THE UNIVERSITY OF MANITOBA

THE EFFECTS OF CONTROL AND PREDICTION OF AVERSIVE STIMULI ON EXPECTANCY FOR SUCCESS, SKILL AND CHANCE ATTRIBUTIONS OF CONTROL, PROOFREADING PERFORMANCE AND PAIN RATINGS

by

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CHAPTER I

INTRODUCTION

Although a number of environmental stimuli are capable of producing stress responses in an individual, it is not these stimuli alone that determine the extent of stress reactions. Cognitive factors determined by the psychological structure of the individual are seen as crucial in determining an individual's reaction to specific aversive events in his life (Lazarus, 1966). Two of the important cognitive factors, controllability and predictability of the aversive stimuli, have been studied extensively. Control is viewed as important in terms of: (1) one's general belief about his ability to control what happens to him (Lazarus, 1966); and, (2) one's belief about his capacity for control in a particular situation (Glass & Singer, 1972; Lazarus, 1966). The former type of control is a personality variable while the latter is a situational variable. The predictability of an aversive event also reduces stress responses (Glass & Singer, 1972; Seligman, Maier & Solomon, 1971).

The term "stress" has had multiple meanings and other terms have been used to refer to similar phenomenon. Lazarus (1966) discusses the many uses of this term and suggests a new terminology. However, stress has been generally defined as the affective, behavioral and physiological response to aversive stimuli (Appley & Trumbell, 1967).[1] Noise as a

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[1]This general definition of stress will apply to this paper. "Aversive stimuli" will refer to painful or fearful events (Seligman, Maier & Solomon, 1971).

stressor has been discussed in detail by Glass and Singer (1972) and there are several reviews of the literature on the effect of noise (Broadbent, 1957; Kryter, 1950; 1970). In general, noise is capable of eliciting stress responses and the degree of stress appears to be mediated by cognitive factors. Thus, noise under certain conditions influences affective, behavioral, and physiological responses. Both the predictability and controllability of noise have been found to influence response to the noise (Glass & Singer, 1972).

Previous investigators of the effects of control of unavoidable events have typically: (1) compared controllable to uncontrollable stimuli; (2) varied either the onset or the duration of the stimuli; and (3) focused more on control as a situational than as a personality variable. Previous researchers have also compared the predictability versus the unpredictability of aversive events. The dependent variables investigated can be categorized as affective (e.g., pain ratings), behavioral (e.g., proofreading performance), or physiological (e.g., skin conductance) responses. When control and prediction have been compared in the same study, predictability of the onset and controllability of the duration were varied. Although the findings have been contradictory, there is evidence that both control and prediction reduce the impact of aversive stimuli (Seligman, Maier & Solomon, 1971).

The purpose of the present study was to investigate the relative effects of control and prediction of unavoidable aversive events for subjects who differed in their general beliefs about control (as determined by Rotter's (1966) Internal-External Scale). The effects of control and prediction of both the onset and the duration of white noise were compared. The following measures were utilized as the dependent variables: expectancy for success, skill attribution, chance attribution, proofreading performance, and pain ratings. The following review of the literature attempts to show the relationship between situational control, prediction, and generalized expectancies for control.

Control of Aversive Events

Individuals have been placed in potentially aversive situations and then have been allowed some degree of control over what happens to them in these situations. When such control was possible, there was often less stress than when no control was possible. For example, it has been shown that subjects who could control the order of intelligence subtests to be taken had no increase in galvanic skin response during the instruction period while subjects with no control had significant increases in galvanic skin response (Stotland & Blumenthal, 1964); subjects who could advance slides of travel pictures at their own rate tolerated ice water immersion longer than subjects whose slides were changed by the experimenter (Kanfer & Seidner, 1973); subjects who could avoid shock selected a higher level of shock and rated themselves as less anxious than did random shock subjects (Bowers, 1968); subjects who could control rest periods from a shock avoidance procedure had lower systolic blood pressure levels than subjects who had no control of the rest periods (Hokanson, DeGood, Forrest & Brittain, 1971); and, subjects who expected to be able to escape shock if they exhibited skill in a recognition-learning situation showed heightened perceptual vigilance in comparison to subjects who did not expect to escape shock (Phares, 1962).

The results of a well-known study contradicts the typical findings of the effects of control. Brady, Porter, Conrad and Mason (1958) placed pairs of monkeys in a shock avoidance condition. Only one monkey in each pair, the "executive", could prevent the shocks. By pressing a lever he could prevent both himself and his partner from being shocked. The "executives" were the ones which tended to develop massive stomach ulcers while the partners who had no control did not develop ulcers. This study has been criticized by Seligman, Maier and Solomon (1971) on the grounds that the monkeys were not randomly assigned to the groups. It was the monkeys which learned an avoidance response first that were chosen as executives. They point out that Sines, Clelland and Adkins (1963) found that rats which are susceptible to ulcers acquire an avoidance response faster than controls. It is possible, then, that the executive monkeys were constitutionally more emotional and prone to ulcers than were their partners. In addition, when Weiss (1968) used rats in a similar experiment, uncontrollable shocks resulted in more ulcers and a greater decrease in body weight than controllable shocks.

Control of the onset of aversive events when studied in terms of individuals being able to administer shocks to themselves also has been found to reduce stress. Haggard (1943) found that subjects who could administer their own shocks showed less anxiety, as measured by galvanic skin response, than subjects who could not administer the shocks. Pervin (1963) found that subjects preferred shocks that they could deliver to themselves more than those delivered by the experimenter. Staub, Tursky and Schwartz (1971) found that subjects who could administer shocks to themselves and control the intensity of the shocks reached greater levels of shock before they reported it as uncomfortable and endured stronger shocks than subjects who had no control of the administration and intensity of the shocks.

Control of the duration of aversive events also influences stress. A classical study by Mowrer and Viek (1948) led to later research in this area. In this early study, one group of rats was trained to escape shocks by rearing up on their hind legs. A second group received unescapable shocks of the same duration. The group that had received uncontrollable shocks refused food more frequently than did the group which had received controllable shocks. This finding was subsequently confirmed (Lindner, 1968).

The results of some studies with humans have also indicated that control of the duration of aversive stimuli influences stress; however, the findings have been inconsistent. Physiological, affective, and behavioral responses have been utilized as dependent variables in examining the effects of control of the duration of aversive stimuli.

Physiological responses to the aversive stimuli when the duration was controllable have been studied in terms of skin conductance and heart rate measures. Control of the duration of aversive stimuli has been found to reduce skin conductance responses to the aversive stimuli. Corah and Boffa (1970) found that trials in which subjects could not escape (i.e., influence the duration) from white noise led to greater skin conductance changes than trials in which subjects could escape. Geer and Maisel (1972) found that control of the duration of aversive photographs led to a lower skin conductance than no control. Several studies found that even the perception of having control reduced skin conductance responses (Champion, 1950; Geer, Davidson & Gatchel, 1970).

On the other hand, Bandler Madaras and Bem (1968) found no differences in skin conductance responses between trials in which subjects could escape aversive stimuli and those in which subjects could not escape the aversive stimuli. And Glass and Singer (1972) reported on a number of studies that indicate that skin conductance responses decrease (i.e., adaptation takes place) after repeated exposure to the stimuli regardless of the controllability of the duration. However, when they looked at the skin conductance responses during the first few exposures to the aversive stimuli, they found that control led to smaller skin conductance responses than no control. In a later study (Glass, Singer, Skipton, Kranz & Cohen, 1973) adaptation was not found to occur in either control or no control conditions.

The findings regarding heart rate are also inconsistent. Elliott (1969) found that there was greater heart rate acceleration in a shock controllable condition than in a shock uncontrollable condition. However, Geer, Davidson, and Gatchel (1970) found no differences in heart rate measures for perceived control and no perceived control subjects.

Affective responses to aversive stimuli as a function of the controllability of the duration of the aversive stimuli have also been examined. Again, the findings have been inconsistent. For example, controllable in comparison to uncontrollable aversive stimuli were found to be less aversive (Glass, Singer & Friedman, 1969), to lead to the endurance of stronger shocks (Bowers, 1968), to produce more tension (Elliott, 1969), to produce less anxiety (Bowers, 1968), and to be rated equally in the degree of painfulness (Geer, Davidson & Gatchel, 1970). In terms of discomfort ratings, the results of one study (Corah & Boffa, 1970) suggests that controllable aversive stimuli produces less discomfort than uncontrollable ones while the results of another study (Bandler, Madaras & Bem, 1968) suggest that uncontrollable aversive stimuli produce less discomfort than controllable ones.

Behavioral responses to aversive stimuli which are controllable in terms of the duration have been examined through the use of a performance task after exposure to the aversive stimuli. Glass, Singer, and Friedman (1969) found that subjects with perceived control of the duration showed greater tolerance for frustration (that is, tried more insoluble puzzles) and performed better on a proofreading task than subjects with no perceived control of the duration. These findings were confirmed by Mayhew (1969).

Thus the findings regarding the effect of control of the duration of aversive stimuli on physiological and affective responses have been contradictory. The effects on behavioral responses have received relatively little attention but the present evidence suggests that perceived control of the duration reduces impairment following exposure to aversive stimuli. Two factors which have been neglected in previous research and which may help account for the contradictory findings are: (1) the predictability of the onset of aversive stimuli and (2) generalized expectancies for control (internal versus external). The implications of these two factors are discussed below.

Prediction of Aversive Events

The type of predictable or unpredictable aversive events which are relevant to this paper are those which are certain to occur but the time of onset or duration are either known (predictable) or unknown (unpredictable). In the studies on the effects of predictable versus unpredictable aversive events on behavior, the focus has been on the predictability of the onset of the aversive stimuli rather than the duration.

Prediction of aversive events appears to influence stress. Pervin (1963) found that subjects reported less anxiety when they knew when shocks were to occur than when they did not know when the shocks were to occur. Predictable shocks were also preferred to unpredictable ones. Jones, Bentler and Petry (1966) reported two studies in which it was possible to make responses that would provide information about the scheduling and sequencing of unavoidable shocks. They found that such information served as a positive reinforcement. Monat, Averill and Lazarus (1972) found that subjects preferred a condition in which the time of shock onset was known rather than a condition in which the time of shock onset was unknown. Behavioral aftereffects have also been reduced by making the aversive events predictable (Glass, Singer and Friedman, 1969; Mayhew, 1969).

The above studies suggest that being able to predict when aversive events are to occur is less stressful than not being able to predict their onset. However, prediction may have a different effect on heart rate measures. Two studies (Deane, 1961; Elliott, 1969) found that knowledge regarding when shocks were to occur increased heart rate acceleration.

Thus, prediction under certain conditions does play a role in reducing stress. The previously mentioned studies regarding the effect of control of the duration of aversive stimuli have not taken into account that the predictability of the onset and/or duration of the aversive stimuli may have influenced the results. The onset of the aversive stimuli has sometimes been predictable and at other times unpredictable. In addition, the duration in the no control conditions varied in their predictability.

The Relationship Between Control and Prediction of Aversive Events

In general, the results of the previously mentioned studies suggest that when aversive events are made either predictable or controllable the adverse effects of the events are reduced. Some studies have varied both the predictability of the onset and the controllability of the duration of aversive stimuli; however, only one study attempted to directly compare the effectiveness of the two variables (i.e., prediction versus control of the duration).

Glass, Singer and Friedman (1969) exposed their subjects to loud unpredictable (randomly occurring) noise. Half of the subjects were given a button which would enable them to terminate the noise for the rest of the experiment. These subjects were encouraged to use the button only if the noise became too much for them to bear. Subjects with the button showed greater tolerance for frustration (that is, tried more insoluble puzzles) and performed better on a proofreading task than subjects without a button.

The effectiveness of the possession of a button to terminate aversive stimuli was also found by Mayhew (1969). Subjects were exposed to either unpredictable or predictable high intensity noise. Within each of these conditions, some subjects were given a button with which to terminate the noise while other subjects did not have a button. Possession of the button during exposure to the unpredictable noise reduced the number of proofreading errors missed and increased subjects' tolerance for frustration. When the noise was predictable, both button and no button subjects performed at a similar level as a no noise control group.

In general, the above mentioned studies provide more support for the idea that both prediction and control reduce the impact of aversive stimuli. However, since these studies varied predictability in terms of the onset of the aversive stimuli and varied control in terms of a potential escape response, no direct comparisons of control and prediction were possible. More information about the relative effectiveness of the two variables might be obtained by comparing the control of the onset of the aversive stimuli with prediction of the onset and by comparing prediction of the duration with control of the duration.

Prediction and control of the duration of aversive stimuli were compared in one study. Geer and Maisel (1972) investigated the possibility of a prediction-control confound operating in previous studies on the effects of control of the duration of aversive stimuli. They asked the following question: "Are the effects of control due primarily to the ability of the subject to predict or is the effect of control somehow more directly related to the effect of control itself?" (Geer & Maisel, 1972,

p. 314). They pointed to the fact that subjects who control the duration of an aversive stimulus can also predict its duration. In their study they utilized three groups of subjects who had different types of control over the duration of photographs of violent death victims. An actual control group could control the duration of the aversive stimuli by the use of a button which they held in their hand. A predictability group received information about the duration time of the aversive stimuli. Subjects in the actual control and predictability groups were provided with information about when the stimuli would begin via a warning tone that preceded each aversive stimulus by 10 seconds. The dependent variable was galvanic skin response. Subjects in the actual control group reacted with a lower skin conductance to the photographs than the other two groups. Subjects in the predictability group were more strongly affected by the warning tone preceding the stimuli than the actual control group. The authors concluded that the effects of control are not due just to prediction.

Geer and Maisel's study leaves many questions unanswered. First, does control of the duration of aversive stimuli result in lower skin conductance only when the onset of the aversive stimuli is predictable? In other words, will control and prediction act alike if the onset is unpredictable? Second, how effective were the manipulations of actual control, prediction, and no control? It seems particularly important to check the effectiveness of the prediction manipulation since the subjects had to rely on their ability to judge the time factors disclosed to them. Third, would the results be similar if psychological measures were used rather than galvanic skin response? That is, control and prediction may have similar effects on affective and/or behavioral responses. Fourth, did the fact that the no control subjects were not able to predict the onset of the aversive stimuli influence the results? In other words, the no control group differed from the other two groups by being exposed to unpredictable onsets as well as unpredictable durations of the aversive stimuli. Fifth, would the results be the same if subjects who clearly differed in generalized expectancies for control (internals and externals) were placed in the three conditions? That is, does control and prediction of aversive stimuli influence internals and externals in the same way?

Thus, the nature of the relationship between control and prediction is not clear. However, the results of several studies suggest that these two variables may play a similar role in decreasing stress. In Staub, Tursky and Schwartz's (1971) first experiment subjects who could control the administration of shocks to themselves tended to administer the shocks in rapid sequence (about five seconds between shocks). Because of this timing the shocks became predictable to a yoked no control group. No differences were found between the two groups on any of the four measures used. In a second experiment a signal light was used before each shock and the timing of the light was varied in order to prevent yoked no control subjects from being able to predict when the shocks were to occur. Under these conditions, subjects with control reached greater levels of shock before they reported it as uncomfortable and endured stronger shocks than subjects who did not have control. The authors used the data from their own study and that from the Glass, Singer and Friedman (1969) study to suggest the following relationship between control and prediction:

> Lack of control represents a condition of helplessness; the ability to predict events may reduce the subjective experience of helplessness even when control is not possible, and thereby reduce tension or anxiety... . Previous research findings (Glass et al., 1969) together with the present ones suggest the possibility that under some conditions control and predictability may function as safety signals that reduce threat and the impact of aversive stimuli; when the ability to terminate aversive stimuli is lacking, predictability may reduce impact, and when the ability to predict is lacking, a perceived ability to terminate aversive stimuli may have a similar effect... . (Staub, Tursky & Schwartz, 1971, pp. 161-162).

This idea that control and prediction function interchangeably (Staub, Tursky & Schwartz, 1971) and the idea that it is the element of prediction in control that accounts for the effect of control (Geer & Maisel, 1972) needs further investigation.

<u>Locus of Control of Reinforcement</u>

The above studies on control have focused on control as a situational variable. Through Rotter's (1966) locus of control of reinforcement construct, control has been studied as both a situational and personality variable.

One of the main concepts in Rotter's social learning theory is expectancy. Expectancy is defined as the probability held by a particular individual that a certain behavior in a specific situation will lead to a particular reinforcement. Rotter (1954, 1966) focuses on two kinds of expectancy: situational specific expectancy and generalized expectancy. Both kinds of expectancy are partly the result of previous experience, but the former is the result of experience in the same situation while the latter involves the experience of the individual in other situations for functionally related behaviors. Reinforcement is thought to strengthen an expectancy that a particular behavior or event will be followed by that reinforcement in the future. If the reinforcement does not follow the behavior or event, then the expectancy will be extinguished or reduced.

One expectancy construct, locus of control of reinforcement (Rotter, 1966; Rotter, Seeman & Liverant, 1962), has been investigated under both generalized expectancy and situational expectancy conditions. As a generalized expectancy, locus of control is viewed as a personality variable (Nickels & Williams, 1970). Rotter believes that individuals differ in the extent to which they attribute reinforcements to their own actions (internals) or to external factors such as fate, luck, chance, or other people (externals). The measurement of individual differences has been accomplished primarily through the use of the Internal-External Scale (I-E scale) described by Rotter (1966).

As a situational expectancy, locus of control is viewed by Rotter as a function of whether, in a given situation, reinforcement is expected to be contingent upon one's behavior (skill) or under the control of a source external to the individual (chance). Situations thus can differ in the kind of cues given about the control of reinforcement. The situational variable has been studied either by ambiguous tasks where the locus of control is defined by differential instructions (skill or chance), or by the use of tasks that by their nature are skill or chance determined and may or may not have differential instructions.

When compared in a variety of situations internals have been found to differ from externals. For example, it has been shown that internals differ from externals in being more persistent at a task (Shepel & Weiss, 1970), reporting more constructive reactions to frustrations (Brissett & Nowicki, 1973), showing more sensitivity to environmental stimuli (Ducette & Wolk, 1973), devaluating failed tasks less (Phares, Wilson, & Klyver, 1971), tending to forget failures (Efron, 1963), preferring skill rather than chance activities (Schneider, 1968), resisting subtle attempts to influence their behavior (Johnson, 1970), engaging in more behaviors that would yield information (Davis & Phares, 1967), and showing less attitude change with a high prestige communicator (Ritchie & Phares, 1969).

Internals and externals have been placed in situations that were skill or chance determined. Some investigators suggest that the personality variable of internal-external control is more important in determining the subjects' responses than the situational variable (Phares, 1965; Seeman & Evans, 1962; Seeman, 1963) while other investigations suggest that the situational variable may be the more important factor (Lefcourt & Steffy, 1970; McDonald, Tempone & Simmons, 1968; Nickels & Williams, 1970; Williams, 1971).

Locus of control was initially viewed as a variable that primarily influences learning. However, as shown above, the construct has been found to be useful in predicting behavior in a variety of situations. Thus, it is possible that the construct may have some usefulness in predicting responses to aversive events.

Locus of Control and Controllable and Predictable Aversive Events

The reactions of internals and externals have been studied in relation to failure (Bandt, 1967; Davis & Davis, 1972), reported reactions to frustration (Brissett & Nowicki, 1973), and threat (Lipp, Kolstoe, James & Randall, 1968). However, only a few studies have examined how internals and externals behave in relation to control of physically aversive stimuli and there are no studies concerning prediction of such aversive stimuli.

The results of two studies suggest that the perception of control of aversive events differentially affects the cognitive task performance of internals and externals (Houston, 1972; Watson & Baumal, 1967). In Houston's (1972) study, internals and externals were assigned to either an unavoidable or avoidable shock condition. In the unavoidable shock condition the subjects were told that there was no way of avoiding an electric shock which would occur randomly while they performed a memory task. In the avoidable shock condition the subjects were told that they could avoid an electric shock by not making mistakes on the memory task. In a nonstress condition shock was not mentioned and the subjects simply performed the memory task. No shocks were actually delivered to any of the subjects. The results indicated that subjects performed better in congruent control situations than incongruent ones (i.e., internals in the avoidable shock condition and externals in the unavoidable shock condition).

In another study (Watson & Baumal, 1967), internals and externals learned a list of paired associate nonsense syllables either under instructions that these associates would later serve as avoidance responses (subject to their learning skills) or would sometimes serve as avoidance responses (to be determined by chance). Internals had more errors and requested more practice trials when they anticipated not having control over the later situation, while externals made more errors and requested more practice trials when they anticipated control over the later situation. As in Houston's study, no shock was actually delivered.

Degree of anxiety in controllable versus uncontrollable aversive situations did not differ for internals and externals. Houston (1972) using the Affect Adjective Check List (Zuckerman, 1960) and heart rate as measures of anxiety found no internal-external differences. Bowers (1968) found no internal and external differences when using a five point anxiety rating scale and skin conductance as measures of anxiety. These findings, however, can be questioned on the basis that in both of the above studies all levels of I-E scorers were used. There is evidence that middle scorers on the I-E scale respond differently in certain circumstances than either internals or externals (e.g., Lipp, Kolstoe, James & Randall, 1968). The use of these middle scorers in these studies may have influenced the results.

There is evidence of a relationship between an external generalized expectancy and an uncontrollable aversive situation. Hiroto (1974) using a learned-helplessness paradigm found that externals were more helpless (responded slower, had more trials to reach an avoidance criterion, and made fewer responses during the test trials) after exposure to uncontrollable noise than internals. Hiroto suggests that an external generalized expectancy for control and an uncontrollable aversive situation are related. That is, both conditions can be seen as involving "the expectancy that responding and reinforcement are independent" (Hiroto, 1974, p. 192).

Several studies on coping reactions during anticipatory stress (Averill & Rosenn, 1972; Monat, Averill & Lazarus, 1972) had subjects take the I-E scale along with other personality scales. The I-E scale did not relate to coping strategies.

In summary, relatively little attention has been given to how internals and externals react to controllable and uncontrollable aversive events. There is some evidence that internals and externals perform better on cognitive tasks when they are in congruent control conditions rather than incongruent ones. However, other evidence suggests that externals may be more helpless in congruent control situations. Measures of anxiety have not distinguished internals from externals in aversive situations but this may be due to the type of I-E scorers used.

The findings that internals and externals perform better in congruent control situations (Houston, 1972; Watson & Baumal (1967) are not in line with the suggestions and findings of other investigators. Davis and Phares (1967) and Rotter (1966) suggest that it is ambiguous control situations that the personality variable is more important in determining behavior while situations in which the locus of control is clearly structured (control versus no control or skill versus chance) the situational variable is more important. The results of several studies (e.g., McDonald, Tempone & Simmons, 1968; Nickels & Williams, 1970, and Williams, 1971) found no differences between internals and externals when the control conditions were clearly structured. It may be that there are certain conditions under which the personality variable is more important even though the situation is structured and that aversiveness is one of these conditions.

Is a situation that allows knowledge of the time factors involved for the onset and/or duration of aversive events (i.e., a prediction situation) similar to either a condition of control or of no control? Although it has been assumed that prediction allows the perception of some degree of control over aversive events (Lefcourt, 1973; Staub, Tursky, & Schwartz, 1971), previous research has not focused on this question. A prediction situation may be somewhat ambiguous in regards to where the control lies; thus, according to the suggestion mentioned above (Davis & Phares, 1965; Rotter, 1966), one's general belief about control might operate in a prediction situation. If as previous studies have indicated (Davis & Phares, 1967; Seeman & Evans, 1962), information is more important to internals than externals, and if knowledge can provide a sense of control, then internals might perceive the situation as one in which he has control. Consequently, an internal in a prediction situation would behave more like subjects who clearly have control of the aversive stimuli while externals would behave more like subjects without control.

The Present Study

From previous research it isn't clear whether or not control and prediction are equally effective in reducing the impact of stress reactions. In addition, the role of generalized expectancies for control in prediction and control situations isn't clear. The present study was concerned with these two issues. Individuals differing in generalized expectancies for control (internals and externals) into conditions which varied in the type of control of the onset and type of control of the duration of aversive stimuli (white noise presentations). These conditions were: actual control (the subjects could indicate when the onset of the aversive stimuli was to occur and/or its duration); prediction (the subjects knew when and/or for how long the aversive stimuli would occur); and, no control (the subjects had no control of or knowledge of the onset and/or duration of the aversive stimuli). Thus, control and prediction could be compared in two different situations (type of control of the onset and type of control of the duration) and the behavior of internals and externals could be compared in the different type of control situations. The effects of the variables of generalized expectancies for control, type of onset control, and type of duration control on the following dependent variables were examined; performance on a proofreading task (i.e., percentage of errors missed and the number of words read), expectancy for success, skill attribution, chance attribution, and pain ratings.

The selection of the dependent variables involved several considerations. First, proofreading performance and pain ratings have previously been found to be influenced by both control and prediction of aversive stimuli. Thus, they were relevant for a comparison of the effects of these two variables. Second, expectancy for success and attribution to skill or chance factors have been studied in relation to Rotter's locus of control of reinforcement construct and their inclusion in this study might help clarify the relationship between situational control, generalized expectancies for control and prediction.

The present study was closely related to the previously mentioned Geer and Maisel (1972) study in that control and prediction were compared. However, the present study attempted to expand Geer and Maisel's results by: (1) examining psychological rather than skin conductance responses; (2) examining the possible influence of generalized expectancies for control; (3) comparing control and prediction of the onset in addition to the duration; and, (4) providing subjects in the prediction conditions with more precise knowledge concerning the onset and duration of the aversive stimuli.

The effects of the three types of control of the onset have not previously been compared to each other. Although prediction may provide the perception of some degree of control, it is assumed here that the positive aspects of actual control will be greater. A situation where control is possible through making a response (i.e., where one's skill can be utilized) might be expected on a subsequent task to lead to higher expectancies for success, better performance, and attribution of his success to skill rather than chance factors. Such a situation might also lead to the experiencing of the aversive stimuli as less painful than when no control is possible.

Along the same lines and on the basis of the Geer and Maisel (1972) finding, subjects with control of the duration of aversive stimuli might be less negatively affected than subjects with prediction or no control.

Generalized expectancies for control might also influence the effects of type of control of the onset and type of control of the duration. Previous research suggests that internals and externals in congruent control situations show less stress than when in incongruent control situations. In addition, a prediction situation may provide internals with more of a sense of control than externals.

On the basis of the above considerations the following hypotheses were made:

(1) Subjects in the onset actual control condition will have higher expectancies for success, higher skill attribution, lower chance attribution, a smaller percentage of errors missed, a larger number of words read, and lower pain ratings than subjects in the onset prediction and onset no control conditions.

(2) Subjects in the duration actual control condition will have higher expectancies for success, higher skill attribution, lower chance attribution, a smaller percentage of errors missed, a larger number of words read, and lower pain ratings than subjects in the duration prediction and duration no control conditions.

(3) Internals in the actual control conditions and externals in the no control conditions will have higher expectancies for success, higher skill attribution, lower chance attribution, a smaller percentage of errors missed, a larger number of words read, and lower pain ratings than internals in the no control conditions and externals in actual control conditions; internals in the prediction conditions will have higher expectancies for success, higher skill attribution, lower chance attribution, a smaller percentage of errors missed, a larger number of words read, and lower pain ratings than externals in the prediction conditions.

CHAPTER II

METHOD

Subjects

Rotter's (1966) Internal-External Scale (I-E scale) was administered along with other scales to approximately 1000 female introductory psychology students from the University of Manitoba in large groups prior to the main experiment and as part of another experiment. Subjects were then selected on the basis of their score on the I-E scale. One hundred and ninety-six subjects participated in the experiment. The data from sixteen subjects were excluded from the experiment[2] resulting in a final subject sample of 180 which represented 91.8% of the total subjects tested.

The I-E scale consists of 29 forced-choice items and it mainly samples general attitudes and beliefs regarding how reinforcement is controlled. An individual who holds the view that his behavior is the instrument by which he obtains reinforcement is labelled an internal, while the individual who perceives that his reinforcements are beyond his control is labelled an external. The I-E scale is scored in terms of the number of external items selected; thus, a high score indicates an external

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[2]Subjects were excluded from the experiment for the following reasons: actual control subjects with very long duration times (3 subjects); unwillingness to tolerate the white noise during the test trials (4 subjects); inability to follow instructions (2 subjects); inability to reach the criterion level of aversiveness during the pretest trials (5 subjects); equipment failure (1 subject); and, lack of any aversive ratings of the white noise during the test trials (1 subject).

expectation and a low score indicates an internal expectation. A copy of the I-E scale is located in Appendix A. The mean score on this scale was originally reported as between 8 and 9 (Rotter, 1966) and was later reported as between 12 and 13 (Rotter, 1971). Due to the change in the mean score over time and the reported variability for different samples of subjects (Rotter, 1966), the range of scores obtained for all females tested for the present study was the basis for the cut-off scores for internals and externals. The range of scores was divided into thirds: high (externals), middle, and low scores (internals). By this method, subjects who scored 15 and above were considered as externals, while subjects who scored 9 and below were considered internals. Subjects who scored in the middle range were excluded from the experiment since middle scorers have sometimes responded differently in certain situations than internals or externals (e.g., Bandt, 1967; Lipp, Kolstoe, James & Randall, 1968) and little is known concerning why these differences occur. For example, middle scorers were found to be less denying than either internals or externals (Lipp, Kolstoe, James & Randall, 1968). Females only were included in this study in order to control for possible sex differences. Sex differences in terms of how internals and externals behave have been found in the past (e.g., Silvern & Nakamura, 1971; Levenson, 1972).

Apparatus

White noise ranging in intensity from 79-105 decibels from a Grason-Stadler generator, model 901-B, was used as the aversive stimuli and was presented to the subject over Sharpe fidelity earphones, model HA-10.

A triple interval digital display[3] was used specifically to insure that subjects in the prediction conditions would know when the white noise would start and/or stop. The requirements of the display, that in certain instances it provide an unequivocal indication of the onset of an event and that the indication should be easily changed, suggested the use of integrated circuits to carry out the counting and logic functions. The Motorola family of McMos devices were used. A picture of the unit that controlled the subject's display (control unit) can be found in Appendix B. A three-decade "presettable down-counter" ranging up to 99.9 was used to control the time intervals. An accurate 10 Hz clock pulse fed to the counters caused them to count backwards from the previously set number to 00.0 in so many seconds. Circuits to detect the zeros in the counters immediately advanced the program such that a new previously set number was presented to the down-counter and the process repeated.

Three different intervals could thus be developed before repeating: Response, Onset, and Duration. The Response Interval was fixed at 15 seconds. The Onset and Duration Intervals could each be operated in two ways. When either or both were set to the "actual control" mode, the permanently wired number 99.9 was presented to the pre-settable counters. In this case, the program was advanced to the next interval manually by the experimenter. In the "prediction" conditions, however, three easily

[3]The requirements for the display and control units were determined by Dr. James Nickels, Les Bell and Florence Vantress. The units were designed and built by Les Bell.

adjusted rotary switches selected any number up to 99.9, as required. In the "no control" mode, control of the intervals was identical to the "prediction" mode. Onset and duration intervals as determined by the actual control subjects was measured by two digital clocks.

The display unit presented to the subjects was in a separate housing from the previously mentioned control unit (see Appendix C for a picture of the display box). Two large (7/8" wide x 1 1/4" long) red L.E.D. numeric readouts (digits) were viewed by the subjects from a sloping panel which was part of a 6 x 5 x 4 inch cabinet. These digits showed the two most significant numbers contained in the down-counters discussed above during the Onset and Duration Intervals in the "actual control" and "prediction" conditions. The display was blanked out during the Response Interval. In the "no control" condition, the display was altered each second as in the other conditions, but merely reflected the arithmetic of rapidly adding 57 to a two-decade counter every second. For example, the numbers appeared in the following sequence: 72, 29, 86, 43, 00, 57, 14, 71, 38.

Independent Variables

The basic design of the experiment was a 3 x 3 x 2 x 2 higher order repeated measures design with three between subject variables (type of control of the onset, type of control of the duration, and generalized expectancies for control) and one within subject variable (pre- and posttrial measurements). A summary of the design is illustrated in Table 1. The design applied to the following dependent

TABLE 1

EXPERIMENTAL DESIGN

Measured I-E Category	Experimental Conditions	
	Onset	Duration
Internals	Actual control	Actual control
		Prediction
		No control
	Prediction	Actual control
		Prediction
		No control
	No control	Actual control
		Prediction
		No control
Externals	Actual control	Actual control
		Prediction
		No control
	Prediction	Actual control
		Prediction
		No control
	No control	Actual control
		Prediction
		No control

variables: expectancy for success, skill attribution, chance attribution, percentage of errors missed, and number of words read. Pain ratings were measured on a posttrial basis by a 3-way analysis of variance using the 3 previously mentioned between variables.

Generalized expectancies for control. As stated previously, Rotter's (1966) I-E scale was administered prior to the main experiment and subjects were selected on the basis of their scores on this scale. Ten internals and ten externals were assigned to each of the nine treatment conditions in the manner described in the procedure.

Control of the onset. Subjects were assigned to one of three onset conditions. Subjects in the actual control condition indicated when they wanted the aversive stimuli to start. The numbers in the display box began at 99 and decreased sequentially. When the subjects wanted the noise to start, they stated out loud the number that was then being displayed. Subjects in the prediction condition knew when the aversive stimuli would begin. The numbers in the display box decreased sequentially until 00 was reached. When 00 was displayed, the subjects stated "zero" out loud. At the finish of zero on the display, the white noise started. Subjects in the no control condition could neither determine when nor knew when the aversive stimuli would occur. The numbers in the display box gave no information about the onset of the white noise. In order to insure that the no control subjects also watched the display, they were told to state out loud whatever number was being displayed when the noise started.

Control of the duration. Subjects were assigned to one of three duration conditions. Subjects in the actual control condition indicated when they wanted the aversive stimuli to stop. The numbers in the display box began at 99 and decreased sequentially. When the subjects wanted the noise to stop, they stated out loud the number that was then being displayed. Subjects in the prediction condition knew when the aversive stimuli would stop. The numbers in the display box decreased sequentially until 00 was reached. When 00 was displayed, the subjects stated "zero" out loud. At the finish of 00 on the display, the white noise stopped. Subjects in the no control condition could neither determine the duration nor knew the duration of the aversive stimuli. The numbers in the display box gave no information about the duration of the white noise. In order to insure that the subjects watched the display, they were told to state whatever number was being displayed when the noise stopped.

Pretrial and Posttrial Measurements. The experiment involved two periods of measurement. The measurements were taken: (1) before each subject was exposed to the aversive stimuli (pretrial); and (2) after the 15 trials of white noise (posttrial). Pretrial and posttrial measurements constituted a repeated or within subject variable.

Dependent Variables

The following is a list of dependent variables in the order in which they were presented to the subject:

Expectancy for success. Expectancy for success was measured by asking each subject to state the percentage of errors that she expected to locate in the proofreading task.

Skill attribution. The influence of a number of factors in determining proofreading performance was measured by the Attribution Questionnaire (see Appendix D). Each subject indicated the contribution she felt each of the following factors makes in determining the percentage of errors found in the proofreading task: your present skill at proofreading; your past experience at proofreading and performing similar tasks; your mental, emotional, and physical state during the proofreading task; your luck; chance; the kind of passage; the type of errors in the passage; and, other. Skill attribution was measured by taking the percentage of influence attributed to factor A: "your present skill at proofreading."

Chance attribution. Chance attribution was measured by taking the percentages of influence each subject attributed to factor D ("your luck") and factor E ("chance") on the Attribution Questionnaire.

Percentage of errors missed. The proofreading tasks[4] required each subject to correct errors in a passage approximately two pages in length. Each page of the tasks contains about 250 words and there are about 15 errors on each page. Errors were misspellings, transpositions, grammatical mistakes, punctuation errors and typographical errors. Copies of Proofreading Task A and Proofreading Task B are located in Appendix E. To control for possible differences in the difficulty of the passages one half of the subjects were given Task A first and half of the subjects were given Task B first. Percentage of errors missed was measured by dividing the number of errors missed (not found) by the number of errors possible to locate at the point the subject was told to stop work (i.e., after 5 minutes). The number of words read by each subject

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[4]These tasks are modifed versions of the one used by Glass and Singer (1972) and Glass, Singer and Friedman (1969). The passages were taken from sections of Jacob's (1961) The death and life of great American cities.

was also measured to determine if the mean number of words was similar among subjects in the various conditions.

Pain ratings. Pain ratings were measured only on a posttrial basis. Following each of the 15 test trials of white noise, each subject rated the white noise in terms of it's pleasantness-painfulness on the Noise Rating Scale (see Appendix F, for a copy of the Noise Rating Scale). On this 15 point scale, minus seven indicated that the noise was extremely pleasant, plus seven that the noise was extremely painful, and zero that the noise was neutral. Total pain ratings were measured by summing the noise rating scores on the 15 trials for each subject.

Procedure

Each subject was given a common description of the purpose of the experiment and the nature of the proofreading task (see Appendix G). Each subject was then requested to state her expectancy for success (in terms of the percentage of errors she expected to locate) on the proofreading task. After the subject filled out the Attribution Questionnaire, she was given 5 minutes to complete the proofreading task.

The subject was given 5 pretest trials of white noise in order to find her particular level of noise sensitivity. During these trials the white noise began at a low level of intensity and increased in intensity until the subject indicated that her plus five level on the Noise Rating Scale was reached. The highest intensity of white noise reached during these pretest trials was used for the 15 test trials of white noise.

Subjects in the prediction and no control conditions were yoked to subjects in the actual control conditions. Yoking of the groups was accomplished by taking the latency and/or duration time on each trial for a given subject in the actual control group and using that time for a subject in the prediction condition and a subject in the no control condition. A chart illustrating the exact yoking procedure can be found in Appendix H. Internals and externals were assigned to one of the nine treatment conditions on a separate basis. For example, the first internal subject was placed into the actual control of the onset and actual control of the duration condition. The next five internals were randomly assigned to one of the conditions in which actual control was possible (including another actual control of the onset and actual control of the duration conditions). The next four internal subjects were randomly placed into one of the four conditions in which actual control was not possible. This procedure was followed until there were 10 internals in each condition. The same procedure was followed for the external subjects.

Following the specific instructions for the nine treatment conditions (see Appendix I), each subject was given 15 trials of white noise. Each trial consisted of a 15 second response interval, an onset period and a duration period. During the response interval, the subject rated the previous noise presentation. The onset period consisted of the time between the onset of the lighted display and the onset of the white noise. The duration period consisted of the time between the onset and the termination of the white noise.

Additional measures of expectancy for success, skill and chance attribution, and percentage of errors missed on the proofreading task were obtained for each subject. The subject then filled out a questionnaire concerning her perceptions of the experimental procedures and hypotheses. A copy of the questions in the Post-Experimental Questionnaire is located in Appendix J. Each question was actually written on a separate piece of paper. Lastly, the subject was told that she would receive more information concerning the experiment and her performance by mail after the experiment was completed and after the data was analyzed.

CHAPTER III

RESULTS

Effectiveness of Experimental Manipulations

Four scales from the Post-Experimental Questionnaire were used to determine the subject's perceptions of the controllability and predictability of the white noise. Each of the scales ranged from 0 (either no control or not predictable) to 10 (either complete control or very predictable). See Appendix K for the means of these scales. 3 x 3 x 2 analyses of variance tests were performed on the scores from each scale (see Appendix L for the summary tables).

Control of the onset. In terms of control of the onset, an analysis of variance revealed significant main effects for generalized expectancies for control ($F = 3.87$, $df = 1/162$, $p < .05$) and the type of control of the onset ($F = 49.82$, $df = 2/162$, $p < .001$). Internals felt that they had more control of the onset than externals. Using the Tukey HSD method of making pair-wise comparisons (Kirk, 1968) for type of onset control, it was found that subjects in the actual control condition felt that they had more control than subjects in the prediction and no control conditions ($p < .01$), and that subjects in the prediction condition felt that they had more control than subjects in the no control condition ($p < .01$). Thus, the manipulation of actual control of the onset was effective.

Control of the duration. An analysis of variance concerning control of the duration indicated a significant main effect for type of control of the duration ($F = 73.57$, $df = 2/162$, $p < .001$). Subsequent analysis using the Tukey HSD method indicated that subjects in the actual control condition felt that they had more control than subjects in the prediction ($p < .01$) and no control conditions ($p < .01$), and that subjects in the prediction condition felt that they had more control than subjects in the no control condition ($p < .05$). Thus, the manipulation of actual control of the duration was effective.

<u>Predictability of the onset</u>. For predictability of the onset an analysis of variance indicated significant main effects for type of onset control ($F = 4.73$, $df = 2/162$, $p < .01$), and type of duration control ($F = 5.68$, $df = 2/162$, $p < .01$). Subsequent analysis concerning the type of onset control using the Tukey HSD method indicated that subjects in the actual control condition found the onset of the white noise more predictable than subjects in the prediction ($p < .05$) and no control ($p < .05$) conditions, and that subjects in the prediction and no control conditions did not differ from each other ($p > .05$). Thus, the predictability of onset was not successfully manipulated. Subsequent analysis concerning the type of duration using the Tukey HSD method revealed that subjects in the actual control condition found the onset more predictable than subjects in the no control condition ($p \leq .05$) but not more than subjects in the prediction condition ($p > .05$). The difference between subjects in the prediction and no control conditions was not significant ($p > .05$).

<u>Predictability of the duration</u>. In terms of predictability of the duration an analysis of variance revealed significant main effects

for type of control of the duration ($F = 10.10$, $df = 2/1162$, $p < .001$). Subsequent analysis using the Tukey HSD method indicated that subjects in the actual control condition found the duration more predictable than subjects in the no control condition ($p < .01$) but not more than subjects in the prediction condition ($p > .05$). The difference between subjects in the prediction and no control conditions was not significant ($p > .05$). Thus, the predictability of the duration was not successfully manipulated.

Hypotheses

In the analysis of the effects of the independent variables, both multivariate and univariate techniques were used. The multivariate test of the equality of mean vectors for each hypothesis was used as a control for Type I error in the way suggested by Cramer and Bock (1968). In this procedure the multivariate analysis is used to establish an accurate omnibus error rate for the dependent variables by taking into account the exact variance-covariance matrix between the dependent variables (Gabriel & Hopkins, 1974). The rejection of the null hypothesis using a multivariate test was a prerequisite for the testing of the hypothesis for the separate univariate dependent variables. The error rate per hypothesis was selected at .05.

Since the percentage of errors missed might vary according to the number of words read, number of words read was used as a dependent variable and as a control for percentage of errors missed. Thus, the univariate F for percentage of errors missed was obtained by the multivariate generalization of covariance, the step down F (Bock, 1966). In other words, the effect of number of words was eliminated in all univariate tests of percentage of errors missed.

The analysis of the major hypotheses was performed sequentially. Since type of control of the onset and type of control of the duration should have no effect prior to treatment, differences between the type of control of the onset and type of control of the duration conditions on the pretrial measures had to be eliminated from tests of differences on the posttrial measures. Therefore, the hypotheses concerning type of control of the onset, type of control of the duration, and the interaction of these two variables with generalized expectancies for control were tested by multivariate and univariate analyses of covariance. The five pretrial measures of expectancy for success, skill attribution, chance attribution, percentage of errors missed and number of words read were used as covariates for tests of the six posttrial measures. Through the use of covariance for these hypotheses, their interactions with pre- and posttrial measurements were eliminated. Since generalized expectancies for control might, for theoretical reasons, have a legitimate influence on the pretrial measures, analysis of covariance was not applied to differences between internals and externals. The differences between generalized expectancies for control were analyzed by repeated measures analysis considering both between- and within- (pre-post) factors (Kirk, 1968).

Thus, the analysis of the hypotheses included the following: (1) for the first and second hypotheses, an analysis of between subjects measures on the posttrial measures using the pretrial measures as covariates (see Appendix Q for the summary table; see Appendix R, for the means); (2) for the third hypothesis an analysis of between subject factors across pretrial and posttrial measures (see Appendix S, for the summary table; see Appendix T for the means); and (3) for pre- and posttrial measurement and the interaction of pre- and posttrial measurement with generalized expectancies for control, an analysis of within subject factors (see Appendix U for the summary table). A summary of the multivariate analyses of variance for the hypotheses is presented in Table 2. For the analysis of covariance the likelihood ratio test for the hypothesis of parallelism (Bock, 1966) was nonsignificant ($\chi^2 = 123.387$, df = 510, $p > .25$).

The first hypothesis stated that subjects in the onset actual control condition will have higher expectancies for success, higher skill attribution, lower chance attribution, a smaller percentage of errors missed, a larger number of words read, and lower pain ratings than subjects in the onset prediction and onset no control conditions. As indicated in Table 2 the multivariate test of the effect of type of onset control was nonsignificant ($p < .2193$). Thus, there were no significant differences between onset actual control, onset prediction, and onset no control on any of the dependent variables.

The second hypothesis stated that subjects in the duration actual control condition will have higher expectancies for success, higher skill attribution, lower chance attribution, a smaller percentage of errors missed, a larger number of words read, and lower pain ratings than subjects in the duration prediction and duration no control conditions. As indicated in Table 2 the multivariate test of the effect

TABLE 2

Multivariate and Univariate Analyses of Variance

For Tests of Hypotheses

Source	df	MS	F	p
		Between Subjects		
Generalized Expectancy of Control (Gen Exp)[a]				
Multivariate			2.5766	.0208
No. words read	6	9797.6133	0.5710[b]	.4510
% Errors missed	6	147.0638	0.4965[b]	.4823
Pain ratings	6	672.7998	1.5900	.2091
Expectancy for success	6	444.9377	0.3983	.5289
Skill attribution	6	853.6853	0.6396	.4250
Chance attribution	6	2204.9956	9.5282	.0024
Subject Within Groups[a]				
No. words read	162	17151.8711		
% Errors missed	162	427.3213		
Pain ratings	162	423.1350		
Expectancy for success	162	1117.1777		
Skill attribution	162	1334.6838		
Chance attribution	162	231.4178		
Type of Onset Control (Ons Con)[c]				
Multivariate			1.2963	.2193
No. words read	12	7890.3750	3.3847[b]	.0364
% Errors missed	12	307.0352	1.5632[b]	.2128
Expectancy for success	12	39.2969	0.4018	.6698
Skill attribution	12	80.6152	1.3786	.2550
Chance attribution	12	29.6484	1.2369	.2931
Pain ratings	12	114.1211	0.2783	.7575
Type of Duration Control (Dur Con)[c]				
Multivariate			1.6573	.0755
No. Words read	12	279.0000	0.1197[b]	.8873
% Errors missed	12	33.5098	0.3416[b]	.7112
Expectancy for success	12	21.1484	0.2162	.8058
Skill attribution	12	13.1875	0.2255	.7984
Chance attribution	12	30.9473	1.2911	.2979
Pain ratings	12	3437.8008	8.3847	.0004

Continued...

TABLE 2 (CONTINUED)

Source	df	MS	F	p
Ons Con x Dur Con[c]				
Multivariate			0.7392	.8122
No. words read	24	2021.4375	0.8671	.4852
% Errors missed	24	92.5146	0.4202[b]	.7940
Expectancy for success	24	64.9805	0.6644	.6177
Skill attribution	24	28.1512	0.4814	.7494
Chance attribution	24	36.1641	1.5087	.2023
Pain ratings	24	386.4629	0.9426	.4410
Ons Con x Gen Exp[c]				
Multivariate			0.7794	.6719
No. words read	12	1003.3437	0.4304	.6510
% Errors missed	12	14.8770	0.0738[b]	.9289
Expectancy for success	12	51.4082	0.5256	.5922
Skill attribution	12	98.0977	1.6775	.1902
Chance attribution	12	43.7559	1.8254	.1646
Pain ratings	12	164.5137	0.4012	.6702
Dur Con x Gen Exp[c]				
Multivariate			0.9528	.4945
No. words read	12	1887.1250	0.8095	.4469
% Errors missed	12	5.4824	0.0864[b]	.9173
Expectancy for success	12	242.3633	2.4781	.0872
Skill attribution	12	173.2617	2.9629	.0546
Chance attribution	12	11.0254	0.4600	.6322
Pain ratings	12	82.1602	0.2004	.8186
Ons Con x Dur Con x Gen Exp[c]				
Multivariate			0.7598	.7883
No. words read	24	1710.9062	0.7339	.5701
% Errors missed	24	16.1680	0.0384[b]	.9972
Expectancy for success	24	72.2070	0.7383	.5672
Skill attribution	24	73.3809	1.2549	.2902
Chance attribution	24	11.5381	0.4813	.7494
Pain ratings	24	464.6035	1.1332	.3430

Continued...

TABLE 2 (CONTINUED)

Source	df	MS	F	p
Subj Within Groups[c]				
No. words read	157	2331.2058		
% Errors missed	157	126.1704		
Expectancy for success	157	97.8017		
Skill attribution	157	58.4769		
Chance attribtuion	157	23.9705		
Pain ratings	157	410.0081		
Within Subjects				
Pre- and Post-trial (Pre-Post)[d]				
Multivariate			20.9840	.0001
No. words read	5	18164.1187	42.8888[b]	.0001
% Errors missed	5	1677.4971	16.1388[b]	.0001
Expectancy for success	5	1862.4460	14.7869	.0002
Skill attribution	5	288.7991	4.5009	.0354
Chance attribution	5	680.5540	20.8689	.0001
Gen Exp x Pre Post[d]				
Multivariate			1.1679	.3273
No. words read		5184.1836	1.2241[b]	.2702
% Errors missed		86.3891	0.4127[b]	.5216
Expectancy for success		130.0498	1.0325	.3111
Skill attribution		0.3556	0.0055	.9408
Chance attribution		62.4220	1.9141	.1684
Subj Within Groups				
No. words read	162	65.0782		
% Errors missed	162	14.4676		
Expectancy for success	162	125.9523		
Skill attribution	162	64.1653		
Chance attribution	162	32.6110		

[a]Tested across both pretrial and posttrial measures.

[b]Obtained by the multivariate generalization of covariance, the step down F (Bock, 1968).

[c]Tested by analyses of covariance for posttrial measures using the five pretrial measures as covariates.

[d]Tested as within subject factor (multivariate tests with post- minus pre-score transformations).

of type of control of the duration was nonsignificant ($p < .0755$). Thus, there were no significant differences between subjects in the actual control, prediction and no control conditions on any of the dependent variables.

The third hypothesis stated that internals and externals in congruent control conditions would have higher expectancies for success, higher skill attribution, lower chance attribution, a smaller percentage of errors missed, a larger number of words read, and lower pain ratings than internals and externals in incongruent conditions. Also, for the prediction conditions, it was expected that internals would have higher expectancies for success, higher skill attribution, lower chance attribution, a smaller percentage of errors missed, a larger number of words read, and lower pain ratings than externals. As indicated in Table 2, the multivariate tests of the interactions of type of control of the onset with generalized expectancies for control ($p < .6719$) and type of control of the duration with generalized expectancies for control ($p < .4945$) were nonsignificant. Thus, internals and externals did not significantly differ in any of the type of control conditions on any of the dependent variables.

The multivariate tests on pre- and posttrial measurements ($p < .001$) and generalized expectancies for control ($p < .0208$) were found to be significant. The univariate effects of pre- and posttrial measurements on each of the dependent variables can be found in Table 2. Pre- and posttrial differences were found for all of the dependent measures.

The univariate effects of generalized expectancies for control on each of the dependent variables is found in Table 2. A significant effect was found for chance attribution ($p < .0024$). Externals tended to attribute success on the proofreading tasks more to chance factors than internals on both the pretrial and posttrial measurements (no significant generalized expectancies for control by pre- and posttrial measurement interaction was found). The univariate tests of generalized expectancies for control for all other dependent variables were nonsignificant.

Post Hoc Analyses

Additional analyses were conducted in order to provide more information. The analyses were performed on: the onset and duration times of the actual control subjects; the decibel levels of white noise that the subjects were exposed to; and the subjects' perception of the purpose of the display box.

Onset and duration times. Six groups of subjects had actual control of the onset of the aversive stimuli. On each of the 15 trials of white noise, the onset time was delineated as the interval between the appearance of the lighted numbers on the display and the subject's response to begin the white noise. A 3 x 2 analysis of variance on the total onset time for each of the 15 trials (see Appendix M, for the summary table; see Appendix N, for the means) revealed no significant main effects or interaction effects.

Six groups of subjects had actual control of the duration of the aversive stimuli. The duration time was specified as the interval between the onset of the white noise and the subject's response to terminate the noise. A 3 x 2 analysis of variance on the total duration time for the 15 trials for each subject (see Appendix M, for the summary table; see Appendix N, for the means) revealed a significant main effect for type of onset control ($F = 4,33$, $df = 2/54$, $p < .05$). Subsequent analysis using the Tukey HSD method indicated that subjects in the actual control of the onset condition were exposed to the white noise for a shorter time period than subjects in the no control of the onset condition ($p < .05$), while subjects in the prediction condition did not differ significantly in duration time from either subjects in the actual control or subjects in the no control conditions ($p > .05$).

Decibel levels of white noise. During the pretest trials each subject was asked to indicate which level of noise coincided with their plus five level on the Noise Rating Scale. The plus five level for each subject was then used for the 15 test trials of white noise. Since the plus five levels were subjective and varied from 79 decibels to 105 decibels, a 3 x 3 x 2 analysis of variance was performed in order to determine if the intensity of white noise that each group of subjects was exposed to was equivalent. This analysis revealed no significant main effects or interaction effects (see Appendix O, for the summary table for the analyses of variance; see Appendix P, for the means).

Subjects' perception of the purpose of the display box. Question number 6 of the Post-Experimental Questionnaire asked the subjects: "What did you think was the purpose of the lighted numbers?" The three most common responses were that: (1) they served as a timing device for the subject and/or experimenter; (2) they were meant to be a distraction from the white noise; and (3) they were meant to be an interference in concentration (serving as an additional stimulus to attend to). Chi-square tests were performed on the number of subjects in each type of control of the onset and type of control of the duration group who mentioned a distraction or concentration hypothesis in order to determine if one or more of these different conditions may have influenced how the numbers were perceived. The difference for type of onset was nonsignificant ($\chi^2 = 1.19$, df = 2, $p > .05$). For type of duration, there was a significant difference ($\chi^2 = 53.17$, df = 2, $p < .001$). The number of subjects in the duration no control condition (43) who mentioned distraction or interference with concentration was significantly higher than the number of subjects in the actual control (9) or prediction (11) groups.

CHAPTER IV

DISCUSSION

Despite the significant differences between internals and externals on chance attribution of the proofreading tasks, none of the hypotheses were confirmed. These findings will be discussed in terms of the methodological problems with the present study and the specific hypotheses. Recommendations for future research will also be discussed.

Methodological Problems

There were several methodological problems with the present study which may have influenced the results. First, the predictability of the aversive stimuli did not seem to have been successfully manipulated since subjects in the prediction conditions did not perceive the onset or duration of the aversive stimuli as significantly more predictable than subjects in the no control conditions. One reason for this finding may be that although subjects in the prediction conditions knew on each trial when the noise would start or stop (that is, after the 00 occurred in the display box), the first number in the display box varied from trial to trial and the subjects did not know before each trial how many seconds (or numbers) would elapse before the noise started or stopped. In other words, they had less information than if they knew, for example, that on each trial the noise would last five seconds. This reduced information, therefore, may have lowered their sense of predictability to a level similar to that of the no control subjects. In addition, the use of a constant fifteen second period may have increased the predictability of the noise for subjects in the onset no control condition. That is, although the no control subjects did not know exactly when the noise would start, they knew that it would occur sometime after the numbers appeared in the display box (since the numbers were blanked out during the response period). This much information may have led them to be prepared for the noise any time after the display light came on and thus increased their subjective feeling of predictability.

However, although the subjects in the prediction conditions did not find the aversive stimuli more predictable than subjects in the no control conditions they did have, at the least, a signal right before the onset and termination of the noise (i.e., the occurrence of 00 in the display box). Past findings concerning the effects of signalled versus unsignalled aversive stimuli have been contradictory. In some studies, unsignalled shocks led to a higher level of autonomic arousal, higher reports of painfulness, and were less preferred than signalled shocks (D'Amato & Gumenik, 1960; Lanzetta & Driscoll, 1966; Pervin, 1963; Weiss, 1970). However, in a series of studies, Furedy and Doob (1972) found that signalled shock did not reduce the rated aversiveness of shocks and they were not preferred to unsignalled ones. In addition, in a study of the aftereffects of signalled and unsignalled noise (Glass & Singer, 1970), signalled noise did not result in better proofreading performance than unsignalled noise and the ratings of the aversiveness of the signalled noise was similar to that of unsignalled noise. Thus, in the present study, the presence of a signal had no effect and confirms other findings that signalling does not reduce stress.

It should be noted, however, that subjects in the prediction condition felt that they had significantly more control of the aversive stimuli than subjects in the no control conditions. Thus, they might be expected to respond differently than no control subjects regardless of the similarity in their predictability scores. However, no differences were found.

Although the ineffectiveness of the manipulation of the predictability conditions may help explain the similarity in responses between subjects on the prediction and no control conditions, it does not explain why the subjects in the actual control conditions responded in a similar way to subjects in the other two conditions. A second problem with the present study, which may help explain the findings, was that all of the subjects were exposed to one type of unpredictable noise - aperiodic or irregular noise - thus, they might be expected to behave in a similar manner.

Some investigators have varied predictability in terms of its periodicity (e.g., Glass & Singer, 1972; Mayhew, 1972). In these cases the onsets of the noise occurred at regular periods and lasted for regular intervals. The findings from these studies suggest that predictable noise is less stressful than unpredictable noise. For example, aperiodic noise led to more proofreading errors and less frustration tolerance than periodic noise.

Hence, the periodicity of the stimuli, at least with noise, may be more important than the mere presence of a signal. In the present study, all of the subjects were exposed to aperiodic noise. That is, in terms of the onset the actual control subjects determined when the noise would start and there was trial by trial variability in terms of the onset times of the aversive stimuli. Through the yoking procedure, the subjects in the other two conditions were exposed to similar variable onset times. Although the actual control subjects found the onset of the white noise more predictable than subjects in the other two conditions, all of the subjects heard aperiodic noise.

Previous research (e.g., Glass, Friedman, & Singer, 1969; Mayhew, 1969) suggests that control of the duration of aperiodic noise is less stressful in terms of proofreading performance than no control. As stated previously the duration of noise in the present study can be categorized as aperiodic; however, the findings did not confirm previous results. In previous studies, however, subjects had only potential control in terms of the presence of a button and the use of the button meant the termination of the noise for the entire experiment. Actual control, as in the present study, may have been more stressful than potential control since on each trial a response was required to stop the noise. In addition, feelings of control may be stronger if one knows that the entire experiment rather than a single trial can be terminated. Thus, limited feelings of control may account for the similar behavior of actual control and no control subjects in the present study.

Third, the subjects in the no control conditions may have been distracted from the full impact of the aversive stimuli through the procedure used to validate that they were watching the display box and thus they did not show the expected effects of having no control over the aversive stimuli. Changing numbers in the display box were used for the actual control conditions (so that subjects could indicate by stating a number when they wanted the noise to start or stop) and the prediction conditions (so that subjects would know through the use of 00 when the noise would start or stop). Since attending to changing numbers might serve as a type of distraction from the noise, changing numbers were also used in the no control conditions so that the findings could be attributed to the type of control rather than the attending to numbers in the display box. To insure that the no control subjects watched the display box, they were asked to state the numbers being displayed when the noise started or stopped. However, this procedure may have led the subjects in the no control condition to become so involved with the task of watching and stating numbers during exposure to the noise that the noise became secondary and had little impact on them. This possibility is supported in terms of the duration no control condition since the subjects' pain ratings were smaller than in the other two conditions and the subjects tended to report that the purpose of the display box was to distract them or interfere with concentration. This explanation isn't likely for the onset no control subjects since their pain ratings were similar to those subjects in the onset actual control and prediction conditions and they did not tend to perceive the display box as a distraction or interference.

It is also possible that the subjects in the no control conditions via their stating numbers when the noise started or stopped had the illusion of control. Langer and Roth (1975) found evidence that suggests that people have a strong motivation to see control and that a single cue can be enough to induce the illusion of control. In the present study, it isn't likely that stating a number led to an illusion of control since subjects in the no control condition felt like they had significantly less control than subjects in the other conditions.

Although the no control conditions were meant to serve as comparisons (traditional control groups) for the effects of actual control and prediction, an additional no-noise control group would have been beneficial in the present study. That is, there were no significant differences between the groups and it isn't clear if all groups experienced stress or if stress was reduced for all groups (by control and prediction or by distraction in the no control groups). An additional no-noise control group might have clarified this issue.

It may suffice in future research to simply ask the no control subjects to watch the changing numbers in the display box if a reasonable explanation is given to them for doing so. That is, no explanation may result in the subjects busying or distracting themselves with hypotheses about the meaning of the changing numbers. The alternatives of showing the no control subjects constant numbers or deleting the display box from the no control conditions assumes that watching changing numbers has no distraction effects for the subjects in the actual control and prediction conditions. A better procedure would involve pilot studies to determine which condition (no display or constant numbers) led to the least distraction from the aversive stimuli.

Although the possible involvement of the no control subjects in an additional task may help explain why subjects in the no control condition did not differ from subjects in the actual control or prediction conditions, this does not explain why in the present study subjects in the actual control conditions responded like subjects in the prediction condition. It may be that knowing when the onset or duration of an aversive event is to occur is similar to having actual control of the event or, as previously mentioned, the periodicity of the aversive event is more important than actual control of it.

A fourth problem with the present study has to do with the measurement of the dependent variables before exposure to aversive stimuli. Pretrial measures were taken in order to determine subjects' initial responses. For example, it seemed important to know if initially subjects differed in the language and reading abilities related to good proofreading performance. These pretrial measures, however, could have caused several unexpected problems. First, the success or failure on the first proofreading task may have been confounded with the effect of the controllable or uncontrollable exposure to white noise. That is, uncontrollable situations (e.g., noise, insoluble anagrams, etc.) lead to later helpless behavior (Hiroto, 1974). Thus, for example, a subject in the uncontrollable situation in the present study may have experienced high success on the proofreading task and this success may have been more important than lack of control over the noise. Second, although it was expected that without feedback the expectancies on the second task would not change (Zajonc & Brickman, 1969) unless the treatment conditions had an effect, the subjects had the opportunity prior to the second task to form hypotheses about whether their performance should improve due to practice or become worse due to exposure to the noise.

They could also make a guess about their proofreading ability. Although the relationship between the percentage of errors found on the first task and their expectancy for success on the second task was not high ($r=.22$), the subjects still could have been influenced by their estimation of their success on the first task. The subject's estimation of their success might also have influenced skill attribution, chance attribution, and their actual performance on the second task. In future research it may be helpful to obtain a measure of perceived success right after the completion of the first task to determine if there is a high correlation between perceived success and subsequent measures.

Although a similar proofreading task has been used extensively by Glass, Singer and their students (e.g., Glass & Singer, 1972), there are several differences between their use of the proofreading task and the use of the ones in the present study. In the present study a measure of proofreading performance was obtained prior to exposure to the noise, and as stated previously, could have led to several problems. Second, no ongoing task was performed by the subjects during noise exposure in the present study. Glass and Singer (1972) suggest that performance deficits after exposure to uncontrollable and unpredictable noise may not occur unless the subjects are actively involved in tasks during noise exposure. Third, the proofreading tasks used in the present study were shorter (two pages versus seven pages) than in previous studies. A longer proofreading task may be required to obtain the expected effects of control and prediction. However, if premeasures are taken, two long proofreading tasks may be perceived as extremely boring and thus influence the results.

In addition, the level and type of noise may also be important in obtaining the proofreading performance deficits after exposure to uncontrollable and unpredictable noise. Glass and Singer (1972) have typically used noise at the 108 decibel level while in the present study the average level of noise was about 90 decibels. The type of noise used by Glass and Singer (1972) involved:

> ...the following sounds superimposed upon one another: (a) two people speaking Spanish; (b) one person speaking Armenian; (c) a mimeograph machine; (d) a desk calculator; and, (e) a typewriter (Glass & Singer, 1972, p. 25).

In the present study white noise was used.

Lastly, a recent study by Roth and Kubal (1975) found that the effects of uncontrollable aversive events are increased by the importance of the tasks one has no control over and the number of trials in an uncontrollable situation. In the present study, the expected effects for subjects in the no control situation may have been obtained if the proofreading tasks and the noise exposure trials had been described as more important (i.e., related to the subjects' intelligence) and if the number of trials had been more than 15.

In summary, the results of the present study may have been influenced by the ineffectiveness of the manipulation of the predictability of the aversive stimuli, the aperiodity of the white noise, the distraction of subjects in the no control conditions from the impact of the noise and the use of pretrials measures concerning the proofreading tasks.

The explanations which best account for the findings are the aperiodicity of the noise, and the distraction from the noise in the no control condition.

The Specific Hypotheses

The hypothesis which stated that subjects who could determine when the onset of the aversive stimuli would occur would have higher expectancies for success, higher skill attribution, lower chance attribution, better proofreading performance, and lower pain ratings than subjects with prediction or no control of the onset was not confirmed. There were no significant differences between subjects in the onset actual control condition and subjects in the onset prediction and onset no control conditions on any of the dependent variables even though the manipulation of control seemed effective.

The effects of control versus no control of the onset of noise have not been examined in previous studies and with the exception of pain ratings, previous onset control studies have not used the dependent variables included in the present study. The findings of the present study are in line with some previous findings that pain ratings are not reduced by control of the onset of aversive stimuli (Staub, Tursky & Schwartz, 1971; Pervin, 1963).

In the present study control of the onset might have been more effective in reducing the impact of the aversive stimuli if the subjects in the actual control condition had a more active role in delivering the aversive stimuli. The experimenter delivered the aversive stimuli to all of the subjects and control was possible only in terms of the subjects being able to state when they wanted the noise to start. The use of a switch or button by the actual control subjects might have been more effective than a verbal response in reducing the impact of the aversive stimuli.

That is, for example, Pervin (1963) found that one reason the control condition was preferred to the no control one was that there was a greater correspondence between switch and shock and this correspondence reduced the surprise of the shock. In the present study control via a verbal statement had no apparent advantage over no control. This explanation is not likely, however, since the perceived degree of control over the onset of the aversive stimuli was significantly higher for subjects in the actual control condition than for subjects in the no control condition. It is more likely that either actual control has no differential effect or that the periodicity of the aversive stimuli is more important than actual control.

The lack of difference in responses between subjects in the prediction and no control conditions may be explained, as discussed previously, in terms of the ineffectiveness of the attempt to vary predictability as well as the aperiodicity of the noise. However, as metnioned previously, the results of some studies (e.g., Furedy & Doob, 1972) suggest that when predictability has been studied via the use of a signal, no differential effects have been found.

The similar results between subjects in the actual control and prediction condition appear to be due either to the comparable effects of prediction and actual control on the dependent variables or to the aperiodicity of the aversive stimuli.

Thus, in terms of the type of onset, it is tentatively concluded that actual control has no differential effect on the dependent variables used than prediction or no control.

The second hypothesis which stated that subjects in the actual control of the duration condition would have higher expectancies for success, higher skill attribution, lower chance attribution, better proofreading performance, and lower pain ratings than subjects in the prediction and no control conditions was not confirmed. There were no significant differences between subjects in the duration actual control condition and subjects in the prediction and no control conditions on any of the dependent variables even though actual control subjects perceived that they had more control than subjects in the other two conditions.

This finding is not in line with Geer and Maisel's (1972) results which suggested that actual control leads to less stress than prediction or no control. However, there are several differences between the Geer and Maisel study and the present one which may help account for the contradictory findings. First, Geer and Maisel used skin conductance responses as the dependent variables. It may be that actual control effects physiological responses more reliably than psychological ones. Second, in the Geer and Maisel study, subjects with actual control had the use of a button to terminate the aversive stimuli while in the present study subjects with actual control made verbal responses. As stated previously, a verbal response may not be as effective as a switch or a button in eliciting feelings of control. Third, Geer and Maisel used photographs of victims of violent death as the aversive stimuli while white noise was used in the present study. Visual aversive stimuli may influence behavior differently than auditory aversive stimuli. Fourth, in Geer and Maisel's study, subjects in the prediction condition were not supplied, as in the present study, with external information (e.g., a clock) concerning the duration of the aversive stimuli and they may not have found the aversive stimuli predictable. Lastly, in the Geer and Maisel study, subjects in the no control condition were exposed to unpredictable onsets of the stimuli while subjects in the actual control and predictable conditions knew when (via a warning tone) the onset of the stimuli was to occur. Thus, the behavior of the no control subjects seems to be the result of both unpredictable onsets and durations. Thus, it is still not clear if control and prediction function interchangeably. Since this issue is important, it should be the focus of future research.

In terms of the type of duration control, the results of the present study indicated that subjects with actual control of the duration did not differ from subjects in the prediction condition in their perception of the predictability of the white noise. This finding suggests that on any given trial the subjects in the actual control condition tended not to know when they would ask for the noise to be stopped. In other words, their control can be categorized as spontaneous (decided at the moment) control. Since prediction subjects know the duration of the aversive stimuli at the beginning of a trial, actual control and prediction conditions would be more comparable if the actual control subjects determined the duration before each trial. Previous research has not distinguished between spontaneous and predetermined control; however, these two types of control may not have similar effects on behavior. For example, in Geer and Maisel's (1972) study, subjects in the actual control condition determined on each trial the specific time for the termination of the aversive stimuli while subjects in the prediction condition knew beforehand how long the stimuli would last and the duration was constant for each trial.

The effects of predictable versus unpredictable durations of aversive stimuli have not previously been examined. Although no differences were found in the present study between these two conditions, actual differences might be found when the manipulation of predictability is more successful than in the present study. That is, it seems reasonable to assume that aversive stimuli of unknown durations would be more stressful than those of known durations.

The hypothesis which stated that internals and externals would be influenced by the type of control situation was not confirmed. It was expected that internals in actual control conditions and externals in no control conditions would have higher expectancies for success, higher skill attribution, lower chance attribution, better proofreading performance, and lower pain ratings than internals in no control conditions and externals in actual control conditions. In addition, in the prediction conditions, it was expected that internals would behave like subjects with actual control and externals would behave like subjects without control. However, internals and externals did not differ from each other on any of the dependent variables regardless of the type of control condition.

These findings are not surprising in light of the general findings that the type of control condition had no differential effects on the dependent variables. Again, the periodicity of the stimuli, the experience with the first proofreading task and the distraction of the no control subjects may have been more important than generalized expectancies for control. It should be noted, however, that internals and externals have behaved in a similar manner in a number of studies (e.g., Nickels & Williams, 1970; McDonald & Tempone, 1968; Williams, 1971).

Externals did tend to attribute performance on the proofreading tasks to chance factors more than internals. It is not clear why this occurred. It may be the result of the general concept of externals; that is, they tend to attribute the outcomes of their behavior more to external factors than internals. Although internals and externals did not differ in their attribution to skill factors, internals did feel that they had more control of the onset of the aversive stimuli than externals. It is not clear why this difference did not also occur in terms of control of the duration.

Recommendations for Future Research

The present study suggests a number of questions which need to be clarified through future research. First, it still is not clear if actual control and prediction of aversive stimuli affect behavior in a similar manner. Both the present study and Geer and Maisel's (1972) study have methodological problems which may have influenced the findings. Although the importance of predictable versus unpredictable aversive events has been studied extensively (Seligman, Maier & Solomon, 1971), little is known concerning the comparative effects of prediction and control. As stated previously, prediction may function interchangeably with control or it may be that the element of prediction in control accounts for the effect of control. These ideas should be explored further. Prediction may play an important role in reducing the effects of learned helplessness. Seligman and his colleagues (e.g., Seligman, 1975; Miller & Seligman, 1975) present considerable evidence that exposure to uncontrollable versus controllable aversive events leads to more helpless behavior (e.g., more passivity, less motivation and more emotional behavior) in a later situation. All situations that one confronts during his life do not fall into these two categories -

many are predictable. Prediction of aversive stimuli may lead to more indications of helplessness than control of aversive events but to less indications of helplessness than the lack of control of aversive events. If, as stated previously, prediction leads to more feelings of control (as suggested by Lefcourt (1973) and substantiated by the present study by subjects in the prediction conditions having significantly more feelings of control than no control subjects), then prediction should lead to less helplessness. If prediction does lead to less helplessness than no control, there are implications for therapy. That is, for example, more emphasis on helping the client predict or forecast those uncontrollable aversive events that are causing problems may lead to minimal feelings of helplessness, avoidance, etc.

Second, the measurement of predictability needs further investigation. In the past predictability has been varied in terms of its periodicity, the use of a warning signal right before the event, and via a clock that shows the subjects when the aversive event is to occur. It isn't known which of these ways is more effective or even if all three types of conditions are necessary in order for the individual to experience a high sense of predictability. In fact, it isn't clear if actual control of an event is necessary before high predictability is possible. In addition, the wording of a scale for the measurement of predictability is important. Glass and Singer (1972) mention that in trying to assess differential perceptions of the predictability of noise, it is extremely difficult to phrase the rating scales. In their studies, they report fairly low prediction ratings by subjects exposed to periodic (predictable) noise. In the present study, higher prediction ratings may have been obtained if the question for the prediction scales stated more clearly that the issue was the extent to which the occurrence of 00 on the display box predicted or indicated that the onset or termination of the noise was to occur. However, this question would have missed the fact that the trial by trial variability meant that the circumstances for each trial could change.

Third, a more specific definition of aversiveness is needed. Seligman, Maier and Solomon (1971) use the term "aversive stimuli" to refer to painful or fearful events. However, it is difficult to measure either painfulness or fearfulness for a particular individual and feel that their experience is similar to that of another individual. In past research different terms to describe the aversive stimuli have been used - e.g., pain, aversiveness, discomfort. It is not clear if these terms have similar meanings to the subjects. In addition, it isn't clear if the different aversive stimuli used (e.g., shock, white noise, a collection of many types of noise, and photographs of victims of violent deaths) have the same degree of aversiveness or if any of these stimuli are truly representative of the type of aversive stimuli an individual is confronted with during his life.

Lastly, it seems important to distinguish between spontaneous control over aversive stimuli (e.g., being able to decide at the moment when the aversive stimuli will terminate) versus predetermined control (e.g., making a decision beforehand about how long the aversive stimuli will last). That is, strictly speaking, predetermined control is more comparable to the type of prediction where the time of the event is known. On the other hand, spontaneous control is more comparable to the type of prediction where a signal is used right before the event occurs. These different types of control and prediction may not be comparable and they might not affect behavior in the same way.

Conclusions

The purpose of the present study was to compare the effects of control and prediction of aversive stimuli. A number of methodological problems makes it difficult to draw conclusions. The manipulation of the prediction conditions did not seem to be effective, the subjects in the no control conditions may have been distracted from the full impact of the noise, and all subjects were exposed to a type of unpredictable noise that may have been more important than the 3 types of control conditions established in the present study.

However, the present study suggested both problems areas and future research areas concerning unavoidance aversive events. Before it is clear if control and prediction reduce stress to the same extent, better measures of predictability are needed, the most effective type of prediction should be determined, perceived versus actual control should be compared, and more precise definitions of aversiveness should be found.

Thus, it is concluded that it is important to determine the relative effects of control and prediction of aversive stimuli on behavior and it is only tentatively concluded, as indicated by the results, that control, prediction, and no control have similar effects on the dependent variables used in this study.

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APPENDIX A

INTERNAL-EXTERNAL SCALE

Please select the <u>one</u> statement in each pair of statements which you <u>more strongly</u> believe to be the case (as far as you personally are concerned). Be sure to select the one YOU BELIEVE TO BE CLOSER TO THE TRUTH rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief; obviously there are no right or wrong answers. (Remember, mark one and only one statement in each pair.)

<u>I more strongly believe that:</u>

1. a. Children get into trouble because their parents punish them too much.

   b. The trouble with most children nowadays is that their parents are too easy with them.

2. a. Many of the unhappy things in people's lives are partly due to bad luck.

   b. People's misfortunes result from the mistakes they make.

3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.

   b. There will always be wars, no matter how hard people try to prevent them.

4. a. In the long run people get the respect they deserve in this world.

   b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. a. The idea that teachers are unfair to students is nonsense.

b. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. a. Without the right breaks one cannot be an effective leader.

b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. a. No matter how hard you try some people just don't like you.

b. People who can't get others to like them, don't understand how to get along with others.

8. a. Heredity plays the major role in determining one's personality.

b. It is one's experiences in life which determine what they're like.

9. a. I have often found that what is going to happen will happen.

b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.

b. Many times exam questions tend to be so unrelated to course work, that studying is really useless.

11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.

b. Getting a good job depends mainly on being in the right place at the right time.

12. a. The average citizen can have an influence in government decisions.

b. This world is run by the few people in power, and there is not much the little guy can do about it.

13. a. When I make plans, I am almost certain that I can make them work.

b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

I more strongly believe that

14. a. There are certain people who are just no good.

    b. There is some good in everybody.

15. a. In my case getting what I want has little or nothing to do with luck.

    b. Many times we might just as well decide what to do by flipping a coin.

16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.

    b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.

    b. By taking an active part in political and social affairs the people can control world events.

18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.

    b. There is really no such thing as "luck".

19. a. One should always be willing to admit his mistakes.

    b. It is usually best to cover up one's mistakes.

20. a. It is hard to know whether or not a person really likes you.

    b. How many friends you have depends upon how nice a person you are.

21. a. In the long run the bad things that happen to us are balanced by the good ones.

    b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. a. With enough effort we can wipe out political corruption.

I more strongly believe that:

b. It is difficult for people to have much control over the things politicians do in office.

23. a. Sometimes I can't understand how teachers arrive at the grades they give.

b. There is a direct connection between how hard I study and the grades I get.

24. a. A good leader expects people to decide for themselves what they should do.

b. A good leader makes it clear to everybody what their jobs are.

25. a. Many times I feel that I have little influence over the things that happen to me.

b. It is impossible for me to believe that chances or luck play an important role in my life.

26. a. People are lonely because they don't try to be friendly.

b. There's not much use in trying too hard to please people, if they like you, they like you.

27. a. There is too much emphasis on athletics in high school.

b. Team sports are an excellent way to build character.

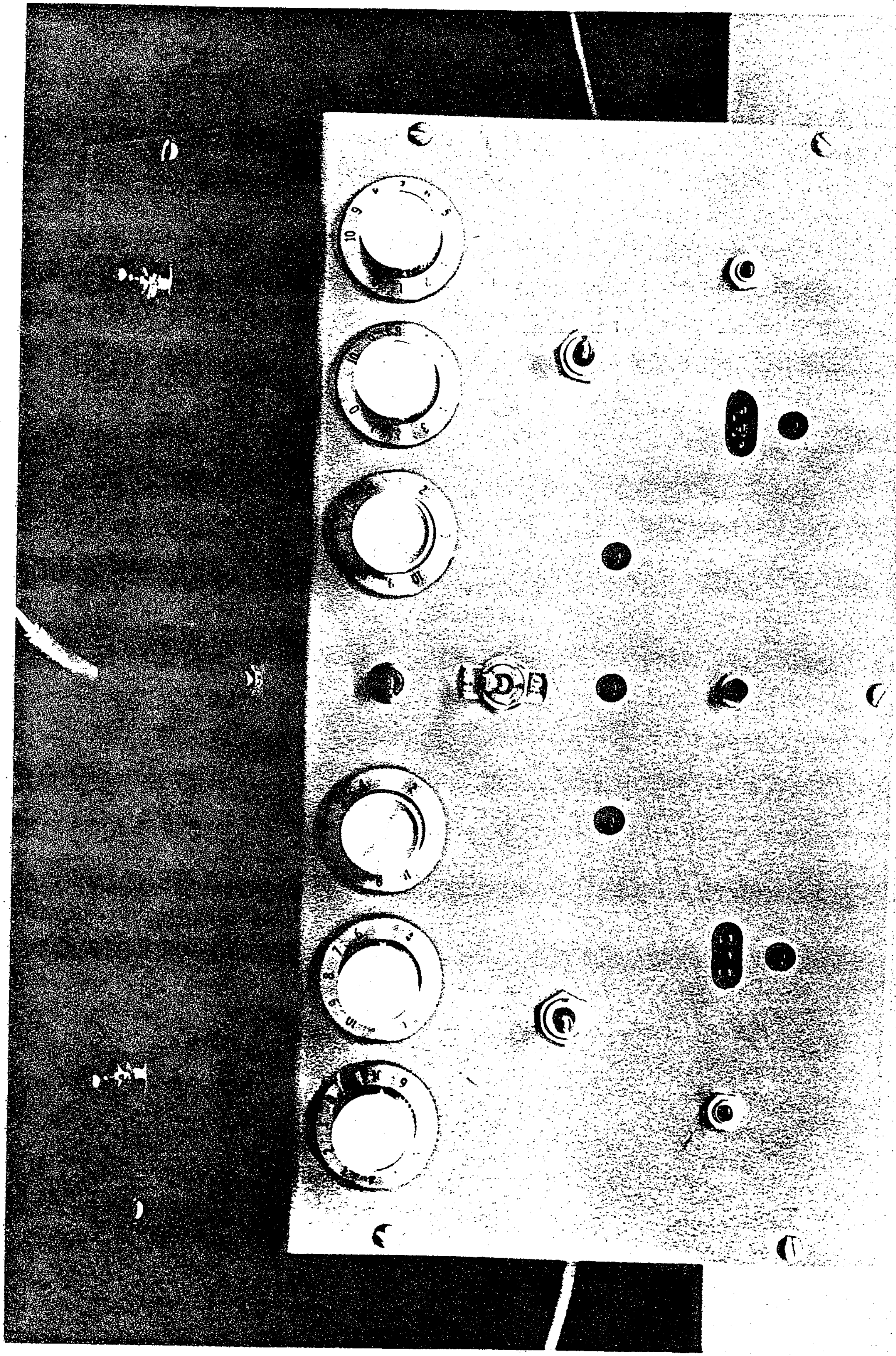
28. a. What happens to me is my own doing.

b. Sometimes I feel that I don't have enough control over the direction my life is taking.

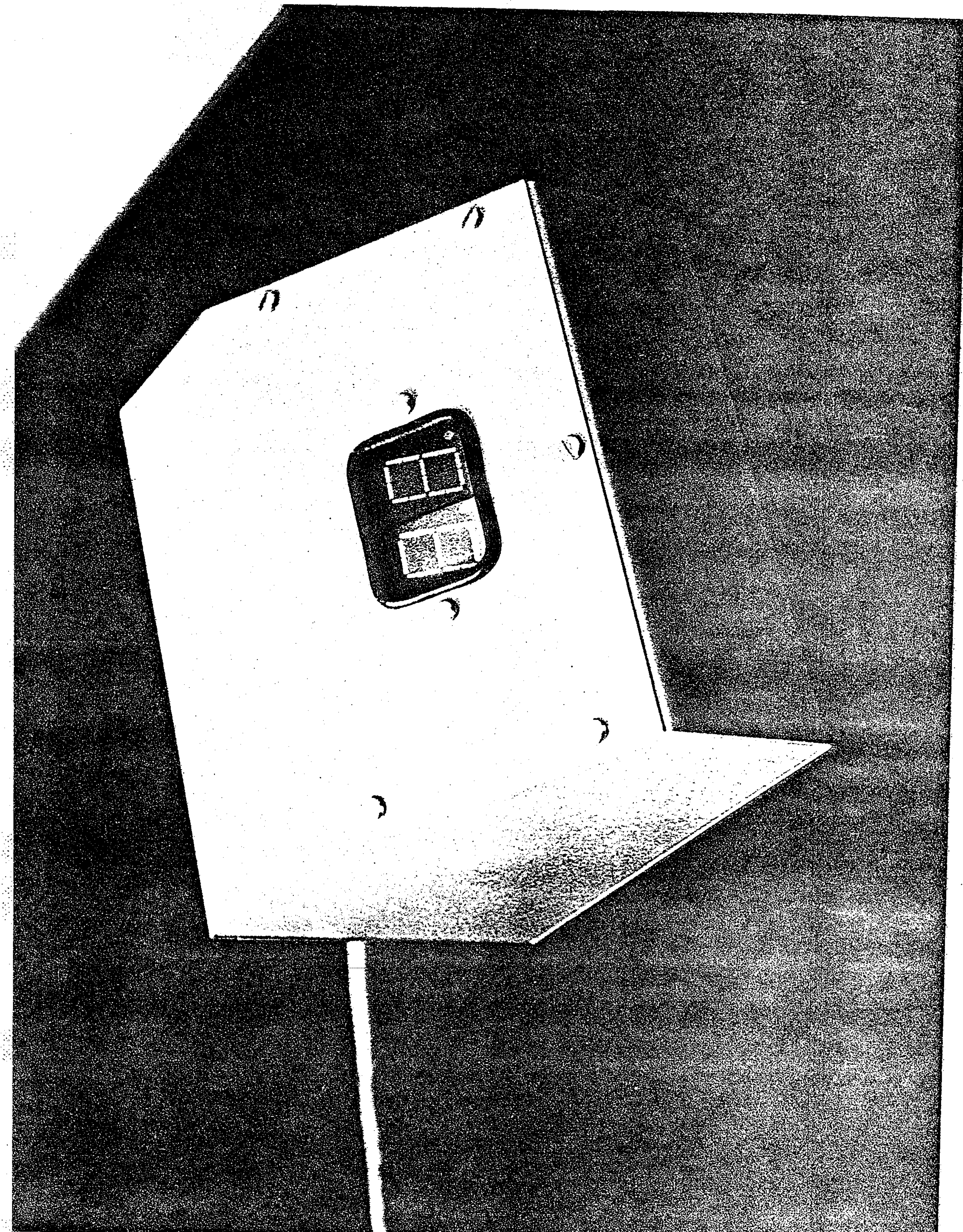
29. a. Most of the time I can't understand why politicians behave the way they do.

b. In the long run the people are responsible for bad government on a national as well as on a local level.

APPENDIX B



APPENDIX C



APPENDIX D

ATTRIBUTION QUESTIONNAIRE

You may feel that certain factors in the proofreading task determine the number of errors found. Please indicate (in terms of percentage) the contribution you feel each of the following factors makes in determining how many errors are found (all percentages must add up to a 100).

INFLUENCING FACTOR	PERCENTAGE OF INFLUENCE
A. Your present skill at proofreading	________
B. Your past experience at proofreading and performing similar tasks	________
C. Your mental, emotional and physical state during the proofreading task	________
D. Your luck	________
E. Chance	________
F. The kind of passage	________
G. The type of errors in the passage	________
H. Other (describe fully)	________

APPENDIX E

PROOFREADING TASK A

Money has its limitations, It cannot buy inherent success for cities where the conditions for inherent success is lacking and where the use of money fails to supply them. Furthermore, money can only do ultimate harm where itdestroys the conditions for inherent success. On the other hand, by helping to supply the requiremends needed, money can help build inherent success in cities. Indeed, it is indispensable.

For these reasons, money is a powreful force both for city decline and for city regeneration. But it must be understood that it is not the meer availability of money. but how it is available, and for what, that is all important.

Three principal kinds of money finance and shape most of the changes that occur In residential and business properties in cities. Because this money is so powerful an instrument - as it go, so goes our cities.

The first, and most important, of there kinds of money is the credit extended by conventional, nongovernmental lending institutions. In order of size of their mortgage holddings, the most important of these institutions is: savings and loan associations, life insurance companies, commercial banks and mutual savings banks. Added to these are variuos categories of minor mortgage lenders - some of them growing rapidly, such as pension funds. by far the lion's share of building, remodeling, rehabilitation, replacement and expansion that occurs in cities (as well as in the suburbs beyond cities(is financed by this kind of money.

The second kind of money is that provided by government, eithir out of tax receipts or through governmental borrowing power. Aside from the city building which are traditionally governmental (schools, highways, etc.), residential and business properties are also financedin some cases by this money. Still more, are shaped and influenced by the fact that it can be drawn on for partial financing, or for insurance of other loans. Land-clearance subsideis from the federal and city governments to make privately financed redevelopment and renewla projects financially feasible, are among the uses of this money; so are housing projects underwritten by fedderal, state or city governments. In addition, the federal government will guarantee as much as 9 0 percent of the value of residential mortgages financed by conventional lenders - and will even buy up guaranteed mortgages from lenders-provided that the developments whose mortgages has thus been guaranteed conform to standards of planning approved by the Federal Housing Administration.

The third kind of money comes from a shadow world of investment, an underworld of cas h and credit, so to speak. Where this money come from ultimately, and by what avenues it finds its way, is concealed and devious. This money is lent at interest rates strating at about 20 percent and; ranging as high as the market will bear, apparently in some cases up to 80 percent in combinations of interest rates and arrangers' fees and cuts. It does many jobs - a few of which is actually exploitative conversions of humdrum buildings to slum buildings at exhorbitant profits? This money is to mortgage market what loan-shark money is to personal finance.

PROOFREADING TASK B

Lack of gradual money wastes city districts already inherently fit for city life; and therefore with a great potential for rapid improvement. It also means there are no hope for districts that lack one or more of theconditions for generating diversity, and need help in acquiring these supplements, as well as mony for normal changes and worn-out structures.

Where is the money from conventional sources, which might be going into gradual change? Where does it go instead.

Some of it goes into planned cataclysms of redevelopment and renewal; more is going into self-distruction of diversity, to the ruin-atoin of outstanding city success.

Much is not going into cities at all, but instead into the outskirts of cities.

As Haar said, the credit authority are not only the power to destroy but The power to create and the power to divert. He was writing specifically of the government's credit authority, and the use of that authority to encourage suburb building rather than city building.

The immense new suburban sprawls of American citys have not come about by accident - and still lesser by the myth of free choice between cities and suburbs. Endless suburban sprawl was made practical (and for many families was made actually mandatory) through the ceration of some-thing the United states lacked until the mid-1930's: a national mortgage market specifically calculated to encourage suburban home building. Because of the certitude offered by government mortgage guarantees: a bank in New Haven could, would and does buy up mortgages on suburban houseing in Southern California. A bank in Chicago buy up mortgages on suburban housing in Indianapolis one week, while an Indianapolis bank, the next week, buys them up for suburban housing outside Atlanta or buffalo. Nor, nowadays, must these mortgages necessarily be government guaranteed? They can be a repetition, without the guarantees, of the kind of planinng and building that is made routine and accepted by the guarantees.

A national mortgage has obvoius advantages in bringing the demand for money together with a distant supply of money quickly and sensitively. But, particcularly when it is diverted so heavily into one kind of growth, it has disadvantages too.

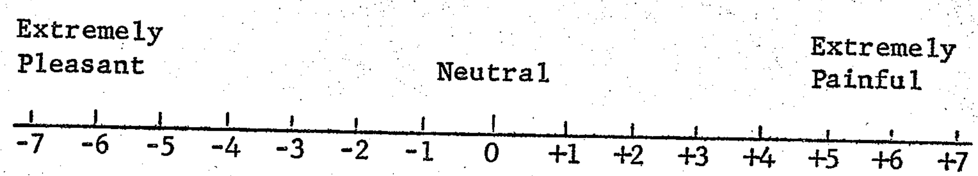
as the people of the Back-of-the-Yards found out, there is apt to be no relationship between city-created and city/needed savings, and city building investment. So remote are the relationship that in 1959 when one of the savings banks in Brooklyn announced that 70 percent of its loans had been made close to home, the New York Times considered the fact sufficient newsworthy to give it a big play on the business pages. Close to home is a definition with some elasticity. The 70 percent, it turned out, had bene used in Nassau County; a huge mess of new suburban sprawl on Long Island, out beyond Brooklyn. Meantime, much of Brooklyn lies under the sentence of the blacklist.

City people finnance the building of suburbs. To be sure, one of the historic missions of cities; those marvelously productive and efficient places, are to finance colonization.

But you can run anything into the ground.

APPENDIX F

NOISE RATING SCALE



APPENDIX G

GENERAL INSTRUCTIONS

The purpose of this experiment is to assess your reactions to a variety of stimuli. During the experiment I will ask you to do a variety of tasks. First, I will give you a passage which contains a number of different types of errors and you are to locate the errors. There are about 30 errors in the passage. In this sample passage there are examples of the five types of errors you will find (the experimenter showed the subject the paper containing the examples of errors and read out loud the following short passage, pointing out the five types of errors):

> ✓ This is a sad and common story on housing or renewal sites; (the semicolon is underlined as an error since there should be a comma instead--this is a punctuation error) and is one reason ✓ these schemes is ("is" is underlined as an error since it should read "these schemes are"--this is a grammatical error) fought so ✓ desperately by site businessmen. They are subsidizing thees (thees should be "these" but the es is switched around--this is a transposition error) schemes, not with a fraction of their tax money, but with their livelihoods, with their children's college ✓ mony, (mony is underlined because it is misspelled--thus there are ✓ misspellings) __ with (the blank space is underlined because there should be no double space there--that is a typographical error) years of their past put into hopes for the future--with nearly everything they have.

I would like to know what percentage of the errors that you expect to locate in the passage. That is, tell me the percentage of errors--from 0 to 100 percent--that you expect to find.

Now you may feel that certain factors in the proofreading task determine how many errors that you find. Please use this form (the experimenter placed the Attribution Questionnaire in front of the subject) to indicate the contribution you feel each of the listed factors makes in determining the percentage of errors located. All percentages must add up to 100. (After the subject finished the questionnaire, the experimenter checked to see if the percentages added up to 100. If necessary, the subject was asked to readjust the scores so that they did add up to 100).

Good. Now please read each page of the passage carefully and when you locate an error, underline the error and then place a check mark in the margin at the level of the error. If you find more than one error in the same sentence, underline each of the errors and then place that number of check marks in the margin. Please work as quickly and accurately as you can and I will tell you when to stop. Are there any questions? (If the subject had not completed the task in five minutes, the experimenter said) Please stop now and show me the last word that you read.

White noise from a noise generator will be used in this experiment. Do you have objections to hearing noise? If you later find the noise objectionable, you may withdraw from the experiment and still get credit for your attendance. Please use this Noise Rating Scale in order to state the feeling produced by the noise (the experimenter placed the scale on the table in front of the subject). As you can see, minus seven indicates that the noise is extremely pleasant, plus seven indicates that the noise is extremely painful, and zero indicates that the noise is neutral--that is, neither pleasant nor painful.

As you know there are individual differences in the level of noise that is experienced as pleasant or painful. I am interested, first, in finding your level of plus five. Now, at this level the noise is definitely on the painful side of the scale and is approaching extremely painful. The noise will be painful enough so that you will not want to hear it for very long periods of time but can endure it for shorter periods.

The noise will begin at a low level and will increase in intensity or loudness until you indicate that you feel that your level of plus five is reached. When the plus five level is reached, state out loud "plus five". This gradual increasing of the noise level will occur five times. Each time state "plus five" when that level is reached. Are there any questions? Please put on the earphones.

(After the 15 trials of white noise, each subject was given the following instructions.)

Now I will give you another proofreading task. The number and types of errors are the same as in the first task. That is, there are about 30 errors and the types of errors are the ones shown on the paper (the experimenter points to the sample passage). Again, I would like to know what percentage of the errors--from 0 to 100--that you expect to locate in the passage.

Again, you may feel that certain factors determine how many errors you find. Please use this form (the experimenter places the Attribution Questionnaire in front of the subject) to indicate the contribution you feel each of the listed factors makes in determining the percentage of errors located.

The instructions for this proofreading task are the same as for the first one. That is, read each page carefully and when you locate an error, underline the error and then place a check mark in the margin at the level of the error. If you find more than one error in the same sentence, underline each of the errors and then place that number of check marks in the margin. Please work as quickly and accurately as you can and I will tell you when to stop. (If the subject had not completed the task in five minutes, the experimenter said) Please stop now and show me the last word that you read.

This post-experimental questionnaire is also an important part of the experiment. Please answer the questions as frankly and honestly as possible and please make sure that you have responded to each question. (The experimenter gave the subject the questionnaire.)

Thank you for participating in this experiment. After the experiment is completed and after the data are analyzed, I will send you a description of the experiment and the results. Also I will send information concerning your performance on the tasks.

APPENDIX H

YOKING PROCEDURE

The yoking procedure was carried out for both internals and externals. Thus, there were nine groups of internals and nine groups of externals.

Group 1. Onset actual control and duration actual control condition.

Group 2. Onset actual control and duration prediction condition (Duration time for each S was yoked to an S in Group 1).

Group 3. Onset actual control and duration no control condition (Duration time for each S was yoked to an S in Group 1).

Group 4. Onset prediction and duration actual control condition (Onset time for each S was yoked to an S in Group 1.)

Group 5. Onset prediction and duration prediction condition (onset time for each S was yoked to an S in Group 2, duration time for each S was yoked to an S in Group 4).

Group 6. Onset prediction and duration no control condition (Onset time for each S was yoked to an S in Group 3; duration time for each S was yoked to an S in Group 4).

Group 7. Onset no control and duration actual control condition (Onset time for each S was yoked to an S in Group 1).

Group 8. Onset no control duration prediction condition (Onset time for each S was yoked to an S in Group 2; duration time for each S was yoked to an S in Group 7).

Group 9. Onset no control and duration no control condition (Onset time for each S was yoked to an S in Group 3; duration time for each S was yoked to an S in Group 7).

APPENDIX I

TEST TRIAL INSTRUCTIONS

Onset Actual Control and Duration Actual Control

Now you will hear presentations of white noise. After each presentation of noise, you are to state the feeling produced by the noise. State out loud the number along the noise rating scale which best describes the feeling produced by the noise presentation.

You will be able to say when you want the noise to start and when you want the noise to stop. Numbers will appear in this display box (the experimenter pointed to the display box). The numbers will begin at 99 and will decrease one at a time. At the time that you want the noise to start, state out loud the number which is then being displayed. Then watch the numbers again. The numbers will begin at 99 and will decrease one at a time. At the time you want the noise to stop, state out loud the number that is then being displayed.

This is neither a speed nor an endurance test. That is, I am not trying to see how quickly you can respond or how long you can endure before you state the numbers being displayed to start or stop the noise. Listen to the noise long enough to give it a rating. Just remember to state the number being displayed when you want the noise to start and then state the number being displayed when you have heard enough. Then after the noise stops, state out loud your noise rating. Are there any questions? Please put on the earphones.

Onset Actual Control and Duration Prediction

Now you will hear presentations of white noise. After each presentation of noise, you are to state the feeling produced by the noise. State out loud the number along the noise rating scale which best describes the feeling produced by the noise presentation.

You will be able to say when you want the noise to start. Numbers will appear in this display box (the experimenter pointed to the display box). The numbers will begin at 99 and will decrease one at a time. At the time that you want the noise to start, state out loud the number which is then being displayed.

Then watch the numbers again. You will be able to know when the noise will stop. The numbers will decrease one at a time until zero (00) is reached. At the time that zero is finished being displayed, the noise will stop. Although the first number may vary from trial to trial, the numbers will always decrease one at a time until zero is reached and the noise will always stop after zero is finished being displayed. Let me know when the noise is about to stop by stating out loud the number zero when it is displayed.

This is neither a speed nor an endurance test. That is, I'm not trying to see how quickly you can respond or how long you can endure before you state the number being displayed to start the noise. Just remember to state the number being displayed when you want the noise to start and then let me know that the noise is about to stop by stating "zero" when it appears on the display. Then after the noise stops, state out loud your noise rating. Are there any questions? Please put on the earphones.

Onset Actual Control and Duration No Control

Now you will hear presentations of white noise. After each presentation of noise, you are to state the feeling produced by the noise. State out loud the number along the noise rating scale which best describes the feeling produced by the noise presentation.

You will be able to say when you want the noise to start. Numbers will appear in this display box (the experimenter pointed to the display box). The numbers will begin at 99 and will decrease one at a time. At the time that you want the noise to start, state out loud the number which is then being displayed. Then watch the numbers again. Let me know when the noise stops by stating out loud the number that is being displayed when the noise stops.

This is neither a speed nor an endurance test. That is, I am not trying to see how quickly you can respond or how long you can endure before you state the number being displayed to start the noise. Just remember to state the number being displayed when you want the noise to start and then state the number being displayed when the noise stops. Are there any questions? Please put on the earphones.

Onset Prediction and Duration Actual Control

Now you will hear presentations of white noise. After each presentation of noise, you are to state the feeling produced by the noise. State out loud the number along the noise rating scale which best describes the feeling produced by the noise presentation.

You will be able to know when the noise will start. Numbers will appear in this display box (the experimenter pointed to the display box). The numbers will decrease one at a time until zero (00) is reached. At the time that zero is finished being displayed, the noise will start. Although the first number may vary from trial to trial, the numbers will always decrease one at a time until zero is reached and the noise will always begin after zero is finished being displayed. Let me know that the noise is about to start by stating out loud the number zero when it is displayed.

Then watch the numbers again. You will be able to say when you want the noise to stop. The numbers will begin at 99 and will decrease one at a time. At the time that you want the noise to stop, state out loud the number which is then being displayed.

This is neither a speed nor an endurance test. That is, I'm not trying to see how quickly you can respond or how long you can endure before you state the number being displayed to stop the noise. Listen to the noise long enough to give it a rating.

Just remember to let me know that the noise is about to start by stating zero when it is displayed and then state the number being displayed when you have heard enough. Then after the noise stops, state out loud your noise rating. Are there any questions? Please put on the earphones.

Onset Prediction and Duration Prediction

Now you will hear presentations of white noise. After each presentation of noise, you are to state the feeling produced by the noise. State out loud the number along the noise rating scale which best describes the feeling produced by the noise presentation.

You will be able to know when the noise will start. Numbers will appear in this display box (the experimenter pointed to the display box). The numbers will decrease one at a time until zero (00) is reached. At the time that zero is finished being displayed, the noise will start. Although the first number may vary from trial to trial, the numbers will always decrease one at a time until zero is reached and the noise will always begin after zero is finished being displayed. Let me know when the noise is about to start by stating out loud the number zero when it is displayed.

Then watch the numbers again. You will be able to know when the noise will stop. The numbers will decrease one at a time until zero (00) is reached. At the time that zero is finished being displayed, the noise will stop. Although the first number may vary from trial to trial, the numbers will always decrease one at a time until zero is reached and the noise will always stop after zero is finished being displayed. Let me know when the noise is about to stop by stating out loud the number zero when it is displayed.

Just remember to let me know that the noise is about to start by stating "zero" when it is displayed and then let me know that the noise is about to stop by stating "zero" when it appears on the display again. Then after the noise stops, state out loud your noise rating. Are there any questions? Please put on the earphones.

Onset Prediction and Duration No Control

Now you will hear presentations of white noise. After each presentation, you are to state the feeling produced by the noise. State out loud the number along the noise rating scale which best describes the feeling produced by the noise presentation.

You will be able to know when the noise will start. Numbers will appear in this display box (the experimenter pointed to the display box). The numbers will decrease one at a time until zero (00) is reached. At the time that zero is finished being displayed, the noise will start. Although the first number may vary from trial to trial, the numbers will always decrease one at a time until zero is reached and the noise will always begin after zero is finished being displayed. Let me know that the noise is about to start by stating out loud the number zero when it is displayed.

Then watch the numbers again. Let me know when the noise stops by stating out loud the number that is being displayed when the noise stops.

Just remember to let me know that the noise is about to start by stating "zero" when it is displayed and then state the number being displayed when the noise stops. Then after the noise stops, state out loud your noise rating. Are there any questions? Please put on your earphones.

<u>Onset No Control and Duration Actual Control</u>

Now you will hear presentations of white noise. After each presentation of noise, you are to state the feeling produced by the noise. State out loud the number along the noise rating scale which best describes the feeling produced by the noise presentation.

Numbers will appear in this display box (the experimenter pointed to the display box). Let me know when the noise starts by stating out loud the number which is being displayed when the noise starts.

Then watch the numbers again. You will be able to say when you want the noise to stop. The numbers will begin at 99 and will decrease one at a time. At the time that you want the noise to stop, state out loud the number which is then being displayed.

This is neither a speed nor an endurance test. That is, I am not trying to see how quickly you can respond or how long you can endure before you state the number being displayed to stop the noise. Listen to the noise long enough to give it a rating.

Just remember to state the number being displayed when the noise starts and then state the number being displayed when you have had enough. Then after the noise stops, state out loud your noise rating. Are there any questions? Please put on the earphones.

Onset No Control and Duration Prediction

Now you will hear presentations of white noise. After each presentation of noise, you are to state the feeling produced by the noise. State out loud the number along the noise rating scale which best describes the feeling produced by the noise presentation.

Numbers will appear in this display box (the experimenter pointed to the display box). Let me know when the noise starts by stating out loud the number which is being displayed when the noise starts.

Then watch the numbers again. You will be able to know when the noise will stop. The numbers will decrease one at a time until zero (00) is reached. At the time that zero is finished being displayed, the noise will stop. Although the first number may vary from trial to trial, the numbers will always decrease one at a time until zero is reached and the noise will always stop after zero is finished being displayed. Let me know that the noise is about to stop by stating out loud the number zero when it is displayed.

Just remember to state the number being displayed when the noise starts and then let me know that the noise is about to stop by stating "zero" when it is displayed. Then after the noise stops, state out loud your noise rating. Are there any questions? Please put on the earphones.

Onset No Control and Duration No Control

Now you will hear presentations of white noise. After each presentation of noise, you are to state the feeling produced by the noise. State out loud the number along the noise rating scale which best describes the feeling produced by the noise.

Numbers will appear in this display box (the experimenter pointed to the display box). Let me know when the noise starts by stating out loud the number which is being displayed when the noise starts.

Then watch the numbers again. Let me know when the noise stops by stating out loud the number that is being displayed when the noise stops.

Just remember to state the number being displayed when the noise starts and then state the number being displayed when the noise stops. Then after the noise stops, state out loud your noise rating. Are there any questions? Please put on the earphones.

APPENDIX J

POST-EXPERIMENTAL QUESTIONNAIRE

The purpose of this questionnaire is to better evaluate the experiment you have just finished and to obtain suggestions for future related studies. Please answer the following questions as frankly and honestly as possible.

1. What are some of your reactions to the experiment? What did you think of it?
2. What was the purpose of this experiment and what were you supposed to do?
3. During the experiment did you ever believe that the purpose might be something different than what I was telling you? If so, explain.
4. What did you think was the purpose of the Noise Rating Scale when you were giving your ratings?
5. How did you go about deciding what rating to give the noise presentations?
6. What did you think was the purpose of the lighted numbers?
7. What did you think was the purpose of asking you the percentage of errors that you thought you would find on the proofreading task?
8. What did you think was the purpose of asking you the contribution of different factors in determining your performance on the proofreading tasks?
9. When you took the proofreading task the second time,

   (a) did you expect you were supposed to do better, worse, or about the same? Explain.

(b) rate your attitude while doing the task:

resist the influence __,__,__,__,__ change your performance

10. When you stated how many errors you expected to find on the proofreading task the second time:

(a) did you expect that you were supposed to give a higher percentage, a lower percentage, or one about the same? Explain.

(b) rate your attitude while giving your rating:

resist the influence __,__,__,__,__,__ change the rating

11. When you rated the factors determining your performance on the proofreading task for the second time:

(a) did you rexpect that you were supposed to change your ratings or keep them about the same? Explain.

(b) rate your attitude while giving your second rating?

resist the influence __,__,__,__,__ change the rating

12. This scale indicates the degree of control over the onset of the white noise that you felt you had during the test trials. The scale extends from 0 (no control) to 10 (complete control). Please indicate by placing a check (√) mark in the appropriate box along the scale, the degree of control you felt you had over when the noise would begin.

no control   complete control

0	1	2	3	4	5	6	7	8	9	10

13. This scale indicates the degree of control over the duration of the white noise that you felt you had during the test trials. The scale extends from 0 (no control) to 10 (complete control). Please indicate by placing a (√) mark in the appropriate box along the scale, the degree of control you felt you had over how long the noise would last.

no control | | | | | | | | | | complete control

0	1	2	3	4	5	6	7	8	9	10

14. This scale indicates the degree to which you found the onset of the white noise predictable during the test trials. The scale extends from 0 (not predictable) to 10 (very predictable). Please indicate by placing a check (√) in the appropriate box along the scale, the degree to which you felt that the onset of the white noise was predictable.

not predictable | | | | | | | | | | very predictable

0	1	2	3	4	5	6	7	8	9	10

15. This scale indicates the degree to which you found the duration of the white noise predictable during the test trials. The scale extends from 0 (not predictable) to 10 (very predictable). Please indicate by placing a check (√) in the appropriate box along the sscale, the degree to which you felt the duration of the white noise was predictable.

no predictable | very predictable

0	1	2	3	4	5	6	7	8	9	10

16. Any additional comments or suggestions would be appreciated.

APPENDIX K

Cell Means for Analyses of Variance on the

Controllability and Predictability of the Aversive Stimuli

	Onset Control	Duration Control	Onset Prediction	Duration Prediction
Onset Control				
Actual Control (1)	7.90	5.20	6.87	6.07
Prediction (2)	4.62	5.13	6.33	5.83
No Control (3)	2.63	5.13	5.43	5.80
Duration Control				
Actual Control (1)	5.62	8.60	7.12	7.08
Prediction (2)	4.67	4.10	5.88	5.90
No Control (3)	4.87	2.77	5.63	4.72
Onset Control x Duration Control				
1, 1	8.60	8.85	7.75	7.35
1, 2	7.25	3.80	6.75	5.70
1, 3	7.85	2.95	6.10	5.15
2, 1	5.35	8.10	6.75	6.60
2, 2	4.10	4.90	5.90	6.10
2, 3	4.40	2.40	6.35	4.80
3, 1	2.90	8.85	6.85	7.30
3, 2	2.65	3.60	5.00	5.90
3, 3	2.35	2.95	4.45	4.20
Generalized Expectancy				
Internal (1)	5.48	5.43	6.37	5.74
External (2)	4.62	4.88	6.06	6.06
Onset Control x Generalized Expectancy				
1, 1	8.33	5.00	7.40	5.57
1, 2	7.47	5.40	6.33	6.57
2, 1	5.03	5.30	6.00	5.57
2, 2	4.20	4.97	6.67	6.10
3, 1	3.07	6.00	5.70	6.10
3, 2	2.20	4.27	5.17	5.50

Continued...

	Onset Control	Duration Control	Onset Prediction	Duration Prediction
Duration Control x Generalized Expectancy				
1, 1	6.33	8.73	7.83	7.13
1, 2	4.90	8.47	6.40	7.03
2, 1	4.87	4.43	5.67	5.50
2, 2	4.47	3.77	6.10	6.30
3, 1	5.23	3.13	5.60	4.60
3, 2	4.50	2.40	5.67	4.83
Onset Control x Duration Control x Generalized Expectancy				
1, 1, 1	9.30	9.10	8.40	7.20
1, 1, 2	7.90	8.60	7.10	7.50
1, 2, 1	8.00	3.00	7.20	5.20
1, 2, 2	6.50	4.60	6.30	6.20
1, 3, 1	7.70	2.90	6.60	4.30
1, 3, 2	8.00	3.00	5.60	6.00
2, 1, 1	6.50	8.60	7.80	6.90
2, 1, 2	4.20	7.60	5.70	6.30
2, 2, 1	4.10	5.00	5.10	5.10
2, 2, 2	4.10	4.80	6.70	7.10
2, 3, 1	4.50	2.30	5.10	4.70
2, 3, 2	4.30	2.50	7.60	4.90
3, 1, 1	3.20	8.50	7.30	7.30
3, 1, 2	2.60	9.20	6.40	7.30
3, 2, 1	2.50	5.30	4.70	6.20
3, 2, 2	2.80	1.90	5.30	5.60
3, 3, 1	3.50	4.20	5.10	4.80
3, 3, 2	1.20	1.70	3.80	3.60

APPENDIX L

Analysis of Variance for Onset Control

Source	df	MS	F
Ons Con	2	424.5161	49.82***
Dur Con	2	15.0500	1.77
Ons Con x Dur Con	4	2.0667	0.24
Gen Exp	1	32.9389	3.87*
Ons Con x Gen Exp	2	0.0056	0.00
Dur Con x Gen Exp	2	4.1722	0.49
Ons Con x Dur Con x Gen Exp	4	8.8889	1.04
Within Cells	162	8.5204	

*$p < .05$.

***$p < .001$

Analysis of Variance for Duration Control

Source	df	MS	F
Ons Con	2	0.0889	0.01
Dur Con	2	560.5549	73.57***
Ons Con x Dur Con	4	7.7388	1.02
Gen Exp	1	13.8889	1.82
Ons Con x Gen Exp	2	17.6222	2.31
Dur Con x Gen Exp	2	0.9557	0.13
Ons Con x Dur Con x Gen Exp	4	14.9888	1.97
Within Cells	162	7.6197	

***$p < .001$.

Analysis of Variance for Onset Predictability

Source	df	MS	F
Ons Con	2	31.4899	4.73**
Dur Con	2	37.8399	5.68**
Ons Con X Dur Con	4	5.6049	0.84
Gen Exp	1	4.3575	0.65
Ons Con x Gen Exp	2	11.8211	1.77
Dur Con x Gen Exp	2	14.6711	2.20
Ons Con x Dur Con x Gen Exp	4	10.1394	1.52
Within Cells	162	6.6605	

**$p < .01$.

Analysis of Variance for Duration Predictability

Source	df	MS	F
Ons Con	2	1.2671	0.15
Dur Con	2	84.0169	10.10**
Ons Con x Dur Con	4	3.8331	0.46
Gen Exp	1	4.3564	0.52
Ons Con x Gen Exp	2	10.1550	1.22
Dur Con x Gen Exp	2	3.1051	0.37
Ons Con x Dur Con x Gen Exp	4	5.0057	0.60
Within Cells	162	8.3173	

**$p < .001$.

APPENDIX M

Analysis of Variance for Onset Times

Source	df	MS	F
Onset	2	98.6734	0.17
Gen Exp	11	0.6215	0.00
Ons x Gen Exp	2	333.5698	0.56
Within Cells	54	596.9343	

Analysis of Variance for Duration Times

Source	df	MS	F
Dur	2	1321.4250	4.33*
Gen Exp	1	666.6670	2.19
Dur x Gen Exp	2	188.4047	0.62
Within Cells	54	305.0918	

*$p < .05$.

APPENDIX N

Cell Means for Analyses of Variance on Onset and Duration Times (in Seconds)

Condition	Mean
Onset	
Ons Con	
Duration Control (1)	50.90
Duration Prediction (2)	55.30
Duration No Control (3)	52.57
Gen Exp	
Internal (1)	52.83
External (2)	53.03
Ons Con x Gen Exp	
1, 1	51.41
1, 2	50.40
2, 1	50.85
2, 2	59.76
3, 1	56.22
3, 2	48.93
Duration	
Dur Con	
Onset Control (1)	58.18
Onset Prediction (2)	64.57
Onset No Control (3)	74.32
Gen Exp	
Internal (1)	69.03
External (2)	62.36
Dur Con x Gen Exp	
1, 1	64.81
1, 2	51.56
2, 1	65.12
2, 2	64.02
3, 1	77.15
3, 2	71.50

APPENDIX O

Analysis of Variance for Decibel Levels

Source	df	MS	F
Ons Con	2	18.9886	0.40
Dur Con	2	115.4011	2.43
Gen Exp	1	18.0524	0.38
Ons Con x Dur Con	4	77.5250	1.63
Ons Con x Gen Exp	2	63.7041	1.34
Dur Con x Gen Exp	2	1.9499	0.04
Ons Con x Dur Con x Gen Exp	4	91.5412	1.92
Within Cells	162	47.5749	

APPENDIX P

Cell Means for Analysis of Variance

on Decibel Levels of White Noise

Ons Con	
Actual Control (1)	90.28
Prediction (2)	89.16
No Control (3)	89.71
Dur Con	
Actual Control (1)	91.25
Prediction (2)	89.35
No Control (3)	88.55
Gen Exp	
Internal (1)	89.40
External (2)	90.03
Ons Con x Dur Con	
1, 1	92.22
1, 2	90.65
1, 3	87.97
2, 1	92.17
2, 2	88.57
2, 3	86.72
3, 1	89.35
3, 2	88.82
3, 3	90.95
Ons Con x Gen Exp	
1, 1	90.97
1, 2	89.60
2, 1	88.90
2, 2	89.42
3, 1	88.33
3, 2	91.08
Dur Con x Gen Exp	
1, 1	91.13
1, 2	91.37
2, 1	88.88
2, 2	89.82
3, 1	88.18
3, 2	88.92
Ons Con x Dur Con x Gen Exp	
1, 1, 1	91.05
1, 1, 2	93.40
1, 2, 1	91.80
1, 2, 2	89.50
1, 3, 1	90.05
1, 3, 2	85.90
2, 1, 1	94.50
2, 1, 2	89.85
2, 2, 1	86.35
2, 2, 2	90.80
2, 3, 1	85.85
2, 3, 2	87.60
3, 1, 1	87.85
3, 1, 2	90.85
3, 2, 1	88.50
3, 3, 1	88.65
3, 3, 2	93.25

APPENDIX Q

Multivariate and Univariate Analyeses of

Covariance for Posttrial Measures

Source	df	MS	F	p
Ons Con				
Multivariate			1.2963	.2193
No. Words Read	12	7890.3750	3.3847	.0364
% Errors Missed	12	307.0352	1.5632	.2128
Expectancy for Success	12	39.2969	0.4018	.6698
Skill Attribution	12	80.6152	1.3786	.2550
Chance Attribution	12	29.6484	1.2369	.2931
Pain Ratings	12	114.1211	0.2783	.7575
Dur Con				
Multivariate			1.6573	.0755
No. Words Read	12	279.0000	0.1197	.8873
% Errors Missed	12	33.5098	0.3416	.7112
Expectancy for Success	12	21.1484	0.2162	.8058
Skill Attribution	12	13.1875	0.2255	.7984
Chance Attribution	12	30.9473	1.2911	.2779
Pain Ratings	12	3437.8008	8.3847	.0004
Gen Exp				
Multivariate			2.4716	.0262
No. Words Read	6	6179.4375	2.6507	.1055
% Errors Missed	6	76.0742	1.6152	.2056
Expectancy for Success	6	110.7891	1.1328	.2887
Skill Attribution	8	0.0934	0.0160	.8997
Chance Attribution	6	211.5000	8.8233	.0035
Pain Ratings	6	1022.3555	2.4935	.1163
Ons Con x Dur Con				
Multivariate			0.7392	.8122
No. Words Read	24	2021.4375	0.8671	.4852
% Errors Missed	24	92.5146	0.4202	.7940
Expectancy for Success	24	64.9805	0.6644	.6177
Skill Attribution	24	28.1514	0.4814	.7494
Chance Attribution	24	36.1641	1.5087	.2023
Pain Ratings	24	386.4629	0.9426	.4410

Continued...

Source	df	MS	F	p
Ons Con x Gen Exp				
Multivariate			0.7794	.6719
No. Words Read	12	1003.3437	0.4304	.6510
% Errors Missed	12	14.8770	0.0738	.9289
Expectancy for Success	12	51.4082	0.5256	.5922
Skill Attribution	12	98.0977	1.6775	.1902
Chance Attribution	12	43.7559	1.8254	.1646
Pain Ratings	12	164.5137	0.4012	.6702
Dur Con x Gen Exp				
Multivariate			0.9528	.4945
No. Words Read	12	1887.1250	0.8095	.4469
% Errors Missed	12	5.4824	0.0864	.9173
Expectancy for Success	12	242.3633	2.4781	.0872
Skill Attribution	12	173.2617	2.9629	.0546
Chance Attribution	12	11.0254	0.4600	.6322
Pain Ratings	12	82.1602	0.2004	.8186
Ons Con x Dur Con x Gen Exp				
Multivariate			0.7598	.7883
No. Words Read	24	1710.9062	0.7339	.5701
% Errors Missed	24	16.1680	0.0384	.9972
Expectancy for Success	24	72.2070	0.7383	.5672
Skill Attribution	24	73.3809	1.2549	.2902
Chance Attribution	24	11.5381	0.4813	.7494
Pain Ratings	24	464.6035	1.1332	.3430
Subjects Within Groups				
No. Words Read	157	2331.2058		
% Errors Missed	157	126.1704		
Expectancy for Success	157	97.8017		
Skill Attribution	157	58.4769		
Chance Attribution	157	23.9705		
Pain Ratings	157	410.0081		

APPENDIX R

Adjusted Cell Means for Analysis of Covariance on Posttrial Measures

Dependent Variables

Condition	No.Words Read	% Errors Missed	Expectancy for Success	Skill Attribution	Chance Attribution	Pain Ratings
Gen Exp						
Internal (1)	469.315	31.067	61.957	32.084	7.129	57.128
External (2)	481.250	29.743	63.555	31.938	9.337	61.983
Ons Con						
Actual Control (1)	478.494	32.541	62.443	32.599	7.558	59.489
Prediction (2)	462.496	28.004	63.679	32.766	8.168	60.973
No Control (3)	484.858	30.669	62.145	30.668	8.974	58.205
Dur Con						
Actual Control (1)	476.797	29.553	63.447	32.098	8.725	66.517
Prediction (2)	476.255	30.994	62.370	32.432	8.571	60.732
No Control (3)	472.797	30.667	62.451	31.503	7.404	51.418
Gen Exp. x Ons Con						
1, 1	468.143	33.036	60.643	32.080	6.602	58.606
1, 2	460.513	29.025	63.000	34.355	6.116	56.715
1, 3	479.291	30.920	62.227	29.817	8.670	56.063
2, 1	488.845	32.046	64.243	33.119	8.515	60.372
2, 2	464.479	26.764	64.358	31.178	10.220	65.231
2, 3	490.425	30.418	62.063	31.518	9.277	60.346

Continued...

Condition	No. Words Read	% Errors Missed	Expectancy for Success	Skill Attribution	Chance Attribution	Pain Ratings
Gen Exp x Dur Con						
1, 1	467.093	30.442	63.908	32.772	7.357	65.444
1, 2	467.530	31.310	62.643	33.834	7.232	57.519
1, 3	473.323	31.448	59.319	29.646	6.798	48.422
2, 1	486.500	28.664	62.985	31.425	10.092	67.590
2, 2	484.980	30.678	62.096	31.030	9.909	63.945
2, 3	474.270	29.885	65.583	33.360	8.011	54.415
Ons Con x Dur Con						
1, 1	481.390	31.320	62.490	31.355	7.910	68.448
1, 2	475.599	32.379	62.427	33.990	6.796	61.306
1, 3	478.493	33.925	62.413	32.454	7.970	48.713
2, 1	472.189	29.551	63.856	33.309	9.092	63.993
2, 2	454.970	27.289	65.127	33.394	8.036	60.308
2, 3	460.331	27.173	62.054	31.597	7.377	58.620
3, 1	476.812	27.790	63.995	31.631	9.172	67.109
3, 2	498.196	33.314	59.555	29.913	10.881	60.582
3, 3	479.566	30.902	62.885	30.459	6.867	46.923

Continued...

Condition	No.Words Read	% Errors Missed	Expectancy for Success	Skill Attribution	Chance Attribution	Pain Ratings
Gen Exp x Ons Con x Dur Con						
1, 1, 1	470.323	31.766	61.867	29.172	6.885	68.938
1, 1, 2	458.519	32.226	62.474	35.899	6.333	61.516
1, 1, 3	475.588	35.117	57.588	31.169	6.589	45.365
1, 2, 1	456.304	30.351	65.372	35.798	6.736	65.073
1, 2, 2	451.704	28.307	63.060	36.794	5.104	49.333
1, 2, 3	473.531	29.076	60.567	30.472	6.507	55.739
1, 3, 1	474.652	29.212	64.486	33.345	8.451	62.320
1, 3, 2	492.366	33.396	62.394	28.809	10.261	61.707
1, 3, 3	470.853	30.151	59.801	27.297	7.298	44.162
2, 1, 1	492.458	30.875	63.113	33.538	8.936	67.959
2, 1, 2	492.679	32.530	62.379	32.080	7.259	61.095
2, 1, 3	481.399	32.733	67.238	33.738	9.349	52.061
2, 2, 1	488.072	28.750	62.339	30.820	11.447	62.912
2, 2, 2	458.235	26.272	67.194	29.994	10.968	71.282
2, 2, 3	447.131	25.270	63.540	32.721	8.246	61.500
2, 3, 1	478.971	26.368	63.505	29.917	9.894	71.898
2, 3, 2	504.025	33.232	56.715	31.017	11.502	59.457
2, 3, 3	488.280	31.653	65.970	33.620	6.437	49.683

APPENDIX S

Multivariate and Univariate Analyses of Variance

for Between Subject Treatment Effects

Source	df	MS	F	p
Ons Con				
Multivariate			0.4700	.9315
No. Words Read	12	15127.1289	0.8816	.4161
% Errors Missed	12	325.1460	0.9934	.3727
Pain Ratings	12	98.8741	0.2337	.7920
Expectancy for Success	12	73.4872	0.0658	.9364
Skill Attribution	12	89.1702	0.0668	.9354
Chance Attribution	12	46.7719	0.2021	.8172
Dur Con				
Multivariate			1.9588	.0276
No. Words Read	12	4318.7812	0.2517	.7779
% Errors Missed	12	555.4141	1.1828	.3091
Pain Ratings	12	3087.4971	7.2967	.0010
Expectancy for Success	12	558.4282	0.4999	.6076
Skill Attribution	12	796.1001	0.5965	.5520
Chance Attribution	12	307.6206	1.3293	.2676
Gen Exp				
Multivariate		—	2.5766	.0208
No. Words Read	6	9797.6133	0.5710	.4510
% Errors Missed	6	147.0638	0.4965	.4823
Pain Ratings	6	672.7998	1.5900	.2091
Expectancy for Success	6	444.9377	0.3983	.5289
Skill Attribution	6	853.6853	0.6396	.4250
Chance Attribution	6	2204.9956	9.5282	.0024

Continued...

Source	df	MS	F	p
Ons Con x Dur Con				
Multivariate			0.8165	.7171
No. Words Read	24	10354.0898	0.6035	.6607
% Errors Missed	24	489.9761	1.2203	.3042
Pain Ratings	24	450.7227	1.0652	.3756
Expectancy for Success	24	861.1777	0.7709	.5456
Skill Attribution	24	1367.3760	1.0245	.3964
Chance Attribution	24	291.4231	1.2593	.2882
Ons Con x Gen Exp				
Multivariate	12		1.7920	.0486
No. Words Read	12	57759.6250	3.3664	.0370
% Errors Missed	12	577.6172	1.4512	.2373
Pain Ratings	12	88.3503	0.2088	.8118
Expectancy for Success	12	2001.4231	1.7915	.1700
Skill Attribution	12	605.1707	0.4534	.6363
Chance Attribution	12	797.2146	3.4449	.0343
Dur Con x Gen Exp				
Multivariate			0.4097	.9595
No. Words Read	12	1830.4824	0.1067	.8989
% Errors Missed	12	64.7894	0.1538	.8576
Pain Ratings	12	92.7163	0.2191	.8035
Expectancy for Success	12	1085.0054	0.9712	.3809
Skill Attribution	12	1442.4377	1.0807	.3418
Chance Attribution	12	145.8662	0.6303	.5338
Ons Con x Dur Con x Gen Exp				
Multivariate			1.0170	.4413
No. Words Read	24	12829.3555	0.7477	.5609
% Errors Missed	24	370.5522	1.0139	.4019
Pain Ratings	24	481.0662	1.1369	.3411
Expectancy for Success	24	2331.9316	2.0873	.0849
Skill Attribution	24	1065.2949	0.7982	.5280
Chance Attribution	24	57.0330	0.2465	.9115

Continued...

Source	df	MS	F	p
Subject Within Groups				
No. Words read	162	17157.8711		
% Errors Missed	162	427.3213		
Pain Ratings	162	423.1350		
Expectancy for Success	162	1117.1777		
Skill Attribution	162	1334.6838		
Chance Attribution	162	231.4178		

APPENDIX T

Pretrial and Posttrial Observed Cell Means for Generalized Expectancies for Control

Condition	# Words	% Errors Missed	Expectancy for Success	Skill Attribution	Chance Attribution
			Pre		
			Dependent Variables		
Internals	442.5	33.56	65.61	34.39	8.72
Externals	444.5	33.35	66.33	32.17	11.63
			Post		
Internals	468.9	31.20	61.54	33.08	6.19
Externals	481.7	29.61	69.97	30.94	10.28

APPENDIX U

Multivariate and Univariate Analyses of

Variance for Within Subject Treatment Effects

Source	df	MS	F	p
Pre- Post-Trial (Pre-Post)				
Multivariate			20.9840	.0001
No. Words Read	5	18164.1187	16.1388	.0001
% Errors Missed	5	1677.4971	8.0144	.0053
Expectancy for Success	5	1862.4460	14.7869	.0002
Skill Attribution	5	288.7991	4.5009	.0354
Chance Attribution	5	680.5540	20.8689	.0001
Ons Con x Pre Post				
Multivariate			1.3932	.1821
No. Words Read	10	14453.2812	3.4127	.0354
% Errors Missed	10	455.9314	1.0870	.3396
Expectancy for Success	10	78.8665	0.6262	.5360
Skill Attribution	10	73.6166	1.1473	.3201
Chance Attribution	10	46.7721	1.4372	.2413
Dur Con x Pre Post				
Multivariate			0.3246	.9744
No. Words Read	10	1557.8086	0.3678	.6928
% Errors Missed	10	19.3604	0.0911	.9131
Expectancy for Success	10	16.0167	0.1272	.8807
Skill Attribution	10	24.0500	0.3748	.6880
Chance Attribution	10	14.9555	0.4586	.6330

Continued...

Source	df	MS	F	p
Gen Exp x Pre Post				
Multivariate			1.1679	.3273
No. Words Read	5	5184.1836	1.2241	.2702
% Errors Missed	5	86.3891	0.8618	.3549
Expectancy for Success	5	130.0498	1.0325	.3111
Skill Attribution	5	0.3556	0.0055	.9408
Chance Attribution	5	62.4220	1.9141	.1684
Ons Con x Dur Con x Pre Post				
Multivariate			0.6245	.8958
No. Words Read	20	5221.9219	1.2330	.2990
% Errors Missed	20	27.3028	0.0892	.9858
Expectancy for Success	20	81.4332	0.6465	.6302
Skill Attribution	20	33.7417	0.5259	.7169
Chance Attribution	20	46.5222	1.4266	.2275
Ons Con x Gen Exp x Pre Post				
Multivariate			0.6708	.7515
No. Words Read	10	2028.5142	0.4790	.6203
% Errors Missed	10	62.1189	0.2734	.7612
Expectancy for Success	10	74.8665	0.5944	.5532
Skill Attribution	10	87.8388	1.3689	.2573
Chance Attribution	10	7.7055	0.2363	.7899

Continued...

Source	df	MS	F	p
Dur Con x Gen Exp x Pre Post				
Multivariate			0.8597	.5715
No. Words Read	10	3674.8105	0.8677	.4219
% Errors Missed	10	43.2177	0.1274	.8805
Expectancy for Success	10	291.1160	2.3113	.1024
Skill Attribution	10	147.2721	2.2952	.1040
Chance Attribution	10	2.9556	0.0906	.9135
Ons Con x Dur Con x Gen Exp x Pre Post				
Multivariate			0.5883	.9217
No. Words Read	20	2053.8271	0.4849	.7468
% Errors Missed	20	35.3978	0.1462	.9645
Expectancy for Success	20	72.1832	0.5731	.6826
Skill Attribution	20	69.8804	1.0891	.3638
Chance Attribution	20	15.2889	0.4688	.7586
Pre Post x Subject Witnin Groups				
No. Words Read	162	4235.1680		
% Errors Missed	162	209.3101		
Expectancy for Success	162	125.9523		
Skill Attribution	162	64.1653		
Chance Attribution	162	32.6110		