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Verbal Operant Conditioning and Response-Reinforcement Contingency Awareness

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BY

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ABSTRACT OF THESIS

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ABSTRACT

The following problem was investigated: can persons be conditioned to emit a verbal response without their awareness of the response-reinforcement contingency? It was hypothesized that when a "set to problem solve," is not induced and experimenter effect due to the subject-experimenter interaction is eliminated, subjects are conditioned to emit a verbal response without an accompanying contingency awareness.

Three experiments were conducted in order to test the hypothesis. In experiment 1 an attempt was made to condition vocal response length using a visual reinforcer. In experiments 2 and 3 an attempt was made to condition use of specific pronouns using a visual reinforcer. All three experiments demonstrated that when "set to problem solve" and E - S interaction was eliminated, conditioning did not occur.

The central finding of this study was that while elimination of "set to problem solve" may be a necessary antecedent of conditioning without awareness, it is not a sufficient condition. It was further concluded that 2 states of affair may exist concerning the role of response-reinforcement contingency awareness in verbal operant conditioning: (1) it is possible that awareness is

necessary for conditioning in many instances; (2) it may be the case that a rival alternative hypothesis exists to explain why conditioning did not occur without awareness.

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INTRODUCTION

Many of the phenomena described as communication by researchers in the field of speech communication are also labeled as verbal behavior by psychologists. Verbal behavior has been the target of a large body of research. Much of that research has been concerned with the conditioning or acquisition of verbal responses. Therefore, research on verbal conditioning has application to the study of communication. Hence, this study in communication dealt with verbal conditioning. Specifically, the topic of verbal operant conditioning and contingency awareness was studied.

Problem

A favorite undergraduate, and possibly graduate, game is called "condition and teacher"; that is, students reinforce certain teacher acts and manipulate his subsequent behavior. Numerous examples exist of students conditioning teacher behaviors. Teachers have been conditioned to move to the side of the classroom, to cough, or to change gestures and speech habits. For example, when a teacher moves toward one side of the room, students may reinforce his movement. Reinforcement may be in the form of students paying attention, taking notes, asking questions, or head nodding. The result of the conditioning would be a teacher consistently standing at one side of the room.

When this occurs in the classroom, or in the outside world, is the individual conditioned aware of what is being done to him? Does the person being conditioned have to be aware of his behavior and of the reinforcement before conditioning can occur?

Some researchers have produced conditioning without awareness. Other researchers have found no conditioning without awareness. One of the first experiments dealing with this question was conducted by William Verplanck (1955), who demonstrated that communicative behavior emitted in a dyadic setting can be a function of conditioning. While engaged in everyday conversations, experimenters conditioned subjects to make "evaluative statements" by using two types of social reinforcers. The reinforcers were: (1) agreement, operationally defined as "you're right," "I agree," "that's so," head nodding, or smiling; and (2) paraphrasing, defined as repeating back to the subject what he had just said. The major result of this experiment was that subjects increased their rate of emitting evaluative statements as a function of having those statements reinforced.

A secondary finding was that no subjects gave evidence of response-reinforcement-contingency awareness, i.e., they were unaware of what they were doing or why. Thus, Verplanck, along with others (Taffel, 1955; Greenspoon, 1955) raised the following problem: can persons be conditioned to emit a verbal response without their awareness of the response-

reinforcement contingency? This present study was an attempt to answer this question.

Literature Review

The experiments conducted to test whether or not contingency-awareness is necessary for verbal operant conditioning have yielded inconclusive results. Most experiments have found no conditioning without awareness. However, both early and recent studies have indicated that contingency awareness may not necessarily mediate verbal operant conditioning. Greenspoon (1955) used a procedure in which subjects emitted single word responses. Depending upon the experimental group, subjects were reinforced with either "mmm - hmm" or "uh - huh" for emitting either plural or non-plural words. This experiment demonstrated significant conditioning without subject awareness of the response-reinforcement contingency.

Taffel (1955) conducted the archetypal verbal operant conditioning and contingency-awareness experiment. Each subject was presented with 80 cards. An infinitive verb was typed onto the center of each card. The pronouns "I," "We," "You," "He," "She," and "They," were typed onto the bottom of the cards in random order. The experimenter instructed subjects to construct sentences, using the pronouns and verbs on the cards. To establish a base rate the first twenty sentences were randomly reinforced, with the word "good." Thereafter, all sentences beginning with "I" or "We" were

reinforced for the experimental group. The control group constructed sentences, but received no reinforcement. After conditioning, each subject answered an awareness questionnaire and was interviewed. The experimental group was compared to the control group for the dependent variable ("I" and "We" responses) and the correlated variable (awareness). Subjects were conditioned without their being able to verbalize the purpose of the study or the relationship between their responses and the experimenter's behavior. Recent researchers have used the basic Taffel design, making changes in order to answer specific research questions.

Greenspoon, Taffel, Dixon and Oakes (1965), and Verplanck all found conditioning without awareness; but the bulk of the research supports the proposition that awareness necessarily mediates conditioning.

Spielberger and DeNike (1966) challenged the Greenspoon findings. They claimed that Greenspoon used an insensitive awareness interview. They argued that some of Greenspoon's conditioned subjects were aware of the response-reinforcement contingency, but Greenspoon's interview failed to detect it. Dozens of studies have since investigated the relationship between verbal operant conditioning and response-reinforcement contingency awareness.

Several recent studies, using different independent, dependent, and correlated variables, have found that no verbal operant conditioning occurs without response-reinforcement

contingency awareness. Experimenters investigating different independent variables have found no conditioning without awareness. Ault and Vogler (1969) used four different reinforcers in four experimental groups: "right," "wrong," "correct," and "incorrect." The "right" group had a significantly lower mean awareness score. Thus, "right" was a poorer discriminative stimulus than the words "wrong," "correct," and "incorrect." Hamilton, et al. (1970), in a vicarious learning task, used "mmm - hmm" as a reinforcer and found that only aware subjects were conditioned. A vicarious learning task is one in which the subject does not actually receive reinforcement but rather watches someone else receive reinforcement for the desired response. Walker, et al. (1968), found that "mmm - hmm" was not an effective reinforcer, whereas "good" did reinforce a verbal response. Immediate reinforcement produced conditioning, delayed reinforcement did not. Mondy (1968) discovered significantly more conditioning occurred as reinforcement was presented less and less subtly. David (1967) concluded that speed set (emphasis on quick completion of the task) had no significant effect upon either verbal operant conditioning or response-reinforcement-contingency awareness.

Experimenters focusing on other dependent variables provided evidence to support the necessity for awareness. Whereas Taffel used pronouns and Greenspoon used plural nouns, Dixon and Hammond (1970) used noun plurals formed by adding the phonemes /s/ and /z/. Awareness and reinforcement ("good")

interacted to produce significant conditioning. Hamilton (1970), positing the same conclusions, used present participles as the response class.

The relation between correlated variables and verbal operant conditioning was studied in two experiments supporting the position that awareness is necessary for conditioning. Hamilton (1970) and Mondy (1968) examined the interaction between a subject's intent to comply and verbal operant conditioning. Both experiments detected conditioning only for aware subjects expressing intent to comply with the experimenter.

Ude and Volger (1969) hypothesized that subjects' perception of internal versus external control of reinforcement would mediate verbal operant conditioning. This experiment operationally defined internal and external control using the Internal Versus External Control of Reinforcement Scale, developed by Rotter, Seeman, and Liverant (1962). The construct definition of internally perceived control was the degree to which individuals perceived reinforcement to be contingent upon their own behavior. Externally perceived control was defined as reinforcement outside and independent of the individual. Individuals who perceived internal control (internals) were significantly more aware of the response-reinforcement contingency than were individuals who perceived external control (externals). Aware internals had a significantly greater correct response rate than either unaware internals or externals.

Hersen and Sudik (1971) studied verbal operant conditioning performance for subjects with high and low scores on the M.M.P.I. Paranoia (P.A.) scale and the Suspiciousness scale. The high P.A. subject group had a higher proportion of aware subjects. The low suspicious subject group demonstrated significantly better performance on three of four trial blocks than did the high suspicious subject group. The findings concerning awareness and conditioning were consistent with the theory that awareness necessarily mediates conditioning.

Miller (1967) studied awareness conditioning, verbal conditioning and meaning conditioning. He summarized four results of his study:

> (1) Conditioning of meaning and verbal operant conditioning can occur together. (2) Awareness statements are operantly conditionable. (3) Verbal reinforcements can be arranged to produce either covariation of awareness statements and verbal conditioning or lack of covariation. (4) Awareness statements during conditioning relate significantly to awareness measured by a post-conditioning questionnaire.

Except for the Greenspoon, Taffel, Verplanck, and Dixon and Oaks studies, all of the previously mentioned studies found no verbal operant conditioning without contingency awareness. However, recent research has not given unanimous support to this finding. Several studies found verbal operant conditioning without contingency awareness. Barik (1968) used a sentence completion task where subjects chose one of two words for use in constructing a sentence. In

the Length (L) treatment group, subjects were reinforced for either always choosing the word with the most letters, or always choosing the word with the least letters. In the Related (R) treatment group, the word pairs referred to conceptually or semantically similar objects or events, with one word referring to a larger item (e.g., "chair-throne," "worm-snake"). Verbal operant conditioning did not occur in the L group but did occur in the R group, even when data from aware subjects were discarded. Other experiments also demonstrated conditioning without contingency awareness (Rosenfeld and Baer, 1969; Silver et al., 1970; and Kennedy, 1970).

The common finding of most verbal operant conditioning research is that contingency awareness does facilitate verbal learning. However, the issue of whether or not verbal operant conditioning can occur without response-reinforcement contingency awareness remains to be answered. Awareness theorists point to research demonstrating that verbal operant conditioning does not occur without response-reinforcement contingency awareness, while non-awareness theorists point to research demonstrating that verbal operant conditioning does occur without response-reinforcement-contingency awareness. The task now becomes one of accounting for the discrepancy in the research findings.

The existing literature suggests three possible explanations for the discrepancy: (1) methodological differences

have produced the discrepancy; (2) awareness correlates with, but does not cause, conditioned responses, in which case a third variable sometimes leads to conditioning with awareness and sometimes leads to conditioning without awareness; and (3) the verbal operant conditioning experiments are actually problem-solving exercises for the experimental subjects.

Methodological differences between those finding conditioning with awareness and those finding conditioning without awareness could generate different research findings. Awareness assessment is one potential source of discrepancy. Spielberger's original attack upon Greenspoon's findings charged that Greenspoon used an insensitive interview technique. Non-awareness theorists countered with the accusation that Spielberger's (1962) technique was leading the subjects toward contingency awareness. The various methods of awareness assessment, therefore, must be compared and contrasted.

Several different assessment methods have been used. Walker (1968) used the open ended question, "What do you think occurred in this experiment?" DeNike (1964) assessed awareness after each trial block. Silver (1970) used a series of questions, the last of which almost directly suggested the response-reinforcement contingency. Several experiments used double-blind procedures to increase assessment validity (e.g., Kennedy, 1970). In these experiments interviewers were unaware of whether individual subjects were

placed in experimental or control groups. Many experiments also used two independent interviewers to enhance reliability (e.g., Dixon and Hammond, 1970).

At least two experiments have treated awareness assessment as an independent variable, thus giving us some information about the role of awareness interviews. Dixon and Moulton (1970) used four temporal types of awareness assessment: (1) after every trial; (2) after every ten trials; (3) post-experimentally; and (4) only with subjects' volunteered responses. The conclusion was posited that questioning procedures for awareness may alter the reinforcement effect. Levin (1961) compared a brief interview and an extended one. Both interviews yielded similar results. For Levin's experiment, awareness assessment did not seem to be a function of interview length.

Despite the numerous methods of assessing awareness, and despite the potentially biasing properties of those methods, differences in assessment do not seem to account for the discrepancy in research findings. Silver (1970), himself a non-awareness theorist, answered the accusation of insensitive awareness measurement devices by pointing to his own interview technique, which was, perhaps, the most leading and suggestive interview technique thus far devised. He found conditioning without awareness. Leftwich (1969) answered the accusation that researchers finding no conditioning without awareness used leading interviews. He used

two assessment techniques: Spielberger's and a non-questioning technique. He concluded that both methods yielded similar results. Spielberger's methods did not, therefore, lead subjects into spurious awareness. The conclusion can be tentatively advanced that the research discrepancy is not a result of different methods of awareness assessment.

A second possible difference between those experimenters that discovered conditioning without awareness and those that discovered conditioning only with awareness was that both groups of researchers had systematically different hypotheses concerning the role of awareness in conditioning. Thus, an experimenter bias effect is suggested. It is possible that some of the past experimental results were due to self-fulfilling prophecies. Sheehan (1969) demonstrated the plausibility of this hypothesis. He instructed some experimenters that they could obtain conditioning without awareness. Other experimenters were told that conditioning without awareness could not occur. The experimenters then conducted verbal operant conditioning experiments and tested for awareness. The results of Sheehan's experiment indicated that experimenters found that for which they were looking. Thus, self-fulfilling prophecy could account for the research discrepancies. No other systematic methodological differences seem to exist between experiments supporting conditioning with awareness and conditioning without awareness.

The second hypothesis is that awareness is a correlate to, not necessarily a cause of, conditioned verbal responses. Awareness is a concomitant of learning and not a determinant of learning. The relationship between conditioned response and awareness is that both are dependent variables. The correlational relationship between awareness and conditioned response was described by Gruber (1970). Miller (1967) and Miller and Babcock (1970) treated awareness statements as dependent variables in their experiment. They concluded that awareness statements are operantly conditionable. If awareness and verbal responses positively correlate, then perhaps the research discrepancy is a function of an undiscovered antecedent variable(s). The undiscovered third variable may be the experimenter effect.

The third hypothesis is that most verbal operant conditioning experiments do not engage the subjects in true "conditioning," rather the experiments are, in fact, problem solving tasks (Dixon, 1966; Holmes, 1967; Kanfer, 1968; and Spielberger and DeNike, 1966). The subjects in most Taffel-type designs simply test hypotheses of their own. They engage in the behavior of systematically using one verb or pronoun at a time until they identify the appropriate contingency. Previously learned problem solving and cue identification behaviors are manifest. If this explanation of the research discrepancy is correct, then the simplicity and lack of subtlety in the Taffel-type designs have largely

precluded the possibility of finding conditioning without awareness.

The "problem solving" explanation has been attacked by Hersen and Sudik (1971) who reasoned that if past verbal operant conditioning experiments were actually problem-solving tasks, then G.P.A. and subject conditioning should covary. Their study revealed that no such relationship existed. Hersen and Sulik concluded that their research argues against the problem-solving theory.

Rosenfeld and Baer (1969) demonstrated positive support for the theory with an experiment in which the functions of the experimenter and subject were reversed. The person who thought he was the experimenter was actually the subject. The experimenters (actually subjects) were conditioned to make verbal responses. In this experiment no experimenters (actually subjects) were aware of the response-reinforcement contingency, nor were they approaching the experiment with a "set to problem solve."

In summary, some experiments have produced conditioning with awareness, others have not. Three possible causes of the discrepancy were considered in this review. None of them have been conclusively demonstrated at this time. As long as the discrepancy in research findings exists, the question of the necessity of awareness remains unanswered. However, recent research does seem to indicate that when the problem solving nature of verbal operant conditioning

experiments is eliminated, conditioning without awareness occurs. It may be that awareness facilitates conditioning, but does not necessarily precede conditioning.

Hypothesis

Sheehan (1969) found that experimenter bias possibly contributed to the research discrepancy in the area of verbal operant conditioning and response-reinforcement contingency awareness. Two possible sources of experimenter bias could have influenced verbal operant conditioning experiments. The first type of bias deals with awareness assessment. This type of experimenter bias was largely discounted by several experiments cited in the literature review. Secondly, experimenter bias could have influenced the experimenter - subject interaction during Taffel-type experiments. Nonverbal cues on the part of the experimenter could have lead subjects to contingency awareness in experiments supporting the non-awareness prediction. If the experimenter - subject interaction is the source of self-fulfilling prophecy, then the remedy lies in excluding face-to-face interaction from the experimental procedure. The experiments of this present study made such an exclusion. Eliminating a possible source of experimenter bias should generate a more viable response to the question: can a person be conditioned to emit a verbal response without that person's awareness?

Rosenfeld and Baer (1969) suggested that if conditioning is performed subtlety enough, and if the subject has no "set to problem solve," then conditioning should occur without awareness. However, as noted in the literature review, the problem-solving hypothesis has not received total support. Also, the Rosenfeld and Baer study did not attempt to eliminate bias associated with face-to-face interaction between the experimenter and the subject. Therefore, the Rosenfeld and Baer study did not offer a definitive answer to the question. However, Rosenfeld and Baer (1969) and Sheehan (1969) together lead to the following hypothesis tested in the present study: when a "set to problem solve," is not induced, and experimenter effect due to the subject-experimenter interaction is eliminated, subjects are conditioned to emit a verbal response without an accompanying contingency awareness.

EXPERIMENT I

METHOD

Subjects

Twenty males served as Ss. Males were used because it was felt that it would be easier to find pleasurable visual stimuli for males than for females. The pleasurable visual stimuli consisted of slides of girls and landscapes. All Ss were volunteers from speech communication classes at the University of New Mexico.

Apparatus

The experiment was conducted in a 13' X 18' room with a 7' ceiling (see figure 1 for a diagram of the room arrangement). The room contained: two chairs, one table with a height of 24" and a surface measuring 22" X 36", one portable projection screen (40" X 64"), two Kodak model 800 H carousel slide projectors with 3" lenses, a Sony model TC-106A tape recorder with microphone, and a Fashiontime brand 1/10 second stopwatch.

In the front of the room was the projection screen. In the middle of the room, facing the front, was a chair for the Ss. The S's chair was placed 6' from the screen. 1' behind and 1' to the right of the S was the table on which were placed the two slide carousels. This placed the slide projectors seven feet from the screen. E was

seated behind the table. The tape recorder was placed immediately to the left of E on the floor. The stopwatch and data sheets were placed upon the table. When the S entered the room, data sheets were placed face down.

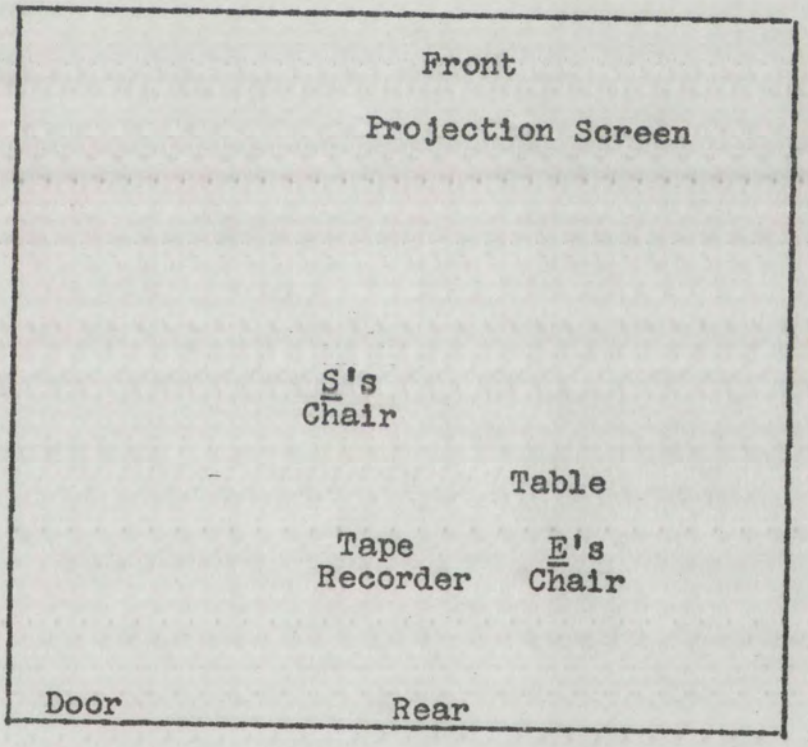

Figure 1. Diagram of the Experimental Room Arrangement.

Forty Kodak slides were used in the first experiment. Two general types of slides were used: reinforcing and non-reinforcing. Two types of reinforcing slides were used: landscapes and girls. Nine landscape slides included: two hot-air balloons, a mountain, a snow covered stream, a fireplace with a fire going, a mountain stream, the Grand Canyon, a flower, and a blossomed tree. Eleven

pictures of girls included blonds and brunettes from the University of New Mexico. The girls were dressed conservatively.

Twenty non-reinforcing slides were comprised of students walking across the university mall. The non-reinforcing slides each met four criteria: (1) The slides included no close-ups of people or objects; (2) The scenes were judged by E as commonplace to most students; (3) All non-reinforcing slides were basically similar in content and setting; and (4) The slides were judged by E to contain little novel or attractive stimuli.

Procedure

As Ss reported to the laboratory they were escorted to the experiment room one at a time and were seated in the chair. E then read to S the following instructions:

> I cannot interact with you, so, if you would, please face the screen and try not to turn around. Here is a microphone. When you talk, please talk into the microphone loud and clear. I will now show you a series of 30 slides, lasting approximately 15 minutes. I will flash the slides on the screen for eight seconds. After the eight second period I will remove the slide and the screen will go white. When the screen turns white, react to the slide you have just seen. By react, I mean that you can describe the slide, evaluate the slide, or make any associations that come to mind. Whatever comes into your mind you may say. I would appreciate it if you would make your responses at least ten words or more. If you have any questions, or if you would like any of the slides focused, just ask me.

Questions were answered by re-reading portions of the instructions.

Ss were then randomly assigned, using a table of random numbers, to either an experimental or a control group.

Vocal response length was the response designated for attempted conditioning. Response length was chosen because it was a shapeable response. Shaping can be defined as the procedure of rewarding successive approximations to the desired response. For the experimental group "long" responses were reinforced, short responses were not reinforced. "Long" responses were operationally defined as any responses longer (in seconds) than the S's response to the previous slide. For example, if a S responded for eight seconds on the first trial and nine on the second trial he was reinforced for the second trial response. However, if the second trial response was seven seconds he was not reinforced. In isolated instances Ss were reinforced for responses shorter than the preceding response. This occurred, however, only when the shorter response was actually longer than the majority of that S's previous responses.

Reinforcement was operationally defined as viewing a reinforcing slide upon completion of a "long" response. In order to reinforce Ss for emitting the response, one slide projector was loaded with reinforcing slides. The other slide projector was loaded with non-reinforcing slides.

E operated the slide projector. E also timed and recorded the S's response duration. All thirty trials for each S were scored and recorded. A trial score equalled the number of seconds that elapsed between the time the S uttered his first sound, following viewing the slide, until he ended his vocal response. The score also included a two second period of silence which came after the S finished talking. Letting two seconds elapse after the S completed his response, before E stopped the stopwatch, was done to guard against E mistaking a pause for a completed response.

After thirty trials the S was interviewed for awareness (see appendix I for a reproduction of the entire interview schedule), asked not to discuss the experiment with other persons, thanked, and dismissed. No debriefing occurred because it was felt that little psychological harm could come to Ss by not knowing the true nature of the experiment. Also, a debriefed S could brief a future S.

The control group received the same instructions and treatment as the experimental group except that the control group viewed reinforcing and non-reinforcing slides in a random order.

Testing the Instrument

It was hypothesized that slides perceived by Ss as pleasurable, attractive, and good would function as rein-

forcers for a vocal response. Therefore, it was necessary to demonstrate that the reinforcing slides were, in fact, perceived by males as pleasurable, attractive, and good. Seven student judges rated each of the forty slides on a semantic differential-type scale. The semantic differential consisted of three bipolar scales, each with seven points: (1) pleasurable - not pleasurable; (2) attractive - unattractive; and (3) good - bad. A value of "one" represented the pleasurable, attractive, or good pole of the scale, "seven" represented the not-pleasurable, unattractive, or bad pole of the scales.

The judges, similar to the Ss, were volunteers from speech communication classes. The judges were instructed in the use of the semantic differential and were then asked to rate each of the slides. Judging occurred in the same room and used the same apparatus as the attempted conditioning procedure. Judges were exposed to each slide for eight seconds and then rated the slide using the semantic differential.

Table 1 depicts the results from the judges' ratings. Judges' ratings of the thirty-nine slides indicated that all reinforcing slides were perceived by naive judges as significantly superior to all non-reinforcing slides on all three dimensions. Statistical comparisons were performed using independent, two-tailed, t tests, using each slide's mean rating as data points.

Table 1

Summary Data from the Instrument Test for Experiment I

Scale	Mean Reinforcing Slides	Mean Non-Reinforcing Slides	df	t
Pleasurableness	1.823	4.000	37	11.485*
Attractiveness	1.782	4.040	37	12.205*
Goodness	2.047	4.078	37	10.634*

*$p < .001$

RESULTS

Vocal response length, measured in seconds, was the dependent measure. Mean seconds-per-trial response length for Ss in the experimental (reinforced) group was 9.737 seconds. Mean seconds-per-trial response length for Ss in the control group was 8.141 seconds. The group which received reinforcement for "long" responses did average longer response lengths than did the control group; however, the difference between the groups was not significant, t ($df = 18$) = .537; $p > .05$. Figure number two portrays mean response length per every five trials for the experimental and control groups.

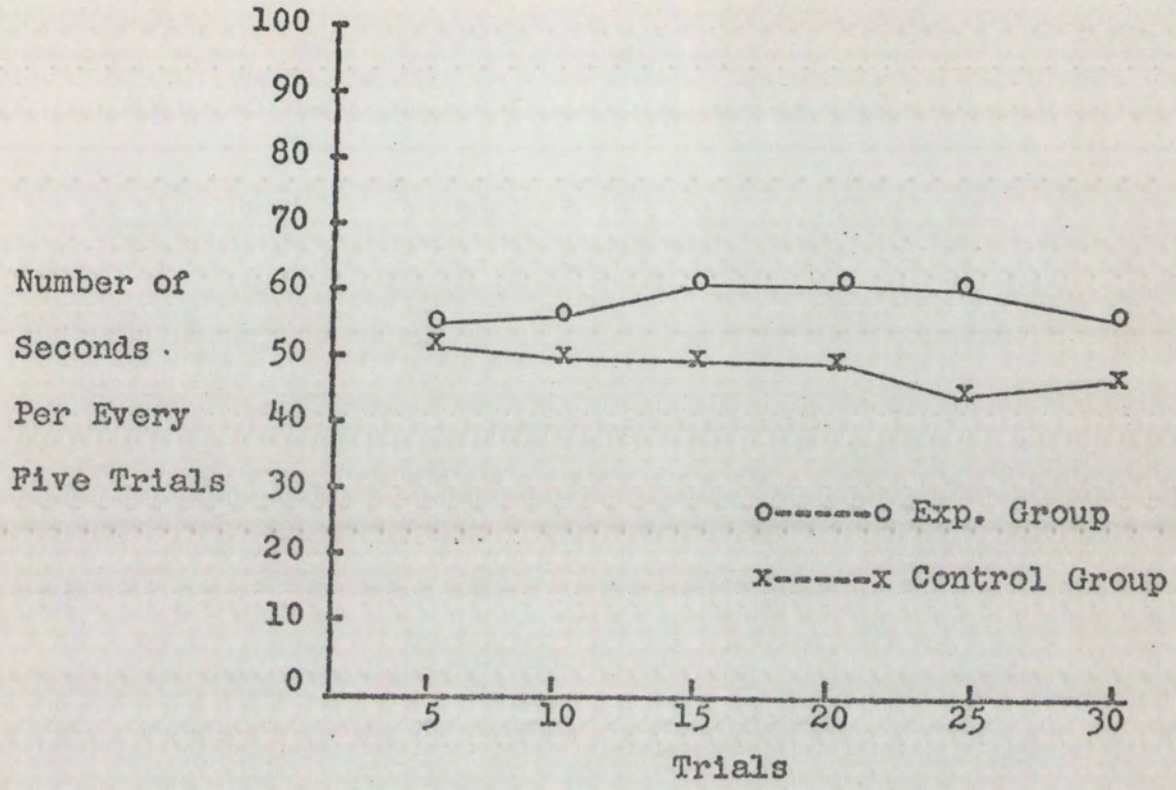

Figure 2. Mean Response Length for Experiment I

After the experiment all Ss were interviewed by E for awareness, using an interview instrument adapted from Silver et al. (1970). The last question of the interview was: "I noticed that toward the end your reactions got longer. Was there any reason for this?" No Ss gave any indication of contingency awareness. No Ss gave any answers which mentioned any connection between the length of response and the quality of the pictures.

EXPERIMENT II

In experiment I Ss in the experimental group were not conditioned to emit a high frequency of long responses as was predicted. This may have been due to the possibility that awareness is necessary before conditioning can occur, yet the design of experiment I precluded response-reinforcement contingency awareness. The inability to condition Ss may have been due to the failure of experiment I to meet certain prerequisites of conditioning. Those prerequisites might have been: (1) a conditionable response; (2) an adequate reinforcer; and (3) a state of deprivation. Therefore, experiment II was performed using: (1) a known conditionable response, (2) a different reinforcer and neutral stimulus, and (3) temporary pleasurable-stimulus deprivation for the Ss.

METHOD

Subjects

Twenty males served as Ss. All Ss were volunteers from speech communication classes at the University of New Mexico. No S had previously participated in either experiment I or the instrument testing session.

Apparatus

Most of the apparatus used in experiment I were also enlisted for use in the second experiment. However, two

changes were made: (1) some of the slides were changed, and (2) a deck of stimulus cards was used in this experiment.

Twenty-eight reinforcing slides were used in experiment II. The reinforcing slides included eight slides of girls with six landscapes taken from experiment I, and fourteen additional slides. The additional slides included ten slides of nude girls, copied from Playboy magazine; the neutral slides used in experiment I were replaced in experiment II with one neutral slide: a single shade of grey.

The deck of stimulus cards used in experiment II was similar to that used by Taffel (1955). Thirty 3 X 5, unlined, white cards were used. Each card contained a different infinitive verb typed onto the middle of the card. Six pronouns (I, We, He, You, They, and She) were typed, in random order, onto the bottom of each card.

Procedure

The procedure for experiment II was similar to experiment I with three variations. First, the response to be conditioned was changed from vocal response length to sentences containing the pronouns "I" or "We." This change was made because the construction of sentences containing the pronouns "I" or "We" is a known conditionable response (Taffel, 1955). On each of the thirty trials Ss constructed

sentences using the infinitive verb and one of the pronouns typed onto the cards. When Ss in the experimental group used one of the target pronouns, the next slide the Ss viewed was a "reinforcing" slide.

The second change from experiment I was in the area of stimulus material. Slides of nudes were added to slides of lanscapes and girls. It was reasoned that a different type of reinforcing slide might produce conditioning. The neutral slides were also changed from pictures of the university mall to a slide containing a solid field of grey. This change was made because of the possibility that even pictures of the mall were pleasurable, despite judges' evaluations of mall slides. If changes in stimulus material from experiment I to experiment II fail to produce changes in results, the generalizability and reliability of the experiment I findings are enhanced.

The third change was the exposing of all Ss to the grey slide for three minutes at the beginning of the experimental session. All Ss were instructed by E to, "Please concentrate on the grey rectangle for three minutes. Try not to let your mind wander. I will tell you when three minutes are up." This change was made in order to enhance the pleasurable aspects of the reinforcing slides. The situation was analogous to starving a rat before using him in a learning experiment where food is used as a reinforcer.

Testing the Instrument

An instrument test was performed on the slides. The procedure used for the experiment II instrument test was identical to the procedure used in experiment I. Results of the instrument test indicated that the reinforcing slides were perceived by the six judges as being superior to the neutral grey slide on all three scales. It should be noted that the judges rated the grey slide eight times. The final mean rating for the grey slide was derived from all eight ratings. Table number two gives the results from the judges ratings.

Table 2

Summary Data from the Instrument Test for Experiment II

Scale	Mean Reinforcing Slides	Mean Non-Reinforcing Slides	df	t
Pleasurableness	1.898	4.707	34	16.144*
Attractiveness	1.981	4.583	34	12.390*
Goodness	2.112	3.688	34	7.433*

*$p < .001$

Appendix V lists the mean ratings of landscape, girl, nude, mall, and grey slides for experiments I and II.

RESULTS

The number of "I" and "We" responses emitted by each S during the thirty instrumental conditioning trials was recorded by E. The mean number of "I" and "We" responses emitted by Ss in the experimental (reinforced) group was 17.9. The mean number of target responses emitted by Ss in the control group was 15.00. This finding was in the expected direction, but the difference was not significant, t (df = 18) = 1.043; $p > .05$.

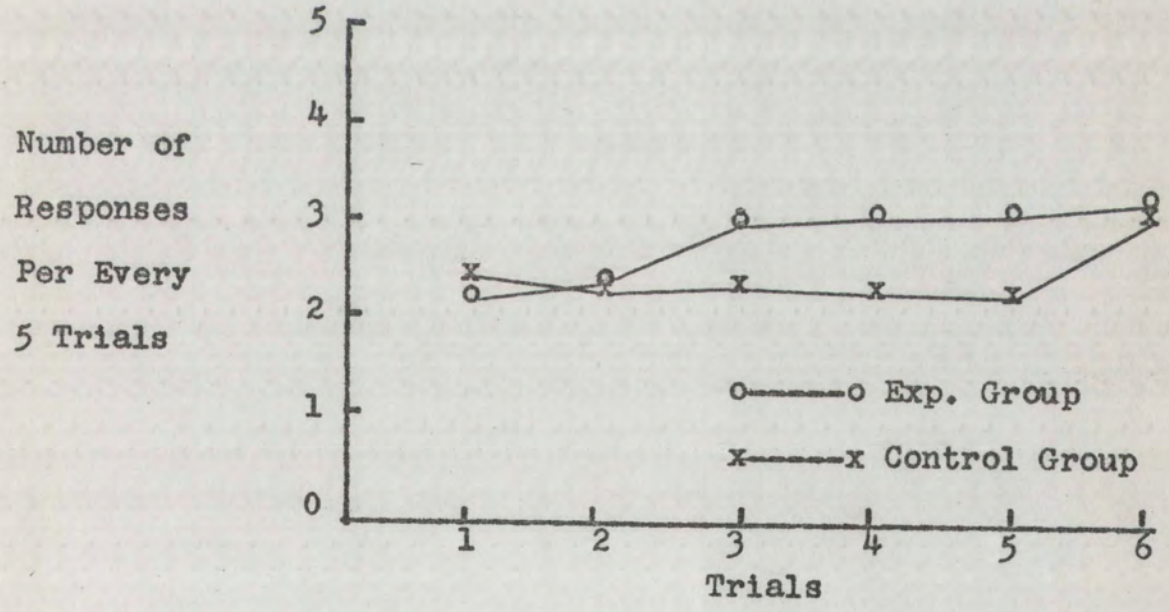

Figure 3. "I", "We" Responses for Experiment II

Using the same awareness interview used in experiment I, no Ss demonstrated contingency awareness during interviewing.

Lastly, because delay of reinforcement could prevent conditioning, the delay of reinforcement was measured. S responses were recorded using the audio tape recorder. Using this recording, the time between the emitting of the "I" or "We" response and the presenting of the reinforcing slide was determined with the stopwatch. This was made possible because the tape recorder picked up both the S's vocal response and the sound of the slide carousel. Based upon the recordings of Ss #8, #10, #12, #13, and #19* the mean time between the emitting of the response and the presentation of the reinforcer was 2.804 seconds, the range was 1.6 to 7.1 seconds.

*The tape recording of the other experimental Ss was inadvertantly destroyed.

EXPERIMENT III

Experiments I and II failed to demonstrate conditioning without awareness, as was predicted. Two possible reasons for this failure were examined in experiment III. First, the delay of reinforcement in experiments I and II could have prevented conditioning. Therefore, in experiment III the delay of reinforcement was reduced. Secondly, response sets or S expectancies concerning use of the pronouns "I" and "She" could have predisposed Ss to use or not to use "I" and "She" pronouns. For example, a S may have felt self-conscious using the pronoun "I" and at the same time felt very comfortable using the pronoun "She" because "She" was suggested by the stimulus material. Other Ss might have felt comfortable using the pronoun "I" because "I" is a frequently used pronoun. Therefore, the pronouns "I" and "She" were deleted from experiment III.

METHOD

Subjects

Twenty male subjects were used. All subjects were volunteers from speech communication classes at the University of New Mexico. No S had participated in any part of either experiment I or experiment II.

Apparatus

All apparatus used in experiment II were used in experiment III with one exception. The deck of stimulus cards was altered. The pronouns "I" and "She" were deleted from all thirty stimulus cards.

Procedure

The procedure used in experiment II was used in experiment III with one modification: the presentation of the reinforcing slide for the experimental group was made immediately after the S used the "We" pronoun instead of waiting until he had completed his sentence, as was done in experiment II.

RESULTS

The mean number of "We" responses emitted by members of the experimental group was 10.416. This contrasted with a mean of 8.250 for the control group. This difference was significant, t (df = 18) = .919; $p > .05$.

Two members of the experimental group responded to the awareness interview in such a way that E determined they were aware of the response-reinforcement contingency. The two aware Ss emitted 23 and 20 "We" responses, respectively. After subtracting their scores from the experimental results, the adjusted experimental group had a mean of 8.20 while the control group had a mean of 8.25, t (df = 16) = .031; $p > .05$.

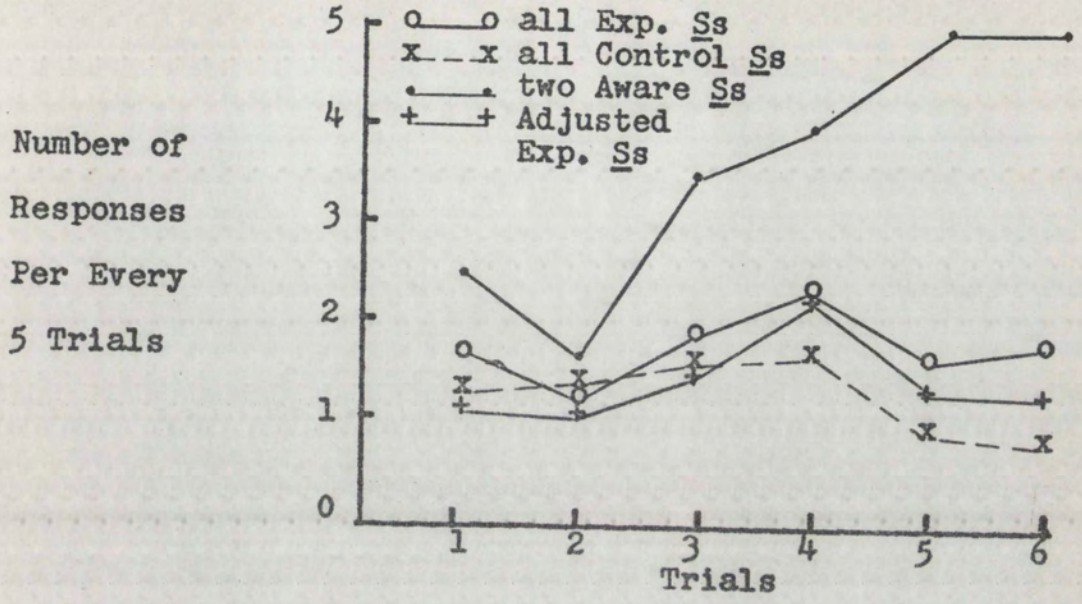

Figure 4. "We" Responses for Experiment III.

DISCUSSION

Three conditions had to be met before the hypothesis could be tested: (1) elimination of experimenter - subject interaction; (2) elimination of "set to problem solve"; and (3) an attempt had to be made to condition subjects. The conditions of the hypothesis appeared to have been met.

First, the experimenter - subject interaction was eliminated by the physical arrangement of the room, which prevented the subject from seeing the experimenter during the attempted conditioning. Also, the instructions used in all three experiments contained a sentence explaining that the experimenter and subject could not interact, and that the subject was not to turn around. Finally, the reinforcement was not social. The reinforcement was not "good," "mmm - hmm," "right" or head nodding. Thus, the experimenter's role in dispensing reinforcement was mechanical in that he simply pushed buttons on the slide projector. It can be concluded, therefore, that the experimenter - subject interaction was eliminated during conditioning. If verbal and nonverbal interaction was eliminated, "self-fulfilling prophecy" due to interaction should not have biased the results.

Secondly, "set to problem solve" was apparently eliminated. This was evidenced by the fact that in experiments I and II no subjects were aware of the response-reinforcement contingency. Had subjects engaged in problem-solving

behaviors several subjects should have discovered the contingency. In experiment III two of twelve subjects were aware of the contingency. This may have been due to the interruption of the subject's sentence construction task with the presentation of the reinforcement stimuli. When the subject used the pronoun "We," he was immediately reinforced. The close temporal contiquity may have been noticed by the two aware subjects. Indeed, the two aware subjects stated that they "noticed" that when they used the "We" pronoun, the next slide they saw was a picture, but when they used one of the other three pronouns, the next slide they saw was grey. However, neither of the aware subjects said they had searched for the appropriate contingency. Thus, it appeared that no subjects held a "set to problem solve."

The third condition, hypothesized to be a prerequisite to conditioning without awareness, was that an attempt must be made to condition subjects. This attempt was made. The fundamental elements of conditioning were present in all three experiments. Subjects emitted an operationally definable response. The response was closely followed by the presentation to the subject of what was judged to be a pleasurable stimuli. The frequency of that emitted response should have increased relative to a control group.

Despite the attempt to meet all three necessary conditions of the hypothesis, the research hypothesis was not

confirmed. In two of the three experiments, results were in the predicted direction, but the results were not statistically significant. Thus, subjects were not conditioned.

Because awareness was largely precluded by the procedure; and because no subjects were conditioned, it is possible that awareness necessarily mediates conditioning in this type of conditioning procedure. However, concluding that awareness was necessary for conditioning would imply acceptance of the null hypothesis. The null hypothesis cannot be accepted, it can only be retained. Thus, if support is to be given to the thesis that awareness necessarily mediates conditioning, it can only come when all rival alternative hypotheses have been eliminated. The argument that awareness is necessary for conditioning can only be accepted when all other reasons for the failure to condition have been systematically eliminated.

Four sources of rival alternative hypotheses were examined in this study: (1) the response, (2) the reinforcing stimuli, (3) the delay of reinforcement, and (4) the subject's perceptual set.

The responses chosen for conditioning may not have been conditionable. Experiment I used vocal response length. This response was designated for conditioning because it was felt that this would be a shapeable response. However, this response may not be amenable to conditioning without something to mediate it, such as awareness. There-

fore, experiments II and III used a known reinforcable response. This response was the Taffel-type sentence construction task used in previous research. Thus, an attempt was made to exclude response choice as a cause of conditioning failure.

The reinforcing stimuli may not have been perceived as pleasurable. To test this possibility, judges rated all slides on a semantic-differential type scale. Judges rated the reinforcing slides as being significantly more pleasurable, more attractive, and better than the neutral slides. Also, to guard against the possibility that all slides in experiment I were actually pleasurable, experiments II and III used a grey slide as a neutral, non-reinforcing slide. Finally, to enhance the pleasurable impact of the reinforcing slides, subjects were exposed to the grey slide for three minutes in an attempt to create a sort of stimulus deprivation.

It must be cautioned, however, that if a stimulus is perceived as pleasurable, it does not mean the stimulus must necessarily function as a reinforcer. The failure to produce conditioning could have been due to the inability of pleasurable, attractive stimuli to produce conditioning at the unawareness level.

Delay of reinforcement could have also prevented conditioning. The mean delay of reinforcement for subjects in experiment II was 2.804 seconds. This delay could have

been large enough to have prevented conditioning. Therefore, in experiment III the presentation of the reinforcing stimulus was made as soon as the subject used the target pronoun. The only factor creating reinforcement delay in experiment III was the experimenter's reaction time. Thus, delay of reinforcement was minimized.

Another rival alternative hypothesis could have been response set. If subjects entered the experiment with a response set, then perhaps the response set interfered with conditioning. For example, during experiment II the pronouns "I" and "She" were emitted by the subjects in both experimental and control groups at a much higher frequency than the other pronouns. However, some subjects didn't make much use of the "I" pronoun. It may have been the case that subjects had differing expectations concerning the "I" pronoun. Some subjects may have felt that they would use the "I" pronouns often because it was easy to use. Other subjects may have decided not to use the "I" pronoun because it would make them appear egocentric. Other subjects may have felt they should use all pronouns equally. A similar problem occurred with the "She" pronoun since some of the stimulus material suggested use of this pronoun: two thirds of the reinforcing slides contained women. An attempt was made to eliminate the problem of "response sets" by eliminating the "I" and "She" pronouns from the deck of stimulus

cards used in experiment III. However, new response sets may have been created by subjects in experiment III.

While four rival alternative hypotheses were tentatively eliminated, other factors could have prevented conditioning without awareness. For example, it may be the case that a transfer of training, mediated by language, is preventing conditioning without awareness. In other words, as a result of past learning, subjects may have decided at the beginning of the experiment how to use the pronouns. It may be the case that subjects talk through the situation to themselves and make decisions about responses based upon subject expectations about what the subject believed he should do. Once a person makes a conscious decision concerning responding he may not then be amenable to conditioning. In the future perhaps this and other possibilities should be tested before accepting awareness as a necessary antecedent of conditioning.

SUMMARY

The following problem was investigated: can persons be conditioned to emit a verbal response without their awareness of the response-reinforcement contingency? Based upon the experiments of Rosenfeld and Baer (1969) and Sheehan (1969) it was hypothesized: When a "set to problem solve," is not induced and experimenter effect due to the subject-experimenter interaction is eliminated, subjects are conditioned to emit a verbal response without an accompanying contingency awareness. Three experiments were conducted in order to test the hypothesis. None of the experiments produced results supporting the hypothesis.

Two states of affair may exist concerning the role of response-reinforcement contingency awareness in verbal operant conditioning: (1) it is possible that awareness is necessary for conditioning in many instances; (2) it may be the case that a rival alternative hypothesis exists to explain why conditioning did not occur without awareness. Four such rival alternative hypotheses were tested in this study: the response was varied, the reinforcer was varied, the delay of reward was varied, and finally, the conditions producing response set were varied. All four variations of the design failed to yield significant verbal operant conditioning.

However, before the awareness theory can be accepted other rival alternative hypotheses must be tested. Future

research should test other conditions that may be necessary antecedents of conditioning without awareness. For example, the possibility that language-mediated transfer of training prevents conditioning should be tested. The possibility that perceived pleasurable, attractive visual stimuli do not function as reinforcers should also receive attention in future research.

The central finding of this study was that while elimination of "set to problem solve" may be a necessary antecedent of conditioning without awareness, it is not a sufficient condition.

APPENDIX I

Awareness Interviews

Experiment I

1. While making up the sentences, did you think you were supposed to make them up in any particular way? (If "yes," then ask "How?")

2. Did you try to form your response in any particular way, according to any rules or procedures or plan? (If "yes," then ask "What?")

3. I noticed that toward the end your reactions got longer. Was there any reason for this?

Experiments II and III

1. While making up the sentences, did you think you were supposed to make them up in any particular way? (If "yes," then ask "How?")

2. Did you try to form your responses in any particular way, according to any rules or procedures or plan? (If "yes," then ask "What?")

3. I noticed that you seemed to use more "I" and/or "We" pronouns in your sentences. Can you think of any reason for this?

APPENDIX II

Infinitive Verbs used in Experiments II and III

To See*

To Listen
To Ski
To Hear
To Drink
To Hit
To Skip
To Eat
To Read
To Mix
To Beg
To Dance
To Write
To Smell
To Ramble
To Walk
To Steal
To Sing
To Run
To Kill
To Bowl
To Sleep
To Look
To Jump
To Touch
To Burn
To Borrow
To Feel
To Talk
To Riot
To Swim

* Used on the example card.

APPENDIX III

Instructions used in Experiments II and III

Please concentrate on the grey rectangle for three minutes. Try not to let your mind wander. I will tell you when three minutes are up.

I cannot interact with you, so please face the screen, and try not to turn around. Please do your talking toward the microphone. Talk loud and clear. I will show you a series of 30 slides lasting approximately 15 minutes. The slides will appear on the screen for 8 seconds. Please keep your eyes on the screen during all of the 8 seconds. After I remove the slide the screen will appear white as you see it now. When the screen turns white construct a short sentence using the infinitive verb typed onto the middle of the top card. Also, use at least one of the pronouns typed onto the bottom of the card. The sentences you construct need not have anything to do with any of the slides. Just respond quickly with the first sentence that comes to mind. For example, the example card on the top of the deck has the verb "to see" and four pronouns. You might respond with a sentence such as, "Do you want to see my car?" or "We are going to see the game." Remember, when the screen turns white construct a short sentence using the infinitive verb typed onto the middle of the top card. Also,

use at least one of the pronouns typed onto the bottom of the card. The sentences you construct need not have anything to do with any of the slides. Just respond quickly with the first sentence that comes to mind. If you have any questions or if you would like any of the slides focused, please ask me. Ready?

APPENDIX IV

Table 3

Delay of Reinforcement as Measured in Seconds for Some Experimental Subjects in Experiment II

Subjects	8	10	12	13	19
	2.5	2.6	2.1	3.2	4.9
	4.5	3.0	4.0	4.2	7.1
	3.1	2.0	3.2	1.9	3.1
	2.2	2.1	2.4	2.0	2.6
	3.6	3.0	3.0	2.1	2.3
	4.0	3.0	3.1	1.7	2.5
	2.4		3.8	1.8	2.9
	3.0		2.2	1.6	2.1
	2.5		2.8	1.7	2.1
	2.0		2.0	1.8	2.1
	4.0		3.0	3.3	3.2
	5.5		3.1	2.0	2.1
	4.5		2.6	3.1	2.7
	5.7		3.1	2.1	
			4.6	1.7	
			2.8	2.0	
			2.8	1.9	
			3.7	2.2	
			2.2	2.4	
			2.7	3.2	
			5.1	2.1	
			2.5	2.1	
				1.8	
				1.9	
				1.8	
				1.9	
				2.7	
				1.9	
Total	44.5	15.7	66.2	63.1	37.0
Mean	3.18	2.61	3.01	2.25	3.08

APPENDIX V

Table 4

Results of the Instrument Tests from Experiments I and II

		Landscape	Girls	Nudes	Mall	Grey
Pleasurableness Scale	Exp. I	1.66	1.94	____	4.00	____
	Exp. II	1.92	2.10	1.17	____	4.71
Attractiveness Scale	Exp. I	1.48	2.01	____	4.04	____
	Exp. II	1.86	2.15	1.85	____	4.58
Good Scale	Exp. I	1.70	2.31	____	4.08	____
	Exp. II	1.95	1.75	1.97	____	3.69

APPENDIX VI--Raw Data

Table 5

Raw Data from the Instrument Test of the Neutral Slides on the Pleasurableness Scale for Experiment I

Judges	1	2	3	4	5	6	7	Total	Mean
	3	4	6	6	6	4	1	30	4.29
	3	4	4	7	7	7	4	36	5.14
	4	3	5	2	4	1	3	22	3.14
	4	5	7	7	6	6	3	38	5.43
	3	2	2	4	5	2	2	20	2.86
	5	3	3	6	5	4	3	29	4.14
	3	3	6	6	5	5	3	31	4.23
	3	1	6	5	5	5	3	28	4.00
	4	1	6	3	4	4	3	25	3.57
Slide Ratings	2	1	6	6	5	4	2	26	3.71
	3	4	6	6	4	6	3	32	4.57
	4	1	6	6	4	7	4	32	4.57
	3	1	6	3	4	1	1	19	2.71
	1	1	7	3	6	4	3	25	3.57
	3	4	7	2	3	2	4	25	3.57
	4	3	3	3	2	3	2	20	2.86
	4	3	7	5	5	4	4	32	4.57
	2	1	7	7	4	7	7	35	5.00

Table 6

Raw Data from the Instrument Test of the Reinforcing Slides on the Pleasurableness Scale for Experiment I

Judges	1	2	3	4	5	6	7	Total	Mean
	3	3	2	1	3	1	1	14	2.00
	1	1	1	4	2	1	1	11	1.57
	1	2	1	1	1	2	1	9	1.29
Land-scape Slide Ratings	2	2	1	2	1	3	1	12	1.71
	1	3	1	1	2	1	1	10	1.43
	1	4	2	2	3	1	1	14	2.00
	2	1	4	3	2	1	1	14	2.00
	2	1	2	2	2	2	1	12	1.71
	2	1	2	1	1	1	1	9	1.29
	2	2	3	2	1	1	1	12	1.71
	1	1	3	1	3	1	1	11	1.57
	3	1	1	1	3	1	1	11	1.57
	2	4	5	2	2	1	1	17	2.43
	1	1	5	1	3	1	1	13	1.86
Girl Slide Ratings	2	3	5	1	4	1	1	17	2.43
	2	1	2	1	3	1	1	11	1.57
	1	3	3	2	3	1	1	14	2.00
	3	1	6	1	4	1	1	17	2.00
	1	1	3	1	2	1	1	10	1.43
	2	3	6	1	2	1	1	16	2.29

Table 7

Raw Data from the Instrument Test of the Reinforcing Slides on the Attractiveness Scale for Experiment I

Judges	1	2	3	4	5	6	7	Total	Mean
	3	2	2	4	3	1	1	16	2.29
	1	1	1	2	2	1	1	9	1.29
	1	1	1	1	1	2	1	8	1.14
Land-scape	3	1	1	1	1	1	1	9	1.29
Slide	1	1	1	3	2	1	1	10	1.33
Ratings	1	3	1	2	2	1	1	11	1.57
	1	1	2	2	2	1	1	10	1.43
	1	1	1	1	1	2	1	8	1.14
	1	1	3	1	1	4	1	12	1.71
	1	2	2	3	2	1	1	12	1.71
	1	1	2	2	3	1	1	11	1.57
	2	1	1	2	4	1	1	12	1.71
	2	4	4	3	2	1	1	17	2.43
Girl	2	1	6	3	2	1	1	16	2.29
Slide	1	1	2	4	3	1	1	13	1.86
Ratings	1	2	2	2	3	1	1	12	1.71
	2	1	5	5	2	1	1	17	2.43
	1	3	5	2	4	1	1	17	2.43
	2	1	2	1	1	1	1	9	1.29
	3	3	4	1	4	1	1	17	2.43

Table 8

Raw Data from the Instrument Test of the Neutral Slides on the Attractiveness Scale for Experiment I

Judges	1	2	3	4	5	6	7	Total	Mean
	3	3	5	6	5	4	1	27	3.86
	2	4	5	6	7	7	4	35	5.00
	5	2	6	3	2	1	2	21	3.00
	4	6	7	7	5	3	2	34	4.86
	3	4	3	2	5	3	3	23	3.29
	5	3	4	5	5	3	3	28	4.00
	2	4	6	3	6	6	3	30	4.29
	2	1	6	4	5	6	1	25	3.57
Slide Ratings	3	1	4	4	4	4	2	22	3.14
	3	1	7	6	5	4	2	28	4.00
	2	4	7	7	4	7	3	34	4.86
	4	1	7	7	5	7	3	34	4.86
	3	1	6	4	3	1	1	19	2.71
	1	2	7	4	7	5	2	28	4.00
	4	4	7	4	4	2	3	28	4.00
	5	4	6	4	1	7	4	31	4.43
	4	3	5	5	4	4	4	29	4.14
	4	1	6	4	4	7	7	33	4.71

Table 9

Raw Data from the Instrument Test of the Reinforcing Slides on the Goodness Scale for Experiment I

Judges	1	2	3	4	5	6	7	Total	Mean
	4	2	2	2	3	1	1	15	2.14
	2	1	1	2	4	1	1	12	1.71
	2	2	1	1	1	2	1	10	1.43
Land-scape	4	2	1	1	2	2	1	13	1.86
Slide Ratings	1	4	1	1	2	1	1	11	1.57
	2	4	1	1	5	1	1	15	2.14
	1	1	2	1	1	1	1	8	1.14
	2	1	1	1	5	2	1	13	1.86
	2	1	2	1	1	2	1	10	1.43
	3	3	3	1	1	1	1	13	1.86
	2	2	2	2	2	1	1	12	1.71
	3	1	1	3	2	1	1	12	1.71
	3	5	5	1	5	1	1	21	3.00
Girl Slide	2	2	6	4	5	1	1	21	3.00
Ratings	2	3	5	2	4	1	1	18	2.57
	2	1	2	1	2	1	1	10	1.43
	2	2	3	2	1	1	1	12	1.71
	3	4	5	2	2	1	1	18	2.57
	1	4	5	2	6	1	1	20	2.86
	2	4	3	1	5	1	1	17	2.43
	2	4	5	1	6	1	1	20	2.86

Table 10

Raw Data from the Instrument Test of the Neutral Slides on the Goodness Scale for Experiment 1

Judges	1	2	3	4	5	6	7	Total	Mean
	4	3	4	4	2	4	2	23	3.29
	3	3	4	6	6	4	4	30	4.29
	5	3	6	4	3	1	2	24	3.43
	5	6	7	4	5	4	4	35	5.00
	4	4	3	3	3	2	3	22	3.14
	4	3	4	5	4	4	3	27	3.86
	4	4	6	5	4	6	2	31	4.23
Slide Ratings	3	1	5	6	3	6	2	26	3.71
	4	1	6	4	6	4	2	27	3.86
	3	3	7	6	5	4	2	30	4.29
	3	4	7	6	2	6	3	31	4.23
	5	4	6	7	7	7	3	39	5.57
	4	1	6	4	5	1	2	23	3.29
	2	4	7	4	5	4	3	29	4.14
	5	4	7	4	6	2	3	31	4.23
	5	4	2	6	7	4	1	29	4.14
	5	3	6	7	6	4	4	35	5.00
	3	1	6	4	4	1	7	26	3.71

Table 11

Raw Data from the Instrument Test of the Slides on the Pleasurableness Scale for Experiment II

Judges	1	2	3	4	5	6	Total	Mean
	7	4	1	6	6	5	29	4.83
	7	4	3	1	7	3	25	4.17
Neutral	7	4	5	2	7	5	30	5.00
Slide	7	4	6	2	7	6	32	5.33
Ratings	7	4	7	1	7	3	29	4.83
	7	4	4	1	7	6	29	4.83
	7	4	7	1	7	2	28	4.67
	7	4	7	1	1	4	24	4.00
	1	1	1	1	6	3	13	2.17
Land-	1	1	2	1	1	3	9	1.50
scape	2	1	3	5	2	2	15	2.50
Slide	3	1	3	1	1	3	12	2.00
Ratings	3	1	2	1	1	2	10	1.67
	1	1	3	1	3	1	10	1.67
	2	1	2	1	3	2	11	1.83
	1	4	2	3	2	2	14	2.33
	1	2	3	3	3	2	14	2.33
	2	2	2	1	2	3	12	2.00
	1	2	4	1	3	6	17	2.83
Girl	3	2	5	1	3	3	17	2.83
Slide	1	1	3	1	1	2	9	1.50
Ratings	1	1	4	1	1	4	12	2.00
	1	2	3	1	1	1	9	1.50
	2	1	2	1	1	3	10	1.67
	2	1	4	1	1	4	13	2.17
	1	3	2	1	4	2	13	2.17
	1	1	3	1	2	4	12	2.00
	1	2	1	1	1	2	8	1.33
	1	1	1	1	5	3	12	2.00
Nude	1	1	1	1	1	2	7	1.17
Slide	1	2	2	1	2	6	14	2.33
Ratings	1	1	1	1	2	3	9	1.50
	1	1	1	1	1	1	6	1.00
	1	2	2	1	1	2	9	1.50
	1	3	1	1	2	3	11	1.83
	1	4	2	1	1	2	11	1.83

Table 12

Raw Data from the Instrument Test of the Slides on the Attractiveness Scale for Experiment II

Judges	1	2	3	4	5	6	Total	Mean
	4	5	3	5	7	5	29	4.83
	4	4	5	1	7	3	24	4.00
Neutral	5	4	6	1	7	5	28	4.67
Slide	5	4	6	2	7	6	30	5.00
Ratings	5	4	7	1	7	3	30	5.00
	6	4	4	1	7	6	28	4.67
	6	4	7	1	7	2	27	4.50
	6	4	7	1	2	4	24	4.00
	1	1	3	1	5	3	14	2.33
Land-	1	1	2	1	1	3	9	1.50
scape	2	2	3	6	1	2	16	2.67
Slide	2	1	3	1	1	3	11	1.83
Ratings	2	1	1	1	1	2	8	1.33
	1	1	2	1	3	1	9	1.50
	4	1	3	1	2	2	13	2.16
	1	4	1	2	1	2	11	1.83
	1	1	1	3	2	2	10	1.66
	1	1	2	1	1	3	9	1.50
	2	3	4	1	4	6	20	3.33
Girl	3	3	5	1	4	3	19	3.16
Slide	1	2	2	1	1	2	9	1.50
Ratings	2	2	4	1	1	4	14	2.33
	2	3	3	1	2	1	12	2.00
	3	2	4	1	1	3	14	2.33
	2	1	4	1	1	4	13	2.16
	1	2	2	1	3	2	11	1.83
	1	3	3	1	3	4	15	2.50
	1	1	2	1	1	2	8	1.33
	2	3	1	1	5	3	15	2.50
Nude	1	1	2	1	1	2	8	1.33
Slide	2	1	2	1	2	6	14	2.33
Ratings	2	1	1	1	3	3	11	1.83
	1	1	1	1	2	1	7	1.17
	1	2	2	1	1	2	9	1.50
	1	2	1	1	3	3	11	1.83
	3	3	2	1	2	2	13	2.17

Table 13

Raw Data from the Instrument Test of the Slides on the Goodness Scale for Experiment II

Judges	1	2	3	4	5	6	Total	Mean
	4	5	1	6	4	5	25	4.17
	4	4	2	1	4	3	18	3.00
Neutral	4	4	3	1	4	5	21	3.50
Slide	4	4	5	1	4	6	24	4.00
Ratings	4	4	6	1	4	3	22	3.67
	4	4	4	1	4	6	23	3.83
	4	4	7	1	4	2	22	3.67
	4	4	7	1	2	4	22	3.67
	1	1	2	1	7	3	15	2.50
Land-	1	1	2	1	1	3	9	1.50
scape	3	2	3	6	4	2	20	3.33
Slide	2	1	2	1	1	3	10	1.67
Ratings	1	1	2	1	2	2	9	1.50
	1	1	1	1	2	1	7	1.17
	3	1	1	1	1	2	9	1.50
	1	5	3	4	1	2	16	2.66
	1	3	2	3	5	2	16	2.66
	2	1	2	1	2	3	11	1.83
Girl	2	2	4	1	4	6	19	3.17
Slide	3	3	5	1	4	3	19	3.17
Ratings	1	2	3	1	2	2	11	1.83
	1	2	4	1	2	4	14	2.33
	2	2	3	1	4	1	13	2.17
	3	2	4	1	1	3	14	2.33
	2	1	2	1	2	4	12	2.00
	1	2	3	1	4	2	13	2.17
	1	2	7	1	1	4	16	2.66
	1	2	4	1	1	2	11	1.83
	2	3	2	1	4	3	13	2.17
Nude	1	1	2	1	2	2	9	1.50
Slide	1	1	2	1	4	6	15	2.33
Ratings	1	1	1	1	2	3	9	1.50
	1	1	1	1	4	1	9	1.50
	1	3	2	1	2	2	11	1.83
	1	2	2	1	4	3	13	2.17
	2	3	2	1	3	2	13	2.17

Table 14

Raw Data from Experiment I
for Experimental Group

Subject	Trials	Total	Mean
1	09 03 06 03 10 05 04 05 05 04 04 10 03 08 06 08 06 08 08 05 06 07 04 04 07 05 02 04 05 05	173	05.8
4	17 25 16 30 28 37 21 26 30 28 41 33 40 18 20 30 36 35 28 36 34 21 25 37 28 28 26 18 24 24	840	28.0
5	08 11 07 06 07 07 04 05 04 06 05 07 06 05 07 07 06 06 07 06 06 06 05 04 05 04 03 06 04 08	178	05.9
6	12 13 14 14 12 17 12 17 11 10 09 15 10 15 12 15 10 11 10 12 13 11 17 15 14 12 11 12 16 12	394	13.1
7	14 15 16 17 08 15 10 16 16 08 27 18 19 17 12 10 20 12 12 14 12 09 23 25 09 30 21 18 11 14	467	15.6

Table 14 (cont.)

Subject	Trials	Total	Mean
10	06 04 08 08 05 10 04 08 09 06 06 04 08 06 08 11 07 10 04 10 06 06 07 06 11 08 06 04 04 10	210	07.0
11	05 04 04 04 02 08 02 03 04 04 04 02 02 03 02 03 04 02 06 06 06 10 07 04 03 06 04 06 12 04	132	04.4
14	27 15 30 23 21 21 13 25 14 28 16 23 24 24 28 24 33 26 30 23 25 20 26 21 38 20 20 20 26 26	720	24.0
16	06 11 04 07 06 04 05 10 08 07 10 09 06 07 05 08 10 06 05 06 09 07 09 05 07 05 05 07 10 05	209	07.0
17	07 07 05 09 06 09 06 04 16 11 08 17 12 10 08 04 12 06 16 03 08 12 12 18 12 14 08 08 14 16	291	09.7
19	05 05 04 08 06 07 06 09 04 07 14 08 12 06 08 16 12 15 13 06 15 09 05 07 10 12 09 06 09 07	260	08.7

Table 15

Raw Data from Experiment I
for Control Group

Subject	Trials	Total	Mean
2	16 12 14 10 16 08 16 17 15 08 15 26 10 15 15 18 18 16 12 15 14 13 10 09 10 23 10 16 14 18	429	14.3
3	14 12 09 16 14 24 16 17 10 20 14 11 07 25 18 25 06 12 21 20 15 16 12 15 17 16 15 14 18 22	471	15.7
8	13 09 12 14 11 07 07 08 05 11 10 06 11 13 08 16 14 07 10 16 16 10 08 10 10 08 15 08 11 15	319	10.6
9	13 13 09 12 13 12 08 12 10 09 12 08 12 08 13 12 10 05 11 12 05 10 09 10 09 09 09 10 09 05	301	10.0
12	04 08 08 09 06 07 06 04 05 03 06 04 11 07 06 09 07 06 06 06 06 04 06 07 07 06 06 04 05 06	185	06.2

Table 15 (cont.)

Subject	Trials	Total	Mean
13	08 08 15 10 11 11 08 10 08 08 07 08 11 09 11 11 09 10 09 13 10 10 10 08 10 10 10 10 10 08	291	09.7
15	04 05 03 04 04 04 05 04 04 04 03 06 03 04 03 06 03 05 03 03 05 03 03 03 06 03 04 05 05 06	123	04.1
18	16 22 16 12 13 12 10 15 11 11 13 19 15 20 24 20 12 21 15 23 24 11 19 25 16 14 18 15 13 15	490	16.3
20	03 03 05 04 04 03 03 05 03 08 04 05 06 05 07 03 03 03 03 03 04 04 03 03 04 05 06 04 09 04	129	04.3

Table 16

Raw Data from Experiment II
for Experimental Group

Subject	Trials	Total	Mean
1	0 0 0 0 0 0 1 0 1 1 0 1 0 1 1 0 1 1 1 1 1 1 1 1 1 0 1 0 0 1	17	.566
3	1 1 0 0 0 1 0 1 0 1 0 0 1 1 1 1 1 0 1 1 1 1 1 1 1 1 0 1 1 1 1	21	.700
6	1 1 1 1 0 0 0 0 0 0 0 0 1 1 1 1 0 1 0 1 1 0 1 1 1 0 1 1 1 1 1	19	.633
7	0 1 0 0 0 1 1 1 0 1 1 0 0 0 0 0 0 0 0 0 1 1 1 0 1 0 1 1 1 0 0	13	.403
8	0 1 0 1 0 0 0 1 0 0 0 1 0 1 0 1 1 0 1 1 1 0 0 1 0 1 0 1 1 0	14	.467
10	0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 1 1 0 0 1	6	.200
12	0 1 1 1 1 1 1 1 0 1 0 1 1 1 1 1 1 0 1 0 1 0 1 1 1 1 1 1 0 1 0	22	.733
13	0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	28	.933
15	1 1 1 0 0 1 1 1 0 0 0 0 0 1 0 0 0 0 1 0 1 0 1 0 0 1 0 1 0 0	12	.400
19	1 1 0 0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	28	.933

Table 17

Raw Data from Experiment II
for Control Group

Subject	Trials	Total	Mean
2	0 0 0 0 0 1 0 0 1 1 1 0 0 0 1 0 1 0 0 1 1 0 0 1 0 0 1 0 1 1	12	.400
4	1 0 1 0 0 1 0 1 0 1 0 0 0 0 1 0 0 1 1 0 0 1 0 0 1 1 1 0 1 0	14	.467
5	1 1 0 0 1 1 1 0 0 1 1 1 0 1 1 1 0 0 0 1 0 1 1 0 0 1 1 1 0 1	18	.600
9	1 0 0 0 0 1 1 0 0 0 0 1 0 1 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 1	8	.267
11	0 1 0 0 0 0 1 0 0 0 1 1 0 1 0 0 0 0 0 1 1 1 1 1 0 0 1 1 0 0	12	.400
14	0 1 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1	27	.900
16	1 1 1 0 0 1 1 0 0 0 1 1 0 1 0 1 1 1 1 1 1 0 0 1 0 1 1 0 1 0	18	.600
17	1 0 1 0 1 0 1 1 0 1 0 1 1 0 0 1 0 1 1 0 1 1 1 0 0 1 1 1 1 1	19	.634
18	0 1 1 1 1 0 1 0 1 0 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 0 1 0 0	11	.367
20	0 1 1 1 0 0 0 1 0 1 0 0 0 1 0 1 1 0 0 0 0 0 0 1 0 1 1 0 0 0	12	.400

Table 18

Raw Data from Experiment III
for Experimental Group

Subject	Trials	Total	Mean
2	0 0 0 1 1 1 0 0 0 0 1 0 1 0 0 1 1 1 0 1 0 0 0 0 0 0 1 0 0 0	10	.333
6	0 0 0 0 1 0 1 1 0 0 0 1 1 0 0 0 0 0 1 0 0 0 0 1 0 0 1 1 1 0	10	.333
7	0 1 0 1 0 0 1 0 1 1 1 0 0 0 1 1 0 0 0 1 0 0 0 0 1 0 0 1 0 0	11	.367
8	0 1 0 1 0 0 0 0 1 0 0 1 0 0 1 1 1 0 1 1 0 1 1 1 0 0 0 1 0 1	14	.467
9	0 0 0 0 0 0 1 0 0 0 0 0 1 0 1 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0	5	.167
10	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	.000
11*	1 0 0 1 0 0 0 1 0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	23	.767
12	0 0 0 0 0 0 0 0 1 0 1 0 1 1 0 0 1 0 0 0 1 1 0 0 0 0 1 0 1 0 0	9	.300
13*	0 1 1 1 0 0 1 0 0 0 0 1 1 1 0 1 1 1 0 0 1 1 1 1 1 1 1 1 1 1	20	.667
15	0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 0	4	.133
17	0 1 0 0 1 0 0 0 1 1 1 0 0 1 0 1 0 1 0 1 0 1 0 0 0 0 0 0 0 0	10	.333
18	0 1 0 0 1 0 1 0 0 0 0 0 0 1 0 0 1 1 0 0 1 0 0 0 0 1 1 0 0 0	9	.300

* The subject was aware of the response-reinforcement contingency.

Table 19

Raw Data from Experiment III
for Control Group

Subject	Trials	Total	Mean
1	1 0 0 1 0 0 1 0 0 0 0 0 1 1 0 1 0 1 0 1 0 0 0 1 0 0 0 0 0 0	9	.300
3	0 1 0 0 0 1 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 1 1 0 1 0 0 0 1 0	8	.267
4	0 0 0 1 0 0 0 1 0 1 0 1 0 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 1	7	.233
5	0 0 0 0 0 0 1 0 1 0 1 0 1 0 0 0 0 1 0 1 0 0 0 1 0 0 0 0 0 0	7	.233
14	0 0 0 1 0 0 1 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0	6	.200
16	0 1 1 0 0 0 1 0 0 1 0 0 1 1 0 1 0 1 0 1 1 0 0 1 0 0 1 0 1 0	13	.433
19	0 0 1 0 1 0 0 1 1 0 0 0 0 1 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 0	7	.233
20	1 0 1 0 0 0 0 0 0 0 1 0 0 0 1 0 0 1 0 0 0 0 0 1 0 1 0 1 0 1	9	.300

REFERENCES

Ault, R. L., & Vogler, R. E. Discriminative and reinforcing functions of four verbal stimuli. Psychological Reports, 1969, 24, 555-563.

Barik, H. C. Verbal conditioning of relational responses to minimize incidence of correlated hypotheses. Journal of Verbal Learning and Verbal Behavior, 1968, 7, 572-574.

David, K. H. Effects of a speed set on awareness and verbal operant conditioning. Psychological Reports, 1967, 21, 549-552.

DeNike, L. D. The temporal relationship between awareness and performance in verbal conditioning. Journal of Experimental Psychology, 1964, 68, 521-529.

Dixon, T. R. A complex reinforcement contingency: The control of awareness in verbal conditioning. Journal of Verbal Learning and Verbal Behavior, 1966, 5, 514-521.

Dixon, P. W. & Hammond, S. Operant conditioning of spoken phonemes /s/ and /z/ and awareness. Psychological Reports, 1970, 26, 87-92.

Dixon, T. R., & Moulton, A. E. Effects of questioning unaware problem solvers in a verbal conditioning task. Journal of Experimental Psychology, 1970, 83, 431-434.

Dixon, P. W., & Oakes, W. P. Effect of intertrial activity on the relationship between awareness and verbal operant conditioning. Journal of Experimental Psychology, 1965, 69, 152-157.

Greenspoon, J. The reinforcing effect of two spoken sounds on frequency of two responses. The American Journal of Psychology, 1955, Sept., 409-416.

Gruber, R. P. Discrimination, generalization, and awareness in verbal operant conditioning. The Journal of Psychology, 1970, 75, 263-270.

Hamilton, D. L., Thompson, J. J., & White, A. M. Role of awareness and intentions in observational learning. Journal of Personality and Social Psychology, 1970, 16, 689-694.

Hersen, M., & Sudik, E. Verbal conditioning as related to awareness, paranoia, and suspiciousness. Journal of Clinical Psychology, 1971, 27, 43-47.

Hersen, M., & Sudik, E. Verbal conditioning as related to awareness and grade point average. Journal of Clinical Psychology, 1971, 27, 266-269.

Kanfer, F. H. Verbal conditioning: A review of its current status. In T. R. Dixon, & D. L. Horton (Eds.) Verbal behavior and general behavior theory. Englewood Cliffs, N.J.: Prentice-Hall, 1968.

Kennedy, T. D. Verbal conditioning without awareness: The use of programmed reinforcement and recurring assessment of awareness. Journal of Experimental Psychology, 1970, 84, 487-494.

Leftwich, J., Nawes, M. N., & Seigel, S. Awareness in verbal conditioning; objective assessment and automatic strengthening. Psychological Reports, 1969, 25, 51-59.

Levin, S. M. The effect of awareness on verbal conditioning. Journal of Experimental Psychology, 1961, 61, 67-75.

Miller, A. W. Awareness, verbal conditioning and meaning conditioning. Psychological Reports, 1967, 21, 681-691.

Miller, A. W., & Babcock, B. B. The operant conditioning of awareness. Journal of General Psychology, 1970, 83, 169-177.

Mondy, L. W. Degrees of awareness and intentions to comply in verbal conditioning. Psychological Reports, 1968, 22, 339-343.

Rosenfeld, H. M., & Baer, D. M. Unnoticed verbal conditioning of an aware experimenter by a more aware subject: The double-agent effect. Psychological Review, 1969, 76, 425-432.

Rotter, J. B., Seeman, M., & Liverant, S. Internal versus external control of reinforcement: A major variable in behavior theory. In N. Washbourne (Ed.), Decisions, values, and groups. New York: Pergamon Press, 1962.

Sheehan, P. W. E - expectancy and the role of awareness in verbal conditioning. Psychological Reports, 1969, 24, 203-206.

Silver, D. S., Saltz, E., & Modigliani, V. Awareness and hypothesis testing in concept and operant learning. Journal of Experimental Psychology, 1970, 84, 198-203.

Spielberger, C. D. The role of awareness on verbal conditioning. Journal of Personality, 1962, 30, 102-129.

Spielberger C. D., & DeNike, L. D. Operant conditioning of plural nouns: A failure to replicate the Greenspoon effect. Psychological Reports, 1962, 11, 355-366.

Spielberger, C. D., & DeNike, L. D. Descriptive behaviorism versus cognitive theory in verbal operant conditioning. Psychological Review, 1966, 73, 306-326.

Taffel, C. Anxiety and the conditioning of verbal behavior. Journal of Abnormal and Social Psychology, 1955, 51, 496-501.

Ude, L. K., & Vogler, R. E. Internal versus external control of reinforcement and awareness in a conditioning task. Journal of Psychology, 1969, 73, 63-67.

Verplanck, W. S. The control of the content of the conversation: Reinforcement of statements of opinion. Journal of Abnormal and Social Psychology, 1955, 51, 668-676.

Vogler, R. E. Awareness and the operant conditioning of a cooperative response. Journal of Psychology, 1968, 69, 117-127.

Walker, T. S. Delayed "good" and "mmm - hmm" reinforcers in verbal conditioning. Psychological Reports, 1968, 23, 411-416.