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Behavioral Analysis of Psychoanalytically Derived Interpretations Presented on Operant Schedules of Reinforcement.

Joel Robert Butler
Louisiana State University and Agricultural & Mechanical College

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BEHAVIORAL ANALYSIS OF PSYCHOANALYTICALLY DERIVED
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OF REINFORCEMENT

A Dissertation

Submitted to the Graduate Faculty of the
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in partial fulfillment of the
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Doctor of Philosophy

in

The Department of Psychology

by

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ABSTRACT

The purpose of this study was to investigate the reinforcing effects of psychoanalytic interpretations, utilizing intermittent schedules of reinforcement, on verbal behavior in simulated therapeutic interviews. It was hypothesized that verbal behavior in an interview where interpretations were presented on different schedules would vary as a function of frequency of reinforcement, kind of schedule, and time between reinforcements.

The subjects were eight female undergraduate student volunteers from Louisiana State University. The experimental setting was constructed to simulate a therapy situation. Each subject received individual instruction regarding free-association and was then asked to respond accordingly. Response measures were the number of words and the time spoken. The first three interviews were used to establish the operant level, during which time the subject was allowed to talk at whatever pace she desired. The next four sessions constituted what was designated as the treatment phase, which consisted of psychoanalytically-derived interpretations presented on Skinnerian schedules of reinforcement. The last or eighth session was considered an extinction session and no interpretations were given.
Results clearly supported the prediction that psychoanalytic interpretations may be used as verbal reinforcers in an interview situation, and that subjects respond differentially according to frequency of reinforcement, reinforcement schedule, and time between reinforcements. The most pronounced of the effects was between the variable and the fixed schedules. Data obtained from subjects reinforced under fixed schedules did not differ significantly in appearance from those usually obtained under more rigid laboratory conditions using lower animals. Data obtained from subjects under variable schedules appeared less stable. It was noted that for all schedules, the duration of time spoken decreased and the number of words per minute increased. It was concluded that highly complex forms of human behavior, such as that emitted during psychotherapeutic sessions, are amenable to experimental analysis.
CHAPTER I

INTRODUCTION

Sigmund Freud offered to society in general, and to psychology and psychiatry in particular, a theoretical framework of personality as well as a therapeutic technique. There have been many members of society, lay and professional, whose acceptance of Freud's theory has been so extensive as to perpetuate something akin to a cult, and like all cults, one resistant to examination. But there have also been those who have received his ideas with something less than enthusiasm. Few in this opposing group have suffered in silence but fewer still have offered satisfactory alternatives, and criticism has been centered on the difficulty involved in systematically investigating the concepts of psychoanalysis either as a personality theory or as a method of treatment. Sears (1944), for example, has pointed to the subjective character of psychoanalysis as the prime difficulty for the limited empirical verification of its hypothesis and concepts.

However, there has been no shortage of investigations attempting to examine the relevant variables between expressed behavior and the psychoanalytic concepts of the structure, dynamics and development of personality. Much
of this work has been related to the testing of various defense mechanisms. Examples of research which are characteristic of this area are investigations such as the experimental analysis of displacement by Dollard and Miller (1950) and the studies of regression by Barker, Dembo and Lewin (1937). In a summary of psychoanalytic research, Sears (1944) reports there is little to support the psychoanalytic theory of personality, but he concludes that experimental psychology, while critical, has made no significant contributions which provide for definition or delineation of the relationship of personality concepts to behavior. The experimental problem seems to be one of technique.

While the procedural requirements of the laboratory appear cumbersome and inappropriate in the clinic, nevertheless, there must be a rapprochement between the two if the operations of the clinic are to enter the realm of scientific endeavor. Common to both laboratory and clinic is the observation of behavior. Therefore, the systematic study of a sample of behavior becomes elementary to the resolution of this problem. The study of human behavior in the clinic, for example, led Freud to formulate his psychoanalytical theory. The concepts of his theory are inseparably linked to the psychoanalytical treatment method which provides a common base for many of the psychotherapeutic procedures in use today.

While the technique of treatment is an intrinsic portion
of the psychoanalytical framework, it has proved even less amenable to scientific inquiry, and the reason for such difficulty lies in the complex dynamics of the therapy session. However, the same complex dynamics demand investigation if it is ever to be possible to predict the direction of behavioral change resulting from psychotherapy.

To dwell on the total therapeutic process is to become lost in the gulf which separates what is identified as behavioral symptoms and whatever is identified as determinants of the symptoms. This gulf is representative of the intervening variable, which is really made up of many factors, none of which are defined and thus make observation and classification exceedingly difficult and prone to error.

If lawfulness is to be established with respect to what happens in psychotherapy and the resultant modification of individual behavior then it is not the intervening variables which must be studied but rather, those variables which can be observed and manipulated, such as the various techniques of psychotherapy, which are the only factors open to scientific testing. In effect, the only efficient manner in which the conceptual properties of treatment can be examined is not to study the concept but to study segments of the behavior from which the concept originated (the clinical interviews) under conditions allowing for greater control.

One such segment of behavior and a technique common to
psychoanalytically-based psychotherapy is the use of interpretation. An attempt then to isolate this aspect of psychotherapy would be a preliminary step in an experimental approach to determine the function of the interpretive process. If, as the psychoanalysts contend, interpretations effect a major change in the patients' behavior by making conscious those previously unconscious motivating factors which determined his behavior, then an understanding of interpretive function should shorten the gap between concept and behavior. This seems necessary for prediction in psychotherapy as Ekstein (1959) noted.

Since there has been little systematic investigation of the basic process of interpretation, despite its wide use, an inquiry into the nature of the process seems necessary. A first step in such an inquiry would appear to be an investigation of the source of its genetic development.

Freud (1900) stressed that interpretation cannot be compared simply with a deductive or translating technique. He contended that interpretation implies assigning a meaning to that which seems to have no meaning otherwise—such as a dream. Freud never used the German word "Interpretation" but instead used the word "Deutung" which approximates in meaning such words as explanation, solution, signification, translation, definition, etc. However, "Deutung" also has been used in religious and superstitious contexts, for example, for prophecies and fortune-telling. Freud noted
that "Deutung" was prescientific in origin but introduced it into what he considered to be scientific work, yet he referred many times to psychoanalysis as an art of interpretation. If interpretation is an art then the use of the word "Deutung" seems deliberate and well-chosen. Such use might well have "foretold" the many psychological problems arising from attempts to explain the process of interpretation. Brammer and Shostrom (1960) have defined interpretation as a means of presenting the patient with a hypothesis about relationships or meanings of attitude behaviors for the patient's consideration. Thus, interpretation is generally defined as an attempt by the therapist to impart meaning or insight to the patient, which aids the patient in the resolution of his problem. Rogers (1942), in an opposing view, contends that therapeutic processes often are delayed by the use of interpretation. Regardless of the dispute over the desirability of the effects of interpretation it is generally agreed that it does have a significant influence on the patient's behavior. For example, Kanfer and others (1960) have investigated the influence of interpretation on duration of utterance and found that it significantly lowers mean duration of speaking during the interview. A modification of the Taffel technique (Taffel, 1955) was used on normal (Adams, Butler, and Noblin, 1961) and psychotic (Adams, Noblin, Butler, and Timmons, 1961; Timmons, Noblin, Adams, and Butler, 1961) populations,
where interpretations were made with respect to incomplete sentences printed on cards given to the subjects. The interpretations given represented the reinforcement supplied when the subject chose a personal pronoun instead of a relative pronoun to complete the sentence. It was found that the response class (I and we) following reinforcement at first was depressed then increased significantly beyond the operant level and was slightly more resistant to extinction than either the control or verbal conditioning groups.

Since in a behavioristic analysis of the phenomenon one might begin with the observation that an interpretation is a response of the therapist to a certain class of behavior emitted by the patient in a free-responding situation, then such behavior can well be considered as operant behavior within the framework of operant conditioning. Brady and Lind (1961) have suggested that a rapprochement between dynamic theory and operant conditioning is a desirable and necessary step to advance the study of human behavior. To support further this view Skinner (1953) stated that, by the use of operant techniques, it was possible to construct not only complex intellectual tasks but such interactions between systems of behavior as are seen in the Freudian dynamism, i.e., even the Freudian wish may be reduced. He further stated that the nature and function of verbal behavior have taken on surprisingly fresh and promising aspects
when reformulated under the structure of such a framework.

Lindsley (1956) contended that by utilizing operant techniques even the meaning or value of the reinforcer to the patient can be measured by the frequency of the behavior he will emit in order to get the reinforcing agent. Reinforcement or the control of behavior through its consequences is generally recognized to be a key variable in determining the characteristics of behavior. While conditioning and reinforcement have usually been linked to biological drives (food, water, sex, etc.), there are some consequences of behavior which cannot be termed biological or primary but are responsible for the emergence and maintenance of much, if not most, of the behavior of people. The effects of interpretations seem to fit into this "non-primary" class of reinforcement, which Skinner (1953) termed generalized conditioned reinforcers. Exactly how they fit and the degree and direction in which they effect behavior is far from clear (Sidman, 1961).

Since Skinner has concentrated his work on conditioning of operant behavior, which has no known environmental stimulus, he has perforce worked with the other experimental conditions—reinforcement and the variations in the schedule of reinforcement. Ferster and Skinner (1957) have provided an extensive description of the characteristics of various reinforcement schedules, and the effectiveness of such schedules has been repeatedly demonstrated with laboratory animals.
A very large number of studies of operant conditioning have been made on two responses and on two species: the key-pecking of hungry pigeons and the bar-pressing of hungry rats—both reinforced by food. Behavioral psychologists take pride in the stimulus-response laws found in the amassing of experimental evidence by operant conditioning (Keller and Schoenfeld, 1950; Skinner, 1938; Skinner, 1953).

The question arises as to what extent the Skinnerian experimental conditions might apply to human subjects, particularly those in an interview situation. To many "pure" behaviorists the relationship of this wealth of experimental data and the derived laws to human behavior seems, at the least, an ill-timed question; but there are other investigators to whom this question poses a problem of considerable relevance. Many attempts utilizing different methods have been made to demonstrate or exhibit this relationship. One such method has been by simple analogy (Skinner, 1953) and another by the construction of a complex theoretical structure from which predictions about behavior could be made, which may or may not be testable (Miller and Dollard, 1947). These investigatory tactics electrify, edify, or horrify, depending upon the reader's orienting frame of reference.

The laboratory experiments of Warren and Brown (1943) where children were conditioned to press a lever, with candy
as a reinforcement, constitute one of the first attempts to utilize operant conditioning on human subjects. However, it is a fair question to ask how close the lever-for-candy-press observed in the laboratory is to on-going human behavior. Caution cannot be abandoned when generalizing outside this "special" laboratory situation.

Another and more straightforward attempt by Verplanck (1955) to bring man within the realm of the operant reference frame suggests a methodology which identifies responses and reinforcing stimuli under conditions where the subject is acting as naturally as possible and is not "aware" of the procedure involved. Utilizing such a procedure, Greenspoon (1955), who suspected that the therapist's "mmm-hmm" in "non-directive" therapy constituted a reinforcement, was able to show that the relative frequency of the subject's saying of plural nouns (the response) was a function of the experimenter's manipulation of "mmm-hmm" which constituted the reinforcement. Verplanck (1956) by means of a pencil tap to indicate a reward "point" was able to condition a wide variety of simple motor behaviors. He was further able to differentiate or shape, more complex aspects of behavior and then to manipulate them as responses. The graphic functions obtained from these experiments could not be distinguished from the graphic functions obtained on the rat or the pigeon in a Skinner box. The responses made by the human subjects were quite different from those of the
rat or the pigeon but the general rules relating responses to reinforcements were the same. Such order in responding presents a lawfulness in response-reinforcement behavior across the species of man to lower animals. Next, and this was a long step past the conditioning of simple motor movement and types of word responses, was the conditioning of rather complex verbal behavior in the form of opinion statements or statements of a preselected topic, where the reinforcements were agreement or paraphrasing by the experimenter (Verplanck, 1956).

Salzinger (1957) has provided methodological clarification with regard to verbally reinforced behavior, couched in a system which divides verbal behavior into units objectively distinguishable from each other. His conceptualizations were in terms of responses which could be grouped into response classes, and the grouping of reinforcements into either positive (agreement) or negative (disagreement) with emitted responses (either verbal or non-verbal).

In terms of an experimental analysis of verbal behavior, including the effects of interpretations as reinforcing stimuli, it really matters little whether the theoretical background is psychoanalytic or reinforcement. The theoretical advance stays in a functional relationship to the technical advance and it is not to neglect theory that the experimental stress here seems directed toward the technical problems concerned in the nature of interpretations.
as reinforcements. Such stress seems appropriate when you consider that in psychology, theory is generally far ahead of technique.

The purpose of the present study was to investigate the reinforcing effects of psychoanalytic interpretations, utilizing intermittent schedules of reinforcement, on verbal behavior in simulated therapeutic interviews. It was hypothesized that verbal behavior in an interview where interpretations were presented on different schedules would vary as a function of the following variables:

1. The greater the frequency of reinforcements (interpretations) the greater will be the number of responses (words) per unit of time.

2. The schedule of reinforcement (e.g., a reinforcement delivered after a given number of responses, or a reinforcement delivered after particular time intervals) will differentially affect the frequency of responses.

3. The longer the time between reinforcements (e.g., an interval of ten minutes vs. five minutes or a ratio of 1000 words vs. 500 words) the less will be the increase in frequency of responses.
CHAPTER II

METHOD

Subjects. The subjects were eight female undergraduate student volunteers from Louisiana State University with a mean age of 19.8 years.

Response Measures. The dependent variables in this experiment were the number of words and the time spoken.

Procedure. Before the experimental interviews began, each student was given the following instructions: "We will be here for eight sessions of 50 minutes each. During that time you are to make yourself comfortable and to speak whatever occurs to you. Please allow your thoughts complete freedom of expression—just free-associate. Say anything you want and have no fear of criticisms or reprisals. Do you understand?" Each subject was told that her responses were being measured but that what she said was not being recorded.

At the beginning of the first interview each subject was requested, "Tell me something about yourself." If the subject responded with a question such as, "What do you want to know?", she was told "anything which seems important to you." Otherwise, no further structure was provided.
The first three interviews were used to establish the operant level or baseline from which conditioning proceeded. The operant level was established by allowing the subject to talk at whatever pace she desired. No attempt was made by the examiner to elicit verbal responses during these sessions.

The next four sessions constituted what is designated as the treatment phase of the experiment. Treatment consisted of psychoanalytically-derived interpretations presented on Skinnerian schedules of reinforcement (Skinner, 1953). One subject was randomly assigned to each of the following treatment conditions:

- Variable-Interval (VI) 5
- Variable-Interval (VI) 10
- Variable-Ratio (VR) 500
- Variable-Ratio (VR) 1000
- Fixed-Interval (FI) 5
- Fixed-Interval (FI) 10
- Fixed-Ratio (FR) 500
- Fixed-Ratio (FR) 1000

The interpretations were controlled by utilizing causal kinds of interpretations (Colby, 1961), that is, the examiner attributed cause-effect relationship to the subject's statements. For example, "You maintain your room in such excellent order because of strict controls placed on you when you were a small child."

During the last session no interpretations were made.

Apparatus. The experimental setting was constructed to simulate a therapy situation. The room contained a large,
comfortable chair and ottoman for the subject. A second chair for the experimenter was placed behind the subject. On a small table out of view of the subject but easily seen by the experimenter were a clock and light socket containing a small, blue light. A portable partition was used to cut down on the size of the area and thus reduce the extraneous sources of stimulation.

The timing apparatus and counters were in an adjoining room. The conversation by the subject and the experimenter was picked up by a microphone concealed under the experimenter's table. Although the subjects were aware that response measures were being taken, none discovered the presence of the microphone. Two experimental assistants tabulated the amount of time and the number of words spoken by subject and by the experimenter in the fifty-minute session. They listened to the conversation by means of earphones connected to an amplifier. Duration of speech was recorded by means of electrically-operated timers. The number of words spoken by the subject was tabulated by manually-operated counters. The experimenter was notified by means of the assistant flashing the blue light when a psychoanalytic interpretation was to be given.
CHAPTER III

RESULTS

Analysis of Response Frequency Data. The number of words was tabulated and the totals per session were combined into blocks in the following manner: the first three sessions constituted the operant or baseline; the fourth and fifth sessions constituted the first phase of treatment and the sixth and seventh sessions made up the second phase of treatment; the eighth session was treated as an extinction trial. The above stated effects may be seen in Figure 1.

Change scores, representing an index of change in the ratio of words spoken per minute, were used in Figures 1 through 11 with exception of Figures 2 and 3. The response frequency and time spent talking in the three sessions prior to receiving reinforcements were used as a base in calculating for such indices for each subject. Analyzing change using the performance in the first three sessions as a base was valid for several reasons. First, the reliability of this measure is above .90 for 10 trials (Bass, 1959). Second, time as a physical unit is a true measure with an absolute zero for which the use of percentage change indices is appropriate. Third, a baseline of performance was necessary in order to examine the differential effect of treatment.
FIG. 1 CHANGE SCORES OF WORDS SPOKEN PER MINUTE OVER SESSIONS FOR ALL SUBJECTS
AVERAGE DURATION OF SPEAKING TIME OVER SESSIONS FOR ALL SUBJECTS

FIG. 2 AVERAGE AMOUNT OF TIME TALKED IN MINUTES
FIG. 3 AVERAGE NUMBER OF WORDS SPOKEN PER MINUTE OVER OPERANT SESSIONS FOR ALL SUBJECTS
FIG. 4 PERCENT CHANGE OF WORDS SPOKEN PER MINUTE FOR VR 500 AND FR 500 SCHEDULES OVER SESSIONS
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FIG. 6 PERCENT CHANGE OF WORDS SPOKEN PER MINUTE FOR FR 500 AND FR 1000 SCHEDULES OVER SESSIONS
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FIG. 8 PERCENT CHANGE OF WORDS SPOKEN PER MINUTE FOR VI 10 AND FI 10 SCHEDULES OVER SESSIONS
Fig. 9 Percent change of words spoken per minute for FI 5 and FI 10 schedules over sessions.
FIG. 10 PERCENT CHANGE OF WORDS SPOKEN PER MINUTE FOR VI 10 AND VI 5 SCHEDULES OVER SESSIONS
**FIG. 11** PERCENT CHANGE OF WORDS SPOKEN PER MINUTE FOR FI 5 AND VI 5 SCHEDULES OVER SESSIONS
Fourth, no significant difference was indicated by examination of Figure 3 in the group operant level.

A Friedman's Analysis of Variance (Siegel, 1956) was calculated for these data. The result was significant beyond the .001 level of confidence which indicated that there was definitely an overall change effect due to the treatment.

To find the locus of treatment in terms of the increase in responses per minute, Wilcoxon Matched-Pairs Signed-Ranks Tests (Siegel, 1956) were computed between the operant and first treatment phase and showed a significance beyond the .05 level. Between the operant and the second treatment phase significance was indicated beyond the .01 level. Between the second treatment phase and trial eight or extinction phase, the Wilcoxon Test revealed no significant difference but the increasing trend continued.

The Mann-Whitney U Test (Siegel, 1956) was used to measure the differential effect between fixed and variable reinforcement schedules. The test did not reveal the existence of a significant difference between these groups for the operant, treatment, or extinction sessions. Similar Mann-Whitney analyses were applied to the data obtained from the subjects under ratio and interval schedules of reinforcement. Significance approached but failed to reach the .05 level of confidence.
Analysis of Time Duration Data. From the data presented in Figure 2, a clear and steady downward trend is evident with only two minor deviations. As the experiment continued from session to session, the time spoken as a group decreased about 10 minutes per session or about 1.2 minutes per person per session.

It is to be noted, however, that even though the duration of time spoken decreased, the number of words per minute increased. This result can readily be seen from comparing Figure 1 and Figure 2.

The differential effects of the various intermittent schedules of reinforcements are presented in Figures 4 through 11. The cumulative record for each subject on the various schedules is described in Figures 12 through 19.

At the end of the eighth session, each subject was asked about the nature and purpose of the experiment. None was able to verbalize the experimental concept.
FIG. 12 CUMULATIVE RECORD OF SUBJECT 1, SESSION 7, FI 5
FIG. 13 CUMULATIVE RECORD OF SUBJECT 2, SESSION 7, VR 1000
FIG. 14 CUMULATIVE RECORD OF SUBJECT 3, SESSION 7, VI 5
FIG. 15 CUMULATIVE RECORD
OF SUBJECT 4, SESSION 7, FI 10
FIG. 16 CUMULATIVE RECORD
OF SUBJECT 5, SESSION 7, VI 10
FIG. 17 CUMULATIVE RECORD
OF SUBJECT 6, SESSION 7, FR 500
FIG. 18 CUMULATIVE RECORD
OF SUBJECT 7, SESSION 7, FR 1000
FIG. 19 CUMULATIVE RECORD OF SUBJECT 8, SESSION 7, VR 500
CHAPTER IV

DISCUSSION

The hypothesis regarding variation in response frequency in an interview situation as a function of greater frequency of reinforcement, the schedule of reinforcement, and time intervening between reinforcements was clearly supported by the results of this study. However, before discussion of the specific hypothesis, elaboration of a significant reinforcement effect which is related to and which encompasses all of the variables stated above is essential. This effect is the relationship between duration of time talked and the frequency of response, that is, the number of words spoken. Inspection of Figure 2 will show that there is a lower mean duration of time spoken by the subject over trials. This result is consistent with the findings of Kanfer, et al. (1960) and Matarazzo, et al. (1958) who found that in an interview situation the amount of time employed by the subject in speaking decreased. Bass (1960) and Frye (1961) in studies of leadership and group interaction found similar results in group situations. What these studies have not shown, however, and this point is crucial to the investigation of the interpretive process, is that even though less time is used in speaking, the number of words per minute may
have been greater (as was the case in this experiment). This is simply an increase in the activity level of the subject. In this instance, the activity is verbal and thus may be considered symbolic and only indirectly related to the primary or biological drives, much as the psychoanalytic secondary process is related to the primary drives. A simpler but possibly more direct comparison might be with the hungry organism in the Skinner box where in this instance, too, the activity level increases. In the biological evolutionary process, it is axiomatic that the active organism changes and thereby is more likely to survive. If the hungry organism does not seek food he will surely die. It seems reasonable, then, to state that an increase in activity functions as a protective or defensive device. Symbolic gratification (generalized conditioned reinforcers) does not primarily gratify but is used as a token from which to interpret and, as has already been stated, words are symbols not directly related to primary or biological drives but as symbols may be considered as a functioning part of the secondary process of the Freudian ego. It seems obvious that symbols function in symbolic areas, but if an increase in word responding is to be considered the same as an increase in any other area of responding (thus protective or defensive) then it must be asked what such an increase protects from or defends against. It may be answered, then, that the defense is one of personality and the protection is from threat to
the personality. Since by almost all physiological and psychological tests an increase in activity is concomitant with anxiety, it would appear that the source of threat is anxiety, elicited by a stimulus (interpretation), which may be, at this time, a noxious stimulus. Further, it appears quite unlikely that any of the subjects were consciously or deliberately speeding up their rate of speaking (none expressed awareness of this increase and five of the eight subjects volunteered the notion that they were actually slowing down) which is to say that such activity was outside their awareness. Accordingly, it seems feasible to suggest that such a measured increase as was obtained in this experiment might well be termed as an operational definition of an unconscious defense mechanism where anxiety precipitated or elicited by the interpretation was the motivating factor. Information from such measures of the interpretive process suggests that interpretations as technical instruments of inquiry (operant reinforcers), where accurate records of effects are maintained, may make it possible to measure dynamics and even structural change in the personality. From this aspect of change, it is prediction of behavior which is being attempted from the interpretation and not necessarily only a hypothesis about the past. Such a construction draws the technical use of interpretation nearer to the realm of scientific explanation, which predicts, and away from the realm of artful understanding which foretells.
To return to the variables in the general hypothesis, it was found, according to statistical analysis, that all treatments achieved a significant effect regardless of the particular schedule of reinforcement employed. However, a comparison of the differences between treatments was not statistically significant. But a visual inspection of Figures 1 through 11, except for Figure 2, shows a clear difference in effects in terms of form and magnitude, which are consistent and supportive for the stated hypothesis. Since the trend was established on such a small number, it would appear probable that with a larger number of subjects statistical significance could have been demonstrated. Until this experiment has been replicated using a larger number, however, conclusions drawn from these data must necessarily be tentative.

Inspection of all the graphs, where individual performance has been charted, points to the pronounced differential effect in form of responding, between the fixed and variable schedules, with much less emphasis on the other intermittent schedule variations such as between ratio and interval, and between different magnitudes of reinforcement or differences in time between reinforcements.

In regard to the differences between fixed and variable schedules it was found that the subjects on the fixed schedules were more constant and stable in their performances as well as maintaining a considerably high level of responding.
These results were not completely consistent with reports (Ferster & Skinner, 1957) of the characteristic response patterns of lower animals but was consistent with Kanfer's (1958) study of reinforcement schedules on verbal behavior.

The problem here seems to be two-fold. First, verbal conditioning has been repeatedly achieved, but the stated differential effect found in this experiment suggests that these conditioning phenomena in verbal behavior are far less stable than those responses obtained with lower order organisms in the laboratory. To some extent, this instability is a reflection of the sensitivity of verbal behavior to a variety of concurrent stimuli which is in part outside the interviewer's control and works to the effect of reducing the directness of the relationship between the reinforcer and the response class. Such stimuli are the physical conditions and characteristics of both subject and experimenter, the status of the experimenter, the problem area, etc. Second, the particular effect found in the variable schedules, which appears to be less stable, may be a question of discrimination, where successful reinforcement is dependent upon the subject's ability to discriminate among the various temporal and frequency aspects of the reinforcements.

The second phase of this problem may be related to the previous discussion about anxiety. The variable schedules are more ambiguous than the fixed and as such are more difficult to structure. People in a new situation attempt to
provide meaning to the situation on the basis of their past experiences. In effect, they are able to predict from the antecedent conditions. To the extent that prediction is a function of discriminative stimulus, structure and meaning are provided. Where the subject cannot provide structure and meaning, anxiety occurs. This is the reason people tend to become more anxious in new and thus unpredictable situations. The experimenter believes that this accounts for the instability of the variable schedules on verbal behavior. Further, as people become more and more anxious, they are able to discriminate less and less which, in turn, generates an increase in anxiety and decreases discriminative powers. A more parsimonious explanation might be that conditioning under variable schedules simply proceeds at a slower rate.

Regarding the fixed schedules, perhaps the most important finding of this experiment concerning the order and consistency of behavior is that the graphic data do not differ significantly in appearance from those usually obtained under more rigid laboratory conditions in which lower animals were used. Under the fixed schedules, the individual appears able to predict better on a basis of a discriminative stimulus, either time or ratio, when the interpretation will be given. Thus such a discriminative stimulus increases response tendency which leads to the consistency of performance.

Apart from the objective data which have already been
discussed, there were subjective indices to show the rather
dramatic effect of psychoanalytically-derived interpreta-
tion on behavior. In this study there were obvious examples
of resistance, transference, withdrawal, and hostility. For
example, it was noted that for the fifth session, the first
trial after the initial treatment trial, four of the eight
subjects were late for their appointments, one postponed the
interview, one failed to keep the appointment and one ar-
rived early. This type of behavior never occurred during
the operant trials, but such resistance, hostility, or with-
drawal was demonstrated numerous times during the remainder
of the experiment. It would seem reasonable to assume on
the basis of such evidence that behavior in the simulated
therapy situation was highly similar to the actual therapy
sessions.

It appears that one example of complex human behavior,
the interpretive process in the therapy situation, has
proven amenable to experimental analysis. Order has been
demonstrated and significant data can be obtained in field
situations where the design is clear and measures are possi-
ble. In addition, human behavior, including verbal behavior,
can be investigated without the subject's being aware of the
response measures which are reinforced, thus eliminating the
confounding effect of awareness on the modification of be-
havior.

It seems reasonable to consider any number of studies
investigating the interpretive process as well as other portions of the therapy session. Experiments are needed to determine what other facets of human behavior may be grouped into measurable response classes and what other environmental stimuli constitute reinforcement as well as the effects of different schedules of reinforcement.
CHAPTER V

SUMMARY

The purpose of this study was to investigate the reinforcing effects of psychoanalytic interpretations, utilizing intermittent schedules of reinforcement, on verbal behavior in simulated therapeutic interviews. It was hypothesized that verbal behavior in an interview where interpretations were presented on different schedules would vary as a function of frequency of reinforcement, kind of schedule, and time between reinforcements.

The subjects were eight female undergraduate student volunteers from Louisiana State University. The experimental setting was constructed to simulate a therapy situation. Each subject received individual instruction regarding free-association and was then asked to respond accordingly. Response measures were the number of words and the time spoken. The first three interviews were used to establish the operant level, during which time the subject was allowed to talk at whatever pace she desired. The next four sessions constituted what was designated as the treatment phase, which consisted of psychoanalytically-derived interpretations presented on Skinnerian schedules of reinforcement. The last or eighth session was considered an extinction session and no interpretations were given.
Results clearly supported the prediction that psychoanalytic interpretations may be used as verbal reinforcers in an interview situation, and that subjects respond differentially according to frequency of reinforcement, reinforcement schedule, and time between reinforcements. The most pronounced of the effects was between the variable and the fixed schedules. Data obtained from subjects reinforced under fixed schedules did not differ significantly in appearance from those usually obtained under more rigid laboratory conditions using lower animals. Data obtained from subjects under variable schedules appeared less stable. It was noted that for all schedules, the duration of time spoken decreased and the number of words per minute increased. It was concluded that highly complex forms of human behavior, such as that emitted during psychotherapeutic sessions, are amenable to experimental analysis.
REFERENCES


VITA

Joel Robert Butler was born June 14, 1924, in Pawhuska, Oklahoma. In May, 1941, he was graduated from College-High School in Bartlesville, Oklahoma. He received training as a cadet in the United States Merchant Marine Cadet Corps, and later served in the armed services of the United States for 33 months. His academic program was resumed in 1954, when he entered the College of San Mateo and received the Associate in Arts degree in June, 1956. He entered San Francisco State College in September, 1956, and was awarded the degree of Bachelor of Arts in January, 1958. Internship of one year in clinical psychology was served at the San Francisco State College Counseling Center. In August, 1959, he received the degree of Master of Science from San Francisco State College. He entered Louisiana State University in September, 1959, and became a candidate for the degree of Doctor of Philosophy.
EXAMINATION AND THESIS REPORT

Candidate: Joel Robert Butler

Major Field: Psychology

Title of Thesis: BEHAVIORAL ANALYSIS OF PSYCHOANALYTICALLY DERIVED INTERPRETATIONS PRESENTED ON OPERANT SCHEDULES OF REINFORCEMENT

Approved:

[Signatures]

Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

[Signatures]

Date of Examination:

4 January 1962