Changing attitudes by means of classical conditioning

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Introduction

As knowledge of attitude change processes has grown, a wide variety of theoretical analyses have been developed to integrate portions of this knowledge and to guide further research. Many theorists argue that attitude change and formation in the "real world" are produced by the fundamental mechanisms of classical conditioning (Kiesler, Collins, and Miller, 1969) but little research has been done to support such a theory.

Wenger and Williams (1935) were doing research in this general area when they attempted to alter the likes and dislikes of humans to certain foods by means of classical conditioning. The reaction of children between one and one-half and three years of age to certain stimuli, such as vinegar, was changed for dislike to indifference and even to liking by being paired repeatedly with a very pleasant stimulus like chocolate.

Luba (1940) performed an experiment which was designed to discover whether sensations could be classically conditioned to objective stimuli in the same automatic, mechanical, unconscious fashion that objective responses have been conditioned. He concluded that certain images can be considered to be classically conditioned sensations.

Razran (1939) presented a series of CSs during a long eating period, having misinformed the subjects as to the purpose of the experiment. He gave 40 flashes of colored lights (CS) during a two minute period of eating pretzels (UCS), having told the subjects that he was trying to "find out the effects of eye fatigue on digestion." With this technique, none of the 12 subjects, during several hundred total hours of experimentation, gave any sign of thinking he was expected to secrete saliva in
response to the CS. The data show striking confirmation of Pavlov's classical conditioning findings.

Doob (1947) may have been the first to attempt to formally theorize in the area of conditioned attitudes. Doob described an attitude as an implicit, mediating response, a hypothetical construct or intervening variable between an objective stimulus and an overt response. These stimulus-response bonds (observable stimulus-attitude-objective response) are assumed to obey all the laws of behavior theory. The response "may be conscious or unconscious, distinctly verbal or vaguely proprioceptive" (Doob, 1947, p. 136). Doob did not conduct any research to support his assertion that attitudes are learned mediating responses, but work in support of his theory has been done by several investigators (Eisman, 1955; Das and Nanda, 1963; Staats and Staats, 1957).

The most pertinent work in support of Doob's theory has been done by Staats and Staats (1957). They hypothesized that meaning responses elicited by a word can be conditioned to a contiguously presented neutral stimulus, e.g. a nonsense syllable. A nonsense syllable was visually presented and each time paired with the auditory presentation of a different word. While these words were different they all had an identical meaning component as measured by the semantic differential. They obtained significant indications that meaning responses had been conditioned to the nonsense syllable.

If the same word was paired many times with the nonsense syllable, the fact that the nonsense syllable would come to elicit the same meaning could be accounted for on the basis of direct association. The direct association was eliminated by pairing the syllable on each trial with a
different word which had an identical or similar meaning component. Staats and Staats (1957) maintained that the results of this first-order conditioning paradigm indicated that the meaning of stimuli may be learned without awareness.

Staats, Staats, and Biggs (1958) showed that the known semantic differential ratings of words can be modified by pairing certain words with other words which have different semantic ratings. That is, words that already elicited emotional responses were used to condition emotional responses to new words. Also, the number of conditioned trials effects the strength of the conditioned meanings (Staats and Staats, 1959). Thus, it would appear that the same technique may obtain results in higher order conditioning. Other studies (e.g. Blandford and Sampson, 1964; Coots and Rankin, 1960) also used the higher order paradigm in pairing words. The usual finding is that the neutral stimulus which was paired with a series of unpleasant adjectives comes to be evaluated more negatively.

Staats (1967) concluded that the acquisition of attitudes or affective and emotional "meaning" for a social object or word takes place through classical conditioning. Many stimulus events in our environment elicit emotional responses in a particular individual. New stimuli (conditioned stimuli or CS) attain the power to elicit these same emotional responses if the new stimulus is consistently paired with the old stimulus (i.e. the unconditioned stimulus, or UCS). Since words and social objects are frequently paired with important environmental events, it is not surprising that many words and social objects attain the ability to evoke emotional responses. It may be suggested that a word becomes meaningful when it
comes to elicit a conditioned response through classical conditioning.

The studies mentioned thus far generally used the semantic differential technique to determine the "meaningfulness" of the words. Early (1960) published a study which would make it appear that the "meaningfulness" of classically conditioned attitudes affect behaviors other than the behavior of scoring a rating scale. He used Staats' and Staats' (1957) attitude conditioning procedures with fourth and fifth grade children. After positive attitudinal conditioning to the names of "isolate" children, these isolates were themselves approached more in the free play situation by the conditioned children than were control isolate children. Thus, it would appear that there is a relationship between the conditioned attitudes of Staats and the mediating response of Doob. In this context it appears that studies using the general procedure of Staats and Staats (1957) have given support to the behavioral theory of Doob (1947).

The greatest criticism against the conditioning procedure discussed here is that the "conditioning" effect may be due to subjects becoming aware of the demand characteristics of the experimenter and cooperating with them.

Orne (1962) believes that as far as the subject is able, he will behave in an experimental context in a manner designed to play the role of a good subject, or in other words, to validate the experimental hypothesis. The subjects may actually treat the experiment as a problem to be solved. This problem is implicitly recognized in the large number of psychological studies which attempt to conceal the true purpose of the experiment from the subjects in the hope of thereby obtaining more reliable data.
Staats and Staats (1957) circumvented the problem by eliminating the data of those subjects who were classified as "aware" of the experimenter's intent. They identified these subjects by a post-experimental questionnaire in which subjects were asked to write down anything they had thought about the experiment, especially the purpose of it.

Kriechkaus and Eriksen (1958) analyzed the problem of awareness and concluded that even in the studies that have focused more directly on the problem of awareness than did Staats, the experimenter of necessity, has had to rely upon the subjects verbal report concerning his awareness of the events of the experimental situation. The adequacy of such a criterion depends crucially upon: (a) the thoroughness of the inquiry; (b) the precautions taken in asking questions in such a way as to elicit correlated hypothesis if they exist; (c) attention to the reliability of evaluating the subject's verbalization; and (d) some estimate of the validity of the verbalization. This problem seems to be even more confounded because Eriksen (1960) explains that awareness is generally equated with the inability to verbalize. It is possible that Staats was just testing the subject's ability to verbalize.

Cohen (1964) also investigated this particular question by performing an experiment following the same general paradigm of Staats and Staats (1957), but he maintained he used a more sophisticated method of analyzing the awareness of the subjects. The subjects' written comments about the experiment were evaluated by three independent judges. He then classified as "aware" any subject who was so termed by one of the three judges. He found that the majority of the subjects were termed as "aware". Furthermore, if these aware subjects were eliminated from the analysis the
remaining subjects did not show significant conditioning.

This study was followed by Insko and Oakes (1966) in which they used a procedure similar to Staats. They differed from Staats and Staats (1957) in that they attempted to produce conditioning of attitudes toward a nonsense syllable both with and without the presence of an interfering inter-trial activity. Their assumption was that the inter-trial activity would interfere directly with the hypothesizing behavior of the subject (awareness) but not directly with conditioning. Thus, they attempted to see whether or not a direct manipulation of awareness would produce an indirect effect upon conditioning.

They measured the demand characteristic by asking, "Did you feel as if you were supposed to rate the nonsense syllable in any particular way? If so, explain." Awareness was questioned by, "During the experiment did you notice any change in the type of words associated with the nonsense syllable? If so, explain." In agreement with Cohen's (1964) findings their results indicated that conditioning and awareness were correlated.

Page (1969) conducted a study in which he compared two different groups of subjects. Both groups were first semester psychology students, but one group participated early in the semester, and the second group participated toward the end of the semester. He found that the naive subjects (those participating early in the semester) conditioned less and were less aware than the sophisticated subjects (those participating late in the semester). He believed it was reasonable that subjects who had spent a semester listening to a psychologist lecture, reading a textbook etc., would do better at determining what a psychologist might expect them to do in an experiment.
Page determined awareness with such questions as:

Do you know the meaning of the term conditioning? If so, did you think about it during this experiment?
What syllable was always or usually paired with words of pleasant meanings?

Page concluded by stating that his study supports the idea that the so-called conditioning attitudes are entirely artifacts of demand characteristics.

Staats (1969) replied to the findings of his critics (Cohen, 1964; Insko and Oakes, 1966; Page, 1969) by suggesting that their questionnaires had far greater "demand characteristics" than the original procedures. He believes that the questionnaires actually demand that the subject indicate that he "saw through" the purpose of the experiment. Furthermore, he believes that Cohen (1964) changes the entire purpose of the questionnaire when he deleted that part which read, "while you were participating in the experiment." Because it was possible to be aware any time after the completion of the experimental session, it is only natural that Cohen obtain a greater number of aware subjects than in the original Staats and Staats (1958) study. Staats (1969) summarized the studies in support of the classical conditioning of attitudes and believes that they substantially support the classical conditioning analysis of attitude formation in contrast to the demand or awareness interpretation.

Zana, Kiesler, and Pilcnsis (1970) add support to Staats contentions. By pairing meaningful adjectives with the onset and offset of electric shock, they established two attitudes, one based on negative affect and one based on positive affect within each subject. They worked under an elaborate cover story which included a disguised post-test given by a
second experimenter. They concluded that the demand characteristics of the experimental situation could not possibly account for the data.

**Statement of the Problem** All of the above studies subsequent to Staats and Staats (1957) have used words, either nonsense or adjectives, as stimuli. Candland (1968) believes that few would challenge the statement that man receives more information about the external world through vision than through any other sense. Therefore, it appears that this general procedure should be tested using visual stimuli.

Seldom in the "real world" is there an aversive stimulus, such as shock, paired with a neutral stimulus which would effect attitudes in the manner that they have been produced by several of the previously mentioned studies (Staats, Staats, and Crawford, 1962; Zana, et. al., 1970). Therefore, it appears that the classical conditioning paradigm should be followed using an aversive stimuli which is more natural than shock.

On the basis of the present evidence, it could be concluded that Staats (1969) is correct when he suggests that his critics (Cohen, 1964; Insko and Oakes, 1966; Page, 1969) actually had far greater "demand characteristics" than his original procedures. But it does not appear that Staats has completely resolved the awareness controversy. If the "aware" subjects cannot be differentiated from the "unaware" subjects the problem of the "demand characteristic" will remain. A post-experimental questionnaire needs to be developed which meets the criticism of Cohen (1964) by containing a type of question that probes far enough. It should also satisfy Staats (1969) by not demanding that the subject indicate that he "saw through" the purpose of the experiment.
Although it would be desirable to test for generalization to an actual behavior, it would not be feasible at this particular stage of the study. Rather, an attitude survey will be developed to determine if the attitude change to the visual stimuli generalize to another attitude, or to another aspect of the investigated stimuli.

Hypotheses This study consisted of three different treatment groups with two different dependent measures of each group; therefore, six hypotheses were posited.

Hypothesis I: The attitudes of subjects in Experimental Group I will change from neutral to unfavorable upon paired presentation of unfavorable (UCS) and neutral (CS) stimulus pictures as measured by an 11 point scale.

Hypothesis II: The attitudes of subjects in Experimental Group II will change from neutral to favorable upon paired presentations of favorable (UCS) and neutral (CS) stimulus pictures as measured by an 11 point scale.

Hypothesis III: The attitudes of subjects in the Control Group will not change upon paired presentations of neutral stimulus pictures as measured by an 11 point rating scale.

Hypothesis IV: The attitudes of subjects in Experimental Group I will change toward the agree end of the Likert scale upon paired presentations of positive (UCS) and neutral (CS) stimulus pictures.

Hypothesis V: The attitudes of subjects in Experimental Group II will change toward the disagree end of the Likert scale upon paired presentations of negative (UCS) and neutral stimulus pictures.

Hypothesis VI: The attitudes of subjects in the Control Group will not change upon paired presentations of neutral stimulus pictures as measured by the Likert scale.

Method

Subjects

Introductory Psychology students at the University of Nebraska at
Omaha, who volunteered to participate in research for extra credit, were used as judges and subjects. Fifty judges were required to determine the scale values of each picture. Thirty subjects were used to determine the best statements in the Likert attitude scale. Thirty additional subjects were required to determine the reliability of the Likert attitude scale. Thirty subjects randomly selected from a Social Problems class at the University of Nebraska at Omaha were used to determine the level of external validity of the Likert scale. Thirty subjects were randomly assigned for each of the three treatment groups. Five subjects were defined as aware and their responses were not analyzed. Four other subjects were confused by the instructions and their responses were not analyzed. Thus, the treatment groups consisted of 30 subjects each.

Instruments

Pictures. Sixty pictures were required for this study. A large number of black and white pictures were chosen from popular magazines and converted to transparent slides. Pictures with people as their main theme were chosen for the study. Three categories of pictures were selected. The first group was classified as the unfavorable group of pictures. The people in these pictures showed the results of war, famine, disease, inadequate shelters, and any other conditions which could be caused by the population problem. The second group of pictures were neutral. The people in these pictures had no special expression on their faces and could not be considered especially favorable or unfavorable. Third, a favorable group of pictures was selected in which it appeared the people were enjoying the benefits of a happy, healthy life. It appeared that the people in these pictures had no special problems confronting them,
least of all the population problem. After a large number of pictures had been chosen from magazines, they were shown to a number of judges. These judges rated the pictures using the equal-appearing interval technique as described by Edwards (1957). Thurstone (1920) recommended 200 to 300 judges as adequate for providing stable scale values using this technique, but Beyle (1932) using the conventional procedure, obtained a correlation of .9972 between scale values based on sorting of 150 judges and scale values based on sortings of 50 judges. Ferguson (1935) reported that scale values based on the sortings of 50 or even 25 persons correlated near unity with those based on responses of three or four hundred persons. After a review of the literature, Webb (1955) concluded that scale values of high reliability can be obtained on the basis of as few as 15 to 25 judges but he believes one would expect a larger number of subjects to be needed to produce ambiguity or dispersion values of high reliability. Therefore, 50 judges were used to determine the scale values of the pictures. For this study the scale values and the ambiguity (or dispersion) values were determined by the method described by Edwards (1957). Instructions used for this rating process may be found in Appendix A. An example of the scale may be found in Appendix B.

Three different groups of 18 pictures each were obtained: (a) those with neutral ratings, (b) those with unfavorable ratings, and (c) those with favorable ratings. The criteria for the scale values were as follows: unfavorable-one and two; neutral-five, six, and seven; favorable-ten and eleven.

Attitude Survey. A pre-experimental and a post-experimental attitude survey was required for this study. This was a survey of the subject's
attitude toward the population problem to test for generalization from the visual stimuli (pictures) to another aspect of the investigated stimuli, the population problem. The same survey was used as a pre- and post-measure. This survey used Likert's method of summated ratings as described by Edwards (1957). The Likert scale contained 30 items and may be found in Appendix C. Fourteen of these items were related to the population problem and the remaining 16 items acted as distractors and were concerned with child rearing practices. Selection of the ten best items regarding the population problem was determined by the correlational method in accordance with the Likert method (Edwards, 1957). The 14 pertinent items may be found in Appendix D. Appendix D also contains the correlations and means of these items. The ten best items are also indicated in Appendix D. After the ten best items had been selected, the Likert scale was re-administered to 30 different subjects. It was administered at the beginning of a one hour class period and once again at the termination of the same class period. Test-retest reliability was determined in this manner. A Pearson correlation resulted in a .96 correlation coefficient. The extent of internal validity was determined with the use of the t test as described by Edwards (1957). External validity was determined with the use of a contrasting group. The contrasting group was a Social Problems class at the University of Nebraska at Omaha. This class had recently heard five lectures on the population problem. The results of these procedures are located in Appendix E.

Awareness Measure (Picture Rating Questionnaire). The questionnaire that was used to determine the awareness of the subjects may be found in Appendix F. Six of the ten questions were considered pertinent to this
They were:

2. This study attempted to change my attitude.

5. This study tested my ability to learn the meaning of pictures.

7. This study attempted to change my feelings toward certain things.

3. This study measured my span of attention.

4. The stories which I wrote were a type of personality test.

6. This study is an attempt to determine my social philosophy.

Questions 2, 5, and 7 were labeled as the aware statements. That is, if a subject agreed on two of these three questions he was defined as aware. An aware subject presumably knew the purpose of the study. But questions 3, 4, and 6 were labeled as the unaware questions. If a subject agreed on two of these statements he was defined as unaware regardless of how he responded to questions 2, 5, and 7. The purpose of the unaware set of statements was to control for a response set on the part of the subjects to agree with all of the statements.

Booklet. The subjects were given a booklet at the beginning of the treatment sessions. This booklet contained a blank sheet of paper, an instruction sheet for rating the pictures, a page with six rating scales, a blank page, two more pages with 24 rating scales, and finally the questionnaire to determine awareness. All rating scales were 11 point scales.

Projectors. Two slide projectors were required as two different pictures were shown at the same time.
Procedure

This study consisted of three different treatment groups with two different dependent measures of each group. Experimental Group I was exposed to pairs of unfavorable and neutral pictures. Experimental Group II was exposed to favorable and neutral pictures. The third group acted as a control group and was exposed to pairs of neutral pictures only. The two dependent measures were an 11 point rating scale and a Likert survey.

Basically, the two experimental groups followed the higher order conditioning paradigm of Staats, Staats, and Biggs (1958) but visual stimuli were used in place of auditory stimuli.

Experimental Group I first completed the Likert survey. This test was administered by a confederate ostensibly having no connection with the present experiment. The confederate explained that he was a research assistant for a psychology professor doing research in the area of child development. When the questionnaire had been completed the confederate left the room. The subjects were then provided with the booklets. It was explained that they were going to view a series of pictures and they would be required to complete a task after viewing these pictures. They were told that they were required to write two short stories about the pictures and rate several pictures during the sequence of the pictures. Exact instructions may be found in Appendix G. The stories had several purposes: (a) it was assumed that the subjects gave the pictures more attention when they knew several tasks were to be required; and (b) it aided in deceiving the subjects.

The subjects were then presented with a series of 108 pairs of
pictures. This sequence consisted of different pairs of 18 negative pictures which were randomly paired with six neutral pictures. Each negative picture was paired with each neutral picture once. Each pair was presented for seven seconds. The neutral picture was the CS and the unfavorable pictures acted as the UCS. The spatial order in which the pictures were presented was randomly ordered so that both the UCS and the CS appeared on the right and left side of the screen in a random order. The CS was always presented approximately .5 seconds before the UCS.

When the subjects had seen 27 pairs of pictures they were told that they were allowed three minutes to write a short story or description of all the pictures that they had viewed. After the 54th pair the subjects were asked to rate six new neutral pictures on the 11 point scale. These pictures had not been presented before this time. The 81st pair was followed by a third break in which the subjects had six minutes to write a short story or description of the pictures that they had viewed up to this time. While the subjects were writing this short story the confederate returned. It was explained that the questionnaire which he administered was invalid because he forgot to time the subjects. The experimenter explained that it was necessary for the confederate to wait a short time. The last 27 pairs were followed by the ratings of the 24 pictures which had been shown throughout this sequence plus six additional pictures. The six additional pictures were pictures that had the opposite scale value as those pictures in the treatment. In other words, if the subjects had been exposed to neutral and favorable pictures, the additional pictures were unfavorable. The purpose of the additional pictures was to counteract the possibility of a response set while rating the pictures. All of
these pictures were presented in a random order. When the subjects had completed the above procedure they completed the Picture Rating Questionnaire (Awareness Measure) found in Appendix F. When this was completed the confederate re-administered the Likert survey.

The second treatment was administered to Experimental Group II. The only difference was that the second group was exposed to pairs of neutral and favorable pictures instead of pairs of neutral and unfavorable pictures as was the case with Experimental Group I.

A third group of randomly assigned subjects acted as a control group. The only difference between this group and the other two groups was the fact that these subjects were exposed to pairs of neutral pictures only.

Results

A one-way analysis of variance was used to test the hypothesis regarding the first dependent variable, the picture ratings. Before the analysis of variance was computed the Kolmogorov-Smirnow test (Siegel, 1956) was used to determine whether the sample that acted as judges for deriving the scale values and the sample in the experimental group were from the same population. The Kolmogorov-Smirnow two-sample test compared the ratings of the judges to the ratings of the control group for the neutral pictures. It did not prove to be significant.

Also, F-Max (Winer, 1962) was calculated to test for heterogeneity of the variance of the treatment groups. It was concluded that there was homogeneity of variance as the F-Max was insignificant (F=1.97).

A one-way analysis of variance was run on the picture ratings. Each individual Ss' rating score was determined by adding the ratings of the six neutral pictures. The group means were as follows: Group I
(Unfavorable Pictures), 46.12; Group II (Favorable Pictures), 38.84; Group III (Neutral Pictures), 39.00. Results of the analysis appear in Table I.

**TABLE I**

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
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<tr>
<td>Treatments</td>
<td>2</td>
<td>8864.32</td>
<td>432.16</td>
<td>14.93*</td>
</tr>
<tr>
<td>Error</td>
<td>72</td>
<td>2084.00</td>
<td>28.94</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>2948.32</td>
<td></td>
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</tr>
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</table>

* p < .01

Although the F was significant at the .01 level, the change was in the opposite direction from that predicted in Hypothesis I and II.

In view of the significant treatment effect and in line with the original hypothesis, the differences between treatments were examined. These comparisons were made using Duncan's studentized range statistic (Winer, 1962). Results of these comparisons appear in Table II.

**TABLE II**

<table>
<thead>
<tr>
<th>Comparison</th>
<th>DF</th>
<th>Studentized Range</th>
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<tbody>
<tr>
<td>Group I-Group II</td>
<td>24</td>
<td>7.12 *</td>
</tr>
<tr>
<td>(Unfavorable-Favorable)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I-Group III</td>
<td>24</td>
<td>7.28 *</td>
</tr>
<tr>
<td>(Unfavorable-Neutral)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group II-Group III</td>
<td>24</td>
<td>.16 **</td>
</tr>
<tr>
<td>(Favorable-Neutral)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .005

** n. s.

Two of the three comparisons were significant, but the change was not in the direction predicted by Hypothesis I, II, and III. There was not a significant difference between Group II (neutral pictures) and Group
I (favorable pictures) and the small difference that did exist was opposed to the prediction made in Hypothesis II.

The second dependent measure, the Likert scale measuring Ss' attitude toward the population problem, was analyzed by means of the three t-tests for related measures. Since the original hypothesis involved the amount of change in attitude within treatment groups, no comparison was made between groups. Ss were randomly assigned to the different conditions but a one-way analysis of variance in the pre-test scores produced an F value that was significant (F = 4.08, p < .05). This suggests their initial attitudes were different and caution is required in interpreting the changes attributed to treatments. The results of the t-tests between pre- and post-measure scores are shown in Table III.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Pre Measure</th>
<th>Post Measure</th>
<th>t-value</th>
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<tbody>
<tr>
<td>Group I</td>
<td>M s.d.</td>
<td>M s.d.</td>
<td></td>
</tr>
<tr>
<td>(Unfavorable)</td>
<td>25.28 4.97</td>
<td>23.68 4.46</td>
<td>1.97 *</td>
</tr>
<tr>
<td>Group II</td>
<td>23.20 4.36</td>
<td>26.40 4.45</td>
<td>3.01 **</td>
</tr>
<tr>
<td>(Favorable)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group III</td>
<td>22.80 5.54</td>
<td>25.40 4.87</td>
<td>2.09 *</td>
</tr>
<tr>
<td>(Neutral)</td>
<td></td>
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</tbody>
</table>

* p < .05
** p < .01

The significant differences between pre- and post-measures for Groups I and II indicate that hypothesis IV and V were supported. Hypothesis VI was not supported because the significant change in the control group was not predicted.
Discussion

First Dependent Variable: Picture Ratings

The analysis of the first dependent variable resulted in a significant $F$ but the significance was in a direction opposite to that predicted in Hypotheses I, II, or III.

Several possible explanations for this phenomena may be considered. First, it is possible that the USC was too ambiguous. The Q values that resulted from the ratings were generally high. Unfortunately, visual stimuli are more likely to be differentially interpreted by Ss than are verbal stimuli.

Secondly, it is possible that the spatial distance between the paired stimuli was too great. The opaque slides projected an image approximately 30" by 30" with a distance of approximately 12" between them. This may have decreased the possibility of an association between the stimuli.

Thirdly, it will be recalled that the procedure of this study basically followed the paradigm of Staats, Staats, and Biggs (1958). In that study the subject reported each US word aloud immediately after the experimenter pronounced it. This enabled the subject to arrive at the contingency between the stimuli. This may have been an important consideration in this study because Dawson (1970) maintained that the CS-UCS pairings may produce at least two measurable phenomena: (a) the acquisition of conditioned responses; and (b) the development of contingency learning (the ability to verbalize the contingency between stimuli). Dawson stated that the current dominant view is that classical conditioning and contingency learning are fundamentally different learning processes. They concluded that contingency learning plays an essential role in human
classical conditioning. Dawson (1970) studied the same problem by embedding CS-UCS pairings in a masking task. He concluded that contingency learning is an essential variable in human classical conditioning. How is this related to the present study? While interviewing the subjects to establish a criteria for awareness, no mention was ever made of the connection between the two stimuli. No subject attempted to relate one picture to the other; instead, they attempted to explain them as one stimuli. Not one subject made reference to a learning process. The experimenter went to great efforts to mask the purpose of this study. It might be that any possibility of contingency learning was eliminated. This would account for the lack of a conditioned effect according to several authors (Dawson, 1970; Dawson and Grings, 1968; Kimble, 1962).

A fourth explanation for failure to support the findings of Staats, Staats, and Biggs (1958) comes from Helson's Adaptation Level Theory. There was a significant change but in a direction opposite to that predicted from Staats' findings. The phenomena which did occur could be explained by the Adaptation Level Theory of Helson (1964). This theory has been applied most thoroughly in the area of perceptual phenomena. Although it has been seldom considered in the context of social phenomena, Adaptation Level Theory (AL) can be directly and not just analogically applied to social behavior according to Helson (1959). Insko (1967) cited numerous research projects where it has been applied to conformity behavior. Rambo and Main (1969) conducted an investigation in which they applied it to a social judgment situation.

According to AL theory adjustive behavior is determined by three sources of variance: (a) stimuli immediately confronting the individual;
(b) background stimuli; and (c) residual effects of stimuli from past experience (Helson, Blake, Mouton, and Olmstead, 1956). Behavior is thought to be the resultant of the interactions among these three sets of factors, and any particular response depends upon the adjustamental level for that situation. Behavioral level is not fixed but shifts in accordance with changes in the factors operating within the situation and the individual. In this particular study the stimuli immediately confronting the individual were the neutral pictures. Helson stated that it is not always easy to distinguish between stimuli as such and background stimuli. Such was the case in this particular study as it was difficult to distinguish between the stimuli as such and the background stimuli. The third factor, the residual effects, were the attitudes of the subjects before the treatment. The residual effects were manipulated by the treatment session.

Considered in AL terms, this study was concerned with the context effect. AL theory predicts that neutral items, when judged in context with unfavorable items, will be judged as closer to the favorable end of the attitude dimension than when judged in a favorable item context. Also, a judge, when confronted with a judgmental task involving an item series, supplies anchors based on his expectations concerning what the series should be. An anchoring stimulus will shift the level of adaptation so that all of the comparison will be judged relatively lighter or "contrasted" away from the anchor.

The results of this study would have supported an AL theory hypothesis. Neutral stimuli, when judged in context with unfavorable stimuli, were judged as closer to the favorable end of the attitude dimension than when they were judged in a favorable item context. The theory would also
account for the greater shift in the neutral stimuli when paired with unfavorable stimuli than when paired with favorable stimuli (Refer to Table II). The median of the unfavorable stimuli was 2.2 or 1.7 intervals from the real limit of the unfavorable end of the continuum. The median of the favorable stimuli was 9.1 or 2.4 intervals away from the real upper limit of the continuum. In other words, the negative pictures represented a heavier anchor than did the favorable pictures.

Second Dependent Variable: Likert-type Attitude Survey

The second dependent variable was the Likert-type attitude survey, measuring the subjects' attitude toward the population problem. The analysis confirmed Hypotheses IV and V in the predicted direction. The subjects changed toward the agree end of the Likert scale upon paired presentations of positive and neutral stimulus pictures. Furthermore, the subjects changed toward the disagree end of the Likert scale upon paired presentations of negative and neutral pictures.

Hypothesis VI was not confirmed because the attitudes of the subjects in the Control Group did change upon paired presentations of the neutral stimulus pictures. The first analysis made it appear that the change occurring in all three groups was not due to the treatment but some other phenomena. A re-analysis of the pictures used as neutral stimuli in the control session revealed that the experimenter made a poor selection of pictures. Eighteen pictures were used that had median ratings of a 5, 5, or 7 on an 11-point rating scale. But the median rating of the neutral pictures taken together was 6.98. This would indicate that the distribution of scale values for the sample of neutral pictures was skewed toward the favorable end of the rating scale. Furthermore, all 18 of
these pictures had people as their main theme. In fact, three of these pictures were of large groups of people.

It was concluded that these pictures were not really neutral. They were slightly favorable. Although these pictures had only slightly favorable scale values, they may have produced the attitude that groups of people were not bad. The above, plus the fact the Likert scale had a test-retest reliability coefficient of .96 lead to the conclusion that the treatment did have a significant effect on the attitude measured by the Likert scale, in spite of the change made by the control group.

Conclusions and Future Research

It was previously stated that the most pertinent work in support of the behavioral theory of Doob (1947) has been done by Staats and his associates. Unfortunately, this research has dealt exclusively with auditory stimuli. The purpose of this study was to change the stimulus dimension to that of vision. A second purpose was to determine if the results of the conditioning process would generalize to an attitude survey. The results indicated that it was not possible to change from an auditory stimulus to visual stimulus and obtain the same results.

In fact, there was a significant change in the opposite direction to that predicted from the results of Staats, Staats, and Biggs (1958). A post-hoc interpretation indicated that the results could be explained by the AL theory of Helson (1964). It was concluded that the treatment effects, whatever the phenomena may have been, did significantly change the attitudes of the subjects as measured by the Likert scale. There was also a change in the control group but this was explained by the fact that the pictures in that group were slightly favorable instead of neutral.
There would be greater confidence in future research of this type— if several changes were made. First, pictures should be acquired that are more extreme in their scale values (closer to the end of the continuum), particularly the favorable category. Secondly, the results would be more conclusive if pictures were acquired that were less ambiguous (smaller Q value). This would be most easily accomplished by the experimenter taking photographs of actual events rather than attempting to find them in magazines as was done in this project. This would also make it possible to acquire the desired extreme scale values suggested above. If it was not possible to photograph the types of events desired, it would be possible to have an artist portray the desired scenes. Thirdly, in future research the control group should be presented with stimuli that are truly neutral. The theme of these pictures should in no way deal with the topic of the pre- and post-test. Lastly, the two stimuli should be presented with less distance between them.
REFERENCES


Thurstone, L. L. Attitudes can be measured. *American Journal of Sociology*, 1928, 33, 529-554.


APPENDIX A

Instructions for Rating Scale
INSTRUCTIONS FOR PICTURE RATING STUDY: The purpose of this study is to measure the meaning of certain things to various people by having them judge them against a series of descriptive scales. Please make your judgments on the basis of what these pictures mean to you. Please make your ratings of the pictures in order. Use the first scale to rate the first picture, the second scale for the second picture, and so on.

Here is how you are to use these scales:

If you feel that the picture is very closely related to one end of the scale, you should place your check-mark as follows:

<table>
<thead>
<tr>
<th>Unfavorable</th>
<th>Neutral</th>
<th>Favorable</th>
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OR.

<table>
<thead>
<tr>
<th>Unfavorable</th>
<th>Neutral</th>
<th>Favorable</th>
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</table>

If you feel that the picture is quite closely related to one or the other end of the scale (but not extremely), you should place your check-mark as follows:

<table>
<thead>
<tr>
<th>Unfavorable</th>
<th>Neutral</th>
<th>Favorable</th>
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<tr>
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OR

<table>
<thead>
<tr>
<th>Unfavorable</th>
<th>Neutral</th>
<th>Favorable</th>
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The direction toward which you check, of course, depends upon which of the two ends of the scale seem most characteristic of the picture you're judging. The extent of the direction depends upon the strength of your"feelings" about the picture. You may mark any space on the scale.

If you consider the picture to be neutral on the scale, both sides of the scale equally associated with the picture, or if the scale is completely irrelevant, unrelated to the concept, then you should place your check-mark in the middle space:

<table>
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<tr>
<th>Unfavorable</th>
<th>Neutral</th>
<th>Favorable</th>
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IMPORTANT: (1) Place your check-marks in the middle of spaces, not on boundaries.

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<th>Unfavorable</th>
<th>This Neutral Not This Favorable</th>
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</table>

(2) Be sure you check the scale for every picture--do not omit any.

(3) Never put more than one check-mark on a single scale.

As each picture is shown you will be given the number of that particular picture. Please write that number to the left of the scale as follows.

<table>
<thead>
<tr>
<th>Unfavorable</th>
<th>Neutral</th>
<th>Favorable</th>
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Sometimes you may feel you have seen somewhat the same picture before in the series. This is not so, they are all different. Therefore, do not look back through your ratings. Do not try to remember how you checked similar pictures. Make each picture a separate and independent judgment.
APPENDIX B

Rating Scale
<table>
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<th>Unfavorable</th>
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APPENDIX C

Likert Survey
Following is a list of statements. Please indicate your agreement or disagreement by entering a number on the IBM answer sheet according to the following code:

1-Strongly Agree
2-Agree
3-Uncertain
4-Disagree
5-Strongly Disagree

Since this is a survey of opinions, it is desired that you indicate your own personal opinions regarding these questions, regardless of whether you think other people might agree or disagree with you. There are no "right" or "wrong" answers to these statements. This is a study of personal opinions only. Please fill these forms out independently.

1. Adults should give no suggestions which will influence the form of child's play.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

2. Your family should have fewer than three children.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

3. A child should not be allowed to destroy or abuse his own play things.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

4. A parent should praise his (or her) child liberally in private.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

5. A marriage should not be made unless the couple plans to have children.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

6. Parents should, if necessary, make almost any sacrifice or their own money or comfort in order to make their children happy.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

7. A child should be allowed to spend his money or allowance as he wishes.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

8. If one parent refuses a child's request, the other parent should refuse it also.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

9. All children should grow-up in a city of more than 500,000 people.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

10. An older child should be expected to take care of younger brothers and sisters.
    1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

11. Wide-spread acceptance and approval of birth control is imperative.
    1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree
12. Parents should allow children of less than fifteen years of age to see only those movies of which they approve.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

13. In terms of size, the ideal family has more than five members.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

14. Parents may allow their daughters to have "dates" beginning at age sixteen.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

15. Overpopulation is the cause of many social problems.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

16. Children of high school age or younger should be allowed to go only with those friends of whom their parents approve.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

17. If parents have adequate finances, they should have as many children as physiologically possible.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

18. In all quarrels between young children adults should arbitrate.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

19. A child should obey his parents because they are his parents.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

20. The U. S. government should increase their financial support to family planning programs in developing countries.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

21. A young child must be disciplined until he has learned not to touch those objects in his environment which he cannot handle without damaging.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

22. Adults should give no suggestions which will influence the form of a child's play constructs.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

23. Birth control would help to solve many of our social problems.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

24. Parents should allow their children of high school age to stay out at night as late as they wish.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

25. The environmental problem supersedes all other problems.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

26. Birth control is an expression of individual selfishness.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree
27. Parents should take their children with them on trips and vacations.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

28. Increased birth rates aid developing countries.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

29. Large families increase the well being of this country.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree

30. Large families are to be admired.
   1-Strongly Agree  2-Agree  3-Uncertain  4-Disagree  5-Strongly Disagree
APPENDIX D

Correlation coefficients and means of the pertinent items
in the Likert survey
Items Chosen for Survey

2. Your family should have fewer than three children.
correlation coefficient = .644  mean = 2.86

11. Wide-spread acceptance and approval of birth control is imperative.
correlation coefficient = .628  mean = 2.2

13. In terms of size, the ideal family has more than five members.
correlation coefficient = .446  mean = 1.86

17. If parents have adequate finances, they should have as many children as physiologically possible.
correlation coefficient = .488  mean = 2.06

20. The U. S. government should increase their financial support to family planning programs in developing countries.
correlation coefficient = .645  mean = 2.8

23. Birth control would help to solve many of our social problems.
correlation coefficient = .455  mean = 2.3

25. The environmental problem supersedes all other problems.
correlation coefficient = .592  mean = 2.86

28. Increased birth rates aid developing countries.
correlation coefficient = .416  mean = 1.96

29. Large families increase the well being of this country.
correlation coefficient = .603  mean = 1.96

30. Large families are to be admired.
correlation coefficient = .593  mean = 2.66

Items Not Chosen for Survey

5. A marriage should not be made unless the couple plans to have children.
correlation coefficient = .203  mean = 1.86

9. All children should grow-up in a city of more than 500,000 people.
correlation coefficient = .253  mean = 1.5

15. Overpopulation is the cause of many social problems.
correlation coefficient = .386  mean = 2.06

26. Birth control is an expression of individual selfishness.
correlation coefficient = .291  mean = 1.76

A score of 1.00 indicates that the subject strongly agrees with population control. Questions 13, 17, 29, and 30 were recorded as having the opposite value as appeared on the actual survey. That is, strongly disagree was recorded as a value of one. This technique was used to prevent the subjects from forming a mental set and disagreeing or agreeing with all the pertinent items.
APPENDIX E

Validation Results of Likert Study
Internal Validity

A comparison was made between the extreme scores on the Likert Survey. The subjects constituting the top 25 percent of the scores were compared to the subjects constituting the bottom 25 percent. The $t$-test method as advised by Edwards (1957) was used to determine if the survey distinguished between the two groups. Analysis was done for each question and also for the summated scores.

<table>
<thead>
<tr>
<th>Question</th>
<th>$t$-value</th>
<th>level of significance (df=6, one-tailed test)</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>4.16</td>
<td>.05</td>
</tr>
<tr>
<td>11</td>
<td>4.15</td>
<td>.05</td>
</tr>
<tr>
<td>13</td>
<td>1.44</td>
<td>.10</td>
</tr>
<tr>
<td>17</td>
<td>3.12</td>
<td>.05</td>
</tr>
<tr>
<td>20</td>
<td>3.03</td>
<td>.05</td>
</tr>
<tr>
<td>23</td>
<td>2.29</td>
<td>.05</td>
</tr>
<tr>
<td>25</td>
<td>4.59</td>
<td>.05</td>
</tr>
<tr>
<td>28</td>
<td>1.80</td>
<td>.05</td>
</tr>
<tr>
<td>29</td>
<td>2.16</td>
<td>.05</td>
</tr>
<tr>
<td>30</td>
<td>2.41</td>
<td>.05</td>
</tr>
</tbody>
</table>

External Validity

The Likert Survey was administered to 30 randomly selected students enrolled in Introductory Psychology and 30 randomly selected students enrolled in Social Problems (a second year sociology class). This sociology class was chosen as a contrasting group because the preceding four lectures had been on the population problem. A one-tailed $t$-test (df-29) resulted in a value of 5.24. This was significant at the .05 level of probability.
APPENDIX F

Awareness Questionnaire
Following is a list of statements concerning the study in which you have just participated. Please indicate your opinion on each of the statements. To indicate your opinion draw a circle around that word which best describes your extent of agreement.

1. This study attempts to determine how well I perceive hidden characteristics of pictures.
   Strongly Agree  Agree  Undecided  Disagree  Strongly Disagree

2. This study attempted to change my attitude.
   Strongly Agree  Agree  Undecided  Disagree  Strongly Disagree

3. This study measures my span of attention.
   Strongly Agree  Agree  Undecided  Disagree  Strongly Disagree

4. The stories which I wrote were a type of personality test.
   Strongly Agree  Agree  Undecided  Disagree  Strongly Disagree

5. This study tested my ability to learn the meaning of pictures.
   Strongly Agree  Agree  Undecided  Disagree  Strongly Disagree

6. This study is an attempt to determine my social philosophy.
   Strongly Agree  Agree  Undecided  Disagree  Strongly Disagree

7. This study attempted to change my feelings toward certain things.
   Strongly Agree  Agree  Undecided  Disagree  Strongly Disagree

8. Something significant may be determined about me from the manner in which I have rated these pictures.
   Strongly Agree  Agree  Undecided  Disagree  Strongly Disagree

9. There is one explicit theme in these pictures.
   Strongly Agree  Agree  Undecided  Disagree  Strongly Disagree

10. It has been interesting to participate in this study.
    Strongly Agree  Agree  Undecided  Disagree  Strongly Disagree
APPENDIX G

Instructions
**Instruction One:** You are going to view a series of pairs of pictures. After these pictures have been presented you will be required to write several short stories about these pictures and rate several of the pictures on a rating scale.

**Instruction Two:** You will notice that the first page of your booklet is a blank sheet of paper. Please write a short story about all the pairs of pictures that you have seen. You have four minutes to write this story. If you don't have time to think of a story at this time you will have another opportunity in a few minutes. At the end of the four minutes more pairs of pictures will be presented.

**Instruction Three:** (After the 54th pair of pictures): You will notice that on the next page of your booklet there are six rating scales. I am going to present six pictures for a period of 15 seconds each. Please rate each of these pictures according to the original instructions for rating pictures.

**Instruction Four:** (After the 81st pair of pictures): You will notice a blank sheet of paper immediately following the page with the six rating scales. Please write a short story about all the pairs of pictures that you have seen up to this time. You will have six minutes to complete this task. You will not have another opportunity to write this story.

**Instruction Five:** (After the 108th pair of pictures): The next two pages of your booklet contain a series of rating scales. You are going to view another series of pictures. Once again, each picture will be presented for 15 seconds. Please rate each picture as it is presented.

**Instruction Six:** The last page of the booklet contains a short questionnaire. Please complete this questionnaire.