

TWO TECHNIQUES FOR THE ELIMINATION OF AWARENESS IN
THE CONDITIONING OF MEANING EXPERIMENT

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ABSTRACT

Awareness in conditioning of meaning experiments was investigated. The experimental procedure employed closely paralleled that used by Staats and Staats (1957).

Conditioning trials were presented to 125 Subjects (Ss). For all Ss the conditioned stimuli (CSs) consisted of evaluatively neutral (as measured on four semantic differential evaluative scales) nonsense syllables. For about half (61) of the Ss the unconditioned stimuli were evaluatively loaded meaningful words. For the remainder (64) of the Ss the UCSs were evaluatively loaded nonsense syllables. One CS was consistently paired with six different positive evaluative UCSs and a second CS was paired with six negative evaluative UCSs. Normative evaluative ratings of CSs and UCSs were obtained prior to the actual experiment. Non-critical filler pairings were included to disguise the purpose of the experiment. In both groups pairings were presented either one, three or five times.

All Ss rated the CSs on four evaluative scales of the semantic differential, recalled the pairings and completed a demand and contingency awareness questionnaire. In addition, a control group of 22 Ss which did not receive conditioning trials rated the CSs.

It was hypothesized that the conditioning of meaning phenomenon (as reflected in the ratings of critical CSs) would occur and that this phenomenon would be independent upon the inclusion of "aware" Ss. There were two methods for determining awareness. Any S who indicated on the questionnaire that he was aware either of the CS-UCS contingency and/or of the purpose of the experiment were considered aware. Eleven Ss, all in the meaningful UCS group indicated such awareness. All Ss in the nonsense syllable UCS group were considered unaware because of the surface meaninglessness of the UCSs in that group. The conditioning phenomenon was shown to exist and was not dependent on the inclusion of the eleven aware Ss. However, the nonsense syllable UCS group did not in general, exhibit the phenomenon.

It was also hypothesized that the strength of the conditioning effect would be a function of the number of CS-UCS

pairings (one, three or five). This hypothesis found strong support and for the meaningful UCS group was not dependent upon the inclusion of the aware Ss.

Results are discussed in terms of the conditioning and awareness literature, demand characteristics, and the "mere-exposure" hypothesis of Zajonc.

APPROVED BY

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Chapter 1

In 1957 Staats and Staats reported a study which concluded that evaluative meaning was classically conditioned to previously neutral nonsense syllables. As a result of this study and numerous other studies based on it (e.g., Staats, Staats and Biggs 1958, Staats and Staats 1959) a controversy stemming from the Staats' interpretation has developed. The Staats' interpretation was founded on the assumption that the conditioning in their experiment took place without the Subjects' (Ss') awareness of the consistent pairings of one nonsense syllable with words that were positively evaluative (sweet, kind, etc.) and the pairing of a second nonsense syllable with negative evaluative words (cruel, sick, etc.). Opponents of the classical conditioning hypothesis have since conducted studies which they feel indicate that a conditioning of meaning without awareness of these contingencies is not possible (e.g., Cohen 1964, Page 1969).

The present study was conducted for the purpose of further clarifying the issues of awareness and the conditioning meaning. It attempts to replicate the Staats' results and to eliminate the possibility of awareness of the conditioned stimulus (CS) - unconditioned stimulus (UCS) contingencies.

The Staats' Experimental Procedure

In the technique employed by Staats and Staats (1957) six UCS word lists containing 18 words each were used. Two of the lists loaded highly on the evaluative factor of the Semantic Differential (Osgood and Suci, 1955). One of the lists consisted of negative evaluative words and the other of positive evaluative words. The other four lists contained words which were relatively neutral on the evaluative dimension. Each of these lists was paired with a different CS nonsense syllable. The former two lists served as the experimental variable. The latter four served to conceal the purpose of the experiment from Ss.

The nonsense syllables were projected on a screen and were followed by the auditory presentation of the associated UCS word. The syllables were presented in random order, though each syllable never appeared more than twice in succession. No UCS word was paired more than once with its associated nonsense syllable. In this way no systematic association was formed between a CS and a UCS. Each nonsense syllable was projected 18 times with a different word following it each time, i.e., there were 18 conditioning trials.

Prior to the presentation of the conditioning trials Ss were given two practice tasks. One of these tasks required the learning of nonsense syllables, the other the learning of

meaningful words. They were then instructed that the purpose of the experimental phase was to investigate the effects of learning nonsense syllables and meaningful words simultaneously. The instructions were used in order to keep Ss from becoming aware of the true purpose of the study.

After the conditioning phase of the study and prior to a recall test of syllables and words (used solely for consistency with the deceptive instructions) Ss rated the six nonsense syllable CSs on the pleasant-unpleasant scale of the Semantic Differential. Ss were told that the rationale for the rating was that the way one feels about a syllable may effect the learning of the syllable. On the post pairing rating test the syllable paired with the negative evaluative words was rated as significantly more unpleasant than neutral and the syllable paired with the positive evaluative words was rated as significantly more pleasant than neutral. Following the experiment Ss were asked to write down anything they thought about the nature and purpose of the experiment. Nine of the 86 Ss wrote that they were aware of a relationship between certain syllables and words. These Ss were dropped from the analysis. (The issue of awareness will be discussed in a following section).

Basic Studies in Conditioning of Meaning

In subsequent studies Staats and Staats, their

colleagues and other investigators have elaborated upon the original research findings. All of these studies, including the original one, are based upon the assumption that meaning is a response and that as a response it should be affected by any of the variables that effect responses in general.

Staats and Staats (1958) performed a variation of their original study which involved substituting national names and male first names for nonsense syllables as the CS. For one group "Dutch" was paired with positive UCS words and "Swedish" with negative words. In a second group the procedure was reversed. For other Ss the same procedure employed male first names. Again all Ss that indicated in the post-experimental interview that they were aware of a systematic name-word list contingency were dropped from the analysis. As in the original study the results showed that CSs paired with negative evaluative words were rated significantly lower than neutral and all CS words paired with positively evaluative words were rated significantly higher than neutral. The conclusion drawn on the basis of the data is that attitudes have been classically conditioned without S's awareness.

Staats, Staats and Biggs (1958) used the same paradigm in two other related studies. In one of these studies, colour names (red and yellow) were used as CSs. It was known from normative data that the colour names had slightly negative

evaluative meanings as measured by the pleasant-unpleasant scale of the Semantic Differential. In the second study the obviously negative words "awful" and "unfair" were used. Results showed that when these words were paired with positively evaluative UCS words they were rated significantly more positive than when paired with negative evaluative words. The nine Ss (out of the total of 72) who verbalized awareness of the CS-UCS contingencies were dropped from the analysis.

In another study, Staats and Staats (1959) tested the hypothesis that "if meaning is indeed a response...the intensity of conditioned meaning should increase as the number of conditioning trials are increased" (p. 211). In this study nine groups of Ss receiving 0, 2, 4, 6, 8, 10, 12, 14, 16 and 18 conditioning trials were used. Scale values of the critical CS nonsense syllables, as rated for pleasantness, were plotted against the number of conditioning trials. In support of the hypothesis, the results indicated a positive relationship between number of conditioning trials and the rated affect of the nonsense syllables.

In another study, Staats, Staats and Heard (1959) conditioned evaluative meaning to the words carpet and rock. The post-conditioning ratings were performed not on these words but on their synonyms - rug and stone. Results showed that the synonyms were rated in a negative or positive

direction depending on whether the original words were paired with negative or positive UCS words. The authors concluded from these results that evaluative meaning that has been conditioned to one word will generalize to words of similar meaning.

Staats, Staats and Heard (1960) demonstrated that meaning exhibits still another characteristic of responses in general. UCS word lists were used that contained varying numbers of words loading on the evaluative factor of the Semantic Differential. Varying percentages (they used 0%, 50%, and 100%) of a fixed ratio schedule of reinforcement were employed. The authors found that conditioning of meaning to CVCs was stronger under conditions of continuous reinforcement than under partial reinforcement so that "the intensity of the acquired attitude is a function of the percentage of reinforcement." (p. 349).

Another approach to the affect conditioning phenomena is reported by Blanford and Sampson (1964). In this study the usual nouns and adjectives used as UCSs in the preceding experiments were dropped and famous and infamous names of historical figures were used instead. It was found that CVCs paired with famous names were rated significantly more positively than CVCs paired with infamous names. Aside from the change of the kind of UCS used, the methodology was identical to that used in the original Staats and Staats experiment.

In yet another approach to investigating the affect conditioning phenomenon, Early (1968) has published a study that illustrates the possibility for attitude conditioning to affect social behaviours as well as ratings of the pleasant-unpleasant scales. Using fourth and fifth grade children as Ss, names of "isolate" children in the class were paired with positively evaluative UCSs. It was found by observation of a free-play situation that these isolates were subsequently approached by the Ss more frequently than were control isolates whose names did not appear as CSs in the conditioning procedure.

Various other studies have been reported in the literature which employ the Staats and Staats paradigm and have successfully replicated the original results while further exploring other characteristics of meaning as a response.

Awareness in Conditioning of Meaning Studies

Since the inception of both verbal operant conditioning (Greenspoon, 1955) and the classical conditioning of meaning studies, the psychological literature has been replete with reviews and studies challenging the conclusion that researchers in the learning field frequently adopt - that learning, operant or classical, takes place without S's awareness of the reinforcement contingency.

In the field of verbal operant conditioning numerous reviews (e.g., Eriksen, 1960; Dulany, 1961; Levin, 1961;

Lanyon, 1967) have cited evidence and arguments that this type of conditioning requires awareness of the reinforcement contingency in order for learning to occur. More recently, studies have appeared which challenge the conclusion that the classical conditioning of meaning can occur without the S's awareness of the reinforcement contingency. As an instance of the latter, Cohen (1964) replicated the Staats' procedure in all essential details with special attention "directed to the determination of awareness or unawareness" (p. 373). Using a post-experimental questionnaire, 52 of 97 Ss verbalized awareness of the CS-UCS contingency. Ratings of the CS nonsense syllables were analyzed separately for aware and unaware Ss. In addition, a control group which received no conditioning trials, evaluated the syllables. This provided a baseline against which the experimental group could be compared. The results of the study indicated that only aware Ss evinced a conditioning effect. Unaware Ss did not rate the syllables significantly different from the control group. In his discussion Cohen states that "...within the framework of a classical conditioning model, this study provides no support for learning without awareness." (p. 377).

Hare (1964, 1965), using a technique similar to that of Cohen, has also concluded that only Ss who were aware of the CS-UCS contingency were effectively conditioned. Hare prefers

a cognitive explanation of his results, that is, Hare believes that Ss form the concept of goodness or badness that relate all the words of the UCS list and this concept is then related to the nonsense syllable that is always paired to the list. The Ss rate the syllables in the expected direction because they are aware of the relationship between the syllable and the concept.

Demand Characteristics in Conditioning of Meaning Studies

A different approach to the awareness problem in conditioning of meaning studies is taken by several investigators and involves studying the 'demand characteristics' of an experiment (Orne, 1962). This approach is based upon the assumption "...that S not only reacts to the experimental variable being manipulated but also reacts to the various cues of the experiment that reveal its 'real' purpose. These cues were designated as 'demand characteristics'" (Rozelle, 1968 p. 894).

The first published study to directly investigate the demand characteristic variable in conditioning of meaning experiments was reported by Insko and Oakes (1966). These investigators used a post-experimental questionnaire designed to discover those Ss who were either contingency aware and/or demand aware. They found that although contingency awareness was directly related to the strength of the conditioned

evaluative response, awareness of the demand characteristics did not add an effect beyond simple contingency awareness.

Rozelle (1968) performed a study that was an approximate replication of the Staats, Staats and Heard (1959) experiment previously reported. He failed to replicate the conditioning of meaning effect. In his discussion Rozelle states that due to his use of more elaborate and involved instructions than those used by Staats, Staats and Heard it is possible that the demand characteristics of his experiment were more ambiguous than those of the latter study. This would have prevented the Ss in Rozelle's study from "forming hypotheses that were accurate enough to allow the detection of the actual syllable-word relationships. Thus, the level of awareness or accuracy of S in attempting to discover the syllable-word relationships in the experiment was reduced. The result was a sample of 'unaware' Ss who showed no conditioning effect." (p. 894).

In a more recent study concerning the demand awareness variable in conditioning of meaning experiments Page (1969) contests the conclusions of the Staats and Staats (1957), Cohen (1964) and Insko and Oakes (1966) studies. Care was taken in Page's experiment to vary the learning difficulty of CS-UCS pairings by using 2, 4, and 10 filler CS-UCS lists. The post-experimental questionnaire included measures of both

contingency and demand awareness. Extra syllables were included in the semantic differential rating booklets in order to further disguise the nature of the task.

Page assumed that awareness is an all or none dichotomy, "a subject either knows it or he doesn't" (p. 181). A general analysis of the data indicated a strong conditioning effect - a replication of the original Staats and Staats results. It was also found that the more difficult the task (number of filler CS-UCS lists) the less likely were Ss to become aware of the real nature of the study. Awareness of contingency pairings (indicated by correct responses to questions such as "What syllable was always paired with words of pleasant meaning?") was a good predictor of strength of conditioning. However, contrary to the results of Insko and Oakes, awareness of the demand characteristics (indicated by positive responses to questions like "Did you think that the experimenter might have expected that you would rate certain of the nonsense syllables in any certain way?") was the best predictor of strength of conditioning. In addition "...eighteen subjects were contingency aware who weren't demand aware, and these subjects did not show high conditioning" (p. 183).

The overall analysis showed that Ss who were unaware of the demand characteristics rated the experimental syllables in the expected direction and significantly different from the

control syllable.

Page concludes that "It appears that the Staats' (1958) classical conditioning of evaluative affect or attitude interpretation of the data is incorrect ... the present study supports the idea that the so-called conditioned attitudes are entirely artifact of demand characteristics" (p. 185).

In a reply published simultaneously with Page's study Staats (1969) attempted to answer the many difficulties posed by the former author. Staats' argument contests not the results of the Page study, but his interpretation of the results. This argument has four main thrusts. The first point is that although some Ss do not evidence a conditioning effect this is most probably due to lack of attention on the part of these Ss rather than a general inability to classically condition a meaning response. Ss who attend to the stimuli will condition well and Ss who do not attend will not condition. This would explain the bimodal conditioning curves usually resulting in conditioning of meaning experiments. Page preferred explaining this bi-modality in terms of the demand-awareness explanation. That is, Ss who are demand-aware and cooperate with the demand characteristics of the experiment rate the syllables in the expected direction. Ss who are not demand-aware rate the syllables neutrally, as do those Ss who are demand-aware and uncooperative. Staats also employed the

preceding interpretation in order to reinterpret Page's results which showed that the greater the number of filler CS-UCS pairings the less likely are both awareness and conditioning. Staats states that the lengthening of the lists increases the boring and repetitive nature of the task and not its difficulty. This would, of course, result in more inattention and thereby in a lack of conditioning.

Secondly, Staats challenges the demand characteristic procedure itself. Staats suggests that the questionnaire used by Insko and Oakes and by Page, itself "demands" that the S become aware of the purpose of the experiment. The questionnaire shapes his verbal reports with items that "program" him to the response desired by E. The questionnaire may elicit awareness responses that weren't made during the conditioning trials. This may occur even though the question asks the S when the awareness occurred.

Next Staats questions the implicit assumption in Page's study of the causative direction of awareness in the conditioning procedure. That is, although Page believes that awareness of contingency pairings and of demand characteristics precede and cause the desired evaluative response it is possible that the direction of causation is in the opposite direction. Staats describes an S in one of his studies who reported that during the conditioning procedure she saw a CS word and