THE TYPE A CORONARY-PRONE BEHAVIOR PATTERN AND REACTIONS TO UNCONTROLLABLE EVENTS:

AN ANALYSIS OF LEARNED HELPLESSNESS

by

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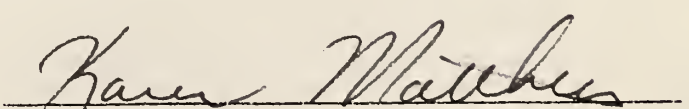

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This is dedicated to all those, who now and will forever, attempt to understand despite their knowledge.

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INTRODUCTION

More than a million deaths each year are attributed to coronary heart disease and the incidence is steadily increasing. A number of medical researchers have pointed to the psychological state of depression as a precursor to this, as well as many other forms of major illnesses. For example, the work of Greene (e.g., Greene, Goldstein, & Moss, 1972), suggests that sudden death due to coronary disease occurs in men who have been depressed for a week up to several months prior to death. Since there are major parallels between behaviors that define helplessness and symptoms of depression (Seligman, 1975), it is not unreasonable to assume that the state of helplessness may be an antecedent of coronary disease (Krantz, Glass, & Snyder, 1974). If helplessness figures generally in the etiology of somatic and psychic disease, it seems obvious that we should ask what set of factors interact with this state or predispose an individual toward cardiovascular impairment rather than some other disorder (e.g., cancer).

The work of Rosenman and Friedman (Rosenman, Friedman, Strauss, Wurm, Kositchek, Hahn, & Werthessen, 1964; Rosenman, Friedman, Strauss, Wurm, Jenkins, & Messinger, 1966) offer a partial answer to this question with their research on the "coronary-prone behavior pattern" called Type A. The Type A pattern is characterized by competitive achievement-striving, a sense of time urgency, hostility, hard-drivingness, and impatience, all of which can be elevated and observed primarily in the presence of appropriate environmental circumstances (Friedman & Rosenman, 1974; Friedman, 1969). Persons mainfesting the behavior pattern, as determined by a standardized interview, are

designated Type A; those who exhibit the pattern to a lesser degree are called Type B. Thus, this overt behavior pattern is a bipolar continuum, rather than a strict typology. Glass (1977) suggests the Type A behavior pattern is a response style that may mediate the relationship between helplessness and coronary disease. Research (Glass, 1977) indicates that extended experience with salient uncontrollable stress may result in enhanced vulnerability to helplessness among Type A's. It may be, therefore, that the specific interaction of Pattern A and helplessness-inducing life events is prodromal to clinical coronary heart disease.

The research to be reviewed below is presented in two parts. First, the Type A behavior pattern is explored in detail, including the methods for its measurement, its relationship to coronary disease, the effects of uncontrollable events on Pattern A, and various interpretations of the experimental findings are discussed. The second part of the literature review deals with the learned helplessness model, both the original and reformulated accounts. The major focus of this study is to analyze from the point of view of the subject, the various ways in which Type A and Type B college students might experience uncontrollable events, specifically, failure on a cognitive task. As shown in the literature review, it is unclear as to what the critical experimental variables and their manner of operation are as they interact with the Type A behavior pattern upon exposure to uncontrollable events. Therefore, this study explores and discusses this interaction.

Measurement of Pattern A

There are two primary methods for the measurement of the coronary-prone behavior pattern: (1) a standardized stress interview developed by Friedman and Rosenman (e.g., see Rosenman et al., 1964); and (2) an objective self-administered questionnaire developed by Jenkins (Jenkins, Rosenman, & Friedman, 1967). In the interview, subjects are asked a series of questions about their characteristic competitiveness, aggression, and hostility. Both the content and overt behavioral style (e.g., speech stylistics) of the subject's responses are important to final assessment of the behavior pattern. Subjects are classified as: fully developed A's (A1); incompletely developed A's (A2); incompletely developed B's (B3); and fully developed B's (B4). In addition, there is an intermediate pattern called Type X, which is found in persons who exhibit some of the characteristics of both the Type A and Type B. Estimates indicate that about 10% of the population fall in the X category (Friedman & Rosenman, 1974). The stress interview requires trained judges, is time consuming and is, like every interview technique, not independent of the subject and interviewer interaction. Jenkins, Rosenman, and Friedman (1968) report that two trained judges rated the behavior pattern interviews the same way in 84% of 75 cases drawn from a larger sample of over 3000 men. The judgment was dichotomous, that is, either A or B. As for test-retest reliability, Jenkins et al. (1968) have shown that of 1064 adult male subjects, 80% were placed in the same A-B category on the basis of interviews conducted 12-20 months apart.

The second assessment technique is the self-administered questionnaire known as the JAS, that is, the Jenkins Activity Survey for Health Prediction (Jenkins et al., 1967). This scale was developed by evaluating the ability of each of a large number of potentially relevant questions to predict the interview assessment. The items were then weighted according to their predictive validity and combined to form the JAS, which has been shown to agree with the dichotomous interview assessment 73% of the time, and with the assessment of extreme A's and B's 90% of the time (Jenkins, Zyzanski, & Rosenman, 1971). The test-retest reliability of the JAS over a one year period was .66 (Jenkins et al., 1971).

Scoring of the JAS items is based on a series of optimal weights derived from discriminant function equations generated from scores of adult subjects used in a prospective study designed to establish the predictive validity of the structured interview (Jenkins, Rosenman, & Zyzanski, 1974). In addition to the overall A-B score, the JAS can be scored for three factor analytically derived scales, which have been named Speed and Impatience (S), Hard-Driving (H), and Job Involvement (J) (Jenkins, Zyzanski, & Rosenman, 1971). The factor scores represent the three qualitatively different sets of overt behavior characteristics which typify the Type A pattern.

Typical questions from the JAS are:

1. "How would your wife (or closest friend) rate you?"; Pattern A responses are "Definitely hard-driving and competitive" and "Probably hard-driving and competitive", and B responses are "Probably relaxed and easy going" and "Definitely relaxed and easy going".

2. "How would your spouse (or best friend) rate your general level of activity?"; an A response is "Too active, needs to slow down", and B responses are "Too slow, should be more active" and "About average, is busy much of the time".

A modified, student version of the JAS was designed for young men and women attending college. This was necessary because administration of the intact JAS to such a population is not entirely appropriate. The test was, after all, designed for working male adults. A discussion of the modification, its scoring, and reliability can be found in Glass (1977, Appendix A). Suffice it to note here that the A-B scale of the student JAS contains 21 items, just as in the original JAS. Note, also, that with one exception, each item is virtually identical to the corresponding item in the adult version.

Construct Validity of Pattern A

Glass (1977) and his associates have conducted a series of experiments documenting that Type A's (as measured by the JAS) indeed behave in a competitive, aggressive, and impatient fashion. One such Pattern A component, excessive achievement striving, has been demonstrated by Burnam, Pennebaker, and Glass (1975). They reported that Type A's worked on a seemingly important 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. The hard-driving character of the Type A individual is also manifest in a tendency to suppress subjective fatigue while exercising, thus persisting at a task despite veridical feelings of exhaustion (Carver, Coleman, & Glass, 1976). Type A individuals also

fail to report a variety of other physical symptoms of illness when performing a stressful task (Weidner & Matthews, 1978).

Aggressiveness and hostility are believed to constitute another major component of the Type A behavior pattern. Suggestive evidence in this regard comes from two sources. In an experiment in which cooperative task performance was deliberately slowed down by the subject's partner (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 more recent study by Carver and Glass (1978) subjects were exposed to a confederate who did or did not threaten their sense of competence and mastery. There were three treatment conditions in this experiment: (1) harrassment while working on a frustrating task, (2) no harrassment while working on a frustrating task, and (3) no harrassment and no task to perform. An opportunity was then given to shock the confederate under the guise of a learning experiment. Type A's were significantly more aggressive when exposed to the harrassment treatment than the control condition, but Type B's were not. More importantly, this study showed that the full harrassment procedure was not necessary to produce heightened aggression among the Type A's. The simple frustration of being confronted with a task whose challenge could not be met yielded nearly as much aggression among Type A individuals as did the full harrassment procedure. In contrast, the frustration manipulation had no such effect among Type B's. The types did not differ in the amount of shock delivered to the confederate in the no harrassment-no task control condition.

A third component of Pattern A, time urgency, has also been elicited 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) 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 et al., 1975).

The Association of Pattern A with Coronary Disease

There are two major manifestations of clinical coronary heart disease: (1) angina pectoris, and (2) myocardial infarction. The latter is the disorder commonly called heart attack. A myocardial infarction involves necrosis (death) of heart tissue caused by insufficient oxygen supply over a relatively long period of time. In many cases, though not all, the infarction is a result of a clot of thrombus forming in a coronary artery. The term angina pectoris designates a disorder involving a type of chest pain which arises when the heart muscle experiences anoxia because of an inadequate blood supply occasioned by occlusion of one or more of the coronary arteries (Friedberg, 1966). Coronary artery disease (CAD), or atherosclerosis, is a symptomless disorder characterized by thickening of the coronary arteries.

Epidemiological research has demonstrated both prospectively and retrospectively that knowledge of the interview assessment of the Type A pattern significantly increases prediction of the major manifestations of coronary heart disease, independent of traditional risk

factors such as cigarette smoking, serum cholesterol, and hypertension (Rosenman, Brand, Jenkins, Friedman, Strauss, & Wurm, 1975; Brand, Rosenman, Stoltz, & Friedman, 1976; Shekelle, Schoenberger, & Stamler, 1976; Jenkins, 1976). In two retrospective studies with men (Friedman & Rosenman, 1959) and women (Rosenman & Friedman, 1961), the Type A pattern was shown to be associated with a higher prevalence of both the risk factors and the symptoms of coronary heart disease than was the Type B pattern. Due to the retrospective and correlational nature of these studies, it was not possible to conclude that Pattern A precipitated the onset of coronary heart disease, but only that it was associated with it.

To overcome some of these limitations, a large scale prospective study conducted by the Western Collaborative Group (WCGS) was begun in 1960 (Rosenman, Friedman, Strauss, Wurm, Kositchek, Hahn, & Werthessen, 1964). On the basis of the interview assessment, 3400 men with no history or symptoms of heart disease were classified as Type A's or Type B's. The responsibility for diagnostic judgments of heart disease was undertaken by two cardiologists, both of whom worked independently of the study and had no knowledge of the behavior pattern classifications. In the 2½ and 4½ year follow-up studies (Rosenman, Friedman, Strauss, Wurm, Jenkins, & Messinger, 1966; Rosenman, Friedman, Strauss, Jenkins, Zyzanski, & Wurm, 1970), it was found that healthy men judged to possess Pattern A at intake had between 1.7 and 6 times the rate of disease of men judged to be Pattern B. Furthermore, the association of Pattern A with CHD was maintained even after partialing out the effects of traditional risk factors on which Type

A's and Type B's differed. Upon the conclusion of the study, the results indicated that men judged at intake to be Type A had more than twice the rate of new CHD during 8½ years as men originally judged to possess Pattern B behavior (Rosenman, Brand, Jenkins, Friedman, Strauss, & Wurm, 1975). These results also showed that Type A subjects with CHD were 5 times more likely to have a second myocardial infarction than were Type B subjects with CHD.

Other studies indicate that Pattern A, as measured by the interview, is not only related to the actual occurrence of clinical CHD, but is also associated with the coronary artery disease process which culminates in myocardial infarction or angina. Data derived from autopsies and coronary angiography have shown that the atherosclerotic process (thickening of the coronary arteries) is more fully developed in Type A's relative to Type B's (Blumenthal, Williams, Kong, Thompson, Jenkins, & Rosenman, in press; Friedman, Rosenman, Strauss, Wurm, & Kositchek, 1968).

Two recent studies (Jenkins, Zyzanski, Rosenman, & Cleveland, 1971; Kenigsberg, Zyzanski, Jenkins, Wardwell, & Licciardello, 1974) have demonstrated that the JAS, the second technique, can also distinguish between coronary and noncoronary populations on a retrospective basis. The JAS has also successfully predicted the occurrence of coronary disease in an initially healthy population over a four year period (Jenkins, Rosenman, & Zyzanski, 1974). Among extreme Type A's, the annual incidence of coronary heart disease was 15 per 1000, while among extreme Type B's the incidence was only 8 per 1000. More recently, Zyzanski, Jenkins, Ryan, Flessas, and Everist (1976)

have shown a striking relationship between Pattern A and the atherosclerotic process. Type A's, as measured by the JAS, showed a greater magnitude of occlusion of the coronary arteries than did Type B's. A more recent study using the A-B scale score of the JAS found that it was the strongest single predictor of recurrent CHD among a set of available variables including serum cholesterol and number of cigarettes smoked daily (Jenkins, Zyzanski, & Rosenman, 1976). Glass and his associates (1977) have also found that Pattern A characteristics in college students, as measured by the JAS, are also associated with factors that place an individual at high risk for CHD (e.g., serum cholesterol, triglyceride levels, serum uric acid, and lipalbumin levels).

Pattern A and Uncontrollable Stress

The descriptive elements of the Type A pattern suggest someone who is continually striving to avoid loss of control over his environment (Glass, 1977). In contrast to B's, Type A's work hard, suppress fatigue, and show little tolerance for being interrupted and slowed down, perhaps in the interest of achieving control over environmental demands and requirements. These demands are stressful, for the possibility of failure and loss of esteem are evident. The Type A pattern is conceptualized as a coping response style aimed at asserting and maintaining control over potentially uncontrollable situations (Glass, Snyder, & Hollis, 1974). Whereas, Type A's appear to be engaged in a continual struggle for mastery over their social and physical environments, Type B's are relatively free of such concerns.

The evidence to be presented below suggests that the behavioral style of Type A's indeed reflect a greater reactivity to signs of

uncontrollability. However, this response style of A's to uncontrollability must be qualified to take into account the prominence or salience of the cues signifying the uncontrollable nature of the stressor. As used in the context of this paper, cue salience refers broadly to those stimulus or stimulus-field properties which compel or attract a subject's attention. Taken at a very basic level, this concept could be defined in terms of the physical intensity of the stimulus, but other properties such as novelty, unpredictability, and the relationship to other elements in the stimulus-field obviously play an important role in compelling attention. For example, a salient cue signaling uncontrollability would be one which attracts the subject's attention, as, for example, loud rather than soft inescapable noise. Properties of the situation including instructional set and environmental cues also lead to differential salience.

Initial Reactions to Uncontrollability

Recent evidence has been offered suggesting that Type A's are more reactive to salient initial indications of uncontrollability than Type B's. This notion was tested in a series of experiments in which perceptions of control were manipulated (Glass, 1977). In one such study, the initial efforts of Type A's to reassert control were measured by the response rate of Type A's and B's earning points on either a VR/5 or FR/5 schedule of reinforcement (Glass, 1977, Chapter 9). Subjects depressed a switch in order to earn points which were defined as worth 1 cent apiece. Half of the cases were randomly assigned to an FR/5 training schedule (that is, a controllable condition), whereas the other half were assigned to a VR/5 schedule (an uncontrollable condition). Within each of these treatments, half of the subjects

experienced the partial reinforcement procedure under High Salience conditions; that is, the response apparatus was illuminated in an otherwise darkened chamber, and a counter and bright signal light were activated whenever the subject earned a point. The remaining half of the cases in both VR/5 and FR/5 worked in a well-lit chamber, where there was no visible counter and the only indication of reinforcement was activation of a dim light whenever a point was earned. This was the Moderate Salience treatment. The number of switch depressions within the total period constituted the major dependent measure. Subjects perceived less control over earning points in the VR/5 schedule than in the FR/5 schedule, thereby confirming the effectiveness of the reinforcement manipulation in inducing differential perceptions of control. The results also indicated that in the High Salience VR/5 condition, A's had a higher response rate than their Type B counterparts. The reverse was true in Moderate Salience. These findings suggest that Type A's make more vigorous efforts to control when they are initially threatened by a salient loss of control. In contrast, if the uncontrollability cues are of moderate salience, Type B's make more vigorous efforts to reassert control than Type A's. This pattern of findings has been replicated by Matthews (Note 1) on male adults and children.

Prolonged Exposure to Uncontrollability

Enhanced performance reflects an attempt to assert and maintain control after its loss has been threatened. However, enhanced responding must prove ineffective in the long run, for extended exposure to uncontrollable stress eventually leads to the perception that a

noncontingency exists between responses and outcomes. The Type A individual may then be expected to give up efforts at control on a subsequent task, and show what has been called learned helplessness (see Glass, 1977). While Type B's will also experience helplessness under these circumstances, nevertheless, it is the A's who should exhibit little efforts to control presumably because of their tendency to experience loss of control as more threatening (Glass, 1977).

Research has been conducted which provides some support for this notion provided that the uncontrollable event is highly salient. Krantz, Glass, and Snyder (1974) found that Type A subjects showed depressed response initiation after exposure to uncontrollable 108 dBA noise (High Salience) relative to their escape behavior following controllable noise of comparable intensity. With a 78 dBA uncontrollable noise (Moderate Salience) A's did not give up responding. Type B subjects, by contrast, showed learned helplessness after uncontrollable noise of moderate intensity.

In a second learned helplessness experiment (Glass, 1977, Chapter 8, Exp. 2), cue salience was varied by manipulating the subject's degree of awareness of his success or failure on a series of cognitive tasks. When cues were of high salience, Type A's showed greater interference with subsequent learning after uncontrollable (insoluble) than controllable (soluble) pretreatment. When cues were of moderate salience, Type A's performed at about the same level in the test phase, whether pretreatment was controllable or uncontrollable. The pattern of response was the opposite for Type B subjects, with learned helplessness tending to occur only after pretreatment with uncontrollable cues of moderate salience. It would appear, therefore, that learned

helplessness occurs in A's after extended exposure to uncontrollability in a subset of uncontrollable events. A similar sequence applies to Type B's if the salience measure is of moderate as compared to high intensity.

The experimental data pertaining to this line of thought suggests a complex pattern of response. It appears that Type A's show greater learned helplessness than B's under high salience (e.g., 108-decibel inescapable noise) but not under moderate salience (e.g., 78-decibel inescapable noise). Various interpretations have been offered to explain this complex pattern of responses.

Achievement Motivation or Pattern A?

One such interpretation argues that random reinforcement and exposure to inescapable noise are more parsimoniously treated as manipulations of failure even though they demonstrably effect feelings of control. It could be argued that the behavior of Pattern A is explicable in terms of the dual constructs of need-for-achievement (n Ach) and fear-of-failure (f fai). In this regard, investigators (Atkinson, 1957; Weiner, 1972) have developed theoretical models which propose that success depresses the performance of individuals high in resultant achievement motivation (i.e., high n Ach and low f fai), while failure increases their achievement strivings. A reverse set of predictions are made for individuals low in resultant achievement motivation. However, two recent studies (see Glass, 1977) reveal low correlations (.15 and .17, respectively) between the student JAS and a measure of need-for-achievement (Edwards, 1957). Both correlations are significant ($p < .05$) but the samples were large (Ms = 275 and 294, respectively)

and the magnitude of these coefficients are quite small. A measure of fear-of-failure (Mandler & Sarason, 1952) correlated negligibly with JAS scores (-.02). These results suggest that Pattern A is not simply an alternative label for high need-for-achievement and low fear-of-failure.

Recently, Matthews and Saal (in press) found that in a sample of male college students, Pattern A as measured by either the interview or the JAS was not related to achievement, power, or affiliation motives, in spite of their descriptive resemblance to the Type A pattern. However, when both need to achieve and need to avoid failure were considered simultaneously, as suggested by achievement motivation theory (Atkinson & Feather, 1966), an interesting pattern of findings emerges. Those with the highest JAS Type A scores were individuals high on need to achieve and low on need to avoid failure. Men with this particular combination of characteristics choose moderately challenging tasks, persist longer on them, and are upwardly mobile (Atkinson & Feather, 1966), all behaviors consistent with the chronic achievement-striving characteristic of Type A's. However, those with the highest interview scores were not those high on need to achieve and low on need to avoid failure. So we conclude that the Type A's efforts to control cannot be explained by the achievement motivation construct.

Cognitive-motivational interpretation

Since Type A individuals are presumably more concerned than their Type B counterparts about maintaining environmental control, it may be expected that A's would distort cues signifying lack of control

(Glass, 1977). Indeed, when uncontrollability cues do not compel attention, for example, in the case of soft inescapable noise, Type A's should find it relatively easy to minimize the fact that they are unable to control the stimulation. Under these conditions, A's may exert less efforts at achieving control than B's, hence fail to show subsequent helplessness. This may occur because the motive to exert control is not sufficient enough to bring about the enhanced efforts to locate control-relevant cues. On the other hand, if lack of control is a salient feature of their environment, for example, in the case of loud inescapable noise, A's should experience difficulty in ignoring its presence and thus exert enhanced efforts at locating control-relevant cues. These efforts will eventually result in a stronger certainty that nothing can be done about terminating the noise. Such awareness of uncontrollability should lead to a decrement in efforts at control, that is, learned helplessness.

There are some difficulties with this interpretation however. One difficulty is the absence of evidence indicating that Type A's experience uncontrollable stimuli of moderate salience as less uncontrollable than B's. While one learned helplessness experiment (Krantz et al., 1974) produced self-ratings of control tending to support this notion of denial, a second study (Glass, 1977, Chapter 8, Exp. 2) was unequivocal in its failure to replicate this pattern. However, it may be that lack of control can be freely admitted on a questionnaire, yet explained away by the subject in terms of attributions designed to enhance his sense of mastery.

It was previously noted in the partial-reinforcement study (Glass, 1977, Chapter 9) that initial level of responding was greater among Moderate Salience B's than Moderate Salience A's. Though Glass is at a loss to explain these results, he draws upon data from another study (Glass, 1977, pp. 48-49) showing that B's have a lower threshold than A's for responding to aversive events. This experiment provides some documentation for this assertion, since it indicated that B's responded sooner than A's to an unwanted sound stimulation. Assuming, then, that Type B's have a lower general response threshold, this might explain their specific reaction to uncontrollability cues of moderate salience in terms of the fact that such cases exceed their threshold for response. It follows from this hypothesis that B's should show greater learned helplessness after extended experience with non-prominent (moderately salient) stimulation, presumably because they have more fully explored the possibility of a response-reinforcement contingency and concluded that they do not, in fact, have control over the situation. The trouble with this line of reasoning is that it leaves us without a satisfactory explanation for the low initial responsivity of B's when the uncontrollable stimuli are of high salience. Since the threshold for B's was presumably reached in moderate salience, the decrement in responsivity in high salience is puzzling.

Concerning the results of Glass's (1977) research, the observed enhanced responsivity of A's may be a style of response rather than the result of perceptual effects, or a combination of both. By and large, Glass and his colleagues have been unable to detect differences between A's and B's in the way they assess experimental situations.

The only significant exceptions are the control-rating data reported in one study (Glass, 1977), plus occasional differences beween A's and B's in felt frustration. It is, of course, entirely possible that they have failed to sample a number of the more relevant perceptual dimensions. For example, it was noted (Glass, 1977, Chapter 7) that Moderate Salience A's might be denying lack of control through some unmeasured attributional process, and there may still be other differences in how experimental procedures were perceived by their subjects.

Attentional interpretation

Recently, Matthews and Brunson (in press) demonstrated that Type A's have a differential responding style, which is inferred to be indicative of an attentional difference between Type A's and B's. In a dual-task situation, Type A's focused, or concentrated, their attention on the primary task (a modified-version of the Stroop Color Word test) and gave minimal attention to a secondary task (key-pressing to a light). Type B's, on the other hand, appeared to split their attention between the primary and secondary tasks. In a second experiment of this study, they found that Type A's and B's in a Control (No Noise) condition performed in a similar manner on the Stroop. Their results suggest that Type A's concentrate their attention on salient environmental events, thus appearing hyperalert but unable to report extraneous (peripheral) cues. These results may provide an interpretation of Type A's reactions to the salience of uncontrollable events. That is, Type A's, may attend to the most salient aspects of their environment and do not respond to any event controllable or uncontrollable

unless it is very compelling of attention. This attentional interpretation of the salience findings can explain Type A's behavior. It does not explain why Type B's do not give up following highly salient uncontrollable events, given that they do give up following moderately salient ones.

Arousal interpretation

Making the assumption that A's may be more aroused than B's could account for various results of Type A pattern research. A simple arousal concept could probably account for a good deal of the data showing that A's work near maximum capacity, deny subjective feelings of fatigue and exhibit exaggerated striving towards success (Carver, Coleman, & Glass, 1976; Glass, 1977; Weidner & Matthews, 1978; Snyder & Glass, Note 3). Some of the time urgency experiments are explicable on the assumption that more aroused Type A's deviate from the optimal level of activation necessary for efficient task performance. Given a complex reaction time task, for example, aroused subjects may be expected to do more poorly than less aroused subjects (cf. Easterbrook, 1959; Kahneman, 1973). Elevated levels of arousal can also explain the aggression data (Glass, 1977; Carver & Glass, 1978), providing that we think of activation as potentiating the impact of aggressive cues (cf. Berkowitz, 1967).

The general notion of activation-arousal has greater difficulty in accounting for the differential reactivity of A's relative to B's after brief and extended exposure to salient uncontrollable stressors. The test-phase tasks used in Glass's (1977) research (for example, choice reaction time or anagrams) were relatively complex, and therefore

it might be expected that more aroused, Inescapable A's would do more poorly compared to their less aroused Type B counterparts. Such an effect did, in fact, occur after extended uncontrollable pretreatment, where the level of stressful stimulation was high (Glass, 1977, Chapter 7). In contrast, such an effect did not occur when extended pretreatment stimulation was of moderate intensity, or when pretreatment was brief and stimulation was of high intensity.

In addition, Glass (1977) has stated that in several of his experiments that there was no detection of differences in arousal reactions of Type A's and B's, thus this data did not indicate the viability of an arousal approach to the helplessness effects. Glass has suggested that the possibility exists that electro-physiological measurements (e.g., heart-rate, finger vasoconstriction, and GSR) are insensitive to A-B differences in autonomic reactions to uncontrollable stress. It is also possible that the conditions under which their physiological readings were taken were not appropriate for detecting A-B differences. Moreover, activation or arousal is not a unitary concept; and states of behavioral, autonomic, electro-cortical, and biochemical arousal are often dissociated from one another (Lacey, 1967).

As Glass (1977) points out, there is an obvious problem for an arousal interpretation of his results; that is, there is an inability to determine how uncontrollable stimulation, whether high or moderate, might affect the level of arousal of Type A and Type B subjects. It would thus appear that activation-arousal does not provide a coherent and parsimonious explanation for the range of effects observed in his

research. However, there is a possibility that a more sophisticated analysis of the arousal concept, one which permits specification of the subject's location on the arousal continuum, may yet prove to be an accurate interpretation of Pattern A behavior. Such a conclusion must await theoretical and empirical work.

Expectational interpretation

A further possibility is that Type A's have higher expectations of control than Type B's. Elevated expectancies could produce an increase in motivation to exercise control. There is, in fact, evidence that when lack of control (for example, failure) occurs in a context of expectations of control (success), performance suffers more than when the expectations of control are lower (e.g., Douglas & Anisman, 1975). Compared to B's, then, the high control expectancies of A's might lead them to exert greater efforts when confronted by a stressor which threatens their sense of mastery. It is not immediately obvious, however, why expectancies would have this effect only with cues of uncontrollability that are high in salience.

There are, moreover, some difficulties with at least one of the basic assumptions underlying an expectational hypothesis. It has been assumed that (1) the incentive to assert control is related to expectations that one's controlling behavior will be successful and, (2) Type A's have higher expectations of control than Type B's. The first assumption may very well be correct. There is research to suggest that a relationship exists between expectations and efforts at control (Wortman & Brehm, 1975; Thornton & Jacobs, 1972). Still other studies suggest that the manipulation of control expectancies can

both potentiate and alleviate performance degradations due to prolonged exposure to uncontrollable stressors (e.g., Dweck, 1975; Krantz et al., 1974; Exp. III; Thornton & Powell, 1971). Moreover, at least one theoretical formulation emphasizes the role of expectations in determining reactions to uncontrollable events (Wortman & Brehm, 1975). This theory proposes that the greater one's expectations of control, the greater will be the motivation to assert control when confronted by evidence of uncontrollability. Similar to Glass's (1977) formulation, the theory suggests that as uncontrollable stimulation continues, and the futility of responding is realized, expectations of control along with the motivation to control are lowered and learned helplessness ensues.

As for the second assumption, there is some evidence (Glass, Snyder, & Hollis, 1974) for the hypothesis that A's have higher expectations of control than B's, comes from a weak, though significant correlation between Type A scores on the JAS and "internal" scores on Rotter's I-E scale ($r = .17$, $df = 271$, $p < .01$). In addition, Type A's report themselves to be more confident, dominant, and socially competent than do Type B's as measured by three scales of the Texas Social Behavior Inventory (see Glass, 1977, Appendix C). The correlations with the JAS were .24, .40, and .17 ($ps < .01$), respectively. These findings reflect that A's expect to be successful in their social and physical environments and that they claim to act upon these beliefs. These coefficients are statistically significant primarily because of the large number of cases on which they are based, but the magnitude of the relationship is obviously too small to warrant serious consideration.

Only one study has been cited that dealt with the expectational hypothesis with Type A's and B's (Hollis, 1975, Note 4). Expectations of success or failure on a series of cognitive tasks (adapted from Roth & Kubal, 1975) were either raised, lowered, or left untreated by means of instructional manipulations. Type A, relative to Type B, subjects exerted less effort over time to solve a series of insoluble puzzles. Since a similar pattern of results occurred for the High as opposed to the Low Expectation condition, tentative support was obtained for the notion that expectations of control mediate greater susceptibility to the effects of uncontrollability. While subjects in the High Expectation treatment had reliably greater expectancies of success than did those in the Low Expectation treatment, the results also showed that A's in the No Expectation treatment reported lower expectations than their Type B counterparts. There was an A-B main effect, such that B's in all three conditions anticipated more success than A's. These results clearly do not support the notion that A's have higher expectancies of control than B's. Other data from Hollis (1975, Note 4) study failed to give credence to the notion that generalized expectations of control mediate initial hyper-responsiveness of A's in high salience.

An obvious question emerges from the research thus far reported: Why do A's and B's show differential responsivity to uncontrollability cues of high and moderate salience? Several interpretations of the experimental results have been offered; and, yet, none of them can clearly explain this complex pattern of behavior. All of the interpretations suggested in the previous section extend our knowledge of

the Type A behavior pattern, but leave us without a perspicuous understanding of Type As' responses to uncontrollable events. Until we understand these findings, we cannot assert that A's are more threatened by loss of control than B's, but rather that under certain circumstances A's are threatened and under other circumstances B's are threatened.

Review of the Learned Helplessness Literature

Recent research has demonstrated that organisms which experience inescapable noxious stimulation showed impaired performance on subsequent instrumental tasks. This phenomenon, described by Seligman (1975) as "learned helplessness", has been observed with infrahumans (e.g., Overmier & Seligman, 1967; Seligman & Maier, 1967) as well as sometimes with humans (e.g., Hiroto & Seligman, 1975; Krantz, Glass, & Snyder, 1974). Seligman has proposed that learned helplessness occurs because the organism learns that its reinforcements are independent of its responses (i.e., that it lacks control over its outcomes), and this learning undermines the motivation to initiate further instrumental responses.

Although research with animals has generally supported learned helplessness theory (see Maier & Seligman, 1976, for a recent review), results of studies using human subjects have yielded many conflicting findings. In brief, some researchers have clearly demonstrated helplessness in humans (e.g., Roth & Kubal, 1975; Krantz, Glass, & Snyder, 1974; Hiroto, 1974). Other researchers, however, claim to have found with conceptually identical manipulations something quite the opposite of helpless behavior. Subjects exposed to an experience with noncontingent reinforcement seemed to behave less passively and perform better

than control subjects on the experimental tasks designed to test for helplessness effects (e.g., Roth & Bootzin, 1974; Thornton & Jacobs, 1972; Glass, 1977).

From the start, this "facilitation" effect was dealt with as relevant to the helplessness process; as something that might be incorporated into a theoretical model of helplessness. Roth and Bootzin (1974) attempted to account for these faciliation effects by suggesting that the strength of the helplessness training (i.e., the impact of the experience with noncontingent reinforcement) was not sufficient to produce manifestations of helpless behavior in the test situation. The actual increase in controlling behavior of helpless subjects in the test situation, the authors argued, may be a manifestation of a possible curvilinear relationship between experiences of no control and helpless behavior. Such a relationship suggests that an initial reaction to feelings of no control is to behave assertively in an attempt to reestablish and exercise control, whereas repeated experience with no control leads to passive, helpless behavior (cf. Wortman & Brehm, 1975). Roth and Bootzin's (1974) analysis alludes to the general importance of a subject's experience of noncontingency for that subject's subsequent behavior. However, their analysis does not specify those variables which are likely to contribute to variations in the subjective impact of noncontingency.

The problems encountered in human helplessness research not found in the generally successful animal research in the area may be explained by differences in the cognitive capacities of humans and animals. While animals are presumably limited in their cognitive capacities, it is likely that humans, given their comparatively extensive cognitive

abilities, attempt to control events during training and subsequently develop explanations for their failure to do so.

Abramson, Seligman, and Teasdale (1978) have proposed a reformulation of the original learned helplessness model that addresses the majority of the problems and criticisms of the earlier model. According to the reformulated account, the individual first learns that certain outcomes and responses are independent and then makes an attribution about the cause. This attribution determines the person's subsequent expectation for future noncontingency. This expectation, in turn, determines both the kind of deficit and its generality and chronicity.

Seligman (e.g., Abramson et al., 1978) has argued that people's attributions for their inability to control their outcomes can be classified along three orthogonal dimensions. Two of these dimensions (internal-external, stable-unstable) have frequently been used by attribution theorists; the third (global-specific) is new and has been introduced by the authors. Abramson et al. (1978) do not define the internal-external dimension, but it is generally used to differentiate between causes that stem from the person versus those that stem from environmental or situational factors. Stable factors are long-lived and recurrent; unstable factors are short-lived and intermittent. Global factors occur across situations, whereas specific factors are more unique to the situation in which helplessness training was induced. Abramson et al. (1978) predict that attributions to internal factors are more likely to be characterized by self-esteem loss than attributions to external factors. Attributions to stable

factors should produce deficits with greater chronicity than attributions to unstable factors. Deficits attributed to global factors are expected to generalize further than those attributed to specific factors.

The old model was unable to explain why depression was frequently associated with low self-esteem or why depressed individuals often make internal attributions for their failure (Abramson et al., 1978). The authors' distinction between personal and universal helplessness helps overcome each of these problems. The reformulated model specifies that regardless of whether people attribute lack of control to personal or universal failings, their depression will be symptomized by sadness and passivity. However, low self-esteem and high self-blame will be reported only when they attribute their failures to personal factors. Abramson et al. (1978) have speculated that depressions may be more intense if attributions are made to personal or internal factors, but they have provided no evidence in support of this assertion to date.

In general, the properties of the attribution predict in what new situations and across what span of time the expectation of helplessness will be likely to recur (Abramson et al., 1978). An attribution to global factors predicts that the expectation will recur even when the situation changes, whereas an attribution to specific factors predicts that the expectation need not recur when the situation changes. An attribution to stable factors predicts that the expectation will recur even after a lapse of time, whereas the attribution to unstable factors predicts that the expectation need not recur after a lapse of time. Whether or not the expectation recurs across situations and with elapsed time determines whether or not the helplessness deficits

recur in the new situation or with elapsed time. As Seligman (e.g., Abramson et al., 1978) points out, the attribution merely predicts the recurrence of the expectations but the expectation itself determines the occurrence of the helplessness deficits. New evidence may intervene between the initial selection of an attribution and the new and subsequent situation and may change the expectation.

An important empirical question suggested by the above reformulation is whether individuals' assignment of causality for lack of control affects their feelings of helplessness. Under some conditions a person who is unable to influence a particular outcome may conclude that his failure to do so stems from his own personal shortcomings or inadequacies (Abramson et al., 1978). He may feel that there are responses that would be effective in controlling the environment, but that he lacks the ability or motivation to make them. Under other circumstances, a person may conclude that his failure to exert control over a particular outcome stems from characteristics of the task or situation rather than his approach to it. He may feel that there is no response that he or anyone could make that would change the situation. A person may make attributions of causality concerning the uncontrollable outcome itself, or for his inability to foresee, avoid, or cope with it to his satisfaction (Wortman & Brehm, 1975). There are a few studies which look at the effects of attributions, as well as the causes of attributions, in the context of responses to lack of control and to failure.

Dweck and her associates (Dweck, 1975; Dweck & Repucci, 1973; Dweck, Davidson, Nelson, & Enna, 1978) have demonstrated the differential effects of attributions for failure to lack of ability versus

lack of effort. When fourth-grade girls fail, they attribute their failure to lack of ability and perform badly on a subsequent cognitive test. Lack of ability is a global attribution (as well as internal and stable) and implies failure expectation for the new task. Fourth-grade boys, on the other hand, attribute failure to lack of effort and do well on the subsequent test. Lack of effort is unstable and probably more specific (but also internal). Similarly, when students are told to attribute failure on math problems to not trying hard enough, they also do better than if they attribute it to lack of ability (Dweck, 1975). The ability attribution is one that transfers to the new situation because it is global, internal and stable. Effort attributions being more specific and unstable do not transfer to new situations as well.

To date, four studies have manipulated attributions for helplessness. Klein, Fencil-Morse, and Seligman (1976) confronted both depressed and nondepressed subjects with four discrimination problems, each containing 10 trials. Subjects received random reinforcement for their answers on each trial, making the problems impossible to solve. Some of the subjects were led to attribute this failure to inadequate ability (internal); others were induced to make an attribution to task difficulty (external); a third group received no attribution instructions. Subjects were then tested for helplessness effects on an anagram task. Among the nondepressed subjects, there was no relationship between subjects' attributions of causality and their subsequent task performance. The deficits of the depressed subjects under the no-instruction condition were the same as those of the

depressed subjects in the "internal attribution" group. There were no deficits in the "external attribution" group. The results suggest that depressed subjects tend naturally to blame themselves for failure, and that giving them an opportunity to make external attributions resulted in an improvement in their performance. These results support Seligman's reformulation.

Tennen and Eller (1977) attempted to manipulate attributions by giving subjects unsolvable discrimination problems that were labeled either progressively easier or progressively harder. The authors reasoned that failure on easy problems should produce attributions to lack of ability whereas failure on hard problems should produce attributions to task difficulty. Subjects, in a second presumably unrelated experiment, then tried to solve soluble anagrams. In line with the reformulated model (Abramson et al., 1978), attributions to inability (easy problems) produced deficits. Attributions to task difficulty (hard problems) resulted in facilitation of anagram solving. Abramson et al. (1978) propose that lack of performance deficits in the task-difficulty group were because their attributions for helplessness were too specific and also external to produce an expectation of noncontingency in the test task.

Two studies (Hanusa & Schultz, 1977; Wortman, Panciera, Shusterman, & Hibsher, 1976) found that relative to a group exposed to contingent events, neither a group instructed to believe they were personally helpless nor a group instructed to believe they were universally helpless on a training task showed subsequent performance deficits on a test task. In fact, in both of these experiments, subjects who were induced to make attributions to inadequate ability performed

better in helplessness testing than subjects who made attributions to situational factors (the difficulty of the task). These two studies then refute Seligman's reformulation.

As can be seen from the studies cited above, there is no consistent picture as to what may be occurring in these types of experiments. A basic assumption underlying the reformulated model of helplessness (Abramson et al., 1978) is that there is a clear relationship between the attributions of causality that people make for their inability to control their outcomes and their subsequent behavior. However, both Bem (1972) and Nisbett and Wilson (1977) have reviewed a number of studies that leave grave doubts about the validity of this assumption. Most investigators who have conducted attribution experiments have assumed that the subject's attributions would reflect overt behavior and have not bothered to attain behavioral measures. In many of these experiments, subjects have been asked to indicate their attributions to a variety of causal factors by checking the appropriate point on a series of rating scales. As Wortman and Dintzer (1978) point out: Are these causal questions entertained by subjects who are not cued by these scales?

Partly as a result of the puzzling discrepancy between subject's attributions and their overt behavior, researchers have begun to study how attributions are made and how people collect and process information that is relevant to their initial attribution (Abelson, 1976; Davison & Valins, 1971; Fischoff, 1976; Kahneman & Tversky, 1973; Markus, 1977; Nisbett & Borgida, 1975; Snyder, Schultz, & Jones, 1974). A review of these studies is beyond the scope of this thesis.

Taken as a whole, however, they suggest that the link between attribution and behavior may not be as straightforward as Abramson et al. (1978) have implied.

One way to answer this question is to expose subjects to uncontrollable outcomes and allow them to freely respond. One study has used this procedure (Hanusa & Schultz, 1977). In this experiment, subjects were given noncontingent reinforcement, contingent reinforcement, or no pretreatment on a computer-administered concept-formation task. They were then tested for helplessness effects on a maze task. Immediately following the experiment, they were asked to make open-ended attributions for their success or failure on both of these tasks. Generally, subjects did not spontaneously report attributions for their success or failure. Typically, subjects responded by repeating the outcome. Even with further probing, subjects did not give specific attributions, making any analysis of these data meaningless.

Wortman and Dintzer (1978) offer some further thought on this matter. If attributions in fact determine the chronicity and generality of helplessness and depression, we would expect people confronted with uncontrollable outcomes to pose these questions to themselves. Of course, subjects in the study reported above (Hanusa & Schultz, 1977) may have been concerned about attributions of causality for their performance but unable to articulate them to the experimenter. A second possibility is that they may have made attributions while they were performing the task but forgot these attributions by the time they were questioned by the experimenter. Alternatively, it may take a certain amount of time to make an attribution, and subjects

were questioned before they had formulated an attribution. Yet another possibility is that the outcome must reach a certain level of intensity or importance before people ask why it has happened (cf. Bulman & Wortman, 1977).

Abramson et al. (1978) have proposed that subjects are confronted with an uncontrollable outcome, make an attribution about its cause, formulate an expectation of future noncontingency, and then show symptoms of helplessness. However, there may be several intervening links between each of these steps. Wortman and Dintzer (1978) suggest that when confronted with an uncontrollable outcome, individuals develop one or more hypotheses about its cause and about the likelihood of future uncontrollability. They may then attempt to test these hypotheses by seeking out information about their own behavior in other settings and/or information about the behavior of others. This notion of hypothesis-testing may be critical in terms of understanding the process of helplessness, and deserves more attention than it has received. It seems important to ask that when individuals are confronted with an uncontrollable outcome, what kinds of information do they seek out? How do the initial hypotheses that they have developed affect the way that subsequent information is processed? It also appears important to ask if individual difference variables affect the types of hypotheses formed and whether failure affects these differential hypothesis-testing strategies?

As Roth (Note 5) points out in a recent review of the learned helplessness area, it is necessary to be able to discriminate among the various ways in which human subjects might experience objective

noncontingency in learned helplessness experiments. This will allow not only for better prediction of the behavioral consequences and their generalizability, but will lead to a better understanding of the nature of the behavioral effects that do occur. The learned helplessness construct has been applied to a wide range of real-life phenomena such as depression, the aging process, heart disease, and environmental stress; and, it has been suggested that it can in fact explain certain deficits or instances of maladaptive behavior associated with them. Roth (Note 5) argues that the only circumstances that would justify extrapolating from the behavior of human laboratory subjects to the behavior of persons demonstrating severe psychological deficits is the one in which it could reasonably be argued that there were similar phenomenal experiences surrounding the behavior in both cases. Thus, it is important to discriminate among the various ways in which laboratory subjects might experience noncontingency and it is critical to establish an understanding of the phenomenal experiences related to more severe instances of helplessness in the real world (Roth, Note 5).

General Summary and Statement of Aim

On a general level, it has become clear that an examination of human helplessness requires a consideration of not only objective noncontingency, but also requires a consideration of the manner in which objective noncontingency is experienced by human subjects. A review of the literature does not yield a clear understanding of how the Type A-B dimension interacts with salient uncontrollable events. Until we understand these findings, we cannot assert that

A's are more threatened by loss of control than B's. All that is clearly known is that under certain circumstances, Type A's have an elevated threshold of responsivity for uncontrollable cues; and that under other circumstances, Type B's show this elevated threshold of responsivity for uncontrollable cues. The salience variable has been shown to affect the way in which A's and B's respond to uncontrollable stressful stimulation. Glass (1977) has suggested that experience with uncontrollable stressors of high salience may lead to greater vulnerability to helplessness for Type A's. Helplessness has been indicated by measuring depressed responding. Until we understand the meaning of this depressed responding, we are unable to adequately interpret the experimental findings. The role of attributions have been examined in the context of the learned helplessness paradigm, and there exists the possibility that an attributional process interacts with the response styles of Type A and B subjects. Hypothesis-testing strategy has been suggested as an intervening link within the learned helplessness process, and evidence has been offered by Diener and Dweck (1978) that indicates differential use and effectiveness of hypothesis-testing in children. Discriminating among the various ways in which Type A and B subjects might experience noncontingency would be very important not only in terms of offering an explanation for the experimental findings reported by Glass (1977), but would allow for better prediction of the behavioral consequences and their generalizability, and hopefully would lead to a better understanding of the nature of the behavioral effects that do occur.

This study was designed to explore differences between Type A and B subjects in their task performance during failure. This study was further designed to inquire into the nature of the experiences Type A and B subjects perceive before and during exposure to noncontingency resulting in failure.

In order to examine performance change under failure and the accompanying cognitive components, subjects were trained on a discrimination learning task that allowed monitoring of their hypothesis-testing strategies and classification of the sophistication of the strategies before and during failure. Subjects were requested to verbalize "what they are thinking about" while performing the task. In contrast to the usual procedure of soliciting statements of particular cognitions at prespecified times and of presupposed structure, this continuous verbalization procedure permitted subjects to report what cognitions were salient to them as they become salient. This procedure was modeled after a recent analysis of learned helplessness by Diener and Dweck (1978). Their study explored individual differences in the nature, timing, and relative frequency of a variety of achievement-related cognitions by continuously monitoring verbalizations before and during failure. Their results revealed striking differences both in the pattern of performance and in the nature of the verbalizations made by "helpless" and "mastery-oriented" children (as measured by an internal-external attribution scale) during failure. These differences were accompanied by marked differences in hypothesis-testing strategy change under failure.

This methodology has its roots in the phenomenological model. Essentially, the qualitative phenomenological method involves emphasis on a particular phenomenon as it reveals itself to the experiencing individual (Giorgi, 1971, 1976). According to this view, one must approach all phenomena with a minimum of presuppositions in order to allow the meaning to reveal itself (Giorgi, 1976, Note 6). For human psychological phenomena, this usually means that one must "...capture phenomena precisely as they are lived by human persons" (Giorgi, 1976, Note 6, p. 1). Thus this particular methodology made it possible to analyze differences in the nature, relative frequency, and timing of cognitions reported by Type A and B subjects as they experience them. This study, then, addresses the cognitive-motivational differences between Type A and B subjects by examining whether their verbalizations differ in a systematic fashion.

For example, do both types make attributions following the same amount of failure feedback, or do Type A and B subjects perceive failure and make different attributions depending on the salience of the situation? Are Moderate Salience A's denying lack of control through some previously unmeasured attributional process? Do B's indicate a lower level of expectancy than A's in either salience condition? Do Type B's maintain a less "personal" view of failure feedback in high salience conditions because they are less threatened by loss of self-esteem, and use the feedback more constructively, and provide themselves with cues for improving performance? Do Type A's dwell on the negative affect associated with failure in high salience and perhaps withdraw from the situation by making task-irrelevant verbalizations?

In addition, this study was designed to permit an examination of the precise nature of the performance decrement during failure by analyzing the changes and effectiveness of hypothesis-testing strategies and addresses the following types of questions: Do both types utilize the same strategies prior to failure and differ only after exposure to failure? Does the salience of the situation influence the effectiveness of the strategies used by both types? Does the Type A subject try alternative, sophisticated strategies but abandon them sooner than the Type B subject? Does the deterioration in performance during a series of failures generally occur in a gradual fashion or does it tend to occur immediately? Does this occur for both types and for different levels of salience?

In summary, the present research was aimed at (a) determining the nature, timing, and relative frequency of a variety of cognitive variables by continuously monitoring verbalizations during failure and (b) specifying the course of hypothesis-testing strategies during failure.

CHAPTER TWO

METHOD

Overview

Subjects were told that the purpose of the experiment was to evaluate differential linguistic style and the cognitions that accompany problem solving with college-age populations. All subjects received identical instructions except as outlined below.

Subjects, classified as either Type A or Type B, worked on a discrimination learning task, and the level of their hypothesis-testing strategy was monitored. After four success (soluble) problems, a failure procedure (insoluble problems) was instituted, and changes in hypothesis-testing strategy were assessed. In addition, all subjects were asked to verbalize what they are thinking about while performing the task.

Half of the subjects in each A-B category were randomly assigned to one of two conditions: (1) Moderate Salience; and (2) High Salience. Within the Moderate Salience treatment, the subjects listened to the experimenter evaluate their performance on the series of dimension tasks. The remaining subjects (High Salience) not only listened to these evaluations but, in addition, kept a written record of the evaluations.

Subjects

Subjects were 45 male undergraduates enrolled in introductory psychology courses at Kansas State University who obtained course credit for their participation. Female subjects were not used because the previous Type A and learned helplessness research cited utilized only male subjects. Prior to the experiment, a college student version of the Jenkins Activity Survey (JAS) was administered during a pretesting session. Discussion of this

version of the JAS, as well as validity and reliability data for the original JAS, has been presented in the introduction. Four subjects (two Type A's and two Type B's) were dropped from the analyses since they did not meet the criterion of solving 3 out of 4 soluble problems successfully. One additional subject (Type A) was dropped from the analyses because he indicated verbally during the session and also on the post-experimental questionnaire that he definitely did not believe the failure manipulation. The final subject population included in the analyses totaled 40, 20 Type A's and 20 Type B's, half of each type were assigned to each of the salience conditions (scores on the JAS ranged from 1-6 for the Type B's and 9-12 for the Type A's).

Task and Materials

The task consisted of a series of four dimension, two choice discrimination problems (cf. Levine, 1966) in which the subject searched for the one solution that was correct. Each subject was presented with four soluble problems and four insoluble problems. The first two soluble problems served as training problems for the subjects, although performance measures were taken on all eight problems. A problem consisted of a set of 3" x 5" wire-index stimulus cards contained in a ringed booklet, with each card containing two stimulus patterns. Each stimulus pattern consisted of one combination of values for four stimulus dimensions, each of which can take on two values. The four stimulus dimensions and their associated values were as follows: (1) letter (A or T); (2) letter size (large or small); (3) border shape surrounding the letter (circle or square); (4) border texture surrounding the letter (dashed or solid). For any given card, the second stimulus pattern on the card contained the opposite values from the first stimulus pattern (see Appendix C).

The stimuli were varied in a systematic fashion so that the subject's hypothesis about the correct solution could be inferred unambiguously from his choices. In order to monitor hypothesis-testing, a "blank trial" procedure was used in which the subjects did not receive feedback about the correctness of their responses on the first three of every four trial blocks (Levine, 1966). A hypothesis is defined as the consistent selection of a particular stimulus property, such as the letter T, over four trials prior to feedback. The instructions explicitly pointed out that no responses by the experimenter meant neither correct or incorrect. It has been demonstrated that when subjects receive no feedback, they maintain the same response for the next trial (Frankel, Levine, & Karpf, 1970; Gumer & Levine, 1971; Levine, 1966, 1969; Levine, Miller, & Steinmeyer, 1967).

Previous research (Fellows, 1968; White, 1965) has shown that subjects (i.e., children) frequently display response sets such as position alternation and position perseveration. To eliminate the possibility that one of these response sets could be mistaken for a solution-relevant hypothesis, the stimuli were ordered within a single block of four trials such that all useful hypotheses could be separated from position responses. The instructions also explicitly stated that the only possible solution is one of the letter types, letter size, border shapes, or border textures.

Procedure

In general, the procedure employed was similar, with specified exceptions, to that employed by Diener and Dweck (1978) in their analysis of the experience of failure by children. Upon arrival, each participant

was met by a male experimenter and taken to a small experimental room equipped with a table, chair, one-way mirror, and intercom system. All subjects participated individually. Participants were advised that the general nature of the experiment concerned concept learning and that the experimenter was interested in subject's linguistic style and the cognitions that accompany problem-solving. The instructions emphasized the importance of subjects verbalizing "what they are thinking about" while working on the task. They were promised a complete debriefing after participation and were asked to sign a statement of informed consent if they chose to participate. Additionally, they were assured of freedom to withdraw from participation at any point during the procedure.

Training Problems

Since one goal of this study was to examine the effects of failure feedback on problem-solving strategies and self-perceptions, rather than to test sophistication of hypothesis use per se, each subject was given training prior to the test problems. The use of the training set of problems accomplished two functions: (1) It provided a practice session to insure that all subjects were capable of solving the problems. (2) The training problems allowed the subjects ample time to become accustomed to the verbalization procedure.

Hypothesis use during training was monitored by tape recording subject's responses and measures of ease of training were taken across both training problems. Ease of training was measured by keeping track of the amount of hints needed by the subject to find the correct solution to the problem. At the beginning of each new series of cards,

all stimulus dimensions (letter type, letter size, border shape, border texture) were reiterated, all stimulus values were named by the experimenter, and the subject was told that there was only one correct answer for the entire series of cards for that problem.

The following instructions introduced the task:

> The task you will be working on is concerned with concept formation and problem solving ability. Later you will be looking at cards like the sample in front of you on Card #1. Note that each card has two stimulus patterns (one on the left and one on the right) which vary along four dimensions. There are specific values associated with each dimension. Each of the four dimensions has two values. In the sample, the dimensions and their values are: (1) letter type with values of A or T; (2) letter size with values of large or small; (3) border shape with values of circle or square; (4) border texture with values of solid or dashed. Each pattern has one value from each of the four dimensions. I have arbitrarily chosen one of the eight values as correct. The idea is for you to figure out what this correct value is. Look at each card and choose which side, left or right, contains the correct value. I will then tell you whether your choice of sides was correct or incorrect. In this way, you can eliminate the incorrect values and determine the correct value in a few trials. The object is to figure out what the correct value is so that you can choose the correct side as often as possible. At the end of a series of trials, I'll ask you to tell me the correct value. As you remember,

there are 16 cards per problem. You will begin with Card #1, and choose a side - left or right - and then I will tell you whether you are correct or incorrect, depending on whether or not the value I have chosen is on the side you select. Remember, the correct answer will never be a combination of values. The correct answer will be only one of the eight values - either circle or square - large or small - A or T - solid or dashed.

On the first training problem, veridical feedback ("correct" or "incorrect") was given after every response. Upon completion of a deck of 16 cards (trials), the subject was asked to verbalize the correct solution. If the subject was correct, he was told, "Very good", and then given the second training problem. If the subject was wrong, the same problem was repeated with a hint provided by the experimenter: "The correct answer is one of the two shapes, either the square or the circle. See if you can figure out the right answer. The same answer is right for this whole deck of cards. Try to be right every time". For those subjects, if any, who were still unable to reach the correct solution, the deck was again repeated along with the hint.

On the second training problem, the subject was introduced to the no-feedback procedure, that is, trials on which no information about correctness was given following the subject's response. The subject was told: "I have been saying 'correct' or 'incorrect' each time you selected either the right side or the left side. From now on I will not always tell you if you are correct or incorrect. After some cards I will say nothing. Don't let this bother you. Keep trying to be correct all of the time. Remember, you are still trying to figure out

which of the dimensions is the correct answer for this whole deck of cards". During the second training problem, feedback was given after every second response. If the subject was unable to arrive at the correct answer after going through the deck once, a hint was provided, and the same problem was repeated. (A criterion of successfully solving 3 out of 4 soluble problems without hints was implemented before the subject's data was included in the data analysis.)

Test Problems

The test problems consisted of two soluble and four insoluble problems. The two soluble problems were similar in every way to the training problems except for feedback was now given only after every fourth response. As mentioned earlier, a criterion of successfully solving 3 out of the 4 Soluble problems was implemented before the subject's data was included in the data analyses.

The four Insoluble test problems were similar to the Soluble test problems in that the subject received feedback after every fourth response. The Insoluble test problems differed from the Soluble test problems in the following way. The feedback always consisted of "incorrect", thus permitting the monitoring of strategy change following continued failure feedback. In addition, the Insoluble test problems had an added dimension of color with values of red or blue. This was introduced to the subject as an added fifth dimension. It was also pointed out that the subject would have four additional trials to find the correct solution. This increased the number of trails (cards) to 20 for each of the four Insoluble test problems.

Verbalizations

Due to the nature of the problem being investigated, that is, the nature of the experiences Type A and Type B subjects perceived before, during, and after exposure to noncontingency resulting in failure, the traditional experimental and/or correlational designs did not provide the most appropriate methodological framework for a clear understanding of the problem. Therefore, in addition to monitoring the changes in hypothesis-testing strategies, it was suggested to also monitor the verbalizations of subjects as they were performing the task in the experimental situation. In contrast to the usual procedure of soliciting statements of particular cognitions at prespecified times, the continuous verbalization procedure permitted the subject to report what cognitions were prominent to them as they became prominent. Thus, it was possible to analyze differences in the nature, relative frequency, and timing of cognitions reported by Type A and Type B subjects.

Verbalizations were continuously monitored and recorded on both training problems and on the six test problems. Prior to beginning the training problems, and after the subjects had been given the instructions for the concept formation problems, the subjects were asked to begin "thinking out loud". They were told that we were interested in linguistic style and what kinds of things college-age people think about while working on tasks of this nature. In order to dispel inhibitions about making task-irrelevant statements, it was stressed that subjects think about many different kinds of things, such as lunch, what they are doing after classes, solving the problems,

and that the subject should feel free to say out loud anything he was thinking about. The subject was reminded at the beginning of each problem "to think out loud". Verbalizations were monitored on training, soluble and insoluble problems so that changes before, during and following failure could be assessed.

In order to ensure that all subjects left the experiment feeling comfortable with their performance, they were completely debriefed regarding the failure manipulations. The subjects were asked not to discuss the experiment with their fellow students.

Salience Manipulation

Half of the Type A and Type B subjects received evaluative feedback from the experimenter as described above (Moderate Salience condition). The remaining subjects were assigned to a condition in which efforts were made to enhance their awareness of contingency and noncontingency (High Salience condition). These subjects were required to keep a written record of "correct" and "incorrect" answers. They were provided with a tally sheet (see Appendix E) consisting of line columns, headed "correct" and "incorrect", for each of the dimension problems. The sheet also contained the words, "right" and "wrong" next to each of the pairs of columns. Checkmarks were placed in one or the other column for each of the feedback trials of a given problem. These tallies corresponded to whether the subject's choices were correct or incorrect according to the feedback given by the experimenter. For example, the first training problem had 16 pieces of feedback information, the second training problem had 8 pieces of feedback, the two Soluble test problems had 4 pieces of feedback, and the four Insoluble test problems had 5 pieces of feedback information. 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 found the correct solution. This procedure made it relatively simple for subjects to see how they were doing on the problems throughout the session, thereby enhancing their perceptions of contingency or noncontingency. The above procedure was similar to that used by Glass (1977, Chapter 8).

In addition, subjects in the High Salience condition were verbally instructed to pay special attention to the feedback given by the experimenter, in order to facilitate their learning the correct solution. Those subjects in the Moderate Salience condition were not given this additional instruction. This procedure was utilized to further enhance the subject's awareness of contingency or noncontingency.

Training measures. To ensure that deterioration following failure was not simply a function of lack of proficiency at the task, training measures during the first two problems were taken. In addition to monitoring feedback utilization and sophistication and extent of hypothesis use during training, the number of hints required during training was recorded. The hints were given when the subject was unable to solve the training problems within the specified number of trials. Four training measures were derived for each subject from these hints: (1) the total number of hints needed for the four soluble problems; (2) the number of times more than one set of hints was needed to solve a given problem; (3) the number of hints needed on the two soluble test problems (3 & 4) on which feedback was given every fourth trial; and, (4) the total number of errors across all four soluble problems.

Scoring procedures

Classification of hypotheses: Strategies versus Stereotypes. Useful strategies are sequences of hypotheses that, when followed perfectly, will eventually lead to a problem solution. Stereotypes (ineffectual strategies) are sequences of hypotheses that can never lead to a problem solution because they involve the repeated use of a disconfirmed hypothesis or the failure to use an allowable hypothesis. In order to assess the subject's use of strategies and stereotypes, the scoring system used by Diener and Dweck (1978) and adapted from Gholson, Levine, and Phillips (1972) was used. Since the proposed study was designed to examine performance decrements following consistent failure, subjects were given 5 blocks of trials per problem, and the scoring criterion used to identify a given stretegy or stereotype was its use on 3 of the 5 trial blocks.

Useful strategies. The useful strategies were further classified into three types: dimension checking, hypothesis checking, and focusing (see Gholson et al., 1972, for a more detailed explanation). In dimension checking, the subject proceeds through all five dimensions (letter type, letter size, border shape, border texture, and color) in a systematic fashion one dimension at a time. When the subject tests one value of a dimension, he chooses the one that was consistent with the feedback on the previous trial. When a hypothesis held is disconfirmed at or after the second feedback trial, the subject recognizes that it is logically impossible for the other hypothesis on the dimension to be correct. To put it another way, if some hypothesis is held by the subject he can recognize that because this particular hypothesis was consistent with the feedback at the

time of its selection, its complement must of necessity have been inconsistent with the feedback at that time, and hence cannot be the solution. According to this strategy, then, the subject goes through the dimensions one at a time, manifesting only one hypothesis per dimension. For example, suppose the subject tests the shape dimension on the previous trial by choosing a circle with the letter A and was told "incorrect". If the subject is now testing the letter dimension, he will choose T, for on the previous trial he was able to eliminate the letter A.

In hypothesis checking, the subject eliminates only one possible solution per feedback. Ten (eight) hypotheses are ordered by the subject into the pairs of hypotheses from each of the five (four) dimensions, as though the subject imagines a list of the pairs of hypotheses. He goes through this list, testing each hypothesis in turn, one dimension at a time. Thus he tries a hypothesis, then if it is disconfirmed, he tries its complement (the opposite hypothesis on the same dimension). If that is disconfirmed he tries a hypothesis from another dimension, then its complement, etc. The hypotheses are samples in a locally consistent manner, i.e., consistent with the information in the last disconfirming trial. For example, suppose the subject tests the shape dimension by choosing a circle with the letter A and receives "incorrect" feedback; if the subject then decided to test the letter dimension, he would still try both A and T on subsequent trials.

Focusing occurs when the subject chooses hypotheses that are not only locally consistent but consistent with all the preceeding

feedback trials. The subject processes information perfectly and eliminates all dimensions that have been logically disconfirmed on each feedback trial. For example, consider a maximally efficient subject, one who starts with all eight (ten) hypotheses, eliminates four of these at feedback trial one (F1), two more at F2, and the final incorrect hypothesis at F3, leaving only the correct hypothesis. For this subject, his first hypothesis will be consistent with the feedback information at F1, his second hypothesis will be different from the first and will be consistent with the information at both F1 and F2, and his third hypothesis will be correct. The above process is for eight dimensions, but also applies to ten dimensions in the same manner.

Stereotypes. Stereotypes (ineffectual task strategies) are response sets that can never lead to the solution of the problem. The three stereotypes of interest here were stimulus preference, position alternation, and position perseveration. Stimulus preference refers to the selection of a single stimulus characteristic (for example, the shape circle) independent of feedback. Position alternation occurs when the subject alternately chooses the left and then the right stimulus regardless of what they are (for example, LRLR or RLRL). Position perseveration occurs when the subject chooses the stimulus in the same position each time regardless of feedback.

Verbalization Categories

Categories: The tape recordings of the subjects' verbalizations were listened to in their entirety by the author, who was blind to the group membership of subjects making the verbalizations. A category system was then adopted and modeled after Diener and Dweck (1978).

This existing category system appeared to be sufficiently broad and encompassing enough to be appropriate for the data collected. The categories are described below:

1. Statements of useful-task strategy. These were statements of a plan or system that under normal conditions would eventually lead to a solution. These statements corresponded to strategies.

2. Statements of ineffectual approach to task. These were statements that ignored the experimenter's feedback and would not lead to problem solution under normal conditions. These statements corresponded to stereotypes rather than strategies.

3. Attributions. Five categories were adopted attributing responsibility to subject's ability, chance, subject's efforts, task difficulty, or to the experimenter.

4. Self-instructions. These statements referred to instructions the subject gave to himself that, if followed, could improve performance, such as a direction to slow down or to concentrate more.

5. Self-monitoring. Verbalizations in this category were statements that described the subject's solution-oriented behavior other than the subject's task strategy, such as monitoring his own effort expenditure or concentration.

6. Statements of positive affect. These were statements indicating that the task was enjoyable or a challenge, and statements indicating that the subject wished to continue doing the problems.

7. Statements of negative affect. This category included statements that indicated boredom, anxiety, or a desire to terminate the task or to escape from the situation.

8. Positive prognostic statements. These were statements expressing

a subject's high expectancy of success or indicating a belief that he would solve the problem if given sufficient opportunity.

9. Solution-irrelevant statements. Statements in this category were completely irrelevant to solution attainment and were often, although not necessarily, irrelevant to the task.

Raters: At the conclusion of the study, all verbalizations were categorized by two independent female raters. These raters were trained in the use of the categories utilizing pilot subjects' tapes and were blind to the nature of the study and to the particular group to which each subject belonged. Each rater made frequency assignments to the categories for each subjects' verbalizations on a problem-by-problem basis. Inter-rater reliabilities were computed using Pearson product-moment correlation coefficients for each category separately. Only those verbalizations during the two Soluble (Success) test problems and the four Insoluble (Failure) test problems were included in the analyses. The reliability correlation coefficients were computed for the Soluble (Success) and Insoluble (Failure) test problems separately with a mean reliability coefficient for the Success problems of $r = .932$ and a mean coefficient for the Failure problems of $r = .952$. The overall mean reliability correlation coefficient for the thirteen verbalization categories was $r = .942$, with a range of $r = .805$ to 1.00. (See Appendix F for individual category interrater reliability coefficients.)

Each rater's frequency assignment for each subjects' verbalizations, by separate category, was then summed and divided by two to arrive at the final mean category score for each subject on a problem-by-problem basis. These scores then, were used in the final analyses.

CHAPTER THREE

RESULTS

Strategies occurring before and during failure

None of the measures of difficulty - total number of hints needed on all four Soluble (Success) problems; number of hints needed on the two training problems; number of hints needed on test problems 3 and 4 (where feedback after every fourth trial began); or the total number of errors on the four Soluble (Success) problems - pointed to any differences between the groups in ease of training or ability to work the problems. Both Type A and Type B subjects, regardless of Salience condition, utilized feedback appropriately during the training procedure and the two Soluble (Success) test problems, retaining their hypothesis following the feedback "correct" and changing hypotheses following the feedback "incorrect." An analysis of variance was performed on the number of times each subject used focusing, dimension checking, or hypothesis checking on the two Soluble (Success) test problems. There was no significant difference between groups or conditions for the number of times subjects used focusing or dimension checking, although there was a significant interaction term for the number of times subjects used hypothesis checking, $F(1,36) = 8.313$, $p < .007$. Internal contrasts indicated that Type A's in the Moderate Salience condition used hypothesis checking more often than the other three groups, $t(36) = 3.481$, $p < .001$ (Means: High Salience A's = .3, High Salience B's = .5, Moderate Salience A's = 1.1, Moderate Salience B's = .2).

Upon the introduction of the failure manipulation for the four Insoluble test problems, the situation changes. Type A's in the High Salience condition began to use more ineffectual strategies or disconfirmed hypotheses than the other three groups. Table 1 presents the means for the four trials

Table 1

Means for Use of Ineffectual or Disconfirmed Hypotheses
Across the Four Insoluble Test Problems:

Type A-B x High-Moderate Salience x Problems Classification

	High Salience		Moderate Salience	
	Type A	Type B	Type A	Type B
Problem 1	0.5	0.1	0.0	0.1
Problem 2	0.5	0.4	0.2	0.6
Problem 3	0.9	0.2	0.1	0.2
Problem 4	1.2	0.3	0.4	0.4

Collapsed across Problem Trials

	High Salience	Moderate Salience
Type A	.775	.175
Type B	.250	.325

of the Insoluble test problems. The 2 x 2 x 4 analysis of variance (Type A-B x High-Moderate Salience x Four Insoluble Problems) confirmed these results with a significant interaction term, $F(1,36) = 8.091$, $p < .01$. Internal contrasts further concluded that Type A's in the High Salience condition used more ineffectual strategies or disconfirmed hypotheses than the other three groups, $t(36) = 3.903$, $p < .001$.

Another way of viewing the data is to look at the sophistication of the strategies used. It was thought that it would not only be of interest if the groups varied in their use of ineffectual strategies overall, but also, if they differed in their use of less sophisticated strategies. It has been suggested (Diener & Dweck, 1978; Gholson et al., 1972) that these strategies can be ordered according to level of sophistication. Scores were assigned to the subjects' strategies according to a rank ordering ranging from 6 (most sophisticated) to 1 (least sophisticated). It was then determined whether or not the subject's hypothesis testing strategy improved, remained the same, or deteriorated during failure (see Table 2). Score values were then assigned of 3, if subject's hypothesis testing strategy improved; 2, if it remained the same; and 1, if it deteriorated following failure in order to create an overall degree of deterioration score. As one can see in Table 2, Type A's in the High Salience condition exhibited an increased usage of less sophisticated strategies, resulting in a greater degree of deterioration in their hypothesis-testing strategies, as did Type B's in the Moderate Salience condition. This pattern of results was tested by an analysis of variance on these scores revealing a significant interaction term for Type A-B x High-Moderate Salience, $F(1,36) = 17.286$, $p < .0001$. Internal contrasts further indicated that Type A's in the High Salience condition had a greater degree of deterioration than either

Table 2

Number of Type A and Type B Subjects whose Hypothesis Testing Strategy Improved, Remained the Same, or Deteriorated Following Failure

	Improved	Same	Deteriorated
High Salience			
Type A	0	3	7
Type B	0	9	1
Moderate Salience			
Type A	1	9	0
Type B	0	6	4

High Salience B's or Moderate Salience A's (ps < .05). However, High Salience A's and Moderate Salience B's did not differ significantly from each other, $t(36) = 1.603$, $p > .10$.

In order to appreciate the specific pattern of performance following failure, one must examine the problem-by-problem change. Table 3 shows the percent of Type A and Type B subjects in High or Moderate Salience exhibiting each type of strategy or stereotype on each of the four Insoluble (Failure) test problems. As can be seen from Table 3, High Salience A's showed a progressive decrease in the use of legitimate strategies with an attendant increase in ineffectual responses. Moderate Salience B's also demonstrated increased use of ineffectual strategies by the second failure problem. However, on the third and fourth problems the situation changed such that only 10% of Moderate Salience B's were using ineffectual strategies on the last failure problem. Both High Salience B's and Moderate Salience A's behaved in a similar manner and did not use ineffectual strategies on the third and fourth failure problems.

The effects depicted in Table 3 were virtually duplicated with an analysis of the sophistication of strategy use across the four insoluble problems. This is perhaps not surprising, since the measures are obviously not independent. As may be observed in Table 4, Type A's in the High Salience condition are using far less sophisticated strategies than the other three groups by the fourth insoluble problem. High Salience A's are increasingly using less sophisticated strategies across the four problems. Moderate Salience B's, however, begin to exhibit the use of less sophisticated strategies on Insoluble Problem 2, but then improve their performance on the last two insoluble problems. The 2 x 2 x 4 analysis of variance (Type A-B x High-Moderate Salience x Four Insoluble Problems) for the scores on the level

Table 3

Percentage of Type A and Type B Subjects Exhibiting Each Type of Strategy on the Four Insoluble (Failure) Problems:

Type A-B x High-Moderate Salience x Problems Classification

Group	High Salience Problem				Moderate Salience Problem			
	1	2	3	4	1	2	3	4
Type A								
Useful Strategies								
Focusing	0	0	0	0	0	0	0	0
Dimension checking	80.0	50.0	30.0	20.0	90.0	70.0	80.0	60.0
Hypothesis checking	10.0	40.0	50.0	20.0	10.0	20.0	20.0	40.0
Ineffectual Strategies								
Stimulus preference	0	10.0	10.0	40.0	0	10.0	0	0
Position alternation	0	0	0	0	0	0	0	0
Position preservation	10.0	0	10.0	20.0	0	0	0	0
Type B								
Useful Strategies								
Focusing	0	0	0	0	0	0	0	0
Dimension checking	90.0	60.0	70.0	80.0	70.0	20.0	70.0	60.0
Hypothesis checking	0	40.0	30.0	20.0	20.0	50.0	20.0	30.0
Ineffectual Strategies								
Stimulus preference	10.0	0	0	0	10.0	30.0	10.0	10.0
Position alternation	0	0	0	0	0	0	0	0
Position preservation	0	0	0	0	0	0	0	0

Table 4

Means for Level of Sophistication of Hypothesis-testing Strategy on the Four Insoluble Test Problems:[1]

Type A-B x High-Moderate Salience x Problems Classification

	High Salience		Moderate Salience	
	Type A	Type B	Type A	Type B
Problem 1	4.7	5.0	5.2	5.0
Problem 2	4.4	4.6	4.6	3.9
Problem 3	3.9	4.7	4.8	4.6
Problem 4	3.2	4.8	4.6	4.5

Collapsed across Problem Trials

	High Salience	Moderate Salience
Type A	4.05	4.80
Type B	4.78	4.50

[1] The higher the number, the higher level of sophistication of strategy use (6 = most sophisticated; 1 = least sophisticated).

of strategy sophistication confirmed the above pattern of performance. The analysis revealed a Problems main effect, $F(3,36) = 22.5695$, $p < .0001$, such that sophistication of strategy use decreased across the four insoluble problems. In addition there were interactions between Type and Salience, $F(1,36) = 4.5832$, $p < .05$, Type and Problems, $F(3,36) = 10.5193$, $p < .001$, and between Salience and Problems, $F(3,36) = 7.0904$, $p < .001$. These second-order interactions are explicable in terms of an obtained triple interaction (Type x Salience x Problems), $F(3,36) = 3.6615$, $p < .05$. Internal contrasts further indicated that High Salience A's used significantly less sophisticated strategies than the other three groups, $t(36) = 3.4906$, $p < .001$, overall.

In summary, the statistical analyses so far have all shown large and significant differences in the performance of Type A's and Type B's in High and Moderate Salience conditions during and following failure. High Salience A's have been shown to use more ineffectual strategies or disconfirmed hypotheses across the four Insoluble (Failure) test problems. In fact, it has been demonstrated that High Salience A's used these ineffectual strategies more than three times as often as the other three groups by the end of the fourth failure problem (see Tables 1 and 3). One may notice that Moderate Salience B's did not use as many ineffectual or less sophisticated strategies as the High Salience A's, though they did show increased usage compared to either High Salience B's or Moderate Salience A's. Thus, the strategy-change data demonstrated that behavior following failure is dramatically different for Type A's and B's in the High and Moderate Salience conditions. It appears, in fact, that High Salience A's are beginning to exhibit deterioration in their performance, resembling helplessness, when faced with noncontingency resulting in failure. Moderate

Salience B's, on the other hand, are showing some deterioration in their use of effective strategies when first confronted with the noncontingency, but helplessness, per se, is not evident nor indicated by their strategy-change data.

The results presented thus far replicate previous research (Glass, 1977) in that marked performance differences may be observed between Type A and Type B subjects dependent upon the salience condition. However, the full extent of these differences is still unclear unless we examine the cognitive concomitants of the performance changes as well.

Verbalizations: What are Subjects Saying?

In order to provide a clear view of what the subjects were saying (and thinking about) during the experiment, the verbalizations were analyzed for the Soluble (Success) test problems and the Insoluble (Failure) test problems separately.[1] The mean frequency scores for the subjects' verbalized responses, by verbalization category, are presented in Table 5.[2]

Success Trials. During the first two soluble test problems, where subjects were allowed to succeed, there were few marked differences. The analysis of variance (Type A-B x High-Moderate Salience) did indicate, however, that Type A's made more statements of useful-task strategy, $F(1,36) = 4.618$, $p < .04$. Both High Salience A's and Moderate Salience B's made more statements indicating their awareness of the increased difficulty of the task, $F(1,36) = 5.297$, $p < .03$, than did the other two groups. There was a marginally significant interaction term, $F(1,36) = 3.077$, $p < .09$, for statements of positive affect, along with significant main effects for Type, $F(1,36) = 4.431$, $p < .05$, and Salience, $F(1,36) = 6.923$, $p < .02$. By examining the means in Table 5, rows 19 and 20, for statements of positive affect, it is apparent that Moderate Salience B's were enjoying the task, more so than the

Table 5

Mean Frequency Response Scores for Verbalization Categories:
Type A-B x High-Moderate Salience x Soluble-Insoluble

Category		Soluble (Success) Problems		Insoluble (Failure) Problems	
		High Salience	Moderate Salience	High Salience	Moderate Salience
Useful task strategy	Type A	4.20	3.45	12.8	9.15
	Type B	1.00	2.75	3.60	6.70
Ineffectual task strategy	Type A	0.50	0.35	1.65	0.50
	Type B	0.00	0.20	0.15	0.10
Ability attribution	Type A	0.30	0.30	2.10	1.40
	Type B	0.15	0.30	0.35	1.65
Chance attribution	Type A	0.00	0.00	0.25	0.30
	Type B	0.10	0.00	0.30	0.85
Effort attribution	Type A	0.00	0.20	0.40	0.40
	Type B	0.15	0.20	0.00	0.30
Task difficulty attribution	Type A	0.75	0.25	1.35	0.70
	Type B	0.25	0.60	0.70	2.00
Experimenter attribution	Type A	0.00	0.10	0.40	0.45
	Type B	0.05	0.10	0.20	0.40
Self-instructions	Type A	0.05	0.35	1.45	0.60
	Type B	0.05	0.45	0.45	1.95
Self-monitoring	Type A	0.40	0.00	0.90	0.30
	Type B	0.05	0.10	0.25	0.25
Statements of positive affect	Type A	0.10	0.35	0.50	0.70
	Type B	0.20	1.45	0.15	1.55
Statements of negative affect	Type A	1.25	0.45	4.65	2.20
	Type B	0.80	1.30	2.85	6.50
Positive prognostic statements	Type A	0.40	0.10	0.75	0.35
	Type B	0.00	0.45	0.20	1.10
Solution irrelevant statements	Type A	0.50	0.65	1.65	0.80
	Type B	0.70	0.90	1.30	2.65

other three groups.

For the most part, the verbalizations during the two soluble (success) test problems indicated an absence of major differences between the groups. Type A's and Type B's in the two salience conditions did not appear to respond very differently. However, the ego involvement of Type A's and their resultant achievement motivation was apparent in their statements of useful-task strategy. At the same time, the Type B's seemed to be enjoying themselves more during this part of the task.

Failure Trials. Striking differences began to emerge when the subjects experienced the noncontingency resulting in failure on the four insoluble test problems. High Salience A's began making increasingly more statements of ineffectual approach to the task, that ignored the experimenter's feedback and that would not lead to problem solution under normal conditions (see Table 5). Type A's in the High Salience condition attributed responsibility for their failure on the insoluble test problems primarily to their own ability, and to a lesser extent, the difficulty of the task. In addition, High Salience A's began to increasingly express negative affective statements. Their unhappiness with the experimental situation was characterized by statements such as: "This is really starting to get to me"; "Oh, shit!"; "Damn it, that was a stupid mistake"; "(sigh) - I don't know how in the world I'm going to do these"; "This is taking a long time"; "I'm not sure this is worth all the hassle for a few points"; "I'm really getting perturbed".

Conversely, Moderate Salience B's did not make statements of ineffectual approach to the task. They did begin to make some statements attributing their failure on the insoluble problems to their own ability, but as the failure experience continued, they attributed their failure more so to the difficulty of the task (see Table 5). Moderate Salience B's expressed

extreme unhappiness with the task situation by making negative affective statements such as: "I sure wish this would get over with"; "This is sort of boring"; "This isn't much fun"; "This is ridiculous"; "This is sure taking a long time"; "Oh, Boy! What can I do now"; as well as a considerable amount of cursing. However, this unhappiness was mediated by their making some statements of positive affect and positive prognostic statements such as: "I've almost got it figured out now"; "I'm sure I'll get it"; "I'll get the next one for sure".

The analysis of variance confirmed the above patterns of responding. As Table 6 indicates, the category "Statements of ineffectual task strategy" reveals significant main effects for Type A-B, $F(1,36) = 10.670$, $p < .002$, and High-Moderate Salience, $F(1,36) = 4.256$, $p < .05$. There was also a marginally significant Type x Salience interaction term, $F(1,36) = 3.576$, $p < .07$. Internal contrasts revealed that the main effects were largely due to High Salience A's responses, $t(36) = 4.17$, $p < .001$. The analysis of variance also demonstrated differences between the groups for the "Ability attribution" and "Task-difficulty attribution" categories with significant Type x Salience interaction terms, $F(1,36) = 4.778$, $p < .04$ and $F(1,36) = 5.329$, $p < .03$, respectively. High Salience A's attributed responsibility for their failure more to internal causes (i.e., ability); whereas, Moderate Salience B's made more attributions to external causes (i.e., task difficulty). Furthermore, as Table 6 indicates, the analysis of variance reveals a significant Type x Salience interaction term for "Statements of negative affect", $F(1,36) = 6.636$, $p < .02$. Both Moderate Salience B's and High Salience A's, to a slightly lesser degree, expressed unhappiness and negative affect during the experimental situation.

In summary, the results of the analyses of variance of the verbalization

Table 6

Analysis of Variance of Verbalization Categories for Insoluble (Failure) Problems:

Type A-B x High-Moderate Salience Classification[1]

Category of Verbalizations	Effect	F-value	p
Useful task strategy	Type	3.890	.060
Ineffectual task strategy	Type	10.670	.002
	Salience	4.256	.050
	Type x Salience	3.576	.070
Ability attribution	Type x Salience	4.778	.040
Chance attribution	N.S.	--	--
Effort attribution	N.S.	--	--
Task difficulty attribution	Type x Salience	5.329	.030
Experimenter attribution	N.S.	--	--
Self-instructions	N.S.	--	--
Self-monitoring	N.S.	--	--
Statements of positive affect	Salience	4.017	.060
Statements of negative affect	Type x Salience	6.636	.020
Positive prognostic statements	Type x Salience	3.652	.070
Solution irrelevant statements	N.S.	--	--

[1] df (1,36)

categories revealed important quantitative and qualitative differences in verbalized responses of High and Moderate Salience Type A's and B's. Type A's in the High Salience condition made significantly more statements of ineffectual approach to the task. This pattern of responding corresponded to the actual strategies they used as demonstrated by the performance data presented earlier. High Salience A's made personal, internal attributions to their own ability for failure on the insoluble problems and it appeared that they didn't expect to do very well when confronted with failure. Moderate Salience B's, on the other hand, did not verbalize statements of ineffectual approach to the task. They indicated that they were quite unhappy and they attributed their failure to the difficulty of the task. In fact, Moderate Salience B's picked up on the reality of the situation - the task was difficult. These Type B's were behaving appropriately under the given circumstances.

It is also interesting to note the qualitative differences between the negative affective verbalizations of the High Salience A's and the Moderate Salience B's. The Type A's in the High Salience condition were expressing negative affect that indicated anxiety, and which focused on themselves, being directed internally. The Moderate Salience B's, however, made negative affective statements that indicated boredom and a desire to escape or avoid the task situation. These negative affective statements were directed more externally and towards the task, rather than to themselves.

Post-Experimental Questionnaire

Upon completion of the experimental procedure, all subjects were asked to complete a questionnaire that was designed to assess the subjects' perceptions of the experiment and to judge whether or not the failure manipulations were successful (see Appendix G). (The means for the post-

experimental questionnaire items may be found in Appendix I, Table 4.) On all but one item, a series of analyses of variance revealed no significant differences between groups or conditions. The one exception was the question "For the same concept formation tasks, did you generally feel that there really was a solution to the problems?" This question pertained to the five dimension Insoluble (Failure) test problems. There was a statistically significant main effect for Type, $F(1,36) = 4.286$, $p < .05$. However, when one examines the means (Type A = 2.25 and Type B = 1.75) on a seven-point scale (1 = was a solution, and 7 = was not a solution) the magnitude and meaningfulness of the Type A-B main effect decreases.

In addition, subjects were asked to assign percentage estimates of responsibility, regarding their performance, for the outcome on the tasks for five attributions (see Appendix H). The subjects did this for the four dimension (Soluble) and five dimension (Insoluble) problems separately.

Being that the percentage estimates for the five attributions totaled a constant (100 percent) and lacked independence, the data were transformed utilizing a square root, arc tangent transformation procedure (Arheart, Note 6), in order to accomodate a multivariate analysis of variance procedure. (The means for the five attributions for Type A-B x High-Moderate Salience x Success-Failure may be found in Table 7.)

The overall MANOVA for the five attributions, using Wilk's criterion (Barr, Goodnight, Sall, & Helwig, 1976), is presented in Table 8. The MANOVA revealed two statistically significant main effects for Type A-B, $F(5.32) = 8.97$, $p < .001$, and Success-Failure (repeated), $F(5,32) = 3.36$, $p < .05$. As can be noted in Table 8, Type A and Type B subjects, regardless of salience condition, differed significantly in regards to their self reports of attributions, and this tended to change during failure. Due to the

Table 7

Means for Self-reported Attributions (Percentage Estimates)[1]

	Ability	Chance	Effort	Task Difficulty	Experimenter
High Salience A's x Success	49.5	7.5	27.0	8.0	4.5
High Salience A's x Failure	49.5	5.5	30.5	10.5	4.5
Moderate Salience A's x Success	42.0	10.5	27.5	13.0	8.0
Moderate Salience A's x Failure	41.5	11.5	25.0	16.5	5.5
High Salience B's x Success	31.3	28.3	15.1	16.9	8.4
High Salience B's x Failure	17.4	30.8	17.1	25.3	9.4
Moderate Salience B's x Success	30.4	20.5	20.8	19.2	9.1
Moderate Salience B's x Failure	23.5	25.0	15.9	24.5	11.1

[1]Means reported are for percentage estimates.

Table 8

Multivariate Analysis of Variance on Self-reported Attributions:
Type A-B x High-Moderate Salience x Success-Failure Classification

	Multivariate Test[1]		Univariate Test F Values[2]				
Source	df	F value	Ability	Chance	Effort	Task Difficulty	Experimenter
Type A-B (T)	(5,32)	8.97***	85.23***	128.31***	30.48***	52.99***	14.89***
High-Moderate Salience (S)	(5,32)	0.39	0.63	0.17	0.12	8.01**	0.03
Success-Failure (Q)	(5,32)	3.36*	6.68*	0.38	0.24	12.27**	0.07
T x S	(5,32)	0.68	5.75*	8.53**	2.28	4.95*	0.38
T x Q	(5,32)	1.55	6.34*	1.14	0.01	0.63	1.03
S x Q	(5,32)	1.47	0.79	0.50	3.01	1.13	1.45
T x S x Q	(5,32)	0.99	0.94	0.02	0.04	0.00	0.39

[1] Multivariate analyses utilized Wilk's Criterion.

[2] df(1,36) for all univariate F tests.

* $p < .05$
** $p < .01$
*** $p < .001$

significant main effects for Type A-B and Success-Failure on the multivariate test, it was possible to examine the univariate tests. Type A subjects attributed more responsibility for the outcome of the tasks to their own ability and effort, both of which are internal causes, and less to chance, task difficulty or experimenter. Type A's were relatively consistent in their assignment of attributions across success and failure problems (see Table 7). During experiences with success, the Type B's attributed responsibility fairly evenly to ability, chance, effort, and task difficulty. The change in percentage estimates of responsibility from success to failure appears to be due primarily to the Type B's. The main effect for Success-Failure (see Table 8) indicates a shifting of the Type B's attributions to their own ability during success to an attribution to the difficulty of the task during failure. This pattern of results, in fact, indicates how the Type A and B subjects encoded their attributions of responsibility for their failure on these problems at the close of the experiment. Thus, Type A's blamed their abilities for their failure, even though both Type A's and Type B's had learned the task equally well, had equal degrees of success during training, and had received equal amounts of failure feedback. Type B's, on the other hand, shifted their attributions from ability to task difficulty when confronted with the noncontingency, which in fact, was appropriate behavior for this situation.

CHAPTER FOUR

DISCUSSION

As may be recalled, this study was designed to explore the differences between Type A and B subjects in their performance on a cognitive task during failure; and further, to inquire into the nature of the experiences of Type A's and B's before and during exposure to noncontingency resulting in failure. Previous research (Glass, 1977) has suggested that Pattern A may be thought of as a response style for coping with perceived lack of control over environmental stress. Glass (1977) concluded that enhanced efforts at control lead to greater vulnerability to helplessness after extended experience with uncontrollable events of high salience. Type A's have been observed to respond to highly salient losses of environmental control by making greater initial efforts than B's to reassert control followed by more extreme giving up relative to B's. When the uncontrollable event is moderately salient, Type A's actually make less effort than Type B's to reassert control and do not give up, whereas Type B's do. Previous research, however, has not offered a compelling explanation of why the Type A-B dimension interacts with salient uncontrollable events. The present results are consistent with previous research (Glass, 1977) in that marked performance differences have been observed between Type A and Type B subjects, dependent upon the salience classification: High Salience A's began to use more ineffective and less sophisticated strategies during the failure experience and to a lesser extent, so did Moderate Salience B's.

The present data provide a clearer understanding of the manner in which objective noncontingency is experienced by Type A and B subjects. As may be recalled from the results presented earlier, it was noted that Type A's and Type B's differed in their self-reported attributions for responsibility of failure on the test problems. At the close of the experiment, Type A's

tended to attribute failure to internal causes (i.e., their own ability). It was also noted on the post-experimental questionnaire that Type A's believed the failure problems were less soluble than did Type B's, possibly because they felt the problems were not soluble for them. Furthermore, during the failure experience, High Salience A's increasingly verbalized that they attributed their failure on the problems to their own ability. At the same time, as their strategy performance was deteriorating, they acknowledged their use of ineffectual strategies by verbalizing statements of ineffectual approach to the task. Their verbalizations were further characterized by negative affective statements indicating unhappiness with their performance. The present data suggest, therefore, that High Salience A's are experiencing personal helplessness (cf. Abramson et al., 1978) when confronted with noncontingency resulting in failure.

On the other hand, there is no evidence to suggest that Moderate Salience B's were experiencing the same kind of helplessness. Type B's in the moderate salience condition did evidence some deterioration in their strategy performance during failure. However, they generally did not make statements of ineffectual approach to the task. During the failure experience they tended to attribute their failure on the problems to external causes (i.e., task difficulty). Their self-reported attributions, at the close of the experiment, corresponded with how they felt during the failure experience. In fact, it appears that Moderate Salience B's appropriately encoded the failure noncontingency as being attributed to task difficulty. In addition, Moderate Salience B's expressed negative affect directed at the task, indicating boredom and a desire to escape the situation. This observed pattern of responding resembles what Seligman has termed universal helplessness (cf. Abramson et al., 1978). Moderate Salience B's appear to view the noncontin-

gency as a situation in which neither they nor relevant others can control - they attribute failure to the difficulty of the task. Miller and Norman (1979) have proposed a similar model as Seligman's reformulated account. They suggest that performance deficits that occur as a result of attributions to relatively variable external causes such as experimenter control or task difficulty, as with the Moderate Salience B's, are really "pseudohelplessness" because they do not represent a change in the individual's basic expectancies or mode of adaptation. Deficits that occur as a result of attributions to stable, internal causes do result in more lasting, generalized learned helplessness, if in fact, the expectation of uncontrollability is generalized as is the case with personal helplessness.

The present data also seems to be consistent with the attentional interpretation offered by Matthews and Brunson (in press). This notion suggests that Type A's attend to the most salient aspects of their environment and inhibit their attention to any peripheral cue or task-irrelavent event that might deter them from their performance. Type A's in the high salience condition appeared to focus their attention on task-relevant issues as evidenced by their continued involvement with searching for a correct solution for the insoluble problems. Even their internal attributions to ability and their expressions of negative affect were task related. Moderate Salience B's, however, appeared to divide their attention between their performance on the task itself and to external events such as the noncontingency of the task, as indicated by their task difficulty attributions.

The relative significance of the learned helplessness paradigm is largely tied to the degree of generalization that occurs. Roth and Bootzin (1974) have succinctly addressed this issue of generalization: "The major question is whether an induced external expectancy generalizes to a new

situation, not whether it controls behavior in the situation it is induced" (p. 255). Clearly, a reduction of responding in a situation in which responses do not influence outcomes is an adaptive behavior. It becomes maladaptive only when it is transferred or generalized to new situations in which outcomes are contingent on responses. Within this context, it may be suggested that Moderate Salience B's are, in fact, exhibiting appropriate behavior when confronted with uncontrollable events. They become aware of the true contingencies of the situation, and they attribute their failure on insoluble problems to the difficulty of the task. High Salience A's, however, appear to respond to extended salient uncontrollable events in a maladaptive manner. They struggle to find the correct solution; fail in their attempts; and relate this failure experience to attributions towards their own ability and unsuccessful performance. Further, this individual difference variable may very well predict the behavior that is generalized to a future task. Seligman and his associates have made the implicit assumption that helpless responding is maladaptive. The issue regarding whether helplessness is adaptive has been discussed in some detail by Wortman and Brehm (1978) and, therefore, will not be repeated here. Briefly, however, they believe that many of the behaviors associated with helplessness (giving up, losing interest in the outcome, or losing interest in the motivation to pursue it) are maladaptive only when the outcome in question is controllable or modifiable. If the outcome is truly uncontrollable, these behaviors may be highly functional (cf. Weiss, 1971), as with the behavior exhibited by Moderate Salience B's.

The strengths of the present methodology deserve some mention. Previous research methodologies have been limited by self-report measures on post-experimental questionnaires. The present data provides an added insight by exploring the phenomenology of the behavior and the cognitive concomitants

of the performance changes. The consistency of the data on both behavioral and cognitive measures has been evident. Also the self-report data from the post-experimental questionnaire provided an indication of how the subjects actually encoded the experimental experience. There are obviously some limitations to the methodology adapted for this study. Many questions still remain unanswered such as why the high salience condition did not interest the Type B's. The phenomenology of the behaviors they exhibited have not provided any clues.

Obviously, further research is necessary in order to determine the full extent and impact of the attributional process on the learned helplessness phenomenon. Furthermore, how does it come to be that Type A's and B's tend to formulate different attributions, at different times, when exposed to salient uncontrollable events, resulting in failure outcomes? The present research has been successful in distinguishing not only the performance differences of A's and B's in high and moderate salience conditions, but also has pointed to distinctions in the cognitive concomitants of the performance changes during and following exposure to uncontrollable events.

CHAPTER FIVE

CONCLUSIONS AND SPECULATIONS

Type A individuals in the high salience condition and Type B's in the moderate salience condition, to a lesser extent, exhibited performance decrements across a series of insoluble concept formation problems. The behavioral, cognitive and self-report measures reflect a consistency of the data. These results suggest that High Salience A's are beginning to experience personal helplessness (cf. Abramson et al., 1978) and may continue to do so if, in fact, the expectations of uncontrollability were generalized to a new situation. Conversely, Moderate Salience B's appear to be "pseudohelpless", that is, they are experiencing universal helplessness.

The present data suggest an important modification of current attribution theory (Eswara, 1972; Rest, Nierenberg, Weiner, & Heckhausen, 1973; Weiner, Frieze, Kukla, Reed, Rest, & Rosenbaum, 1971; Weiner & Kukla, 1970). These studies suggest and support the hypothesis that if one attributes failure to an internal cause (e.g., ability), self-depreciation and negative affect result; whereas, attributions of failure to an external cause (e.g., task difficulty) minimizes this affect. In the present study negative affective expression was manifested in the verbalizations of both High Salience A's and Moderate Salience B's, to a greater extent, during their experiences with failure noncontingency. However, the data revealed distinct qualitative differences between High Salience As' and Moderate Salience Bs' negative affective responses. High Salience As' responses reflected dissatisfaction and unhappiness with their performance that corresponded with their internal self-attributions. Moderate Salience B's, on the other hand, actually expressed more prevalent negative affect, but these responses were directed at the task, indicating boredom and a desire to escape the situation. The

present data suggest that individuals, in situations where there is failure noncontingency, express considerable negative affect and make different attributions for their failure. However, only certain kinds of negative affect will accompany the learned helplessness process; that is, negative affect which is internally directed (e.g., High Salience A's responses of unhappiness with their performance).

Furthermore, it is reasonable to expect that when exposed to highly salient uncontrollable events in natural settings, not just experimental situations, Type A's would also be more likely to manifest motivation and performance decrements and make internal attributions which accompany these performance deficits. These decrements have been variously labeled as "helplessness" or "giving up". Since coronary victims often report a greater frequency of uncontrollable life events in the period preceding their infarction, a number of researchers (e.g., Engel, 1968; Green et al., 1972) have suggested that helplessness may be a precursor of coronary heart disease (CHD). This association between helplessness and CHD underscores the importance of understanding the factors potentiating the greater susceptibility of Type A's to the effects of uncontrollability. It may be reasonable to assume, therefore, that attributions and attentional differences mediate the relationship between Pattern A, helplessness, and CHD.

One optimisitc implication of the present research is that Type A reactions to uncontrollable events may be ammenable to change. These findings suggest a number of possible directions for the design of therapies or intervention techniques for coronary-prone (i.e., Type A) individuals. For example, we might speculate that the individual who is threatened by the occurrence or reoccurrence of CHD would do well to learn to better predict, recognize, and acknowledge uncontrollability in his or her environment. For

to do otherwise might enhance the deleterious effects of uncontrollable stimulation and increase the likelihood of CHD. The implication for the Type A who struggles to keep abreast of his numerous and often arbitrary goals and deadlines is that he should become realistic and flexible enough so that unavoidable delays and setbacks do not represent disconfirmation of a particularly high expectation that the task will be completed successfully. Paralleling this notion, Wortman and Dintzer (1978) maintain that adaptive responding to aversive life events can be facilitated not by designing treatments to minimize helplessness but by teaching people to make accurate assessments of their ability to influence their outcomes and make accurate attributions for their failure to do so. This reasoning suggests that for pseudohelplessness (universal helplessness), exposure to experiences of response-outcome dependence and success will alleviate deficits. The success of this treatment with nondepressed subjects has been demonstrated by Kilpatrick-Tabak and Roth (Note 7), but was not found effective with depressed subjects. According to Seligman's reformulated model (Abramson et al., 1978) and Miller and Norman's (1979) attribution-theory model, treatment of personal helplessness would require direct focus on changing the attributions themselves. Examples of these changes and the effectiveness of this type of treatment can be seen in the studies of Klein et al.(1976) and Dweck (1975).

Other treatment strategies such as relaxation procedures (e.g., Wolpe, 1958) may play a useful role in the therapeutic intervention with Type A's involved in salient uncontrollable experiences. There is already evidence (Suinn, 1974) indicating that subjects can be trained to react to general anxiety and stress with relaxation-inducing responses which, in turn, seem to reduce major risk factors of coronary heart disease, such as cholesterol and triglyceride levels. Establishing control over physiological reactions

associated with anxiety seems particularly important in view of the higher cholesterolemic effects associated with Pattern A response to daily stress and challenge (Friedman et al., 1958; Jenkins et al., 1974). But then not all individuals can relax in this manner, perhaps especially if they try anxiously to do so, as may be the case for some overmotivated Type A's. Relaxation is not achieved by simple command or direct effort, but by deliberately tensing muscle groups (an available voluntary response) and then "letting go" of that muscle tension (Lowenstein, Note 8). Biofeedback is assumed to offer a further extension of voluntary self-control over normally involuntary responses, but here again overmotivated individuals are unlikely to learn how to reliably produce responses generally associated with a state of low effort or relaxation.

The research presented up to this point has focused primarily on Pattern A and learned helplessness. Fogle (1978) has suggested that the persistance of instrumentally ineffective coping behavior constitutes an experimental converse of learned helplessness and has termed this "learned restlessness". In these terms, a learned restless individual is one who persists in futile if not self-defeating attempts to escape a feared or uncontrollable event - they often are trying too hard. In some respects the concept of learned restlessness describes the behavior of Type A individuals. Emotional arousal in the form of anxiety and/or frustration is naturally prominent in learned restlessness, just as low arousal and depression are emotional concomitants of learned helplessness. Literally, the victim of learned restlessness gets no rest, not even the rest of resignation (Fogle, 1978). This may at first seem contradictory, but if placed in the context of real-life, natural settings, the Type A individual may behave repeatedly, throughout his or her lifetime, as the characterized learned-restless person. The behavior eventually

after repeated exposure to highly salient uncontrollable events, culminates in personal learned helplessness. With certain individuals, some degree of learned helplessness might actually prove, therapeutically, more adaptive in the long run (Fogle, 1978). This approach has much in common with Frankl's (1975) dereflection. Here attention is refocused away from goals that often defy deliberate attainment. The client is encouraged to give up trying. This does not really break the pattern of restless responding, since even a response of passivity may be attempted actively and deliberately as a coping device. The learned restlessness model would tend to suggest that genuine resignation may often be more helpful than feigned resignation.

This discussion raises and leaves unanswered many questions as to how therapeutic efforts should be guided in the case of Pattern A, helplessness and coronary heart disease. A detailed discussion of clinical practice in this area cannot be attempted here; however, the clinical literature provides many examples to be examined. The learned helplessness and learned restlessness models offer competing therapeutic messages. The appealing goal, for clients, clinicians and physicians alike, that more and better coping is better, leads to the notion that trying harder helps. The learned restlessness model, then, seems almost counterintuitive, at least to work-oriented Western minds and the classic Type A individual. In Zen Buddhism, as with other Eastern tradition, giving up is more readily recognized as an adaptive course in many situations (Watts, 1957). Even the ultimate goal of enlightenment, after all, is said to elude deliberate striving, or deliberate non-striving. It is hopefully suggested that individuals can escape the trap of trying too hard, with regard to some of their personal and social objectives, by selectively and appropriately giving up.

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FOOTNOTES

[1] Initially, it was desired to analyze the verbalization data by a 2 (Type A-B) x 2 (High-Moderate Salience) x 3 (Trial Blocks) analysis of variance (two between, one within) procedure, with Trial Block 1 consisting of the two Soluble test problems; Trial Block 2 consisting of the first two Insoluble test problems; and Trial Block 3 consisting of the last two Insoluble test problems. Problems 1 and 2 were training problems, and thus, were not categorized or analyzed. Upon examination of the data, it was discovered that some verbalization categories contained 0 cases per cell, primarily in the Soluble problems. Further scrutiny of the data revealed non-normal distributions for these categories as well as heterogeneity of variance. These problems were circumvented by analyzing the verbalization categories by Soluble (Success) and Insoluble (Failure) problems separately, with a 2 x 2 (Type A-B x High-Moderate Salience) design.

[2] A mean frequency response criterion was set at 2.00 for the verbalization category totals. This was decided on in light of the very small mean responses in some of the categories: very few responses decrease the meaningfulness of the data, even though statistical significance may exist.

Appendix A. Student version of the Jenkins Activity Survey for Health Prediction.

Permission to use the Jenkins Activity Survey for Health Prediction must be obtained from the following:

Dr. G. David Jenkins
Department of Psychiatry
School of Medicine
Boston University
Boston, Massachusetts

APPENDIX B

Informed Consent for Subjects in Experiments

Informed Consent by Subjects in Experiments

I, _____ have carefully read/listened to
Print Name
(circle one) and fully understand the instructions for this experiment on

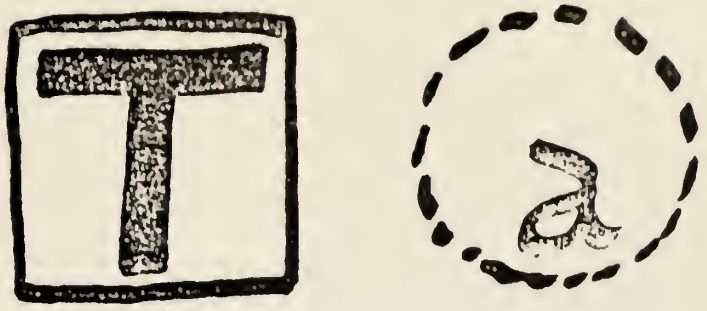
_____. I give my consent to serve as a subject
Title of Experiment
in this experiment on _____. I am aware that I can
Date
ask questions or terminate the experiment at any point.

_____
Signature

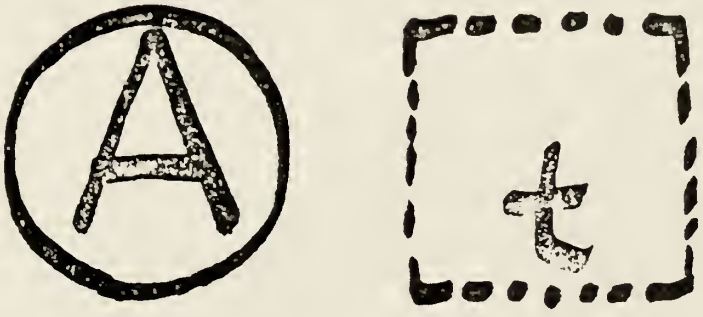
APPENDIX C

Concept Formation Problems

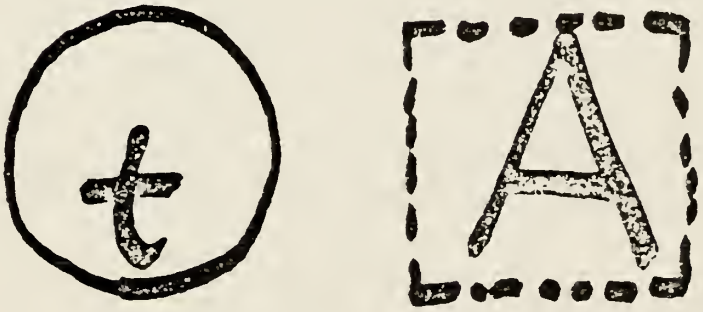
Appendix C, Figure 1. Concept Formation Problems
(Four Dimension)



CARD #1



CARD #2

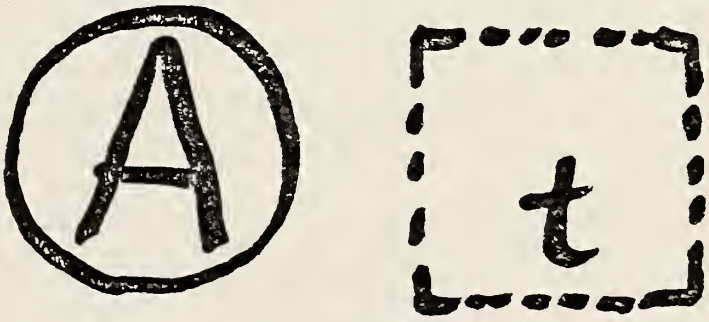


CARD #3

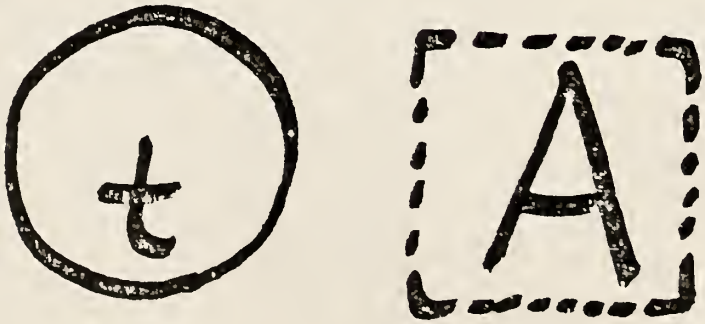
CARD #4

CARD #5

CARD #6



CARD #7

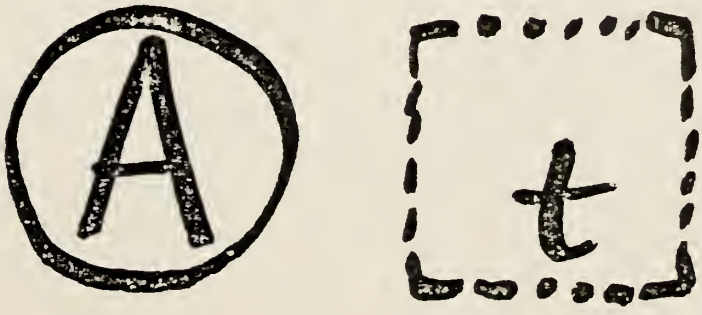


CARD #8

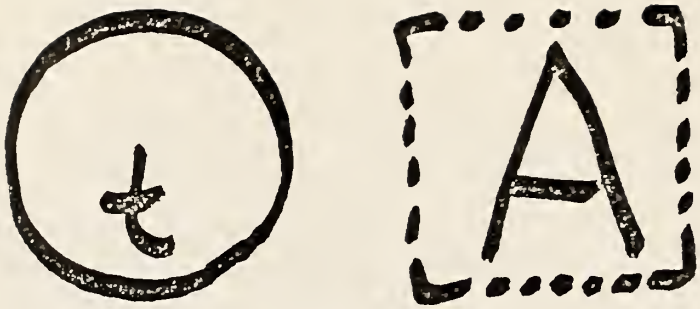
CARD #9

CARD #10

CARD #11



CARD #12



CARD #13

CARD #14

CARD #15

CARD #16

Appendix C, Table 1

Feedback Sequence for Insoluble (five-dimension) Concept Formation Problems[1]

	Insoluble (Failure) Problems			
	1	2	3	4
Trial Block 1	Correct	Correct	Incorrect	Correct
Trial Block 2	Incorrect	Correct	Correct	Incorrect
Trial Block 3	Correct	Incorrect	Incorrect	Correct
Trial Block 4	Correct	Incorrect	Correct	Incorrect
Trial Block 5	Incorrect	Correct	Incorrect	Correct

[1] Feedback was presented after every fourth response (subject's completion of each trial block). Figures 1 and 2 present the ordering of each series of cards for the four dimension and five dimension problems, respectively. Order remained the same, but correct solution (four dimension) and feedback (five dimension) was variable across problems and constant across subjects.

(blue)   (red)

CARD #1

(blue)   (red)

CARD #2

(blue)   (red)

CARD #3

(red)   (blue)

CARD #4

(blue)   (red)

CARD #5

(red)   (blue)

CARD #6

(red)   (blue)

CARD #7

(red)   (blue)

CARD #8

(blue)   (red)

CARD #9

(red)   (blue)

CARD #10

(blue)   (red)

CARD #11

(blue)   (red)

CARD #12

(blue)   (red)

CARD #13

(red)   (blue)

CARD #14

(blue)   (red)

CARD #15

(red)   (blue)

CARD #16

(red)   (blue)

CARD #17

(red)   (blue)

CARD #18

(blue)   (red)

CARD #19

(red)   (blue)

CARD #20

APPENDIX D

Verbatim Instructions for the Concept Formation Problems

Experimenter Script

Hello. My name is Brad, and I'll be your experimenter for this study that you signed up for. Before we begin, please fill out this permission slip. The general nature of this experiment concerns concept learning and I am particularly interested in people's linguistic style and the cognitions that accompany problem-solving. In other words, I am investigating the different ways and styles that people have in terms of speech and tonal quality of their voices, and especially, what they are thinking about when they work on concept-formation problem-solving tasks. It occurs to me that different people think about many different things while working on a variety of different tasks or problems. I will first be reading to you a set of instructions that will explain the task and what is involved in successfully completing this task. I want to emphasize that it is very important, once we begin, for you to verbalize (state out loud) what you may be thinking about while working on this task. For example, if you are thinking about trying to solve the particular problem you are working on, or if you are thinking about lunch or dinner, or how well you did on the previous problems, or what is playing on T.V. tonight, or the date you have planned later in the week or how interesting or disinteresting the problems may be - whatever happens to come into your mind - this is what I want you to verbalize. Please feel completely free to talk about anything and everything that comes into your mind, including any strategies for problem-solving you may be thinking about. When you finish the problems I will give you a complete debriefing, that is explain to you the particulars concerning this experiment and answer any questions you may have. Please hold those types of questions until we finish. But any other questions concerning the procedures of the experiment or the problems - please feel free to interrupt or stop me,

especially if something is not clear to you. It is important that you understand the instructions - so if something is confusing or unclear - please ask me to explain. I'll now be going to the next room and I will be talking to you via the intercom. The entire experiment will be recorded, and I will be keeping track of your responses from the other room. The instructions I read to you from there will explain the details of the task. You will be working on problems that are in these booklets. Each booklet contains four problems. Each problem has 16 cards or trials - I use cards and trials interchangeably. As I mentioned, the remaining instructions will come to you through the intercom.

Remember, once we begin, please verbalize - say out loud - whatever you may be thinking about while working on these problems.

The task you will be working on is concerned with concept-formation and problem-solving ability. Later you will be looking at cards like the sample in front of you on Card 1. Note that each card has two stimulus patterns (one on the left and one on the right) which vary along four dimensions. There are specific values associated with each dimension. Each of the four dimensions has two values. In the sample, the dimensions and their values are: (1) letter type with values of A or T; (2) letter size with values of large or small; (3) border shape with values of circle or square; (4) border texture with values of solid or dashed. Each pattern has one value from each of the four dimensions. I have arbitrarily chosen one of the eight values as correct. The idea is for you to figure out what this correct value is. Look at each card and choose which side, left or right, contains the correct value. I will then tell you whether your choice of sides was correct or incorrect. In this way, you can eliminate the incorrect values and determine the correct value in a few trials. The object is to figure out what the correct value is so that you can choose the correct side as

often as possible. At the end of a series of trials, I'll ask you to tell me the correct value. As you remember, there are 16 cards per problem. You will begin with Card #1, and choose a side - left or right - and then I will tell you whether you are correct or incorrect, depending on whether or not the value I have chosen is on the side you select. Remember - the correct answer will never be a combination of values. The correct answer will be only one of the eight values - either circle or square - large or small - A or T - solid or dashed. Do you have any questions? Are the instructions clear?

Hints: The correct answer is one of the two shapes, either the square or the circle. From your last response (left or right) do you see which is the correct value? Now, let's go back to the beginning of Problem #1, Card #1. We will begin this problem fresh. I will be selecting a different value, and we will start this problem from scratch.

Second training problem: I have been saying "correct" or "incorrect" each time you selected either the right side or the left side. From now on I will not always tell you if you are correct or incorrect. After some cards I will say nothing. Don't let this bother you. Keep trying to be correct all of the time. Remember, you are still trying to figure out which of the dimension's values is the correct answer for this whole deck of cards.

Hints: If appropriate.

Soluble test problems: For the following problems I will be giving you feedback after every fourth trial or in other words after every fourth card. After the other cards, I will say nothing. Again, don't let this bother you. Keep trying to be correct for each of the cards all of the time. Remember, you are still trying to figure out which of the values is the correct answer for this whole series

of cards. Any questions?

Insoluble test problems: The following problems, which are contained in the other booklet, are similar to the problems you have been just working on. Go ahead and open the other booklet to the first set of stimulus patterns. The difference in these problems is that they now contain an additional dimension of color, either blue or red. So these problems now have five dimensions and ten values for you to choose from: (1) letter type with values of A or T; (2) letter size with values of large or small; (3) border shape with values of circle or square; (4) border texture with values of solid or dashed; and (5) letter color with values of blue or red. In addition, since I have included this extra dimension, you will have four more trials or cards to help you solve the problem. The feedback trials are the same - they will be given after every fourth trial or card. Also, remember to say the number of the card you are on when responding.

Let me remind you - please remember to verbalize - think out loud - whatever comes into you head - when you are working on these problems. It is important to the success of this experiment for me to know what you are thinking about while working on these problems.

Salience Condition: In addition to working on the problems, I want you to keep a record of how well you are doing on these problems. On this tally sheet, you will notice that there are eight problems. For each problem there are a series of lines that correspond to two columns, either CORRECT or INCORRECT. Each time I tell you that you are CORRECT or INCORRECT, I want you to put a checkmark in the corresponding column. Also, at the end of each column, for each series of problems, you will notice the words RIGHT or WRONG. After completing each problem, I want you to circle the word RIGHT or WRONG that

corresponds to whether I tell you that you are right or wrong in your choice of values. The numbers alongside the lines in the columns correspond to the cards where you will receive the feedback. Be sure to pay special attention to the feedback that I give you while working on these problems. This should help you do well on all the problems.

Instructions to all groups:

Remember to verbalize whatever you may be thinking about while working on these problems. I am very interested in your speech style as well as tonal qualities of your voice - but especially, I am interested in the many different things that college-age people think about while working on these types of problem-solving tasks.

APPENDIX E

Salience Manipulation Tally Sheet

TALLY SHEET

Problem #1

	Correct	Incorrect
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
	Right	Wrong

Problem #2

	Correct	Incorrect
2		
4		
6		
8		
10		
12		
14		
16		
	Right	Wrong

Problem #3

	Correct	Incorrect
4		
8		
12		
16		
	Right	Wrong

Problem #4

	Correct	Incorrect
4		
8		
12		
16		
	Right	Wrong

Problem #5

	Correct	Incorrect
4		
8		
12		
16		
20		
	Right	Wrong

Problem #6

	Correct	Incorrect
4		
8		
12		
16		
20		
	Right	Wrong

Problem #7

	Correct	Incorrect
4		
8		
12		
16		
20		
	Right	Wrong

Problem #8

	Correct	Incorrect
4		
8		
12		
16		
20		
	Right	Wrong

APPENDIX F

Interrater Reliability Coefficients for Verbalization Categories

Appendix F, Table 1

Interrater Reliability Correlation Coefficients for Verbalization Categories[1]

	Soluble (Success) Test Problems	Insoluble (Failure) Test Problems
Statements of useful-task strategy	.956	.966
Statements of ineffectual approach to task	.937	.978
Ability attribution	.950	.989
Chance attribution	1.000	.965
Effort attribution	.899	1.000
Task difficulty attribution	.919	.910
Experimenter attribution	.805	.898
Self-instructions	.912	.930
Self-monitoring	.899	.902
Statements of positive affect	.953	.971
Statements of negative affect	.949	.953
Positive prognostic statements	.952	.964
Solution-irrelevant statements	.990	.953
	$\bar{X}$ = .932	$\bar{X}$ = .952

[1] Pearson product-moment correlation coefficients

APPENDIX G

Post-Experimental Questionnaire

NAME: _____

SOCIAL SECURITY NUMBER: _____

CLASS: _____

AGE: _____ SEX: Male _____

Female _____

Did you feel the tasks were important? (circle the appropriate number)

1 2 3 4 5 6 7

Very important Not important

Did you feel friendly towards the experimenter? (circle the appropriate number)

1 2 3 4 5 6 7

Friendly Hostile

Did you feel the experimenter was fair with you? (circle the appropriate number)

1 2 3 4 5 6 7

Definitely fair Definitely unfair

How important do you think this research is? (circle the appropriate number)

1 2 3 4 5 6 7

Very important Not very important

Did you feel comfortable verbalizing your thought and feelings while working on the concept formation problems? (circle the appropriate number)

1 2 3 4 5 6 7

Very comfortable Not very comfortable

Please respond to the following questions in terms of how you felt during the concept formation tasks that utilized four-dimensions.

During the concept formation tasks (in which you attempted to identify the correct stimulus elements by choosing left or right), did you generally feel that you had the ability to solve the problems? (circle the appropriate number)

1	2	3	4	5	6	7
Did have ability						Did not have ability

For the same concept formation tasks, did you generally feel that there really was a solution to the problems? (circle the appropriate number)

1	2	3	4	5	6	7
Was a solution						Was not a solution

Did you feel certain of having solved the problems? (circle the appropriate number)

1	2	3	4	5	6	7
Very certain						Not certain

Were you satisfied with your performance on this task? (circle the appropriate number)

1	2	3	4	5	6	7
Very satisfied						Very dissatisfied

Please respond to the following questions in terms of how you felt <u>during</u> the concept formation tasks that utilized <u>five-dimensions</u>.

During the concept formation tasks (in which you attempted to identify the correct stimulus elements by choosing left or right), did you generally feel that you had the ability to solve the problems? (circle the appropriate number)

1	2	3	4	5	6	7
Did have ability					Did <u>not</u> have ability	

For the same concept formation tasks, did you generally feel that there really was a solution to the problems? (circle the appropriate number)

1	2	3	4	5	6	7
Was a solution					Was <u>not</u> a solution	

Did you feel certain of having solved the problems? (circle the appropriate number)

1	2	3	4	5	6	7
<u>Very</u> certain					<u>Not</u> certain	

Were you satisfied with your performance on this task? (circle the appropriate number)

1	2	3	4	5	6	7
Very satisfied					Very <u>dis</u>satisfied	

APPENDIX H

Attribution Questionnaire

In regards to your performance on the concept formation tasks, I want you to now assign percentage estimates of responsibility for the outcome on the tasks to each of the following:

(Your answers here apply to the four-dimension, 16 trial problems)

Your own ability	_____	per cent (%)
Chance	_____	per cent (%)
Your own effort	_____	per cent (%)
Task difficulty	_____	per cent (%)
The experimenter	_____	per cent (%)
		(your total should equal 100%)

(Your answers here apply to the five-dimension, 20 trial problems)

Your own ability	_____	per cent (%)
Chance	_____	per cent (%)
Your own effort	_____	per cent (%)
Task difficulty	_____	per cent (%)
The experimenter	_____	per cent (%)
		(your total should equal 100%)

APPENDIX I

Statistical Analyses

Appendix I, Table 1

Analysis of Variance of Hypothesis Checking Strategy Use on Two Soluble (Success) Test Problems:

Type A-B x High-Moderate Salience Classification

Source	Mean Square	df	F-Test	P(F)
Type (T)	1.225	1	3.366	0.078
Salience (S)	0.625	1	1.718	0.198
T x S	3.025	1	8.313	0.007
Error (between)	0.364	36	--	--

Appendix I, Table 2

Analysis of Variance (Two Between, One Within)
on the Number of Times Each Subject Used Ineffectual or
Disconfirmed Hypotheses on the Four Insoluble (Failure) Test Problems:

Type A-B x High-Moderate Salience Classification

Source	Error Term	Mean Square	df	F-Test
Salience (S)	N(ST)	2.7562	1	4.8940*
Type (T)	N(ST)	1.4062	1	2.4969
Problems (P)	PN(ST)	1.1062	3	2.9556*
S x T	N(ST)	2.5562	1	8.0901**
S x P	PN(ST)	0.2395	3	0.6401
P x T	PN(ST)	0.6562	3	1.7533
S x T x P	PN(ST)	0.1062	3	0.2839
N(ST)	--	0.5631	36	--
PN(ST)	--	0.3742	108	--

* $p < .05$
** $p < .01$

Appendix I, Table 3

Analysis of Variance on Subject's Degree of Deterioration on Hypothesis Testing Strategy Use:

Type A-B x High-Moderate Salience Classification

Source	Mean Square	df	F-Test	P(F)
Type (T)	0.025	1	0.143	0.708
Salience (S)	0.625	1	3.571	0.067
T x S	3.025	1	17.286	0.0001
Error (between)	0.175	36	--	--

Appendix I, Table 4

Means for Post-experimental Questionnaire Items (Seven-point Scale)

Items Scale (1 ——— 7)	High Salience A's	High Salience B's	Moderate Salience A's	Moderate Salience B's
Very important ——— Not important	4.90	4.50	4.70	3.50
Friendly ——— Hostile	1.90	1.90	2.20	2.20
Definitely fair —— Definitely unfair	2.10	1.60	1.80	1.60
Very important —— Not very important	2.50	3.30	3.40	3.20
Very comfortable - Not very comfortable	4.20	5.80	5.80	5.80
Did have ability - Did not have ability[1]	2.00	1.80	1.60	2.50
Was a solution —— Was not a solution[1]	1.30	1.20	1.40	1.50
Very certain ——— Not certain[1]	2.60	2.20	2.50	2.10
Very satisfied ——— Very dissatisfied[1]	2.80	3.10	2.70	2.90
Did have ability - Did not have ability[2]	3.40	2.70	3.20	2.90
Was a solution —— Was not a solution[2]	2.40	1.70	2.10	1.80
Very certain ——— Not certain[2]	4.00	4.30	4.70	4.50
Very satisfied ——— Very dissatisfied[2]	6.10	6.50	6.70	6.50

[1] Four Dimension (Soluble) Problems

[2] Five Dimension (Insoluble) Problems

Appendix I, Table 5

Analysis of Variance for Self-rating of Post-experimental Questionnaire Item "Was a Solution?":

Type A-B x High-Moderate Salience Classification

Source	Mean Square	df	F-Test	P(F)
Type (T)	2.500	1	4.286	0.046
Salience (S)	0.100	1	0.171	0.681
T x S	0.400	1	0.686	0.413
Error (between)	0.583	36	0.583	

Appendix I, Table 7

Means for Self-reported Attributions (Transformed Data)[1]

	Ability	Chance	Effort	Task Difficulty	Experimenter
High Salience A's x Success	.7799	.2241	.5389	.2337	.1771
High Salience A's x Failure	.7803	.1912	.5739	.3093	.1900
Moderate Salience A's x Success	.7045	.2660	.5406	.3566	.2394
Moderate Salience A's x Failure	.7009	.2761	.4892	.3902	.1654
High Salience B's x Success	.5824	.5542	.3888	.4088	.2741
High Salience B's x Failure	.4135	.5827	.4095	.5174	.3056
Moderate Salience B's x Success	.5762	.4555	.4492	.4430	.2775
Moderate Salience B's x Failure	.4975	.5125	.4012	.5077	.2814

[1]Means reported are presented in radians from transformed percentage estimate data.

APPENDIX J

Verbalization Category Rating Sheet

NAME _____ SUBJECT # _____

	Problem 1	Problem 2	Problem 3	Problem 4
1) Statements of useful strategy				
2) Statements of ineffectual approach to task				
3) Attributions: Ability Chance Effort Task Diff. Experimenter				
4) Self-Instructions				
5) Self-monitoring				
6) Statements of positive affect				
7) Statements of negative affect				
8) Positive prognostic statements				
9) Solution-irrelevant statements				
COMMENTS:				

NAME _____ SUBJECT # _____

	Problem 5	Problem 6	Problem 7	Problem 8
1) Statements of useful strategy				
2) Statements of ineffectual approach to task				
3) Attributions: Ability Chance Effort Task Diff. Experimenter				
4) Self-instructions				
5) Self-monitoring				
6) Statements of positive affect				
7) Statements of negative affect				
8) Positive prognostic statements				
9) Solution-irrelevant statements				
COMMENTS:				

THE TYPE A CORONARY-PRONE BEHAVIOR PATTERN AND REACTIONS TO UNCONTROLLABLE EVENTS:

AN ANALYSIS OF LEARNED HELPLESSNESS

by

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B.A., Rutgers-The State University, 1977

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ABSTRACT

This study investigated the differences between Type A and Type B students in their performance on a cognitive task before and during failure. The study further explored the nature of the experiences Type A and B subjects perceive before and during exposure to noncontingency resulting in failure. The Type A coronary-prone behavior pattern has been conceptualized as a response style aimed at asserting and maintaining control over one's physical and social environment. Past research has indicated that Type A's, compared to Type B's, greatly increase their initial efforts to assert control when confronted by potentially salient uncontrollable events. As nonreinforced responding continues, Type A's exposed to highly salient uncontrollable events, are also more likely to conclude that responding is futile and that they are in fact helpless. Helplessness has been shown to have deleterious effects on subsequent intellectual performance and, in extreme cases, physical health.

The present research was aimed at (a) determining the nature, timing, and relative frequency of a variety of cognitive variables by continuously monitoring verbalizations before and during failure and (b) specifying the precise nature of the performance change by examining the course of hypothesis-testing strategies during failure. Typa A and B subjects were assigned to one of two conditions: (1) Moderate Salience; and (2) High Salience. In order to examine performance change under failure and the accompanying cognitive components, subjects were trained on a discrimination learning task that allowed monitoring of their hypothesis-testing strategies and classification of the sophistication of the strategies before and during failure. Subjects were requested to verbalize "what they are thinking about" while performing the task. In contrast to the usual procedure of soliciting

statements of particular cognitions at prespecified times and of presupposed structure, this continuous verbalization procedure permitted subjects to report what congitions were salient to them as they became salient.

The results were consistent with previous research in that marked performance differences were observed between Type A and B subjects, dependent upon the salience classification: High Salience A's began to use more ineffective and less sophisticated strategies during the failure experience and to a lesser extent, so did Moderate Salience B's. When the cognitive concomitants of the performance changes were examined, certain distinctions were observed between High Salience A's and Moderate Salience B's. The High Salience A's attributed their failure on the tasks to internal causes (i.e., ability). Moderate Salience B's, on the other hand, tended to attribute failure on the tasks to external causes (i.e., task difficulty). The self-report attribution data, collected at the close of the experiment, suggested that the Type A and B subjects actually encoded their attributions to internal and external causes, respectively. The behavioral, cognitive and self-report measures reflected a consistency of the data. These results suggest that Type A's in the high salience condition were beginning to experience personal helplessness and may continue to do so if, in fact, the expectations of uncontrollability were generalized to a new situation. Conversely, Moderate Salience B's appeared to be "pseudohelpless", that is, they were experiencing universal helplessness.

Helplessness has been suggested as a precursor of coronary heart disease. This association between helplessness and coronary heart disease underscores the importance of understanding the factors potentiating the greater susceptibility of Type A's to the effects of uncontrollability. The present results suggested that attributions and attentional differences

mediate the relationship between Pattern A, helplessness, and coronary heart disease. Implications and speculations for the design of therapies and intervention techniques for coronary-prone (i.e., Type A) individuals were also discussed.