



6-1-1968

## Regression in a Verbal Conditioning Situation as a Function of Psychiatric Illness

Perry O. Orwick

Follow this and additional works at: <https://commons.und.edu/theses>

---

### Recommended Citation

Orwick, Perry O., "Regression in a Verbal Conditioning Situation as a Function of Psychiatric Illness" (1968). *Theses and Dissertations*. 3714.  
<https://commons.und.edu/theses/3714>

This Dissertation is brought to you for free and open access by the Theses, Dissertations, and Senior Projects at UND Scholarly Commons. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of UND Scholarly Commons. For more information, please contact [und.common@library.und.edu](mailto:und.common@library.und.edu).

REGRESSION IN A VERBAL CONDITIONING SITUATION  
AS A FUNCTION OF PSYCHOTIC ILLNESS

by

Perry O. Orwick

B. A. in Psychology, University of North Dakota 1963  
M. A. in Psychology, University of North Dakota 1964

A Dissertation

Submitted to the Faculty

of the

University of North Dakota

in partial fulfillment of the requirements

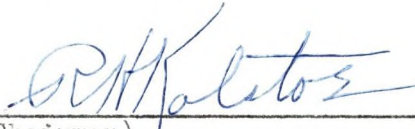
for the Degree of

Doctor of Philosophy

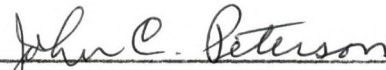
Grand Forks, North Dakota

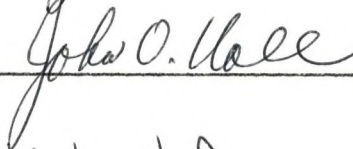
June  
1968

This Dissertation submitted by Perry O. Orwick in partial fulfillment of the requirements for the Degree of Doctor of Philosophy from the University of North Dakota is hereby approved by the Faculty Advisory Committee under whom the work has been done.



(Chairman)









  
Dean of the Graduate School

Permission

Regression in a Verbal Conditioning Situation as a Function of  
Psychiatric Illness

Department of Psychology

Doctor of Philosophy Degree

In presenting this dissertation in partial fulfillment of the requirements for a graduate degree from the University of North Dakota, I agree that the Library of this University shall make it freely available for inspection. I further agree that permission for extensive copying for scholarly purposes may be granted by the professor who supervised my dissertation work or, in his absence, by the Chairman of the Department or the Dean of the College in which my dissertation work was done. It is understood that any copying or publication or other use of this dissertation or part thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of North Dakota in any scholarly use which may be made of any material in my dissertation.

*Ferry Quirk*

*May 13, 1968*

## ACKNOWLEDGEMENTS

The author wishes to express his appreciation to members of the Department of Psychology, past and present, and to his advisory committee for the contributions each has made toward the achievement of my educational goals.

Dr. Ralph H. Kolstoe is deserving of a special note of appreciation. As teacher, chairman of my advisory committee, and friend, he has been a constant source of information, advice, and support throughout the course of my graduate education. His generous assistance in bringing this work to its final form is gratefully acknowledged and appreciated.

The author also wishes to express his gratitude to members of the staff of the North Dakota State Hospital without whose cooperation this project could not have been completed. To Dr. Hubert A. Carbone, Superintendent; Dr. Awad A. Ismir, Director of the Psychology Department; and Dr. Walter F. Steinman, Chairman of the Research Board, I extend my sincere appreciation.

An immeasurable personal debt of gratitude will always remain to my wife, Ruby, for her sacrifices and moral support which made achievement of my educational goals possible. To my parents, Bruce and Marguarite Orwick, for their support and encouragement, I will always be indebted. Finally, my children, Randy, Nancy, and Kristin, deserve credit for withstanding the trials imposed upon them during the course of my education.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS . . . . .	iv
LIST OF TABLES . . . . .	vii
ABSTRACT . . . . .	x
Chapter	
I. INTRODUCTION . . . . .	1
The Clinical Psychoanalytic Concept of Regression	
The Concept of Regression in Experimental Psychology	
The Verbal Operant Conditioning Paradigm	
Verbal Conditioning and Personality Variables	
Procedural Variables and Verbal Conditioning	
Experimenter-Subject Interaction and Verbal Con-	
ditioning	
Awareness in Verbal Conditioning	
Verbal Conditioning of Psychiatric Patients	
Statement of the Problem	
Hypotheses	
II. EXPERIMENTAL METHOD . . . . .	25
Subjects	
Apparatus and Experimental Room	
Experimental Method	
Instructions to Subjects	
III. RESULTS . . . . .	31
Description of Subjects	
Age	
Educational Level	
Months of Hospitalization	
Reliability of Administering Reinforcement	
Base Rate Performance	
Comparisons between Base Rate and Acquisition Periods	
Regression Measures	
Number of Regressed Responses Emitted in the	
Punishment Period	
Proportion of Regressed Responses Emitted in the	
Punishment Period	
Number of Seconds to Emit the First Regressed Response	
in the Punishment Period	

Correlations between Regression Measures  
 Analyses of the Regression Measures after Logarithmic Transformation  
 Differential Conditionability of the Three Diagnostic Groups  
 Time for the Experimental Group to Condition in the Reinforcement Period for Adjectives  
 Proportion of Adjectives Emitted by the Experimental Group in the Reinforcement Period for Adjectives  
 Time for all Ss to Condition in the Reinforcement Period for Plural Nouns  
 Proportion of Plural Nouns Emitted by all Ss in the Reinforcement Period for Plural Nouns  
 Proportion of Adjectives Emitted by the Experimental Group during the Last Block of Nine Reinforcements in the Acquisition Period for Adjectives  
 Proportion of Plural Nouns Emitted by all Ss during the Last Block of Nine Reinforcements in the Acquisition Period for Plural Nouns  
 Comparison of Base Rate and Punishment Period Operant Levels  
 Comparisons between Conditioners and Nonconditioners  
 Awareness of the Reinforcement Contingency

IV. DISCUSSION . . . . .	67
V. SUMMARY . . . . .	83
APPENDIX . . . . .	87
BIBLIOGRAPHY . . . . .	90

LIST OF TABLES

Table	Page
1. Means and Standard Deviations of the Ages of All <u>Ss</u> Who Met the Conditioning Criterion . . . . .	32
2. Analysis of Variance of the Ages of All <u>Ss</u> Who Met the Conditioning Criterion . . . . .	33
3. Means and Standard Deviations of the Educational Level in Years of All <u>Ss</u> Who Met the Conditioning Criterion . . . . .	34
4. Analysis of Variance of the Educational Level of All <u>Ss</u> Who Met the Conditioning Criterion . . . . .	34
5. Means and Standard Deviations of the Total Length of All Hospitalizations in Months for <u>Ss</u> Who Met the Conditioning Criterion . . . . .	35
6. Analysis of Variance of Total Length of All Hospitalizations for <u>Ss</u> Who Met the Conditioning Criterion . . . . .	36
7. Comparisons between (1) Schizophrenics and Neurotics, (2) Schizophrenics and PTDs, and (3) Neurotics and PTDs on Months of Hospitalization . . . . .	37
8. Proportion of Adjectives and Plural Nouns Emitted in the Base Rate Period for the Experimental and Control Groups . . . . .	38
9. Proportion of Adjectives and Plural Nouns Emitted during the Base Rate and Acquisition Periods for the Experimental and Control Groups . . . . .	39
10. Means and Standard Deviations of the Number of Regressed Responses Emitted by <u>Ss</u> in the Punishment Period . . . . .	42
11. Analysis of Variance of the Number of Regressed Responses Emitted in the Punishment Period . . . . .	42
12. Comparisons between (1) Schizophrenics and Neurotics, (2) Schizophrenics and PTDs, and (3) Neurotics and PTDs of the Experimental Group on the Number of Regressed Responses Emitted in the Punishment Period . . . . .	43
13. Means and Standard Deviations of the Proportion of Regressed Responses Emitted by <u>Ss</u> in the Punishment Period . . . . .	44



14.	Analysis of Variance of the Proportion of Regressed Responses Emitted in the Punishment Period . . . . .	45
15.	Comparisons between (1) Schizophrenics and Neurotics, (2) Schizophrenics and PTDs, and (3) Neurotics and PTDs of the Experimental Group on the Proportion of Regressed Responses Emitted in the Punishment Period . . . . .	46
16.	Means and Standard Deviations of the Number of Seconds to the First Regressed Response in the Punishment Period . . .	47
17.	Analysis of Variance of the Number of Seconds to Give the First Regressed Response in the Punishment Period . . . . .	48
18.	Comparisons between (1) Schizophrenics and Neurotics, (2) Schizophrenics and PTDs, and (3) Neurotics and PTDs of the Experimental Group on the Number of Seconds to the First Regressed Response in the Punishment Period . . . . .	49
19.	Means and Standard Deviations of the Amount of Time in Minutes for <u>Ss</u> in the Experimental Group to Achieve the Conditioning Criterion for Adjectives . . . . .	52
20.	Analysis of Variance of the Amount of Time for <u>Ss</u> in the Experimental Group to Achieve the Conditioning Criterion for Adjectives . . . . .	52
21.	Means and Standard Deviations of the Proportion of Adjectives Emitted by the Experimental Group in the Reinforcement Period for Adjectives . . . . .	54
22.	Analysis of Variance of the Proportion of Adjectives Emitted by the Experimental Group in the Reinforcement Period for Adjectives . . . . .	54
23.	Means and Standard Deviations of the Amount of Time in Minutes for <u>Ss</u> of Both Groups to Achieve the Conditioning Criterion for Plural Nouns . . . . .	56
24.	Analysis of Variance of the Amount of Time for <u>Ss</u> of Both Groups to Achieve the Conditioning Criterion for Plural Nouns . . . . .	56
25.	Means and Standard Deviations of the Proportion of Plural Nouns Emitted by <u>Ss</u> of Both Groups in the Reinforcement Period for Plural Nouns . . . . .	58
26.	Analysis of Variance of the Proportion of Plural Nouns Emitted by <u>Ss</u> of Both Groups in the Reinforcement Period for Plural Nouns . . . . .	58

27.	Comparisons between (1) Schizophrenics and Neurotics, (2) Schizophrenics and PTDs, and (3) Neurotics and PTDs on the Proportion of Plural Nouns Emitted in the Rein- forcement Period for Plural Nouns . . . . .	59
28.	Means and Standard Deviations of the Proportion of Adjectives Emitted by the Experimental Group in the Last Segment of the Reinforcement Period for Adjectives .	60
29.	Analysis of Variance of the Proportion of Adjectives Emitted by the Experimental Group in the Last Segment of the Reinforcement Period for Adjectives . . . . .	61
30.	Means and Standard Deviations of the Proportion of Plural Nouns Emitted by Both Groups in the Last Segment of the Reinforcement Period for Plural Nouns . . . . .	62
31.	Analysis of Variance of the Proportion of Plural Nouns Emitted by Both Groups in the Last Segment of the Reinforcement Period for Plural Nouns . . . . .	63
32.	Number of Verbal Responses Emitted by the Experimental and Control Groups in the Base Rate and Punishment Periods . .	64
33.	Comparisons between Conditioners and Nonconditioners on the Total Words, Proportion of Adjectives, and Proportion of Plural Nouns Emitted in the Base Rate Period . . . . .	65

## ABSTRACT

The primary purpose of this study was to investigate regression among psychiatric groups in a verbal conditioning situation. Secondary purposes were to study the conditioning performance of the psychiatric groups and their awareness of the reinforcement contingency.

The actual Ss were 30 male and 30 female patients selected from the resident population of the North Dakota State Hospital. Ss were selected on the basis of an official diagnosis of schizophrenia, psychoneurosis, or personality trait disturbance, age, and months of hospitalization. Sixteen individuals in each of the diagnosis x sex categories were randomly selected to serve in either an experimental or control group. The first 5 Ss in each of the diagnosis x sex categories to achieve the conditioning criterion were utilized in the investigation of regression. Of the 73 patients utilized, 13 did not achieve the criterion. These Ss were used only for comparisons between conditioners and nonconditioners.

The Ss in the experimental group received 27 reinforcements for adjectives followed by 27 reinforcements for plural nouns. Reinforcement was a flash of green light and a point registering on a counter. Ss were instructed that the number of points they received would determine how much money they would receive when the session was completed. Punishment by means of a red light was then administered for all verbal responses in a 5-minute punishment period. Ss were instructed that red lights meant that points and money were being lost. The control group

received 27 reinforcements for plural nouns only and then punishment during the 5-minute punishment period. The E administered all reinforcement and punishment from behind a one-way mirror and had no personal contact with the Ss prior to the experiment. Instructions to Ss were taped and transmitted to them over a speaker. The E's research assistant had only minimal personal contact with the Ss prior to the experimental session and following this when a questionnaire was administered to assess awareness of the reinforcement contingency.

Hypotheses advanced in this investigation were:

1. The experimental group would demonstrate significantly more regressed responses than the control group.

2. Schizophrenics in the experimental group would demonstrate significantly more regressed responses than neurotics who in turn would demonstrate significantly more regressed responses than character disorders.

3. Schizophrenics in the experimental group would regress more quickly to an earlier learned response than neurotics who in turn would regress more quickly than character disorders.

4. Neurotics and character disorders in the experimental and control groups would demonstrate greater conditionability than schizophrenics.

5. Operant levels for conditioners would be significantly higher than for nonconditioners.

6. More character disorders and neurotics would demonstrate awareness of the reinforcement contingency than schizophrenics.

Analysis of the results supported the hypothesis that the experimental group would demonstrate regression when compared to the

control group. Hypotheses concerning differential regression among the three diagnostic groups were not supported. The hypothesis involving differential conditionability among the diagnostic groups not only failed to receive full support, but there were nonsignificant trends in the opposite direction. Comparisons between conditioners and nonconditioners on base rate data suggested the importance of total verbal operant level in determining conditioning. Since only 5 Ss were judged aware, no conclusion could be drawn concerning the awareness hypothesis.

Failure of this research to support the hypothesis of differential regression among the diagnostic categories was discussed in relation to methodological inadequacies and the theory from which the hypotheses were derived. The absence of differential conditionability among the diagnostic categories was discussed in relation to pre-experimental E-S interaction. Suggestions were made for utilizing a verbal conditioning situation in further studies of regression, stress, rigidity, and psychotherapy.

## CHAPTER I

### INTRODUCTION

#### The Clinical Psychoanalytic Concept of Regression

The concept of regression is central to the psychoanalytic theory of psychopathology. Explanation for neurotic, psychotic, and character disturbances rests on the assumption that the individual, when confronted with intolerable stress (anxiety), returns (regresses) to less mature patterns of behavior which were at one time successful in reducing anxiety. By considering the degree of regression, and the fixation points to which the regression occurs, psychoanalytic theorists offer explanation for the various types of psychiatric disorders.

"By regression we mean a return to a less mature, less realistic level of experience and behavior." (Cameron, 1963, p. 218) In their discussion of regression, Ford and Urban (1963) state, ". . . that when new response sequences are ineffective, the individual tends to fall back on responses learned and used effectively in earlier stages." (p. 147) Fenichel (1945) has stressed that with respect to the active mastery of all tasks, internal or external, there remains a potential for regressive action which varies in individuals and under various cultural conditions. His view is shared by Cameron (1963) who states,

It is generally believed that, if internal or external stress becomes sufficiently intense, almost anyone will regress and exhibit infantile needs. Adults who have been left especially

vulnerable because of innate hypersensitivities or because of failure to resolve major infantile and childhood crises, are likely to regress under relatively minor stress. (p. 121)

The psychoanalytic theorists also emphasize that in the process of personality and mental development, earlier levels persist along with or underneath higher levels. Stress factors, internal or external, may cause a regression and make these earlier, more primitive levels obvious.

It was stated that in mental development the progress to a higher level never takes place completely; instead characteristics of the earlier level persist alongside of or behind the new level to some extent. Disturbances of development may occur not only in the form of a total arresting of development but also in the form of retaining more characteristics of earlier stages than is normal. When a new development meets with difficulties, there may be backward movements in which the development recedes to earlier stages that were more successfully experienced. Fixation and regression are compliments to each other. (Fenichel, 1945, p. 65)

Thus immature, inappropriate, passive-receptive types of mastery may be the result of both a lack of progression (fixation) in development or a regression to more primitive behavior following stress.

Regression is to those levels of strongest fixation.

Also regression presupposes significant fixation on the level toward which regression tends. Thus, what we call "regression" is probably always a matter of degree, of relative weights of fixation and regression. (Schafer, 1954, p. 333)

When the dominant habit is blocked by conflict or extinguished through nonreward, the next strongest response will be expected to occur. . . . When this happens, it is called regression. The more strongly the earlier habit was reinforced in the past (fixation), the more likely it is to be the next strongest one and hence to recur. (Dollard and Miller, 1950, p. 171)

The stronger a fixation, the more easily will a regression take place if difficulties arise. (Fenichel, 1945, p. 65)

While persistent regression, or a return to a more primitive level of functioning is usually considered maladaptive, its defensive or adaptational values have also been emphasized. Cameron (1954)

states that pathological regression is defensive because at some level, short of complete dissolution, it preserves the integrity of the psychodynamic system. A similar view is shared by Schafer (1954) who states:

Similarly, regression is not a defense: it is a complex change of personality organization and behavior one very prominent aspect of which is defensive, namely, the warding off of threatening impulses associated with one level of psychic functioning by retreating to a genetically earlier and less threatening level. (p. 163)

In their discussion of the adaptational nature of regression, The Mount Sinai Seminar Group (1964) put forth a similar view. They also caution that the components of the regressive behavior must have been present in the original pattern if the behavior is to be termed regressive.

Regression as an adaptational phenomenon is the return from a higher level of function to a previously lower level of function which involves a partial regression of phenomenological and dynamic function to an earlier state. When one talks of regression one usually is describing phenomena of a functional nature in the sense that there is a return to an earlier pattern of behavior. However, one must be clearly aware of which components were present in the original pattern of behavior. (p. 100)

A non-pathological type of regression has also been discussed by the Ego-psychologists including Kris (1952) and Schafer (1954). This "regression in the service of the ego" (Kris, 1952) is a temporary, partial, controlled regression of ego functioning to facilitate immediate adjustment and, more often, to assist creative processes. It differs from pathological regression in degree, temporal characteristics, and by the fact that it is at all times under conscious control.

Psychoanalytic theorists have made fixation and regression the cornerstones of their explanations of psychopathology. The symptomatology of character disorders, psychoneuroses, and psychoses,



are explained and differentiated psychodynamically in terms of the degree of regression that has taken place. Regression has both a breadth and depth aspect. The former refers primarily to the number of various mental functions which show regression, and the latter refers to the degree to which each function has regressed to a more primitive level. Thus, the breadth and depth of regression, and the behaviors (symptoms) indicative of regression, become the basis on which various forms of mental disorder are differentiated. It is the symptoms of psychopathology which are the regressive phenomena and variation in breadth and depth of regression is seen in different symptom complexes. In a discussion of regression and psychoanalytic treatment Freud (1950) pointed out that the regression was due to anxiety and non-gratification of needs. "... you will remember that it was a frustration that made the patient ill, and that his symptoms serve him as substitute gratifications." (Vol. I, p. 398)

Freud's (1950) theoretical conception of regression to explain the symptoms of psychopathology is still used by modern psychoanalytically inclined writers.

First, regression appears to be one aspect of every neurotic and psychotic solution. (Schafer, 1954, p. 333)

Psychoses as well as neuroses are based on the organisms reaction to conflicts by regression: however, the depth of the regression is different. (Fenichel, 1945, p. 439)

There also seems to be general agreement among orthodox psychoanalysts and ego-analysts that in various psychiatric disorders the degree of regression is different. In the schizophrenias the regression is most profound.

Freud succeeded in bringing schizophrenic mechanisms into consonance with his theory of neurotic symptom formation by grouping all the phenomena around the basic concept of regression.

With such a grouping, no judgment was given as to the somatogenic or psychogenic origin of this regression. In different cases, the regression may have different causes and a different range, but it always has the same great depth. It reaches back to much earlier times than does any regression in neurosis, specifically to the time when the ego first came into being. (Fenichel, 1945, p. 415)

In schizophrenic reactions the adult regresses to fixation points which are deeper and more widely dispersed than in any other form of behavior pathology. (Cameron, 1963, p. 615)

In psychotic reactions both fixation and regression are pathological. Regression is characteristically subtotal rather than merely partial. (Cameron, 1963, p. 466)

. . . some schizophrenics do not suffer from a psychotic regression, but rather from a lack of progression. (Bellak, 1958, p. 58)

The schizophrenic tends to regress to this earliest phase in his life. (van der Waals, 1960, p. 181)

In the psychoneuroses the regression is less severe than in psychotic reactions, due to the presence of more adequate mechanisms for controlling the anxiety which could ultimately create deeper regression. In the character disorders (neurotic characters) the degree of regression, according to psychoanalytic theorists is still less, although, ". . . 'fixation' and 'regression' are the basic concepts in this pathology." (Fenichel, 1945, p. 468)

Neurotic characters, instead of reacting to their experiences adequately, respond more or less rigidly with the same reaction patterns. They are not only fixated to certain levels of instinctual demands, but also to certain mechanisms of defense. . . . By definition, character means that a certain constancy prevails in the ways the ego chooses for solving its tasks. The problem of fixation to certain defense mechanisms is but a special case of the more comprehensive problem of character traits in general. (Fenichel, 1945, p. 523)

In summarizing the various regression patterns in psychoneuroses, personality disorders, and psychoses, Cameron, (1963) states:

In the neuroses, the daytime regression that permits symptom formation to appear is only partial. Most preconscious and conscious functioning goes on at normal levels. The neurotic defenses bind the intruding impulses and fantasies from id-derivatives,

repressed unconscious ego or super-ego, and thus form the compromise organization which we call the neurotic symptom.

In personality disorders the situation is somewhat different. Regressive trends do not appear as discrete symptoms in character disorders, for example, but rather as distortions of personality structure, comparable to childhood deformities in physical development. This includes the so called character-armoring in which what might have erupted later as a neurotic or psychotic symptom is made into an integral part of the character. . . . There may be normal behavior and experience most of the time. Regression to childhood fixation points then occurs during periods of unusual stress, or when the more mature behavior meets with frustration, and primary anxiety threatens to overwhelm the person.

In psychoses, regression can be called defensive as long as it preserves the preconscious and conscious from annihilation, which in the vast majority of psychotic persons it does. Psychotic regression, however, is massive and subtotal. Relatively little of the preconscious and conscious organization may remain to support an effective interaction with the surroundings. (p. 237)

#### The Concept of Regression in Experimental Psychology

Although "regression" is a cornerstone of the psychoanalytic theory of psychopathology, the term is frequently used in an imprecise manner with nebulous meaning. In experimental psychology the term has been operationally defined, reducing much of the confusion which surrounds its use in psychoanalytic theory. English and English (1958, p. 450) restrict the use of the term "regression" to the situation in which ". . . during the extinction of  $R_2$  to S, a previously extinguished  $R_1$  to the same S occasionally reappears." Underwood (1949) considers regression, within this framework, to be one type of response to frustration.

A laboratory definition of regression allows one to point out specifically the behavior to which the organism reverts. This is accomplished by requiring the organism to learn one habit as a response to a situation, then replacing it with another habit. Following the acquisition of the second habit the organism is then frustrated in (prevented from) making this second response. Regression takes place if the first habit reinstates itself. (p. 208)

Experimental research on regression in the situation where variables have been manipulated has been minimal. This is particularly

true in the area of research with humans. As long ago as 1940, Mowrer pointed out that inducing regression in children or adults may be dangerous or unethical, particularly when noxious stimulation is used as a frustrating stimulus. He pointed to the relative ease with which variables could be manipulated with animal subjects and advocated the use of such subjects for research on regression.

Review of the literature reveals few studies experimentally demonstrating regression in human subjects. A classic study of regression is that of Barker, Dembo, and Lewin (1941). Using thirty pre-school children, each subject served in two conditions. Condition one involved a nonfrustrating free-play situation in which the children played with toys for thirty minutes. Following this period a screen was removed and the children were allowed to play with toys which were nicer and more desirable than the first toys. The latter were scattered among the new toys. Following this session a frustration period was introduced. This involved separating the new toys from the old toys by a wire mesh screen and not allowing the children to play with the more desirable toys. To determine whether regression had taken place as a response to frustration the authors compared the sessions on ratings of constructiveness of play. They found the mean rating for constructiveness of play during the first session to be significantly greater than the mean rating in the session following frustration. They interpreted their results as evidence for the occurrence of regression.

The absence of a control group in the above study makes interpretation difficult. Without such a reference group it is impossible to state whether the decreased constructiveness of play

was due to regression, or perhaps boredom or fatigue. Child and Waterhouse (1952) appear to question the measure of regression in the Barker, Dembo, and Lewin study. Along with offering an interference interpretation of this study they suggest that frustration of one activity will produce lowered quality of performance in the second activity.

Barthol and Ku (1959) tested the hypothesis that under stress or frustration subjects will regress to the earliest learned of two responses. Eighteen subjects, randomly divided into two groups, learned to tie bowline knots by two methods, reversed in order for the two groups. Later, late at night and under restrictive conditions, the subjects took a difficult intelligence test and were asked to "tie a knot." In this stressful situation it was noted whether the subject tied the knot by the first learned or second learned method. The results indicated, with a high level of significance, regression to the first learned response occurred. The authors suggest studies to determine whether regression is to the first learned response or merely to an earlier learned response.

Knutson (1964) studied the phenomenon of regression in human subjects utilizing an operant verbal conditioning paradigm. Undergraduate college subjects in the experimental group received twenty-five reinforcements by means of a flash of green light for emitting gerunds and then twenty-five reinforcements for emitting plural nouns. Punishment by means of a flash of red light was then administered for all verbal responses in a five minute period. All reinforcements and punishments were administered from behind a one-way mirror by the experimenter who had no personal contact with the subjects prior to

the experiment. A control group received twenty-five reinforcements for plural nouns only and then punishment for all verbal responses in the five minute punishment period.

In support of his major hypothesis Knutson found that the experimental group gave more regressed responses (gerunds) than the control group. A unique contribution of this study was the demonstration that regression can be studied in human subjects without the use of physical punishment or noxious stimulation.

Knutson also hypothesized that high-anxious subjects (as measured by the Taylor Manifest Anxiety Scale) of the experimental group would condition more rapidly than low-anxious subjects of the same group; that high-anxious subjects of the experimental and control groups would give a greater number of regressed responses in the punishment period than low-anxious subjects; and that high-anxious subjects of the experimental group would regress more quickly in the punishment period than low-anxious subjects. None of these hypotheses were supported.

Experimental studies of regression in psychiatric patients are notably lacking. Those few which are reported do not meet the requirements of a laboratory or operational definition of regression.

Reasoning that regression in schizophrenia should result in such patients displaying perceptual characteristics similar to children, Friedman (1952) compared responses to the Rorschach test. Using a scoring system purporting to test "perceptual structuralization" he found that his group of schizophrenics showed a "genetically lower level" in the structural aspects of their perception when compared to normal adults. The responses of the schizophrenics were

found to be similar to those of children. This was interpreted as due to "perceptual regression."

Suttell and Pascal (1952) in attempting to test the "regression" hypothesis compared the performance of schizophrenics, neurotics, normal adults, and children on the Bender-Gestalt test. They found some similarity between perceptual-motor performance of the schizophrenics and children. However, their "regression indicator" items did not differentiate between schizophrenics and neurotics.

Siegel (1953) studied perceptual structuralization in paranoid schizophrenia. Reasoning that regression is least in paranoid schizophrenia when compared to the other schizophrenias, the author hypothesized the presence of both regressed and mature perceptual responses to the Rorschach. His paranoid schizophrenic subjects produced "a combination of genetically early and genetically late characteristics" which the author interpreted as offering some support for the regression hypothesis in schizophrenia.

The above studies by Friedman (1952), Suttell and Pascal (1952), and Siegel (1953) all lack the control of variables and precision required by the experimentalist to demonstrate the occurrence of some phenomenon.

Wilensky (1952) in a somewhat better controlled study compared the performance of schizophrenics and normals on several tasks following frustration. He was concerned with the effects of failure on subsequent tasks. The author concluded from his findings that schizophrenics when compared to normals have lower frustration tolerance, performed more poorly following frustration, were more perseverative, abandoned the tasks more frequently, and tended to give more

bizzare responses. Wilensky's study, however, did not demonstrate regression, i.e. a return to a previously learned response following frustration.

#### The Verbal Operant Conditioning Paradigm

Although Thorndike (1935) was the first to imply that verbal behavior could be controlled by positive or negative verbal reinforcement, Skinner (1953, 1957) has provided the major impetus to the study of verbal responses as behavior per se. The present interest in the modification of verbal behavior was initiated by Greenspoon (1951). Greenspoon (1951, 1955) and Taffel (1955) demonstrated that the frequency of emission of certain classes of verbal behavior could be increased by administering verbal and nonverbal rewards. Since these initial studies the voluminous research concerning a wide variety of aspects of verbal conditioning has been reviewed by Adams (1957), Krasner (1958, 1962), Greenspoon (1962), and Williams (1964).

The procedures utilized in verbal conditioning studies have varied considerably. Although some researchers have failed to find a conditioning effect, the phenomenon appears to be a valid one. Greenspoon (1962) states, "The weight of numbers would tend to support the view that the probability of making a verbal response can be changed through the introduction of various kinds of stimuli following the occurrence of the response. That is, most of the research has demonstrated the phenomenon of verbal conditioning." (p. 546)

The Greenspoon (1951, 1955) procedure involved asking subjects to "say words." Plural nouns were then reinforced by a verbal "mmm-hmm," a visual stimulus consisting of a light, and an auditory stimulus consisting of a tone. When compared to control groups which



received no reinforcement all of these stimuli produced a significant increase in the emission rate of plural nouns.

Another widely used procedure was developed by Taffel (1955). Subjects were instructed to make a sentence using one of six pronouns and the verb which appeared on an index card. Using the social reinforcer "good" Taffel found a significant increase in the use of the first person pronoun when it was consistently followed by the reinforcing stimulus.

In addition to the Greenspoon and Taffel procedures, Krasner (1958) has delineated some less popular subject tasks which have been used in verbal conditioning studies. These include interviews, storytelling, and participation in test-like situations. Various types of response classes have been manipulated by verbal reinforcement. These include human responses, animal responses, gerunds, adverbs, plural nouns, pronouns, affect responses, self-referrent responses, etc.

The types of reinforcements used to condition verbal behavior have also been varied. Greenspoon (1951) and Taffel (1955) used the verbal reinforcers "mmm-hmm" and "good," respectively. Nonverbal reinforcers such as lights (Sidowski, 1954; Knutson, 1964), a buzzer (Greenspoon, 1951), a bell tone (McNair, 1957) and nonverbal social reinforcers such as headnodding and smiling (Wickes, 1956) have all been shown to be effective in conditioning verbal behavior.

#### Verbal Conditioning and Personality Variables

Many studies have dealt with the relationship of various personality characteristics to verbal conditioning. Reidy (1958) hypothesized that acquisition of a verbal response would be influenced

by need for approval acting as a drive, but did not support this hypothesis in a verbal conditioning study. Crowne and Strictland (1961) found that need for approval facilitated the conditioning of verbal behavior in a Greenspoon-type situation.

Eysenck (1959), on the basis of his theory of personality predicted greater conditionability in introverts than extraverts, and in a Taffel-type experiment supported his hypothesis. Subsequent studies, however, (Das, 1961; Das and Mitra, 1962; McDonnell and Inglis, 1962; Knowles, 1963) have failed to demonstrate any relationship between performance in a verbal conditioning situation and the Introversion-Extraversion dimension.

Studies of the relationship of anxiety to verbal conditioning have been contradictory and equivocal. Dailey (1953), using college students as subjects, found no significant difference between high-anxious and low-anxious subjects in a verbal conditioning task. Taffel (1955) found that high-anxious psychiatric patients conditioned more readily than low-anxious patients. Buss and Gerjoy (1958) found no significant differences between high-anxious and low-anxious psychiatric patients. Knutson (1964), using college students as subjects in a free operant verbal conditioning situation, found no significant differences in the conditionability of high-anxious and low-anxious subjects. In a modified Taffel situation Sarason (1958) found that high test-anxiety was related to higher levels of verbal conditioning. Negative findings have recently been reported by Spielberger, DeNike, and Stein (1965).

In a Taffel-type procedure, Hetrick and Haas (1962) found no relationship between the variables of ego-strength, depression, and psychopathy and verbal conditioning.

The interaction of subjects and sex of the experimenter administering the reinforcement has also been investigated. Cieutat (1962) evaluated this interaction by conditioning verbalization in a group discussion situation and found the reinforcement (attention) was effective only when the experimenter and subject were of the same sex. In two later studies Cieutat (1964) found inconsistent results on the conditioning measures when the sex of the experimenter and subjects were varied.

Using a Taffel-type paradigm Ogawa and Oakes (1965) found a significant interaction between conditioning, anxiety level, and sex. For female subjects the relationship between anxiety and conditioning was not influenced by the sex of the experimenter. For male subjects the relationship was highly dependent upon the sex of the experimenter: with a male experimenter high-anxious male subjects condition as well or better than low-anxious male subjects; but with female experimenters low-anxious male subjects condition better than high-anxious male subjects. If substantiated by further research the work of Ogawa and Oakes might prove to explain some of the seemingly contradictory findings regarding the relationship of anxiety to verbal conditioning.

Meyer, Swanson, and Kauchack (1964) attempted to condition fourth and fifth grade children to respond with hostile or neutral verbs in a modified Taffel procedure. The variables of age, sex, intelligence, and type of reinforcing stimuli were evaluated. Although age and sex differences were not significant, there was a tendency for the bright subjects to emit more hostile verbs. Using the reinforcements of "good," a light flash which the subjects understood to mean

"good," and a light flash with no special connotation attached, they found the first two reinforcers to be effective in producing conditioning while the third was not.

Mosher (1966) predicted that guilt would facilitate the conditioning of "super-ego" or guilt related content and inhibit the conditioning of hostile words. In a Taffel-type situation the hypotheses were supported.

#### Procedural Variables and Verbal Conditioning

In a modified Taffel procedure Buchwald (1959) evaluated the effectiveness of verbal reinforcement. Using "right," "wrong," and "nothing" singly and in combinations the author concluded that during exposure to right-nothing, "nothing" becomes a negative reinforcer. In exposure to nothing-wrong, "nothing" becomes a positive reinforcer. There were also indications that the assumption that "right" and "wrong" are equally potent reinforcers may be slightly superior to the assumption that "right" is a much weaker reinforcer than "wrong."

Investigating the influence of instructional set, Hall (1960) found that subjects conditioned faster under conditions of ego-orientation to the task as compared to task-oriented instructions. Both groups, however, conditioned to the social reinforcer "good." Kanfer and Marston (1962) found that task-relevant information facilitated learning in verbal conditioning experiments.

Simkins (1963) investigated the role of preconditioning instructions and type of reinforcement on verbal conditioning in a Taffel paradigm. Subjects in different experimental groups were given varying degrees of information concerning the nature of the reinforcement and the reinforcement contingency. In some groups the reinforcement

was "good" and in others the subjects received points as reinforcement. It was found that information facilitated conditioning and, beyond this, subjects who received points learned better than those who received the verbal social reinforcer.

Greenspoon (1962), in describing characteristics of response classes selected for reinforcement has indicated that some negative results in conditioning studies probably occur when the basis of discrimination of the critical response class is not sufficiently defined to enable the subject to make the discrimination.

Weiss, Ekman, Ullmann, and Krasner, (1965) studied the relationship of the context of reinforcement to conditioning in a situation in which subjects were verbally reinforced for using emotional words in telling stories to TAT-like pictures. Prior to conditioning one group read sample stories given by "other people" with no further information. The second group also read the stories but were told that two of the stories were written by mental patients and two by college students. Two of the stories were written in highly emotional language. Thus, a situation was created designed to conflict with the experimenter's subsequent reinforcement of the subject's use of emotional words. Another group was reinforced for the use of emotional words, but did not read the sample stories beforehand. Only the latter group displayed conditioning. The two types of structuring produced no differential effects. The authors concluded that examiner reinforcement may be effective in ambiguous conditions because of possible anxiety reduction by structuring the situation.

Meyer and Crum (1966) conditioned animate nouns in a free operant verbal conditioning procedure. They used three groups which

received no reinforcement, positive reinforcement, and positive-negative reinforcement, respectively. The authors found a significant conditioning effect in the positive and positive-negative groups over the control group. Further, the use of positive and negative reinforcement produced greater conditioning than did the single use of positive reinforcement alone.

Several studies (Binder, et. al., 1957; Kanfer, 1958; Reece and Whitman, 1962; Solley and Long, 1958) have found differences in effectiveness between experimenters in obtaining conditioning in the same experimental situation. Recently Lublin (1965) attempted to systematically study some of the sources of differences in effectiveness among controllers of verbal reinforcement. One major finding was that experimenters differed in their speed of administering reinforcement. This factor was significantly related to the level of conditioning achieved by the subjects.

#### Experimenter-Subject Interaction and Verbal Conditioning

The nature of the experimenter-subject interaction has been shown to be an important variable influencing verbal conditioning. Kanfer and Karas (1959), manipulating the quality of preconditioning experimenter-subject interaction found that either the experimenter's praise or criticism produced more learning than no interaction.

Binder, McConnell, and Sjöholm (1957) found that for comparable subjects, an attractive female experimenter produced steeper learning curves than another experimenter who was a husky ex-Marine captain. Krasner, Ullmann, Weiss, and Collins (1961) found that two male Ph.D.'s obtained a significantly greater number of critical responses (emotional words) than a female AB experimenter.

Sapolsky (1960) created high- or low-attraction between Ss and experimenters by manipulating instructions. In a Taffel-type task this author found less conditioning when the reinforcer and subject were incompatible. Ferguson and Buss (1960) demonstrated that an aggressive reinforcer inhibited conditioning of hostile verbs.

Bryan and Lichtenstein (1966) also investigated the effects of subject and experimenter attitudes in verbal conditioning. Subjects were given a neutral, like, or dislike personality description of the experimenters prior to conditioning in a Taffel-type task. Subjects with either positive or negative attitudes conditioned while neutral subjects did not. Experimenters given comparable personality descriptions of their subjects yielded no significant main effect. However, a significant interaction suggested that hostile experimenters inhibited conditioning.

The presence or absence of the experimenter during conditioning has also been discussed as an important variable affecting verbal conditioning. Weide (1959) asserted that it was doubtful if verbal conditioning could occur when the experimenter was not physically present in the situation. Singer (1961) noted that the presence or absence of the experimenter appeared to be an important variable influencing verbal conditioning. As noted above, Kanfer and Karas (1959) found that when the experimenter either praised or criticised the subject prior to conditioning, more verbal conditioning occurred than when there was no pre-experimental subject-experimenter interaction. Knutson (1964) and Nordmark (1964, 1968) both found that verbal conditioning can occur in the physical absence of the experimenter. Ebner (1965), using both a normal and schizophrenic

group, found that normals conditioned when reinforcement was administered over a loudspeaker and there was no interaction between the experimenter and Ss. Schizophrenics, however, did not demonstrate conditioning.

#### Awareness in Verbal Conditioning

Whether conditioning of verbalizations without subject awareness takes place has been a controversial matter. Adams (1957) concluded that evidence for learning without awareness is equivocal and pointed out that there is little concensus as to what constitutes awareness or how to measure it. Krasner (1958) reviewed thirty-one studies of verbal conditioning and reported that about five per cent of all the combined subjects were aware in the opinion of their various experimenters.

Postman and Sassenrath (1961) concluded that learning without awareness does occur and that verbal rewards and punishments significantly effect incidental learning.

Most studies have utilized an interview or questionnaire to assess subject awareness. Levin (1961) found that lengthening the interview increased the number of subjects judged aware. Krasner, Weiss, and Ullmann (1961) concluded that, considered alone, awareness is a concept of dubious validity in verbal conditioning. From their research they conclude that subject-determined variables will determine the effect that awareness has on conditioning. As noted by Williams (1964), several studies (Ekman, Krasner, Ullmann, 1963; Kanfer and Marston, 1962; Simkins, 1963; Spielberger, 1962; Spielberger, Levin, and Shepard, 1962) support the conclusion that awareness is a function of pre-conditioning instructions, discriminability of critical response



and reinforcement, personality attraction, and atmosphere, and that these variables can be controlled to influence reported awareness.

### Verbal Conditioning of Psychiatric Patients

Leventhal (1959) investigated the use of verbal reward and punishment with normal, neurotic, and psychotic subjects in a Taffel-type verbal conditioning procedure. All three diagnostic groups conditioned over trials when both reward and punishment were used. Normal subjects also showed significant learning when verbal reward and punishment were used alone. Schizophrenics did not condition under reward conditions alone and neurotics did not condition when only punishment was administered.

Johannsen and Campbell (1964) attempted to condition chronic schizophrenics in a Taffel-type situation. Dividing subjects into groups on the basis of a social-responsiveness rating scale, the experimenters administered either verbal reward or verbal punishment in the conditioning period. Conditioning was found to occur, but limited to the high socially responsive group functioning under reward conditions.

Salzinger and Portnoy (1964) attempted to condition self-referred affect statements in interviews with schizophrenic patients. Failure to obtain conditioning in chronic schizophrenics was explained on the basis of extremely low operant levels (Salzinger and Pisoni, 1960, 1961). Acute schizophrenics with higher operant levels demonstrated conditioning. The authors concluded that reactivity to reinforcement may provide a valuable prognostic index for mental patients. Salzinger, Portnoy, and Feldman (1964) used three groups

of hospitalized schizophrenics and attempted to condition various classes of responses in continuous speech. The groups were reinforced for self-referred affect statements and speech in general, respectively. A third group received no reinforcement and served as an experimental control group. The two reinforcement groups both demonstrated conditioning when compared to the control group. As had been found previously, those subjects who did not condition were found to have very low operant levels prior to the introduction of reinforcement. The effect of reinforcement was found to be specific to the response class reinforced whether narrow (self-referred affect statements) or more general (total speech out-put).

Timmons, Noblin, Adams, and Butler (1965) studied the differential effects of verbal reinforcers and psychoanalytic interpretations in the acquisition and extinction phases of a modified Taffel-type procedure. Subjects were hospitalized male schizophrenics. Mild, affirmatory words used as verbal reinforcers produced the steepest acquisition curve which was followed by a marked drop in frequency of the selected response class during extinction. Psychoanalytically derived interpretations used as reinforcers produced a less steep acquisition curve, but extinction was less rapid.

Ebner (1965) used 36 schizophrenic patients and 36 normals in a Taffel-type sentence construction task. One-half of each group received the verbal reinforcer "good" in the presence of the experimenter; the others heard the reinforcer over a loudspeaker and did not have any direct contact with the experimenter. Normal groups showed significant verbal conditioning under both reinforcement procedures, but no conditioning was obtained for the schizophrenic groups.

There was no relationship between the Taylor Manifest Anxiety Scale and conditioning performance.

Ells (1967) attempted to condition seventy-two hospitalized schizophrenics in a Taffel-type situation. The social reinforcer "good" proved to be reinforcing for only about one-fourth of the subjects. The most important factor contributing to performance was awareness of the response-reinforcement contingency. Also, reinforcement tended to be more effective when the subjects had no pre-experimental interview with the experimenter.

#### Statement of the Problem

Although differential degrees of regression and fixation are the cornerstone of the psychoanalytic theory of psychopathology, no one has yet demonstrated experimentally that differential readiness for regression exists among various psychiatric groups. Psychoanalytic theory would suggest that after schizophrenics, neurotics, and personality trait disturbances have been conditioned to the same level on two responses successively, and then subjected to subsequent punishment, their readiness to revert back (regress) to the first conditioned response would vary as a function of their psychodynamic organization. A verbal conditioning paradigm appeared to be an ideal situation in which to study regression among various psychiatric diagnostic groups.

The verbal conditioning research of several authors utilizing psychiatric patients as subjects has led to equivocal findings and pointed to the need for additional studies. Most of the previous research has demonstrated difficulty in obtaining verbal conditioning with schizophrenics as compared to neurotics, and has emphasized the

importance of interpersonal and reinforcement variables. On the basis of previous research it was believed that verbal conditioning would occur most readily in schizophrenics under conditions of minimal personal interaction and the use of relatively non-social reinforcers. The verbal conditioning paradigm used to study differential regression appeared suitable for studying differential conditionability among various psychiatric groups under such conditions. The procedure also seemed appropriate for studying differences among conditioners and nonconditioners as well as studying awareness of reinforcement contingencies among psychiatric groups.

#### Hypotheses

The hypotheses of this investigation were:

1. The experimental group would demonstrate significantly more regressed responses than the control group.
2. Schizophrenics in the experimental group would demonstrate significantly more regressed responses than neurotics who in turn would demonstrate significantly more regressed responses than character disorders.
3. Schizophrenics in the experimental group would regress more quickly to an earlier learned response in the punishment period than neurotics who in turn would regress more quickly than character disorders.
4. Neurotics and character disorders in the experimental and control groups would demonstrate greater conditionability than schizophrenics.

5. Operant levels for conditioners would be significantly higher than for nonconditioners.

6. More character disorders and neurotics would demonstrate awareness of the reinforcement contingency than schizophrenics.



## CHAPTER II

### EXPERIMENTAL METHOD

#### Subjects

The subjects (Ss) were selected from the inpatient population at the North Dakota State Hospital, Jamestown, North Dakota. Although the basic design called for 60 Ss, 90 patients were selected in order to obtain enough Ss who achieved the conditioning criterion.

From the official hospital records patients who met the following criteria were randomly selected as potential subjects.

1. Official diagnosis of Schizophrenia, Psychoneurosis, or Personality Trait Disturbance
2. Between and ages of 16 and 40 inclusive
3. Less than 2 years of total hospitalization
4. No evidence of organic brain disease
5. No evidence of mental retardation

Further, no patient who, in the clinical judgment of the experimenter (E), was in an acutely disturbed state or on excessive dosages of medication was selected to serve as a S.

From the pool of patients who met the above criteria (128 patients) 16 individuals in each of the following classifications were randomly selected: male schizophrenic, male neurotic, male personality trait disturbance, female schizophrenic, female neurotic, and female personality trait disturbance. (Patients diagnosed as Personality

Trait Disturbance are also referred to as PTD or character disorders in this research.) These 6 classifications will be referred to hereafter as diagnosis x sex categories.

Equal numbers of individuals in each of the diagnosis x sex categories were randomly assigned to a control and experimental condition. From these individuals, the actual Ss utilized in the experimental investigation of regression were selected as follows. From among the individuals assigned to the control condition the first 5 Ss in each of the diagnosis x sex categories who achieved the criterion of conditioning comprised the control group. Similarly, from among the individuals assigned to the experimental group the first 5 Ss in each of the diagnosis x sex categories who achieved the conditioning criterion comprised the overall experimental group. Ss who did not meet the conditioning criterion were not used in the experimental evaluation of regression. However, they were utilized in the investigation of differences between conditioners and nonconditioners.

The order in which the Ss appeared for the experiment was determined by means of a table of random permutations. Such randomization was utilized to minimize potential bias in the selection of actual Ss.

#### Apparatus and Experimental Room

The apparatus consisted of 2 tape recorders, 2 microphones, a radio speaker, two 6-volt 25 watt light bulbs, three 6-volt electric counters, two 6-12 volt transformers, switches and wiring.

Two rooms, approximately 12 x 14 feet, were utilized for the experiment. A 3 x 4 foot one-way mirror was located in the wall

between the 2 rooms. The E was located in 1 of the rooms and had no interpersonal contact with the Ss. The E's female research assistant (RA) indicated where the S should sit and had no further contact with the Ss until after completion of the experimental session. RA then took Ss to another room where a brief questionnaire was administered. The RA did not know to which group the S was assigned nor the diagnosis of the patient until after the experimental procedure had begun.

The experimental room contained several chairs around the perimeter and a table which held the instrument complex. The instruments consisted of an enclosed radio speaker over which the S received recorded instructions. A green light was located on the right side of the speaker case and a red light was located on the left side. Below each light was an electric counter. A microphone was located in the center of the table on a stand.

The E's room contained 2 tape recorders. One was used to record responses emitted by the Ss. The other was used to transmit recorded instructions. The E administered reinforcement (flash of green light) and punishment (flash of red light) by pushing an appropriate switch. With each occurrence of reinforcement and punishment, an electric counter near the E registered. The respective counters under the lights in the S's room also registered.

During the experimental session the number of adjectives, plural nouns, and other words were recorded. Following a procedure utilized by Knutson (1964) which yielded highly reliable identification of response classes, a data sheet for each S was utilized. On the data sheets adjectives were designated by "x," plural nouns by "o," and



other words by "-." The entire experimental session for all Ss was recorded on tape.

Following collection of all data 10 Ss from the experimental group were randomly selected to provide information on the reliability of scoring the critical response classes. For the Ss in the reliability sample, comparison between experimental and post-experimental scoring of the reinforced response classes was made.

#### Experimental Method

The basic paradigm utilized was that successfully employed by Knutson (1964). The paradigm may be diagrammed as follows:

		A	B	C
Exp. Gp.	Base rate	Reinf. for Adjectives	Reinf. for Pl. Nouns	Punish. for all words
Control Gp.	Base rate	-----	Reinf. for Pl. Nouns	Punish. for all words

During a 5-minute preconditioning period the base rates for the 2 critical response classes (adjectives and plural nouns) were determined for each S in both the experimental and control groups. The base rate consisted of the number of critical responses in relation to total word out-put.

There were 3 experimental conditions. Condition A was administered to all members of the experimental group, but not the control group. During this period the experimental Ss were given reinforcement for all adjectives emitted during a maximum 25-minute acquisition period. The criterion of conditioning was 27 reinforcements for adjectives during this time period. When 27 reinforcements had been given this acquisition period was stopped.

All Ss in the experimental and control groups participated in Condition B. Ss were reinforced for all plural nouns emitted during a maximum 25-minute acquisition period. The conditioning criterion, as in Condition A, was 27 reinforcements during the time period allowed. The experimental session was immediately stopped for those Ss who did not meet the conditioning criterion in either of the reinforcement periods.

All subjects in the experimental and control groups participated in Condition C. During a 5-minute period all verbal responses received punishment (flash of red light) immediately following attainment of the criterion in Condition B. Following the punishment period all Ss were given arbitrary reinforcements in an attempt to alleviate any distress the experiment might have created.

Following Condition C the Ss were taken to another room by RA and asked to complete a brief questionnaire. After this they were paid for their participation in the experiment. Regardless of their performance, Ss in the experimental group received \$.50 and Ss in the control group received \$.35. Those Ss who did not meet the conditioning criterion received \$.35. Three measures of regression were obtained in the punishment period: number of adjectives occurring in the 5-minute period, proportion of adjectives occurring in the 5-minute period, and number of seconds for the first adjective to occur.

#### Instructions to Subjects

Recorded instructions were transmitted to each S through the speaker located in front of the S. These instructions were a modified form of those used by Knutson (1964). The modification includes introduction of the possibility of receiving a monetary reward by emitting

correct responses and omits ego-threat aspects of the instructions used by Knutson. The instructions were as follows:

You are about to participate in a study conducted by a member of the Department of Psychology. It is approved by the Research Board and hospital administration. The purpose of the experiment is to determine people's ability to solve unfamiliar problems. Following completion of the procedure, you will be paid money. The amount of money you receive will depend on how well you solve the problem.

The task involves your ability to say certain types of words that the experimenter wishes you to give. You are to say all the words that come to your mind. Say them loudly and clearly. Do not use sentences or phrases. Do not count. Just say individual words. The green light will flash when you have given an appropriate word and the counter immediately below the green light will record a point earned whenever the green light flashes. The amount of points you receive will determine the amount of money you will get when the session is over. The red light will indicate points being taken away and these points will also be recorded on the counter immediately below the red light. Try to earn as many points and as much money as you can. If neither light is flashing this indicates that you are neither earning nor losing points and money. The first 5 minutes will be used to determine your usual rate and type of words. Neither light will come on during this period. I will tell you when the actual study has begun by saying, "The five minutes are up. The lights will now indicate correctness of words and whether you are earning money." Since I will not be able to answer questions, please listen carefully while the instructions are repeated.

The instructions were repeated and then followed by, "Ready now, wait for about 10 seconds then begin saying words and continue saying them until I tell you to stop."

After completion of the experiment, Ss were asked to complete a brief questionnaire to assess their awareness of the response-reinforcement contingency. The questionnaire was as follows:

1. How did you decide which words to say?
2. What kinds of words gave you the most points?

In this research "awareness" was defined as any statement indicating a principle that if followed 100 per cent of the time would lead to reinforcement of every response.

## CHAPTER III

### RESULTS

#### Description of Subjects

The basic design of this research called for 60 Ss who achieved the conditioning criterion of 27 reinforcements within a 25-minute period of time. In order to obtain 60 such Ss it was necessary to subject 73 patients to the experimental procedure. The 13 patients who did not meet the conditioning criterion were used only for relevant comparisons between conditioners and nonconditioners, not in the experimental investigation of regression.

#### Age

Table 1 presents the means and standard deviations of the ages of the 60 Ss. Table 2 presents a summary of the analysis of variance on the age variable. From these tables it can be seen that the mean age of the experimental group (27.12) did not differ significantly from the mean age of the control group (29.00). These tables also show that the mean ages of schizophrenics (29.01), neurotics (25.56), and PTDs (29.61) did not differ at a statistically significant level. Nor did the mean age of males (29.00) differ significantly from the mean age of females (27.12). The mean age for the entire sample was 28.06 with a standard deviation of 7.24. Hartley's procedure (Winer, 1962, pp. 93-94) was utilized for testing the significance of the differences between the variances of the 12 diagnosis x sex

treatment categories. This yielded an  $F_{max} = 24.12$  ( $df = 12,4$ ) which was not statistically significant. Thus the treatment groups were quite homogeneous with respect to variability on the age variable.

TABLE 1

MEANS AND STANDARD DEVIATIONS OF THE AGES OF ALL  
Ss WHO MET THE CONDITIONING CRITERION

		<u>Experimental Group</u>		<u>Control Group</u>		
		<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	
Schiz	N	5	5	5	5	20
	M	25.95	24.36	30.95	34.80	29.01
	SD	5.13	9.43	7.42	1.92	6.70
Neurotic	N	5	5	5	5	20
	M	27.58	20.80	25.12	28.73	25.56
	SD	6.44	2.93	7.15	8.71	7.17
PTD	N	5	5	5	5	20
	M	34.75	29.27	29.63	24.80	29.61
	SD	3.73	7.10	9.35	2.72	7.24
	N	15	15	15	15	60
	M	29.43	24.81	28.57	29.44	28.06
	SD	6.19	6.59	8.40	6.79	7.24
	N	30		30		
	M	27.12		29.00		
	SD	6.80		7.67		

Table 2 demonstrates a significant Group x Diagnosis interaction ( $F = 4.26$ ). In the experimental group the PTDs had a significantly higher mean age (32.01) than neurotics and schizophrenics whose means were 24.19 and 25.16 respectively. These latter means were not significantly different. In the control group the schizophrenics mean age of 32.87 differed significantly from that of the neurotics (26.92) and character disorders (27.22). The difference between the means of

the neurotics and PTDs of the control group was not statistically significant.

TABLE 2

ANALYSIS OF VARIANCE OF THE AGES OF ALL Ss  
WHO MET THE CONDITIONING CRITERION

Source of Variation	SS	df	MS	F*	p
Group	53.393	1	53.393	1.14	
Diagnosis	191.646	2	95.823	2.05	
Sex	52.416	1	52.416	1.13	
Group x Diagnosis	396.585	2	198.293	4.26	<.05**
Group x Sex	113.163	1	113.163	2.43	
Diagnosis x Sex	99.557	2	49.778	1.07	
Group x Diagnosis x Sex	59.323	2	29.662		
Within	2233.741	48	46.536		
Total	3199.823	59			

\*F values less than 1.00 were not recorded for the analyses of variance utilized in this research.

\*\*The .05 level of significance for two-tailed tests was chosen as the level for the rejection of all null hypotheses in this research.

#### Educational Level

Table 3 presents the means and standard deviations of the educational level of the 60 Ss. A summary of the analysis of variance on the education variable is presented in Table 4. From these tables it can be seen that the mean years of education attained by the experimental group (12.03) did not differ significantly from that of the control group (10.87). The mean of the males (12.00) did not differ significantly from that of the females (10.90). Schizophrenics, neurotics, and character disorders with means of 12.30, 11.10, and 10.90 respectively were not significantly different. None of the interactions were statistically significant. The mean years of

TABLE 3

MEANS AND STANDARD DEVIATIONS OF THE EDUCATIONAL  
LEVEL IN YEARS OF ALL Ss WHO MET THE  
CONDITIONING CRITERION

		<u>Experimental Group</u>		<u>Control Group</u>		
		<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	
Schiz	N	5	5	5	5	20
	M	14.00	11.20	12.40	11.60	12.30
	SD	1.73	3.25	2.65	3.20	2.98
Neurotic	N	5	5	5	5	20
	M	11.80	11.60	9.60	11.40	11.10
	SD	2.56	.73	1.49	1.74	1.97
PTD	N	5	5	5	5	20
	M	13.60	10.00	10.60	9.60	10.90
	SD	1.96	1.79	1.74	1.96	2.65
	N	15	15	15	15	60
	M	13.13	10.93	10.87	10.87	11.45
	SD	2.35	3.05	2.32	2.54	2.76
	N	30		30		
	M	12.03		10.87		
	SD	2.94		2.43		

TABLE 4

ANALYSIS OF VARIANCE OF THE EDUCATIONAL LEVEL OF ALL Ss  
WHO MET THE CONDITIONING CRITERION

Source of Variation	SS	df	MS	F	p
Group	20.417	1	20.417	2.82	
Diagnosis	21.900	2	10.950	1.52	
Sex	18.150	1	18.150	2.51	
Group x Diagnosis	3.033	2	1.517		
Group x Sex	18.150	1	18.150	2.51	
Diagnosis x Sex	27.700	2	13.850	1.92	
Group x Diagnosis x Sex	.300	2	.150		
Within	347.200	48	7.233		
Total	456.850	59			

education for the entire sample was 11.45 with a standard deviation of 2.76. A nonsignificant  $F_{max} = 4.76$  ( $df = 12,4$ ) was obtained indicating that the diagnosis x sex groups were homogeneous with respect to variability on the education variable.

#### Months of Hospitalization

Table 5 presents the means and standard deviations of the total number of months the 60 Ss had been hospitalized for psychiatric reasons. A summary of the analysis of variance of total months of hospitalization is presented in Table 6. From Table 5 it may be seen that the standard deviations are extremely large when compared to the

TABLE 5  
MEANS AND STANDARD DEVIATIONS OF THE TOTAL LENGTH OF  
ALL HOSPITALIZATIONS IN MONTHS FOR Ss WHO  
MET THE CONDITIONING CRITERION

		<u>Experimental Group</u>		<u>Control Group</u>		
		<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	
Schiz	N	5	5	5	5	20
	M	3.60	6.20	9.20	13.20	8.05
	SD	2.41	2.63	8.75	7.30	6.96
Neurotic	N	5	5	5	5	20
	M	3.80	3.80	4.00	2.40	3.50
	SD	5.11	1.72	5.02	1.36	3.80
PTD	N	5	5	5	5	20
	M	2.00	4.20	6.40	4.00	4.15
	SD	1.26	4.07	5.54	3.69	4.25
	N	15	15	15	15	60
	M	3.13	4.73	6.53	6.53	5.23
	SD	3.44	3.16	6.98	6.75	5.57
	N	30		30		
	M	3.93		6.53		
	SD	3.40		6.87		



means and that the various groups have unequal variances. Hartley's test yielded an  $F_{max} = 48.23$  ( $df = 12,4$ ) for the diagnosis x sex categories which was not significant. Comparing the variances of the experimental and control groups a  $F_{max} = 4.08$  ( $df = 2,29$ ) which was significant at less than the .01 level was obtained. When the variances of the diagnostic categories were compared an  $F_{max} = 3.35$  ( $df = 3,19$ ) was obtained. This was significant at less than the .05 level. Thus, the data for total length of all hospitalizations was characterized by marked skewness and heterogeneity of variance. However, considering the robustness of the F test and the descriptive purpose for which this data is presented an analysis of variance was completed.

TABLE 6

ANALYSIS OF VARIANCE OF TOTAL LENGTH OF ALL HOSPITALIZATIONS  
FOR SS WHO MET THE CONDITIONING CRITERION

Source of Variation	SS	df	MS	F	p
Group	101.4000	1	101.4000	3.73	<.05
Diagnosis	242.2334	2	121.1167	4.45	<.05
Sex	9.6000	1	9.6000		
Group x Diagnosis	120.9000	2	60.4500	2.22	
Group x Sex	9.6000	1	9.6000		
Diagnosis x Sex	48.1000	2	24.0500		
Group x Diagnosis x Sex	22.5000	2	11.2500		
Within	1306.4000	48	27.2166		
Total	1860.7334	59			

The mean number of months of hospitalization was 3.93 for the experimental group and 6.53 for the control group. The difference between these means was significant at less than the .05 level ( $F = 3.73$ ). The main effect for Diagnosis was also significant beyond

the .05 level ( $F = 4.45$ ). Table 7 presents polynomial contrasts between the means of the three diagnostic categories. Schizophrenics, with a mean of 8.05, differed significantly from Neurotics and PTDs

TABLE 7

COMPARISONS BETWEEN (1) SCHIZOPHRENICS AND NEUROTICS,  
(2) SCHIZOPHRENICS AND PTDs, AND (3) NEUROTICS  
AND PTDs ON MONTHS OF HOSPITALIZATION

Comparison	SS	df	F	p
1	414.05	1,48	15.21	<.001
2	304.20	1,48	11.18	<.001
3	8.45	1,48		
	MS error 27.2166			

whose means were 3.50 and 4.15 respectively. The standard deviations for schizophrenics, neurotics and PTDs were 6.96, 3.80, and 4.25 respectively. It should be noted that these data are markedly skewed. The mean difference between months of hospitalization for neurotics and PTDs was not statistically significant. The mean months of hospitalization for the entire sample was 5.23 with a standard deviation of 5.57. Once again, with respect to the entire sample the data was markedly skewed.

#### Reliability of Administering Reinforcement

The reliability of scoring the critical response classes was determined by utilizing the following procedure. During the experimental session the number of adjectives, plural nouns, and other words were recorded and designated on data sheets as "x," "o," and "-", respectively. The entire experimental session for each S was tape

recorded. After collection of all data the E used a table of random permutations to select 10 tapes for post-experimental scoring. The 2 scorings for the 10 Ss in the reliability sample were correlated utilizing Spearman Rank-Difference Correlations ( $r_s$ ). The correlation between experimental and post-experimental scoring for adjectives yielded a reliability coefficient of  $r_s = .94$ . The reliability coefficient for plural nouns was  $r_s = .99$ .

#### Base Rate Performance

Table 8 presents comparisons between the base rate performance of the experimental and control groups. During the base rate period the experimental group emitted a mean proportion of .110 (SD = .112) adjectives which did not differ significantly from the mean proportion

TABLE 8

PROPORTION OF ADJECTIVES AND PLURAL NOUNS EMITTED IN THE BASE RATE PERIOD FOR THE EXPERIMENTAL AND CONTROL GROUPS

Response Class		Experimental Group	Control Group	df	t	p
Adjectives	N	30	30	58	1.28	>.05
	M	.110	.076			
	SD	.122	.097			
Plural Nouns	N	30	30	58	.89	>.05
	M	.181	.212			
	SD	.137	.140			

(.076) emitted by the control group (SD = .097). The mean proportions for plural nouns were .181 (SD = .137) and .212 (SD = .140) for the experimental and control groups respectively. It should also be noted that all four measures reported in Table 8 are considerably skewed.

Since the groups did not differ significantly on the critical response classes in the base rate, one may assume they were comparable groups prior to the reinforcement and punishment procedures.

Comparisons between Base Rate and Acquisition Periods

Although all 60 Ss utilized in the investigation of regression met the conditioning criterion specified prior to collection of the data, a further method of determining if conditioning occurred was utilized. The proportion of plural nouns and adjectives occurring in the base rate period was compared to the proportion of these responses occurring in their respective reinforcement periods. These data are presented in Table 9. The experimental group increased from a mean proportion of .181 (SD = .137) plural nouns in the base rate period to a mean proportion of .290 (SD = .113) plural nouns in the reinforcement period. These means were significantly different beyond the .01

TABLE 9

PROPORTION OF ADJECTIVES AND PLURAL NOUNS EMITTED DURING  
THE BASE RATE AND ACQUISITION PERIODS FOR THE  
EXPERIMENTAL AND CONTROL GROUPS

Group		Base Rate	Acquisition Period	df	t	p
Experimental Plural Nouns	N	30	30			
	M	.181	.290	29	2.95	<.01
	SD	.137	.113			
Adjectives	N	30	30			
	M	.110	.407	29	4.13	<.001
	SD	.122	.237			
Control Plural Nouns	N	30	30			
	M	.212	.318	29	2.58	<.02
	SD	.140	.167			

level of significance ( $t = 2.95$ ). Also for the experimental group the mean proportion of adjectives was increased from .110 ( $SD = .122$ ) in the base rate period to .407 ( $SD = .237$ ) in the reinforcement period. This mean difference resulted in an obtained  $t$  value of 4.13 which was significant beyond the .001 level. Thus, the experimental group demonstrated conditioning with respect to both response classes. The control group, which was reinforced only for plural nouns, increased from a mean proportion of .212 in the base rate period ( $SD = .140$ ) to a mean of .318 in the reinforcement period ( $SD = .167$ ). This mean difference was found to be significant at less than the .02 level ( $t = 2.58$ ) and demonstrated that the control group also conditioned on plural nouns.

#### Regression Measures

The hypothesis that the experimental group would demonstrate more regressed responses (adjectives) in the punishment period was tested by considering two measures of regression: number of adjectives occurring in the punishment period and proportion of adjectives occurring in the punishment period. A third measure of regression-- number of seconds to give the first adjective in the punishment period--was also used to test this hypothesis. However, it was believed that this measure was more appropriately related to investigation of differential readiness for regression among the three diagnostic categories.

The groups differed significantly with respect to total months of hospitalization and a significant Group x Diagnosis interaction was obtained on the age variable. In order to determine if a covariant adjustment was needed, Pearson Product-Moment correlations ( $r$ ) were computed between

the variables of age and months of hospitalization and the three regression measures. The  $r$  between age and number of adjectives emitted in the punishment period was found to be  $r = .16$ . The correlation between age and proportion of adjectives in the punishment period was  $r = -.04$ . The correlation between age and time to emit the first adjective in the punishment period was  $r = -.03$ . None of these correlations were statistically significant from zero. The Pearson Product-Moment correlations between months of hospitalization were  $-.13$ ,  $-.21$ , and  $.02$  with number of adjectives, proportion of adjectives, and time to emit the first adjective respectively. Since none of these correlations differed significantly from zero, covariant adjustments were not used.

Number of Regressed Responses emitted  
in the Punishment Period

Table 10 presents the means and standard deviations of the number of regressed responses occurring in the punishment period. Inspection of Table 10 reveals that all standard deviations are very large when compared to the means. There are also large differences among the various standard deviations. Thus, the data is markedly skewed and characterized by heterogeneity of variance. Comparison of the variances among the 12 diagnosis x treatment groups yielded  $F_{max} = 937.89$  ( $df = 12,4$ ) which was significant at less than the .001 level.

Table 11 presents a summary of the analysis of variance of the number of regressed responses emitted in the punishment period. From this table it can be seen that the first hypothesis of this research was supported. During the punishment period the experimental group

TABLE 10

MEANS AND STANDARD DEVIATIONS OF THE NUMBER OF REGRESSED  
RESPONSES EMITTED BY S<sub>s</sub> IN THE PUNISHMENT PERIOD

		<u>Experimental Group</u>		<u>Control Group</u>		
		<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	
Schiz	N	5	5	5	5	20
	M	5.20	8.80	3.00	4.20	5.30
	SD	3.54	12.25	3.52	3.31	7.16
Neurotic	N	5	5	5	5	20
	M	5.80	7.40	7.40	3.00	5.90
	SD	2.32	2.65	5.78	2.53	4.04
PTD	N	5	5	5	5	20
	M	6.20	5.80	.20	.60	3.20
	SD	9.93	2.04	.40	1.20	5.47
	N	15	15	15	15	60
	M	5.73	7.33	3.53	2.60	4.80
	SD	6.17	7.44	4.91	2.92	5.21
	N	30		30		
	M	6.53		3.07		
	SD	6.92		4.06		

TABLE 11

ANALYSIS OF VARIANCE OF THE NUMBER OF REGRESSED RESPONSES  
EMITTED IN THE PUNISHMENT PERIOD

Source of Variation	SS	df	Mean Squares	F	p
Group	180.267	1	180.267	5.05	<.05
Diagnosis	81.400	2	40.700	1.14	
Sex	1.667	1	1.667		
Group x Diagnosis	43.133	2	21.566		
Group x Sex	24.066	1	24.066		
Diagnosis x Sex	35.933	2	17.966		
Group x Diagnosis x Sex	29.934	2	14.967		
Within	1713.200	48	35.691		
Total	2109.600	59			

emitted a mean of 6.53 regressed responses (SD = 6.92). The control group emitted a mean of 3.07 regressed responses (SD = 4.06). This mean difference was found to be significant beyond the .05 level of significance. Neither the main effect for Sex nor Diagnosis was statistically significant. None of the interactions approached significance.

The second hypothesis stated that schizophrenics of the experimental group would demonstrate a significantly greater number of regressed responses than neurotics who in turn would demonstrate significantly more regressed responses than the character disorders. Statistical evaluation of the simple effects was justified by this a priori hypothesis. Table 12 presents polynomial contrasts between the mean number of regressed responses given by the three diagnostic

TABLE 12

COMPARISONS BETWEEN (1) SCHIZOPHRENICS AND NEUROTICS,  
(2) SCHIZOPHRENICS AND PTDs, AND (3) NEUROTICS  
AND PTDs OF THE EXPERIMENTAL GROUP ON THE  
NUMBER OF REGRESSED RESPONSES EMITTED  
IN THE PUNISHMENT PERIOD

Comparison	SS	df	F	p
1	.800	1,27	.02	>.05
2	5.000	1,27	.10	>.05
3	1.800	1,27	.03	>.05
	MS error			
	52.90			

categories in the experimental group. The mean number of adjectives given by schizophrenics, neurotics and PTDs in the punishment period were 7.00, 6.60, and 6.00 respectively. The standard deviations were 9.20, 2.62, and 7.17 for the schizophrenics, neurotics and PTDs



respectively. As indicated by Table 12 none of these means were significantly different. Thus, utilizing number of adjectives occurring in the punishment period as a measure of regression, the second hypothesis of this research was not supported. Since the order of means was in the predicted order trend analysis was carried out. The test for linear trend was nonsignificant ( $F = .095$ ;  $df = 1,27$ ).

Proportion of Regressed Responses  
emitted in the Punishment Period

In order to consider overall operant level in the punishment period, the ratio of adjectives to other verbal responses was utilized as a second measure of regression. Table 13 presents the means and

TABLE 13

MEANS AND STANDARD DEVIATIONS OF THE PROPORTIONS OF  
REGRESSED RESPONSES EMITTED BY Ss IN  
THE PUNISHMENT PERIOD

		<u>Experimental Group</u>		<u>Control Group</u>		
		<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	
Schiz	N	5	5	5	5	20
	M	.31	.18	.21	.13	.21
	SD	.20	.13	.23	.13	.19
Neurotic	N	5	5	5	5	20
	M	.26	.31	.16	.11	.21
	SD	.10	.02	.09	.11	.12
PTD	N	5	5	5	5	20
	M	.12	.26	.02	.03	.10
	SD	.08	.07	.03	.06	.12
	N	15	15	15	15	60
	M	.23	.25	.13	.08	.17
	SD	.16	.10	.17	.12	.15
	N	30		30		
	M	.24		.11		
	SD	.13		.14		

standard deviations of the proportion of regressed responses emitted in the punishment period. A summary of the analysis of variance on this data is presented in Table 14. Observation of the relative size of the respective means and standard deviations reported in Table 13

TABLE 14

ANALYSIS OF VARIANCE OF THE PROPORTION OF REGRESSED  
RESPONSES EMITTED IN THE PUNISHMENT PERIOD

Source of Variation	SS	df	Mean Squares	F	p
Group	.2633	1	.263	14.39	<.001
Diagnosis	.1382	2	.069	3.78	<.05
Sex	.0015	1	.002		
Group x Diagnosis	.0225	2	.011		
Group x Sex	.0128	1	.013		
Diagnosis x Sex	.0776	2	.039	2.12	
Group x Diagnosis x Sex	.0199	2	.010		
Within	.8823	48	.018		
Total	1.4181	59			

demonstrates marked skewness of the data. Comparison of the variances of the diagnosis x sex categories yielded an  $F_{max} = 132.25$  ( $df = 12,4$ ) which was significant at less than the .01 level. Thus heterogeneity of within group variance was demonstrated. From Table 14 it is evident that the first hypothesis was again supported. The control group emitted a mean proportion of .11 adjectives ( $SD = .14$ ) in the punishment period. The experimental group emitted a mean proportion of .24 adjectives ( $SD = .13$ ). This mean difference was significant beyond the .001 level ( $F = 14.39$ ). The main effect for Diagnosis was significant at less than the .05 level ( $F = 3.78$ ). Neither the main effect for Sex nor any of the interactions were statistically significant.

Although the Group x Diagnosis interaction was not significant, the a priori hypothesis concerning differential regression among the diagnostic categories of the experimental group made examination of the simple effects justifiable. Table 15 presents polynomial contrasts between the means of the three diagnostic categories of the experimental group. Since there were no significant differences between

TABLE 15

COMPARISONS BETWEEN (1) SCHIZOPHRENICS AND NEUROTICS, (2) SCHIZOPHRENICS AND PTDs, AND (3) NEUROTICS AND PTDs OF THE EXPERIMENTAL GROUP ON THE PRO-  
PORTION OF REGRESSED RESPONSES EMITTED  
IN THE PUNISHMENT PERIOD

Comparison	SS	df	F	p
1	.0084	1,27	.35	>.05
2	.0152	1,27	1.04	>.05
3	.0464	1,27	1.92	>.05
	MS error .0242			

sexes, males and females were not considered separately. The mean proportion of adjectives given by the schizophrenics, neurotics and PTDs of the experimental group in the punishment period were .25, .29, and .19 with standard deviations of .17, .06, and .10 respectively. It may be seen from Table 15 that none of the comparisons among means reached the required level of statistical significance. Since the means were not in the predicted order, no trend analysis was performed.

Number of Seconds to emit the First Regressed  
Response in the Punishment Period

The means and standard deviations of the number of seconds to give the first regressed response in the punishment period are presented

in Table 16. From this table it can be seen that in most of the diagnosis x sex categories the standard deviations are very large with respect to the means and that variances among the twelve treatment groups are unequal. Hartley's test of significance of differences among variances of the diagnosis x sex categories, however, yielded an  $F_{max} = 20.82$  ( $df = 12.4$ ) which was not statistically significant. A summary of the analysis of variance of the number of seconds to give the first regressed response is presented in Table 17. Since many of the Ss, particularly in the control group, did not emit any adjectives during the 5-minute punishment period it was necessary to determine an appropriate time score for these Ss. It was felt that the maximum

TABLE 16

MEANS AND STANDARD DEVIATIONS OF THE NUMBER OF SECONDS TO  
THE FIRST REGRESSED RESPONSE IN THE PUNISHMENT PERIOD

		<u>Experimental Group</u>		<u>Control Group</u>		
		<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	
Schiz	N	5	5	5	5	20
	M	39.80	106.40	78.00	175.00	99.80
	SD	24.36	104.48	111.14	78.35	99.72
Neurotic	N	5	5	5	5	20
	M	97.80	64.80	135.80	154.00	113.10
	SD	77.76	56.16	110.75	89.83	92.59
PTD	N	5	5	5	5	20
	M	107.00	183.00	272.80	276.60	209.85
	SD	105.58	44.10	54.40	46.80	97.41
	N	15	15	15	15	60
	M	81.53	118.07	162.20	201.87	140.92
	SD	82.55	87.95	125.96	91.27	108.35
	N	30		30		
	M	99.80		182.03		
	SD	87.23		111.77		

time score (300 seconds) was most appropriate. To use a lessor value, e.g. the mean time of the Ss who did give adjectives in the punishment period, would only serve to obscure existing time differences. From Table 17 it can be seen that the group main effect reached significance beyond the .001 level ( $F = 8.63$ ). The mean time to give the first regressed response was 99.80 ( $SD = 87.23$ ) seconds for the experimental group and 182.03 ( $SD = 111.77$ ) for the control group. Thus, the first hypothesis of this research was again supported by utilizing time to emit the first adjective as a measure of regression. Neither the Sex main effect nor any of the interactions were statistically significant.

TABLE 17

ANALYSIS OF VARIANCE OF THE NUMBER OF SECONDS TO GIVE THE  
FIRST REGRESSED RESPONSE IN THE PUNISHMENT PERIOD

Source of Variation	SS	df	MS	F	p
Group	101,434.816	1	101,434.816	12.52	<.001
Diagnosis	144,323.033	2	72,161.516	8.91	<.001
Sex	21,774.150	1	21,774.150	2.69	
Group x Diagnosis	17,158.234	2	8,579.117	1.06	
Group x Sex	36.817	1	36.817		
Diagnosis x Sex	19,915.900	2	9,957.950	1.23	
Group x Diagnosis x Sex	10,911.233	2	5,455.616		
Within	388,894.400	48	8,101.967		
Total	704,488.583	59			

Table 17 shows that the Diagnosis main effect for time to emit the first adjective in the punishment period was significant at the .001 level ( $F = 8.91$ ). To investigate the a priori hypothesis that schizophrenics of the experimental group would regress more quickly to an earlier learned response than neurotics who in turn would regress

more quickly than character disorders, polynomial contrasts were made. Table 18 presents the results of these comparisons. The means for the schizophrenics, neurotics and PTDs were 73.1, 81.3, and 145.0 respectively. From Table 18 it can be seen that while it would appear that the PTDs should be significantly different from the schizophrenics and neurotics none of the internal comparisons reached the required level of statistical significance. Since the means were in the predicted order trend analysis was performed. The test for linear trend yielded  $F = 3.54$  ( $df = 1,27$ ) which was nonsignificant.

TABLE 18

COMPARISONS BETWEEN (1) SCHIZOPHRENICS AND NEUROTICS,  
(2) SCHIZOPHRENICS AND PTDs, AND (3) NEUROTICS AND  
PTDs OF THE EXPERIMENTAL GROUP ON THE NUMBER OF  
SECONDS TO THE FIRST REGRESSED RESPONSE IN  
THE PUNISHMENT PERIOD

Comparison	SS	df	F	p
1	336.20	1,27	.04	>.05
2	25848.05	1,27	3.54	>.05
3	20288.45	1,27	2.78	>.05
	MS error 7306.33			

#### Correlations between Regression Measures

Pearson Product-Moment correlations were computed between the three measures of regression utilized in this research. The correlation between number of adjectives in the punishment period and proportion of adjectives in the punishment period was  $r = .48$  which was significantly different from zero beyond the .001 level ( $t = 3.72$ ;  $df = 58$ ). The correlation between number of adjectives and time to emit the first

adjective was  $r = -.53$  which was also significant beyond the .001 level ( $t = 4.11$ ;  $df = 58$ ). The correlation between proportion of adjectives and time to emit the first adjective in the punishment period was  $r = -.66$ . This too was significantly different from zero at less than the .001 level ( $t = 5.12$ ;  $df = 58$ ). McNemar (1962) describes the procedure for testing the significance of differences among intercorrelations. With  $df = 57$  none of the absolute differences between the intercorrelations of the three regression measures reached statistical significance.

Partial correlations were also computed between the three regression measures. The partial correlation between number of adjectives and proportion of adjectives with time to first adjective held constant was  $r_{12.3} = .20$ . This was found to be not significantly different from zero ( $t = 1.54$ ;  $df = 57$ ). The partial correlation between number of adjectives and time to first adjective with proportion of adjectives partialled out was  $r_{13.2} = -.32$ . This correlation differed significantly from zero at less than the .02 level ( $t = 2.55$ ;  $df = 57$ ). The partial correlation between proportion of adjectives and time to first adjective with number of adjectives held constant was  $r_{23.1} = -.54$ . This correlation was significantly different from zero at less than the .001 level ( $t = 4.84$ ;  $df = 57$ ). These partial correlations indicate that proportion of adjectives and time to emit the first regressed responses are measuring a phenomenon somewhat different than that being measured when number of adjectives are considered.

#### Analyses of the Regression Measures after Logarithmic Transformation

In the preceding analyses of the three measures of regression the raw score data was markedly skewed. In addition, the diagnosis x sex

categories were characterized by heterogeneity of variance on the first two measures. The latter was not found with respect to the time for the first regressed response to occur. Because of these violations of assumptions required by the F test the raw data of all three measures was transformed into common logarithms in an attempt to reduce skewness, heterogeneity of variance, and, hence, experimental error variance. Analyses of variance were then performed on the three respective measures of regression. The results of these analyses on the transformed data were the same as those obtained utilizing the raw data. All three measures demonstrated a significant difference between the experimental and control groups, and supported the first hypothesis of this research. Utilizing polynomial contrasts to test the hypotheses of differential regression among the diagnostic groups, no significant differences were obtained. Thus, the second and third hypotheses of this research were not supported by analyses of the transformed data.

Differential Conditionability of the  
Three Diagnostic Groups

Time for the Experimental Group to  
condition in the Reinforcement Period  
for Adjectives

The fourth hypothesis of this research stated that neurotics and character disorders in the experimental and control groups would demonstrate greater conditionability than schizophrenics. This hypothesis was tested by several analyses. Table 19 presents the means and standard deviations of the amount of time taken by Ss of the experimental group to achieve the conditioning criterion for adjectives (27 reinforcements within 25 minutes). A summary of the analysis of



variance of this data is presented in Table 20. The schizophrenics required a mean time of 9.71 (SD = 5.72) minutes to condition on adjectives. The neurotic's and PTD's mean times to condition were 10.59 (SD = 3.19) and 13.88 (SD = 8.32) minutes respectively. Males required

TABLE 19

MEANS AND STANDARD DEVIATIONS OF THE AMOUNT OF TIME IN MINUTES FOR  $S_s$  IN THE EXPERIMENTAL GROUP TO ACHIEVE THE CONDITIONING CRITERION FOR ADJECTIVES

		Male	Female	
Schiz	N	5	5	10
	M	10.19	9.22	9.71
	SD	4.68	6.41	5.62
Neurotic	N	5	5	10
	M	10.30	10.88	10.59
	SD	1.31	4.30	3.19
PTD	N	5	5	10
	M	11.17	16.58	13.88
	SD	8.32	7.40	8.32
	N	15	15	30
	M	10.55	12.23	11.39
	SD	5.59	6.93	6.35

TABLE 20

ANALYSIS OF VARIANCE OF THE AMOUNT OF TIME FOR  $S_s$  IN THE EXPERIMENTAL GROUP TO ACHIEVE THE CONDITIONING CRITERION FOR ADJECTIVES

Source of Variation	SS	df	MS	F	p
Sex	20.9334	1	20.9334	.48	>.05
Diagnosis	96.5734	2	48.2867	1.12	>.05
Sex x Daignosis	55.2139	2	27.6069	.64	>.05
Within	1035.7949	24	43.1581		
Total	1208.5156	29			

a mean time of 10.55 (SD = 5.59) minutes to condition compared to a mean of 12.23 (SD = 6.93) for females. In testing for homogeneity of variance an  $F_{max} = 40.34$  (df = 6,4) was obtained. This indicated that the diagnosis x sex groups were heterogeneous with respect to their variances. Heterogeneity of variance was also demonstrated when the diagnostic groups were compared. This comparison yielded an  $F_{max} = 6.80$  (df = 3,9) which was significant beyond the .05 level. An  $F_{max} = 1.54$  (df = 2,14) was found to be nonsignificant in the comparison of variances for the experimental and control groups. Table 20 indicates that neither the main effects for Sex and Diagnosis nor the interaction reached significance. Although the means for the diagnostic categories do not differ significantly, it should be noted that their order is opposite of that predicted. Schizophrenics actually took less time to condition than character disorders.

Proportion of Adjectives emitted by the  
Experimental Group in the Reinforcement  
Period for Adjectives

The hypothesis that neurotics and PTDs would demonstrate greater conditionability was also investigated by analyzing the proportion of reinforced responses which occurred in the respective reinforcement periods. The means and standard deviations of the proportion of adjectives emitted by the experimental group during the reinforcement period for adjectives are presented in Table 21. It should be noted from this table that marked skewness is present in some of the diagnosis x sex categories. An  $F_{max} = 64.83$  (df = 6,4) was significant beyond the .05 level and demonstrated heterogeneity of variance among the diagnosis x sex categories. The difference between the variances of the experimental and control groups was also

significant beyond the .05 level ( $F_{max} = 3.92$ ;  $df = 2,14$ ). The  $F_{max} = 2.19$  ( $df = 3,9$ ) for the diagnostic categories was not statistically significant. A summary of the analysis of variance of this data is shown in Table 22. The mean proportion of adjectives emitted by females in the reinforcement period for this response class was

TABLE 21

MEANS AND STANDARD DEVIATIONS OF THE PROPORTION OF ADJECTIVES EMITTED BY THE EXPERIMENTAL GROUP IN THE REINFORCEMENT PERIOD FOR ADJECTIVES

		<u>Male</u>	<u>Female</u>	
Schiz	N	5	5	10
	M	.272	.630	.451
	SD	.108	.221	.250
Neurotic	N	5	5	10
	M	.436	.454	.445
	SD	.177	.315	.256
PTD	N	5	5	10
	M	.385	.265	.325
	SD	.441	.055	.173
	N	15	15	30
	M	.364	.449	.407
	SD	.189	.374	.237

TABLE 22

ANALYSIS OF VARIANCE OF THE PROPORTION OF ADJECTIVES EMITTED BY THE EXPERIMENTAL GROUP IN THE REINFORCEMENT PERIOD FOR ADJECTIVES

Source of Variation	SS	df	MS	F	p
Sex	.0547	1	.0547		
Diagnosis	.1007	2	.0503		
Sex x Diagnosis	.3041	2	.1520	1.64	
Within	2.2200	24	.0925		
Total	2.6795	29			

.449 (SD = 3.74). For males the mean proportion was .364 (SD = .189). This mean difference did not approach statistical significance. The mean proportions of adjectives emitted during the reinforcement period for this response class were .451, .445, and .325 for the schizophrenics, neurotics, and PTDs respectively. The respective standard deviations were .250, .256, and .173. The Diagnosis main effect failed to reach statistical significance. Although the differences among the means of the diagnostic categories are attributable to chance, once again they are in a direction opposite from that predicted. The schizophrenics actually gave a higher proportion of critical responses during the reinforcement period for adjectives than PTDs.

Thus, the two preceding analyses failed to support the fourth hypothesis of this research. In addition, the results tended to be in the direction opposite of the prediction.

#### Time for All Ss to condition in the Reinforcement Period for Plural Nouns

The fourth hypothesis was also investigated by evaluating the performance of all 60 Ss in the reinforcement period for plural nouns. The means and standard deviations of the amount of time required by subjects of both the experimental and control groups to achieve the conditioning criterion for plural nouns is presented in Table 23. The summary of the analysis of variance for this data is presented in Table 24. A nonsignificant  $F_{max} = 5.47$  ( $df = 12,4$ ) was obtained indicating that the 12 diagnosis x sex categories were homogeneous with respect to variability. The control group required a mean time of 11.65 (SD = 6.40) minutes to reach the conditioning criterion. The mean time for the experimental group was 15.39 (SD = 6.51) minutes.

TABLE 23

MEANS AND STANDARD DEVIATIONS OF THE AMOUNT OF TIME IN  
MINUTES FOR  $S_s$  OF BOTH GROUPS TO ACHIEVE THE  
CONDITIONING CRITERION FOR PLURAL NOUNS

		<u>Experimental Group</u>		<u>Control Group</u>		
		<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	
Schiz	N	5	5	5	5	20
	M	12.72	14.34	12.72	11.54	12.83
	SD	5.21	7.02	6.11	4.36	5.89
Neurotic	N	5	5	5	5	20
	M	20.27	18.01	11.92	11.24	15.36
	SD	6.89	3.33	7.79	4.96	7.14
PTD	N	5	5	5	5	20
	M	11.51	15.47	11.62	10.84	12.36
	SD	5.63	5.82	7.23	7.61	6.87
	N	15	15	15	15	60
	M	14.83	15.94	12.08	11.21	13.52
	SD	7.11	5.81	6.92	5.82	6.78
	N	30		30		
	M	15.39		11.65		
	SD	6.51		6.40		

TABLE 24

ANALYSIS OF VARIANCE OF THE AMOUNT OF TIME FOR  $S_s$  OF BOTH GROUPS  
TO ACHIEVE THE CONDITIONING CRITERION FOR PLURAL NOUNS

Source of Variation	SS	df	MS	F	p
Group	209.9262	1	209.9262	4.43	< .05
Diagnosis	103.9468	2	51.9734	1.10	
Sex	.1938	1	.1938		
Group x Diagnosis	111.4511	2	55.7255	1.18	
Group x Sex	14.7908	1	14.7908		
Diagnosis x Sex	23.5292	2	11.7646		
Group x Diagnosis x Sex	26.2635	2	13.1317		
Within	2273.9914	48	47.3748		
Total	2764.0928	59			

This mean difference was significant beyond the .05 level ( $F = 4.43$ ). This significant difference is to be expected since the experimental group was first reinforced for adjectives and then after having achieved the criterion for this response class was reinforced for plural nouns. During the conditioning period for plural nouns it was necessary for the response strength built up in the previous reinforcement period to extinguish. Hence, it took the experimental group longer than the control group to achieve the conditioning criterion for plural nouns. Schizophrenics, neurotics, and PTDs required means of 12.83, 15.36, and 12.36 minutes respectively to achieve 27 reinforcements within the 25 minute period. The respective standard deviations were 5.89, 7.14, and 6.87. Neither this Diagnosis main effect nor any of the interactions reached the required level of statistical significance. Thus, the hypothesis of differential conditionability among the three diagnostic categories was not supported by this analysis.

Proportion of Plural Nouns emitted  
by All Ss in the Reinforcement Period  
for Plural Nouns

Table 25 presents the means and standard deviations of the proportion of plural nouns emitted by Ss in the reinforcement period for this response class. A summary of the analysis of variance on this data is presented in Table 26. An  $F_{max} = 101.2$  ( $df = 12,4$ ) was significant at beyond the .05 level demonstrating heterogeneous variances among the diagnosis x sex categories. Comparison of variances of the experimental and control groups ( $F_{max} = 2.18$ ;  $df = 2,14$ ) and among the diagnostic categories ( $F_{max} = 2.14$ ;  $df = 2,9$ ) yielded no statistically significant differences. During the reinforcement period for adjectives

TABLE 25

MEANS AND STANDARD DEVIATIONS OF THE PROPORTION OF  
PLURAL NOUNS EMITTED BY S<sub>s</sub> OF BOTH GROUPS IN  
THE REINFORCEMENT PERIOD FOR PLURAL NOUNS

		<u>Experimental Group</u>		<u>Control Group</u>		
		<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	
Schiz	N	5	5	5	5	20
	M	.247	.305	.224	.251	.256
	SD	.092	.139	.099	.062	.108
Neurotic	N	5	5	5	5	20
	M	.263	.226	.353	.261	.276
	SD	.133	.035	.196	.022	.128
PTD	N	5	5	5	5	20
	M	.380	.320	.354	.463	.379
	SD	.105	.048	.155	.225	.158
	N	15	15	15	15	60
	M	.297	.284	.310	.325	.304
	SD	.125	.095	.167	.167	.143
	N	30		30		
	M	.290		.318		
	SD	.113		.167		

TABLE 26

ANALYSIS OF VARIANCE OF THE PROPORTION OF PLURAL NOUNS EMITTED  
BY S<sub>s</sub> OF BOTH GROUPS IN THE REINFORCEMENT  
PERIOD FOR PLURAL NOUNS

Source of Variation	SS	df	MS	F	p
Group	.1004	1	.0114	.58	
Diagnosis	.1748	2	.0874	4.48	<.05
Sex	.0000	1	.0000		
Group x Diagnosis	.0329	2	.0164		
Group x Sex	.0029	1	.0029		
Diagnosis x Sex	.0323	2	.0161		
Group x Diagnosis x Sex	.0377	2	.0188		
Within	.9380	48	.0195		
Total	1.2300	59			

the experimental group emitted a mean of .290 critical responses (SD = .113) while the control group emitted a mean of .318 (SD = .167). This mean difference was not found to be statistically significant. The Diagnosis main effect was significant at less than the .05 level ( $F = 4.48$ ). The means for the schizophrenics, neurotics, and character disorders were .256, .276, and .379 with standard deviations of .108, .128, and .158 respectively. Table 27 presents polynomial contrasts between the means of the three diagnostic categories. The mean of the PTDs (.379) differed significantly from that of the

TABLE 27

COMPARISONS BETWEEN (1) SCHIZOPHRENICS AND NEUROTICS,  
(2) SCHIZOPHRENICS AND PTDs, AND (3) NEUROTICS  
AND PTDs ON THE PROPORTION OF PLURAL NOUNS  
EMITTED IN THE REINFORCEMENT  
PERIOD FOR PLURAL NOUNS

Comparison	SS	df	F	p
1	.0035	1,48	.18	
2	.1506	1,48	7.72	<.01
3	.1080	1,48	5.34	<.05
	MS error .0195			

neurotics (.276) at less than the .05 level of significance. The mean of the PTDs also differed from the mean of the schizophrenics (.256) at less than the .01 level. There was no significant difference between the means of the schizophrenics and neurotics. Thus, the hypothesis of differential conditionability among the three diagnostic categories received only partial support from the preceding analysis. Character disorders achieved a significantly higher level of conditioning on plural nouns than schizophrenics. Neurotics, however, contrary to



the research hypothesis, did not achieve a greater degree of conditioning than schizophrenics.

Proportion of Adjectives emitted by  
the Experimental Group during the Last  
Block of Nine Reinforcements in the  
Acquisition Period for Adjectives

Two further analyses were performed to investigate the hypothesis of differential conditionability among the diagnostic categories. The ratio of the last 9 reinforced responses in the respective reinforcement periods to total responses occurring during this last block of 9 reinforcements was determined for each S. The means and standard deviations of the proportion of adjectives given by the experimental group in the last block of 9 reinforcements is presented in Table 28. Table 29 presents a summary of the analysis of variance of this data.

TABLE 28

MEANS AND STANDARD DEVIATIONS OF THE PROPORTION OF ADJECTIVES  
EMITTED BY THE EXPERIMENTAL GROUP IN THE LAST SEGMENT  
OF THE REINFORCEMENT PERIOD FOR ADJECTIVES

		<u>Male</u>	<u>Female</u>	
Schiz	N	5	5	10
	M	.547	.695	.621
	SD	.274	.280	.287
Neurotic	N	5	5	10
	M	.711	.508	.610
	SD	.313	.320	.331
PTD	N	5	5	10
	M	.651	.396	.524
	SD	.318	.107	.268
	N	15	15	30
	M	.636	.533	.585
	SD	.310	.282	.300

An obtained  $F_{max} = 8.98$  ( $df = 6,4$ ) was nonsignificant. Thus, the diagnosis x sex categories are quite homogeneous with respect to variance. The mean proportion for males (.636) and females (.533) with standard deviations of .310 and .282 respectively did not differ at a statistically significant level. The mean proportions for schizophrenics, neurotics, and character disorders were .621, .610, and .524 with standard deviations of .287, .331 and .268 respectively and were not significantly different. Thus, hypothesis four was not supported by this analysis.

TABLE 29

ANALYSIS OF VARIANCE OF THE PROPORTION OF ADJECTIVES EMITTED  
BY THE EXPERIMENTAL GROUP IN THE LAST SEGMENT OF THE  
REINFORCEMENT PERIOD FOR ADJECTIVES

Source of Variation	SS	df	MS	F	p
Sex	.0804	1	.0804		
Diagnosis	.0566	2	.0283		
Sex x Diagnosis	.2394	2	.1197	1.23	
Within	2.3301	24	.0970		
Total	2.7065	29			

Proportion of Plural Nouns emitted by  
All Ss during the Last Block of Nine  
Reinforcements in the Acquisition  
Period for Plural Nouns

The data for the final test of the hypothesis concerning differential conditionability among the psychiatric groups is presented in Table 30 and Table 31. Table 30 presents the means and standard deviations of the proportion of plural nouns emitted by the 60 Ss in the last block of 9 reinforcements for this response class. From this table it can be seen that the data in some of the diagnosis x sex

categories are moderately skewed. An  $F_{max} = 66.81$  ( $df = 12,4$ ) which was significant at less than the .05 level demonstrated heterogeneity of variance among the diagnosis x sex categories. Comparison of variances between the experimental and control groups ( $F_{max} = 1.08$ ;  $df = 2,29$ ) and among the diagnostic categories ( $F_{max} = 1.35$ ;  $df = 3,19$ ) yielded no significant differences. The summary of the analysis of variance for this data is presented in Table 31. The means for the experimental group and control group were .548 ( $SD = .298$ ) and .441 ( $SD = .287$ ) respectively. This mean difference did not reach the required level of significance. The mean proportions of plural nouns

TABLE 30

MEANS AND STANDARD DEVIATIONS OF THE PROPORTION OF PLURAL NOUNS  
EMITTED BY BOTH GROUPS IN THE LAST SEGMENT OF THE  
REINFORCEMENT PERIOD FOR PLURAL NOUNS

		<u>Experimental Group</u>		<u>Control Group</u>		
		<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	
Schiz	N	5	5	5	5	20
	M	.504	.765	.460	.226	.489
	SD	.248	.299	.327	.040	.318
Neurotic	N	5	5	5	5	20
	M	.520	.424	.483	.317	.436
	SD	.295	.306	.316	.165	.288
PTD	N	5	5	5	5	20
	M	.497	.578	.525	.633	.558
	SD	.288	.227	.247	.303	.274
	N	15	15	15	15	60
	M	.507	.589	.490	.392	.494
	SD	.278	.312	.299	.267	.299
	N	30		30		
	M	.548		.441		
	SD	.298		.287		

in the last block of 9 reinforcements were .489, .436, and .558 for the schizophrenics, neurotics, and PTDs respectively. The respective standard deviations were .318, .288, and .274. This Diagnosis main effect was not significant nor were any of the interactions significant. Thus, the fourth hypothesis failed to receive support from this analysis.

TABLE 31

ANALYSIS OF VARIANCE OF THE PROPORTION OF PLURAL NOUNS  
EMITTED BY BOTH GROUPS IN THE LAST SEGMENT OF THE  
REINFORCEMENT PERIOD FOR PLURAL NOUNS

Source of Variation	SS	df	MS	F	p
Group	.1718	1	.1718	1.93	
Diagnosis	.1499	2	.0749		
Sex	.0009	1	.0009		
Group x Diagnosis	.2864	2	.1432	1.61	
Group x Sex	.1209	1	.1209	1.36	
Diagnosis x Sex	.1308	2	.0654		
Group x Diagnosis x Sex	.1921	2	.0960	1.08	
Within	4.2758	48	.0890		
Total	5.3286	59			

Comparison of Base Rate and Punishment  
Period Operant Levels

Table 32 presents comparisons between the number of verbal responses emitted in the 5-minute base rate period and the 5-minute punishment period. During the base rate period the 60 Ss emitted a mean of 71.18 (SD = 42.24) verbal responses. The mean for the punishment period was 27.07 (SD = 21.33). This mean difference was significant beyond the .001 level of significance ( $t = 8.39$ ). Thus, the punishment significantly reduced the overall operant rate from the base rate operant level.

TABLE 32

NUMBER OF VERBAL RESPONSES EMITTED BY THE EXPERIMENTAL AND CONTROL GROUPS IN THE BASE RATE AND PUNISHMENT PERIODS

	Base Rate	Punishment	df	t	p
N	60	60			
M	71.18	27.07	59	8.39	<.001
SD	42.24	21.33			

Comparisons between Conditioners and Nonconditioners

There were 13 patients who did not meet the conditioning criterion. In addition, there was 1 paranoid schizophrenic female who became so acutely upset that the procedure was stopped before even complete base rate data could be collected. Of the 13 nonconditioners 6 were schizophrenics, 2 neurotics, and 5 PTDs; these included 4 males and 9 females. Nine of the nonconditioners had been randomly assigned to the experimental group and 4 to the control group. Of the 9 patients assigned to the experimental group 4 conditioned on adjectives, but not on plural nouns; 5 did not condition on adjectives.

Table 33 presents comparisons between conditioners and non-conditioners on relevant base rate data. The mean total words emitted during the base rate period was 71.18 for conditioners (SD = 42.24) and 33.85 for nonconditioners (SD = 9.86). This mean difference was significant at less than the .01 level. The mean proportion of adjectives was .093 for conditioners (SD = .107) and .086 for nonconditioners (SD = .043). The mean proportion of plural nouns emitted in the base rate period was .196 for conditioners (SD = .139) and .237 for nonconditioners (SD = .195). Neither of these last two mean differences reached the required level of statistical significance.

It would appear that whether or not a S reached the conditioning criterion was more dependent on overall verbal operant level, rather than operant level of the reinforced response classes.

TABLE 33

COMPARISONS BETWEEN CONDITIONERS AND NONCONDITIONERS ON THE TOTAL WORDS, PROPORTION OF ADJECTIVES, AND PROPORTION OF PLURAL NOUNS EMITTED IN THE BASE RATE PERIOD

		Conditioners	Nonconditioners	df	t	p
Total	N	60	13			
Words	M	71.18	33.85	71	3.12	<.01
	SD	42.24	9.86			
Prop.	N	60	13			
of	M	.093	.086	71	.77	>.05
Adj.	SD	.107	.043			
Prop.	N	60	13			
of	M	.196	.237	71	.91	>.05
Pl.N.	SD	.139	.195			

#### Awareness of the Reinforcement Contingency

Awareness of the reinforcement contingency was also investigated. In this research "awareness" was rigorously defined as any statement indicating a principle that if followed 100 per cent of the time would lead to reinforcement of every response. Of the 60 Ss who met the conditioning criterion only 5 Ss (8 per cent) demonstrated awareness of the reinforcement contingency. Of the 5 Ss who demonstrated awareness of the reinforcement contingency only 1 was in the control group. This was a female PTD. The 4 aware Ss in the experimental group included 2 male neurotics, 1 male PTD, and 1 female schizophrenic. Of the 4 experimental aware Ss 2 correctly identified plural nouns as the type of words which resulted in reinforcement; 1 correctly

identified adjectives and the other correctly identified both response classes. The use of a rigorous definition and an extremely short questionnaire resulted in only a very few Ss (5) being judged aware of the reinforcement contingency. Such a small number prohibited statistical evaluation of the hypothesis concerning differential awareness among the three diagnostic groups.

## CHAPTER IV

### DISCUSSION

Correlations between experimental and postexperimental scoring of the critical response classes yielded reliability coefficients of  $r_s = .99$  for plural nouns and  $r_s = .94$  for adjectives. Overall the reliability of scoring both response classes was very high. These correlations show that the E was slightly less reliable in scoring adjectives than plural nouns. The major difficulty in scoring response classes was certain cases in which a word could be considered a member of the critical response class when used one way, but not a member of the response class when used with another meaning. For example "light" when used to refer to a ceiling fixture or lamp is a singular noun. When used in a descriptive manner "light" would be an adjective. The principle of scoring a word as a member of a critical class if in any way it could be a member of that class was followed throughout the experiment.

The first hypothesis of this research stated the experimental group would demonstrate significantly more regressed responses than the control group. This hypothesis was supported when both number of regressed responses and proportion of regressed responses occurring in the punishment period were used as the measures of regression. These results are in keeping with those of Knutson (1964) who used the same basic paradigm to study regression among normal college students.



Utilizing a third measure of regression--number of seconds to emit the first regressed response in the punishment period--it was also demonstrated that the experimental group regressed more quickly on the average than the control group. These findings, when considered along with those of Knutson, indicate that a verbal conditioning situation has considerable potential as a technique for experimentally studying regression in human beings.

One may assume, since the occurrence of regression in the experimental group was demonstrated, that the punishment period produced stress or frustration. This assumption received support from two additional sources. Since the length of the base rate period was equal to that of the punishment period (5-minutes) direct comparison of overall operant levels were justified. During the base rate period the Ss emitted a mean of 71.18 verbal responses. This is contrasted with a mean of 27.07 verbal responses emitted in the punishment period. This mean difference was significant and demonstrated a dramatic reduction of operant level during the punishment period. This reduction seems to provide good evidence that the punishment period was indeed stressful. Clinical observations also supported these findings. During the punishment period most Ss demonstrated some signs of frustration and anxiety although there was much variability among Ss' reactions. These signs included such behaviors as swearing, restlessness, constant looking at the counters, perspiration, and inaudible mumbling. There appeared to be relatively little difference in terms of the overt behavior manifested by the three clinical groups during the punishment period.

Not only was the punishment period stressful and frustrating, but the entire experimental procedure appeared to be somewhat anxiety

provoking for most Ss. This appeared to be most true for neurotics and female PTDs. Schizophrenics, for the most part, seemed to attack the situation in a rather casual manner with a comparative minimum of ego-involvement and, hence, ego-threat. The E felt that reliable judgments of diagnosis could have been made from Ss' performance in the experimental situation. Thus, in spite of the fact that the instructions to Ss were intended to be as task-oriented and as little ego-threatening as possible, even the reinforcement periods were quite upsetting to many Ss. Knutson (1964) utilized ego-threat instructions to induce motivation to respond. His Ss were told that performance on the task was highly related to success in college. Knutson also observed considerable variability among his college student Ss. Many became quite upset. Researchers interested in psychological and physiological reactions to stress are restricted by ethical considerations in the amount of stress, punishment, or noxious stimulation to which they can subject human Ss. A verbal conditioning situation such as that used in this research may be potentially useful for studying reactions to stress. Ego-involvement may be manipulated by instructions to Ss; punishment may be varied in intensity. The discomfort that may be induced is not likely to be of longstanding or irreversible. In this study an attempt was made to alleviate any anxiety or discomfort that was generated. This was accomplished by administering positive reinforcement in an arbitrary manner following the punishment period and consisted of 6 to 12 flashes of green light. On the basis of clinical observation this appeared to be effective in putting Ss at ease and allowing them to leave the experiment with a feeling of success.

The relationships between the three measures of regression were determined by Pearson Product-Moment correlations. The correlations were  $r = .48$  between (1) number of adjectives and (2) proportion of adjectives occurring in the punishment period;  $r = -.53$  between number of adjectives and (3) time to emit the first adjective in the punishment period; and  $r = -.66$  between proportion of adjectives and time to first adjective. All of these correlations differed significantly from zero, but in terms of absolute magnitude were not significantly different from each other. Partial correlations ( $r_{12.3} = .20$ ;  $r_{13.2} = -.32$ ;  $r_{23.1} = -.54$ ) demonstrated that number of adjectives as a regression measure is probably measuring a phenomenon different from that being measured by proportion of adjectives or number of seconds to give the first adjective. It would seem that the latter two measures of regression are to be preferred to the former. Proportion of regressed responses considers overall operant level in the punishment period. Obviously if the operant level is low, the probability of emitting critical regressed responses is decreased. The partial correlation  $r_{23.1} = -.54$  indicates that proportion of regressed responses and time to give the first regressed response with number of regressed responses held constant shares about 29 per cent of the variance common to the two measures. It may be speculated that proportion of adjectives is measuring propensity to maintain regressed responses under frustrating conditions. Time to emit the first regressed response may be more related to initial propensity to regress under a stressful situation. The plausibility of this speculation rests upon future research.

The principle hypotheses of this research were not supported. These hypotheses stated that schizophrenics of the experimental group

would demonstrate more regressed responses, and demonstrate the first regressed response more quickly, than neurotics. Further, neurotics would demonstrate more regressed responses than PTDs and would demonstrate the first regressed response more quickly. The three measures of regression failed to show any significant differences among the means of the three diagnostic categories of the experimental group. Neither was there any consistent trend among the order of means on the three measures of regression. The failure of the obtained data to support the hypotheses concerning differential readiness for regression may lie in three factors: the inadequacy of the techniques utilized; the ambiguity and nonspecificity of the psychoanalytic concept of regression; or in the basic inadequacy of the psychoanalytically derived hypothesis.

Dollard and Miller (1950) have stated that the more strongly an earlier response is reinforced, the more likely it will be to recur under stress or when another habit is blocked. The failure of this approach to demonstrate differential regression among the diagnostic categories may be related to the level of conditioning that was obtained. For the experimental group, perhaps if a higher conditioning criterion had been utilized for the first reinforced response class--adjectives--differential regression would have been demonstrated. However, the conditioning criterion utilized in this study was selected after a number of other procedures had been tried in pilot investigation. These other procedures included allowing a greater number of reinforcements to be administered within the 25-minute time limit and administering unlimited reinforcement during a 20- and 25-minute reinforcement period. Since the experimental group was

reinforced for two response classes successively, it was necessary to consider the response level achieved in the first reinforcement period in relation to performance during the second reinforcement period. When Ss received a very large number of reinforcements for adjectives, they could not easily "switch" responses in the second acquisition period. Rather, they persisted in emitting high proportions of adjectives in the second acquisition period. It appeared from this pilot investigation that 25 to 30 reinforcements for adjectives was nearly maximal for allowing conditioning of the second response class within a 25-minute time period. Hence, the criterion of 27 reinforcements within a 25-minute period was selected. It is felt that further investigations of regression utilizing a similar procedure should explore further the relationship of the first conditioned response strength to regression. One approach might be to condition the first response class to a high level, and make the conditioning criterion for the second response class less rigorous.

It would appear that the successive conditioning of two verbal response classes may have value for the study of other personality and psychiatric phenomena. Studies of rigidity in learning or rigidity as a general personality construct might utilize a situation in which the time taken to extinguish on one response class and to condition on the second is considered. This may then be related to indices of rigidity, anxiety, organic brain pathology, or functional psychiatric disorder. Studies of this nature related to Ss' capacities to "switch" from one response class to another seem relevant to the various behavior modification therapies and their use with different psychiatric groups.

The failure of the present study to demonstrate differential regression among diagnostic groups may also lie within the nonspecificity of the psychoanalytic concept of regression. The regressive responses dealt with in this research were overt behavioral acts--emitting verbal responses orally. When the psychoanalyst or psychoanalytic theoretician talks about regression he is describing the process of an individual regressing (going back) to a less mature, nonspecific state of emotional organization. It is emotional stress which causes this regression and reorganization of emotional functioning on a more primitive level. The same is true of fixation. Fixation is a perpetually immature level of emotional organization. Rarely, if ever, is regression total even in the most severe psychopathologies. In addition, in terms of psychoanalytic theory, evidence of psychosexual regression or fixation may not be highly correlated with overt behavior. As an example, according to psychoanalytic theory, peptic ulcer patients are frequently seen (during psychoanalysis) to be highly orally dependent individuals with strong needs for maternal nurturance and support (Fenichel, 1945). Behaviorally, however, they frequently appear independent, self-confident, ambitious, and give few overt hints of their oral dependent needs. Further, according to psychoanalytic theory, the regression in psychoneuroses is greater than that in character disorders. Yet, clinically, the overt behavior of neurotics in terms of interpersonal relations, acceptance of responsibilities and general life patterns is frequently more mature (less regressed) than that of character disorders. This research measured regression in terms of a psychologically "high level" behavioral response. Regression measured in this way may have no

correlation with the psychoanalyst's conception of psychosexual regression. However, if their concept of regression has a low correlation with overt behavior, the usefulness of such a concept is open to question.

The value of a theory, construct, or concept rests upon its usefulness in explaining phenomena. While a theory cannot be proven or disproven, its usefulness may be evaluated in terms of the phenomena it explains. Failure of this research to demonstrate differential regression among the three diagnostic categories may reflect the inadequacy of the psychoanalytic theory of regression to explain the symptoms upon which differential diagnosis depends. Schizophrenics frequently display symptoms of delusions, hallucinations, concretization of thought processes. Neurotics typically display symptoms of anxiety, depression, self-dissatisfaction, etc. Character disorders usually display symptoms of legal difficulties, irresponsibility, excessive drinking, etc. On the basis of these symptoms (and others) differential diagnoses are made. Psychoanalytically the symptoms are explained on the basis of differential degrees of fixation and regression. If in future research it proves impossible to experimentally and with overt behavioral measures demonstrate differential degrees of regression and/or differential readiness to regress under stress among various psychiatric diagnostic groups, the present writer would suggest that the usefulness of the psychoanalytic concept of regression be put to more serious question.

It was predicted that neurotics and PTSDs would demonstrate greater conditionability than schizophrenics. This was suggested by

Leventhal's (1959) research on the verbal conditioning of normal, neurotic, and psychotic Ss under various reinforcement conditions. The present research found some nonsignificant differences in the direction opposite of that predicted. Of Ss in the experimental group schizophrenics took less mean time (9.71) to condition on adjectives than PTDs whose mean time was 13.88 minutes. The mean time for neurotics was 10.59 minutes. When the mean proportion of adjectives emitted during the reinforcement period for this response class was considered, the schizophrenics demonstrated a higher mean proportion (.451) than PTDs (.325). During the last block of 9 reinforcements the schizophrenics emitted a mean proportion of .621 adjectives compared to a mean proportion of .524 emitted by the PTDs. Although none of the mean differences in the three preceding analyses were significantly different, in all cases the schizophrenics of the experimental group demonstrated evidence of greater conditionability than PTDs. This was true with respect to both ultimate response level, and time to achieve the conditioning criterion for adjectives. In addition, the conditioning performance of the neurotics was more similar to that of the schizophrenics than to the PTDs.

When mean time for Ss of the experimental and control groups to achieve the conditioning criterion for plural nouns was considered, the hypothesis concerning differential conditionability among the three diagnostic categories was again not fully supported. Although not statistically significant, neurotics took a longer mean time (15.36) to reach the criterion than schizophrenics (12.83) or PTDs (12.36). Again these means were not in the predicted order. The original hypothesis received only partial support when the mean



proportions of plural nouns emitted during the reinforcement period for this response class were considered. The mean proportion of the PTDs (.379) differed significantly from that of the neurotics (.276) and that of the schizophrenics (.256). The means of the neurotics and schizophrenics were not significantly different. When the proportions of plural nouns emitted by all Ss during the last block of 9 reinforcements for this response class were considered, the main effect for Diagnosis was again nonsignificant. The means of schizophrenics, neurotics and character disorders were .489, .436, and .558 respectively. Thus, when the conditioning performance of all subjects on plural nouns is considered, only one of the three measures partially supports the original research hypothesis statistically. The other measures revealed no statistically significant differences among means and the means were not in the predicted order. In all cases, the performance of the neurotics was more similar to that of the schizophrenics than character disorders.

Since only one of the six analyses of conditioning performance supported (and only partially) the hypothesis that neurotics and PTDs would demonstrate greater conditionability than schizophrenics no firm conclusions may be drawn.

This research demonstrated that with very minimal personal interaction verbal conditioning can be achieved with schizophrenics, neurotics and PTDs. Several studies (Leventhal, 1959; Johansson and Campbell, 1964; Ebner, 1965; Ells, 1967) point to the difficulty of obtaining verbal conditioning in schizophrenics. The results obtained in this research demonstrated that schizophrenics were no more difficult to condition than neurotics or PTDs. On the basis of previous

research on verbal conditioning phenomena, the E attempted to incorporate those elements that would make conditions optimal for verbal conditioning to occur--particularly for schizophrenics. The work of Ebner (1965) and Ells (1967) suggests that many schizophrenics are not responsive to the social reinforcer "good" in a verbal conditioning situation. While money and a social reinforcer such as "good" or "fine" are both secondary reinforcers, it was felt that for hospitalized schizophrenics, money, by virtue of what value it has (e.g. the purchasing power to buy candy and cigarettes), is more closely related to primary reinforcers than social approval. Thus it was felt that introducing a monetary reward along with the green light reinforcement would have greater reinforcement value than "good." Also, an attempt was made to make instructions to the Ss as little ego-threatening and as task-oriented as possible. It is felt the two principal components of the procedure of this study contributing to the successful verbal conditioning of the schizophrenics were the absence of extensive interpersonal contact and the use of a monetary reward.

Experimenter-subject interaction has been shown to be an important variable influencing verbal conditioning. Kanfer and Karas (1959) found that either praise or criticism from the E prior to conditioning produced more learning than no interaction at all. Knutson (1964) and Nordmark (1964, 1968) found that verbal conditioning can occur with minimal pre-experimental personal interaction. Ells (1967) found that for schizophrenics reinforcement tended to be more effective when the Ss had no interview with the E prior to the verbal conditioning procedure.

It was felt that minimal personal interaction might work advantageously toward the conditioning of schizophrenics and to the disadvantage of the neurotics and character disorders. On the basis of clinical knowledge it would seem that pleasant pre-experimental interaction may have stimulated needs for approval, and hence increased the motivation to respond for neurotics and PTDs. This hypothesis receives some support from the research of Crowne and Strickland (1961) who found that need for approval facilitated verbal conditioning. For schizophrenics, however, a pleasant pre-experimental interaction may have been quite frightening and produced withdrawal tendencies and lowered operant levels.

The lack of extensive pre-experimental interpersonal contact and use of a monetary reward in contributing to the successful verbal conditioning of schizophrenics were probably not mutually exclusive components. Most verbal conditioning studies (e.g. Johanssen and Campbell, 1964; Leventhal, 1959) which use some type of verbal approval as the reinforcement, do so within a context of interpersonal interaction. Ebner (1965) studied verbal conditioning in a Taffel-type situation and used both normal and schizophrenic Ss. One-half of each group received the verbal reinforcer "good" in the presence of the E when the appropriate response was emitted. The other half received the same reinforcer over a loudspeaker and had no direct contact with the E. Normal Ss conditioned under both procedures, but no verbal conditioning was obtained for schizophrenics. In a similar Taffel-type situation Ells (1967) reported that the social reinforcer "good" proved to be reinforcing for only about one-fourth of his 72 schizophrenic Ss and tended to be most effective when the Ss had

no pre-experimental interview with the E. These two studies, when compared to the results of the present research, suggest that minimal interpersonal contact and the use of relatively nonsocial types of reinforcement are extremely important variables in producing verbal conditioning among schizophrenics.

The speculation that minimal interpersonal interaction had contrary effects on the schizophrenics as opposed to the neurotics and character disorders receives some minimal support from the data obtained. Namely, that in five of the six analyses the schizophrenics conditioned to the criterion more rapidly and achieved a higher proportion of reinforced responses than PTDs. The fact that the conditioning performance of neurotics was inferior to that of the PTDs and more closely resembled that of the schizophrenics suggests the lack of extensive pre-experimental contact may have worked more to the disadvantage of neurotics than PTDs.

Of the schizophrenics utilized in this research all but two were diagnosed as Schizophrenic reaction, chronic undifferentiated type. Patients diagnosed as Personality Trait Disturbance, both male and female, were primarily individuals with extreme marital difficulties, relatively minor legal difficulties and most had problems with excessive drinking of alcohol. The neurotic Ss were mostly anxiety and depressive reactions.

As a group the schizophrenics appeared quite task-orientated with a minimum of ego-involvement. They seemed to have a rather "loose stream of consciousness" and, for the most part, were able to continue responding with words at a fairly constant rate with comparatively few pauses. Neurotics appeared more constricted, concerned

with personal problems, and often seemed emotionally divorced from the task itself. At those time when neurotics appeared most task-oriented, it frequently seemed they were trying to impress the E with their knowledge and use of uncommon words. Clinically, the males and females of the neurotic and schizophrenic groups did not appear to differ in their modes of responding. Within the PTD group, however, the females tended to respond most like neurotic Ss; somewhat constricted, problem oriented, and at times anxious to impress the E. Male PTDs seemed to be most variable in their general mode of responding. Some responded in a free and easy manner and were quite task oriented; others were more constricted and concerned with personal difficulties. Schizophrenics tended to reveal relatively little about themselves through their free responding. Neurotics, and to a lesser extent PTDs, tended to reveal much about themselves and their problems. The present writer would agree with Knutson's (1964) assertion that an adequate personality description could be written on the basis of many Ss' performance.

The findings of this study indicate the need for studying the various components of the whole verbal conditioning situation and how these are related to the conditioning performance of different psychopathological groups. Such components include response classes to be conditioned, the nature and method of administering reinforcement, and the effect of pre-experimental and experimental personal interaction on conditioning performance.

It is felt that to explore the effect of various qualities of pre-experimental interpersonal encounters with different diagnostic groups may be a potentially fruitful area of research. Determination of

the effect of personal interaction on subsequent reinforcement procedures with various psychiatric groups appears highly relevant to the area of psychotherapy. Since all psychotherapy, individual or group, appears to involve either the explicit or implicit administration of reinforcement (Dollard and Miller, 1950), knowledge concerning the effect of various types of personal encounters on the effectiveness of such reinforcement would be most valuable. The laboratory verbal conditioning situation, in which both the personal interaction and administration of reinforcement can be highly controlled, appears to be well suited to such research.

Of the 73 Ss who completed the experimental session 13 (18 per cent) did not achieve the conditioning criterion. In addition, one female paranoid schizophrenic became so upset that the procedure was stopped after only two minutes of the base rate period. Comparisons were made between relevant base rate data for the conditioners and nonconditioners. The two groups did not differ with respect to proportion of adjectives or proportion of plural nouns emitted during the base rate period. There was a statistically significant difference, however, between the total words emitted by the conditioners (71.18) and nonconditioners (33.85). This finding leads to the conclusion that for this sample overall verbal output was more important in determining whether conditioning occurred than operant level of the critical responses. Obviously, if total operant level was low, the probability of emitting enough critical responses which would receive reinforcement was decreased.

This study also incidently studied awareness of the reinforcement contingency utilizing a rigorous definition of awareness and short

questionnaire. It was hypothesized that more neurotics and PTDs would demonstrate awareness of the reinforcement contingency than schizophrenics. Only 5 Ss (8 per cent) were judged aware: 1 female PTD, 1 male PTD, 2 male neurotics, and 1 female schizophrenic. While in terms of sheer numbers the hypothesis was supported, no conclusions are justified because of the small number of Ss involved. It would appear that any researcher interested in studying awareness in verbal conditioning should use a longer questionnaire and study this phenomenon in terms of various definitions of awareness. Levin (1961) found that lengthening the postexperimental interview increased the number of Ss judged aware. Several studies (Ekman, Krasner, and Ullman, 1963; Kanfer and Marston, 1962; Spielberger, Levin, and Shepard, 1962; Simpkins, 1963) question the validity of the concept of awareness when considered alone. These authors conclude that awareness is a function of pre-experimental instructions, discriminability of critical response and reinforcement and personality attraction. All of these variables operate to influence reported awareness.

## CHAPTER V

### SUMMARY

The primary purpose of this study was to investigate the phenomenon of regression among various psychiatric groups in a verbal conditioning situation. Secondary purposes were to study the conditioning performance of the psychiatric groups and their awareness of the reinforcement contingency.

The actual Ss were 30 male and 30 female patients selected from the resident population of the North Dakota State Hospital. Ss were selected on the basis of the following criteria: an official diagnosis of schizophrenia, psychoneurosis, or personality trait disturbance; between the ages of 16 and 40 inclusive; less than two years of total hospitalization; no evidence of mental retardation or organic brain disease. From the pool of 128 patients who met these criteria 16 individuals in each of the diagnosis x sex categories were randomly selected to serve in either an experimental or control group. Assignment to group was made randomly and the order in which Ss appeared for the experiment was determined by means of a table of random permutations. The first 5 Ss in each of the diagnosis x sex categories to achieve the conditioning criterion were utilized in the investigation of regression. The conditioning criterion was 27 reinforcements within a maximum 25-minute time period. Of the 73 patients utilized 13 did not achieve this criterion. These Ss were



used only for comparisons between conditioners and nonconditioners.

The Ss in the experimental group received 27 reinforcements for adjectives followed by 27 reinforcements for plural nouns. Reinforcement was a flash of green light and a point registering on a counter. Ss were instructed that the number of points they received would determine how much money they would be paid when the session was completed. Punishment by means of a red light was then administered for all verbal responses in a 5-minute punishment period. Ss were instructed red lights meant that points and money were being lost. The control group received 27 reinforcements for plural nouns only and then punishment during the 5-minute punishment period. The E administered all reinforcement and punishment from behind a one-way mirror and had no personal contact with the Ss prior to the experiment. Reinforcements and punishments were recorded on an electric counter and all Ss' responses were tape recorded. All instructions to Ss were taped and transmitted to them over a speaker. The E's female RA had only minimal personal contact with the Ss prior to the experimental session and following this when a brief questionnaire was administered to assess awareness of the reinforcement contingency.

Hypotheses advanced in this investigation were:

1. The experimental group would demonstrate significantly more regressed responses than the control group.
2. Schizophrenics in the experimental group would demonstrate significantly more regressed responses than neurotics who in turn would demonstrate significantly more regressed responses than character disorders.

3. Schizophrenics in the experimental group would regress more quickly to an earlier learned response than neurotics who in turn would regress more quickly than character disorders.

4. Neurotics and character disorders in the experimental and control groups would demonstrate greater conditionability than schizophrenics.

5. Operant levels for conditioners would be significantly higher than for nonconditioners.

6. More character disorders and neurotics would demonstrate awareness of the reinforcement contingency than schizophrenics.

Analysis of the results supported the hypothesis that the experimental group would demonstrate regression when compared to the control group. Hypotheses concerning differential regression among the three diagnostic groups were not supported. The hypothesis involving differential conditionability among the diagnostic groups not only failed to receive full support, but there were some non-significant trends in the opposite direction. Comparisons between conditioners and nonconditioners on relevant base rate data suggested the importance of total verbal operant level in determining conditioning. Since only 5 Ss were judged aware, no conclusion could be drawn concerning the awareness hypothesis.

Failure of this research to support the hypothesis of differential regression among the diagnostic categories was discussed in relation to methodological inadequacies and the theory from which the hypotheses were derived. The absence of differential conditionability among the diagnostic categories was discussed in relation to pre-experimental E-S interaction. Suggestions were made for

utilizing a verbal conditioning situation in further studies of regression, stress, rigidity, and psychotherapy.

APPENDIX

Raw Data from the Experiment\*

SD	TW	TW	TW	TW	TA	TA	TA	TA	PN	PN	PN	PN	CT	CT	Sec
	in	in	in	in	in	in	in	in	in	in	in	in	in	in	in
	BR	CA	CB	CC	BR	CA	CB	CC	BR	CA	CB	CC	CA	CB	CC

Experimental Group

MS	63	114	79	17	8	27	9	3	12	24	27	0	16.00	12.78	85
MS	159	81	203	6	14	27	36	4	9	1	27	1	2.37	8.48	18
MS	100	190	74	18	3	27	18	2	16	47	27	6	12.92	8.50	43
MS	96	138	153	73	7	27	31	12	13	11	27	3	8.03	9.33	20
MS	36	60	123	12	1	27	43	5	13	7	27	4	11.65	24.50	33
MN	88	76	54	25	10	27	17	10	23	13	27	8	11.17	6.83	15
MN	125	66	183	19	8	27	34	5	15	5	27	8	8.47	24.97	235
MN	63	68	134	19	1	27	29	5	12	6	27	6	9.17	20.73	119
MN	109	109	183	23	7	27	16	3	17	3	27	1	12.20	24.53	35
MN	35	35	85	22	3	27	19	6	0	0	27	9	10.47	24.30	85
MP	89	50	58	7	7	27	4	1	48	8	27	3	4.48	8.80	85
MP	52	122	77	16	2	27	22	2	30	48	27	5	16.72	20.50	123
MP	32	114	56	6	0	27	1	0	9	14	27	4	24.53	15.55	300
MP	100	151	139	107	5	27	26	26	24	28	27	8	8.00	5.78	2
MP	73	36	66	21	8	27	5	2	26	5	27	9	2.15	6.92	25
FS	24	73	93	6	6	27	35	2	1	6	27	2	17.27	24.82	38
FS	133	28	599	111	27	27	150	33	0	0	27	2	1.25	19.40	5
FS	69	60	74	9	7	27	16	0	10	0	27	7	15.15	13.58	300
FS	94	34	72	23	25	27	7	3	22	2	27	10	2.80	6.10	64
FS	24	47	60	37	3	27	26	6	0	5	27	24	9.65	7.80	125
FN	36	89	155	15	4	27	30	4	5	10	27	3	15.77	18.03	3
FN	54	144	102	37	8	27	11	12	12	31	27	10	14.83	12.17	2
FN	54	31	138	18	10	27	36	6	5	0	27	2	5.07	18.22	110
FN	111	235	118	28	11	27	26	7	23	28	27	2	12.08	19.07	67
FN	38	34	102	22	17	27	36	8	5	0	27	3	6.63	22.55	142
FP	19	88	78	10	3	27	17	3	2	9	27	2	23.85	24.30	200
FP	28	113	69	21	3	27	14	7	5	12	27	7	25.97	18.37	222
FP	39	78	108	22	1	27	16	5	1	5	27	11	11.35	15.52	141
FP	73	142	88	39	4	27	19	5	12	36	27	14	15.37	12.17	231
FP	42	111	88	29	3	27	14	9	5	23	27	11	6.35	7.00	121

SD	TW in BR	TW in CA	TW in CB	TW in CC	TA in BR	TA in CA	TA in CB	TA in CC	PN in BR	PN in CA	PN in CB	PN in CC	CT in CA	CT in CB	Sec in CC
----	----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	-----------------

## Control Group

MS	152	--	107	19	17	--	2	1	28	--	27	0	--	9.38	14
MS	81	--	106	24	1	--	0	0	11	--	27	5	--	17.65	27
MS	54	--	74	9	13	--	10	5	0	--	27	3	--	9.57	19
MS	53	--	149	22	1	--	0	0	21	--	27	5	--	6.40	300
MS	195	--	405	21	12	--	29	9	1	--	27	1	--	20.58	30
MN	28	--	165	51	1	--	34	10	4	--	27	6	--	17.63	12
MN	128	--	184	37	8	--	5	4	14	--	27	2	--	24.53	230
MN	62	--	89	64	1	--	9	17	32	--	27	11	--	6.32	45
MN	73	--	55	13	5	--	2	0	3	--	27	12	--	5.88	300
MN	128	--	41	27	6	--	1	6	5	--	27	14	--	5.22	92
MP	54	--	105	6	0	--	0	0	14	--	27	3	--	24.53	300
MP	19	--	84	25	0	--	0	0	3	--	27	6	--	7.80	300
MP	24	--	51	11	0	--	0	1	11	--	27	6	--	13.77	164
MP	54	--	51	18	0	--	0	0	22	--	27	14	--	3.57	300
MP	125	--	198	11	0	--	5	0	6	--	27	6	--	8.45	300
FS	108	--	73	64	10	--	5	9	22	--	27	13	--	4.65	140
FS	16	--	110	11	1	--	15	0	1	--	27	2	--	15.48	300
FS	46	--	120	19	10	--	24	7	5	--	27	3	--	16.22	79
FS	156	--	156	59	4	--	0	3	52	--	27	8	--	8.57	226
FS	54	--	112	26	9	--	8	2	10	--	27	7	--	12.78	130
FN	114	--	112	42	5	--	4	6	46	--	27	9	--	8.97	127
FN	21	--	102	20	10	--	32	6	2	--	27	3	--	18.40	37
FN	31	--	112	23	3	--	14	2	10	--	27	8	--	15.77	201
FN	87	--	98	21	14	--	5	0	24	--	27	6	--	7.52	300
FN	119	--	95	40	7	--	7	1	41	--	27	15	--	5.52	105
FP	19	--	133	21	1	--	34	3	3	--	27	2	--	24.63	183
FP	44	--	31	37	2	--	0	0	14	--	27	17	--	3.33	300
FP	25	--	61	8	0	--	3	0	7	--	27	5	--	13.00	300
FP	101	--	83	45	1	--	0	0	29	--	27	14	--	5.42	300
FP	42	--	57	12	4	--	6	0	6	--	27	6	--	7.83	300

SD	TW	TW	TW	TA	TA	TA	PN	PN	PN	CT	CT
	in	in	in	in	in	in	in	in	in	in	in
	BR	CA	CB	BR	CA	CB	BR	CA	CB	CA	CB

## Nonconditioners

MS	37	---	281	4	--	84	2	--	5	-----	25.00
MP	17	---	55	0	--	2	7	--	15	-----	25.00
MP	36	44	---	0	2	--	12	23	--	25.00	-----
MP	42	67	---	0	9	--	20	22	--	25.00	-----
FS	39	104	99	6	27	22	1	7	9	17.80	25.00
FS	45	65	123	11	27	33	5	5	6	14.63	25.00
FS	24	99	148	3	27	31	1	9	14	17.95	25.00
FS	35	264	---	0	6	--	24	84	--	25.00	-----
FS	23	58	---	6	15	--	2	17	--	25.00	-----
FN	49	64	---	1	2	--	9	3	--	25.00	-----
FN	44	116	97	0	27	24	17	22	9	19.10	25.00
FP	28	---	79	3	--	16	6	--	2	-----	25.00
FP	21	---	46	2	--	12	2	--	8	-----	25.00

## \*Explanation of symbols used in the Appendix

TW = Total words

TA = Total adjectives

PN = Total plural nouns

CT = Time to reach conditioning criterion

Sec = Seconds to give first adjective in punishment period

BR = Base Rate

CA = Condition A; reinforcement period for adjectives

CB = Condition B; reinforcement period for plural nouns

CC = Condition C; punishment for all verbal responses

MS = Male schizophrenic

MN = Male neurotic

MP = Male personality trait disturbance

FS = Female schizophrenic

FN = Female neurotic

FP = Female personality trait disturbance

## BIBLIOGRAPHY

- Adams, J. Laboratory studies of behavior without awareness. Psychological Bulletin, 1957, 54, 383-405.
- Barker, R., Dembo, T., & Lewin, K. Frustration and regression: An experiment with young children. University of Iowa Studies in Child Welfare, 1941, 18, No. 1. Reprinted in R. Lawson (Ed.), Frustration: The development of a scientific concept. New York: Macmillan, 1965, Pp. 77-99.
- Barthol, R. F. & Ku, N. D. Regression under stress to first learned behavior. Journal of Abnormal and Social Psychology, 1959, 59, 134-136.
- Bellak, L. The schizophrenic syndrome. In L. Bellak (Ed.), Schizophrenia: A review of the syndrome. New York: Logos Press, 1958, Pp. 3-63.
- Binder, A., McConnell, D., & Sjöholm, N. A. Verbal conditioning as a function of experimenter characteristics. Journal of Abnormal and Social Psychology, 1957, 55, 309-314.
- Bryan, J. H., & Lichtenstein, E. Effects of subject and experimenter attitudes in verbal conditioning. Journal of Personality and Social Psychology, 1966, 3, 182-189.
- Buchwald, A. M. Experimental alterations in the effectiveness of verbal reinforcement combinations. Journal of Experimental Psychology, 1959, 57, 351-361.
- Buss, A. H., & Gerjoy, I. R. Verbal conditioning and anxiety. Journal of Abnormal and Social Psychology, 1958, 57, 249-250.
- Cameron, N. Personality development and psychopathology: A dynamic approach. Boston: Houghton Mifflin, 1963.
- Child, I. L. & Waterhouse, I. K. Frustration and the quality of performance: I. A critique of the Barker, Dembo, & Lewin experiment. Psychological Review, 1952, 59, 351-362.
- Cieutat, V. J. Sex differences and reinforcement in the conditioning and extinction of conversational behavior. Psychological Reports, 1962, 10, 467-474.
- Cieutat, V. J. Sex differences in verbal operant conditioning. Psychological Reports, 1964, 15, 259-275.
- Crowne, D. P., & Strickland, B. R. The conditioning of verbal behavior as a function of the need for social approval. Journal of Abnormal and Social Psychology, 1961, 63, 395-401.

- Dailey, J. M. Verbal conditioning without awareness. Unpublished doctoral dissertation, University of Iowa, 1953.
- Das, J. P. Some correlates of verbal conditioning. Psychological Studies, Mysore, 1961, 6, 30-35.
- Das, J. P., & Mitra, A. K. Relative effectiveness of electric shock and praise and reproof in verbal conditioning. Journal of General Psychology, 1962, 67, 141-146.
- Dollard, J. & Miller, N. E. Personality and psychotherapy. New York: McGraw Hill, 1950.
- Ebner, E. Verbal conditioning in schizophrenia as a function of degree of social interaction. Journal of Personality and Social Psychology, 1965, 1, 528-532.
- Ekman, P., Krasner, L., & Ullmann, L. P. Interaction of set and awareness as determinants of response to verbal conditioning. Journal of Abnormal and Social Psychology, 1963, 66, 387-389.
- Ells, E. M. Effects of operant level, interview with experimenter, and awareness upon verbal conditioning of chronic schizophrenics. Journal of Abnormal Psychology, 1967, 72, 208-212.
- English, H. B. & English, A. C. A comprehensive dictionary of psychological and psychoanalytical terms. New York: Longmans Green, 1958.
- Eysenck, H. J. Personality and verbal conditioning. Psychological Reports, 1959, 2, 510.
- Fenichel, O. The psychoanalytic theory of neurosis. New York: W. W. Norton, 1945.
- Ferguson, D. C., & Buss, A. H. Operant conditioning of hostile verbs in relation to experimenter and subject characteristics. Journal of Consulting Psychology, 1960, 24, 324-327.
- Ford, D. H. & Urban, H. B. Systems of psychotherapy. New York: Wiley, 1963.
- Freud, S. Collected papers of . . . London: Hogarth, 1950.
- Friedman, H. A comparison of a group of hebephrenic and catatonic schizophrenics with two groups of normal adults by means of certain variables of the Rorschach Test. Journal of Projective Techniques, 1952, 16, 352-360.
- Greenspoon, J. The effect of verbal and nonverbal stimuli on the frequency of members of two verbal response classes. Unpublished doctoral dissertation, Indiana University, 1951.



- Greenspoon, J. The reinforcing effect of two spoken sounds on the frequency of two responses. American Journal of Psychology, 1955, 68, 409-416.
- Greenspoon, J. Verbal conditioning and clinical psychology. In A. J. Bachrach (Ed.), Experimental foundations of clinical psychology. New York: Basic Books, 1962.
- Hall, W. E. Effects of set and reinforcement in verbal conditioning. Journal of General Psychology, 1960, 63, 239-248.
- Hetrick, W. R. & Haas, K. Some personality correlates of verbal conditioning. Journal of Psychology, 1962, 53, 409-415.
- Johannsen, W. J. & Campbell, S. Y. Verbal conditioning in chronic schizophrenia: Effects of reinforcement class and social responsiveness. Psychological Reports, 1964, 14, 567-572.
- Kanfer, F. H. Verbal conditioning: Reinforcement schedules and experimenter influence. Psychological Reports, 1958, 4, 443-452.
- Kanfer, F. H. and Karas, S. Prior experimenter-subject interaction and verbal conditioning. Psychological Reports, 1959, 5, 343-353.
- Kanfer, F. H. & Marston, R. Effect of task-relevant information on verbal conditioning. Journal of Psychology, 1962, 53, 29-36.
- Knowles, J. B. Rigidity, extraversion, and verbal conditioning effects. Journal of Clinical Psychology, 1963, 19, 282-286.
- Knutson, C. S. Regression in free-response verbal conditioning. Unpublished doctoral dissertation, University of North Dakota, 1964.
- Krasner, L. Studies of the conditioning of verbal behavior. Psychological Bulletin, 1958, 15, 148-171.
- Krasner, L. The therapist as a social reinforcement machine. In H. H. Strupp and L. Luborsky (Eds.), Research in psychotherapy. Washington, D. C.: American Psychological Association, 1962.
- Krasner, L., Ullmann, L. P., Weiss, R. L., & Collins, B. J. Responsivity to verbal conditioning as a function of three different examiners. Journal of Clinical Psychology, 1961, 17, 411-415.
- Krasner, L., Weiss, R. L., & Ullmann, L. P. Responsivity to verbal conditioning as a function of awareness. Psychological Reports, 1961, 8, 523-538.
- Kris, E. Psychoanalytic explorations in art. New York: International Universities Press, 1952.
- Lawson, R. Frustration: The development of a scientific concept. New York: Macmillan, 1965.

- Leventhal, A. M. The effects of diagnostic category and reinforcer on learning without awareness. Journal of Abnormal and Social Psychology, 1959, 59, 162-166.
- Levin, S. M. The effects of awareness on verbal conditioning. Journal of Experimental Psychology, 1961, 61, 67-75.
- Lublin, I. Sources of differences in effectiveness among controllers of verbal reinforcement. Proceedings of the 73rd Annual Convention of the American Psychological Association, 1965, 3-4.
- McDonnell, C. R., & Inglis, J. Verbal conditioning and personality. Psychological Reports, 1962, 10, 374.
- McNair, D. M. Reinforcement of verbal behavior. Journal of Experimental Psychology, 1957, 53, 40-46.
- McNemar, Q. Psychological statistics. New York: Wiley, 1962.
- Meyer, M. E., & Crum, D. M. Verbal conditioning with "positive" and "positive-negative" reinforcement. Psychonomic Science, 1966, 4, 59-60.
- Meyer, W. J., Swanson, B., & Kauchach, N. Studies of verbal conditioning: I. Effects of age, sex, intelligence, and "reinforcing stimuli." Child Development, 1964, 35, 499-510.
- Mosher, D. L. Differential influence of guilt on the verbal operant conditioning of hostile and "Super-ego" verbs. Journal of Consulting Psychology, 1966, 30, 280.
- Mount Sinai Seminar Group. Psychogenicity. In M. R. Kaufman and M. Heiman (Eds.), Evolution of psychosomatic concepts. New York: International Universities Press, 1964, Pp. 78-103.
- Mowrer, O. H. An experimental analogue of "regression" with incidental observations on "reaction formation." Journal of Abnormal and Social Psychology, 1940, 35, 56-87.
- Nordmark, T. P. A study of a transfer effect in verbal conditioning. Unpublished master's thesis, University of North Dakota, 1964.
- Nordmark, T. P. Effects of internal-external locus of control and differential reinforcement value on the acquisition and generalization of a conditioned verbal response. Unpublished doctoral dissertation, University of North Dakota, 1968.
- Ogawa, J. & Oakes, W. F. Sex of experimenter and manifest anxiety as related to verbal conditioning. Journal of Personality, 1965, 33, 553-569.
- Postman, L. & Sassenrath, J. The automatic action of verbal rewards and punishments. Journal of General Psychology, 1961, 65, 109-136.

- Reece, M. M. & Whitman, R. N. Expressive movements, warmth, and verbal reinforcement. Journal of Abnormal and Social Psychology, 1962, 64, 234-236.
- Reidy, M. E. A study of the unconscious effects of approval and disapproval on verbal behavior. Washington, D. C.: Catholic University Press, 1958.
- Salzinger, K. & Pisoni, S. Reinforcement of verbal affect responses of normal subjects during the interview. Journal of Abnormal and Social Psychology, 1960, 60, 127-130.
- Salzinger, K. & Pisoni, S. Some parameters of the conditioning of verbal affect responses in schizophrenic subjects. Journal of Abnormal and Social Psychology, 1961, 63, 511-515.
- Salzinger, K. & Portnoy, S. Verbal conditioning in interviews: Application to chronic schizophrenics and relationship to prognosis for acute schizophrenics. Journal of Psychiatric Research, 1964, 2, 1-9.
- Salzinger, K., Portnoy, S., & Feldman, R. Experimental manipulation of speech in schizophrenic patients. Journal of Abnormal and Social Psychology, 1964, 68, 508-516.
- Sapolsky, A. Effect of interpersonal relationships on verbal conditioning. Journal of Abnormal and Social Psychology, 1955, 51, 496-501.
- Sarason, I. G. Interrelationships among individual difference variables, behavior in psychotherapy, and verbal conditioning. Journal of Abnormal and Social Psychology, 1958, 56, 339-344.
- Schafer, R. Psychoanalytic interpretation in Rorschach testing. New York: Grune and Stratton, 1954.
- Sidowski, J. B. Influence of awareness of reinforcement on verbal conditioning. Journal of Experimental Psychology, 1954, 48, 355-360.
- Siegel, E. L. Genetic parallels of perceptual structuralization in paranoid schizophrenia: An analysis by means of the Rorschach technique. Journal of Projective Techniques, 1953, 17, 151-161.
- Simkins, L. D. Instructions as discriminative stimuli in verbal conditioning and awareness. Journal of Abnormal and Social Psychology, 1963, 66, 213-219.
- Singer, R. D. Verbal conditioning and generalization of pro-democratic responses. Journal of Abnormal and Social Psychology, 1961, 63, 43-46.
- Skinner, B. F. Science and human behavior. New York: MacMillan, 1953.

- Skinner, B. F. Verbal behavior. New York: Appleton-Century-Crofts, 1957.
- Solley, C. M. & Long, J. When is "uh-huh" reinforcing? Parasentual and Motor Skills, 1958, 8, 277.
- Spielberger, C. D. Awareness in verbal conditioning. In C. W. Eriksen (Ed.), Behavior and awareness. Durham, N. C.: Duke University Press, 1962.
- Spielberger, C. D., DeNike, L. D., & Stein, S. L. Anxiety and verbal conditioning. Journal of Personality and Social Psychology, 1965, 1, 229-239.
- Spielberger, C. D., Levin, S. M., & Shepherd, M. The effects of awareness and attitude toward the reinforcement on the operant conditioning of verbal behavior. Journal of Personality, 1962, 30, 106-121.
- Suttell, B. J. & Pascal, G. R. "Regression" in schizophrenia as determined by performance on the Bender-Gestalt Test. Journal of Abnormal and Social Psychology, 1952, 47, 653-657.
- Taffel, C. Anxiety and the conditioning of verbal behavior. Journal of Abnormal and Social Psychology, 1955, 51, 496-501.
- Thorndike, E. L. Psychology of wants, interests, and attitudes. New York: Appleton-Century, 1935.
- Timmons, E. O., Noblin, C. D., Adams, H. E., & Butler, J. R. Operant conditioning with schizophrenics comparing verbal reinforcers versus psychoanalytic interpretations. Journal of Personality and Social Psychology, 1965, 1, 373-377.
- Underwood, B. J. Experimental psychology. New York: Appleton-Century-Crofts, 1949.
- van der Waals, H. G. Psychoanalytic remarks on the psychology and therapy of chronic schizophrenia. In L. Appleby, J. M. Scher, and J. Cumming (Eds.), Chronic Schizophrenia. Glencoe, Ill.: Free Press, 1960, Pp. 174-193.
- Weide, T. N. Conditioning and generalization of the use of affect-relevant words. Unpublished doctoral dissertation, Stanford University, 1959.
- Weiss, R. L., Ekman, P., Ullmann, L. P., & Krasner, L. The context of reinforcement in verbal conditioning. Journal of Clinical Psychology, 1965, 21, 99-100
- Wickes, T. A. Examiner influence in a testing situation. Journal of Consulting Psychology, 1956, 20, 23-25.

- Wilensky, E. The performance of schizophrenic and normal individuals following frustration. Psychological Monographs, 1952, 66, 12.
- Williams, J. H. Conditioning of verbalization: A review. Psychological Bulletin, 1964, 62, 383-393.