

ABSTRACT

VERBAL CONDITIONING BY AVOIDANCE LEARNING: AN EXPERIMENTAL ANALOGUE TO A PARTICULAR INTERPERSONAL SITUATION

by James P. Mathie^{exp.}

Many researchers have recently attempted to apply the principles which have evolved in animal and human learning studies to the broad fields of personality, interpersonal interactions, psychotherapy and behavioral disorders. The present study attempted to apply some of the principles of avoidance learning and verbal conditioning to the interpersonal situation where one person verbally attacks another person. It was posited that the replies associated with "anxiety reduction" would mimic a person's predominant or characteristic response to such a situation, especially under stress or stimulus change. An artificial interpersonal situation was used to increase experimental control.

Eighty male undergraduate students enrolled in elementary psychology courses served as subjects. They were subjected individually to a three phase experiment. For all three phases they were seated at a teaching machine and were presented with the experimental stimuli through a window in the machine. The first phase was an evaluation phase, the second an acquisition or learning phase and the third another evaluation phase.

During the two evaluation phases, the stimuli consisted of twenty verbal attack statements presented one at a time. The attack statements were printed in a cartoon-like balloon

accompanying the line drawing of a human face. A second line drawing of a face was accompanied by a blank balloon representing the person responding to the attack. The S's composed and wrote replies to each of the twenty attack statements.

After the first evaluation phase, each of the responses was classified into one of five classes of response each representing a different way in which the responder expressed or failed to express anger in his reply. The class of response which occurred most often during this phase was labelled the modal response and was excluded from the acquisition phase.

During the acquisition phase the four remaining classes of response (three of the four on each presentation) were printed in the balloons accompanying the face, representing the responder. Each response was followed by a type of reinforcement. For each S two of these classes of response were rewarded by being correct, one was punished, and one led to the avoidance of punishment. Half of the S's were aware that giving one of the responses would lead to the avoidance of punishment (anxiety reduction or experimental group) the other half were not aware of this (no clear reinforcement or control group).

The third phase was identical to the first evaluation phase except half the S's were stressed during the evaluation, half were not, half had stimulus material similar to acquisition and half had new stimulus material (four groups).

It was assumed that the effects of the reinforcements would be approximately equal on S's with different modal responses and approximately equal on the five classes of response. Both these assumptions were found to be untenable. Individual differences in S's led to differential responses to reinforcement, and the different classes of response were differentially affected. Even so, responses reinforced by being correct in general increased, and those followed by punishment decreased.

As expected stress and novel stimuli as opposed to lack of stress and similar stimulus material led to an increased use of the modal response. The responses reinforced by avoiding the punishment without the S's awareness led to results which mimicked those for the modal response. S's who were aware they could avoid punishment used the modal response more than the unaware S's particularly under stress and with novel stimuli. The results were interpreted in terms of learning two different kinds of avoidance responses depending on the S's level of awareness that avoidance had occurred.

VERBAL CONDITIONING BY AVOIDANCE
LEARNING; AN EXPERIMENTAL ANALOGUE
TO A PARTICULAR INTERPERSONAL SITUATION

By

James P. Mathie

A THESIS

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

DOCTOR OF PHILOSOPHY

Department of Psychology

1965

To
Barbara

W

Acknowledgments

I wish to acknowledge my indebtedness to the Psychology Department at Western Michigan University who provided facilities as well as subjects for the research. I also wish to thank Kalamazoo College and Michigan State University for their cooperation in gathering the preliminary data.

I am also indebted to Dr. Stewart Armitage and the other members of the Psychology Department at the Veteran's Administration Hospital at Battle Creek, Michigan for their support during the course of the research.

In addition, I wish to express my gratitude to the members of my committee: Drs. Joseph Reyher, R. E. Schell, A. A. Seagull, and particularly to the chairman of my committee Dr. M. Ray Denny.

Table of Contents

Dedication	p. 11
Acknowledgments	p.111
Introduction	p. 1
Method	p. 11
Results	p. 25
Discussion	p. 62
Summary	p. 73
References	p. 77
Appendix	p. 79

List of Tables

Table 1.	Examples of Five Kinds of Replies Representing the Five Classes of Response	p. 9
Table 2.	Pattern for the Association of Class of Response with Type of Reinforcement for the Twenty Acquisition Programs	p.18
Table 3.	Mean Frequency for each Class of Response chosen as the First Response during First Ten and Last Ten Trials of Acquisition	p.29
Table 4.	Summary of Analysis of Variance for Class of Response X Stress X Generalization X Membership in Experimental or Control Group	p.32
Table 5.	Mean Change Pre to Post for Classes of Response X Type of Reinforcement for Experimental and Control Groups	p.33
Table 6.	Percent of Times each Class of Response was associated with each Type of Reinforcement across all Experimental Conditions and Experimental and Control Groups	p.34
Table 7.	Percent of Times each Class of Response was associated with each Reinforcement for Experimental and Control Groups and for Stress and Nonstress <u>S's</u>	p.35
Table 8.	Mean Frequency with which <u>S's</u> with a Given Modal Response gave Punished, Safe or Correct Responses for First Ten Trials and Last Ten Trials of Acquisition	p.40
Table 9.	Mean Change Pre to Post for Punished, Safe and Correct Responses according to Modal Responses of <u>S's</u>	p.42
Table 10.	F Test and Newman-Keuls Procedure for Mean Change Pre to Post for Responses associated with Three Types of Reinforcement	p.45
Table 11.	Mean Pre to Post Change in Frequency of Modal Responses X Membership in Experimental and Control Groups, Stress-Nonstress Conditions and Generalization-Nongeneralization Conditions	p.50

Table 12.	Mean Pre to Post Changes for Punished, Safe and Correct Responses X Post Test Conditions for Experimental and Control Groups separately and combined	p.53
Table 13.	Mean Pre to Post Changes for Punished, Safe and Correct Responses X Membership, in Experimental and Control Group for Stress, Nonstress, Generalization and Nongeneralization combined and separately	p.54
Table 14.	Mean Pre to Post Changes in Frequency of Responses representing the Five Classes of Response X Posttesting Conditions and Membership in Experimental and Control Groups	p.57
Table 15.	Mean Pre to Post Changes in Frequency of Punished, Safe and Correct Responses X Stress vs. Nonstress and X Experimental vs. Control for S's with either Self-attack or Denial as their Modal Response	p.61

List of Figures

Figure 1.	Schematic Presentation of Method and Procedure	p. 12
Figure 2.	Sample Item on Pre and Post Test Programs	p. 13
Figure 3.	Sample Item for Acquisition Program	p. 17
Figures 4, 5, 6, 7 and 8.	Acquisition Curves for Frequency of Punished, Safe and Correct Responses across Sixty Trials (blocks of Ten Trials) broken down according to Class of Response being Reinforced; Control Group	p. 27
Figures 9, 10, 11, 12, and 13.	Acquisition Curves for Frequency of Punishment, Safe and Correct Responses across Sixty Trials (blocks of Ten Trials) broken down according to Class of Response being reinforced; Experimental Group	p. 28
Figures 14, 15, 16 and 17.	Acquisition Curves for Frequency of Punished, Safe and Correct Responses across Sixty Trials (blocks of Ten Trials) broken down according to <u>S</u> 's Modal Response; Control <u>S</u> 's.	p. 37
Figures 18, 19, 20 and 21.	Acquisition Curves for Frequency of Punished, Safe and Correct Responses across Sixty Trials (blocks of Ten Trials) broken down according to <u>S</u> 's Modal Response; Experimental Group	p. 38
Figure 22.	Acquisition Curves for Twenty-eight Matched <u>S</u> 's across Sixty Trials (blocks of Ten Trials) for Experimental and Control Groups	p.47

List of Appendices

Appendix 1.	List of Eighty Attack Statements	p. 79
Appendix 2.	Six Faces Used on Acquisition Programs.	p. 87
Appendix 3.	A Note on Training the Judges	p. 89
Appendix 4.	Raw Data for Pre to Post Changes X Posttesting Conditions X Experimental and Control Groups	p. 91

Introduction

Many researchers have recently attempted to apply the principles which have evolved in animal and human learning studies to the broad fields of personality, interpersonal interactions, psychotherapy and behavioral disorders (Shoben, 1949; Mowerer, 1950, 1961; Dollard and Miller, 1950; Wolpe, 1952, 1954, 1958; Eysenck, 1960.) The present study attempts to apply some of the principles and findings of avoidance learning and verbal conditioning to an interpersonal situation which appears to resemble, at least superficially, the classical avoidance learning paradigm. The interpersonal situation under study is that in which one person verbally attacks a second person and the second person replies (or fails to reply) to the attack.

A Review of Related Research

In an elaboration of a study done by Diven (1936), Lacey and Smith (1954) and Lacey, Smith and Green (1955) demonstrated that an emotional response (in terms of a heart response measure) could be conditioned to a previously neutral word. They showed further, as Diven had, that this conditioned emotional response generalized to words that were semantically related to the original stimulus word; e.g. to synonyms and homonyms. This group of studies along with a great many other related studies (see Osgood 1953 pp.701 to 712; Kimble 1961, pp. 354-355; Franks 1961, pp.478 to 481; Jones 1961, pp.488 to 491 for

reviews of the related studies) have shown not only that emotional reactions can be conditioned to verbal stimuli and subsequently by generalization to related words but also that the verbal behavior itself can be modified.

Of particular interest for the present study is the investigation of Eriksen and Kueth (1956) who found that if they asked S's to free associate to a stimulus word and then followed some of their associations with a shock, the S's tended to avoid these words on subsequent word association tasks, even when the threat of shock was not present. This was true for S's whether they were aware of the contingency for shock or not. Eriksen and Kueth considered this to be an analogue to repression and supported their argument on the basis of differences in the reaction times of the "aware" (aware of the relationship between the giving of a particular associate and the receiving of shock) and "unaware" S's. The "aware" S's showed increased reaction times in forming associations to the critical stimulus words and reported deliberately withholding the association that would lead to shock. The "unaware" S's, who also avoided the associations which lead to shock, showed no increase in reaction times and reported no experience of withholding associations. Even the "aware" subjects gradually decreased their reaction times to the critical stimulus words and reported having lost the feeling of withholding associations. The authors discussed their

findings in terms of avoidance conditioning but did not investigate the avoidance response itself, i.e. the words substituted for the words not spoken. The characteristic paradigm for avoidance learning is the presentation of a CS (light or buzzer usually but in the case of Eriksen and Kuethe, the stimulus word) followed after a delay by a UCS (shock) and under the condition that a particular response occurring during the delay period will keep the UCS from occurring (for Eriksen and Kuethe, any associate other than those chosen to be shocked). The response occurring during the delay period between the CS and the UCS which prevents the occurrence of the UCS is called the avoidance response. The various studies on avoidance learning especially those following from Solomon and Wynne (1953) and Solomon, Kamin and Wynne (1953) on traumatic avoidance learning would suggest that the substituted words might become conditioned to the stimulus words because they would be associated with the non-occurrence of shock (this is traditionally stated; associated with anxiety reduction).

The studies cited on the conditioning of emotional reactions to words have confined themselves primarily to rather limited and quite specific types of verbal responses e.g. word association tasks. Another body of research on the conditioning of verbal behavior, that growing out of the work by Greenspoon (1951, 1954, 1955) has gone beyond the conditioning of specific types of

verbal responses e.g. the occurrence of plural nouns in an interview setting (Greenspoon, 1951) particularly in the work of Hildum and Brown (1956), Nuthman (1957) and Salzinger and Pisoni (1960).

Hildum and Brown (1956) found that in telephone interviews, the number of statements favorable or unfavorable to the topic of general education could be increased by differentially reinforcing these statements with the single word "good". This result was obtained when the subjects were not able to verbalize the contingency for reinforcement. In their study, the subjects who had an increase in unfavorable statements toward general education still rated the experimenter as having a favorable attitude toward the topic.

Nuthman (1957) showed that the number of statements reflecting "acceptance of self" on a questionnaire could be increased when such statements were followed by the word "good" spoken by the experimenter. This increase occurred even though the words in the various statements differed and even though the S could not verbalize the relationship between the experimenter's behavior and his own.

Salzinger and Pisoni (1960) showed that the number of statements reflecting affect could be significantly increased in an interview setting if the experimenter followed these statements on the part of the S by words and gestures indicating approval.

In this last group of studies the emphasis was on the modification of the verbal behavior with less emphasis on the conditioning of emotional responses. These studies do, however, point toward the general finding that verbal behavior can be modified by conditioning techniques even when general classes of verbal responses are reinforced rather than specific words or specific types of words. It is suggested therefore that it may be possible to apply some of the principles from the first group of studies on the conditioning of emotional responses to words, to the conditioning of general classes of response. This study is such an attempt to modify general classes of verbal responses within the paradigm of avoidance learning mentioned above.

The verbal behavior to be dealt with was taken from a real life interpersonal situation where the paradigm for avoidance learning seems to exist. This was done with the expectation that further research in less well controlled but more natural settings would proceed more meaningfully if some of the important variables in this interpersonal situation could be identified in the better controlled laboratory setting. Hopefully this would eventually lead to a better understanding of the real life interpersonal situation.

The real life situation is that in which one person verbally attacks another person. In the actual setting, the second person's reply (or lack of reply) is often

followed by some form of a renewed verbal attack by the first person, or a spanking perhaps, if the second person is a child, or any number of other happenings which could be considered unpleasant or punishing. With some frequency, however, the reply of the second person will avert (or at least not be followed by) the occurrence of such punishment. This set of circumstances fits the avoidance learning paradigm and thus the replies not followed by punishment would be presumably associated with "anxiety reduction" and conditions favorable to avoidance learning would be fulfilled. "Anxiety reduction" is used here as an operational term. This usage is in accordance with the avoidance learning literature (Solomon and Wynne etc.) and does not refer to a feeling state of the person as used in the clinical and personality literature.

Animal studies suggest that responses associated with "anxiety reduction" tend to extinguish very slowly and can be reinstated very rapidly when the original stimulus situation is re-presented. If the interpersonal situation referred to above fits the avoidance learning paradigm, then it seems possible that the response a person gives to a verbal attack represents a response learned as a consequence of having been associated with "anxiety reduction" in the past. Since people tend to give a variety of responses to verbal attacks, the focus in this study was on the kind of response S gave most

frequently in the experimental setting (this will be referred to as the S's modal response.). The present study then investigates the possibility of modifying the frequency of occurrence of some other (nonmodal) kind of response by associating it with "anxiety reduction" in the experimental setting. The kind of response associated with "anxiety reduction" in the experimental setting could then be compared with the kind of response S gave most frequently when entering the experimental setting. To argue by analogy for the likelihood that the modal response was also acquired at some earlier time because it had been associated with "anxiety reduction", three reinforcement conditions in addition to "anxiety reduction" were used. The effects of these four types of reinforcements ("anxiety reduction" plus three others) on five different kinds of responses were evaluated under stress and nonstress conditions and in situations either different from or similar to the reinforcement situations (a test for transfer). The effects of the types of reinforcements on the kinds of responses could then be compared with the effects on the S's modal response. The argument by analogy is that if the responses associated with "anxiety reduction" in the experimental setting and the S's modal response were similarly affected by stress and the test for transfer while the responses associated with the other reinforcements were differently affected, then the argument that the modal response was originally

learned to "anxiety reduction" would be strengthened.

The four reinforcement conditions were: 1) "anxiety reduction", 2) punishment, 3) reward, in terms of correctness, and 4) no clear reinforcement. They were chosen because they seem to represent four major reinforcement conditions favorable to changes in behavior (or lack of change in the case of the no clear reinforcement type). These four reinforcement conditions will be referred to as the "types of reinforcement" from here on.

Table 1 gives actual examples of the five kinds of verbal responses (replies of the person attacked), these being; 1) replies reflecting a clear direct verbal attack on the person making the original attack statement; 2) replies reflecting verbal attacks on the person himself and/or replies reflecting open or tacit agreement with the attack statement; 3) replies reflecting an attack but where the object of the attack is either unclear or definitely not the original attacker; also those replies reflecting an attack but where the source of the attack is unclear or where the attack nature of the reply is only thinly disguised; 4) replies which do not seem to reflect an attack by anyone on anyone else or where the attack nature of the reply is very unclear; 5) replies which are specific denials of some part or all of the attack statement, including replies which are positive statements that are directly opposite to the original attack statement. These five "classes of response" will

be referred to respectively as 1.) Anger, 2.) Self-attack, 3.) Object-displacement, 4.) Isolation and 5.) Denial.

Table 1. Examples of Five Kinds of Replies
Representing the Five Classes of Responses

Attack Statement: You have a very annoying laugh.

Possible Replies:

Anger: You certainly are a rude person.

Isolation: Laughter is the medicine of the
soul.

Self-attack: I can't change it.

Object-displacement: With me it's only my
laugh that's annoying.

Denial: It doesn't bother me.

The five classes of verbal replies, as the reader has probably already noticed, were drawn from the literature on defense mechanisms, specifically from Miller and Swanson (1960, pp.194 to 221) and were adapted to the present type of verbal material.

This classification system was chosen for two main reasons. First, the research reported in Miller and Swanson (1960) seems to indicate that this type of categorization system would handle the classification of a large proportion of the verbal responses that might be given in a verbal attack setting. Thus it would be possible to construct replies for the reinforcement situation where each category could be represented often but where the repetition of the exact wording of the replies would be minimized. This allows for the learning of

general classes of response rather than specific words. Secondly, the same research has shown that these categories represent psychologically meaningful response dimensions; i.e. they have been shown in several research settings to be related to other aspects of an individual's behavior or life circumstances. Whether or not these classes of responses relate to underlying personality mechanisms is considered irrelevant to this particular study.

A test for transfer and the effects of stress were included in the comparisons between the S's modal response and the responses associated with the experimental reinforcements. The test for transfer was used to assess the effects of the reinforcements on the S's generalized behavior. A complete failure to transfer would tend to indicate that any learning that took place was situation bound. It was expected that the response associated with some of the reinforcements might generalize while those associated with others might not.

The effect of stress on the responses was included because considerable research (Child, 1954) has shown that stress, defined in many ways, often leads to the disruption of behavior patterns and the production of new responses as well as to the reuse of old responses. Thus the effects of stress on the modal response and on the responses associated with the experimental reinforcements could be compared.

The Method

The experiment consisted of three phases; pretesting, acquisition and posttesting. Figure 1. presents the design of the experiment schematically. The pretesting phase was an evaluation phase where the frequencies with which a S gave each of the five classes of response (to 20 attack statements) were determined. The most frequently given class of response was designated as the modal response and excluded from the acquisition phase. During the acquisition phase the four classes of responses which had occurred less frequently in the pretesting phase were associated with the experimental reinforcements, "anxiety reduction, punishment, reward in terms of being correct, and no clear reinforcement. The posttesting phase was an evaluation phase as was the pretesting phase. Again the frequencies of the five classes of response (the modal response could again be given) were determined. For some S's the posttesting phase was completed under stress (stress condition) while for the others this was not the case (nonstress condition). A test for transfer was also included in the posttesting phase. Some subjects had stimulus material similar to the acquisition phase (nongeneralization) while others had stimulus material less like the acquisition phase (generalization).

The analysis of the results could then focus, pre to post, on the change in frequency of the modal response.

and the responses associated with the various reinforcement conditions. The effects of the conditions of post-testing (stress-nonstress and generalization-nongeneralization) could also be evaluated. Further, the reinforcement condition could be evaluated by reference to the acquisition curves of the training session.

The Stimuli: In all three phases, the stimuli were reproduced on fanfolded paper and presented by means of an MTA 100 Scholar teaching machine. The stimuli were line drawings of two faces accompanied by cartoon-like balloons. (see Figure 2.) The balloon for the face on the left always contained a verbal attack statement (to be described later). During pretesting and posttesting, the balloon for the face on the right was blank. During acquisition, three balloons accompanied the face on the right. Each of these balloons contained a potential reply to the verbal attack statement in the balloon on the left. (The nature of these replies will be described below).

Figure 2. Sample Item on Pre and Post Test Programs.



During the acquisition phase and only during the acquisition phase, the verbal attack statements were also presented by means of a tape recorder. The auditory

presentation coincided with the appearance of the visual presentation in the window of the teaching machine.

The Verbal Attack Type Statements (VATS): These statements consisted of 80 one sentence statements which were composed in such a fashion that each could be considered somewhat unjustified in almost any context in which they were said, e.g. "You can't ever be trusted". The statements were general enough to apply to almost anyone and were always critical in nature.

The Responses: All responses were intended to represent replies to the verbal attack statements. During the pre and posttesting phases S's responses consisted of the replies which he composed himself and wrote on the blank answer paper presented in the far right window of the machine. During the acquisition phase, S's responses consisted of his reading aloud one of the three replies typed in the right hand balloons, writing a letter on the answer paper to record which of the three possible replies he had chosen (they were lettered "A", "B", and "C") and pressing the appropriate lettered button on the left hand side of the machine. The three buttons were labeled "A", "B", and "C" respectively and each would advance the program paper a different distance. On each item, one button advanced the program paper less than an inch, one advanced the paper until the stimulus was almost out of the window, (approximately three inches) and the third advanced the program to the next item. The lettered

button which would move the program a particular distance varied randomly from item to item. During the pre and posttesting phases, the S's pressed any one of the three buttons to move the program to the next item.

The Alternative Replies: The alternative replies were chosen from the replies given by an independent group of 118 college students from Michigan State University and Kalamazoo College (males and females). Each of these students was given a booklet with 18 of the original ninety verbal attack type statements. They were instructed to "write in two different ways that you might reply to the statement depending on who said it to you and the mood you were in when it was said to you". From the replies obtained in this manner the E selected five replies for each of the ninety verbal attack statements which seemed to best represent the five classes of response (Anger, Isolation, Self-attack, Object-displacement and Denial). The replies were also chosen so that there would be a minimum of wording overlap from item to item within a single class of response. Two judges then attempted independently to classify the five responses to each attack statement into one of the five classes of responses. The judges agreed on 92% of the 450 replies classified. The ten verbal attack statements on which the judges showed the greatest disagreement in classifying the five replies were eliminated to arrive at the list of eighty attack statements with five replies to each

statement used in the study itself. The final list of eighty attack statements and the five alternative replies to each are listed in Appendix 1.

The Presentation of the Stimuli: Twenty-three programs were compiled to present the stimuli in accordance with the design of the study. These consisted of one pretesting program, two posttesting programs and twenty acquisition programs.

The Pretest and Posttest Programs: These three programs each consisted of twenty items. Each item was composed of two line drawings of human faces, each with an accompanying balloon (see Figure 2.). The balloon accompanying the left hand face contained one of the eighty verbal attack statements. The balloon accompanying the right hand face was blank. The items were arranged on the program paper in such a way that they would be viewed one at a time by the S. The same twenty verbal attack statements, in the same order were used on all three of these programs.

The Acquisition Programs: Each of these twenty programs consisted of sixty items. Each item was composed of two line drawings of human faces. The left hand face was accompanied by a single balloon containing one of the remaining sixty verbal attack statements (20 of 80 were used on pre and posttesting programs). The right hand face was accompanied by three balloons each of which contained an alternative reply to the attack statement

(these replies were described above). The three alternative replies were lettered "A", "B", and "C" (see Figure 3). The items on the acquisition programs were presented one at a time.

Figure 3. Sample Item for Acquisition Program.



All twenty acquisition programs had the same sixty verbal attack statements arranged in the same order. The programs differed from each other on the basis of the content (class of response) of the alternative replies and the order in which the alternative replies appeared on a particular item. Table 2 gives a schematic presentation of the differences between the programs.

Four of the twenty programs eliminated the Anger class of response during acquisition. These programs are listed under the Anger column in Table 2. Within these four programs the remaining four classes of responses were each associated with reward (being correct) twice and with both punishment and "anxiety reduction" once (for half of the subjects, those in the control group, one of their replies was associated with no clear reinforcement rather than "anxiety reduction"). The four remaining sets of programs (Isolation, Self-attack,

Table 2. Pattern for the Association of Class of Response with Type of Reinforcement for the Twenty Acquisition Programs

Class of Response Absent From Program					
	Anger	Isolation	Self- attack	Object- displacement	Denial
P					
R	O-Correct	O-Correct	O-Correct	S-Correct	S-Correct
O					
G	I-Correct	A-Correct	A-Correct	A-Correct	A-Correct
R					
A	S-Safe	S-Safe	I-Safe	I-Safe	O-Safe
M					
1	D-Punished	D-Punished	D-Punished	D-Punished	D-Punished
P					
R	S-Correct	S-Correct	I-Correct	I-Correct	I-Correct
O					
G	D-Correct	D-Correct	D-Correct	D-Correct	O-Correct
R					
A	I-Safe	A-Safe	A-Safe	A-Safe	A-Safe
M					
2	O-Punished	O-Punished	O-Punished	S-Punished	S-Punished
P					
R	S-Correct	S-Correct	I-Correct	I-Correct	I-Correct
O					
G	O-Correct	O-Correct	O-Correct	S-Correct	S-Correct
R					
A	D-Safe	D-Safe	D-Safe	D-Safe	O-Safe
M					
3	I-Punished	A-Punished	A-Punished	S-Punished	A-Punished
P					
R	I-Correct	A-Correct	A-Correct	A-Correct	A-Correct
O					
G	D-Correct	D-Correct	D-Correct	D-Correct	O-Correct
R					
A	O-Safe	O-Safe	O-Safe	S-Safe	S-Safe
M					
4	S-Punished	S-Punished	I-Punished	I-Punished	I-Punished

Object-displacement and Denial) followed the same pattern as that for Anger and each was missing the class of response used to label it (e.g. Isolation contained no Isolation type replies).

Any one S received only one of the acquisition programs. As the result of the above scheme S could have been given an acquisition program that had any one of the five classes of responses eliminated and which had any one of the four remaining classes of responses associated with any one of the reinforcements.

The two correct responses each occurred on half the items (one to an item). The punished and safe ("safe" is used to refer to "anxiety reduction" and/or no clear reinforcement) responses occurred on all the items. Since a correct item had to be chosen before the S could move to the next item, the correct responses each had to occur thirty times in the course of acquisition. On a chance basis the punished and safe responses also would occur thirty times during acquisition.

The Faces: The six line drawings, all front face portraits of men, were drawn with the intention of making them markedly different from each other in appearance (Appendix 2. contains reproductions of the six faces.). One and the same face was present on the right hand side of all programs. This face represented the person giving the reply in all cases. The five faces which appeared on the left hand side and which represented the person

making the attack statements appeared according to the following scheme. One face appeared on all twenty items of the single pretest program and only there. Two other faces appeared on all twenty acquisition programs and on the nongeneralization posttest program (the program on which stimuli were to be similar to acquisition). The last two faces appeared on the generalization posttest program (the program on which the stimuli were to be different than during acquisition). On programs where more than one face appeared on the left hand side, the faces appeared in random order.

Two different taped voices presented the verbal attack statements during acquisition. For any particular S, however, the same voice accompanied the same face throughout the sixty trials (i.e. on thirty trials). Furthermore, the correct reply on each of these thirty trials was always the same class of response. The variations in the programs allowed for the association of one voice with one face and one class of response on one program and with the other face and another class of response on another program.

The Reinforcements: During acquisition a reply given by S could be followed by reward (in terms of correctness), punishment, "anxiety reduction", or no clear reinforcement. Reward consisted of the program paper moving immediately to the next item. Punishment consisted of the program paper moving to a point just short

of the next item with the item responded to still in view. The distance the paper moved for a punished item was purposely similar in length to the correct item. In addition, a very loud horn noise was presented by means of a tape recorder at the instant that the paper stopped moving. The horn was located slightly behind and to the left of the S. The sound lasted four seconds. "Anxiety reduction" (Experimental S's only) consisted of the paper moving a very short distance and a green bar appearing in the window. The S's were instructed that the green bar meant the horn was turned off and would no longer sound on that item. The "no clear reinforcement" type of reinforcement (Control S's only) was identical to the "anxiety reduction" reinforcement in that the paper moved a short distance and punishment could no longer occur. However, no green bar appeared and no instructions were given to indicate that the horn could no longer sound on that item.

The Conditions of Posttesting: The stress condition of posttesting consisted of the presentation of the loud raucous sound while S responded to the posttest program. The sound lasted four seconds and was presented at irregular intervals. The length of the intervals between the onset of the horn were in order of occurrence, 10, 15, 20, 30, 10, 90, and 10 seconds respectively. The nonstress condition of posttesting consisted simply of the absence of the horn while the S responded to the posttest program.

The generalization condition of posttesting consisted

of the presence of two new line drawings of faces on the left hand side of the posttest program. In the nongeneralization condition, the same faces which had appeared on the left hand side of the acquisition program appeared also on the posttest program.

Subjects: The S's were 80 male students enrolled in the elementary psychology courses at Western Michigan University. All S's volunteered to participate in the research by signing sheets passed out in their classes.

Procedure

At the beginning of the pretesting phase, the S was seated at the teaching machine and was given the following instructions.

"When I turn on the machine, the drawings of two faces will come into view in this window (E pointed to large center window in the machine). One of the drawings will be accompanied by a statement, the other face will have an empty balloon next to it. Your task is to write on the answer paper a reply that might be given by the second person. After you have written in your reply you push any one of these buttons and the machine will move you on to the next set of drawings. Write in a reply on each of the items.

When the S completed the twenty items he was asked to move back from the machine and the pretest program and accompanying answer paper were removed from the machine. The E then classified each of the S's replies into one of the five classes of responses, giving half scores when two different classes of response were represented in a single reply. The class of response occurring

most often was then designated as the modal response and an acquisition program with that class of response eliminated was placed in the machine.

Each S was then assigned either to the experimental or control group in an alternating order. The instructions given to the experimental group were as follows (The parts in quotes in parentheses represent the modifications of the instructions as given to the control group). The first item was already in the window when the instructions were given.

As you can see, this time three possible replies to the first person's statements are already typed in the balloons next to the drawing of the second person. In a moment the statement typed in next to the first person will be presented to you by this tape recorder. You are to listen to the statement and then choose one of the replies "A", "B", or "C" next to the second face. Indicate your choice by writing the letter "A", "B", or "C" on the answer paper. Then you must read the words of the reply you have chosen aloud and push the lettered button that corresponds to the choice you have made. On each problem, only one of the replies will move you on to the next problem immediately. One of the other replies will ("sometimes") cause this loud horn to sound (the horn was sounded briefly). Another one of the replies will cause a green bar to appear in this window ("will move the machine ahead a short distance"). This green bar tells you that the loud horn is turned off until you get to the next problem (this last statement was not given to the control group). You must continue to choose replies by writing in the letter corresponding to the reply you have chosen, reading the words of your choice aloud, and pushing the lettered button which also corresponds to the reply you have made until you choose the reply that moves you on to the next problem. For example; if after you hear the voice on

the tape recorder, you choose reply "A" you would write the letter "A" on the answer paper, then read the words of reply "A" aloud and then push the "A" button. This choice could move you on to the next problem or it could cause the loud horn to sound or it could make the green bar appear in the window ("make the machine move ahead a short distance") which would tell you that the horn could not sound until you get the next problem (this was not said to the control group). If this reply did not move you on to the next problem you would then have to choose one of the other two replies, write in that letter on the answer paper, read the words of that reply aloud and push the button corresponding with that second choice etc.. There will be two different faces on the left hand side and two different voices on the tape recorder. The same voice will always accompany the same face.

When the sixty items of the acquisition program were completed, one of the two posttest programs was put in the machine and the S was given the same instructions as he had been given for the pretest program. For the S's in the stress groups the following statement was added to the instructions. "From time to time while you are working on these problems the horn will sound".

After the S finished the twenty items of the posttest program a short interview was held in which S was asked questions about the experiment. The essentials of the questions asked were as follows.

1. What was the experiment all about? Did you see any pattern to what moved the machine on to the next item? What were you trying to do in the middle part (acquisition)?
2. "The last twenty questions were just like the first twenty questions. Did you answer them in any special way?

3. There were two faces and two voices in the middle part. What if anything did this mean to you?

4. What was your reaction to the horn? What was your reaction when the machine moved ahead a little bit (control group S's only)? What was your reaction to the green bar?

Results

The study, as originally formulated, was mainly concerned with the effect of various types of reinforcements on the probability of occurrence of various classes of response during both an acquisition phase and a post-treatment test. In post-treatment testing, S's could be either stressed or non-stressed and presented with either stimuli similar to training or different from training (generalization test). In the present design, the following assumptions were involved in testing for these effects:

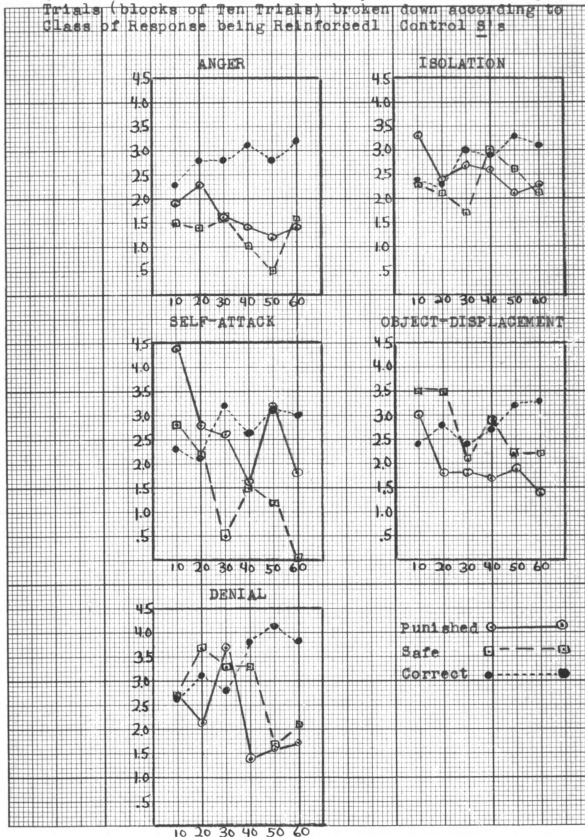
- 1) The five response classes are affected in much the same way by all treatments (e.g. all classes will show a reduction in response frequency when punished, if any one of them shows this effect).
- 2) Reinforcement effects will apply to all subjects alike, independent of the initial response tendency (modal response class) that S's have at the beginning of the experiment. (e.g. If punishment reduces response frequency for S's with one type of prepotent response (modal response class) it will reduce response frequency for

all s's).

It was found that these assumptions held only in a limited way and that the data had to be analyzed and interpreted accordingly. Thus the data pertaining to these assumptions are presented first so that the main analysis can proceed meaningfully. Let us first examine assumption #1 regarding reinforcement for the five different classes of response.

The relevant data regarding acquisition for correct responses as well as safe and punished responses are presented in Figures 4 through 13 and summarized in Table 3. Here frequency of responding is the mean number of times a response is used as the first response in each block of ten trials (each correct response can occur only five times in ten trials while safe and punished responses can occur a maximum of 10 times). During the sixty acquisition trials, frequency of responding increased for all classes of response when they were reinforced by being correct. The amount of increase differed however for the classes of response. Table 3 shows that the mean increase for denial responses exceeds that for any of the other classes of response when the experimental and control groups are considered separately or combined. This can be seen graphically by comparing the curves for the correct responses in Figures 8 and 13 with Figures 4 through 7 and 9 through 12. The difference is most evident between denial and self-attack where the mean

Figures 4,5,6,7 and 8. Acquisition Curves for Frequency of Punished, Safe and Correct Responses across Sixty Trials (blocks of Ten Trials) broken down according to Class of Response being Reinforced. Control S's



Figures 9,10,11,12 and 13. Acquisition Curves for Frequency of Punished, Safe and Correct Responses across Sixty Trials (blocks of Ten Trials) broken down according to Class of Response being reinforced; Experimental S's.

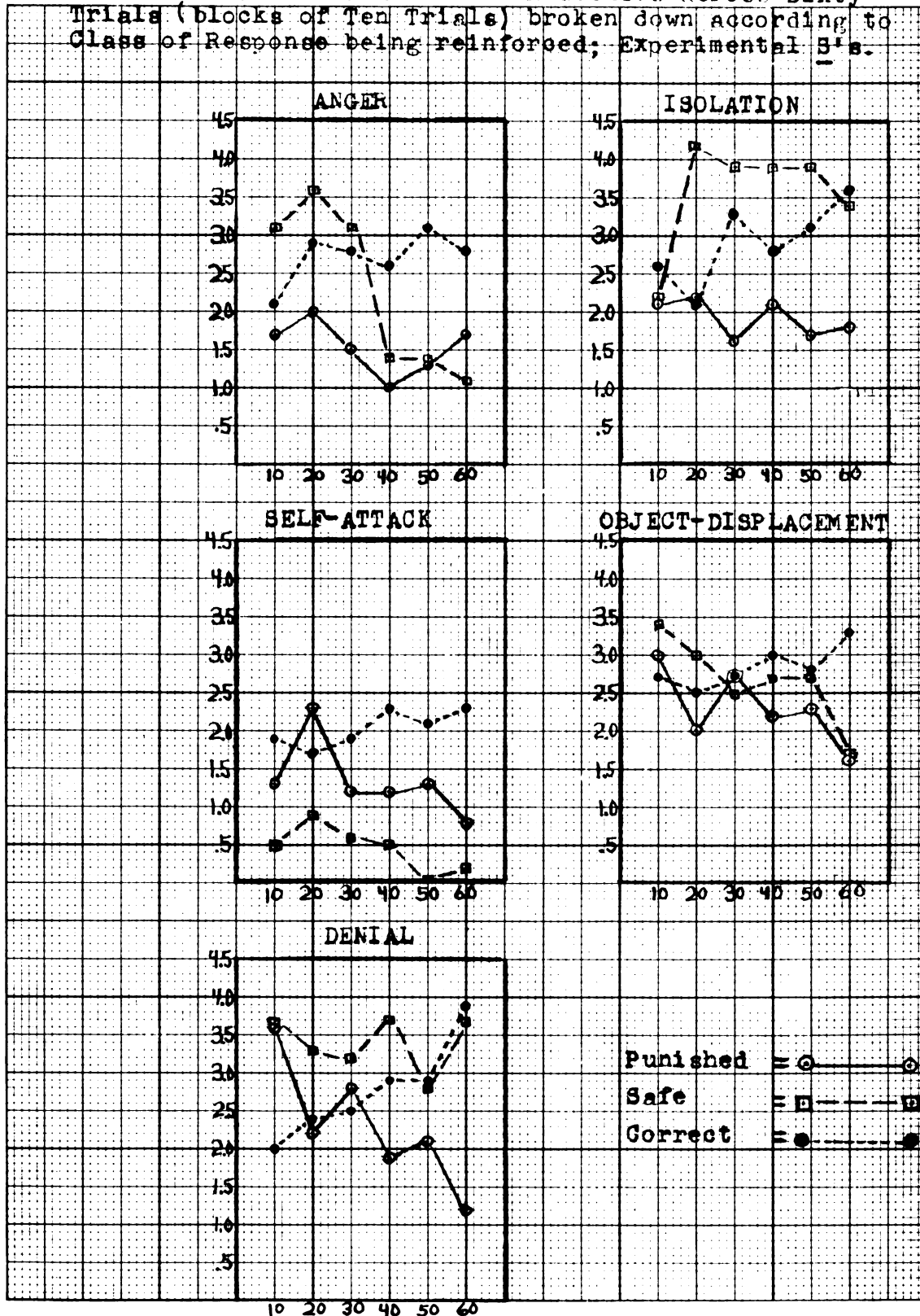


Table 3. Mean Frequency for each Class of Response chosen as the First Response during First Ten and Last Ten trials of Acquisition

Anger		Isolation				Self-attach				Object-displacement				Denial			
P	S	C	P	S	C	P	S	C	P	S	C	P	S	C	P	S	C
n	17	19	35	18	15	33	11	12	23	19	19	39	15	15	30		
1-10	1.8	2.1	2.2	2.6	2.3	2.4	3.5	1.9	2.1	3.0	3.5	2.5	3.2	3.1	2.2		
E & C	50-60	1.5	1.4	3.0	2.0	2.8	3.3	2.1	.2	2.6	1.5	1.9	3.3	1.5	2.7	3.8	
Diff.	-.3	-.7	.8	-.6	.5	.9	-1.4	1.7	.5	-1.5	-1.6	.8	-1.7	-.4	1.6		
n	6	7	22	11	8	12	6	8	11	9	11	19	8	6	16		
1-10	1.7	3.1	2.1	2.1	2.2	2.6	1.3	.5	1.9	3.0	3.4	2.7	3.6	3.7	2.0		
E	50-60	1.7	1.1	2.8	1.8	3.6	.8	.2	2.3	1.6	1.7	3.3	1.2	3.7	3.9		
Diff.	0.0	-2.0	.7	-.3	1.2	1.0	-.5	-.3	.4	-1.4	-1.7	.6	-2.4	0.0	1.9		
n	11	12	13	7	7	21	5	4	12	10	8	20	7	9	14		
1-10	1.9	1.5	2.3	3.3	2.3	2.4	4.4	2.8	2.3	3.0	3.5	2.4	2.7	2.7	2.4		
C	50-60	1.4	1.6	3.2	2.3	2.1..3.1	1.8	.0	3.0	1.4	2.2	3.3	1.7	2.1	3.8		
Diff.	-.5	.1	.9	-1.0	-.2	.7	-2.6	-2.8	.7	-1.6	-1.3	.9	-1.0	-.6	1.4		

increase for the denial responses is three times that of the self-attack response (combined experimental and control groups). Both classes of responses were occurring with almost equal frequency after ten trials (mean frequency after 10 trials for Self-attack 2.1; for Denial 2.2). For the last ten trials of acquisition, the Denial responses occurred a mean of 3.8 times (out of a possible five times) while the Self-attack responses occurred a mean of 2.6 times.

The differential effect of the reinforcements on the five classes of response is even more evident for punishment and safety, particularly when the experimental and control groups are considered separately. Figures 4 through 13 illustrate that the direction of change as well as the amount of change differed among the classes of responses. For the experimental group, the safe response dropped in frequency if it was an Anger type response, (mean decrease 2.0), increased if it was an Isolation response (mean increase 1.2), and stayed about the same if it was a denial response (mean change 0.0). For the punished responses in the experimental group; Anger, Isolation and Self-attack responses showed little change over the sixty trials (mean changes respectively -0.0, -.3, and -.5) while Object-displacement and Denial decreased (mean changes -1.4 and -2.4 respectively).

For the control group, Anger and Isolation responses changed little over the sixty trials (mean changes -1.4

and -2.4 respectively).

For the control group, Anger and Isolation responses changed little over the sixty trials (mean change -1.1 for Anger and -.2 for Isolation). Self-attack on the other hand decreased a mean of 2.8 responses and Object-displacement decreased 1.3 responses per ten trials.

The significance of the differences in the various comparisons above is hard to assess because the groups are small and the n's vary. Furthermore, the data do not reflect differences due to particular combinations of the classes of response (e.g. when Anger is correct, does it increase more if Isolation was the accompanying punished response as opposed to Self-attack etc.?). The comparisons for the data on acquisition do suggest however that assumption #1 cannot be accepted without qualification.

An analysis of the pre to post treatment changes likewise challenge assumption #1. A 2x2x2x5 analysis of variance was used to compare the changes pre to post for the five classes of responses. The experimental and control groups and the four post testing conditions were included in the assessment of the possible differential effects the experimental conditions had on the five classes of response. This analysis is presented in Table 4. Table 5 presents the mean changes in frequencies pre to post for the five classes of response broken down by type of reinforcement.

Table 4. Summary of Analysis of Variance for
Class of Response X Stress X Generalization X
Membership in Experimental or Control Group

Source	SS	df	MS	F
Classes of Response	1571.66	3	523.89	12.63**
Generalization X Class of Response	45.71	3	15.24	1
Stress X Class of Response	396.00	3	132.00	3.18*
Group (E&C) X Class of Response	382.22	3	127.41	3.07*
Class of Response X Subjects within Groups	8957.10	216	41.47	

* = $\leq .05$

** = $\leq .01$

The analysis of variance suggests that across both groups and all posttesting conditions, the five classes of responses were not similarly affected by the experimental conditions (main effect of response class is significant at the .01 level). Anger and Denial responses showed an increase across both groups and all conditions while Isolation, Self-attack, and Object-displacement responses showed little change. Table 5. suggests that these differences vary with the various reinforcements.

One possible explanation for these differences is that Anger and Denial were differentially associated with correct reinforcement during acquisition. Table 6. presents the percentage with which each class of response was associated with each type of reinforcement during

Table 5. Mean Change Pre to Post for Classes of Response
X Type of Reinforcement for Experimental and Control Groups

	Anger		Isolation		Self-attack		Object- displacement		Denial						
n		5		9		15		1		10					
	P	S	C	P	S	C	P	S	C	P	S	C			
E	.40	-1.00	4.90	-2.89	-1.22	8.33	-2.07	.07	4.23	4.0	-9.00	8.50	-1.90	-3.00	4.15
n		4		5		19		2		10					
	P	S	C	P	S	C	P	S	C	P	S	C	P	S	C
C	6.0	-.50	2.50	.20	1.40	3.50	.68	.84	2.87	-3.50	-5.50	7.75	-1.40	.70	2.10

33

acquisition. Although the percentages are not identical across class of response, they are nearly so; and above all, the deviations do not correspond to the direction of the differences in the means in the analysis of variance. The differences between the means are therefore not a reflection of the various responses having been unequally associated with the various reinforcements during acquisition.

Table 6. Percent of Times Each Class of Response was Associated with each Type of Reinforcement Across all Experimental Conditions and Experimental and Control Groups.

	Anger	Isolation	Self-attack	Object- displacement	Denial
P	24	27	24	25	25
C	49	50	50	50	50
S	27	23	26	25	25

Membership in the experimental and control group and the stress conditions during posttesting also influenced the differences found between the classes of responses (Groups X Class of response is significant at the .05 level; Stress X class of response is also significant at the .05 level). The meaning of these significant interactions is not entirely clear because the different classes of responses were associated with the different reinforcements disproportionately. Table 7. presents the percentage with which each class of response was associated with each of the reinforcements during acquisition for the experimental and control groups for the stress conditions.

Table 7. Percent of Times each Class of Response was Associated with each Reinforcement for Experimental and Control Groups & for Stress and Nonstress s's.

	Anger			Isolation			Self-attack			Object displacement			Denial		
	P	S	C	P	S	C	P	S	C	P	S	C	P	S	C
E	17	20	63	36	26	39	24	32	44	23	28	49	27	20	53
C	31	33	36	20	20	60	24	19	57	26	21	53	23	30	47
S	20	17	63	29	29	42	17	38	46	21	26	53	38	19	44
NS	28	36	36	26	17	57	32	14	55	28	23	49	11	32	57

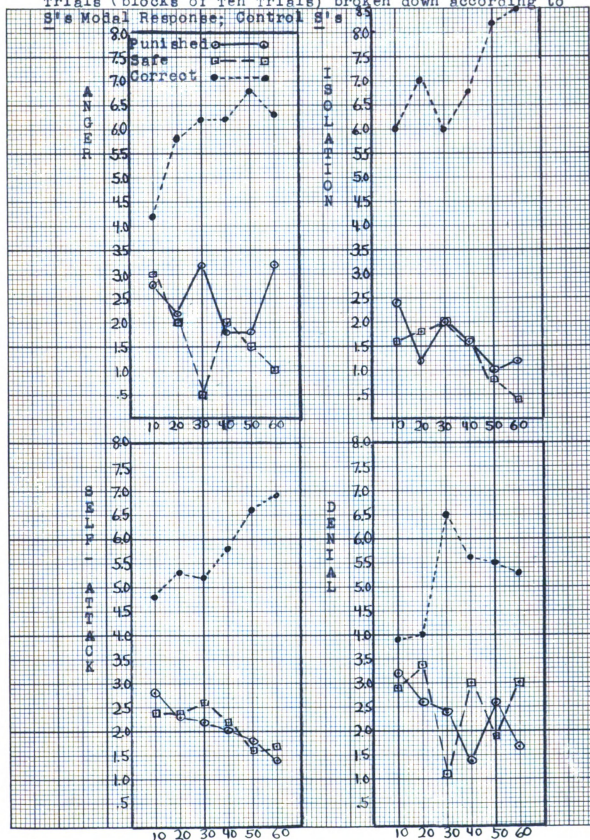
Ideally each class of response should be associated with punishment and safety 25% of the time and with correct 50% of the time. The Object-displacement response is the only response that comes close to this ideal in either group.

Even though the meaning of the above significant interactions (Group X Class of response and Stress X Class of response) are unclear, the weight of the evidence during acquisition and pre to posttesting suggest very strongly that assumption #1 is untenable.

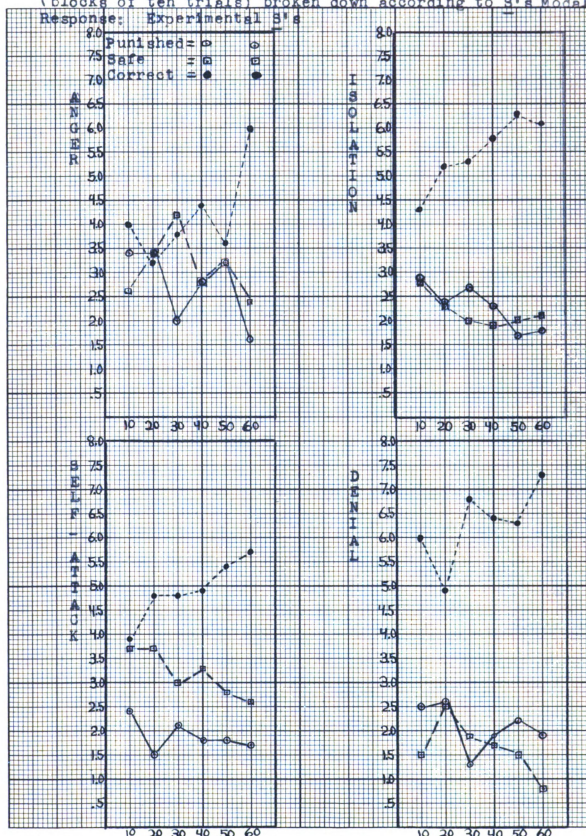
The second assumption was that reinforcement effects would apply to all S's alike, independent of the initial response tendency (modal response class). Figures 14 through 21 show the learning curves for the experimental and control groups in terms of the S's modal response (S's giving Anger responses as their most frequent response during pretesting make up the group used for the learning curves under Anger, etc.). No curves have been drawn for the Object-displacement group since only 3 S's gave this response as their most frequent response during pretesting.

S's in the control group with Isolation or Self-attack as their modal response (Figures 15 and 16) show a greater consistency in the relative frequency of the punished and safe responses across the sixty trials. The Anger and Denial S's in the control group (Figures 14 and 17 in particular show a greater tendency for punished and safe responses to be very close together in frequency

Figures 14, 15, 16 and 17. Acquisition Curves for Frequency of Punished, Safe and Correct Responses across Sixty Trials (blocks of Ten Trials) broken down according to S's Modal Response; Control S's



Figures 18, 19, 20 and 21. Acquisition Curves for Frequency of Punished, Safe and Correct Responses Across Sixty Trials (blocks of ten trials) broken down according to S's Model



at one point in acquisition while very far apart at another point.

In the experimental group, the curves for the punished and safe responses also tend to be smoother in the Isolation and Self-attack groups than in the Anger and Denial groups (Figures 19 and 20 vs. Figures 18 and 21). Here, however, the Self-attack S's (Figure 20) can be distinguished from the other three groups because they show a consistent difference in the frequency of the punished and safe responses across the sixty trials. The safe response is a minimum of .9 responses above the punished response at all times.

Even the correct responses which show a rise in all groups show some differences across modal response groups. In the experimental group, the S's who gave Anger as their modal response (Figure 18) were still not giving the correct response as their most frequent response after thirty trials. In all other groups, by ten trials, the correct response was the most frequent response. S's giving Denial as their modal response also evidence some difference in the frequency with which they gave correct responses across the sixty trials. In the control group in particular (Figure 17) the Denial S's showed a tendency to decrease the frequency with which they gave correct responses after the first thirty trials of acquisition.

Table 8. presents the mean frequency for punished, safe and correct responses for the first ten and last ten

Table 8. Mean Frequency with which S's with a Given Modal Response gave Punished, Safe or Correct Responses for First Ten Trials and Last Ten Trials of Acquisition.

		Anger				Isolation				Self-attack				Object- displacement				Denial			
		9		14		34		0		20											
E & C	n	P	S	C	P	S	C	P	S	C	P	S	C	P	S	C	P	S	C		
	1-10	3.1	2.8	4.1	2.7	2.4	4.9	2.6	2.9	4.4				2.8	2.2	4.8					
	50-60	2.3	1.8	5.9	1.6	1.5	6.9	1.5	2.1	6.4	only			1.8	1.9	6.3					
	Diff.	-.8	-1.0	1.8	-1.1	-.9	2.0	-1.1	-.8	2.0	three			-1.0	-.3	1.5					
E	n	5	9	15	10																
	1-10	3.4	2.6	4.0	2.9	2.8	4.3	2.4	3.7	3.9	<u>S's</u>		2.5	1.5	6.0						
	50-60	1.6	2.4	6.0	1.8	2.1	6.1	1.7	2.6	5.7			1.9	.8	7.3						
	Diff.	-1.8	-.2	2.0	-1.1	-.7	1.8	-.7	-1.1	1.8	For		-.6	-.7	1.3						
C	n	4	5	19	10																
	1-10	2.8	3.0	4.2	2.4	1.6	6.0	2.8	2.4	4.8	Combined		3.2	2.9	3.9						
	50-60	3.2	1.0	5.8	1.2	.4	8.4	1.4	1.7	6.9	Groups		1.7	3.0	5.3						
	Diff.	.4	-2.0	1.6	-1.2	-1.2	2.4	-1.4	-.7	2.1			-1.5	.1	1.4						

trials of acquisition, grouped according to the S's modal response. Data are presented for the experimental and control groups separately and combined. Again the data on S's giving Object-displacement as their modal response are excluded because there were only three such subjects.

The greatest drop in punished responses from the first ten to the last ten trials of learning was found in the experimental group for S's with Anger as their modal response. "Anger" S's in the control group, on the other hand, were the only S's who showed an increase in punished responses from the first to the last ten trials. The other three modal response groups (Isolation, Self-attack and Denial) showed a greater drop in frequency in the control group. For the safe responses, the two Anger groups again stand out. The Anger control S's showed the greatest drop in frequency of the safe responses among the control groups, while the Anger experimental S's showed the least drop in frequency among the experimental groups.

The above data on acquisition seem to suggest very strongly that it can not be assumed that S's with differing modal responses react similarly to the reinforcements. Assumption #2 is therefore very much in question.

The changes from pre to post testing further suggest that assumption #2 is questionable. Table 9. presents the mean changes from pre to post testing for the S's grouped according to class of modal response and type of

reinforcement.

Table 2. Mean Change Pre to Post for Punished, Safe and Correct Responses according to Modal Responses of S.

Modal Response Group					
	Anger	Isolation	Self-attack	Object- displacement	Denial
n	9	14	34		20
P	2.89	-1.79	-.53		-1.65
E & S	-.78	-.28	.44		-1.15
C	3.83	6.60	3.47		3.12
n	5	9	15		10
P	.40	-2.89	-2.07		-1.90
E S	-1.00	-1.22	-.07		-3.00
C	4.90	8.33	4.23		4.15
n	4	5	19		10
P	6.00	.20	.68		-1.40
C S	-.50	1.40	.84		.70
C	2.50	3.50	2.87		2.10

For the combined experimental and control groups, the frequency for punished responses in the Anger group increased a mean of 2.89 responses from pre to post testing. The frequencies for the other three groups decreased (Isolation -1.79; Self-attack -.53; Denial -1.65). Likewise when the experimental and control groups are considered separately the mean increase in frequency of the punished response for the Anger group always exceeded that for the other modal response groups. Six of

the nine S's who gave Anger as their modal response showed an increase of three or more punished responses from pre to post testing. Only twelve of the other 71 subjects showed such an increase. It seems reasonable to conclude that subjects who gave Anger as their modal response did not react to punishment in the same way as S's who gave Isolation, Self-attack or Denial responses as their modal response.

S's giving Isolation as their modal response showed a greater increase in the frequency of correct responses from pre to post than any of the other modal response groups. This is true considering the experimental and control groups separately or combined. The consistencies in the above findings suggest that some real differences are present between the Isolation and Denial groups. The pre to post testing data also suggest then that the second assumption cannot be held with any confidence.

In summary, both assumption #1 and assumption #2 appear to be seriously challenged by the data on acquisition as well as the pre to post testing data. It seems therefore that in considering the effects of a reinforcement, both the class of response being reinforced and the type of subject (in terms of his class of modal response) may make a difference. Thus comparisons between the experimental and control groups and between S's under the various conditions of post testing (e.g. stress vs. non-stress) as well as for acquisition are interpretable only

where all classes of responses have been associated with a particular reinforcement for approximately an equal number of times for all groups. Such conditions hold only for the comparisons between the reinforcement conditions across both groups (experimental and control) and across all post testing conditions (stress-nonstress and generalization-nongeneralization). In other words the only unbiased comparison between reinforcements is achieved when you sum across all experimental conditions.

Table 10 presents the means for the three types of reinforcements across both experimental and control groups and across all post testing conditions for the total sample of 80 S's. This table also presents the F ratio for these means together with the Newman-Keuls Procedure for testing the significance of the difference between all ordered pairs of means.

The means and the Newman-Keuls Procedure indicate that the significant F was due to an increase in the frequency of the correct response from pre to post. The punished and safe responses showed an almost identical decrease in frequency. Since this analysis includes both experimental and control groups and all conditions of post testing, the only reasonable interpretation would seem to be that associating a response with reinforcement by being correct can increase its frequency from pre to post testing.

To assess the effects of type of reinforcement,

Table 10. F Test and Newman-Keuls Procedure for the Mean Changes pre to post for Responses Associated with Three Types of Reinforcements.

Type of Reinforcement	Mean Change
-----------------------	-------------

n = 80

Punished	- .66
Safe	- .49
Correct	3.79
Correct *	4.62

* Based on 2 different correct responses during acquisition

Source	SS	df	MS	F
Reinforcements	1858.11	3	619.37	15.37(p<.01)
Reinforcements X S's within Groups	8705.07	216	40.30	

Newman-Keuls Procedure

	Punished	Safe	Correct a	Correct b
Ordered totals	987	1001	1343	1410
Punished		14	356 **	423 **
Safe			342 **	409 **
Correct a				67
		2	3	4
q.99(r,216)		3.64	4.12	4.40
q.99(r,216) $\sqrt{nMS \text{ error}}$	207	234	250	

** = p < .01

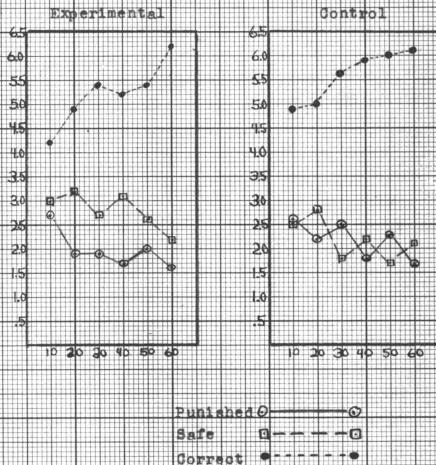
membership in the experimental or control group, and post treatment conditions, a system of extracting matched pairs from the total sample population was devised to eliminate the biases discussed above. The data on acquisition are dealt with first, then the data on changes from pre to post testing.

From the forty subjects in the control group, twenty-eight S's could be found, each of whom matched a S in the experimental group in terms of the class of response chosen as the modal response and in terms of the treatment program received during acquisition. This means that during acquisition all four classes of responses were associated with the same reinforcement. If Self-attack was punished for a S in the control group then Self-attack was punished for the matching subject in the experimental group etc..

Figure 22. presents the acquisition curves for the various types of reinforcements broken down according to membership in the experimental or control group. The data are presented in terms of the number of times a response associated with a particular reinforcement was given in a block of ten trials (only the first response given to a particular item was considered).

These results in Figure 22. show a definite rise in the mean number of correct responses in both groups with the mean of the control group above the experimental group in all points in acquisition up to the last ten

Figure 22. Acquisition Curves for Twenty-eight Matched S's across Sixty Trials (Blocks of Ten) for Experimental and Control Groups



trials. A drop in the mean number of punished and safe responses for both groups is also indicated. The mean number of safe responses is higher in the experimental group than in the control group at all times during acquisition, while the mean number of punished responses is lower in the experimental group for all points in acquisition beyond the first ten trials. Within the experimental group, but not the control, the mean number of safe responses is always considerably above the mean for the punished responses. In the control group the punished and safe responses alternate at being higher across the sixty trials and for all sixty trials occurred exactly the same number of times.

In general, these results point toward a relatively clear differentiation between the responses associated with being correct and those associated with the other reinforcement, for both groups. Furthermore, there seems to be a differentiation between the safe and punished responses within the experimental group but no such differentiation within the control group. These results will be dealt with further after the data on the changes from pre to post testing for matched pairs have been presented.

For the pre to post testing comparisons the matched pairs were drawn as follows (the stress factor is used here as an example). A S was selected from the stress post testing condition. Then from a group of S's comparable on all factors except stress, a S was selected

whose modal response was the same as the first S, and who had the same treatment program (for these two S's, all experimental conditions were identical except for the presence of the stress during posttesting for one of them). This Process of selection continued until each S that could be matched, was matched. This set of matched pairs then constituted the group used for the assessment of the effects of stress on the types of reinforcement. For each of the other comparisons a new set of matched pairs was drawn (e.g. generalization vs. nongeneralization). This procedure lead to some S's being used in several comparisons while other S's were not used in any comparisons. Thus a single analysis that compared all groups on the various factors could not be made; and the hazards of doing multiple t tests has to be considered in the final assessment of the results.

The data on the changes in the frequency of the modal responses from pre to post testing, under the various post testing conditions will be dealt with first. Three sets of matched pairs were drawn from the sample population. One set had S's matched on all experimental conditions and class of modal response, with the only difference being membership in the experimental or control group. Thirty-four S's making seventeen matched pairs constituted this set. A second set of sixteen matched pairs were matched as above on everything except having the generalization program during post testing. A third

set (eighteen matched pairs) was matched on everything except stress non-stress during post testing. Table 11 presents the results of the comparisons for these groups.

Table 11. Mean Pre to Post Change in Frequency of Modal Response X Membership in Experimental and Control Groups, Stress-Nonstress Conditions and Generalization-Nongeneralization Conditions.

	n	S	n	NS	t	
E & C Combined	18	-3.83	18	-9.00	2.14	<.025
Within E	9	-0.33	9	-7.23	1.92	<.05
Within C	9	-7.33	9	-10.78	1.28	<.20
	n	G	n	NG	t	
E & C Combined	16	-4.25	16	-9.88	2.23	<.025
Within E	7	-1.86	7	-10.43	2.33	<.025
Within C	9	-6.11	9	-9.44	.95	<.20
	n	E	n	C	t	
Across S-NS & G-NG	17	-3.64	17	-6.94	1.38	<.10
S	9	-2.67	9	-4.00	.36	
NS	8	-3.50	8	-10.25	1.59	<.10
G	10	-3.20	10	-5.80	.62	
NG	7	-2.86	7	-8.57	1.59	<.10

For all groups and for almost all individual S's the modal response dropped in frequency of occurrence from pre to post testing. Relative to pretesting, the stress and generalization groups gave significantly more modal responses in post testing than did the nonstress and

nongeneralization groups (stress > nonstress $p < .025$ for combined Experimental and Control; generalization > nongeneralization for combined Experimental and Control $p < .025$). Since all other responses besides the modal responses showed some increase from pre to post testing when all types of reinforcements are considered, it seems quite clear that the addition of stress and or generalization led to the return to the response the person used most frequently when first entering the experiment. When the experimental and control groups were considered separately the differences were significant only within the experimental group (stress > nonstress $p < .05$ and generalization > nongeneralization $p < .05$). Furthermore, the trend throughout all comparisons was for the experimental group to give more modal responses (relative to pretesting) than the control group. Table 11. shows that the modal response occurred more often in all the experimental groups than in the comparable control groups. The significance levels are low (.10 and .30) but the trend is consistent and in line with the findings that only in the experimental group were significant differences found between the stress-nonstress groups and the generalization-nongeneralization groups. Membership in the experimental as opposed to the control group seems to lead to a greater use of the modal response and to a greater differentiation in the rate of its occurrence under the various post-testing conditions.

The three sets of matched S's used to assess the changes from pre to post for the modal response were also used to assess the effects of the three reinforcements. Table 12. Presents comparisons between the mean changes in frequency pre to post for the stress and nonstress groups and for the generalization and nongeneralization groups. In each comparison, the experimental and control S's are considered separately and combined. Table 13. presents comparisons between the mean changes in frequency pre to post for the experimental and control groups across all conditions of post testing and stress, nonstress, generalization and nongeneralization conditions separately.

In Table 13. the punished response is the only type of response where any differences appear between the experimental and control group. Across all posttesting conditions and for each condition considered separately, the control group gave more punished responses than did the experimental group. This trend reaches a significant difference only in the nonstress and nongeneralization conditions. As presented in Table 12. the punished response occurred more frequently under the nonstress and nongeneralization conditions for experimental and control S's alike. None of the differences were statistically significant at the .05 level. If differences do exist, however, they would seem to be present in the control S's (the t tests for the control S's yielded p values that were at or close to the .10 level while for the

Table 12. Mean Pre to Post Changes for Punished, Safe and Correct Responses X Post Test Conditions for Experimental and Control Groups separately and combined.

		n	S	n	NS	t	sig.
E & C	P	18	-1.50	18	-.22	.99	
Combined	S	18	.06	18	-.78	.45	
Across G & NG	C	18	3.44	18	5.00	1.68	<.10
			S		NS		
Within E only	P	9	-1.89	9	-1.78	.06	
Across G & NG (E)	S	9	-3.22	9	-1.67	.78	
	C	9	2.67	9	5.39	1.12	
			S		NS		
Within C only	P	9	-1.22	9	1.44	1.52	<.10
Across G & NG (C)	S	9	3.33	9	0.11	3.74	<.005
	C	9	2.22	9	4.61	1.22	
			G		NG		
E & C Combined	P	16	-.75	16	.75	1.03	
Across S & NS	S	16	-.75	16	-1.62	.69	
	C	16	2.88	16	5.38	1.60	<.10
			G		NG		
Within E only	P	7	-2.57	7	-1.29	.54	
Across S & NS (E)	S	7	-2.00	7	-.86	.68	
	C	7	3.21	7	6.28	1.20	
			G		NG		
Within C only	P	9	.67	9	2.33	1.06	
Across S & NS (C)	S	9	.22	9	-2.22	1.34	<.10
	C	9	2.61	9	4.67	1.01	

Table 13. Mean Pre to Post Changes for Punished, Safe and Correct Responses X Membership in Experimental and Control Group for Stress, Nonstress, Generalization and Nongeneralization Combined and Separately.

		Mean		Mean			
		n	E	n	C	t	
Across	P	17	-2.30	17	1.29	2.80	<.01
S-NS &	S	17	0.00	17	-1.00	.84	
G-NG	C	17	2.79	17	2.94	.15	
		E		C			
S	P	9	-1.00	9	.56	1.09	
Across	S	9	-1.33	9	-.89	.24	
G-NG	C	9	2.50	9	2.17	.20	
		E		C			
NS	P	8	-3.75	8	2.12	2.76	<.01
Across	S	8	1.50	8	-1.12	.92	
G-NG	C	8	3.12	8	3.87	.26	
		E		C			
G	P	7	-.86	7	2.28	1.64	<.10
Across	S	7	0.00	7	-1.00	.44	
S-NS	C	7	2.14	7	3.64	.82	
		E		C			
NG	P	10	-3.30	10	.60	2.32	<.025
Across	S	10	0.00	10	-1.00	.41	
S-NS	C	10	3.25	10	2.50	.31	

experimental S's they were at the .30 level or greater).

The effects of the posttesting conditions on the frequency of the punished response were directly opposite to the effects of the posttesting conditions on the modal response. While the modal responses were more frequent under stress and generalization than under nonstress and nongeneralization, the punished responses were more frequent under nonstress and nongeneralization than under stress and generalization.

From Table 12. it can be seen that the correct response like the punished response and opposite to the modal response was given more frequently in the nonstress and nongeneralization conditions for both experimental and control S's. The experimental and control S's show approximately equal differences in favor of the nonstress and nongeneralization conditions. For the combined experimental and control groups these differences approach the .05 level. Table 13. shows no hint of a difference between the experimental and control groups for any of the posttesting conditions.

The safe response (Table 12.) for the experimental S's was more frequent in the nonstress and nongeneralization conditions. For the control S's on the other hand, the safe response was more frequent under the stress and generalization conditions (stress > nonstress $p < .005$; generalization > nongeneralization $p < .10$).

Briefly, the modal response was given more frequently

(relative to pretesting) under the stress and generalization conditions than under the nonstress and nongeneralization conditions for both experimental and control S's. The control S's gave the safe response more often under stress and generalization than under nonstress and nongeneralization. The experimental S's gave the safe response more often under nonstress and nongeneralization. Both the experimental and control S's gave the punished and correct responses more often under nonstress and nongeneralization.

In all of the above comparisons the S's were matched in such a way that each class of response was associated with the same type of reinforcement for each pair of matched S's. This eliminated one bias. The conditions of posttesting or membership in the experimental or control groups still bias the findings by differentially affecting the classes of response. Evidence for these biases are shown in Table 14, which presents the mean changes from pre to post for the five classes of response (stress vs. nonstress, generalization vs. nongeneralization and experimental vs. control). Each of the significant differences in this table will be discussed in terms of the bias it may have introduced with respect to the reinforcement effects.

For the stress-nonstress comparison, the Object-displacement response occurred more frequently (relative to pretesting) under the nonstress condition ($p < .005$ level).

Table 14. Mean Pre to Post Changes in Frequency of Responses representing the Five Classes of Response X Posttesting Conditions and Membership in Experimental and Control Groups.

		n	S	n	NS	t	
E & C Groups Combined	A	18	1.28	18	3.06	.82	
	I	15	-2.13	15	-.40	.85	
	S	8	2.12	8	2.88	.07	
	O	18	-2.11	18	2.33	3.05	<.005
	D	13	6.85	13	3.69	.60	
		n	G	n	NG	t	
E & C Groups Combined	A	15	2.67	15	4.27	.77	
	I	14	.07	14	.57	.06	
	S	5	-3.20	5	-2.20	.47	
	O	16	.00	16	.06	.03	
	D	14	2.71	14	6.50	1.55	<.10
		n	E	n	C		
	A	16	1.50	16	1.69	.10	
	I	15	-3.13	15	0.00	1.61	<.10
	S	8	1.62	8	1.25	.10	
	O	17	-2.65	17	2.06	2.83	<.005
	D	12	7.50	12	2.83	2.03	<.05

In considering the effects of the reinforcements above, the safe response for the control S's was found to occur significantly more often under the stress condition of posttesting than under the nonstress condition. Since this difference is opposite to the effect of stress on the Object-displacement response it seems reasonable to conclude that the difference for the safe response was not due to the effect of stress on the Object-displacement response.

In Table 12. the control S's gave the punished response more often under the nonstress condition (.10 level). When the two S's who had Object-displacement as their punished response were eliminated from the comparison, the mean change for the stress group was $-.14$ and for the nonstress group $.57$. The difference between these adjusted means was not significant ($p > .10$). Thus the difference in the frequency between the punished response under stress as opposed to nonstress conditions for the control group may be due to the effect of stress on the Object-displacement class of response.

Also in Table 12. the correct response for the combined experimental and control groups occurred more frequently under the nonstress than the stress condition. When the eight S's who had Object-displacement as one of their correct responses were eliminated from the comparisons the adjusted mean increase in the number of correct responses for the stress group was 4.65 and for the

nonstress group 4.35. The difference between these adjusted means was not significant ($p > .10$) and the direction of the difference was opposite to that which occurred when the Object-displacement S's were included. It appears therefore that the difference between the frequency of the correct response under the stress and nonstress conditions may not be due to the effect of the stress condition on correct responses per se. This is further supported when the frequency of the Object-displacement response is compared under stress and nonstress conditions for S's who had the Object-displacement response reinforced by punishment and safety. The mean change in frequency pre to post for the combined punished and safe responses (only Object-displacement responses considered here) under stress was -2.90 and under nonstress 4.80. This difference is significant at the .005 level. No differences were found when all five classes of responses were considered together (Table 12. Stress vs. Nonstress for Experimental and Control S's combined).

For the generalization-nongeneralization comparison in Table 14, the Denial class of response showed a tendency to occur more often under nongeneralization ($p < .10$). When the seven S's who had Denial as one of their correct responses were excluded in this comparison the mean changes for nongeneralization was 3.17 and for generalization 3.00. It would seem that the tendency to give more correct responses under nongeneralization may be a tendency for

Denial responses to show a greater frequency under non-generalization conditions.

Also in Table 14. the mean change in frequency for the five classes of responses is given according to membership in the experimental and control group. Here the Isolation, Object-displacement and Denial responses all show some differences between the two groups. In Table 13. only the punished response showed a tendency to occur with different frequencies in the experimental and control groups. When all S's who had Isolation, Object-displacement or Denial as their punished response were excluded in the comparison between the experimental and control groups the punished response still occurred significantly more often in the control group (adjusted mean decrease for experimental group -3.50, adjusted decrease for the control group -1.00 $p < .05$). The tendency for a punished response to occur more often in the control group would not seem to be simply an effect of membership in the experimental or control group on a particular class of response.

Finally, the conditions of posttesting or membership in the experimental or control group could have had a differential effect on S's with differing modal responses. Since more than half of the S's chose either Self-attack or Denial as their modal response, the number of matched S's for the other three classes of responses was too small for any analysis. Table 15 presents the comparisons between

Table 15. Mean Pre to Post Change in Frequency of Punished, Safe and Correct Responses X Stress vs. Nonstress and X Experimental VS. Control for S's with either Self-attack or Denial as their Model Response.

		n	Stress	n	Nonstress	t	sig.
D E N I A L	P	5	.00	5	-2.40	.99	
	S	5	-1.20	5	-2.40	.41	
	C	5	.30	5	5.40	2.00	
			Stress		Nonstress		
S E T T I N G - C K	P	10	-2.30	10	.50	1.46	<.10
	S	10	.30	10	.30	-	
	C	10	1.95	10	4.70	1.19	
			Experimental		Control		
D E N I A L	P	5	-2.40	5	.60	.97	
	S	5	-2.60	5	-.40	1.21	
	C	5	1.30	5	.70	.27	
			Experimental		Control		
S E T T I N G - C K	P	9	-2.67	9	1.77	2.60	<.01
	S	9	.33	9	-1.34	.66	
	C	9	3.38	9	4.22	.35	

the stress and nonstress conditions of posttesting and the comparisons between experimental and control S's broken down according to the S's modal response. The data here are very meager and most comparisons would indicate that S's with differing modal responses were similarly affected by the posttesting conditions and membership in the experimental or control group. In the stress-nonstress comparison however, the S's who gave Denial as their modal response tended to give the punished response more under stress than nonstress while the Self-attack S's gave more punished responses under nonstress than stress.

In short, the procedure of matching S's eliminated some of the biases in the analysis of the effects of the reinforcements. This procedure did not eliminate any differential effects of the posttesting conditions and membership in the experimental or control group on the classes of response or on S's who gave differing modal responses. Table 14 and 15 have shown that these differential effects should not be discounted in further research.

Discussion

Two foci of this study were the responses that S gave most frequently (modal response) during the pretesting phase of the experiment and the responses associated with the various types of reinforcement. Since two of the assumptions underlying the experimental design were challenged by the results of the study, the implications of

these results will be discussed first.

Challenging the assumptions: It was tentatively assumed that S's who differed from each other in the class of response given most frequently during pretesting would not differ greatly from each other in their response to the various reinforcements (e.g. Punishment would have approximately the same effect for all S's regardless of modal response). The results for both acquisition and pre to post comparisons contradict this assumption. In particular, S's who gave Anger responses most frequently during pretesting seemed to react differently to punishment than did other S's. It seems that separating S's according to the class of response given most frequently during pretesting also separates them to some extent in terms of their reactions to certain reinforcements. Another possibility, although the effect is the same, is that S's with different modal responses reacted differently to the total experimental situation, and this affected their reactions to the individual reinforcements.

If S's with different modal responses differ in their reactions to the various reinforcements, then any attempt to change the frequency with which S gives a particular response must take into account this individual difference variable. Attempts to modify the frequency of a response on the basis of a learning paradigm which predicts in most cases but not in each individual case would seem to be relatively inefficient. If the response to punishment of

the S's giving Anger as their modal response is any indication, the results could be directly opposite to the general prediction.

Thus future research in this area could do well to emphasize the role of individual differences. The classes of response (Anger, Isolation, etc.) used in this study seem to have merit as a means of identifying individual differences that are relevant for predicting response to various reinforcements. There are, however, probably many other response measures which might be as useful, if not more useful (GSR, diversity vs. stereotypy in responding under stress etc.).

It was also assumed that reinforcing one class of response would produce the same sort of effect as for any other class (i.e. when Anger responses were punished they would show a frequency change in the same direction and of the same approximate magnitude as Isolation responses etc.). It seems more likely that this assumption is incorrect than correct. In figures 6 through 16, it was shown that responses associated with "anxiety reduction" dropped in frequency over the sixty acquisition trials if they were Anger responses, increased if they were Isolation responses, and showed little change if they were Denial responses. As was the case with differences in modal response, attempts to alter the frequency of a particular response simply on the basis of a learning paradigm which predicts for most classes of response, seems to be inefficient.

Presumably, future research should focus on a detailed description of the responses under study. After the fact, it seems reasonable that describing a response simply as a "verbal response" is an insufficient description in a learning context. Replying with "Charity begins at home" to the attack statement "You think only of yourself" is evidently psychologically quite different from replying with "Thinking of you gives me a headache.". The classes of response used in this study seem to show some merit for establishing a meaningful response division, at least for handling replies to attack statements.

In brief, if principles evolved from human and animal learning are to be applied to the broad fields of personality and psychotherapy, then a great deal of attention will need to be directed to the description of individual differences as well as to what constitutes a psychologically meaningful response unit in a particular situation. This study, however, was concerned primarily with the effect of reinforcements on "interpersonal behavior. While acknowledging that the results of the reinforcement treatments will have to be accepted with some reservation, we believe that certain statements concerning the effects of the reinforcements can be made.

The effects of the posttesting conditions on the reinforced responses in relation to the modal responses: One of the main questions posed at the outset of this study was as follows: Which of the reinforcement treatments,

if any, can modify a nonmodal response so that the effects of the posttesting conditions on the nonmodal response mimic the modal response? Reinforcement by "anxiety reduction" was posited as the most likely reinforcement to lead to this result. The no clear reinforcement type of reinforcement was designed to function as the major contrasting condition of reinforcement. No clear reinforcement differed from "anxiety reduction" reinforcement only in the fact that S's getting no clear reinforcement (the control S's) were not informed that punishment would no longer occur on a particular item once the response in question was made. On the other hand, the experimental S's (those with "anxiety reduction" as the "safe" response) were informed by the green bar on the program paper each time the aversive noise (punishment) was avoided. It was assumed that the experimental S's, by virtue of their knowledge that they had avoided punishment, would experience "anxiety reduction" while the control S's would not. The other reinforcement conditions, reward by correctness and punishment, were required for the definition of the critical reinforcement conditions and provided base line data for this kind of learning situation.

The reinforcement effects during acquisition: The key data on the matched pairs (Figure 22) suggest that there were at least three different types of reinforcements. Reward by correctness, punishment, and "anxiety reduction" (experimental S's) all led to acquisition

curves that were discernibly different from each other. No clear reinforcement (control S's) led to acquisition curves very similar to punishment. The data seem to support the contention that "anxiety reduction" as used in this study was a bona fide reinforcement which was different from the other three.

The differential effects of the posttesting conditions on the modal response and the reinforced responses: The effects of the posttesting conditions on the modal response were clear and in the direction anticipated in the design of the study. The addition of stress or stimulus change led to the use of the older stronger habit, the modal response (the frequency of the modal response was greater under stress and generalization than under nonstress and nongeneralization). The answer to the question of which, if any, reinforced response mimicked the modal response also seems clear. The responses followed by no clear reinforcement occurred more frequently under stress and generalization conditions than under nonstress and nongeneralization conditions. The correct, punished and "anxiety reduction" responses all tended to occur more frequently under the nonstress and nongeneralization conditions. The effects of the posttesting conditions on the correct and punished responses were as anticipated at the outset of the study. The effects of the posttesting conditions on the "anxiety reduction" responses were directly opposite to those anticipated. Even though the acquisition curves

for no clear reinforcement were very similar to the curves for punishment, the posttest data seem to indicate that no clear reinforcement led to a response that was affected by stress and generalization in a manner similar to the modal response, or in a manner different from the other reinforced response.

The return to the modal response: The experimental S's tended to give the modal response more frequently than the control S's under all posttesting conditions. It appears that "safe" response substituted in part for the modal response for the control S's and mimicked the modal response under stress and generalization conditions. The experimental S's clearly gave the modal responses more frequently under the stress and generalization conditions than under the nonstress and nongeneralization conditions (stress > nonstress $p < .05$; generalization > nongeneralization $p < .025$). The control S's on the other hand did not show the same clear differentiation in the frequency of the modal response in the stress vs. nonstress and generalization vs. nongeneralization comparisons (p for both comparisons $> .20$).

One tentative interpretation of these findings is that only the no clear reinforcement condition corresponded to the paradigm for avoidance learning and provided for the learning of a response which mimicked the modal response. A second, somewhat more speculative interpretation of the results is that the paradigm for avoidance

learning was actually fulfilled by both the no clear reinforcement condition and the "anxiety reduction" condition. Both types of reinforcements involved avoiding punishment though only the experimental S's were aware of the situation. The element of conscious awareness or the lack of it may then have led to the conditioning of two different avoidance responses. The avoidance response learned in the case of the control S's was the giving of the specific class of response reinforced by the no clear reinforcement condition during acquisition. The avoidance response learned in the case of the experimental S's was much more general or abstract; namely, the giving of a safe response rather than the giving of a specific "safe" response. Thus when the modal response was again available in the post-testing phase the experimental S's having learned a more general avoidance response, used the already safe modal response as a safe response.

The support for the second interpretation: The support for the interpretation that two different avoidance responses were learned comes from two sources; the data on the control S's in this study, and the report of the Eriksen and Kuethe study (1956).

Although the control S's gave the no clear reinforcement response more frequently under stress and generalization than under nonstress and nongeneralization, the mean number of no clear reinforcement responses accounted for less than thirty percent of the responses given by control

S's during posttesting under stress and generalization. This implies that the control S's could have used the modal response more frequently under stress and generalization than they did. The fact that the control S's did not give the modal response more frequently under stress and generalization suggests that the "anxiety reduction" reinforcement facilitated the use of the modal response among the experimental S's.

The Eriksen and Kuethé study (1956) also seems to lend support to the interpretation that two different avoidance responses were learned as a function of awareness. Some of Eriksen and Kuethé's S's were aware of the relationship between shock and the giving of particular words in their word association tasks while other S's were not aware of this contingency. The "aware" S's reported withholding associations and had longer reaction times than the "unaware" S's who did not report withholding associations. Yet both groups ("aware" and "unaware") avoided the shocked words. It seems reasonable to posit that these two groups of S's may have been learning two different kinds of avoidance response as a function of awareness. Awareness that an avoidance response is being made may alter the nature of the response given.

Some implications of two different kinds of avoidance response: Mednick (1958) in attempting to interpret some of the behavior patterns of schizophrenics in learning theory terms has posited that the behavior was learned

because of association with anxiety reduction. He made no distinction between avoidance responses learned by accidental association with anxiety reduction and those learned under conditions where the S was apparently more aware that his response led him away from an anxiety provoking topic or situation.

However, this distinction between the type of avoidance response learned may be an important distinction for conditioning types of psychotherapies to make. Because of the remoteness in meaning from the anxiety provoking stimulus, avoidance responses learned by accidental association with anxiety reduction might be amenable to symptomatic treatment without symptom substitution. On the other hand, avoidance responses "chosen" by a person to reduce anxiety are likely to be openly related to the anxiety provoking stimulus. In this case anxiety reduction is directly associated with the occurrence of this particular avoidance response. Thus eliminating the avoidance response could lead to symptom substitution. In addition, non-specific avoidance responses like "thinking away" from an anxiety provoking topic might be untouched by psychotherapy as the virtually infinite pool of ways to "think away" gets "diminished" during therapy.

A word about the artificial nature of this study seems in order before closing the discussion. This was a laboratory study and the data were not based on the real life situation they purport to study. The data, however, would

seem to be at least at the same level of relationship to "real life" as are data obtained from the TAT, story telling (Miller and Swanson, 1960), and many other techniques used to predict the situations outside the laboratory. Within this limitation it seems that this study has pointed to the following general findings.

1.) Individual differences between S's play an important role in predicting their response to various reinforcements. The scheme of categorizing S's according to the frequency with which they use the five classes of responses (Anger, Isolation, Self-attack, Object-displacement and Denial) would seem to have some merit in delineating relevant individual difference variables.

2.) The modification of the frequency with which different responses are given in a verbal attack setting should take into account the fact that different kinds of responses are affected differently by various reinforcements. The scheme of categorizing responses into the five classes of response used in this study seems to have some relevance for predicting the effects of various reinforcements on different kinds of responses.

3.) At least within the limits of this experiment, the frequency with which S's give nonmodal responses can be modified by associating the nonmodal responses with various reinforcements.

4.) The no clear reinforcement type of reinforcement appears to modify nonmodal responses in such a way that

the response occurs more often under stress and generalization than under nonstress and nongeneralization. This effect is similar to the effect of these conditions on the modal response and different from the effect of these conditions on the correct, punished and "anxiety reduction" responses.

5.) The presence of the "anxiety reduction" reinforcement as opposed to the no clear reinforcement during acquisition seems to lead to a greater return to the use of the modal response during posttesting, and to a greater differentiation in the frequency of the occurrence of the modal response under the various posttesting conditions.

Summary

The present study attempted to apply some of the principles of avoidance learning and verbal conditioning to the interpersonal situation where one person verbally attacks another person. An artificial interpersonal situation was used to increase experimental control. The study was primarily designed to explore the question as to whether anxiety reduction could function as a reinforcement in such a situation. Would following a verbal reply with anxiety reduction lead to a habit that would generalize to a stressful situation as well as generalize to a situation which differed from the original learning situation?

Eighty male undergraduate students enrolled in elementary psychology courses served as subjects. They were

subjected individually to a three phase experiment. For all three phases they were seated at a teaching machine and were presented with the experimental stimuli through a window in the machine. The first phase was an evaluation phase, the second an acquisition or learning phase and the third another evaluation phase.

During the two evaluation phases, the stimuli consisted of twenty verbal attack statements presented one at a time. The attack statements were printed in a cartoon-like balloon accompanying the line drawing of a human face. A second line drawing of a face was accompanied by a blank balloon representing the person responding to the attack. The S's composed and wrote replies to each of the twenty attack statements.

After the first evaluation phase, each of the responses was classified into one of five classes of response each representing a different way in which the responder expressed or failed to express anger in his reply. The class of response which occurred most often during this phase was labeled as the modal response and was excluded from the acquisition phase.

During the acquisition phase the four remaining classes of response (three of the four on each presentation) were printed in the balloons accompanying the face, representing the responder. Each response was followed by a type of reinforcement. For each S two of these classes of response were rewarded by being correct, one was punished, and one

led to the avoidance of punishment. Half of the S's were aware that giving one of the responses would lead to the avoidance of punishment (anxiety reduction or experimental group) the other half were not aware of this (no clear reinforcement or control group).

The third phase was identical to the first evaluation phase except half the S's were stressed during the evaluation, half were not, half had stimulus material similar to acquisition and half had new stimulus material (four groups).

It was assumed that the effects of the reinforcements would be approximately equal on S's with different modal responses and approximately equal on the five classes of response. Both these assumptions were found to be untenable. Individual differences in S's led to differential responses to reinforcement, and the different classes of response were differentially affected. Even so, responses reinforced by being correct, in general, increased and those followed by punishment decreased.

As expected stress and novel stimuli as opposed to lack of stress and similar stimulus material led to an increased use of the modal response. The responses reinforced by avoiding the punishment without the S's awareness led to results which mimicked those for the modal response. S's who were aware they could avoid punishment used the modal response more than the unaware S's particularly under stress and with novel stimuli. The results were interpreted in terms of learning two different kinds of avoidance

responses depending on the S's level of awareness that avoidance had occurred.

References

- Child, I.L. Personality. In C.P. Stone and Q. McNemar (Eds.), Annual Review of Psychology. Stanford, Calif.: Annual Reviews, 1954. Pp 149-170.
- Diven, K. Certain determinants in the conditioning of anxiety reactions. J. Psychol., 1936, 3, 291-308.
- Dollard, J. and Miller, N.E. Personality and Psychotherapy. New York: McGraw-Hill, 1950.
- Eriksen, C.W. and Kueth, J.L. Avoidance conditioning of verbal behavior without awareness: a paradigm of repression. J. abnorm. soc. Psychol., 1956, 53, 203-209.
- Eysenck, H.J. Behavior therapy and the neuroses. New York: Pergamon Press, 1960.
- Franks, C.M. Conditioning and abnormal behavior. In N.J. Eysenck (Ed.), Handbook of abnormal Psychology. New York: Basic Books, 1961, Pp 457-487.
- Greenspoon, J. The effect of verbal and nonverbal stimuli on the frequency of members of two verbal response classes. Unpublished Ph.D. Dissertation, Indiana University., 1951. Cited by J. Greenspoon, Verbal Conditioning and Clinical Psychology. In A.J. Bachrach (Ed.), Experimental Foundations of Clinical Psychology. New York: Basic Books, 1962. Pp 510-553.
- Greenspoon, J. The effect of two nonverbal stimuli on the frequency of members of Two verbal response Classes. Paper presented at the American Psychological Association Convention, New York, N.Y. 1954. Cited by J. Greenspoon, Verbal Conditioning and Clinical Psychology. In A.J. Bachrach (Ed.), Experimental Foundations of Clinical Psychology. New York: Basic Books, 1962. Pp 510-553.
- Greenspoon, J. The reinforcing effect of two spoken sounds on the frequency of two responses. Amer. J. Psychol., 1955, 68, 409-416.
- Hildum, D.C. & Brown, R.W. Verbal reinforcement and Interview bias. J. abnorm. soc. Psychol., 1956, 53, 108-111.
- Jones, H.G. Learning and abnormal behavior. In H.J. Eysenck (Ed.), Handbook of abnormal psychology. New York: Basic Books, Inc., 1961. Pp 488-528.

- Kimble, G.A. Hilgard and Marquis' Conditioning and Learning. New York: Appleton-Century-Crofts, 1961.
- Lacey, J.I. & Smith, R.L. Conditioning and generalization of unconscious anxiety. *Science*, 1954, 120, 1045-1052.
- Lacey, J.I., Smith, R.L. & Green, A. Use of conditioned autonomic responses in the study of anxiety. *Psychosom. Med.*, 1955, 17, 218-217.
- Mednick, A.A. A learning theory approach to research in schizophrenia. *Psychol. Bull.*, 1958, 55, 316-327.
- Miller, D. & Swanson, G.E. Inner conflict and defense. New York: Holt, 1960.
- Mowerer, O.H. Learning theory and personality dynamics. New York: Ronald Press, 1950.
- Mowerer, O.H. Learning theory and behavior, New York: Wiley, 1960.
- Nuthmann, A.M. Conditioning of a response class on a personality test. *J. abnorm. soc. Psychol.*, 1957, 54, 19-23.
- Osgood, C.E. Method and theory in experimental psychology. New York: Oxford University Press, 1953.
- Salzinger, K & Pisoni, S. Reinforcement of verbal affect responses of normal subjects during the interview. *J. abnorm. soc. Psychol.*, 1960, 60, 127-130.
- Shoben, E.J. Jr. Psychotherapy as a problem in learning theory. *Psychol. Bull.*, 1949, 46, 366-392.
- Solomon, R.L., Kamin, L.J. and Wynne, L.C. Traumatic avoidance learning: the outcomes of several extinction Procedures with dogs. *J. abnorm. soc. Psychol.*, 1953, 48, 291-302.
- Solomon, R.L. & Wynne, L.C. Traumatic avoidance learning: Acquisition in normal dogs. *Psychol. Monogr.*, 1953, 67, No 14 (whole No. 354).
- Wolpe, J. Experimental neuroses as learned behavior. *Brit. J. Psychol.*, 1952, 43, 243-268.
- Wolpe, J. Reciprocal inhibition as the main basis of psychotherapeutic effects. *A.M.A. Arch. Neurol. Psychiat.*, 1954, 72, 205-226.
- Wolpe, J. Psychotherapy by reciprocal inhibition. Stanford: Stanford University Press, 1958.

Appendix 1. List of Eighty attack statements

Twenty Pre and Post Test Attack Statements

1. You're just a big mama's boy.
2. You look like you sleep in your clothes.
3. You never consider the other persons' point of view.
4. Why can't you do your own thinking for a change?
5. You're nothing but a pretty boy.
6. You should do something about your weight.
7. You're ninety percent hot air.
8. You're going to have to get a hold on yourself.
9. When are you going to learn to work things out for yourself?
10. When the going gets tough, you always fold up.
11. You never take anything seriously.
12. You don't give a damn for anyone but yourself.
13. You have no principles at all.
14. You louse up everything you do.
15. Couldn't you try to look just a little bit neater?
16. When are you going to grow up?
17. You always depend on others to make your decisions for you.
18. You're as scatterbrained as any woman.
19. You're never completely honest about anything.
20. You clothes never look half-way decent.

Sixty acquisition attack statements with alternative replies

1. When are you going to do something without someone holding your hand?
 (D) Nobody's holding my hand.
 (S) As soon as I can.

- (O) At least I do something.
 (I) What do you mean?
 (A) How about shutting your mouth.
2. Where were you when the brains were handed out?
 (S) At the end of the line.
 (I) Who knows?
 (A) In front of you.
 (D) I was there.
 (O) At least I have an excuse.
3. You do things in a feminine way.
 (I) It takes both kinds.
 (D) Never.
 (A) Go to hell.
 (O) I see that you watch for these kind of things.
 (S) Just call me Violet.
4. You can't ever be trusted.
 (A) You're a liar.
 (S) Really?
 (I) Honesty is the best policy.
 (D) I think I can be.
 (O) And you?
5. You'd cheat anyone you could.
 (D) I would not.
 (I) Crime doesn't pay.
 (O) Speak for yourself.
 (A) You're out of your mind.
 (S) Even my mother?
6. Horse play is all you're capable of.
 (O) And some people have no sense of humor at all.
 (A) Take a flying leap.
 (S) Do I really present that impression?
 (D) No, actually, I'm very serious.
 (I) All work and no play makes Jack a dull boy.
7. You never contribute anything to solving a problem.
 (D) I contribute all that I can.
 (O) I'm not the only one.
 (I) It depends on what the problem is.
 (S) I'm a little slow at times.
 (A) Neither do you.
8. You don't do anything on your own.
 (I) Two heads are better than one.
 (O) Who says I don't?
 (D) I do too.
 (S) I've done some things on my own.
 (A) How can I with you on my back?

9. You're a slob.
 (D) I am not.
 (A) And you act the part.
 (O) It takes one to know one.
 (S) Anything else the matter with me?
 (I) That's the way it goes.
10. All you do is gossip all the time.
 (I) I'm watching people's reactions.
 (O) And some people I know repeat it every chance they get.
 (D) That is not gossip.
 (A) I learned it from you.
 (S) It's in my nature.
11. You won't ever get anywhere in life.
 (D) I believe I will.
 (A) I'll go further than you ever thought of going.
 (I) Time will tell.
 (S) I'm hoping.
 (O) Maybe not, but I know where I'm going.
12. You're always looking for the easiest way out.
 (S) I'm lazy.
 (O) Only a jerk wouldn't.
 (D) I work just as hard as anybody else.
 (I) Life is difficult.
 (A) What's it to you?
13. Why do you let women push you around all the time?
 (S) Easy going I guess.
 (I) There's more than one way to skin a cat.
 (O) What gives you that stupid notion?
 (D) I never let that happen.
 (A) You're crazy.
14. Don't you ever act your age?
 (O) People who ask that are usually getting old.
 (A) I don't want to emphasize your immaturity.
 (D) Always.
 (S) No
 (I) How old do you think I am?
15. Do you always mumble when you talk?
 (I) What do you mean always mumble?
 (S) I hope not, do you think so?
 (A) Wash out your ears.
 (O) Have you ever listened to yourself.
 (D) I don't mumble.
16. You talk like the president of the Ladies Garden Club.
 (S) I am.
 (I) Some women are very good speakers.

- (A) I guess you know because you attend the meetings.
 - (D) No I don't.
 - (O) Strange, that only happens when I talk to you.
17. At least once in a while you ought to be able to do a good job.
- (A) Try it yourself sometime.
 - (O) It's funny how the biggest goldbricks are the most critical.
 - (D) I do good work.
 - (S) I was just born that way.
 - (I) What constitutes a good job?
18. Aren't you ever going to learn how to take responsibility?
- (D) I feel that I accept responsibility very well.
 - (A) You're the most irresponsible person I know.
 - (I) Responsibility is a vague word.
 - (S) When I grow up.
 - (O) How can I when I'm not given the chance.
19. You think only of what's in it for you.
- (O) Who doesn't?
 - (A) I'll never top you at it.
 - (S) I suppose it has happened.
 - (I) Self-preservation is the first law of existence.
20. You daydream too much.
- (D) Not too much.
 - (O) Not as much as a lot of people.
 - (A) I like it better than listening to you.
 - (I) What does daydreaming too much mean?
 - (S) Very true.
21. You always have someone else solve your problems.
- (I) Outsiders can sometimes see a problem more clearly.
 - (O) Someone else than you that is.
 - (S) It's easier that way.
 - (D) You are mistaken.
 - (A) And you're always trying to solve someone else's problem.
22. You do the stupidest things.
- (D) That's not so.
 - (O) Maybe it's the company I keep.
 - (I) Everything is relative.
 - (S) Sometimes I do.
 - (A) Like listening to you.
23. Why not face it, you just can't take it.
- (S) I never said I could.
 - (I) Take what?

- (A) Shut up.
 - (D) I disagree.
 - (O) I guess you think you're a good judge.
24. Can't you come up with an original idea once in a while?
- (O) When I become as knowledgeable as you, I will.
 - (D) I do quite often.
 - (I) All ideas are merely repetitions of previous ones.
 - (A) Once in a while, puts me ahead of you.
 - (S) No.
25. You have a very annoying laugh.
- (A) You certainly are a rude person.
 - (I) Laughter is the medicine of the soul.
 - (S) I can't change it.
 - (O) With me it's only my laugh that's annoying.
 - (D) It doesn't bother me.
26. You always pick on the little guy.
- (I) Are you commenting on my stature.
 - (A) You say that to everybody, shrimp.
 - (D) I doubt it.
 - (S) He's the only one I can beat.
 - (O) The little ones always have the most bothersome behavior.
27. Everything is just a big joke with you.
- (A) Not everything, just you.
 - (O) That shows how well you know me.
 - (S) Yes it is.
 - (D) You're wrong.
 - (I) Laugh and the world laughs with you.
28. Won't you ever make up your own mind?
- (D) I really feel that I do.
 - (A) Yeh, go to hell.
 - (I) Deciding things is a difficult task.
 - (S) I'm slow at decision making.
 - (O) Does somebody say that I don't?
29. When are you going to start acting like a man?
- (A) When I stop following your example.
 - (S) Probably never.
 - (I) What do you mean, "act like a man"?
 - (O) When people stop asking foolish questions.
 - (D) I don't have to act like one, I am one.
30. You act just like a woman.
- (O) That was a rotten thing to say.
 - (A) You're nuts.
 - (I) What do you mean by acting like a woman?
 - (S) Do I ?

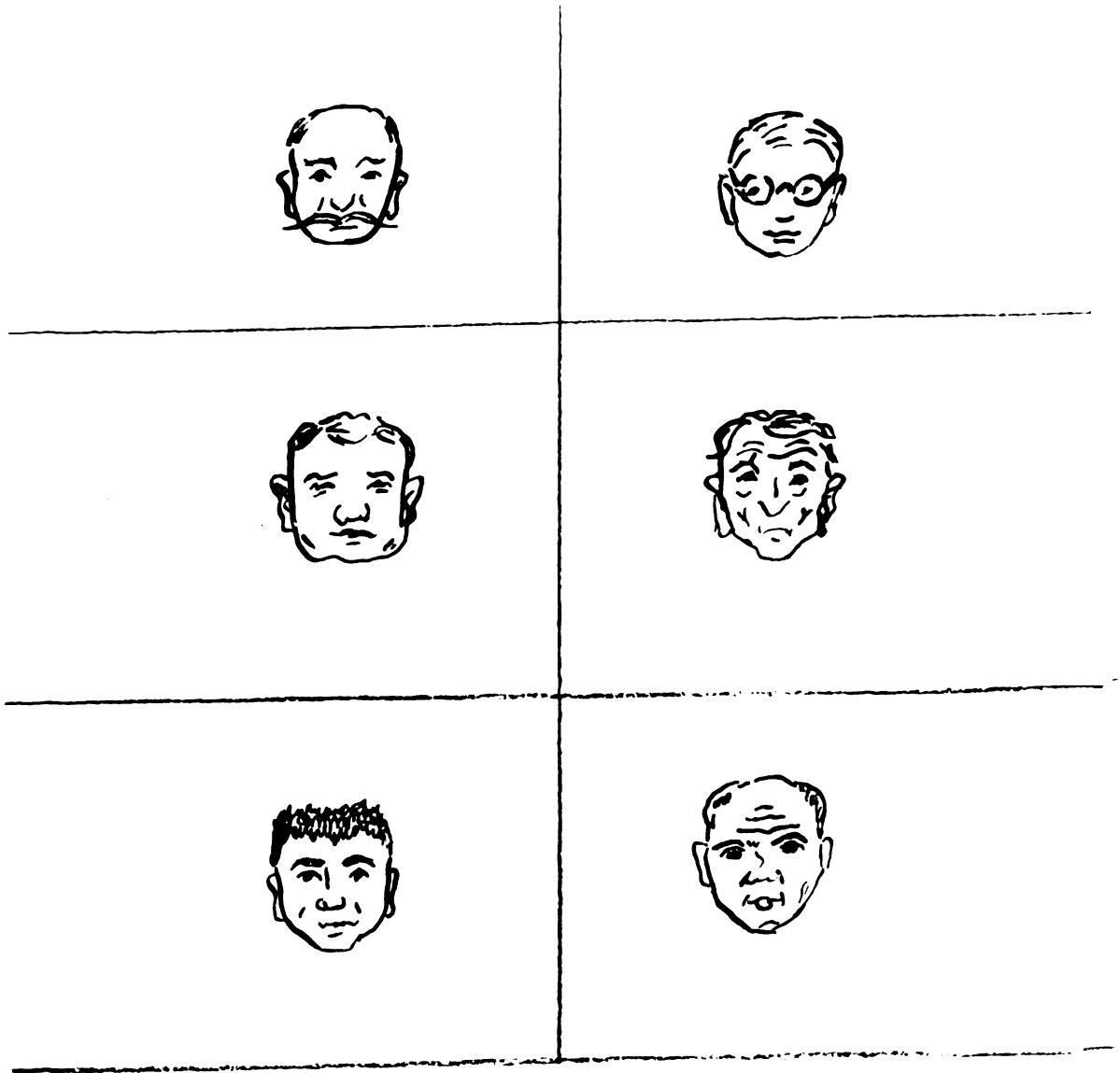
- (D) I don't think so.
31. You never care how you look.
(A) You're crazy.
(O) We both know that's a lie.
(I) Some things can't be helped.
(S) Well, maybe I don't.
(D) Sure I do.
32. You hate to see the other man get ahead.
(I) Anyone with the qualifications should be recognized.
(S) You could be right.
(D) I like to see the other man get ahead.
(O) Only if he's a slob.
(A) You don't know what you're talking about.
33. Why can't you stand on your own two feet?
(S) I don't know.
(D) I always have.
(O) Because usually somebody's stepping on my toes.
(A) Why don't you shut up.
(I) No one can depend completely on his own judgment.
34. Can't you do anything right?
(I) Very few people ever ask me that question.
(S) That's what I keep asking myself.
(D) Of course.
(A) More than you do.
(O) So who's perfect?
35. You're the most insincere person I know.
(O) I'm not going to baby anyone.
(S) I guess I am.
(D) I'm very sincere.
(A) You're the craziest guy I've ever known.
(I) What is sincerity?
36. You've got an ugly puss.
(I) Beauty is in the eyes of the beholder.
(D) That's not so.
(O) Take a look at yourself.
(S) I can't help what I look like.
(A) Not half as ugly as yours.
37. You couldn't get by without someone telling you what to do.
(D) I could so.
(S) Maybe not, that's just me a follower.
(A) Time for you to get lost.
(I) Some people are born leaders.
(O) That's your opinion.
38. You're just a weakling.

- (I) Everyone can't be Hercules.
 - (D) That's not quite true.
 - (S) I'll make a sincere effort to correct it.
 - (O) Not compared to the people around here.
 - (A) I'll take you on any day.
39. You always look as if you're half asleep.
- (O) People make me tired.
 - (I) Judge by actions not looks.
 - (S) Half of the time I am.
 - (A) What's it to you?
 - (D) I don't think so.
40. Don't you ever think things through before you act?
- (S) No, I'm naturally this way.
 - (I) The first duty of life is to live.
 - (A) Mind your own business.
 - (D) I always think things through.
 - (O) At least I can think.
41. If things don't go your way you have a fit.
- (D) I do not.
 - (I) Some things you can have and others you can't.
 - (A) You're a liar.
 - (O) At least I act my age.
 - (S) Well, I'm concerned.
42. You walk just like a woman.
- (A) You walk like an ape.
 - (O) At least I walk and don't crawl.
 - (D) Nope.
 - (I) Do women have a special way of walking?
 - (S) Perhaps.
43. You're nothing but a tightwad.
- (O) I resent that.
 - (S) I didn't realize it.
 - (A) And you're my inspiration.
 - (I) Better tight than poor.
 - (D) I think you're pretty generous.
44. You lean on someone else every chance you get.
- (S) I try not to.
 - (I) It takes intelligence to know when and where to lean.
 - (O) I guess I should try to be more like you huh?
 - (D) I never did and never will.
 - (A) If I leaned on you, you'd collapse.
45. You think only of yourself.
- (A) Thinking of you gives me a headache.
 - (O) We all can't be perfect.
 - (I) I always consider the other person.

- (I) Charity begins at home.
 (S) Do you really think so?
46. Can't you ever let go of your mother's apron strings?
 (D) I did a long time ago.
 (I) I don't believe in things like apron strings.
 (O) She's better to me than some people.
 (S) Perhaps not.
 (A) Don't sweat it fella.
47. You haven't got any backbone.
 (D) Yes I do.
 (S) I'm working on that problem.
 (O) I suppose you do?
 (A) I have more guts than you.
 (I) Scientific evidence shows everybody has a backbone.
48. You act just like a two year old.
 (S) I feel like a two year old at times.
 (D) I always act my age.
 (O) I won't say what you look like.
 (I) You're only as old as you feel.
 (A) How'd you like a twenty year old punch in the mouth?
49. When are you going to take some pride in your appearance?
 (D) I take Pride in my appearance.
 (S) I don't know.
 (A) You just have lousy taste.
 (I) Appearance isn't everything.
 (O) Comparatively speaking, my appearance is good.
50. Don't come sniffing to me for help.
 (A) I'd never ask a bum like you for help.
 (I) What gives you that impression?
 (O) I only ask people who are capable of giving help.
 (S) Who else can I go to?
 (D) I can take care of myself.
51. You're only interested in kid stuff.
 (S) I am a kid.
 (I) It depends on what you call kid stuff.
 (A) Get out of here, I'm tired of the sight of you.
 (D) No, I'm usually quite serious.
 (O) I'm not interested in you.
52. You might as well wear a skirt the way you act.
 (A) You ought to try it when you get out of diapers.
 (D) There's nothing wrong with the way I act.
 (S) Am I really that bad?
 (I) A skirt would be cooler in the summer.
 (O) You're a fine one to talk.
53. Can't you shut up once in a while?
 (D) I don't talk too much.

- (A) I can shut you up.
 - (O) I, at least, have something to say.
 - (S) All right, I won't say another word.
 - (I) Do you feel that I talk too much?
54. You never give anyone a break.
- (A) You wouldn't recognize one if you got it.
 - (S) I am sorry.
 - (D) Oh yes I do.
 - (I) People make their own breaks.
 - (O) They don't deserve it.
55. Can't you ever take a stand on anything?
- (O) Try talking about something important.
 - (A) Go jump in the lake.
 - (D) I always stick by my opinions.
 - (I) Everything can't be set down in black and white.
 - (S) I have a hard time making up my mind.
56. Can't you ever settle down and get something done?
- (D) I get lots done.
 - (A) You're worse than I am.
 - (I) Planning is always a part of getting a job done.
 - (S) I'm a slow starter.
 - (O) Who are you to talk about that?
57. You seem to be involved in something underhanded all the time.
- (A) A crook like you has no kick coming.
 - (O) I'm certainly not the worst one around here.
 - (D) That is not at all true.
 - (S) I guess I'm no good.
 - (I) Seeming doesn't make it so.
58. You're nothing but a sissy.
- (D) No I'm not.
 - (O) Are you something better?
 - (S) I feel like one when you criticize continuously.
 - (A) You're looking for a black eye from me.
 - (I) The world is no longer only for the physically strong.
59. You have a strange walk.
- (D) Not to me.
 - (A) And you have a strange face.
 - (O) And some people are still on all fours.
 - (I) No two people walk the same.
 - (S) I can't help it.
60. Why don't you straighten up and fly right?
- (D) I do fine.
 - (I) The wind's too strong.
 - (S) Give me time.
 - (O) I don't see any good example around here.
 - (A) Why don't you wake up and die right.

Appendix 2. Six Faces used on Acquisition Programs.



Appendix 3. A Note on Training the Judges

The two judges classifying the five alternative replies into the five classes of response agreed on 92% of the 450 replies classified. This rather high level of agreement was reached with very little instruction to the judges. The ease in classifying the responses seemed to be due to a verbal guide given to the judges. They were told to look for the "hooker", i.e. for a loophole or way out that the reply leaves for the responder so that he can say in one way or another (response class), "I am not attacking you." Each class of response has a different "hooker".

To the original attack statement "You have a very annoying laugh" the responder could defend as follows, his reply to the general question; "Are you attacking me (by the original attacker)?"

For Isolation, the responder could say "I am not attacking you. All I said was laughter is the medicine of the soul."

For Self-attack, the responder could say "I am not attacking you. I am attacking myself. I said I can't change it."

For Object-displacement, the responder could say "I am not attacking you, or I am not attacking you. I didn't say anything about you. All I said was, with me it's only my laugh that's annoying."

For Denial the responder could say "I am not attacking

you, all I said was it doesn't bother me."

For Anger the responder has no way of saying "I am not attacking you."

Appendix 4 Raw Data for Pre to Post Changes X Post
Testing Conditions X Experimental and Control Groups

NSNG Experimental						SNG Experimental					
	A	I	S	O	D		A	I	S	O	D
1	s 6	c 6	p 0	c 6	o -18	1	c 4	p 4	s -8	c -2	o 2
2	s -2	c 10	o -18	p -4	c 14	2	p -1	c -3	o -1	c 2	s 3
3	s 0	c -4	p -12	c -1	o 17	3	c 8	p -4	s -6	c 23	o -21
4	o -8	s -9	c -5	p 4	c 18	4	o -12	c 9	p -4	s -8	c 15
5	c 18	p -9	o -14	s -2	c 7	5	p 0	c -5	c 2	s -6	o 9
6	p -6	c -5	c 10	s -4	o 5	6	c 10	o -12	s -6	c 2	p 6
7	p 0	o -4	o -2	c -4	s 10	7	c 8	s 4	o -12	c -4	p 4
8	c 24	p -5	s -6	c -3	o -10	8	c 13	s -1	c -2	p 1	o -11
9	c 22	o -15	p -5	s -3	c 1	9	c 2	p -6	o -5	s -2	c 11
10	c 17	p 4	s -9	o -12	c 0	10	s -3	c 4	o -7	p -1	c 7

p = punished

s = safe

c = correct

o = modal

S = Stress

NS = Nonstress

G = Generalization

NG = Nongeneralization

NSG Experimental						SG Experimental					
	A	I	S	O	D		A	I	S	O	D
1	s -4	o -8	c 6	p 2	c 4	1	c 15	o -12	s -5	c 10	p -8
2	c 6	s -7	o -12	c 13	p 0	2	c 10	s -3	c -2	p -2	o -3
3	c -6	s -2	c 7	p 5	o -4	3	c 10	o -12	p -4	s -4	c 10
4	c -1	p 0	o -2	s 2	c 1	4	c -2	s -6	o 12	c -4	p 0
5	o -1	p -1	c 5	c 1	s -4	5	s -2	o -14	c 10	p -4	c 10
6	c 8	p -4	o -8	s 4	c 0	6	c 4	o -14	p -11	s 0	c 21
7	s 0	c -10	o -4	p -2	c 16	7	c 4	p -6	o 4	s -2	c 0
8	c 18	s 0	o -18	c 2	p -2	8	c 10	o -18	s 1	c 7	p 0
9	o -19	p 0	c 1	c 2	s 16	9	o -6	c 0	s 0	c 3	p 3
10	p -2	o -8	c -2	c 0	s 12	10	p 0	c 10	o -8	c -2	s 0

p = punished

s = safe

c = correct

o = modal

S = Stress

NS = Nonstress

G = Generalization

NG = Nongeneralization

NSNG Control						SNG Control					
	A	I	S	O	D		A	I	S	O	D
1	c -4	s 6	o -8	c 4	p 2	1	c 0	p -2	o -10	s 0	c 12
2	c 1	p 0	o -14	s 6	c 7	2	o -13	c 10	s -4	c 0	p 7
3	p 4	c 11	o -19	c 14	s -10	3	c 8	s -8	o 0	c -2	p 2
4	s -6	c 2	o -4	p 0	c 8	4	p -2	c 6	c -6	s -2	o 4
5	p 4	c 2	o -6	c -2	s 2	5	c 0	s 0	o -1	c -2	p 3
6	s 4	c 2	o -20	p 4	c 10	6	c 0	s -4	c 2	p 0	o 2
7	s 0	o -10	c 1	p 1	c 8	7	s 0	o -19	c 4	p 0	c 15
8	p 0	c 6	o -2	s 4	o -8	8	p 2	c -10	o -3	c 3	s 8
9	s 2	c -4	p 2	c -6	o 6	9	p -1	c 2	o -4	c -4	s 7
10	p -6	c 4	c -6	s 0	o 8	10	c 1	p 2	o -1	s -1	c -1

p = punished

s = safe

c = correct

o = modal

S = Stress

NS = Nonstress

G = Generalization

NG = Nongeneralization

NSG Control						SG Control					
	A	I	S	O	D		A	I	S	O	D
1	p 0	c -6	o 0	c 2	s 4	1	o -17	p 6	c 2	c 7	s 2
2	s -2	c -3	o -7	p 8	c 4	2	c 6	p 4	o -13	s 0	c 3
3	s 2	c 6	p 0	c -2	o -6	3	c -2	p 0	s 13	c -2	o -9
4	p -2	c 10	o 0	c -8	s 0	4	s 6	c 1	o -5	p -10	c 8
5	p 0	o -12	c 11	c 2	s -1	5	o -4	c 4	s -4	c 1	p 3
6	s -2	c 4	p -5	c 10	o -7	6	p 0	o -10	c 4	c 0	s 6
7	o -8	c -5	p 8	s 4	c 1	7	c 11	s -8	c 5	o -4	p -4
8	s 0	c 1	o -13	p -5	c 17	8	s -3	o -2	p -3	o -9	c 17
9	c 23	p -6	s -4	c 0	o -13	9	c 8	s 0	o -10	c 4	p -2
10	c 4	s -2	c 7	p 3	o -12	10	s 2	o -2	c 0	p 0	c 0

p = punished

s = safe

c = correct

o = modal

S = Stress

NS = Nonstress

G = Generalization

NG = Nongeneralization

MICHIGAN STATE UNIVERSITY LIBRARIES



3 1293 03145 2265