This is to certify that the

thesis entitled

An Investigation of Affective Facial Expressions

Within a Learned Helplessness Paradigm

presented by

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has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Counseling Psychology

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Date 3-30-78

O-7639

AN INVESTIGATION OF AFFECTIVE FACIAL EXPRESSIONS IN A LEARNED HELPLESSNESS PARADIGM

By

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A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Counseling, Personnel Services and
Educational Psychology

1978

ABSTRACT

AN INVESTIGATION OF AFFECTIVE FACIAL EXPRESSIONS IN A LEARNED HELPLESSNESS PARADIGM

By

Janet Marie Bowles

The purpose of this investigation was to explore the specific affective responses of subjects within a learned helplessness design. Thirty students enrolled at Michigan State University volunteered to participate in this study. The subjects, 15 men and 15 women, were counterbalanced for sex and randomly assigned to treatment groups. The treatment groups consisted of a No Escape or helpless group, an Escape group, and a No Treatment group.

The No Escape group listened to 30, unsignalled trials of an aversive tone which they could neither escape nor avoid. The Escape group received the same treatment as the No Escape group with the exception that they could escape and avoid the aversive tone by pressing buttons in a pattern unspecified to them. The No Treatment group was not exposed to any treatment.

After the No Escape and the Escape groups had been treated with uncontrollable and controllable noise, respectively, the groups were tested on 20 solvable anagrams. These anagrams were used to test for treatment effects on subsequent task performance behaviors. Each anagram was composed of five letters, arranged in a predetermined order, with only one solution word.

Data were collected on the number of failures to solve anagrams, number of anagram test trials before reaching criterion, and mean response latency for anagram solutions. Subjects in the helpless group evidenced more failures to solve anagrams, larger mean response latencies, and a greater number of anagram trials to criterion. It was concluded that a state of helplessness had been induced through treatment procedures.

Subjects' facial expressions were videotaped from behind a one-way mirror during the anagram phase of the experiment. After all 20 anagrams had been presented, each subject was asked to check 15 adjectives representative of his/her feelings on the Multiple Affect Adjective Checklist.

Videotapes of subjects' facial expressions were edited to 600, 6-second segments with 10-second intervals between segments. Six raters, doctoral candidates in Counseling Psychology, were trained to recognize and label

five affective facial expressions and an Interest-Neutral category of expression. The five affective categories were: Enjoyment-Happiness, Surprise-Startle, Distress-Sadness, Anger-Rage, and Disgust-Contempt.

Reliability between raters was determined by percentage of agreement. For the purposes of this study, agreement between four, five, or all six of the raters on a category of facial affect was considered scorable data. If fewer than four out of six raters agreed on the same affective label for any given segment, that segment was considered unscorable data.

Multivariate analysis of variance with planned comparisons was calculated to explore differences between groups of subjects with regard to observed expression of five categories of facial affect. Univariate analysis of variance was calculated to explore differences between groups of subjects with regard to quantity of observed Interest-Neutral expressions.

Differences were found between treatment groups with regard to specific categories of facial affect observed. The No Escape or helpless group was observed expressing significantly less Enjoyment and more Distress than the Escape and No Treatment groups.

Differences were also observed between men and women in expression of facial affect. Significantly

fewer facial expressions of Interest and more facial expressions of Disgust were observed for women than for men over treatment groups.

Finally, men in the No Escape group were observed expressing significantly more Interest facial expressions than women in the No Escape group. No significant differences were found between men and women within the No Escape group over the five categories of affective facial expression.

DEDICATION

To my mother, Marie Flarry Bowles, who has
encountered the throes of helplessness
and whose strength and love
have endured.

ACKNOWLEDGMENTS

Many skillful and generous individuals contributed to the completion of this dissertation. Thanks to the efforts of these people, the research process has been a rewarding and growth-producing experience for me:

Bill Hinds, Committee Chairperson: For always finding time in his busy schedule to meet with me. For helping to untangle a profusion of questions, ideas, and data into meaningful constructs. For support, encouragement, and humor.

Chuck Bassos, Committee Member: For thought-provoking suggestions and rich theoretical insight. For his ability to conceptualize complex systems and look beyond them from unique vantages. For believing in me, from the beginning.

Bob Wilson, Committee Member: For lending his expertise in research and statistics to the formation and completion of this document. For teaching me to use mistakes as a vehicle for understanding. For many hours of patient consultation.

Larry VanEgeren, Committee Member: For strengthening this exploration with suggestions drawn from his own research in the area of learned helplessness. For help during the frustrating and discouraging times.

Sam Plyler, Committee Member: For pointing out theoretical voids and pitfalls in the manuscript. For sentient questions that illuminated nuances and non-sequiturs. For the chance to try, and to attain.

Judith Taylor, Research Consultant: For guiding me through a vertigo of variables and computer terminology. For giving substance to seeming erratic numbers. For being available to answer a myriad of questions, often at untimely hours.

Dick Burtschi, Special Equipment Consultant: For designing and creating the special equipment used in this project. For graciously sharing his talent and enthusiasm with me. For inspiration.

Bill Bowles, Manuscript Editor: For professionally polishing the final draft of this document with editorial annotations. For fostering discipline, curiosity, and creativity in the written expression of my thoughts. For his quiet, yet profound, influence on my life.

Jim Gosse, Linda Covey-Thornes, Melissa Andrea, Rob Davis, Al Hammer, Pat Forman, My Colleagues: For

struggling through tedious hours of rating films. For their active support and generosity. For their competence and friendship.

John Groves, My Husband: A special thanks for gentle strength during my quandaries and anxious hours. For laughter and jubilant celebration. For courage. For love that words cannot fully fathom.

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CHAPTER I

THE PROBLEM

Introduction

The ability to predict and the need to control circumstances within one's life experience have long been topics of exploration among psychologists intrigued by human motivation and behavior. The first human experience is one in which the infant is unable to meet its own biological and emotional needs. The infant learns to construe events and perceive relationships between objects, which results in a network of personal constructs. If these personal constructs are tested against reality and retained, they afford the individual a sense of security. This security, then, is rooted in the individual's belief that his or her system of construing events results in an ability to predict, and perhaps control, many life experiences.

George Kelly in his work, The Psychology of Personal Constructs, extensively discusses this theory of thought construction and perception of control. Kelly (1955) defines control as "the point of view from

which we seek to explain behavior. To say that something is out of control is merely to say that we have given up trying to explain it" (p. 127). Kelly describes the inability to account for behavior through one's personal constructions of reality and the resulting deficit in one's ability to predict and hence control events as an uncomfortable and ambiguous position.

Another theorist, Ernest Becker, defines the ability to predict and control in terms of "meaning." Becker suggests that for one to perceive an object as even in existence, the individual must be able to "call up a response to that object." He elaborates by writing that the individual will reduce other objects and people to that level or aspect of the object or person with which s/he can cope or find meaning. Becker believes that "one's whole life is an education in broadening his range of behaviors to objects" (Becker, 1968, p. 19). This education results in higher levels of meaning and increases one's ability to cope, or predict and control.

B. F. Skinner (1971) suggests that people are controlled by the environment which they have created for themselves. He contends that freedom is merely an illusion. Lefcourt (1973), on the other hand, maintains that while freedom is an "illusion or construction of events that is independent of man's actions, so too is control a construction or illusion" (p. 417). Lefcourt

is of the opinion that although the concepts of "control" and "freedom" may well be merely illusionary or abstractions by which people attempt to make sense out of their experiences, the belief in these concepts, or the lack of it, profoundly influences consequences. "The sense of control, the illusion that one can exercise personal choice, has a definite and positive role in sustaining life" (Lefcourt, 1973, p. 424).

All of which might lead one to consider: What occurs when an individual perceives that s/he is not in control, that s/he is merely a victim of circumstance or personal misconstructions? Indeed, what happens when all of one's responses in a given situation do not produce the desired outcome from the environment? When one learns that, after all possible responses, s/he is helpless.

Theory

Helplessness

Helplessness has long been recognized by psychologists as a contributing factor in the development of neurotic disorders, primarily with regard to anxiety. Freud (1924, 1936) described the relationship between anxiety and helplessness. He likened trauma to feelings of helplessness and described anxiety as the initial reaction to helplessness in the traumatic situation. Freud stated that "an investigation of the conditions of real anxiety would logically lead to the view that

consciousness of personal weakness and helplessness--inferiority as Adler calls it--when it is able to maintain itself into later life is the final cause of neurosis" (Freud, 1924, p. 413).

Like Freud, Horney's theory of neurosis (1937, 1945, 1950) involves the relationship between anxiety and helplessness. Her central postulate, "basic anxiety," is defined as "a feeling of being isolated and helpless in a potentially hostile world" (Horney, 1950, p. 18). Horney further asserted that "certain elements contained in the effect of anxiety may be particularly unbearable for the individual. One of them is helplessness" (Horney, 1937, p. 46).

Therefore, according to Horney's theory, neurosis develops when the individual experiences feelings of fear from a sense of helplessness, hostility, and isolation. The person in this situation will attempt to cope with the world and behave in a manner so as to restore conditions of safety. These safety orientated behaviors will generally take on one of three characteristic methods of coping proposed by Horney. The compliant type may exhibit a marked need for affection and approval and defer to the needs of others. This person seeks to have interests in common with others and finds most enjoyment in sharing experiences and activities with at least one other person. People in general are perceived by

the compliant type as friendly and "nice." Anger, arguments, and disapproval are aversive to the compliant personality who readily accepts helplessness and weakness in an attempt to solicit protection from a more aggressive individual. Horney labeled this method of coping, "moving toward others."

The second type is characterized by needs to control, succeed, gain recognition, and hence power. This individual detests showing fear or anxiety and will fight to bring these affects under control. The basic attitude is that the world is malevolent and everyone is callously out for their own interests. The aggressive type feels the need to be strong and fights to survive in a hostile ambiance. Sympathy and friendliness from others are rejected as frivolous and necessarily suspect. Horney regards this coping method as one of "moving against others."

The third type, the detached personality, seeks emotional distance from others. Involvement with others in any way, whether to love, fight, compete or cooperate, elicits anxiety. They withdraw into a private, "magic circle" that no one may invade and attempt to become self-sufficient and utterly independent. They avoid competition and arguments and restrict needs so as not to become dependent upon anyone. Enjoyment of others is possible so long as they are expendable. The detached

type is hypersensitive to coercion, influence, and obligation. There is a general tendency to suppress all affect and to maintain an aloof intellectual supremacy. This coping method is referred to as "moving away from others" by Horney (1945, 1950).

Horney proposed that the neurotic is not flexible and rigidly conforms to one of these three coping modes. Thus, the neurotic individual is driven to comply, to fight, or to be aloof regardless of whether these behaviors are appropriate to the situation. If the individual behaves in other than the familiar mode, s/he is "thrown into a panic" (Horney, 1945). The normal person, on the other hand, is able to draw from all three of these coping response modes when desired. Thus, giving in to others, fighting or asserting oneself, and seeking solitude all contribute to a harmonious personality according to Horney's theory.

Mowrer and Viek (1948) were the first to design an empirical study on helplessness nearly 30 years ago. This classic investigation examined the behaviors of rats under two treatment conditions. In one treatment, Stimulus-Control (S-C), rats were shocked but could control the duration of this aversive stimulus by leaping into the air. In the other treatment, Stimulus-No Control (S-Unc), rats had no control over the termination of shock. The experimenters developed a procedure to insure that the

later group (S-Unc) received the identical amount of shock intensity and duration as the (S-C) group. Mowrer and Viek reported that rats which were trained to escape the shocks by performing an instrumental response reacted with less fear (response inhibition) than those rats which were unable to escape the shock through any of their behaviors. Mowrer and Viek described this phenomenon of response inhibition as "fear from a sense of helplessness" and went on to say that "Living organisms are capable of being inhibited, not only by fear of physical punishment, but also--perhaps even more so--by fear of fear" (Mowrer & Viek, 1948, p. 197). This investigation was the first to demonstrate that lack of control over an aversive stimulus inhibits responses from the organism and hence that helplessness may be experimentally induced or learned.

Learned Helplessness

Since the first study by Mowrer and Viek, Martin E. P. Seligman, an experimental psychologist, and his colleagues have been responsible for generating considerable research to investigate further the construct of "learned helplessness." Learned helplessness is defined as a phenomenon which develops when an organism learns that responding and reinforcement are independent (Seligman, Maier, Solomon, 1971; Gatchel, McKinney, & Koebernick, 1977; Thornton & Jacobs, 1971; Hiroto, 1974; Seligman & Miller, 1975).

In order for helplessness to be learned by an organism, Seligman specifies two conditions which must be present. First, the response must be a voluntary response. This is defined by Seligman as "only those responses that can be modified by reward and punishment" (Seligman, 1975, p. 11). The second necessary condition for the development of learned helplessness is response outcome independence. It is specified in this condition that the probability of reinforcement is independent of the subjects' responses. That is, the subject does not have control, or perceives that s/he does not have control, over the occurrence of reinforcement. Seligman elaborates upon this statement of necessary conditions for learned helplessness by stating that the reinforcement involved may be of a positive or negative nature. For example, with positive reinforcement, the subject's response is independent with regard to the administration of a reward or pleasurable condition or outcome. In negative reinforcement, the subject's response is independent to the removal of an aversive condition. Most of the research investigating the learned helplessness construct has focused on response independence with regard to removal of an aversive stimulus. However, the potential occurrence of either positive or negative reinforcement is necessary--when independent of the subject's responses--to induce a state of learned helplessness. In this state, the subject behaves in a manner

which indicates that s/he is not able, or perceives that s/he is not able, to manipulate the environment in order to produce a desired outcome or reinforcement from that environment. In short, the subject "gives up." Having learned that response and outcome are independent, that none of one's responses "work" or are instrumental in producing the desired outcome, the subject then generalizes this expectation to other situations as well. Generalizing the helplessness expectation to new situations may be inappropriate as the subject could, perhaps, now produce a response to this new situation which would result in the desired reinforcement outcome.

Deficits which debilitate adaptive behaviors or responses occur when helplessness is generalized to new situations which are potentially controllable. Seligman (1975) delineated three such maladaptive deficits which have received considerable support from laboratory investigations of learned helplessness. Deficits incurred through learned helplessness: (a) attenuate the motivation to respond, (b) impair the ability to learn that responding incurs reinforcement, and (c) result in "emotional disturbance," primarily depression and anxiety. The research pertaining to each of these deficits will be reviewed later in Chapter II.

The deficit of primary interest in this study is that of emotional discomfort which results from having

learned that one is helpless. Inferences made about the emotional state of subjects in a learned helplessness paradigm have been drawn largely from observations of the subject's behavior while working on cognitive or instrumental tasks after treatment with an inescapable aversive stimulus. Researchers have also incorporated an affective instrument, the Multiple Affect Adjective Checklist (MAACL), to obtain a self-report measure of each subject's emotional state after exposure to one of three treatment conditions within the learned helplessness design. Both behavioral observations of task performance and affective, self-report inventories provide the researcher with an indication of the subject's emotional state in the learned helplessness paradigm. However, further research is needed to define more clearly what specific emotions are elicited by the learned helplessness treatment conditions and the parameters of these emotional responses.

Need

Theorists of learned helplessness propose that "emotional disturbance" results from loss of control over the termination of exposure to an aversive stimulus. Researchers investigating such emotional disturbances have focused on broad and generalized states, primarily those of anxiety and depression. As was mentioned before, inferences about these emotional states have been drawn exclusively from responses to affective self-report

inventories and observations of the subject's behavior while working on cognitive or instrumental tasks after treatment with an inescapable aversive stimulus.

Cleary Eckleman (1976) recently completed a comprehensive study investigating the effects of instigation to aggression on learned helplessness. While this study will be reviewed in depth in a later chapter, of importance here are Eckleman's statements concerning the need for further research efforts to explore subjects' specific emotional responses to the learned helplessness paradigm. Eckleman wrote:

> A part of this process of helplessness induction that would seem to be significant to the organism is the emotional component. What specific emotions are elicited in situations where the organism is exposed to an uncontrollable and unpredictable aversive event? (Eckleman, 1976, p. 6)

Roth and Bootzin (1974) found that some subjects when exposed to uncontrollable aversive stimulation become frustrated while others seemed more assertive and attempted to initiate more controlling responses to the aversive outcomes. In noting this study, Eckleman observed that "different affective states may very well influence whether a person becomes helpless or not" (Eckleman, 1976, p. 9).

Failure to solve anagrams or discrimination problems after treatment with an inescapable aversive stimulus may well be the result of reactive depression. However, this failure may also be a behavioral expression of anger, disgust, distress, or many other reactive

emotional states. No study thus far has attempted to explore the specific affective responses of subjects within the learned helplessness paradigm.

Purpose

There is considerable support for the theory that learned helplessness impairs task performance behaviors and the subsequent ability to learn that responses incur reinforcement. Research findings suggest similarities between the performance behaviors of depressives and helpless subjects. Yet the same research findings also suggest differences between the electrodermal responding of depressives and helpless subjects (Gatchel, McKinney, & Koebernick, 1977). It appears that the generalization of learned helplessness elicits various emotional responses. However, the composition and dynamics of these emotional responses are still of an elusive nature. Therefore, it is the purpose of this investigation to explore the specific affective facial expressions of subjects within the learned helplessness paradigm. The affective facial expressions or responses of happiness-enjoyment, surprise-startle, sadness-distress, anger-rage, and disgust-contempt will be explored as well as an interest-neutral category. The variables believed to influence affective responses, sex of subjects, locus of control, and responses to an affective self-report inventory are also considered within the scope of this study.

Hypotheses

There are two sets of hypotheses for this study. The first set considers the efficacy of treatment on subsequent task performance:

Ha_1:

There will be significant differences between the mean response latencies of the No Escape group and the Escape and No Treatment controls for test trials (20 anagrams).

Ha_2:

There will be significant differences between the No Escape group and the Escape and No Treatment controls with regard to number of anagram test trials to criterion for solving the anagram pattern (criterion for solving the anagram pattern is defined as three successive trials with a response latency less than or equal to 15 seconds).

Ha_3:

There will be significant differences between the No Escape group, and the Escape and No Treatment controls in the number of failures to solve anagrams (failure is defined as the number of trials with latencies of 45 seconds for any given trial).

The second set of hypotheses will be used to consider the effects of treatment upon subsequent facial expression of affect:

Ha_1:

Significantly different affective responses will be observed for the group which learns helplessness than those observed for the Escape and No Treatment control groups.

Ha_2:

Significantly different affective facial expressions will be observed for women versus men over treatment groups.

Ha_3:

Significantly different affective responses across affective categories will be observed for women versus men within the helpless group.

Ha_4:

There will be significant differences in the quantity of Interest-Neutral facial expressions observed for the group which learns helplessness versus the Escape and No Treatment control groups.

Ha_5:

There will be significant differences in the quantity of Interest-Neutral facial expressions observed for women versus men over treatment groups.

Ha_6:

There will be significant differences in the quantity of Interest-Neutral facial expressions observed for women versus men within the helpless group.

Ha_7:

There will be significant correlations between the self-report, affective scales of the Multiple Affect Adjective Checklist and the ratings of facial affect made by observers of videotapes.

Overview

In Chapter II, the literature pertinent to the theory and research of learned helplessness with human

subjects is explored in depth. The literature pertaining to locus of control, the survival value of emotion, affect as rated by observers of facial expression, and sex differences in the expression of emotion are also explored. Chapter III describes the subject sample, research procedures, hypotheses, instrumentation, analysis, and experimental design. The analysis of data and an interpretation of results for each hypothesis are presented in Chapter IV. Chapter V includes a summary of this investigation, a discussion of the findings, and implications for further research in the area of emotional responses to learned helplessness.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this literature review is to present the theory and supporting research which has thus far defined the parameters and resulting deficits of learned helplessness induction. Primary emphasis will be placed on learned helplessness studies which observe the responses of human subjects following exposure to an uncontrollable aversive stimulus. Experiments which incorporate variables similar to those being explored in the present investigation will be described in depth.

Secondary emphasis will be placed on reviewing variables which theoretically pertain to the problem under investigation in this study. Since the "perception" that one is in control or that one is helpless influences behavioral deficits ensuing from learned helplessness, the research which explores perceived locus of control will be summarized.

Other theoretical areas which will be covered in this chapter are: Survival value of emotion, affect as

rated by trained observers of facial expression and, finally, the differences between sexes in expression of emotion.

Learned Helplessness

Proponents of the theory of learned helplessness posit that if an individual is exposed to a situation in which voluntary responses and outcomes are independent, the individual will reduce or discard entirely initiation of instrumental responses. As was mentioned earlier, voluntary responses are defined as those responses which can be modified by positive or negative reinforcement. The other necessary condition for learned helplessness induction, response-outcome independence, refers to a situation in which the subject does not have control, or perceives that s/he does not have control, over the probability of reinforcement.

Once an individual perceives that responses do not produce the desired reinforcement and that the outcome is uncontrollable, this perception then becomes an expectation. That is, the expectation that one is helpless to produce reinforcement through one's behavior now transfers or generalizes to new situations as well. These new situations, however, might actually be controllable in that the individual could increase the probability of eliciting reinforcement through initiating behavioral responses to the stimulus. When an individual generalizes

the response of "giving up" or not initiating adaptive responses to new environmental circumstances, it is believed that the helplessness, which was learned in an actually uncontrollable experience, has now generalized to potentially controllable experiences. The individual believes that s/he is helplessness.

The adaptive behaviors of giving up in an impossible situation become maladaptive when transferred to a situation which may produce reinforcement as a result of one's responses. When the maladaptive behaviors of learned helplessness become one's mode of responding to the environment, certain behavioral, motivational, and emotional deficits are incurred. Seligman (1975) posits that these deficits debilitate an individual who has been subjected to uncontrollable aversive stimulation. Specifically, the three deficits incurred from learned helplessness attenuate the motivation to initiate responses, impair the ability to learn that responding results in reinforcement, and produce emotional discomfort.

The motivational, behavioral, and emotional deficits resulting from helplessness induction are reviewed in the following sections of this chapter.

Motivational Deficits of Learned Helplessness

Early experimental studies of learned helplessness were conducted by Martin E. P. Seligman and his colleagues.

These experimental studies focused on the behavioral responses of dogs following exposure to an uncontrollable aversive stimulus (Overmaier & Seligman, 1967; Seligman, Maier, & Geer, 1968; Seligman, Maier, & Solomon, 1971).

Seligman (1972) described the behavior of experimentally naive dogs when treated with escapable and inescapable shock in a shuttle box. He reported that the dogs treated with escape/avoidance conditions ran frantically about, urinating, defecating, and howling as the traumatically painful shocks commenced. At some point, the dog inadvertently would leap over the barrier of the shuttle box and hence escape the aversive stimulus. On subsequent trials, the dog would jump the barrier more quickly than on the initial trials and eventually learn to escape shock altogether.

The dogs which were treated with inescapable shock responded to initial trials in much the same way as the dogs which were able to escape the shock. However, on subsequent trials these dogs would stop running and howling and would lie quietly whining until the shock abated. On later trials, when these "helpless" dogs were able to escape the shock by leaping the barrier in their shuttle box, they failed to do so. They made no overt attempt to escape from the shock, seeming to give up passively and accept exposure to the aversive stimulus (Seligman, 1972, 1975).

These behaviors are not only representative of dogs in a learned helplessness paradigm. The failure to initiate adaptive responses induced by exposure to uncontrollable shock has also been demonstrated in studies with rats, fish, mice, cats, and humans. A comprehensive review of the literature pertaining to the maladaptive behavioral responses of animals during learned helplessness induction can be found in the recent work of Eckleman (1976).

This early research with animals was followed by experimental studies designed to explore the debilitating effects of learned helplessness on human behavior. Thornton and Jacobs (1971) attempted the first study using human subjects and found results that seem to parallel the passive behaviors of animals in the learned helplessness paradigm. These researchers designed an experiment where subjects were first given conditioning or treatment trials of inescapable/unavoidable shock followed by test trials in which escape/avoidance was possible. The subjects, college students, were assigned to four groups and 30 choice reaction time training trials were given in which one group could avoid shock, a second and third group received inescapable shock yoked to the escape group (one with a task to perform and the other without), and the fourth group performed the task, but with no shock.

Half of the subjects from each of these groups received a fixed level of shock and the other half received a variable level of shock.

Thornton and Jacobs reported that in all phases of the experiment, variable shock more effectively induced and maintained a stressed state, as measured by test trials and the Perceived Stress Index (PSI), than a fixed level of shock. They also observed that a significant number of subjects in the yoked or inescapable noise group (both fixed and variable shock) failed to make even one attempt to escape the shock during test trials when escape was possible.

Thornton and Jacobs delineated some of the problems inherent in their design. One such problem was that subjects in the fixed groups set their own intensity of shock administration at an uncomfortable, but not painful level. This assured that once a subject indicated a fixed level of shock to be unpleasant, but not painful, that subject knew there would be no shocks administered of a greater intensity.

This phenomenon of allowing the subject a certain amount of predictability with regard to the occurrence of the aversive stimulus has been found by Pervin (1963) to reduce stress in the experimental situation. Thornton and Jacobs attempted to control for the problem inherent in this study by also treating a group of subjects with

a variable range of shock to reduce predictability over the occurrence and intensity (within a limited range) of the aversive stimulus.

Hiroto (1974) noted two methodological problems with the work of Thornton and Jacobs. He argued that in the pretreatment phase of the study, the instructional set was confounded with inescapability. He also stressed that the subjects were not conditioned with inescapable, but instead with escapable shock. Hiroto concluded that Thornton and Jacobs' study was not really an investigation of learned helplessness, but instead "demonstrated the effects of prior avoidance training on later escape/avoidance tasks."

Improving on the methodological problems of this study designed by Thornton and Jacobs, Hiroto (1974) examined the effects of inescapability, externality, and chance-set instructions in a learned helplessness paradigm. A sample of college students was equally divided between internals and externals and counterbalanced for sex. These subjects were then randomly assigned to one of three treatment groups: One group received aversive loud noise which could be escaped by button pressing; the second group was conditioned with inescapable noise, and the third group received no pretreatment. All three groups were then exposed to 18 escape/avoidance trials where they were able to control the noise, thereby terminating the aversive stimulus.

Five dependent measures of behavior were used to collect data: (a) Trials to criterion for avoidance acquisition (defined as three consecutive avoidance responses); (b) Trials to criterion for escape acquisition (three consecutive escapes); (c) Number of avoidance responses for the 18 trials; (d) Number of failures to escape (number of trials with latency of 10 seconds); and (e) Overall mean response latency for the 18 trials.

Hiroto reported results which demonstrate inhibition of responses and impaired ability to solve anagrams correctly as a result of treatment with inescapable noise. He also found externals to be more helpless than internals and chance-set subjects more helpless than skill-set subjects. A common state seemed to be elicited by the conditions of inescapability, externality traits, and chance-set instructions. Hiroto speculated that a single process may underlie all three conditions.

Dweck and Reppucci (1973) designed a learned helplessness experiment to demonstrate the effects of low expectancy of reinforcement and low expectancy for control of reinforcement on performance in an achievement situation. The researchers drew a sample of 20 fifth-grade girls and 20 fifth-grade boys. These subjects were administered block design problems by two experimenters. One experimenter administered only soluble block design

problems and the other experimenter administered only insoluble block design problems during the treatment phase of this investigation. These subjects were also asked to state their expectancies for success in solving each problem prior to the presentation of that problem. This was done on a scale from 0 to 10. The number 10 indicating certain success, the number 5 denoting uncertainty of success or failure, and the numbers 0 and 1 indicating certain failure in solving the problems. The Intellectual Achievement Responsibility Scale (IAR), an inventory measuring internal and external responsibility for positive and negative achievement experiences, was administered one month prior to the beginning of the experiment.

Dweck and Reppucci discovered that a number of children were unable to solve the problems administered to them by the failure experimenter even though they had been able to solve those very same problems when administered earlier by the success experimenter. The experimenters report that "The subjects who showed the largest performance decrements were those who took less personal responsibility for the outcomes of their actions and who, when they did accept responsibility, attributed success and failure to the presence or absence of ability rather than to expenditure of effort" (Dweck & Reppucci, 1973, p. 109). The converse of this finding was supported also.

That is, subjects who persisted in spite of failure more often reported that their own sustained efforts were responsible in determining the outcomes of their behavior.

Dweck and Reppucci also observed that male subjects reported a belief in their own sustained efforts as responsible for outcomes to a greater extent than did females. The researchers suggest that "The fact that both the helpless and persistent female subjects were less likely to internally attribute failure to lack of effort than their male counterparts suggests that females might be more prone to deterioration of performance in the face of failure" (Dweck & Reppucci, 1973, p. 116).

This study by Dweck and Reppucci was perhaps the first learned helplessness investigation to incorporate the variable of expectancy for control of reinforcement. The finding that helpless subjects exhibit a tendency to attribute failure to external variables and to minimize the role of their own motivation and effort points out the belief that their responses are independent of outcomes. They believe that they are helpless and exhibit the corresponding behavioral deficits resulting from this belief.

Following this initial investigation, Dweck (1975) designed another study to "determine whether altering attributions for failure would enable learned helplessness children to deal more effectively with failure in an

experimental problem-solving situation" (Dweck, 1975, p. 674). When these children experienced failure in a problem-solving situation, they attributed their failure to "lack of ability." Dweck (1975) attempted to alter these attributions from lack of ability to "insufficient effort."

Dweck's sample for this study consisted of 12 children with extreme reactions to failure. These children were independently identified as helpless by their school psychologist, their principal, and their classroom teacher. "Helpless" was characterized by an "expectation of failure and deterioration of performance in the face of failure" (Dweck, 1975, p. 676). Dweck also asked the teachers to select 10 persistent comparison subjects matched by age, sex, and classroom, with the helpless subjects. Both groups of subjects were then administered the Intellectual Achievement Responsibility Scale, and two subscales of the Test Anxiety Scale for Children (TASC). The Effort versus Ability Failure Attribution Scale was developed and administered to helpless subjects only.

The subjects were matched on interpolation of failure, resulting performance deficits, and were randomly assigned to one of two training groups, the Attribution Retraining Treatment or the Success Only Treatment. For subjects in the Success Only Treatment, a criterion

number of mathematical problems was set within the range of ability for each child to complete before the time limit was depleted. Therefore, subjects in this group were certain to succeed on every trial.

Subjects in the Attribution Retraining Treatment experienced success also, but with the exception of two or three of the mathematical problems. On these two or three problems, the criterion number or degree of difficulty was set above the range of ability for each child to complete before the time limit expired. On these trials, the experimenter verbally attributed failure to "insufficient effort."

Dweck again found that the children who believed that they were helpless took less responsibility for outcomes to their behavior. These subjects were less inclined to emphasize the role of effort in producing reinforcement than were their persistent counterparts. Dweck also reports that subjects in the Attribution Retraining Treatment evidenced substantial increases in the degree to which they recognized lack of motivation, rather than ability, as a determinant of failure. The results of this study indicate that following training "subjects in the Success Only Treatment continued to evidence a severe deterioration in performance after failure, while subjects in the Attribution Retraining Treatment maintained or improved their performance" (Dweck, 1975, p. 674).

Thus, children who were taught to attribute failure to lack of effort during the training sessions learned to persist in their efforts even after experiencing failure during subsequent testing situations.

Behavioral Deficits of Learned Helplessness

The generality of debilitation incurred by uncontrollable events as evidenced in the performance behaviors of helpless subjects has been supported by the work of several researchers (Roth & Bootzin, 1974; Roth & Kubal, 1975; Hiroto & Seligman, 1975; Gatchel & Proctor, 1976; Miller & Seligman, 1975; Gatchel, Paulus, & Maples, 1975; Gatchel, McKinney, & Koebernick, 1977).

Roth and Bootzin (1974) designed an experiment similar to the learned helplessness studies. This experiment was implimented to investigate the effects of experimentally induced expectancies of external control with human subjects. The subject sample for this study was composed of 28 college students enrolled in an introductory psychology course. These subjects were randomly assigned to four treatment groups: (a) contingent reinforcement, (b) noncontingent reinforcement--one task, (c) noncontingent reinforcement--two tasks, and (d) no treatment.

In Phase 1 of this experiment, two groups of subjects received random reinforcement for performance

on problem-solving tasks. This procedure was used to induce expectancies of external control. One group was asked to work on two tasks and the other group was assigned one of two tasks to solve. Two groups were used as controls, one received no treatment and the other received reinforcement contingent upon correct responses.

In Phase 2 of the experiment, all subjects were administered new concept learning tasks presented over closed-circuit television. The subjects were able to control an aversive stimulus, mechanical failure on the television that would otherwise subvert completion of the concept learning tasks, by leaving their chair and going to find the researcher who was outside the experimental room. Both the subject's problem-solving performance on the concept learning tasks and standing up to find help with the television mechanical failure were used to assess helplessness induction as well as expectancies of external control.

Roth and Bootzin found the results of this study to be contrary to their predictions. In Phase 1, expectancies of external control were apparently successfully induced. However, in Phase 2, the helpless subjects initiated more responses to control the aversive stimulus than the control subjects. It seems that the induced expectancy of external control facilitated subjects' behavioral attempts to regain control.

Roth and Bootzin offered alternative explanations for this turn of events. They suggest that random positive reinforcement, as used in their study during the treatment phase, may produce very different effects on instrumental behavior than exposure to uncontrollable aversive events. They also point out that Phase 1 and Phase 2 of their experiment are "much more dissimilar" than the treatment and testing situations which generally compose the learned helplessness experimental paradigm. Perhaps the most interesting alternative Roth and Bootzin offer is that the treatments may not have been strong enough to incur the helplessness deficits and that a curvilinear relationship may exist between experiences which produce external expectancies and behavioral manifestations of helplessness. The researchers suggest that "Perhaps an initial reaction to feelings of no control is to behave somewhat assertively in an attempt to gain control, whereas repeated experience with no control leads to passive, apathetic behavior" (Roth & Bootzin, 1974, p. 261).

This study by Roth and Bootzin was followed by another investigation to clarify necessary conditions for the induction of helplessness in an experimental design. Roth and Kubal (1975) conducted an investigation with the learned helplessness design in order to explore and specify the "conditions under which noncontingent

reinforcement leads to helpless behavior in humans" (Roth & Kubal, 1975, p. 680). These researchers state that under certain circumstances, uncontrollable experiences may have quite the opposite effect of the behavioral deficits incurred through helplessness. As was cited in the previous experiment (Roth & Bootzin, 1974), subjects who received random reinforcement for performance behaviors, while working on concept-learning tasks, initiated a greater number of controlling, "assertive" behaviors when confronted with an aversive stimulus in a subsequent problem-solving situation than did control subjects.

Based on these findings, Roth and Kubal hypothesized that the more helplessness training to which subjects are exposed, the greater the cognitive and motivational deficits evidenced in subsequent instrumental behaviors. They also implied that the relative importance, which subjects attribute to the tasks in a learned helplessness paradigm, will influence attempts to gain control in a later testing situation. To investigate these variables, a study was designed in which "helplessness training consisted of varying amounts of experience with noncontingent reinforcement on concept-formation-type problems in situations differing in perceived importance" (Roth & Kubal, 1975, p. 680).

Roth and Kubal selected a sample of 63 male and female undergraduate college students enrolled in

introductory psychology classes. These subjects were assigned to one of three levels of helplessness treatment: (a) contingent reinforcement--one task, (b) noncontingent reinforcement--one task, and (c) noncontingent reinforcement--three tasks. The three tasks were supposedly decreasing in difficulty and number of attempted trials. Each of these levels was then split in half and differing presentations of the training tasks were presented to each half. One group (Important) was told that the task was a good predictor of academic success in college and the other group (Unimportant) was told that the task was merely a puzzle. This created six treatment groups and a seventh, No Treatment, control group was included.

The researchers concluded from their findings that greater amounts of exposure to noncontingent reinforcement increases feelings of helplessness and incompetence.

> The amount of exposure to noncontingent reinforcement in fact corresponded with the experienced impact of the training situation as indicated by self-report measures. This supports the hypothesized curvilinear relationship between experiences of no control and behavioral manifestations of helplessness. (Roth & Kubal, 1975, p. 690)

In addition, Roth and Kubal found that increasing the importance of the training task also increased the likelihood of helplessness deficits. An observation made by the researchers, of special interest to the present author, is that for subjects who received the

"Important" task instructions, "feelings such as depression and anger seemed to result from the helplessness training only for important subjects" (Roth & Kubal, 1975, p. 689). This observation indicates that specific emotions may indeed be elicited from subjects exposed to uncontrollable outcomes during learned helplessness induction.

Hiroto and Seligman (1975) designed four experiments which were conducted simultaneously. They assigned college students to one of four treatments: (a) Inescapable, escapable, or control groups were administered an aversive tone followed by shuttle box escape testing; (b) Insoluble, soluble, or control groups were administered discrimination problems followed by anagram solution testing; (c) Inescapable, escapable, or control groups were administered an aversive tone followed by anagram solution testing; and (d) Insoluble, soluble, or control groups were administered discrimination problems followed by shuttle box escape testing. Hiroto and Seligman reported evidence that learned helplessness was found with all four experiments as pretreatment with insolubility and inescapability resulted in failure to escape aversive noise and failure to solve anagrams.

They concluded from these findings that learned helplessness, the expectancy that responding is independent of reinforcement, is an internal state which is cross modal or transferred across tasks. That is,

instrumentally conditioned helplessness (inability to escape an aversive stimulus) transfers to cognitive tasks (anagrams and discrimination problems) and conversely, cognitively conditioned helplessness transfers to instrumental tasks. As a result of this cross modality, Hiroto and Seligman (1975) have further suggested that learned helplessness may be construed as an induced trait.

The researchers also concluded that prior learning of helplessness impairs the ability to later relearn that responding will produce reinforcement. Seligman (1975) proposed that the most effective way to reverse the belief that behavior is independent of reinforcement is through "forced responding." He suggested that when an individual responds and perceives reinforcement as contingent upon his behavior or response, then helplessness will dissipate. However, comparatively little has been said about how this reversal is operationalized in humans who perceive control of reinforcement as independent of their behavior or responses.

Emotional Deficits of Learned Helplessness

In 1972, Seligman issued a caveat to the readers of his article entitled "Learned Helplessness." He cautioned them that evidence about "emotional disturbance" in humans as a result of laboratory-induced learned helplessness was merely speculative and he called for

experimental studies to investigate the helplessness theory of reactive depression. Several researchers took heed of that caveat and implemented studies which tend to support the learned helplessness model of reactive depression (Miller & Seligman, 1973; Miller & Seligman, 1975; Gatchel, Paulus, & Maples, 1975; Gatchel, McKinney, Koebernick, 1977).

Seligman (1975) proposed that the depressed individual is one who believes, or has learned, that s/he does not have control over the reinforcers that relieve suffering or bring gratification of needs. The depressed individual according to Seligman feels powerless and does not initiate responses to improve upon this situation. The future looks bleak and hopeless to this person. Seligman (1975) enumerated a list of the symptoms, causes, and cures associated with reactive depression and learned helplessness (see Table 2.1). In order for depression to dissipate, Seligman contends that the individual must be made to understand that gratification of needs is dependent upon his or her behaviors and responses to events.

In order to empirically test these theories of helplessness and depression, Miller and Seligman (1973) designed a study to measure expectancy changes as verbalized by subjects for successful completion of skill and chance tasks. Subjects were assigned to one of four

Table 2.1

Symptoms, Causes, and Cures Associated with Reactive Depression and Learned Helplessness

	Learned Helplessness	Depression
SYMPTOMS	1. Passivity	1. Passivity
	2. Difficulty learning that responses produce relief	2. Negative cognitive set
	3. Dissipates in time	3. Time course
	4. Lack of aggression	4. Introjected Hostility
	5. Weight loss, appetite loss, social and sexual deficits	5. Weight loss, appetite loss, social and sexual deficits
	6. Norepinephrine depletion and cholinergic activity	6. Norepinephrine depletion and cholinergic activity
	7. Ulcers and stress	7. Ulcers (?) and stress
CAUSE	Learning that responding and reinforcement are independent.	Belief that responding is useless.
CURE	1. Directive therapy: forced exposure to responses that produce reinforcement	1. Recovery of belief that responding produces reinforcement
	2. Electroconvulsive shock	2. Electroconvulsive shock
	3. Time	3. Time
	4. Anticholinergics; norepinephrine stimulants	4. Norepinephrine stimulants; anticholinergics (?)
PREVENTION	Immunization by mastery over reinforcement	(?)

Note. From Helplessness: On Depression, Development and Death, by M. E. P. Seligman, 1975.

treatment groups on the basis of depression (as measured by the Beck Depression Inventory) and externality scores (as measured by the Internal-External Scale).

Miller and Seligman found that in skill tasks depressed subjects showed smaller expectancy changes than nondepressed subjects. They interpreted this to mean that depressed subjects perceived reinforcement to be less response dependent than did nondepressed subjects. The depressed subjects and the nondepressed subjects did not differ significantly in expectancy changes when working on chance tasks. However, the depressed subjects perceived less difference between reinforcement contingencies in skill and chance tasks than did the nondepressed subjects. In other words, depressed subjects believed that they had just as much of a chance of being reinforced for tasks based on luck as for tasks based on skill. The researchers concluded that depressed subjects developed a negative cognitive set or "pessimistic distortion" with regard to the consequences of skilled behavior. Based on these findings, it would appear that, like the individual who has learned to be helpless, the depressed person does not expect reinforcement to be contingent upon his behavior.

In a later study, Miller and Seligman (1975) again administered the Beck Depression Inventory and blocked subjects into depressed and nondepressed groups. These

subjects were assigned to one of three treatment groups: Inescapable noise (helpless), escapable noise, and a no-noise control group. Solvable anagrams were assigned to all three groups after treatment with escapable and inescapable aversive noise and data were collected on: Amount of time taken to solve anagrams, number of failures to solve anagrams, and number of trials to discover a pattern to anagram solution. Miller and Seligman found that depressed subjects in the no-noise control group and nondepressed subjects who were unable to escape the noise performed poorly on the anagram task. These subjects failed to solve many anagrams, spent longer amounts of time on the ones that they could solve, and had trouble discovering the solution or pattern to the anagrams. The researchers also discovered an inverse relationship between amount of depression and success with anagrams. They concluded that naturally occurring depression and laboratory-induced learned helplessness produce the same behavioral deficits.

This finding is supported by the later work of Gatchel, McKinney, and Koebernick (1977) who reported that treatment with inescapable noise and naturally occurring depression both impair ability to solve anagrams. However, the data from this study do not indicate a direct relationship between depression and learned helplessness with regard to electrodermal responding.

Greater electrodermal responding to uncontrollable aversive noise was found in depressed subjects than in nondepressed subjects. The researchers interpreted this to mean that depressed subjects may be more sensitive to aversive stimuli than nondepressed subjects. Less electrodermal responding was found in the inescapable noise or helpless group and the researchers speculated that this lack of autonomic arousal indicates decreased task involvement and diminished motivation to respond to task demands. This parallels the findings of an earlier study by Gatchel and Proctor (1976) and supports the hypothesis that learned helplessness impairs the motivation to respond.

The Multiple Affect Adjective Check List, Today Form, (Zuckerman & Lubin, 1965) has been administered to subjects in learned helplessness experiments to determine mood changes as a result of treatment (Gatchel, Paulus, Maples, 1975; Miller & Seligman, 1975; Gatchel, McKinney, & Koerernick, 1977; Eckleman, 1976). This paper and pencil self-report instrument is comprised of three indices designed to measure states of depression, anxiety, and hostility.

Gatchel et al. (1977) administered this affective scale to the depressed and nondepressed subjects in their study and reported elevated levels of affect among the depressed subjects before treatment. After treatment,

the inescapable noise (helpless) group showed significantly elevated scores on the depression, anxiety, and hostility indices. Gatchel et al. (1977) cited this as further evidence of the similarity between naturally occurring depression and learned helplessness. The results of this study support parallel findings on mood changes and learned helplessness in the prior work of Seligman and Miller (1975) and Gatchel, Paulus, and Maples (1975).

All of the researchers previously discussed in this section have explored learned helplessness in light of emotional deficits and have focused on depression and anxiety. One researcher, Cleary Eckleman, recently attempted to investigate a very different emotional facet involved in helplessness induction, that of aggression or hostility.

Eckleman (1976) designed a study to investigate the effects of instigation to aggression on learned helplessness. Two levels of helplessness treatment were crossed with two levels of instigation to aggression. The two levels of learned helplessness were operationalized by presenting groups of subjects with solvable and unsolvable discrimination problems developed by Levine (1971). Verbal insult and neutral verbal exchanges were incorporated to compose the variable of instigation to aggression. Four treatment groups resulted and are as

follows: (a) Unsolvable problems-Verbal insult, (b) Unsolvable problems-Neutral verbal interchange, (c) Solvable problems-Verbal insult, and (d) Solvable problems-Neutral verbal interchange.

Eckleman's subject sample was made up of 22 male and 22 female college students. These subjects were led to believe that they were actually participating in two independent research experiments. The first experiment described to subjects by Eckleman was to be "a study of problem-solving in a minimal social situation." The second experiment described by a female assistant, alleged to be Experimenter #2, was to be "a study of the relationship between the presence of a peer and analytical thinking."

Each subject was treated individually and asked to solve 40 discrimination problems. Responses of subjects in the two unsolvable-problem groups were independent of reinforcement, the correct answer. Responses made by subjects in the two solvable-problem groups were useful in eliciting reinforcement, the correct answer. A neutral verbal exchange or a verbal insult was issued to the subject by an experimental assistant after all discrimination problems were completed.

The subjects then proceeded to Experiment #2 where they filled out an affective adjective checklist and were asked to work with 20 anagrams all of which

were solvable within a 60-second time limit. Four of these anagram trials, predetermined by the experimenter, were used in an attempt to disrupt the subject's performance. The disruptions consisted of the experimenter muttering "random audible verbalizations, shuffling his feet, rustling papers on the desk, humming to himself" (Eckleman, 1976, p. 120). If the subject requested that the experimenter cease these audio disruptions, they were abated and the time latency of the subject's verbalization was recorded. If the subject did not protest, the audio disruptions continued for the duration of the anagram trial, 60 seconds.

Eckleman found that:

> The particular combination of Unsolvable problems and Verbal insult appears to have generated proactive interference on a subsequent anagrams task. The subjects who experienced this particular treatment combination evidenced both the cognitive and motivational deficits that are typical of subjects who have gone through a helplessness induction procedure. . . . Further, these subjects seemed to be in an emotional state that was highly negative and undifferentiated as to specific affects. (Eckleman, 1976, p. 154)

Eckleman inferred that the subjects were "distressed" and that this emotional state influenced their poor performance on the anagrams task. Eckleman had originally hypothesized that instigation to aggression, verbal insult, would proactively interfere with the cognitive and motivational deficits incurred through helplessness induction. On the contrary, instigation to

aggression, when combined with unsolvable discrimination problems in this study, apparently facilitated the induction of helplessness.

In conclusion, Eckleman observed that perhaps "a highly negative and undifferentiated affective state was a major determinant of the performance deficits" (Eckleman, 1976, p. 155) incurred by helplessness induction in his experimental design. Eckleman also notes that subjects in the Unsolvable problems-Verbal insult group sustained elevated scores on the Anxiety, Depression, and Hostility scales of the Multiple Affect Adjective Checklist.

To summarize, the theory of learned helplessness is overwhelmingly supported by the research designed to investigate this construct. It has been demonstrated that subjects who are exposed to uncontrollable aversive stimulation do generalize the expectation that their responses and reinforcement are independent to new situations. These "helpless" subjects also display evidence of motivational, behavioral, and emotional deficits after treatment with uncontrollable outcomes. Emotional deficits which have been investigated within the learned helplessness paradigm are primarily depression, anxiety, and aggression. While these studies have been helpful in clarifying general categories of emotional discomfort, which seem to be incurred through helpless induction,

more research is needed to delineate the specific emotional responses of "helpless" subjects.

Locus of Control

The construct, "locus of control," was developed by the proponents of social learning theory and seems highly related to learned helplessness (Phares, 1976; Rotter, Seeman, & Liverant, 1962; Rotter, Chance, & Phares, 1972; Rotter, 1966; Joe, 1971; Houston, 1972). These researchers define an external locus of control as the expectancy that reinforcement is unpredictable and uncontrollable. From this perspective, reinforcement is controlled by luck or fate, or is up to the discretion of powerful others. People who espouse this view of reinforcement may also believe that the world in which they live is so complex and confusing that it is impossible to be predicted. An internal locus of control, on the other hand, is defined as the expectancy that reinforcement is contingent upon one's own behavior and characteristics.

Rotter, Seeman, and Liverant (1962) proposed that individuals with a high external locus of control would be relatively passive in attempts to enhance their own standing with regard to the world. People in the middle of the internal/external continuum would perceive that while they may have little impact on the world around them, their understanding of that world will help to

better their position in it. Finally, those individuals with a strong internal locus of control will believe that they can change much of their environment and also advance themselves in the world. Rotter et al. (1962) states that these people may be creative, nonconformist, and revolutionary; but he warns that they may also take on characteristics of being highly rigid and moralistic or stymied in their efforts by feelings of failure. With regard to feelings of failure, Rotter et al. (1972) also described a "defensive external." That is, an individual who originally maintains an internal orientation and is competitive but assumes an external expectancy in order to defend against possible feelings of failure.

Houston (1972) designed a study to measure perception of control in a threatening situation and the resulting degree of stress induction. Houston hypothesized that the more control a person perceives s/he has in a situation, the less threatening the situation will be to that person. On the other hand, the less a person perceives that s/he is in control of a situation, the more "helpless" this person will feel and the situation itself will be perceived as more threatening.

Houston drew a sample of 66 male college students from an introductory psychology course and randomly assigned these subjects to one of three treatment

conditions: (a) Nonstress, (b) Avoidable shock, and (c) Unavoidable shock. Each subject was run individually. Subjects were first asked to complete Rotter's Locus of Control Scale (1966) and the Today Form of the Affect Adjective Checklist (AACL). Then subjects were assessed on their "limit for Digits Backward" taken from the Wechsler Adult Intelligence Scale (WAIS) and each subject's upper limit on digits was determined.

During the experimental phase of this investigation, subjects were asked to solve additional sets of digits. The unavoidable-shock subjects were told they would be administered "one or more painful electric shocks on a random basis while working on the digits. They were also informed there was no possible way to avoid receiving these shocks. Subjects in the avoidable-shock treatment were told they might be administered a painful electric shock after every mistake they made in repeating the digits. The subject was further informed s/he could avoid ever receiving a shock by not making mistakes on the digits. (No subject in either of the groups was ever shocked.) Subjects were readministered the AACL after treatment was completed. Mean change scores were calculated for the AACL and heart rate as measured by EKG readouts.

Houston reported that, in general, subjects felt more anxiety in threatening situations over which they

believed they had no control than in situations which were perceived as controllable. He also found that subjects were more physiologically aroused (measured by heart rate) when they perceived the situation as controllable than when they thought they were not in control. Houston proposed that the greater physiological arousal may have resulted from "the effort that the subjects exerted in attempting to achieve control" (Houston, 1972, p. 255). Houston reported that the more internally oriented subjects (as measured by Rotter's Locus of Control Scale, 1966) became more physiologically aroused under stress than the subjects who received high external scores on the locus of control scale. And finally, Houston found that "Subjects performed better in situations in which there was congruence between their beliefs about locus of control in general and their beliefs about the locus of control in the specific situation in which they were working" (Houston, 1972, p. 255).

A myriad of research on locus of control has been implemented since the development of this concept. Phares (1976), in his recent work, Locus of Control in Personality, has summarized the results of this immense body of research. One of the central postulates of the theory of locus of control, as stated earlier, is that internals will exert greater efforts to cope with and master their environment. This postulate is supported by the study previously

mentioned (Houston, 1972) and also in studies involving Swedish, American, and Canadian students, reformatory inmates, and tubercular patients. In these studies, internals demonstrated superior coping, mastery, and cognitive processing abilities. Phares (1976) concludes that:

> Internals seem to acquire more information, make more attempts at acquiring it, are less satisfied with the amount of information they possess and are better at utilizing information and devising rules to process it, and generally pay more attention to relevant cues in the situation.

In relation to social context, Phares (1976) found data in several studies to support the hypothesis that internals are less easily persuaded by others than externals, particularly if they perceive others as subtly attempting to manipulate them without their awareness. They are also less likely to respond to the status or prestige of the person presenting the persuasive message. There is conflicting evidence to suggest that internals are more likely to help other individuals. Data also suggest that internals are inclined to hold themselves more responsible for their "predicaments" and hence actually to be less altruistic and willing to become involved with others in trouble.

With regard to achievement, Phares (1976) studied the research on children in academic settings and found conflicting results. There is a general trend, however, which seems to indicate that internals acquire higher

achievement scores and are better able to delay gratification for future rewards. Rotter et al. (1972) notes that this prediction is not consistent for boys and girls.

Phares (1976) also found significant correlations between anxiety and externality. He suggested that this may indicate greater distress or maladjustment in externals or a greater comfort in admitting to personal difficulty. Internals do not seem to experience this comfort and avoid answering questionnaire items so as to indicate anxiety and maladjustment.

Finally, studies investigating the antecedents of locus of control suggest that families which provide nurturance, warmth, protection, and consistent parental reinforcement foster a belief in internal control of reinforcement. There are qualifying factors involved with these findings, however, and more research is needed in this area. It has also been generally found to be significant that people from lower socio-economic classes are more external in their beliefs about control of reinforcement.

An instrument developed by Rotter (1975) and colleagues has been used to collect much of the data on locus of control. This instrument, referred to as the Internality-Externality Scale (I-E Scale) consists of 23 forced choice and six filler items that draw from diverse life situations where control of reinforcement

expectancies might be relevant to behavior. It was intended that the I-E Scale sample a broad range of situations and hence account for a low degree of prediction across this range. In short, the I-E Scale was intended to be a measure of generalized expectancy with a normal distribution of scores. Phares (1976) notes that early scores from samples were clearly skewed in the internal direction, particularly with college student samples. However, in current studies, the sample scores have moved in the external direction "two to four points depending upon the specific conditions and populations" (Phares, 1976, p. 45). Joe (1971) cites test-retest reliability coefficients ranging from .48 to .84 for a two-month duration. He also reports internal consistency estimates of reliability ranging from .65 to .79 with nearly all correlations in the .70s. Discriminant validity was found by Rotter (1966) who reports low correlations between the I-E Scale and intelligence, social desirability, and political affiliation.

In summary, Hiroto's investigation (1974) mentioned in a previous section illustrates some similarity between locus of control and learned helplessness. Other similarities are that subjects conditioned with learned helplessness and those scoring high on externality do not perceive reinforcement to be contingent on their behavior. Consequently, high externality scores seem to indicate

a general passivity and learned helplessness undermines the motivation to respond resulting in passivity.

Emotion

The Evolutionary or Survival Value of Emotional Expression

Charles Darwin was perhaps the first theorist to speculate that facial expression may be significantly related to internal emotional states. In his book, The Expression of Emotion in Man and Animals, Darwin (1872) discusses the expression of emotion through the face with regard to its survival value for the organism. Darwin suggested in his work that facial expressions served the purpose of alerting other organisms of the same species as to the internal emotional state of the individual organism. Darwin based these conclusions on the many observations he made of different emotional expressions in adults, in children, and in the higher forms of animal life. His work (1872) is filled with rich, extensive accounts and descriptions of these observations of emotional behavior. In particular, Darwin described the emotional manifestations of anger, fear, surprise, contempt, disgust, and shame.

Robert Plutchik also recognized the survival value of emotional expression. In his work, The Emotions: Facts, Theories and a New Model, Plutchik (1962) forwards

a theory of affect based on six postulates. According to this theory:

1. There are few primary affects. Plutchik drew an analogy between affect and the color wheel. The primary colors are red, blue, and yellow while the primary affects are anger, joy, acceptance, surprise, fear, sorrow, disgust, and anticipation. Like the organization of the color wheel, affects which seem most similar to one another will be found juxtaposed and those most divergent will be found opposite each other on the wheel. Thus, surprise is juxtaposed to fear and is opposite anticipation and fear is opposite anger.

2. Like the primary colors, primary affects may be combined to create new or secondary affects. For example, Plutchik suggests that mixing anger + joy = pride, and mixing surprise + fear = alarm, and mixing disgust and expectation will result in cynicism.

3. Physiology and behavior elicit and discriminate between the primary emotions. In this regard, Plutchik delineates eight behavior patterns which he believes may be found on all levels of evolutionary development. He suggests that "these represent the basic dimensions of emotion applicable to all organismic levels. They represent the prototypes of all emotional behavior." The behavior patterns and corresponding emotional states are: Destruction--Anger, Reproduction--Joy, Incorporation--Acceptance, Orientation--Surprise,

Protection--Fear, Deprivation--Sorrow, Rejection--Disgust, and, finally, Exploration--Expectancy.

4. Primary emotions are hypothetical constructs which may only be inferred from behavioral evidence. One such form of evidence is observed facial expressions to be discussed in a later section.

5. Primary emotions may be organized in terms of polarities. Thus, joy would oppose sorrow, acceptance oppose disgust, surprise oppose anticipation, and fear oppose anger.

6. Each of the primary emotions exists in various intensities or levels of arousal. For example, protection may range in emotional expression from terror to panic to fear to apprehension to a mild form of timidity.

From this perspective, Plutchik surmised that environmental situations elicit certain behavioral patterns and corresponding emotional responses. These behavior patterns and emotions function to prolong the survival of the species and of the individuals within the species. Plutchik defined emotion as a "patterned bodily reaction of either destruction, reproduction, incorporation, orientation, protection, deprivation, rejection or exploration, or some combination of these which is brought about by a stimulus" (Plutchik, 1962, p. 151).

The specific emotions under consideration in the present study have been described in detail by Ekman and Friesen (1975). In their recent book, Unmasking the Face, Ekman and Friesen delineate situations which may evoke various emotional responses and the manner in which each of these responses is manifested. The emotions pertinent to this study will be briefly described from the work of Ekman and Friesen with the exception of a neutral category. The neutral-interest category was used in this study to indicate an attending or orienting response with no major expression changes.

Ekman and Friesen (1975) described "surprise" as a very brief emotional response triggered by unexpected and misexpected events. The events may be unexpected because the individual did not have time to correctly anticipate their occurrence. A misexpected event is experienced as surprise when the individual anticipated quite a different set of events to transpire than those which actually occurred. The onset and disappearance of surprise are sudden and unexpected by the individual who experiences this emotion. Ekman and Friesen posit that surprise is neither a positive nor a negative emotion.

"Happiness" or enjoyment may be derived from several experiences. One such experience is pleasure which is defined by Ekman and Friesen as the "opposite of the physical sensation of pain." One may feel

happiness even while anticipating an event which is believed to bring pleasurable sensations. Another sensation which may evoke happiness is excitement. Excitement occurs when one's interest is aroused and is the opposite of feeling bored. One becomes attentive, interested, and involved with the exciting stimulus. Still a third determinant of happiness is relief. When pain abates, when deprived needs are met, such as hunger and thirst, or when one is no longer afraid, happiness may arise. Finally, happiness also pivots on one's self-concept. If something occurs to affirm or enhance a favorable self-concept (i.e., praise, friendship, esteem, rewards) then happiness is experienced. Happiness is generally the emotion which people prefer to experience and is described as a "positive emotion" by Ekman and Friesen (1975).

"Sadness" is an enduring emotional response to loss, disappointment, or hopelessness. Sadness often lasts for at least minutes and more intense sadness remains for hours or days. It is a passive feeling and it is endured quietly. "Distress" is described as a more active element of sadness in that distress literally is louder. One may cry with sobs or wail in protest and anguish over a loss. Ekman and Friesen state that "In distress, there is more of a protest against the loss; in sadness you are resigned to the loss" (Ekman & Friesen,

1975, p. 115). Sadness may be experienced from attempting to control distress or as an aftermath of distress which was acted on.

"Anger" may be aroused from frustration, such as interference with an activity or goal. Part of the experience of anger is the risk of losing control. Once anger is aroused, it may be expressed in three ways: (a) One may express anger directly by verbally or physically attacking the frustrator; (b) Anger may be expressed indirectly by verbally attacking the frustrator when s/he is not present; or (c) One may symbolically release anger by displacing it on to a safer representation of the frustrator. Anger may also be provoked by physical threat and/or psychological hurt, such as rejection or disregard for one's feelings. Observing someone acting in a manner which violates one's values may arouse anger or anger may result if someone fails to meet one's expectations. Finally, Ekman and Friesen suggest that if a person confronts another individual with anger which is seemingly unwarranted or unjustified, the individual may respond with anger also. The duration of anger is variable. Some people appear to stop feeling angry quickly and others experience tenacious feelings of anger.

"Disgust" is a feeling of aversion or expulsion. It is comprised by "getting-rid-of" and "getting-away-from"

responses in which removal of either the object or oneself is the objective. This is the opposite of incorporation or acceptance as described by Plutchik. At its extreme, disgust may result in nausea and vomiting. Frequently disgust or contempt, which includes a condescending tone, will be experienced with anger.

All of the emotions described above by Ekman and Friesen (1975) may be experienced in various intensities, from a mild to an extreme level. Anger, disgust, sadness, and fear are described as "negative emotions," while happiness is described as a "positive" emotion and surprise is considered neither positive nor negative. Ekman and Friesen further contend that all of these emotions may be accurately judged from observation of facial expression.

Emotion and Facial Expression

There is general agreement among theorists and researchers that the human face is an evocative site for emotional expression (Darwin, 1872; Lund, 1939; Haggard & Isaacs, 1966; Ekman & Friesen, 1969; Ekman, Friesen, & Ellsworth, 1972; Ekman & Friesen, 1975). In their work, Emotion in the Human Face, Ekman, Friesen, and Ellsworth (1972) reanalyzed several key experiments of facial expression of emotion. They argued that the results of these experiments were not as contradictory as earlier reviewers had contended.

Ekman et al. (1972, 1975) concluded from their investigations that accurate information about emotional states can be obtained from observations of posed and naturally occurring facial expression particularly with regard to sadness, anger, surprise, disgust, fear, interest, and happiness. They also suggested that facial behaviors, which differentiate one emotion from another, have been described and validated. Ekman and his colleagues contended that accurate information about emotions can be obtained from observations of facial behavior alone with no reference to the particular context within which the emotions occur. Despite these findings, Ekman et al. (1972) described the human face as a "commanding, complicated and at times confusing source of information."

Deciphering Facial Expression of Emotion

While there is general agreement that the human face is a site of emotional expression, identifying specific emotion from facial expressions has been, at times, an elusive quest. Haggard and Isaacs (1966) investigated the relationship of facial expressions to the psychotherapeutic process. They designed a study to determine judges' ability to perceive facial expressions while watching films in slow motion and at normal speed. Their findings indicated that many more expression

changes were observed at slow speed than at normal speed. They also concluded that many facial expressions occur so rapidly that they are of a "subliminal" nature. Haggard and Isaacs referred to this subliminal sequence of changes in facial behavior as "micromomentary expressions" (MME's), which they believe to occur in a context of conflict within the individual. That is, the MME "may serve as a safety valve to permit at least the very brief expression of unacceptable impulses and affects" (Haggard & Isaacs, 1966, p. 165).

Ekman and Friesen (1969) have also suggested that body movements and facial expressions often relay messages quite divergent from the information being simultaneously provided in words. They describe two types of conflicting nonverbal messages, leakage and deception clues. Leakage is defined as revealing something of the nature of concealed information to an "alter" (another individual). Deception clues may tip the alter off that deception is in process but do not relay any additional hints as to the nature of the concealed information.

Deception may be directed toward the self as well as an attempt to delude another and involves inhibition and/or simulation of behaviors. In order to inhibit or simulate behaviors, the individual needs information about sending capacity, external, and internal feedback. The face is a superior site for both transmitting or sending

information and also for receiving feedback from external sources according to Ekman and Friesen. The face, being highly mobile and visible, has the capacity to send information very rapidly. The authors describe "macro" expressions as easily observable and labeled with regard to emotional content and having a duration of about one second. Micro displays of affect, on the other hand, are so short as to be imperceptible unless filmed and rerun at a slow speed. Ekman and Friesen (1969) reported that "such micro displays when shown in slow motion do convey emotional information to observers and that expert clinical observers can see micro displays and read the emotional information without benefit of slow motion projection" (Ekman & Friesen, 1969, p. 97).

Ekman and Friesen also regard the face as providing the most information about external feedback. They proposed that people hold others responsible for what is shown on the face and are more willing to comment on facial displays than on hand or leg or foot movements which may be easily hidden (i.e., by shoes, clothing, furniture . . .).

Culturally determined "display rules" are also delineated by Ekman and Friesen. These display rules are contingent upon such factors as age, sex, roles, status, and so on. They determine what expression of emotion is appropriate with regard to various social situations and

intensify, deintensify, neutralize, or mask the facial behaviors which transmit emotional messages. In short, display rules act to censor what is communicated to others about the individual's emotional state.

In summary, the face is a rich source of information about the emotional state of the individual. Facial expressions of emotion, however, may be disguised or censored in order to protect the ego and delude others as to the actual emotional state of the individual. Expressions of emotion in the face may also occur very rapidly and be imperceptible to the human eye. Therefore, it has been found effective to use film or video-tape to capture these subliminal expressions at normal speed and to rerun them for observers in slow motion. When this is done, trained observers are able to recognize and identify facial expressions of emotion.

Sex Differences in Expression of Emotion

There is evidence to suggest that men and women receive very different training during childhood as to the appropriate expression of emotion (Mischel, 1970; Wenar, 1971; Ferguson, 1970; Hartup, 1972; Ekman & Friesen, 1975; Johnson & Goodchilds, 1976). Children are taught to follow certain prescriptions which define behaviors and expression of emotion, in short, they learn a sex role.

Wenar (1971) indicates that if a child learns his or her sex role well, s/he will be rewarded by social approval. However, if the child does not conform to the behaviors thought appropriate for his or her respective sex role, this child will be punished by ridicule, disparagement, or isolation.

The element of sex-role training that is of importance to this investigation concerns sex differences in the expression of emotion. Several researchers and theorists (Mischel, 1970; Ferguson, 1970; Hartup, 1967; Wenar, 1971) have concluded that young boys are encouraged to express more direct physical aggression and more hostility than girls. In addition, they state that after frustration, males generally express more direct aggression than females. Women, on the other hand, show greater dependency, social passivity, and conformity than men. Women are also encouraged to express more affiliative and nurturant behaviors than men. Mischel (1970) has summarized the findings on sex differences and roles. He states:

> In sum, females are supposed to inhibit aggression and open display of sexual urges, to be passive with men, to be nurturant to others, to cultivate attractiveness, and to maintain an affective, socially poised and friendly posture with others. Males are urged to be aggressive in face of attack, independent in problem situations, sexually aggressive, in control of regressive urges, and suppressive of strong emotions, especially anxiety. (Mischel, 1970, p. 7)

Johnson and Goodchilds (1976) designed a study to investigate sex differences in getting one's way. These researchers sampled over 250 college men and women asking them to write a paragraph on "how I get my way." They found that less than one-third of the men (27%), yet nearly half of the women (45%) report that they "deliberately show emotion" to get their way. Further, the emotional responses of women accounted for over 75% of the so-called "negative emotions" such as "sulking, pouting, and crying." Fifty percent of the men who reported that they employed negative emotion to get their way indicated that they use anger. The other men incorporated a variation of the sad, sulking martyr role if they used negative emotion to get their way. Only 20% of the women reporting use of negative emotion to get their way imply that they use anger and 40% of these women rely on sadness, tears, and sulkiness.

The researchers concluded that:

> Generally, women learn to get their way by helplessness rather than by anger or expertise. While a woman who always acts helpless may be considered appropriately feminine, she will never seem competent to others or to herself. . . . But if she adopts the more effective techniques used mostly by men, she may be called pushy or aggressive. (Johnson & Goodchilds, 1976, p. 69)

Ekman and Friesen (1975) also believe that men and women receive different training about the expression of emotion. They suggest that boys are expected and even

encouraged to display anger and aggression if frustrated or provoked while girls are trained to inhibit angry feelings. This whole process is reversed in the expression of sadness or distress. Here, men have learned to be stoic and even learn to substitute the expression of anger for distress or sadness. Women, on the other hand, have often learned to replace anger with sadness. Ekman and Friesen (1975) suggest:

> It is not proper for men to show distress in public . . . they are limited to sadness. The cry must be inhibited the agitated movements and the protestations held in check or shown only as anger. . . . Interestingly, while social conventions prohibit the appearance of distress and in its place allow the show of anger for men, just the opposite is prescribed for women. Women who are following the American stereotyped demands of "femininity" will not show anger toward others openly, but instead will turn anger inward upon themselves, or show distress, angry tears or sulking. (Ekman & Friesen, 1975, p. 115)

It seems reasonable to conclude from these statements that men and women are trained differently in the "appropriate" expression of emotion. If the performance behaviors of men and women are impeded or frustrated while working on a task, they may well express diverse emotional responses to this situation based on early training in expression of emotion.

Summary

Helplessness has been recognized by early and contemporary theorists and researchers as facilitating neurotic disorders and emotional discomfort. Freud, Horney,

and Mowrer have equated helplessness with feelings of anxiety and trauma. Horney developed a theory of neurotic styles which she believed people assumed in order to cope with helplessness and anxiety. Seligman and his contemporaries believe that helplessness is learned and results primarily in depression and anxiety as well as behavior deficits.

Use of the Multiple Affect Adjective Checklist, Today Form, in learned helplessness paradigms shows elevated scores on the depression, hostility, and anxiety indices for subjects in the helpless group. Other studies designed to recognize and identify helplessness summarize data with regard to subjects' performance behaviors while working on tasks under aversive conditions. Performance behaviors (i.e., number of attempted trials to criterion, number of failures, time latency to solution . . .) have been found to be similar for both naturally occurring depression and laboratory induced learned helplessness. No attempts have been made to further understand the affective facets and dynamics of such generalized states as depression, anxiety, and hostility resulting from learned helplessness.

The construct, locus of control, seems highly related to the learned helplessness theory, and research in this area indicates support for the hypothesis that a common dynamic may catalyze both externality and

helplessness. One of the most notable common factors between helplessness and locus of control is that subjects conditioned with an uncontrollable aversive stimulus and those scoring high on externality do not perceive reinforcement to be contingent upon their behaviors in later situations. This perception of inadequate control of reinforcement fosters a general reaction of passivity and little motivation to initiate adaptive behaviors in helpless subjects as well as in those who score high on externality.

The face has been noted by many researchers as a veritable source of information about human emotional states. Further, expression of these emotional states functions to prolong not only the survival of the species, but also of the individuals within the species. It has been found that trained observers of facial expression are able to correctly recognize and identify or label several emotional states in humans. This identification process is most effective when facial expressions are filmed and replayed for observers.

Finally, theorists and researchers suggest that there are differences in sex role training which pertains to the expression of emotion. Men apparently are trained to express aggression, hostility, and anger if provoked or after exposure to frustrating experiences. Women are often taught to inhibit direct expression of

aggressive and angry feelings and to turn this expression inward resulting in the substitution of expressions of sadness and distress. Men, on the other hand, are trained to inhibit open expression of sadness and distress and to substitute instead an angry or flat affect.

CHAPTER III

DESIGN OF THE STUDY

This chapter is divided into 14 sections which cover the following areas: sample, treatment procedures, testing for treatment effects, video apparatus, debriefing, tape editing, rater sample, rater training, rater reliability, Design I and dependent variables, Design II and dependent variables, instrumentation, hypotheses, and, finally, the analysis of data.

Sample

The sample for this study consisted of 30 university students enrolled in an introductory education course at Michigan State University during summer term 1977. The experimenter introduced the study as a research project designed to investigate the phenomenon of "cognitive processes." The students were informed that the experimenter was interested in audio versus visual learning preferences of different people while engaged in a problem-solving situation. The students were also told that they would be asked to solve an audio-noise task

and a visual-anagram task. Subjects who volunteered to sign up for this study were asked to fill out a Subject Consent Form (Appendix A), a Subject Information Form (Appendix B), and Rotter's Internality-Externality Scale. Subjects were instructed that they could discontinue participation at any time during the course of the study. They also were informed that their progress would be recorded on videotape throughout the experiment. Subjects with hearing impairments or disabilities were asked to report this condition to the experimenter and were subsequently screened from participation altogether.

The total sample was composed of 15 men and 15 women. Within this sample, subject ages ranged from a high of 36 to a low of 18 years. There were 5 subjects between the ages of 18 - 19, 18 subjects between the ages of 20 - 25, 4 subjects between the ages of 26 - 30, and 3 subjects between the ages of 31 - 36. With regard to academic status, there were 3 graduate students returning for teaching certificates, 4 seniors, 19 juniors, and 3 sophomores and 1 freshman.

Treatment Procedures

The 30 subjects were counterbalanced for sex and randomly assigned to one of three treatment groups: No Escape, Escape, and No Treatment. These three groups were treated with an aversive tone prior to the testing phase of this experiment. The No Escape (NE) group

received 30 unsignaled, five-second trials of an aversive tone which subjects were unable to escape or avoid. The tone was calibrated on a Bruel and Kjaer 1613 Sound Level Meter. The Escape (E) group received the same treatment as the No Escape group with the exception that these subjects were able to escape and avoid the aversive tone by pressing buttons on the Subject Stimulus Control Apparatus in a pattern unspecified to them. The third No Treatment (NT) group was not exposed to any treatment. The intertrial interval between tones for the No Escape and the Escape groups ranged from five to 25 seconds.

Subjects in this study were seated at a table in a separate room adjacent to the researcher. Each subject was run individually. A one-way mirror separated the rooms and allowed the researcher to videotape the subjects' facial expressions while working on anagrams. The subjects, however, were unable to view the researcher through the mirror in front of them. Prior to treatment, each subject was met by the researcher in a waiting room and led to the experimental room. In the experimental room there were two chairs, a table, and a "Subject Stimulus Control Apparatus" situated on the table in front of the subject.

The Subject Stimulus Control Apparatus was designed especially for use in this study. The electronic device consisted of a small grey metal box with

three protruding buttons which the subject could manipulate in several different patterns or sequences. If the subjects in the Escape group pressed these buttons in a predetermined or correct pattern, the aversive tone abruptly terminated and a green light located on the wall in front of the subject automatically flashed on. The illuminating light indicated that the subject had found the correct pattern of button pressing to control the noise. This apparatus fed into the Master Stimulus Control Mechanism which was situated behind the one-way mirror in the videotaping room with the researcher. A switch on the Master Stimulus Control Mechanism enabled the experimenter to block subjects' attempts to shut off the noise by button pressing. When the "Sound Switch Shunt" and the "Light Switch Shunt" levers on the master mechanism were activated by the experimenter, the naive subject was unable to control termination of the aversive tone and hence reinforcement. For a detailed diagram of the Master Stimulus Control Mechanism, see Appendix C.

Each subject was seated in the experimental room and told that the study would involve listening to "some loud noise which has been judged to be somewhat unpleasant, but not harmful or dangerous to you" (Hiroto, 1974). The subject then listened to a sample five-second trial of the tone calibrated to 3,000 Hz. at 95 dB (A) through Grason-Stadler TDH39 monoral earphones. If the subject

had found the tone to be unbearably aversive, s/he was encouraged to discontinue further participation in this study by the experimenter. However, no subject withdrew from the study at this point.

Subjects in the No Escape and the Escape groups were given the following instructions immediately before treatment:

> Listen carefully to these instructions. I will not be able to give you any additional information or answer questions now. From time to time, a loud tone will come on like the one you just heard. When you hear that noise you can stop it by pressing buttons in a particular pattern or sequence. The problem for you is to discover which pattern or sequence of button pressing will stop the noise. There is a light located on the wall. The light will tell you how the noise was controlled. If you find a way to stop the noise, the green light will flash on after every time you stop the noise. Remember, if the green light flashes on, this means you have stopped the noise. But if the green light does not flash on, this means you did not stop the noise, but that it stopped automatically. Taking the earphones off or dismantling the apparatus in any way is not the way to stop the noise. Do you understand these instructions? I'm going to leave the room now and we will begin shortly. Please put on the earphones. (Instructions adapted from Hiroto & Seligman, 1975)

After the experimenter read these instructions to the subject, she left the room and informed the subject that she would return when this task had been completed. Each subject was then administered a series of 30 unsignaled, five-second tones with intervals between tones varying from five to 25 seconds. The recording and use of this tone in experiment was closely supervised by audio specialists on the Michigan State University campus.

Subjects in the No Escape group were unable to control the aversive noise by button pressing. However, each tone had a duration of five seconds and then automatically terminated. In this instance, the green light did not illuminate which indicated to the subject that s/he had not found the correct pattern of button pressing to stop the noise. When subjects in the Escape group discovered the correct pattern of button pressing, the noise automatically terminated and the green light flashed on, indicating that the subject had controlled the duration of the tone. One subject in the Escape group failed to discover the correct button pressing pattern which controlled the noise. This subject was dropped from the study and replaced with an extra volunteer. The No Treatment group was not administered any treatment with noise but was asked to wait for the experimenter in an adjacent room for 15 minutes, a duration of time equal to that of the treatment phase of the study for the other two groups.

Testing for Treatment Effects

After the No Escape and the Escape groups had been treated with uncontrollable and controllable noise respectively, the experimenter returned to the experimental room and read directions for the visual-anagram task. The directions for the anagram task were as follows:

> Now in this next task, you will be asked to solve some anagrams. As you know, anagrams are words with letters scrambled. The problem for you is to unscramble and use all the letters so that they form a word. There might be a pattern or principle by which to solve the anagrams, but that is for you to find out. When you know what the word is, say it aloud and go on to the next anagram. I will be in the room with you during this task to record your progress. However, I will be unable to speak with you or to answer your questions during this time. Try to carry on as though I were not in the room. Do you understand these directions? I cannot answer any other questions now. After the experiment is over, I will attempt to answer your questions. (Directions adapted from Hiroto & Seligman, 1975)

Twenty solvable anagram test trials were administered individually to all subjects in each of the three treatment groups. These anagrams were used to test for the effects of treatment with uncontrollable and controllable noise. The subject was presented with a spiral notebook containing 20 anagrams stenciled on 5 x 8 cards. Each anagram was composed of five letters arranged in a predetermined order with only one possible solution word. The letter order which would result in the correct answer or solution word for each anagram is: 3 - 4 - 2 - 5 - 1. Thus, the solution to

3	4	2	5	1
M	A	U	N	H

is HUMAN, the solution to

3	4	2	5	1
I	A	R	D	T

is TRIAD and so on (Appendix D).

There was a 45-second response latency or time limit for each anagram. If the subject was unable to discover the solution word within this time limit, the experimenter indicated that the time was up by asking the subject to turn the page and begin working on the next anagram. During this phase of the study, the

experimenter sat behind and to the right of each subject recording response latencies from a stop watch on an Anagram Response Record Sheet (Appendix E).

After all 20 anagrams were presented, each subject was administered the Multiple Affect Adjective Checklist, Today Form designed by Zuckerman and Lubin (1965). This self-report inventory is comprised of three scales: A Hostility Scale, a Depression Scale, and an Anxiety Scale which measure subjects' affective states. A modification in the instructions for administration of this instrument was incorporated into the present study. That is, subjects were asked to check 15 adjectives "which are representative of the way you are feeling right now, at the present time." The limit of 15 adjectives was used to control for individual variation in the amount of check marks made by subjects.

Videotape Apparatus

Throughout the testing or anagram phase of the study, the facial expressions of each subject were videotaped with a Sony video camera situated behind the one-way mirror. Subjects had been informed that their progress would be recorded on videotape during the course of the study, but they were unable to see the videotape equipment. Two Sony video cameras fed into a Sony Special Effects Generator (SEG1) resulting in a split screen image. One camera with a 25-22.5-90 mm zoom lens was

focused on close-up shots of the subject's head and shoulders and the other camera with a 16 mm normal lens was focused on a digital timer with minutes and tenths of seconds appearing in the upper right-hand corner of the monitor screen.

Debriefing

When the subject had completed the Multiple Affect Adjective Checklist, s/he was individually debriefed by the experimenter as to the true nature of the treatment procedures. Subjects were encouraged to express any aversive feelings incurred through participation in this study during the debriefing session. No subject reported sustaining any adverse effect as a result of their participation and most subjects expressed an interest in learning about the findings of the experiment. The researcher offered to make herself available to talk with subjects who in retrospect might have experienced distress as a result of their participation in this study. None of the subjects indicated a need or interest in further debriefing.

Tape Editing

The film sequence for each anagram was edited in the following manner. Subjects generally spent the first two seconds of each anagram trial visually orienting or attending to the letters of the anagram. After these

first two seconds, the first visible movement of the subject's facial musculature was "framed" in the center of a six-second segment and edited onto the master tape. If no visible facial movement or "macro-expression" (Haggard & Isaacs, 1966) occurred, a six-second sample was edited from the last seconds of that anagram trial. This procedure was repeated for all 20 anagrams viewed by each subject. Based on this process, a sample of 600, six-second segments of videotaped facial expressions was edited onto master tapes. One sample segment was drawn from the film sequence for each of the 20 anagram trials resulting in 20, six-second segments for each of the 30 subjects. Ten-second intervals of blank film were spaced between each of the sample segments. The 20 sample segments for each subject were edited onto master tapes in consecutive order. However, the order in which subjects appear on the master tapes was randomly assigned. The videotape in this experiment was edited on Sony 3/4-inch cassette video-recorders, model numbers VO-2800 and VO-2850. These recorders fed into a Video-Editor, model number TRI-EA3.

Rater Sample

Six graduate students, three female and three male, volunteered to rate subject facial expressions from the edited master tapes. These graduate students were all Ph.D. candidates in the Counseling Psychology doctoral

program at Michigan State University during the time that this study was being conducted.

Rater Training

This group of six raters underwent a rigorous training program in identification and labeling of the six affective categories used in the present study. When the raters arrived at the training location, they were asked to fill out a Rater Information Form (Appendix F). After these forms were collected, the six affective categories were delineated. Synonyms common to each of the affective labels were discussed and a description of each category was given to the raters. The function of each affective category was defined and the movement of various facial muscles, which expressed each affect, was discussed and illustrated. During the presentation of each affective category, a slide was shown depicting that affect by facial expression. The raters were given a training paper, entitled "Categories of Emotion"* (Appendix G), to help clarify these affective descriptors, functions, and demonstrated facial expressions.

Once the raters had become familiar with the six affective categories, 20 slides of posed facial affect developed by Ekman (1976) were shown in groupings of five.

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*Paper by David Inman, Department of Counseling Psychology, College of Education, Michigan State University, 1976.

Each slide was projected onto the screen for six seconds and then raters were given a 10-second interval during which they checked the corresponding emotional category on Affective Data Rating Forms (Appendix H). The six-second stimulus, with a 10-second interval for rating, was used to begin to simulate the timing sequence of the Master Data Tapes.

After five slides illustrating the various emotions of interest in this study were shown to the raters, the correct answers were given. The slides were then reshown for unlimited time periods and questions and discussion of confusion were encouraged by the experimenter. After all 20 posed slides illustrating the six affective categories had been shown and discussed with the raters, 10 additional slides were shown for six seconds with 10-second intervals. The Affective Data Rating Forms used by the raters to identify facial affect on these 10 slides were collected and rater reliability was calculated. Raters identified the same affective label for the 10 posed slides of facial affect with 96.6% agreement.

The next phase of the training program involved showing raters 48 six-second segments of unposed facial expressions of affect from a pilot videotape. This tape was identical in format to the master data tapes which raters were being trained to observe. The 48 segments

again were shown for six seconds with 10-second intervals and were grouped in series of fives. These smaller groups of segments were then reshown with encouragement of discussion about conflicting answers and questions. The last 13 segments of this pilot videotape were shown and the rating sheets collected for a test of rater reliability. The raters identified the same affective labels for these 13 videotaped segments of spontaneous or unposed affect with 82% agreement.

Before the raters began observing the master data tapes, they devised a set of rating rules which they had developed while rating the pilot videotape during training. These rules were as follows:

1. Only mark the category "Interest" if no major change or movement of facial muscles occurs.

2. If several movements of facial muscles occur, mark the dominant or most intense affect observed.

3. If unable to determine which affect was dominant, mark only the last movement or facial expression of affect observed.

The above specified rules were briefly written up and taped to the bottom of the video monitor throughout the rating of the master data tapes.

Rater Reliability

Raters were able to choose only one affective label for each segment they viewed. Six hundred segments

were observed and affective labels were designated by the raters. This resulted in a total of 3,600 affective labels which were assigned by the six raters. For the purposes of this study, reliability between raters was determined by percentage of agreement. Specifically, agreement by four, five, or all of the six raters was considered scorable data. If fewer than four out of six raters agreed upon the same affective label for any given segment, that segment was considered unscorable data. By establishing this criterion for inter-rater reliability, 68 segments out of a possible 600 segments were identified as unscorable data and assigned to the "I Don't Know" category. The distribution of these 68 unscorable segments over treatment and sex is presented in Table 3.1.

Table 3.1

Distribution of Unscorable Videotape Segments over Treatment and Sex

	No Escape	Escape	No Treatment	Sex Totals
Female	7	7	17	31
Male	13	11	13	37
Treatment Totals	20	18	30	68

While the percentage of agreement between raters for posed photos is generally high (80-90%), judging spontaneous affect from facial expressions is considerably more difficult. Therefore, agreement by at least four out of six raters on spontaneous displays of facial affect was considered adequate for the purposes of this study.

Design I

Two similar designs were incorporated in this study. The first experimental design was intended to test for the effects of treatment with a controllable and an uncontrollable stimulus on the ensuing task performance of subjects. In this schema, three levels of treatment were completely crossed with two levels of gender. The purpose of the 3 x 2 design was to determine whether a state of helplessness had in fact been induced through the treatment procedures. Three dependent variables were considered:

1. The mean response latency for the 20 anagrams

2. The number of failures to solve anagrams (defined as the number of anagram trials with latencies of 45 seconds)

3. The number of successful anagram solutions prior to reaching criterion for learning the anagram pattern (Miller & Seligman, 1975)

The three levels of treatment in this study consisted of the No Escape or helpless group, the Escape

group, and the No Treatment group. Two levels of gender, male and female subjects, were completely crossed within the three levels of treatment mentioned previously. Design I is graphically depicted in Figure 3.1.

Design II

The second design was again composed of the same three levels of treatment completely crossed with two levels of gender. However, the purpose of this 3 x 2 design was to test for the effects of treatment with a controllable and an uncontrollable stimulus on subsequent facial expression of affect and self-reported affective states. This design incorporated nine dependent variables: Five different categories or levels of affective facial expression were identified from videotapes by trained raters. These five categories were: (a) Happiness-Enjoyment, (b) Surprise-Startle, (c) Distress-Sadness, (d) Anger-Rage, (e) Disgust-Contempt. One category of facial expression was included to determine quantity of affect observed by raters. The category of facial expression which determined quantity of affect observed in this study was an Interest-Neutral category. Three levels of affect as determined by a self-report inventory, the Multiple Affect Adjective Checklist (MAACL), were also included as dependent variables in this design. The three scales from this checklist were: (a) Anxiety, (b) Hostility, and (c) Depression.

DESIGN I

TREATMENT	GENDER	Ss	Mean Response Latency	Trials to Criterion	Number of Failures
No Escape	Female	1 . . 5			
	Male	6 . . 10			
Escape	Female	11 . . 15			
	Male	16 . . 20			
No Treatment	Female	21 . . 25			
	Male	26 . . 30			

Figure 3.1. Effects of treatment on subsequent task performance behaviors.

Rotter's Internality-Externality Scale was included also as a potential covariate due to the similarities between the theories of learned helplessness and locus of control. These similarities are supported by the work of Hiroto (1974) who indicated that a common theme may underlie both externality and helplessness. Design II is graphically depicted in Figure 3.2.

Instrumentation

Rotter's Internality-Externality Scale (I-E Scale) was included in this study as a potential covariate. High scores on the I-E Scale are indicative of an external locus of control or externality. Externality is defined as the expectancy that reinforcement is unpredictable and uncontrollable. That is, reinforcement is controlled by fate, luck, chance, or the discretion of powerful others. The external personality also encompasses the view that the world is too complex and confusing to be predicted. Externals tend to be passive and make little effort to enhance their standing in the world.

Low scores on the I-E Scale represent an internal locus of control. Internals believe that reinforcement is contingent upon one's own behavior. Hence, internals will exert greater effort than externals to cope with and master their environment.

The I-E Scale consists of 23 forced choice and six filler items that tap diverse life situations where

DESIGN II

			Covariate	MAACL			RATED FACIAL AFFECT						
TREATMENT	GENDER	Ss	I-E	Hos.	Anx.	Dep.	Int.	Hap.	Sur.	Dist.	Ang.	Disg.	IDK
NO ESCAPE	FEMALE												
	MALE												
ESCAPE	FEMALE												
	MALE												
NO TREATMENT	FEMALE												
	MALE												

Figure 3.2. The effect of treatment on subsequent facial expression of affect.

expectancies for control of reinforcement are relevant to behavior. Joe (1971) cites test-retest reliability coefficients ranging from .48 to .84 for a two-month duration. He also reports internal consistency estimates of reliability ranging from .65 to .79 with nearly all correlations in the .70s. Discriminant validity was found by Rotter (1966) who reports low correlations between externality and intelligence, social desirability, and political affiliation.

Coefficient Alpha was calculated to determine item homogeneity for the sample used in this study. Item homogeneity reliability was found to be .60. The average inter-item correlation was .06 with some items having as weak a correlation with each other as -.41. Item total correlations ranged from -.33 to +.46. These tenuous reliability figures were undoubtedly influenced and attenuated by the small sample size (N=30) used in this study.

The MAACL

The Multiple Affect Adjective Checklist (MAACL) Today Form has been used in learned helplessness experiments to determine affective states as a result of exposure to an uncontrollable, aversive stimulus (Miller & Seligman, 1975; Eckleman, 1976; Gatchel, McKinney, & Koebernick, 1977). The MAACL is a self-report instrument composed of three indices designed to measure states of

depression, anxiety, and hostility. The instrument is made up of 132 adjectives or items.

In the studies cited above, subjects in the No Escape or helpless group have evidenced inflated scores on all three scales of the MAACL. That is, subjects who have learned helplessness, as opposed to subjects in the Escape and No Treatment groups, report feeling more anxious, hostile, and depressed.

In this experiment, an attempt was made to control for individual variation in checking behavior by modifying the instructions for administration of the MAACL. Subjects in the present study were instructed to check only 15 adjectives which they believed to be representative of their feelings at the time the instrument was administered.

Three types of scores were derived for each scale within the MAACL. These scores were: (a) Scores which subjects obtained by actively checking or endorsing certain of the 132 adjectives (P), (b) scores which subjects accrued by failing to endorse certain of the adjectives on the checklist (O), and (c) a total score (TOT).

Coefficient Alpha was used to determine reliability for each type of score on all three indices of the MAACL. Reliabilities for the sample used in this study are reported in Table 3.2.

Table 3.2

Reliability Coefficients for Anxiety, Hostility, and Depression Scales of the MAACL

Reliability Scores	ANX	HOS	DEP
P	.66	.67	.46
O	.44	.32	.34
TOT	.69	.65	.46

Code: ANX = Anxiety Scale
HOS = Hostility Scale
DEP = Depression Scale
P = Reliability scores for items actively checked by subjects
O = Reliability scores for items not checked or endorsed by subjects
TOT = Total reliability scores

Total scores for each scale were largely determined by the scores which subjects obtained by not endorsing certain items on the checklist. Instructing subjects to check only 15 items severely restricted the number of adjectives which subjects were able actively to endorse (PScores). However, of greater significance, the 15-item limit also impaired the subject's ability to attenuate 0-Scores (scores obtained by not endorsing certain items on the checklist). Hence, the scores for items not endorsed were automatically elevated by restricting the number of checks subjects could make. Reliability scores for this sample of items which were not checked by subjects are poor. Further, 13 out of 30 subjects failed

to actively check or endorse even one item in each of the three scales of the MAACL (P-Scores).

To investigate further the reliability of MAACL indices for this sample, the Spearman-Brown prophesy formula was derived. The Spearman-Brown prophesy formula was calculated by doubling the number of items which contributed to the O-Scores, that is, items not endorsed by subjects. Since the O-Score items were major contributors to Total Scores, the reliability one might have expected if Total Scores were composed entirely of these items was of interest. Reliability estimates for the Spearman-Brown prophesy formula and the actual reliabilities calculated from Coefficient Alpha are presented in Table 3.3.

Table 3.3

Spearman-Brown and Coefficient Alpha Reliability Scores for the MAACL Scales

Reliabilities	ANX	HOS	DEP
Spearman-Brown	.61	.48	.51
Coefficient Alpha	.69	.65	.46

Code: ANX = Anxiety Total Score Reliability
HOS = Hostility Total Score Reliability
DEP = Depression Total Score Reliability

The reliabilities calculated for Total Scores by doubling the number of O-Score items are very similar to the Total Score reliabilities obtained with Coefficient Alpha. Yet O-Score reliabilities obtained for all three scales of the MAACL are very weak (Table 3.2) which indicates that the usefulness of data derived from this sample is dubious at best. Therefore, due to inflated O-Scores imposed by restricting subjects to check only 15 adjectives, and because the MAACL was not a variable of primary interest in this study, no further analysis of the Anxiety, Hostility, and Depression scales will be performed.

Hypotheses

There will be two sets of hypotheses for this study. The first set will consider the efficacy of treatment as measured by subsequent task performance behaviors:

Ho_1:

There will be no differences between the mean response latencies of the No Escape group and the Escape and No Treatment controls for test trials (20 anagrams).

Ha_1:

There will be significant differences between the mean response latencies of the No Escape group and the Escape and No Treatment controls for test trials (20 anagrams).

Ho_2:

There will be no differences between the No Escape group and the Escape and No Treatment controls with regard to number of anagram test trials to criterion for solving the anagram pattern (criterion for solving the anagram pattern is defined as three successive trials with a response latency less than or equal to 15 seconds).

Ha_2:

There will be significant differences between the No Escape group and the Escape and No Treatment controls with regard to number of anagram test trials to criterion for solving the anagram pattern (criterion for solving the anagram pattern is defined as three successive trials with a response latency less than or equal to 15 seconds).

Ho_3:

There will be no differences between the No Escape group and the Escape and No Treatment controls in the number of failures to solve anagrams (failure is defined as the number of trials with latencies of 45 seconds for any given trial).

Ha_3:

There will be significant differences between the No Escape group and the Escape and No Treatment controls in the number of failures to solve anagrams (failure is defined as the number of trials with latencies of 45 seconds for any given trial).

The second set of hypotheses will consider the effects of treatment upon subsequent facial expression of affect. The first three hypotheses are used to contrast groups on expression of five affective categories.

Ho_1:

No differences will be observed between the affective facial expressions of subjects in the No Escape group versus subjects in the Escape and No Treatment control groups.

Ha_1:

Significantly different affective facial expressions will be observed for subjects in the No Escape or helpless group versus subjects in the Escape and No Treatment control groups.

Ho_2:

There will be no differences between men and women over treatment groups with regard to observed affective facial expressions across affective categories.

Ha_2:

Significantly different affective facial expressions across affective categories will be observed for women than for men over treatment groups.

Ho_3:

There will be no significant differences between men and women in the No Escape or helpless group with regard to observed affective facial expressions across affective categories.

Ha_3:

Significantly different affective facial expressions across affective categories will be observed for women versus men in the No Escape or helpless group.

The next three hypotheses are used to contrast groups on quantity of Interest-Neutral facial expressions observed by raters.

Ho_4:

There will be no differences in the quantity of Interest-Neutral facial expressions observed for subjects in the No Escape group versus subjects in the Escape and No Treatment control groups.

Ha_4:

There will be significant differences in the quantity of Interest-Neutral facial expressions observed for subjects in the No Escape or helpless group versus subjects in the Escape and No Treatment control groups.

Ho_5:

There will be no differences between men and women over treatment groups with regard to quantity of Interest-Neutral facial expressions observed by raters.

Ha_5:

There will be significant differences between men and women over treatment groups with regard to quantity of Interest-Neutral facial expressions observed by raters.

Ho_6:

There will be no significant differences between men and women in the No Escape or helpless group with regard to quantity of Interest-Neutral facial expressions observed by raters.

Ha_6:

There will be significant differences in the quantity of Interest-Neutral facial expressions observed for women versus men in the No Escape or helpless group.

Analysis

Multivariate analysis of variance (MANOVA) with planned comparisons was calculated to test for the effects of treatment on subsequent task performance behaviors (Design I). The Finn Multivariate Analysis of Variance program was applied to the two-way design over subjects with three dependent measures of performance on task. The purpose of this analysis was to determine if a state of helplessness had been induced through treatment procedures. The significance level for the planned comparisons considered in this design was set at the $p < .05$ level for the multivariate test. However, in the event that the multivariate test proved to be significant, univariate tests were conducted at the $p < .017$ level of significance (.05 divided by the number of dependent variables).

Design II considers the effects of treatment on subsequent facial expression of affect. This design was also a two-way design over subjects with six dependent measures of facial affect and a potential covariate. Hypotheses which consider differences between subjects on the set of five affective facial expressions were

analyzed by the Finn Multivariate Analysis of Variance with planned comparisons. The set of five affective facial expressions included: Happiness-Enjoyment, Surprise-Startle, Distress-Sadness, Anger-Rage, Disgust-Contempt. The multivariate approach was chosen for analysis of data in this study because it enables the researcher to consider multiple dependent variables which are believed to be highly interrelated. Univariate analysis of variance (ANOVA), in contrast with the multivariate package, considers only single dependent variables.

Assumptions for MANOVA require the researcher to insure that "(a) dependent variables be normally distributed, (b) observations be independent across subjects, and (c) variances and covariances of dependent variables be similar across groups" (VanEgeren, 1973, p. 522). An equal number of subjects were randomly assigned to each cell in order to insure that the statistic would be robust with regard to possible violations of these assumptions. Planned comparisons within the MANOVA model were considered at the $p < .10$ level of significance. In the event that the multivariate test resulted in significant differences between groups at this .10 level, univariate tests were conducted for each of the five dependent variables to determine in which categories differences occurred. The significance level for each of the five univariate tests was set at $p < .02$.

Univariate analysis of variance (ANOVA) was used to test hypotheses in Design II which explored differences between groups with regard to the variable, Interest-Neutral facial expressions. Univariate analysis was chosen to analyze these hypotheses because the Interest-Neutral category was explored as a separate dependent variable. Each univariate test was analyzed at the $p < .10$ level of significance.

Summary

Thirty students enrolled in an education course at Michigan State University volunteered to participate in this study. These subjects, 15 men and 15 women, were counterbalanced for sex and were randomly assigned to treatment groups. The treatment groups consisted of: (a) A group which was unable to escape or avoid an aversive tone (No Escape Group), (b) A group which was able to escape and avoid an aversive tone (Escape Group), and (c) A group which received no treatment (No Treatment Group).

These three groups of subjects were then administered 20 solvable anagram trials to test for the effects of treatment on subsequent task performance behaviors. Data were collected with regard to number of failures to solve anagrams, number of anagram test trials before reaching criterion, and mean response latency for solving anagrams. Multivariate analysis of variance, the Finn

Program, with planned comparisons was selected to analyze the data. The significance level for the planned comparisons of the multivariate test was set at .05 for Design I hypotheses.

The facial expressions of all subjects were videotaped from behind a one-way mirror during the anagram testing phase of the experiment. Subjects were then asked to complete the Multiple Affect Adjective Checklist (MAACL) marking only 15 adjectives which they thought were representative of their feelings at that time. The subjects were then debriefed by the experimenter.

The videotapes of subjects' facial expressions were edited to 600 six-second segments with 10-second intervals between segments. Six raters, doctoral candidates in Counseling Psychology at Michigan State University, were trained to recognize and accurately label five affective facial expressions and an Interest-Neutral category. The five categories of affective expression used in this study were: Happiness-Enjoyment, Surprise-Startle, Sadness-Distress, Anger-Rage, and Contempt-Disgust. The Interest-Neutral category was included to explore quantitative questions with regard to affective facial expression.

Multivariate analysis of variance, the Finn Program, with planned comparisons was calculated for hypotheses which considered differences between groups of subjects with regard to the set of five categories of

affective facial expression. The probability of significance was set at the $p < .10$ level for each planned comparison.

Univariate analysis of variance was used to test hypotheses which considered differences between groups of subjects on the single affective category of Interest-Neutral facial expressions. The probability of significance was set at the $p < .10$ level for each univariate test. The analysis of data is presented in Chapter IV.

CHAPTER IV

ANALYSIS OF THE DATA

Design I

Hypothesis Testing for Design I

Two designs were incorporated in this study. Design I was used to test for the effects of treatment with a controllable and an uncontrollable stimulus on the ensuing task performance of subjects. Three dependent measures were included in this design and it was believed that the intercorrelations between these measures would be high. The sample correlation matrix did, indeed, yield high intercorrelations between the three dependent variables used to test for treatment effects in Design I (Table 4.1).

Combined cell means for treatment groups over the three dependent variables in Design I are presented in Table 4.2. The combined cell means indicate that the No Escape group evidenced more failures to solve anagrams, a greater number of anagram trials to criterion, and longer mean response latencies than the Escape and No Treatment control groups.

Table 4.1

Sample Correlation Matrix for Dependent Variables in Design I

Variables	Failures	Trials	Mean Latency
Failures	1.000		
Trials	0.807	1.000	
Mean Latency	0.941	0.934	1.000

Code: Failures = Number of failures to solve anagrams
Trials = Number of trials to criterion to solve anagrams
Mean Latency = Mean response latencies for anagram solutions

Table 4.2

Combined Cell Means for Treatment Groups over Dependent Variables in Design I

Treatment	Mean	FAIL	TRIALS	MNLAT
1	$\bar{x}$	16.500	19.600	40.710
2	$\bar{x}$	7.200	12.500	22.590
3	$\bar{x}$	5.900	11.800	20.020

Code: Treatment

1 = No Escape or helpless group
2 = Escape group
3 = No Treatment group

FAIL = Failures to solve anagram trials
TRIALS = Number of trials to criterion for anagrams
MNLAT = Mean response latencies for anagram trials

Multivariate analysis of variance, the Finn Program,* with planned comparisons was chosen to test for significance over the set of three dependent variables. The probability of significance was set at the $p < .05$ level for each planned comparison within the multivariate program. The multivariate test for Design I considered two planned comparisons which are presented in Table 4.3.

Table 4.3

Multivariate Planned Comparisons Contrasting Treatment Groups in Design I

Source	F-Ratio	p <	S/NS
HLP CON	18.920	.0001	S
ESC NOT	.340	.797	NS

Code: HLP = No Escape or Helpless Group
CON = Escape and No Treatment Controls
ESC = Escape Group
NOT = No Treatment Group
S = Significant at Alpha $p < .017$
NS = Not Significant

No significant differences were found between the task performance of the Escape and No Treatment control groups at the $p < .05$ level. The multivariate analysis of variance (MANOVA) program resulted in an F value of .340, with $p = .797$. Since the multivariate null hypothesis was not rejected, no post hoc analysis was conducted.

*Finn program entitled "Univariate and Multivariate Analysis of Variance, Covariance & Regression, Version 4, June 1968."

Significant differences between task performance of the No Escape or helpless group versus the Escape and No Treatment controls combined were found for the MANOVA test at the $p < .05$ level of significance ($F = 18.920$, $p = .0001$). Univariate post hoc tests are reported in Table 4.4.

Table 4.4

Univariate Analyses Contrasting the No Escape Group Versus the Escape and No Treatment Groups on Three Dependent Variables for Design I

Variable	Hypothesis Mean Squares	Error Mean Squares	Univariate F-Ratio	p <	S/NS
FAIL	660.017	14.481	45.577	.0001	S
TRIALS	370.017	38.241	9.676	.0044	S
MNLAT	2510.360	92.473	27.147	.0001	S

Code: FAIL = Number of failures to solve anagrams
TRIALS = Number of anagram trials to criterion
MNLAT = Mean response latencies
S = Significant at alpha $p < .017$
NS = Not Significant
Degrees of Freedom = 3, 25

Univariate analyses of variance were calculated independently for each of three dependent measures: Mean response latencies, number of anagram trials to criterion, and number of failures to solve anagrams. A controlled alpha was determined for each univariate analysis (.05 was divided by three, the number of dependent variables). The probability of significance for each univariate

analysis was set at the $p < .017$ level. Statistics for the following three hypotheses, which test for treatment effects on subsequent task performance of the No Escape versus the Escape and No Treatment controls, are reported from univariate analyses. The hypotheses for Design I are presented in numerical order:

Ho_1:

There will be no differences between the mean response latencies of the No Escape group and the Escape and No Treatment controls for test trials (20 anagrams).

Ha_1:

There will be significant differences between the mean response latencies of the No Escape group and the Escape and No Treatment controls for test trials (20 anagrams).

The null hypothesis was designed to contrast the No Escape or helpless group and the Escape and No Treatment control groups with regard to mean response latencies for anagram test trials. With the alpha level set at $p < .017$, significant differences were found between the treatment groups for mean response latencies. The univariate F value was 27.147, with $p = .0001$. The results suggest significant differences exist between the No Escape or helpless group and the Escape and No Treatment controls with regard to mean response latencies. Therefore, the null hypothesis was rejected in favor of the alternative hypothesis.

Ho_2:

There will be no differences between the No Escape group and the Escape and No Treatment controls with regard to number of anagram test trials to criterion for solving the anagram pattern (criterion for solving the anagram pattern is defined as three successive trials with a response latency less than or equal to 15 seconds).

Ha_2:

There will be significant differences between the No Escape group and the Escape and No Treatment control groups with regard to number of anagram test trials to criterion for solving the anagram pattern (criterion for solving the anagram pattern is defined as three successive trials with a response latency less than or equal to 15 seconds).

The null hypothesis was formulated to test for differences between the No Escape or helpless group and the Escape and No Treatment control groups with regard to number of anagram test trials to criterion. Significant differences were found between treatment groups for number of anagram test trials to criterion with the alpha level set at $p < .017$. The univariate F value was 9.676 with $p = .0044$. The results indicate significant differences exist between the No Escape or helpless group and the Escape and No Treatment controls with regard to the number of anagram test trials to criterion. Therefore, the null hypothesis was rejected in favor of the alternative hypothesis.

Ho_3:

There will be no differences between the No Escape group and the Escape and No Treatment controls in the number of failures to solve anagrams (failure is defined as the number of trials with latencies of 45 seconds for any given trial).

Ha_3:

There will be significant differences between the No Escape group and the Escape and No Treatment controls in the number of failures to solve anagrams (failure is defined as the number of trials with latencies of 45 seconds for any given trial).

The null hypothesis was designed to test for differences between the No Escape or helpless group and the Escape and No Treatment control groups with regard to number of failures to solve anagrams. Significant differences were found between treatment groups in the number of failures to solve anagrams. The alpha level was set at $p < .017$. The univariate F value was 45.577 with $p = .0001$. The results suggest that significant differences exist between the No Escape group and the Escape and No Treatment controls with regard to number of failures to solve anagrams. Therefore, the null hypothesis was rejected in favor of the alternative hypothesis.

A summary of the univariate analyses, which test for the effects of treatment on subsequent task performance of the No Escape group versus the Escape and No Treatment controls combined is presented in Table 4.4 (page 103).

Design II

Covariate for Design II

Rotter's Internality-Externality Scale was included in Design II as a potential covariate, based on Hiroto's (1974) findings that externals seemed to be more helpless than internals. If Hiroto's statement is valid, then it is necessary to control for the possible interdependence between externality and helplessness. Based on this premise, the design variables were coded as dichotomies and Pearson Product Moment Correlation Coefficients were computed to determine if the independent variables of treatment and sex were confounded with externality. None of the resulting correlations, reported in Table 4.5, were found to be significant at the $p < .05$ level. Therefore, independence between group membership and externality can be assumed. Hence in this study, it is possible to observe the effects of treatment with an uncontrollable stimulus on helplessness independent of subject externality.

Also, externality was not found to be significantly related to the dependent variables in this design. The multivariate test to determine the relationship between the dependent variables and the covariate was not found to be significant at the $p < .10$ level ($F = .598$, $p = .791$). Therefore, the externality covariate was eliminated from further analysis in this study. Cell means for the covariate are reported in Appendix I.

Table 4.5

Relationship between Design Variables and the Internality-Externality Scale

Independent Variable Dichotomies	r*	p	S/NS
M vs F	-.16	.21	NS
E vs (H + C)	.18	.17	NS
H vs (E + C)	.01	.48	NS
C vs (H + E)	-.19	.16	NS
E vs C	.28	.11	NS

*N = 30

Code: M = Male
F = Female
H = Helpless or No Escape group
E = Escape group
C = No Treatment or control group
S = Significant at the $p < .05$ level
NS = Not significant

Hypothesis Testing for Design II

Design II of this study was included to test for the effects of treatment with a controllable and an uncontrollable stimulus on subsequent facial expression of affect. Hypotheses which test for differences between subjects on the set of five affective facial expressions were analyzed by the Finn Multivariate Analysis of Variance program with planned comparisons. The set of five affective facial expressions were: Enjoyment-Happiness, Surprise-Startle, Distress-Sadness, Anger-Rage, Disgust-Contempt. The hypotheses which consider differences

between groups on this set of five affective responses are Hypothesis 1, Hypothesis 2, and Hypothesis 3.

The multivariate approach was chosen for analysis of data in this design because it enables the researcher to consider multiple dependent variables. Planned comparisons within the MANOVA model were considered at the $p < .10$ level of significance. If the multivariate test resulted in significant differences between groups, univariate tests were conducted for each of the five affective categories to determine in which categories differences had occurred. The significance level for each of the five univariate tests was set at $p < .02$ (calculated by dividing the multivariate alpha level .10 by the number of dependent variables).

Hypotheses which explored differences between groups with regard to the variable, Interest-Neutral facial expressions, were tested with univariate analysis of variance. These hypotheses are Hypothesis 4, Hypothesis 5, and Hypothesis 6. Univariate analysis was chosen to test these hypotheses because they were used to examine the effects of a single dependent variable, that of Interest-Neutral facial expressions. The three hypotheses which address this variable were each analyzed at the $p < .10$ level of significance.

The multivariate tests of planned comparisons for treatment, sex, and interaction effects are presented in

Table 4.6. The hypotheses for Design II are presented on the following pages in numerical order.

Table 4.6

Multivariate Test with Planned Comparisons for Treatment, Sex, and Interaction Effects over Five Affective Categories in Design II

Source	Hypothesis	F-Ratio	p <	S/NS
T1 vs RST	Ho_1	2.848	.042	S
T2 vs T3		1.119	.382	NS
SEX	Ho_2	5.211	.003	S
SEX T1	Ho_3	.567	.724	NS
INTER		.230	.945	NS

Code: T1 = No Escape or Helpless group
T2 = Escape group
T3 = No Treatment group
INTER = Interaction
S = Significant at alpha p < .10
NS = Nonsignificant
RST = Escape + No Treatment controls combined

The following hypotheses consider the effects of treatment and sex on facial expression of affect:

Ho_1:

No differences will be observed between the affective facial expressions of subjects in the No Escape group versus subjects in the Escape and No Treatment controls.

Ha_1:

Significantly different affective facial expressions will be observed for subjects in the No Escape or helpless group versus subjects in the Escape and No Treatment control groups.

The null hypothesis was tested with Multivariate Analysis of Variance at the $p < .10$ level of significance. The null hypothesis was formulated to test for differences between treatment groups with regard to observed expression of facial affect. The resulting F value was 2.848, with $p = .042$. Significant differences were found between treatment groups with regard to facial expression of affect as observed by raters. The differences between treatment groups were explored further with univariate analyses of the five dependent variables. The data from these analyses are presented in Table 4.7. The null hypothesis was rejected in favor of the alternative hypothesis.

Table 4.7

Univariate Analyses Contrasting Treatment Groups Over the Five Affective Categories in Design II

Variable	Hypothesis Mean Squares	Error Mean Squares	Univariate F	p <	S/NS
ENJOY	79.350	11.867	6.687	.016	S
SURP	2.400	4.100	.585	.452	NS
DIST	58.017	8.750	6.631	.017	S
ANGER	18.150	9.433	1.924	.178	NS
DISG	8.067	1.750	4.610	.042	NS

Code: ENJOY = Enjoyment-Happiness
SURP = Surprise-Startle
DIST = Distress-Sadness
ANGER = Anger-Rage
DISG = Disgust-Contempt
S = Significant at alpha $p < .02$
NS = Not Significant
Degrees of Freedom = 5, 20

Ho_2:

There will be no differences between men and women over treatment groups with regard to observed affective facial expressions across affective categories.

Ha_2:

Significantly different affective facial expressions across affective categories will be observed for women than for men over treatment group.

These hypotheses were formulated to test for differences between men and women over treatment groups with regard to observed expression of facial affect. A multivariate model with five dependent variables was chosen to analyze data. The probability of significance was set at $p < .10$. The resulting F value was 5.211 with $p = .003$. Significant differences were found between men and women over treatment groups with regard to facial expression of affect as observed by raters. The null hypothesis was rejected in favor of the alternative hypothesis.

The differences were explored further with univariate analyses of the five dependent variables. The data from these analysis are reported in Table 4.8. (See page 113.)

Ho_3:

There will be no significant differences between men and women in the No Escape or helpless group with regard to observed affective facial expressions across affective categories.

Table 4.8

Univariate Analyses Contrasting Men and Women over the Five Affective Categories in Design II

Variable	Hypothesis Mean Squares	Error Mean Squares	Univariate F	p <	S/NS
ENJOY	13.333	11.867	1.124	.299	NS
SURP	4.800	4.100	1.171	.290	NS
DIST	22.533	8.750	2.575	.121	NS
ANGER	10.800	9.433	1.145	.295	NS
DISG	12.033	1.750	6.876	.015	S

Code: ENJOY = Enjoyment-Happiness
SURP = Surprise-Startle
DIST = Sadness-Distress
ANGER = Anger-Rage
DISG = Disgust-Contempt
S = Significant at alpha p < .02
NS = Not Significant
Degrees of Freedom = 5, 20

Ha_3:

Significantly different affective facial expressions across affective categories will be observed for women versus men in the No Escape or helpless group.

The null hypothesis was designed to test for differences between men and women within the No Escape or helpless group with regard to observed expression of facial affect. The null hypothesis was tested at the $p < .10$ level of significance in a multivariate model incorporating five dependent variables. The F value was .567, with $p = .724$. Therefore, no significant differences were found between men and women in the No Escape

or helpless group with regard to observed expression of facial affect. The null hypothesis failed to be rejected in favor of the alternative hypothesis.

In addition to the research hypotheses proposed for Design II, no significant differences were found between the Escape group (T2) and the No Treatment group (T3) with regard to expression of facial affect over the five affective categories. The multivariate planned comparison contrasting these two control groups was tested at the $p < .10$ level of significance resulting in an F value of 1.119, with $p = .382$.

Also, no significant interaction effects were found between the independent variable of sex and two levels of treatment (the Escape and No Treatment controls) on the five affective categories observed in this study. This multivariate planned comparison also was tested at the $p < .10$ level of significance and yielded an F value of .230, with $p = .945$.

The next three hypotheses consider differences between treatment groups and between men and women with regard to quantity of Interest-Neutral facial expressions observed by raters. The results of these hypotheses are summarized in Table 4.9. (See page 115.)

Table 4.9

Univariate Analyses Contrasting Treatments, Sexes, and Sex Within the No Escape Group on Quantity of Observed Interest-Neutral Facial Expressions

Variables	Hypothesis Mean Squares	F-Ratio	p <	S/NS
T1 vs RST	2.817	.149	.703	NS
T2 vs T3	22.050	1.164	.292	NS
SEX	149.633	7.896	.009	S
Sex T1	62.017	3.273	.083	S
INTER	18.050	.953	.339	NS

Code: T1 = No Escape or helpless group
T2 = Escape group
T3 = No Treatment group
RST = Escape and No Treatment group combined
INTER = Interaction
S = Significant at alpha p < .10
NS = Not Significant
Degrees of Freedom = 1, 24

Ho_4:

There will be no differences in the quantity of Interest-Neutral facial expressions observed for subjects in the No Escape group versus subjects in the Escape and No Treatment control groups.

Ha_4:

There will be significant differences in the quantity of Interest Neutral facial expressions observed for subjects in the No Escape or helpless group versus subjects in the Escape and No Treatment control groups.

The null hypothesis was formulated to test for differences between treatment groups with regard to quantity of Interest-Neutral facial expressions observed

by raters. The null hypothesis was tested with univariate analysis of variance at the $p < .10$ level of significance. The F value was .149 with $p = .703$. Therefore, no significant differences were found between treatment groups with regard to quantity of neutral facial expressions observed by raters. The null hypothesis failed to be rejected in favor of the alternative hypothesis. The combined cell means for the treatment groups on the dependent variable, Interest-Neutral facial expressions are presented in a later section of this chapter entitled, Supplementary Analysis.

Ho_5:

There will be no differences between men and women over treatment groups with regard to quantity of Interest-Neutral facial expressions observed by raters.

Ha_5:

There will be significant differences between men and women over treatment groups with regard to quantity of Interest-Neutral facial expressions observed by raters.

The null hypothesis was designed to test for differences between men and women over treatment groups with regard to the quantity of neutral facial expressions observed by raters. A univariate model was used to analyze data with the probability of significance set at the $p < .10$ level. The F value was 7.896, with $p = .0098$.

Therefore, significant differences were found between men and women in the treatment groups with regard to quantity of Interest-Neutral facial expressions observed by raters. The null hypothesis was rejected in favor of the alternative hypothesis.

Ho_6:

There will be no significant differences between men and women in the No Escape or helpless group with regard to quantity of Interest-Neutral facial expressions observed.

Ha_6:

There will be significant differences in the quantity of Interest-Neutral facial expressions observed for women versus men in the No Escape or helpless group.

These hypotheses were formulated to test for differences between men and women within the No Escape or helpless group with regard to quantity of neutral facial expressions observed. The null hypothesis was tested at the $p < .10$ level of significance in a univariate model with one dependent variable. The F value was 3.273, with $p = .083$. Therefore, significant differences were found between men and women in the No Escape or helpless group with regard to quantity of Interest-Neutral facial expressions observed by raters. The null hypothesis was rejected in favor of the alternative hypothesis.

In addition to the Interest-Neutral hypothesis tested for Design II, no significant differences were

found between the Escape group (T2) and the No Treatment group (3) with regard to quantity of Interest-Neutral facial expressions observed. Univariate analysis was calculated to contrast these two control groups and the significance level was set at $p < .10$. The resulting F value was 1.164, with $p = .292$.

No significant interaction effects were found between the independent variable of sex and two levels of treatment (the Escape and No Treatment groups) on quantity of Interest-Neutral facial expressions observed in this study. The univariate test was computed with a significance level of $p < .10$. The ensuing F value was .953, with $p = .339$.

Supplementary Analysis

Hypothesis 1 in Design II considered differences between treatment groups with regard to facial expression of affect observed by raters.

Ho_1:

No differences will be observed between the affective facial expressions of subjects in the No Escape group versus subjects in the Escape and No Treatment controls.

Ha_1:

Significantly different affective facial expressions will be observed for subjects in the No Escape or helpless group versus subjects in the Escape and No Treatment control groups.

The null hypothesis was rejected in favor of the alternative hypothesis which indicates that significant differences were found between treatment groups with regard to facial expression of affect observed by raters. An exploration of combined cell means for treatment groups is presented in Table 4.10.

Table 4.10

Combined Cell Means for Treatment Groups over the Five Categories of Observed Facial Affect in Design II

Treatment	Enjoy	Surp	Dist	Anger	Disg
1	1.500	1.600	6.300	.300	2.300
2	5.000	1.000	3.800	3.000	1.300
3	4.900	1.000	2.900	.900	1.100

Code: 1 = No Escape or helpless group
2 = Escape group
3 = No Treatment group

Enjoy = Enjoyment-Happiness
Surp = Surprise-Startle
Dist = Sadness-Distress
Anger = Anger-Rage
Disg = Disgust-Contempt

Raters observed less than half as much Enjoyment and less than one-tenth as much Anger for the No Escape or helpless subjects versus the Escape and No Treatment subjects combined. However, nearly twice as many Distress and Disgust facial expressions were observed for the No Escape or helpless subjects than for the Escape and No Treatment control subjects. Slightly more Surprise

facial expressions were observed for the helpless subjects than for the Escape and No Treatment controls.

Hypothesis 2 considered differences between men and women with regard to expression of facial affect.

Ho_2:

There will be no differences between men and women over treatment groups with regard to observed affective facial expressions across affective categories.

Ha_2:

Significantly different affective facial expressions across affective categories will be observed for women than for men over treatment groups.

The null hypothesis was rejected in favor of the alternative hypothesis indicating that significant differences were found between men and women with regard to facial expression of affect observed by raters. The combined cell means for men and women concerning facial expression of affect are presented in Table 4.11.

Table 4.11

Combined Cell Means for Men and Women over the Five Categories of Observed Facial Affect in Design II

Sex	Enjoy	Surp	Dist	Anger	Disg
1	4.467	.800	5.200	2.000	2.200
2	3.133	1.600	3.467	.800	.933

Code: 1 = Female; 2 = Male
Enjoy = Enjoyment-Happiness
Surp = Surprise-Startle
Dist = Sadness-Distress
Anger = Anger-Rage
Disg = Disgust-Contempt

Raters observed more than twice as many facial expressions of Anger and Disgust for women than for men. They also observed that women more often expressed Enjoyment and Distress than men. Twice as many facial expressions of Surprise were observed by raters for men than for women.

Hypothesis 4 in Design II considered differences between treatment groups with regard to quantity of Interest-Neutral facial expressions observed by raters.

Ho_4:

There will be no differences in the quantity of Interest-Neutral facial expressions observed for subjects in the No Escape group versus subjects in the Escape and No Treatment control groups.

Ha_4:

There will be significant differences in the quantity of Interest-Neutral facial expressions observed for subjects in the No Escape or helpless group versus subjects in the Escape and No Treatment control groups.

Combined cell means for treatment groups on the variable Interest-Neutral facial expressions are reported in Table 4.12. (See page 122.)

Approximately the same amount of Interest-Neutral facial expressions were observed for subjects in the helpless group and for subjects in the Escape and No Treatment controls.

Table 4.12

Combined Cell Means of Observed Interest-Neutral Facial Expressions for Treatment Groups in Design II

Treatment	Interest-Neutral Expressions
1	6.200
2	4.500
3	6.600

Code: 1 = No Escape or helpless group
2 = Escape group
3 = No Treatment group

Hypothesis 5 considered differences between men and women with regard to quantity of Interest-Neutral facial expressions observed by raters.

Ho_5:

There will be no differences between men and women over treatment groups with regard to quantity of Interest-Neutral facial expressions observed by raters.

Ha_5:

There will be significant differences between men and women over treatment groups with regard to quantity of Interest-Neutral facial expressions observed by raters.

Combined cell means for men and women on the variable Interest-Neutral facial expressions are reported in Table 4.13. The null hypothesis was rejected in favor of the alternative hypothesis indicating that significant

differences were found between men and women on the variable Interest-Neutral facial expressions observed by raters. Indeed, more than twice as many Interest-Neutral facial expressions were observed for men than for women.

Table 4.13

Combined Cell Means of Observed Interest-Neutral Facial Expressions for Men and Women in Design II

Sex	Interest-Neutral Expressions
1	3.533
2	8.000

Code: 1 = Female
2 = Male

Hypothesis 6 considered differences between men and women in the No Escape or helpless group with regard to quantity of Interest-Neutral facial expressions observed by raters.

Ho_6:

There will be no differences between men and women in the No Escape or helpless group with regard to quantity of Interest-Neutral facial expressions observed by raters.

Ha_6:

There will be significant differences between men and women in the No Escape or helpless group with regard to quantity of Interest-Neutral facial expressions observed by raters.

The null hypothesis was rejected in favor of the alternative hypothesis indicating that significant differences were found between men and women on the variable of neutral facial expressions.

Cell means for men and women within the helpless group on the variable Interest-Neutral facial expressions are presented in Table 4.14.

Table 4.14

Cell Means for Men and Women in the Helpless Group on Interest-Neutral Facial Expressions Design II

Sex	Interest-Neutral Expressions
1	6.000
2	6.400

Code: 1 = Female
2 = Male

Slightly more neutral facial expressions were observed for men than for women in the No Escape or helpless group.

Summary

Hypotheses for Design I were tested to determine the effects of treatment with a controllable and an uncontrollable aversive stimulus on subsequent task performance. Three dependent measures were included in this study: (a) Number of failures to solve anagrams,

(b) mean response latencies for solving anagrams, (c) number of anagram trials to criterion for solving anagrams. Multivariate analysis of variance with planned comparisons was performed and the probability of significance was set at the $p < .05$ level for each comparison. No significant differences were found between the Escape and the No Treatment groups on any of the dependent variables ($p = .797$). However, the multivariate test for the No Escape or helpless group versus the Escape and No Treatment groups combined proved to be significant ($p = .0001$). Univariate analyses for each of the dependent variables also were significant at the $p < .017$ level. The conclusion was drawn that helplessness was induced by treatment procedures in this study.

Rotter's Internality-Externality Scale was included in Design II as a potential covariate. Externality was not confounded with the independent variables of treatment and sex in this design. Also, the multivariate test to determine the relationship between the dependent variables of facial affect and the covariate was not found to be significant at the $p < .10$ level ($p = .791$). Therefore, the externality covariate was eliminated from further analysis in this study.

Hypotheses for Design II were tested to explore the effects of treatment with a controllable and an uncontrollable aversive stimulus on affective facial

expressions. Two levels of sex were completely crossed with three levels of treatment: (a) A No Escape group, (b) an Escape group, and (c) a No Treatment group. Hypotheses which explored differences between sexes and between treatment groups with regard to observed expression of facial affect were tested by multivariate analysis of variance with planned comparisons. Five dependent variables or categories of facial affect were identified as follows: Happiness-Enjoyment, Surprise-Startle, Distress-Sadness, Anger-Rage, Disgust-Contempt. The level of significance for each planned comparisons within the multivariate test was set at $p < .10$.

Hypotheses which explored differences between treatment groups and between sexes with regard to quantity of Interest-Neutral facial expressions observed were analyzed with univariate analysis of variance. The probability of significance was set at the $p < .10$ level for each univariate analysis.

Significant treatment effects were found with the multivariate test for the No Escape or helpless group versus the Escape and No Treatment groups combined. The null hypothesis (Ho_1 - $p = .042$) was rejected in favor of the alternative hypothesis. Univariate analysis for each dependent variable was performed at the $p < .02$ level of significance.

Significant differences were found between treatment groups on the dependent variables of Enjoyment ($p = .016$), and on Distress ($p = .017$). An exploration of combined cell means for treatment groups shows less than half as many facial expressions of Enjoyment and less than one-tenth as many facial expressions of Anger were observed for subjects in the No Escape group versus subjects in the Escape and No Treatment controls. Also, raters observed approximately twice as many Distress and Disgust affective facial expressions for subjects in the No Escape or helpless group versus subjects in the Escape and No Treatment groups combined.

Significant sex effects were also found with the multivariate test. That is, different expressions of facial affect were observed for men and women over five affective categories. The null hypothesis was tested at the $p < .10$ level and rejected (Ho_2 - $p = .003$). Univariate analyses were calculated at the $p < .02$ level of significance for affective categories. Significant differences were found between men and women on the dependent variable of Disgust ($p = .015$). An exploration of combined cell means for men and women indicates that more than twice as many facial expressions of Anger and Disgust were observed for women than were observed for men.

No significant differences were found with the multivariate test at the $p < .10$ level between men and women in the No Escape or helpless group with regard to observed expression of facial affect over five affective categories. The null hypothesis was not rejected (Ho_3 - $p = .724$).

No significant differences were found with the univariate test at the $p < .10$ level of significance for treatment groups with regard to quantity of Interest-Neutral facial expressions observed. The null hypothesis was not rejected (Ho_4 - $p = .703$).

Significant differences were found between men and women with regard to quantity of observed Interest-Neutral facial expressions. The null hypothesis was analyzed with univariate analysis of variance and the significance level was set at $p < .10$. The null hypothesis was rejected (Ho_5 - $p = .0098$). Significant differences were found between men and women with regard to quantity of observed Interest-Neutral facial expressions. Raters observed more than twice as many Interest-Neutral facial expressions for men than for women as presented in the combined cell means for the sexes.

Significant differences were also found between men and women within the No Escape or helpless group with regard to quantity of observed Interest-Neutral facial expressions. The hypothesis was tested with univariate

analysis at the $p < .10$ level of significance. The null hypothesis was rejected (Ho_6 - $p = .083$). Raters observed slightly more neutral expressions for men than for women in the helpless group as shown in the cell means.

CHAPTER V

A SUMMARY, CONCLUSIONS, AND DISCUSSION

In this chapter, the study is summarized, and conclusions drawn from data analysis are explored. A discussion of implications for future research in the area of affective responses to learned helplessness is also presented.

Summary

The purpose of this investigation was to explore the specific affective responses of subjects within a learned helplessness paradigm. Thirty students enrolled in an education course at Michigan State University volunteered to participate in this study. These subjects, 15 men and 15 women, were counterbalanced for sex and randomly assigned to treatment groups. The treatment groups consisted of: (a) a No Escape or helpless group, (b) an Escape group, and (c) a No Treatment group. The No Escape group listened to 30 unsignalled trials of an aversive tone which they could neither escape nor avoid. The Escape group received the same treatment as the No Escape group with the exception that they could escape

and avoid the aversive tone by pressing buttons in a pattern unspecified to them. The No Treatment group was not exposed to any treatment.

After the No Escape and the Escape groups had been treated with uncontrollable and controllable noise respectively, the experimenter administered 20 solvable anagrams. These anagrams were used to test for the effects of treatment with uncontrollable and controllable noise on subsequent task performance. Each anagram was composed of five letters arranged in a predetermined order with only one solution word. The anagrams were administered individually and each had a 45-second response latency.

Data were collected with regard to number of failures to solve anagrams, number of anagram test trials before reaching criterion, and mean response latency for solving anagrams. Multivariate analysis of variance, with planned comparisons, was selected to analyze the data. The significance level for the planned comparisons of the multivariate test was set at $p < .05$. The purpose of this analysis was to determine if a state of helplessness had been induced through treatment procedures.

The facial expressions of all subjects were videotaped from behind a one-way mirror during the anagram testing phase of the experiment. After all 20 anagrams

had been presented, each subject was asked to check 15 adjectives on the Multiple Affect Adjective Checklist which were representative of his/her feelings at that time. The subjects were then debriefed by the experimenter.

The videotapes of subjects' facial expressions were edited to 600 6-second segments with 10-second intervals between segments. Six raters, doctoral candidates in Counseling Psychology, were trained to recognize and label five affective facial expressions and an Interest-Neutral category of expression. The five affective categories were: Enjoyment-Happiness, Surprise-Startle, Distress-Sadness, Anger-Rage, and Disgust-Contempt.

Reliability between raters was determined by percentage of agreement. For the purposes of this study, agreement between four, five, or all six of the raters on a category of facial affect was considered scorable data. If fewer than four out of six raters agreed on the same affective label for any given segment, that segment was considered unscorable data. By establishing this criterion, 68 out of 600 segments were designated as unscorable data and eliminated from further analysis.

Multivariate analysis of variance with planned comparisons was calculated to explore differences between groups of subjects with regard to observed expression of

facial affect. Five affective categories were considered as mentioned above. The probability of significance was set at the $p < .10$ level for each planned comparison.

Univariate analysis of variance was calculated to explore differences between groups of subjects with regard to quantity of observed Interest-Neutral facial expressions. The probability of significance for each univariate test was set at the $p < .10$ level.

Conclusions

Conclusions will be presented in two sections: Conclusions for Design I and also Conclusions for Design II.

Conclusions--Design I

The purpose of Design I was to test for the effects of treatment with a controllable and an uncontrollable aversive stimulus on subsequent task performance. The multivariate planned comparison which tested for differences on task performance between subjects in the Escape and No Treatment control groups was not found to be significant at the $p < .05$ level.

However, the multivariate test comparing task performances between the No Escape or helpless group versus the Escape and the No Treatment controls combined did prove to be significant at the $p < .05$ level. That is, subjects who found that they were unable to control

termination of exposure to an aversive stimulus transferred this belief in loss of control over reinforcement to the subsequent anagram task.

Subjects in the No Escape or helpless group exhibited greater deficits in task performance behaviors than subjects in either the Escape or the No Treatment control groups. Helpless subjects experienced: (a) Many more failures to solve anagrams, (b) Longer mean response latencies for solving anagrams, and (c) Greater number of trials to criterion for anagram solutions than control subjects. It was concluded from these findings that a state of helplessness had been induced through treatment procedures.

Conclusions--Design II

Covariate.--The Internality-Externality Scale was included in Design II as a potential covariate. Externality was not confounded with the independent variables of treatment and sex in this design. Also, the multivariate test to determine the relationship between the dependent variables of facial affect and the covariate was not found to be significant. Therefore, the externality covariate was eliminated from further analysis in this study.

Treatment effects.--The purpose of Design II was to test for the effects of treatment on subsequent

affective facial expressions of men and women. Significant treatment effects were found with the multivariate test for the No Escape group versus the Escape and No Treatment controls over the five categories of facial affect. The significance level for the multivariate test was set at $p < .10$ Univariate analysis for each affective category was calculated at the $p < .02$ level of significance. Significant differences were found between treatment groups on the dependent variables of Enjoyment ($p = .016$) and on Distress ($p = .017$).

No significant differences were found with the univariate test for treatment groups with regard to quantity of Interest-Neutral facial expressions observed. Apparently subjects in the No Escape group were observed expressing as much "flat" affect as subjects in the Escape and No Treatment control groups.

Sex effects.--Significant sex effects were also found with the multivariate test. That is, different expressions of facial affect were observed for men and women over the five affective categories. The null hypothesis was tested at the $p < .10$ level and rejected. Univariate analyses were calculated for each of the affective categories. Significant differences were found between men and women on the dependent variable of Disgust ($p = .015$).

Significant differences were found between men and women with regard to quantity of observed Interest-Neutral facial expressions. The null hypothesis was tested with univariate analysis at the $p < .10$ level of significance and rejected ($p = .0098$).

Sex within treatment effects.--No significant differences were found with the multivariate test at the $p < .10$ level between men and women within the No Escape or helpless group with regard to observed expression of facial affect over the five affective categories. It was concluded that when men and women believe that they are helpless, they respond with very similar expressions of facial affect.

Significant differences were found between men and women within the No Escape or helpless group with regard to quantity of observed Interest-Neutral facial expressions. The significance level for this univariate test was set at $p < .10$ and the null hypothesis was rejected. It was concluded that men express significantly more neutral or "flat" affect than women when they believe that control of reinforcement is not within their grasp or that they are helpless.

Discussion

Design I

No significant differences were found between the Escape and No Treatment control groups with regard to

task performance measures. These subjects evidenced approximately the same number of failures to solve anagrams and the same number of anagram test trials to criterion. The groups also were similar with regard to their mean response latencies for solving anagrams. However, significant differences were found on all of these measures between the No Escape group and the Escape and No Treatment control groups combined.

The No Escape group was unable to control and hence terminate the aversive tone during the treatment phase of this study. The Escape group, however, was able to silence the tone once the correct sequence of button pressing was discovered. As a result of these treatment procedures, the two groups experienced varying amounts of exposure to noise. Therefore, the issue might be raised that perhaps the subsequent deficits in task performance for the No Escape group was not actually an experience in learned helplessness or loss of control over reinforcement but, instead, the result of greater exposure to an aversive noise.

An examination of group means reveals substantial differences between the No Escape group and the Escape and No Treatment control groups. However, very little difference in group means exists between the Escape and No Treatment groups. The No Treatment group did not experience any exposure to the aversive tone used in this

study. Hence, varying exposure to noise apparently did not result in significant differences between the task performance behaviors of subjects in the Escape and No Treatment groups. Had greater exposure to an aversive tone been the determining factor of treatment effects on performance deficits, then one might have expected significant differences between the Escape group (which received more exposure to noise) and the No Treatment group. It seems logical to conclude, therefore, that the marked difference between the control groups and the No Escape or helpless group on task performance is attributable to loss of control over reinforcement rather than greater exposure to an aversive tone.

The results of Design I indicate that conditioning with an uncontrollable aversive stimulus attenuates subsequent adaptive task performance behaviors. That is, subjects who were unable to escape or avoid the unpleasant tone demonstrated impaired ability to solve anagrams correctly. Helpless subjects seemed to "give up" when confronted with the anagram task. This finding is congruent with conclusions drawn from previous research in the area of learned helplessness (Hiroto, 1974; Hiroto & Seligman, 1975; Seligman, 1975; Seligman & Miller, 1975).

Design II

Treatment effects.--Significant differences were found between the No Escape or helpless group versus the

Escape and No Treatment controls combined with regard to observed expression of facial affect over the five affective categories. Univariate analysis was computed for each of the affective categories. Significant differences were found between the No Escape or helpless group and the No Escape and No Treatment controls combined on the affective categories of Enjoyment and Distress. An exploration of combined cell means for treatment groups shows less than half as many facial expressions of Enjoyment were observed for subjects in the No Escape or helpless group versus subjects in the Escape and No Treatment control groups combined. Also, helpless subjects were observed expressing approximately twice as many Distress-Sadness facial expressions as subjects in the Escape and No Treatment control groups.

Several researchers have suggested that the behavioral deficits incurred through laboratory-induced learned helplessness and the behaviors of depressives are strikingly similar (Miller & Seligman, 1973; Miller, 1975; Seligman, 1975; Gatchel, McKinney, & Koebernick, 1977). Generally, it has been inferred from the behaviors of helpless subjects in these studies that learned helplessness results in "emotional deficits."

The findings from the present study tend to support the theory that laboratory-induced learned helplessness, in addition to causing certain behavioral and

motivational deficits, also appears to evoke emotional discomfort. Specifically, helpless subjects seem to demonstrate fewer pleasurable and more sad or distressed responses than control subjects. This observation strengthens Eckleman's (1976) inference that helpless subjects were "distressed" and that this state influenced their poor performance on the anagram task.

The Multiple Affect Adjective Checklist (MAACL) indices have been used recently in learned helplessness investigations to determine the subject's self-report affective states after treatment with an uncontrollable stimulus (Gatchel, McKinney, & Koebernick, 1977; Gatchel, Paulus & Maples, 1975; Miller & Seligman, 1975; Eckleman, 1976).

In these recent studies, helpless subjects evidenced significantly elevated scores on the Depression, Anxiety, and Hostility indices. This finding, from previous research, corresponds to raters observations in the present study that helpless subjects demonstrated more distressed or sad facial expressions than control subjects. However, raters also observed less than one-tenth as many angry facial expressions for helpless subjects than for control subjects. This observation is in conflict with the results of earlier studies which report elevated hostility scores on the MAACL for helpless subjects. That is, helpless subjects in studies previous to

this one have reported feeling more hostile than their control counterparts.

The results of Eckleman's (1976) study raise questions about the role of aggression and hostility in learned helplessness induction. Eckleman hypothesized that "instigation to aggression" would proactively interfere with helplessness induction. On the contrary, he discovered that subjects exposed to "aggression" (verbal insult) after treatment with an uncontrollable stimulus (unsolvable discrimination problems) were more prone to acquiring deficits incurred by learned helplessness than were control subjects. It makes at least intuitive sense to assume that the emotional state aroused by verbal insult after treatment with an uncontrollable stimulus was not that of aggression or hostility. Perhaps the emotional state resulting from verbal insult, when one has already lost control of reinforcement, is shame or distress. Eckleman might possibly have had more success with "instigation to aggression" if the verbal insult had been delivered before subjects learned that they were not in control of reinforcement. At any rate, the role that hostility, aggression, and anger play in learned helplessness is still unclear.

Helpless subjects in the present study also were observed expressing nearly twice as many Disgust facial expressions as control subjects. Ekman and Friesen (1975)

described disgust as a feeling of aversion comprised of "getting-away-from" responses in which removal of the repugnant stimulus is the objective. Helpless subjects exposed to an uncontrollable aversive stimulus seemed to express a desire to remove the noxious stimulus from their presence through facial expressions of disgust.

Sex effects.--Significant differences were found between men and women over treatment groups with regard to expression of five categories of facial affect. Univariate analysis for each of the affective categories indicated that Disgust was primarily responsible for differences between the sexes with regard to affective expression. An exploration of combined cell means shows that more than twice as many facial expressions of Disgust and Anger were observed for women than for men.

This finding is not consistent with the work of Johnson and Goodchilds (1976). These researchers cited that 50% of men and only 20% of women in their study who reported using negative emotion to get their way indicated that they use anger.

Ekman and Friesen (1975) state that men and women receive different training in the expression of emotion. They suggest that boys are encouraged to display anger and aggression if frustrated or provoked, while girls are trained to inhibit angry feelings. Ekman and Friesen also suggest that men are generally taught to suppress

distress or sadness. They hypothesize that while women are encouraged to express sadness and distress in place of anger, men learn to express anger and aggression in place of sadness. The findings from this study did not support these hypotheses. Women were observed expressing more anger and disgust than men. Also, men demonstrated many more expressions of Distress than they did of Anger as observed by raters in this study.

Ekman and Friesen's hypothesis that women are taught to inhibit expression of angry feelings and men to inhibit expression of distress may explain the discrepancy between the findings of Johnson and Goodchilds and the present study. Men and women who answered the question of "How I get my way" in Johnson and Goodchild's study (1976) may have been responding to socially learned sex roles in the expression of emotion. These sex roles may discourage women from openly reporting that they use anger and men from openly reporting that they use distress to "get their way." It may be that raters in the present study were able to detect the more subtle expression of these prohibited emotions from videotaped facial affect.

Also, it is interesting to note that more than twice as many expressions of Surprise were observed for men than for women. This finding is consistent with the work of Dweck and Reppucci. In a learned helplessness

investigation, Dweck and Reppucci (1973) observed that male subjects reported a belief in their own sustained efforts as responsible for outcomes to a greater extent than did females. Perhaps the male subjects in this study were more surprised than female subjects to find that reinforcement was not contingent upon their responses.

Significant differences were found between men and women over treatments with regard to quantity of Interest-Neutral facial expression observed by raters. An exploration of the combined cell means for men and women in this study indicated that more than twice as many neutral facial expressions were observed for men than were observed for women. The Interest-Neutral category was used in this study as an attending or orienting response with no major expression changes. It was considered a neutral category or a category of "flat" affect.

The finding that men generally demonstrated more neutral affect than women supports the work of Johnson and Goodchilds (1976). These researchers found that less than a third of the men (27%), yet nearly half of the women (45%) in their study, reported that they "deliberately show emotion" to get their way.

Another group of researchers found greater "facial responsiveness" in female subjects (Buck, Miller, & Caul, 1974). They report that the women in their study more accurately communicated emotion through facial expression.

However, female observers in their investigation were not reported to be more accurate than male observers in identifying affect from facial expressions. Buck, et al. concluded that women generally portray emotions more clearly and have a higher level of facial activity than men. Observations from the present study concur with the report of Buck et al. That is, with the exception of Surprise, women were observed expressing a greater quantity and variety of emotion than men across treatments. Perhaps changing roles for women in contemporary society allow them a greater range of emotional expression than their male counterparts.

Finally, it is intriguing to speculate what effect, if any, the sex of the experimenter had upon the emotional responses of men and women in this study. Would women be more apt to express distress if a male experimenter had been present in the room? Would women have inhibited or attenuated their facial expression of emotion if a male experimenter had been present? Would male subjects have expressed more anger and less distress had the experimenter been a man? Would the results have been the same despite the sex of the experimenter?

Sex within treatment effects.--No significant differences were found between men and women in the No Escape or helpless group with regard to observed facial expression of affect across the five affective categories.

Several researchers have theorized that men and women receive different training in the expression of emotion, particularly so when they are faced with frustrating or stressful situations (Mischel, 1970; Wenar, 1971; Ferguson, 1970; Hartup, 1972; Ekman & Friesen, 1975; Johnson & Goodchilds, 1976). While laboratory-induced learned helplessness seems to evoke frustration and stress, the state of helplessness also extends beyond these emotions and incurs motivational and behavioral deficits or passivity. No previous research has attempted to observe and explore the specific emotional responses of men and women to learned helplessness. The results of the present study suggest that when men and women find they are helpless, they express similar affective responses as observed from videotapes of their facial expressions. It may be that the actual loss of control of reinforcement elicits expression of emotional discomfort that transcends the typical restrictions placed on these emotions for both men and women.

On the other hand, a very small sample size may account for the nonsignificance found between men and women within the helpless group on affective facial expression. The No Escape or helpless group was composed of 10 subjects, five male and five female. Perhaps, a larger sample size for the helpless group would have provided sufficient power to find statistical significance for this hypothesis.

Significant differences were found between men and women in the No Escape or helpless group with regard to quantity of Interest-Neutral facial expressions observed by raters. An examination of means for men and women reveals that men were observed expressing more "flat" or neutral affect than women in the helpless group. This finding parallels the observation that men over treatment groups expressed more neutral affect than women over treatment groups. Women seem to have a higher level of facial activity and express more facial affect than men whether they are in control of a situation or whether they are, in reality, helpless.

Limitations

The term "laboratory-induced learned helplessness" has been used frequently throughout this report. The purpose of using this term is, hopefully, to convey to readers that treatment procedures used in this investigation were highly contrived as opposed to naturally occurring.

The sample used in this study was quite small and consisted only of volunteers. Subjects were aware that they were participating in a research project and that their performance on the anagram task was being videotaped. In addition, subjects who participated in this study represent a highly educated cross section of the population (most were upper level undergraduates in

college). Therefore, because subjects were not randomly sampled from a population, and because of the contrived nature of this study, generalization of results beyond the laboratory is a tenuous endeavor.

Implications for Future Research

Learned helplessness is a relatively new concept. The least researched area of helplessness induction seems to be that of emotional deficits or discomfort incurred through loss of control of reinforcement. It was the purpose of the present investigation to explore the area of emotional or affective responses to laboratory-induced learned helplessness.

Differences were found between treatment groups with regard to specific categories of facial affect observed. The No Escape or helpless group was observed expressing significantly less Enjoyment and more Distress than the Escape and No Treatment groups.

Differences were also observed between men and women in expression of facial affect. Significantly fewer facial expressions of Interest and more facial expressions of Disgust were observed for women than for men over treatment groups.

Finally, men in the No Escape group were observed expressing significantly more neutral facial expressions than women in the No Escape group. No significant

differences were found between men and women within the No Escape group over the five categories of facial affect.

Yet, several questions are left unanswered. For example, what impact, if any, does the sex of the experimenter have on subjects' affective responses in a learned helpless paradigm? Subjects may have responded differently had a male experimenter been present during the anagram testing.

Also, what relationship does anger have to learned helplessness? Eckleman's study (1976) revealed that verbal insult facilitates helplessness induction. Does verbal insult after treatment with an uncontrollable stimulus instigate aggression or shame or some other aversive emotional state? Helpless subjects in other studies evidence inflated scores on the Multiple Affect Adjective Checklist, Hostility scale. Is this instrument a valid measure of hostility? Or is it a measure of some undifferentiated negative emotional state? Helpless subjects in the present study appeared to be less angry to observers of facial affect than control subjects. This finding is in conflict with the conclusions drawn from other researchers using Multiple Affect Adjective Checklist self-report instrument. What relationship does anger have to helplessness?

It is also interesting to speculate what patterns of emotion men and women may experience while helplessness

is being induced. Most measures of emotion (including this study) have been taken during the testing phase of the experiment and after treatment with an uncontrollable stimulus. Perhaps more insight could be shed on the development of emotional disturbance by observing the affective expressions of men and women as they attempt to gain control of reinforcement and eventually give up the struggle.

APPENDICES

APPENDIX A

SUBJECT CONSENT FORM FOR COGNITIVE PROCESSES STUDY

APPENDIX A

SUBJECT CONSENT FORM FOR COGNITIVE PROCESSES STUDY

I understand that participation in this study will involve listening to a tone that has been judged by audio specialists as unpleasant, but not painful or damaging to me. To my knowledge, I do not have, nor have I ever been treated for, any hearing impairments or disabilities. I understand that I will be able to listen to a sample of the tone being used in this study and may discontinue any further participation in this study at that time.

I also understand that I will be asked to solve some cognitive problems and that my performance will be videotaped. It is clear to me that these videotapes will be used only for the purposes of research and that my confidentiality will be strictly maintained. That is, the tapes will be erased once the information relevant to this study has been obtained from them. I also have been told that I will never be identified personally in reports from this study.

I have been informed that at any time during the progress of this study I may discontinue my participation totally. I may also disallow release of my videotaped performance on cognitive tasks.

I have freely given my consent to participate in this study being conducted by Jan Bowles under the supervision of Dr. William C. Hinds. I have not been offered, nor do I expect to receive, any remuneration for my participation in this research.

_____
Signature of Participant

_____
Date

_____
Witnessed by

_____
Date

APPENDIX B

SUBJECT INFORMATION FORM

APPENDIX B

SUBJECT INFORMATION FORM

Subject Number:_____ Sex: Male_____

Female_____

Name:_____ Age:_____

Address:_____
Street

_____
City, State . . .

Phone:_____ Major:_____

Academic Status:

Freshman_____

Sophomore_____

Junior_____

Senior_____

Graduate Student_____

APPENDIX C

THE MASTER STIMULUS CONTROL APPARATUS

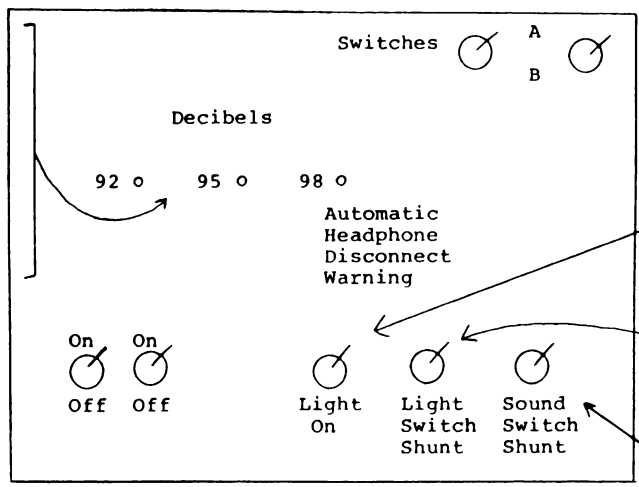
APPENDIX C

THE MASTER STIMULUS CONTROL APPARATUS

The 92 and 95 db red lights will be on during normal operation. If the 95db light flickers during operation, it is because of variations in the signal on the tape. Always start by advancing the tape recorder volume control until the 95db light just stays on continuously. The 98db green light (a) warns you when the sound level in the headphones reaches 98db or more, (b) indicates when your subject has pressed the switches correctly (no sound is reaching the subject then).

To turn the unit on put both switches in the ON position.

NOTE: If the 98db warning light goes on and your subject is not pressing switches, you should either (a) turn down the volume on the tape recorder (this is the best choice) or (b) switch the tape recorder off (this would stop the sound but would also disrupt your research.



When both switches are up the switches are connected for combination A. When both are down they are connected for combination B.

The LIGHT ON switch allows you to turn the "correct-choice" light on any time you want, regardless of what the subject does with the switch box.

The LIGHT SWITCH SHUNT switch allows you to disable the light so that the subject cannot get the correct-choice light to turn on under any circumstances.

The SOUND SWITCH SHUNT switch makes it impossible for the subject to turn off the sound.

The circuit used to provide the 98db warning is a rapidly responding, highly accurate volume sensing device. It provides an instantaneous indication when the sound level reaches or exceeds 98db. For convenience, the circuit has been wired so that when a subject presses a correct switch combination (disconnecting the headphones) the light comes on. This enables the researcher to know when a correct switch combination has been pressed.

APPENDIX D

ANAGRAMS AND SOLUTION WORDS

APPENDIX D

ANAGRAMS AND SOLUTION WORDS

	Anagram	Solution Word
1.	I U P M O	OPIUM
2.	D O N W E	ENDOW
3.	I L G E A	AGILE
4.	C U N R I	INCUR
5.	V O A C H	HAVOC
6.	A C O H R	ROACH
7.	U I R T F	FRUIT
8.	D E O L M	MODEL
9.	M A U N H	HUMAN
10.	O U H L G	GHOUL
11.	L U A E V	VALUE
12.	I A R D T	TRIAD
13.	U T O H Y	YOUTH
14.	B R O A C	COBRA
15.	W E O R P	POWER
16.	G A U R S	SUGAR
17.	U L A T F	FAULT
18.	D G U E J	JUDGE
19.	T E A R W	WATER
20.	B I A T H	HABIT

The time limit for each anagram trial was 45 seconds.

APPENDIX E

ANAGRAM RESPONSE RECORD SHEET

APPENDIX E

ANAGRAM RESPONSE RECORD SHEET

Subject Identification: _____

Trials	Correct Response	Response Latency
1	OPIUM	_____
2	ENDOW	_____
3	AGILE	_____
4	INCUR	_____
5	HAVOC	_____
6	ROACH	_____
7	FRUIT	_____
8	MODEL	_____
9	HUMAN	_____
10	GHOUL	_____
11	VALUE	_____
12	TRIAD	_____
13	YOUTH	_____
14	COBRA	_____
15	POWER	_____
16	SUGAR	_____
17	FAULT	_____
18	JUDGE	_____
19	WATER	_____
20	HABIT	_____

All response latencies are recorded in seconds. The time limit for each trial is 45 seconds.

APPENDIX F

A RATER INFORMATION FORM

APPENDIX F

A RATER INFORMATION FORM

RATER NUMBER:_____

NAME:_____ SEX: Male_____

Female_____

ADDRESS:_____
Street

_____
City State

PHONE:_____

MAJOR:_____

I do, do not want a summary of the results of this study.

APPENDIX G

RATER TRAINING PAPER

"Categories of Emotion"

APPENDIX G

RATER TRAINING PAPER

"Categories of Emotion"*

This part of the training program is designed to introduce you to the emotional labels that we will be using in this study. There are thousands of emotional words, each signifying various shades of meaning, and you probably already have your own special vocabulary for describing emotions. However, for the purposes of this study, we will all use the same terms so we can have a clear understanding of what we are talking about. In this study, the following emotional labels will be used: Interest-Excitement, Enjoyment-Joy, Surprise-Startle, Distress-Anguish, Anger-Rage and Disgust-Contempt. We will now consider each of these affects individually.

1. Interest-Excitement (Int)

Synonyms: Curious, concentration, attending, absorbed, involved, attracted, intense, fascinated.

Description: Interest-Excitement is not usually considered an affect. It has been mostly studied in terms of attention mechanisms. It consists of mildly pleasant sensations which are aroused when one is spontaneously attending to the environment. Most people are capable of maintaining this affect over long periods of time.

Function: Taking in information about the environment.

Facial Components: Eyebrows level but may be slightly raised or lowered. Eyes open normally and fixated. Lips may be parted and jaw dropped slightly.

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*Unpublished paper by David Inman, Department of Counseling Psychology, College of Education, Michigan State University, 1976.

2. Enjoyment-Joy (Joy)

Synonyms: Happy, glad, merry, joyful, cheerful, blissful, jubilant, gay, elated, esctatic, gleeful, jovial.

Description: Enjoyment-Joy is the affect which most people prefer to experience. It is the most pleasant of all the affects. May be stimulated by the onset of positive stimuli or by the cessation of painful or unpleasant stimuli. It can vary greatly from mild enjoyment to ecstasy.

Function: Social bonding, internal positive reinforcement.

Facial Components: Eyebrows level or slightly lowered. Eyes bright--may be partially closed: wrinkles ("crow's feet") in the outer corners. Corners of mouth lifted back and up (exaggerated with laughing). Teeth may be partially exposed, upper lip tensed. Naso-labial folds (running from the nose to the outer edge of the mouth) are evident.

3. Surprise-Startle (Sur)

Synonyms: Astonished, amazed, shocked, flabbergasted.

Description: Surprise is distinguished by its very brief duration. It is sudden in its onset and fades quickly. It is triggered usually by the unexpected; if one anticipates an event, then one cannot be surprised. It may also be triggered by a sudden change in sensory stimulation such as a gunshot or flashbulb going off.

Function: Clearing the sensory systems for assimilation of new information.

Facial Components: The brows are raised so that they are curved and high, making the forehead wrinkled horizontally. The eyes are widened so that the white is visible above and sometimes below the pupil. The jaw drops so that the lips are loosely parted.

4. Distress-Anguish (Dist)

Synonyms: Sad, unhappy, miserable, hurt, dejected, depressed, despondent, dismal, low, grieved, suffering.

Description: Most often, the feeling of distress is associated with a loss of some sort. Loss of a loved one, loss of an opportunity, loss of self-esteem, loss of health all cause distress. Distress is usually a prolonged feeling, usually lasting at least a few minutes, and sometimes for years. It is not as acutely unpleasant as some of the other affects, but its prolonged endurance may have profound consequences.

Function: Communicate deficiency to the environment and attract helpgivers.

Facial Components: Inner corners of the eyebrows are drawn up, sometimes creating vertical wrinkles in the forehead. The skin below the forehead is triangulated with the inner corner up. The corners of the mouth are down and the lip may be trembling.

5. Anger-Rage (Ang)

Synonyms: Irritated, hostile, mad, hateful, aggressive, annoyed, cranky, cross, disagreeable, furious, belligerant, resentful.

Description: Intense anger usually implies risk of losing control. Consequently, anger is diligently suppressed in early socialization. Anger is likely to be triggered by frustration, or physical threat; it may be a reaction to a psychological hurt, an extreme violation of values, or a failure to fulfill expectations.

Function: To mobilize the individual's resources for confrontation with the disturbing element in the environment.

Facial Components: Brows are lowered and drawn together, creating vertical lines in the forehead. Eyes have a hard stare and a bulging appearance. Lips are either firmly pressed together with corners down or drawn back in a squarish shape, baring the teeth.

6. Contempt-Disgust (Cont)

Synonyms: Scornful, disdainful, skeptical, condemning, critical, arrogant, sarcastic, spiteful, revolted, indignant.

Description: A feeling of aversion to something sensory--as a taste, a smell, a sight, or a touch. Also a feeling of aversion to more complex stimuli--ideas, things, or people. An element of condescension accompanies contempt-disgust--a "looking down on" the object as being "below" you.

Function: To "expel" the object in either a physical sense (i.e., vomiting) or a psychological sense by rejecting the object.

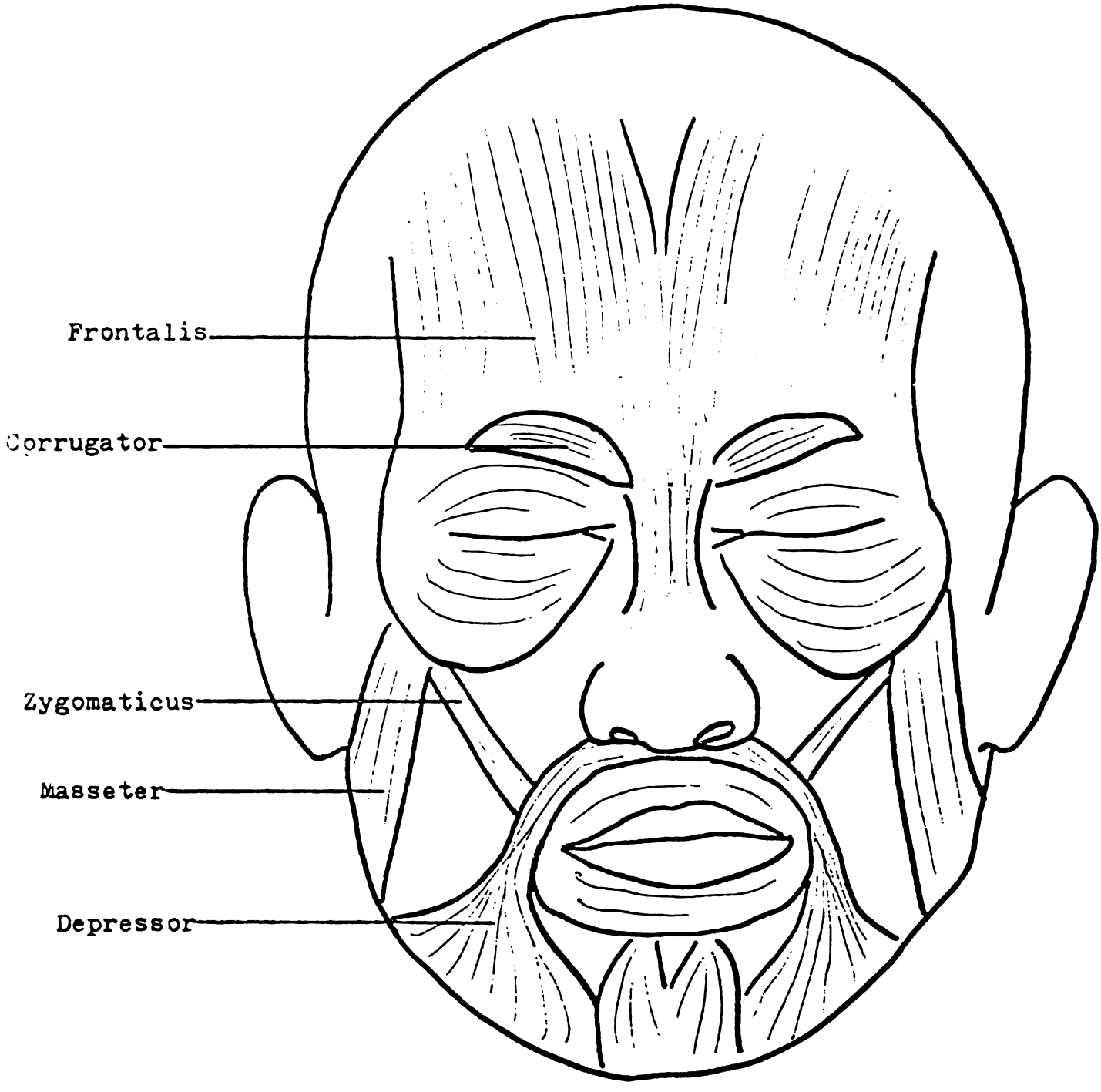
Facial Components: The brow is lowered; one or both cheeks are raised; the nose is sometimes wrinkled. One or both sides of the upper lip is raised and protrudes slightly, leaving the teeth exposed. At times the tongue may be slightly extended.

Thus in this study, you will be learning to recognize and label facial expressions in these six categories:

1. Interest-Excitement (Int)
2. Enjoyment-Joy (Joy)
3. Surprise-Startle (Sur)
4. Distress-Anguish (Dist)
5. Anger-Rage (Ang)
6. Contempt-Disgust (Cont)

These are not the only emotional states that exist, but cross-cultural research has shown that observers can accurately recognize facial expressions and name them accordingly using these labels. Please note that two important affects have been omitted from this study: Fear-Terror and Shame-Humiliation. Although we believe these to be important emotional states, we were able to elicit each of them only a few times on videotape. Thus we do not have enough instances of the facial expressions to provide an accurate test of recognition in this study. The facial expressions in the training tape and in the actual study will then only be correctly labeled in one of the six categories discussed, and in no others.

Schematic of Facial Musclature*



*Modified from Fair, Schwartz, Friedman, Greenberg, Klerman, & Gardner, 1974.

APPENDIX H

AFFECTIVE DATA RATING FORMS

APPENDIX H

AFFECTIVE DATA RATING FORMS

SEGMENT #	Interest Neutral	Happiness Enjoyment	Surprise Startle	Sadness Distress	Anger Rage	Disgust Contempt	I Don't Know

APPENDIX I

CELL MEANS FOR INTERNALITY-EXTERNALITY COVARIATE

APPENDIX I

CELL MEANS FOR INTERNALITY-EXTERNALITY COVARIATE

Treatment	Sex	Externality Mean
1	F	11.000
	M	9.000
2	F	11.000
	M	10.000
3	F	9.200
	M	9.000

Code: Treatment

1 = No Escape or Helpless group
2 = Escape group
3 = No Treatment group
F = Female
M = Male

APPENDIX J

PEARSON PRODUCT MOMENT CORRELATION COEFFICIENTS FOR FIVE AFFECTIVE CATEGORIES AND A NEUTRAL CATEGORY OF FACIAL EXPRESSION

APPENDIX J

PEARSON PRODUCT MOMENT CORRELATION COEFFICIENTS FOR FIVE AFFECTIVE CATEGORIES AND A NEUTRAL CATEGORY OF FACIAL EXPRESSION

	INT	ENJ	SURP	DIST	ANG	DISG
INT	1.000 S=.001	-.250 S=.092	-.334 S=.035*	-.443 S=.007*	-.340 S=.033*	-.212 S=.130
ENJ		1.000 S=.001	-.147 S=.220	-.271 S=.073	-.187 S=.162	-.322 S=.042*
SURP			1.000 S=.001	.152 S=.211	-.104 S=.293	-.028 S=.441
DIST				1.000 S=.001	-.242 S=.099	.249 S=.093
ANGER					1.000 S=.001	-.014 S=.472
DISG						1.000 S=.001

Code: INT = Interest-Neutral
ENJ = Happiness-Enjoyment
SURP = Surprise-Startle
DIST = Sadness-Distress
ANGER = Anger-Rage
DISG = Disgust-Contempt
N = 30
*Significant at the $p < .05$ level

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