CONDITIONING OF EVALUATIVE RESPONSES TO PREVIOUSLY NEUTRAL STIMULI WITH A TACHISTOSCOPIC PRESENTATION OF THE UCS

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B.A., Idaho State University, 1967

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Psychology

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1972

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THIS BOOK CONTAINS NUMEROUS PAGES WITH THE ORIGINAL PRINTING BEING SKEWED DIFFERENTLY FROM THE TOP OF THE PAGE TO THE BOTTOM.

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Ask someone what he thinks of a novel stimulus object which he has encountered, and he will probably be able to tell you whether he "likes" or "dislikes" it. Apparently people have few inhibitions about making evaluations of an object or person of which they have little knowledge. Subjects in psychological experiments have consistently shown a proclivity for making evaluative judgements of a "stranger" whom they have never met and about whom they may know very little. In more common social situations, we often find ourselves responding in a similar way. Introduced to a person for the first time, we frequently find that we have taken an immediate "liking" or "disliking" to that person. When asked to account for this reaction, which might be called "the love at first sight" phenomena, we may be able to express only a vague feeling that there was "something" about the person which led us to respond as we did.

In the absence of specific information, what is it that permits us to make such "snap" judgements about another person, or any other stimulus for that matter? Assuming that such responses are not capricious, but follow general psychological principles, it is necessary to turn to a consideration of the more general question concerning the acquisition of evaluative responses.

Affective Conditioning as the Basis of Evaluative Responding.

Newcomb (1956) suggested that the principle of reinforcement could be used to explain the phenomena of interpersonal attraction. In a recent review of the field, Berscheid and Walster (1969) observed that this is the psychological principle "most frequently used to predict interpersonal attraction" (p. 29). As these authors (Berscheid and Walster, 1969) concluded, it appears that we like those who reward us and dislike those who

punish us.

Recently, a particular "reinforcement model" has been proposed (Byrne and Clore, 1970) for application to the study of interpersonal attraction. Attraction, from this point of view, is only one of a more general class of evaluative responses that are mediated by "implicit affective responses" (Byrne, 1971; Byrne and Clore, 1970). Any stimulus having either positive or negative reinforcement properties is an unconditioned stimulus (UCS) capable of eliciting an implicit affective response of a correspondingly positive or negative valence (Byrne and Clore, 1970). Pairing the UCS with any neutral stimulus which is "present and/or discriminable" results in the conditioning of the affective responses associated with that UCS to the neutral stimulus (Griffitt, 1968a; Griffitt and Guay, 1969). This previously neutral stimulus now becomes a conditioned stimulus (CS) capable of eliciting the differential affective responses conditioned to it, which then mediate the evaluative responses toward the CS (Byrne, 1971; Byrne and Clore, 1970). These affective responses are conceptualized as occurring along a general dimension of feeling ranging from "pleasant" to "unpleasant" (Byrne and Clore, 1970). Since these responses are not subject to direct observation, they must be inferred from the evaluations made when a person assesses his internal state, such as when he is asked to indicate how he feels (Byrne, 1971).

This conceptualization of evaluative responses as a consequence of a mediational process involving classically conditioned affective responses suggests that such evaluations are made on the basis of how the evaluated stimulus makes us feel. As Byrne (1971) has noted, this leads to "an affective conception of man in which individuals are responsive (consciously or not) primarily to their feelings rather than to intellectual or cognitive factors.

A considerable amount of evidence supporting this proposition has been

summarized by Byrne (1971). One consistent finding has been that attraction toward a "stranger" is a positive linear function of the proportion of attitudes of the stranger that are similar to those of the subject (Byrne and Clore, 1970; Byrne and Nelson, 1965; Byrne and Rhamey, 1965). As might be expected, these same attitude statements have been shown to facilitate learning in a discrimination learning task in much the same manner as more traditional reinforcers (Byrne, Young, and Griffitt, 1966; Golightly and Byrne, 1964), thus demonstrating that agreeing and disagreeing attitudes do possess reinforcement properties.

Furthermore, the evidence indicates that reinforcement need not be directly attributable to a person or object in order to obtain differential evaluative responses. Lott and Lott (1960) had children play a game in three-member play groups. Some of the children were rewarded with toys for their performance, while others received no rewards. When they were later asked which of their peers they would choose to accompany them on a family vacation, the rewarded children more often chose those peers who had been members of their play group than did the non-rewarded children. In a slightly different test of the same proposition, Griffitt (1968a) demonstrated that attraction toward a hypothetical stranger was enhanced by reinforcement, in the form of additional bonus points for participation in the experiment, which was merely associated in time with the stranger as well as by reinforcement, in the form of disagreeing and agreeing attitudes, which was directly attributable to the stranger. Similarly, Sachs and Byrne (1970) reported that the evaluation of random geometric figures and of photographs of males and females was differentially influenced by reinforcing attitude statements which could not have been attributed directly to the stimuli evaluated. Griffitt and Guay (1969) reported that the evaluation of non-human stimuli (e.g., TAT cards) was a function of the positive and negative

reinforcement, in the form of creativity ratings, associated with the individual stimuli in much the same fashion as were evaluations of human stimuli. Finally, Griffitt (1968b) demonstrated that merely anticipating negative or positive reinforcement from a hypothetical person affected subsequent attraction responses toward that person. Thus the evidence appears to substantiate the contention that a reinforcing stimulus is a UCS, which can serve to condition an evaluative response to a stimulus associated with the reinforcing event.

That evaluative responses are mediated by positive and negative affective responses occurring implicitly within the individual receives support from several experimental investigations. Disagreeing attitude statements have been shown to elicit Galvanic Skin Responses (GSR's) of higher magnitude than do agreeing attitudes (Clore and Gormly, 1969) suggesting that negative reinforcement does elicit physiological arousal. Goauax (1971), using a technique to manipulate affective mood, reported that attraction responses to a stranger were more positive when obtained from subjects in an "induced elation" condition than were the responses obtained from subjects in an "induced depression" condition. Manipulations of environmental variables have been reported to have similar effects on attraction responses. Griffitt (1970) exposed subjects to either a "hot" or "normal" temperature condition and found that attraction toward a stranger was more negative under the "hot" than in the "normal" condition. Furthermore, ratings of the subject's affective feelings were positively correlated with the attraction responses, but negatively related to temperature. In a second experiment (Griffitt and Veitch, 1971), both temperature and crowding were varied. Increases in both variables were reported to lead to more negative attraction responses, as well as to generally more negative evaluations of affective feelings among the subjects. As Griffitt (1970) suggests, it appears that making a person

feel "bad" leads to more negative evaluations than when a person is in more comfortable circumstances.

The evaluative (affective) meaning of words has also been shown to have reinforcing effects. Subjects reinforced by hearing either a negative or positive word following a response which turned off a light learned to use a left-hand button when that response was followed by a positive word and to avoid the left-hand button when followed by a negative word (Finley and Staats, 1967). It has also been reported that the pairing of words having either positive or negative evaluative meaning with nonsense syllables (Staats and Staats, 1957) and with proper nouns (Staats and Staats, 1958) resulted in differential positive and negative evaluations of the conditioned stimuli along a "pleasant-unpleasant" dimension. Similarly, attraction responses have been shown to be a function of the positive and negative reinforcing properties of descriptive trait adjectives (Griffitt, Bond and Byrne, 1971). Using trait adjectives from Anderson's (1968) list scaled as to "likeableness", Griffitt, et. al., (1971) demonstrated that attraction to a "stranger" was influenced by the positive or negative words associated with the stranger. Using adjectives from the same list, Stalling (1970) reported that it was the positive or negative affective qualities of the adjectives employed, and not the perceived similarity of the traits described to those of the subjects themselves, that was responsible for the reinforcing properties of the words.

Thus a substantial body of evidence indicates that a classical conditioning process underlies the acquisition of positive and negative evaluative responses (i.e., attitudes, cf. Doob, 1947) toward neutral stimuli. There remains, however, one question which is not quite so clearly understood. Is it necessary for the individual to be able to specify the nature or the property of the stimulus to which he is responding before he can provide an

evaluative response?

The problem of awareness in affective conditioning:

Many psychologists, it is observed (Adams, 1957), have believed that in ordinary social situations people often respond to stimuli of which they are not aware and in ways of which they are not aware. Unfortunately, the experimental evidence concerning "behavior without awareness" phenomena is extremely contradictory (Adams, 1957), as well as being plagued by methodological problems (cf. Natsoulas, 1965) and various definitions as to what constitutes awareness (cf. Speilberger, 1962).

A number of years ago, Lazarus and McCleary (1951) reported a phenomena which they termed "subception". Selectively conditioning a galvanic skin response (GSR) to nonsense syllables paired with electric shock, they reported that the GSR was obtained when these "conditioned" syllables were presented, in the absence of shock, at tachistoscopic durations too rapid to permit recognition. Some psychologists (cf. Taylor, 1953) interpreted these results as providing support for McGinnies (1949) well known study of "perceptual defense". Reporting that he had obtained differential recognition thresholds with respect to "taboo" and "non-taboo" words presented to his subjects, he suggested (McGinnies, 1949) that his results indicated that a conditioned emotional reaction to various symbols played a central role in a process of perceptual filtering of pleasant and unpleasant stimuli. Criticism was immediately leveled, first at the results themselves (cf. Goldiamond, 1958) and then at the interpretation offered (cf. Eriksen, 1960). Yet, in spite of the methodological and theoretical difficulties involved, there seems to be a continuing belief that perceptual functions may be affected by affective stimuli (Dixon, 1971; Lott and Lott, in press).

It has been suggested (Church, 1961) that meaning, in a general sense, precedes objects in perception. According to Flavell and Draguns (1957), it

is this principle that underlies the phenomena of subception, permitting a person to react affectively to a stimulus prior to being able to specify what that stimulus is. Consistent with this formulation, Wickens (1970) has suggested that a word is encoded along a series of dimensions during the encoding process. Thus, he has suggested that:

> Each encoding process.....takes some small but finite amount of time, and it is not done simultaneously for all aspects of the word. If the word is withdrawn before it is completely encoded, or leaves traces which can then be encoded, the perception is incomplete, and the meaning which accrues for the symbol is but a fragment of the word's total meaning. Given the requirement to define the word, the subject responds with a word which is consonant with the encoded fragment (Wickens, 1970, p. 14).

A process such as that described could then explain (Wickens, 1970) the apparent ability of subjects to correctly classify a word as referring to a pleasant or unpleasant state of affairs before they are able to correctly identify the word itself (Eriksen, Azuma, and Hicks, 1959), as well as the tendency to report one word, having a similar connotative meaning, in the place of the word originally presented (Postman, Bruner, and McGinnies, 1948).

With respect to this proposition, Wickens and his associates (Wickens, Shearer, and Eggemeier, 1971) have recently presented experimental evidence which suggests that words are encoded along an affective dimension at a very early stage in the encoding process. In this experiment, subjects were presented a word at a tachistoscopic exposure duration too brief to permit correct identification. Following exposure to this "target word", a "match word" was presented for a period of five seconds. One half of the time the "match word" shared a common dimension with the "target word", while the remainder of the time the words had no common dimension. Among the dimensions employed were taxonomic categories, rhymes, synonyms, and sense impressions as well as a pleasant-unpleasant dimension and each of the dimensions

of the Semantic Differential (Osgood, Suci, and Tannenbaum, 1957). Following presentation of the "target word", subjects responded either "yes" or "no" as to whether or not the "match word" was similar to the target word. The investigators observed that their results seemed to provide evidence supportive of the proposition that "attribute" encoding occurs prior to word identification. More specifically, they observed that "a crude affective dimension comes in very early, and, based upon the Semantic Differential data as well as the pleasant-unpleasant dimension, we suggest that it operates for both ends of the affective dimension" (Wickens, et. al., 1971, p. 6).

An Experimental Hypothesis.

The foregoing discussion leads to two general observations: First, evaluative responses may be seen to be mediated by positive or negative affective responses, which are in essence unconditioned responses (UCRs), elicited in response to differentially reinforcing stimuli. Further, evaluative responses can be conditioned to previously neutral stimuli through association with reinforcing stimuli, and that words having either positive or negative evaluative meaning are effective reinforcers. Secondly, there is the suggestion that the affective meaning of a word may be obtained prior to its correct identification. If this is indeed the case, then it is conceivable that evaluative responses could be conditioned to a neutral stimulus through association, in a classical conditioning paradigm, of affective words with that stimulus even in the absence of the subject's ability to specify the word correctly.

This experiment was designed, then, to provide a test of that general hypothesis. More specifically, it is expected that: 1) differential evaluative responses will be conditioned to the neutral stimuli in accordance with the positive or negative affective valence of the word(s) paired with that stimulus, and 2) that conditioned evaluative responses will be obtained

independently of the subject's ability to identify the specific affective stimuli (i.e., the words) employed as the UCS. Furthermore, since Griffitt and Guay (1969) reported that the primary effect upon evaluations of non-human stimuli seemed to result from effects of negative reinforcement, inasmuch as evaluations of the positively reinforced stimuli did not differ from base line ratings, a condition pairing "neutral" affective words with a neutral stimulus will be included to permit an assessment of the differential effects of positive and negative reinforcement.

Since it is possible that a word only acquires affective meaning after it is fully encoded, varying the duration at which the word is presented may result in differential evaluative responses. Therefore, it is conceivable that at shorter exposure durations there may be no essential difference in evaluations with respect to whether a word has positive or negative meaning. On the other hand, increasing exposure duration to an extent that almost certainly ensures that the word(s) is encoded may result in differential evaluations in response to the differential affective word meaning. Further, it is also possible that a word may acquire increasingly polarized affective meaning as it is more surely encoded. Thus, the exposure of a word at increasing durations may lead to increasingly positive or negative evaluative responses in accordance with the level of affective meaning that is elicited or obtained with the exposure to the word. Therefore, it might be expected that as exposure duration increases, increasingly positive or negative evaluations (or both) would be obtained.

METHOD

Subjects: Ninety-six subjects (48 males and 48 females) were recruited from introductory psychology classes at Kansas State University during the spring of 1972 to serve in this experiment. All subjects received credit toward their final course grade for participation. The data from one subject (male) was discarded for failure to follow the instructions, while data obtained from an additional five subjects (two male, three female) was excluded from analysis as a result of equipment malfunction during the experimental session. Thus, a total of 90 subjects provided the data included in the analysis.

Unconditioned Stimuli: Thirty descriptive trait adjectives were selected from Anderson's (1968) list of adjectives scaled as to "likeableness" on a 7-point scale ranging from 0-6. The positive unconditioned stimuli (PUCS) consisted of a series of ten adjectives selected on the basis of likeableness ratings at the upper end of the scale. The likeableness ratings for this group of stimuli ranged from 4.6 to 5.73, with a mean rating of 5.05. The neutral unconditioned stimulus (OUCS) list was composed of an additional series of ten adjectives selected from the central portion of the scaled ratings. Ratings of the OUCS adjectives ranged from 2.57 to 3.65, with a mean rating of 3.10. Finally, the negative unconditioned stimuli (NUCS) were selected from those adjectives with low likeableness ratings; the ratings of the specific adjectives selected ranging from .26 to 1.18, with a mean rating of .79.

In order to control for any possible frequency effects, the adjectives were also selected with reference to the Thorndike and Lorge (1944) word frequency norms. Those adjectives occurring with either extremely high or extremely low frequencies were excluded from consideration, leaving only

those with a frequency of occurrence greater than one but less than 50 per million. The range of the frequency of occurrence per million and the mean frequency for each of the three sets of UCS are as follows: PUCS, frequency ranging from 12 to 33 per million, mean frequency=22.0; OUCS, frequency ranging from 9 to 41 per million, mean=22.0; and NUCS, frequency ranging from 8 to 46 per million, mean 20.5.

To alleviate any effects accruing from differential word length, an additional criterion of between five and seven letters and no more than two syllables was adopted for selection. In fact, four of the adjectives finally selected violated this criterion: Amusing, Bold, Rude, and Liar. In view of the difficulties encountered in finding a sufficient number of adjectives from Anderson's (1968) list which met the criteria of likeableness rating and frequency, it was decided, nevertheless, to retain these four words. The listing of the thirty adjectives selected for use as the UCS is given in Appendix I.

Each of the adjectives was printed in black 18-point capital letters on a white background, consisting of an unlined 5x8 inch index card. The order of appearance of each adjective within the separate lists was determined by a randomization procedure.

Conditioned Stimuli: A series of 12 random sided figures were redrawn from Munsinger and Kessen (1964), similar to those used by Sachs and Byrne (1970), and evaluated by 45 (19 male, 26 female) Kansas State University undergraduate students during the fall of 1971. Each of the 12 figures was rated on each of six 7-point evaluative scales adapted from Griffitt and Guay (1969) which constituted the Figure Evaluation Scale (FES: see Appendix II). Of these 12 figures, three were selected on the basis that the mean evaluations of each approximated the neutral point on the summed ratings across the 6-item FES and appeared not to differ from each other. An analysis of

variance was conducted confirming that the three figures selected did not differ in terms of the evaluative responses obtained. These three figures, two 10-sided and one 13-sided, were selected for use as the conditioned stimuli to be paired with the affective UCS. The three figures are shown in Appendix III, while the means and variances of the pretest evaluations are given in Appendix IV.

Each of the CS figures was drawn in outline form, using 1/16th inch black gloss drafting tape, on a white background of the same material as that used for the UCS. The exact dimensions of each figure varied, but no figure was more than $4\frac{1}{2}$ inches in height and 3 3/4 inches broad.

Apparatus: An Iconix three-channel tachistoscope, consisting of a visual stimulus unit, a time interval generator, a pre-set controller, a light driver and logic unit, was used to present both the CS and the UCS. This apparatus permitted presentations of the stimuli at relatively short exposure durations with a high degree of reliability. Each of the channels could be illuminated independently and individual exposure durations could be obtained for each channel as well.

Illumination of the three channels was equated by means of a MacBeth illuminometer, following placement of a smoke-grey transparent plastic sheet as a filter to reduce both luminance and possible after images. The channels were equated on the basis of five readings per channel by two observors. The light available in the viewing field of the tachistoscope was approximately $4\frac{1}{2}$ foot candles. The values for each of the three channels are presented in Appendix V.

The UCS were always presented in channel three, the CS always presented in channel two, thus each UCS and each CS were viewed under the same illumination at each presentation. Channel one was used as background illumination, constantly presented when neither the UCS nor CS were available to the

subject. In addition, the outline in black of a rectangle with a height of $4\frac{1}{2}$ inches and a breadth of 3 3/4 inches was present in channel one whenever this channel was illuminated. This figure, the dimensions of which corresponded to those of the CS, was used to adjust the subject to the correct viewing attitude prior to the start of the experiment and to assist him in maintaining that posture during the experimental trials. All stimuli (CS and UCS) were presented at a distance of 57 inches from the subject's eye, thus the stimuli presented can be considered to have fallen approximately within the visual angle subtended by the macula.

Design: A 2x5x3 analysis of variance design was employed, yielding two levels for sex of subject, five levels for exposure duration of the UCS, and three levels for sequence of presentation of the UCS. In addition, each of the subjects responded to each of three UCS-CS pairings. Thus, the complete design was a 2x5x3x3 mixed model analysis of variance with repeated measures obtained on the last variable.

Procedure: Upon reporting to the experimental room, subjects of the appropriate sex were randomly assigned to one of the 15 experimental groups. One-fifth of all the subjects were presented the UCS at either 75, 100, 125, 150 or 2000 milliseconds (msec.). The lower limit of 75 msec. was chosen since preliminary testing suggested that a majority of the subjects would be unable to correctly identify the majority of words within any one category at this speed, while, at the same time, it was necessary to operate with an exposure duration which permitted partial identification of the words in order to make the task meaningful for the subjects. Additionally, one-third of the subjects of each sex and in each exposure duration group were administered differential word presentation sequences (WPS) so that subjects assigned to WPS-1 received the UCS-CS pairings in the sequence: PUCS-CS_1, NUCS-CS_2, and OUCS-CS_3. The conditioned stimuli were always presented in the same

sequence, thus all subjects saw the same figure as CS_1, etc. Subjects assigned to WPS-2, then, were administered the sequence of pairings: OUCS-CS_1, PUCS-CS_2, and NUCS-CS_3; while those subjects assigned to WPS-3 received the pairings in the following sequence: NUCS-CS_1, OUCS-CS_2, and PUCS-CS_3. Thus, each UCS was paired equally often with each CS, providing a balanced set of UCS-CS pairings.

Instructions: Once the subject (S) was in the experimental room, he was seated in front of the eyepiece of the tachistoscope and asked to "look into the machine". The first channel of the tachistoscope was illuminated, presenting the rectangular outline, and S was asked to describe what he saw. This enabled the Ss' eyes to become accustomed to the level of illumination within the viewing field, as well as permitting postural adjustments so that S could see the limits of the area within which each of the conditioned stimulus figures would be presented.

S was then told that "This experiment is designed to see how well people are able to perceive and remember personality trait descriptions under conditions of visual interference or distraction. I have selected thirty words which you might use to describe another person's personality characteristics. In addition, I have also selected three figures to be used to provide visual interference or distraction." These instructions, while possibly providing S with some information regarding the category to which the words belonged, were at the same time designed to direct S's attention away from the CS.

S was advised of the specific procedure in the following manner: I will say "ready", which is the signal for you to focus on the center of the "square" in the visual field. About two seconds later, the "square" will disappear and the first of the distraction figures will appear. Approximately two seconds later the first word will flash very briefly in the center of the screen, so you'll have to watch closely in order not to miss it.

After you have seen five words with the first figure, you'll have a chance to rest your eyes for a few seconds while I change to the next figure. You will see an additional five words with the second figure, then I'll change to the third figure and you'll see five more words. Then we will repeat the whole sequence until you have seen all thirty words." Thus, S saw each CS twice in the same order, with the second presentation of CS_1 following the first presentation of CS_3. One-half of each list comprising the appropriate set of UCS were paired with each CS at each presentation. Each S saw the same CS paired with either positive, negative, or neutral words with the sequence of appearance depending upon the specific word presentation sequence to which S was assigned. This resulted in UCS-CS pairings such that each S was presented a positively paired stimulus (PPS), a neutrally paired stimulus (OPS), and a negatively paired stimulus (NPS). This mode of presentation was adopted to prevent S from quickly determining that positive, neutral or negative words always accompanied the same CS figure.

UCS onset followed onset of the CS at a delay interval ranging from 1925 msec. in the 75 msec. exposure duration condition to 1850 msec. in the 150 msec. exposure duration condition, with the exception that in the 2000 msec. exposure duration condition onset of the UCS and CS were simultaneous. Terminations of both UCS and CS were simultaneous in all exposure duration conditions. Each UCS adjective was presented separately in the center of the viewing field such that it appeared within the outline of the CS figure.

S understood that his task was to report the word which he had been shown after each presentation. He was advised that he was to "tell me as soon as you can what the word is that you were shown. If you are not completely certain, but can make a guess as to what it is, go ahead and guess. If you are absolutely uncertain as to what the word was, or you were unable to see anything at all, you should tell me: 'I don't know' or 'I didn't see

it'."

S was also told that while he would be asked later to recall those words he had been shown, that he should concentrate upon trying to correctly report the words as they were shown. He was specifically told not to try to remember all of the words, that it would be sufficient just to be aware that he would be asked to recall the words later. These instructions were included to forestall S's "guessing" that the experiment was concerned with memory and therefore attempting to rehearse the words already presented in order to recall them. Any questions S had about the procedure were answered and the conditioning procedure was begun.

Dependent variables: Each time S was presented a word, he responded verbally as to what he thought that word was. If the verbalization was a correct identification of the word, S's response was scored as "correct". All other verbal responses were recorded and scored "incorrect", as were the "no" responses, i.e., those cases in which S was unable to report any word. Correct responses to PUCS, OUCS, and NUCS were summed separately to provide separate "identification" scores for positive, neutral and negative adjectives for each subject.

After S had been exposed to all of the UCS-CS pairings, he was told: "I would like to get some information about what effect, if any, your impressions of the figure may have had upon your ability to perceive, and later remember, the words that you were shown". S was then given the FES containing six 7-point evaluative scales and asked to evaluate each of the three CS figures in terms of "how you feel about the figure with regard to each of the scales included". Each CS was then presented for a period of 10 seconds in the viewing field of the tachistoscope, in the same sequence as previously but without presentation of the UCS. Following each 10-second presentation of the CS, S completed the FES for that CS, thus the CS figures were

evaluated in the same order as presented initially. The scores were then summed across all six scales to provide an evaluative score (ES) with a possible range from 6-42 for each individual CS figure.

After completing the FES, S was asked to complete a Figure Preference Questionnaire "in order to get as much information as possible about whatever effect there might have been". The Figure Preference Questionnaire (FPQ) consisted of two questions asking about S's judgement as to how "attractive" he thought each figure was and how much he thought he would like to own a copy of the figure if it were described as an "abstract art drawing". The subject could respond by marking one of seven statements for each mode of "attractive" and "like to own" which most closely represented his feeling about the figure. S's responses were then scored from 1 (very unattractive or "very much dislike to own") to 7 (very attractive or "very much like to own") and summed across both modes to yield an FPQ score ranging from 2-14 for each CS. The FPQ itself was adapted from a similar questionnaire used by Sachs and Byrne (1970) and is presented in Appendix VI. To obtain the responses to the FPQ, S was again shown each of the CS individually for a period of 10 seconds as before. Following exposure to each CS, S completed the FPQ for that stimulus.

Once the FPQ responses had been obtained, S was again shown each CS for an additional 10 second period and asked to "write down all of the words you remember seeing with each figure". S was given three copies of a "Word Recall Test" consisting of 10 blank lines on which to write his responses; one for each CS. S's responses to each CS were scored in terms of the number of failures to recall (errors) as well as the total number of responses made whether correct or incorrect. S was encouraged to respond at a maximum by instructions to write down any word that came to mind even though he might be uncertain as to whether he had actually seen the word or not. The form used as the "Word Recall Test" is shown in Appendix VII.

Finally, in order to alleviate any possible "negative response bias" effects, S's responded to a "Word Recognition Test". S was given a list of 60 adjectives, 30 of which had been shown to him during the experiment. Of the 30 additional, extraneous words, all were selected from Anderson's list of personality adjectives and one-third of the thirty were positive, neutral and negative respectively, and were selected by the same criteria as were those used in the UCS sets. It was not possible to equate each of these adjectives for frequency of occurrence, but selection was made so that the extraneous words occurred with a frequency of either 50 or more per million or less than 1 per million, thus there was no overlap of frequency of occurrence with those adjectives in the UCS sets.

S was asked to mark those words which he had been shown during the experiment and to continue working until he had marked a total of 30 adjectives. S's responses were scored in terms of the total number of PUCS, OUCS, and NUCS adjectives recognized resulting in three "recognition" scores per subject, one for each of the three sets of UCS. Thus, even if S were reluctant to identify any particular word for some reason at the time of initial exposure to it, he should have little hesitancy in marking that word as "recognized" when presented with a list containing it.

Once the subject had completed the above tasks, he was asked to respond to a general "Experiment Evaluation Scale" (Appendix VIII) which asked for his judgements about the experiment in general, the experimental room, the experimenter, and the apparatus in terms of ratings on a series of evaluative scales adapted from Griffitt and Guay (1969). Ratings obtained were summed across all scales for each item rated to provide an evaluative score. Finally, S was asked to complete a general questionnaire (Appendix IX) consisting of 10 questions regarding the subject's belief as to the purpose of the experiment, whether he noticed that affective words were used, and if so,

whether he noticed with which figure they appeared. S was then told the true nature of the experiment and any questions he had were answered. He was then thanked for his participation and dismissed.

RESULTS

Evaluative Responses: The initial hypothesis suggested that evaluative responses to a previously neutral stimulus could be conditioned differentially by pairing the neutral stimulus with evaluative (affective) words of differential positive, neutral or negative valence. A summary table of the analysis of variance conducted upon the FES scores is presented in table I and reveals that the expected effects were not obtained. The affective (UCS-CS) pairing (AP) had only a minimal effect ($F_{(2,120)}=2.56$, $p<.10$) and did not reach a generally accepted level of significance. Reference to table II, containing the mean evaluative response (MER) to PPS, OPS, and NPS, suggests that the evaluations of OPS were slightly more positive than the evaluations of either PPS or NPS. While the difference between the evaluations of the latter two stimuli is nonsignificant, the means are ordered in the predicted direction. However, since this effect does not reach an acceptable level of statistical significance, it is unclear as to whether these differences are due to any more than a chance finding.

Since the predicted effects were not obtained in the analysis of the overall FES scores, each of the constituent dimensions summed to yield the FES score were subjected to individual analysis. Again, with the exception of one dimension, the results paralleled those obtained for the overall FES scores. Because of the close correspondence between these results and those obtained for the overall FES scores, these dimensions will not be treated individually.

The single exception to the above described failure to obtain the predicted results was observed in the constituent dimension of "negative-positive". Table III presents the summary table of the analysis of variance

Table I. Summary table of analysis of variance of FES responses

Source	df	SS	MS	F
Total	269	18227.49	67.76	
Between S's	89	4790.82	53.83	
Sex of Subject	1	45.63	45.63	0.83
Exposure Duration	4	228.62	57.15	1.04
Word Presentation Sequence	2	101.25	50.63	0.92
SxED	4	251.46	62.87	1.15
SxWPS	2	1.36	0.68	0.01
EDxWPS	8	302.01	37.75	0.69
SxEDxWPS	8	568.50	71.06	1.30
Error (b)	60	3292.00	54.87	
Within S's	180	13436.67	74.65	
Affective Pairing	2	352.81	176.40	2.56*
SxAP	2	251.67	125.83	1.83
EDxAP	8	746.45	93.31	1.36
WPSxAP	4	1562.26	390.57	5.68**
SxEDxAP	8	242.63	30.33	0.44
SxWPSxAP	4	452.51	113.13	1.64
EDxWPSxAP	16	895.93	55.99	0.81
SxEDxWPSxAP	16	673.48	42.11	0.61
Error (w)	120	8258.67	68.82	

* $p<.10$

** $p<.01$

Table II. Mean evaluative FES responses to PPS, OPS and NPS.

Affective UCS-CS Pairing		
NPS	OPS	PPS
24.29	27.09	25.70*

*None of the means are significantly different from each other at the p=.05 level of significance.

Table III. Summary table for the analysis of variance of "negative-positive" evaluative responses.

Source	df	SS	MS	F
Total	269	746.67	2.78	
Between Subject's	89	187.33	2.11	
Sex of Subject	1	1.20	1.20	0.57
Exposure Duration	4	9.33	2.33	1.10
Word Presentation Sequence	2	2.96	1.48	0.70
SxED	4	9.84	2.46	1.16
SxWPS	2	1.36	0.68	0.32
EDxWPS	8	13.82	1.73	0.82
SxEDxWPS	8	21.94	2.74	1.30
Error (b)	60	126.89	2.12	
Within S's	180	559.33	3.11	
Affective Pairing	2	23.09	11.54	4.11*
SxAP	2	13.09	6.54	2.33
EDxAP	8	45.91	5.74	2.04*
WPSxAP	4	38.82	9.71	3.46*
SxEDxAP	8	21.54	2.69	0.96
SxWPSxAP	4	26.29	6.57	2.34
EDxWPSxAP	16	35.07	2.19	0.78
SxEDxWPSxAP	16	18.42	1.15	0.41
Error (w)	120	337.11	2.81	

*$p < .05$

performed upon evaluative responses to PPS, OPS, and NPS within this dimension. Reference to table III reveals that a significant effect was obtained for affective pairing (AP) of the UCS with the CS figure ($F_{(2,120)}=4.11$, $p<.05$). The mean evaluative "negative-positive" responses to PPS, OPS, and NPS are presented in table IV. Individual comparisons of those means using Duncan's Multiple Range test (Winer, 1962)* reveals that both OPS and PPS were evaluated significantly more positively than was NPS, while there was no difference between the responses to the former two stimuli. Furthermore, as the mean evaluation of the CS obtained in pretesting (3.87) is closely approximated by the obtained evaluation of NPS (3.70), there is a strong implication that the obtained effects are due to the positive reinforcement properties of both the "neutral" and the "positive" evaluative adjectives, rather than to negative reinforcement properties of the "negative" adjectives. This implication, while at variance with the results reported by Griffitt and Guay (1969), is consistent with the observation by Byrne, Young, and Griffitt (1966) that "neutral statements of fact" served to facilitate performance in a discrimination task in much the same manner as did positive reinforcement with agreeing attitudes. Thus, it may be that in situations which involve elements of both positive and negative reinforcement, or at least negative reinforcement, a "neutral" event is interpreted as positively reinforcing, and responded to accordingly.

The failure to obtain a significant effect for the conditioning of evaluative responses when considering the summed FES scores, while analysis of the single "negative-positive" dimension yielded that effect, is somewhat puzzling. There are several factors which may have contributed to that lack of effect. First, it is possible that the ambiguous nature of the CS used in

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*All individual comparisons between means were made with Duncan's Multiple Range test.

Table IV. Mean "negative-positive" evaluative response to PPS, OPS, and NPS

Affective UCS-CS Pairing

NPS	OPS	PPS
3.70a	4.36b	4.28b*

*Means not sharing a common subscript differ from each other at less than the $p<.01$ level of significance. Individual comparisons made by means of Duncan's Multiple Range Test.

this study led to some confusion among the three CS figures such that S was unable to distinguish just which of the three CS figures he was responding to. This argument is tempered somewhat by the fact that conditioned responses were obtained within the "negative-positive" dimension. A second possibility is that the presentation of positive, neutral, and negative adjectives to the same S within a short time span elicited internal affective responses that were not readily dissipated over the short inter-exposure intervals. Thus, there may have been some "carry over" effects which influenced the subsequent evaluations. Additionally, the dimensions included in the FES may not have been "applicable" in a very strict sense to the experimental CS employed. It may be more difficult to see an ambiguous stimulus as "attractive" or "unattractive" than it is to describe it in terms of a relatively undifferentiated affective dimension such as "negative-positive".

Since both stimulus ambiguity and possible "carry-over" effects would most likely be minimal with regard to the first stimulus presented, it was decided to focus attention upon the first UCS-CS paired presentation to determine whether or not a clarification of the results could be obtained. Thus, responses to the first CS figure were analyzed separately, utilizing, in effect, a between groups design with separate subjects being tested under pairing conditions of PPS, OPS, and NPS. One-third of all subjects had been presented with an initial UCS-CS pairing that consisted of either PPS, OPS, or NPS. In this case, then, stimulus ambiguity would be minimized since all S's responded to the same physical figure initially and, furthermore, "carry-over" effects would be at a minimum since each subject received an initial presentation of this stimulus paired with either positive, neutral or negative adjectives. Since there were no sex differences attaining a reliable level of significance, sex of subject was disregarded as a variable in

this analysis. The results of this post-hoc analysis are presented in table V.

A significant effect was obtained for affective pairing with regard to the summed FES scores ($F_{(2,75)}=3.40$, $p<.05$). Inspection of the individual mean responses to PPS, OPS, and NPS (presented in table VI) reveals that the effect obtained is ordered in the direction predicted by the Byrne-Clore reinforcement model. Thus, the lowest MER is obtained in response to NPS, while both PPS and OPS were evaluated significantly more positively than the former stimulus. Again, no difference was obtained between evaluations to OPS and PPS, suggesting that there is, at best, only a slight difference with regard to evaluative responses elicited by each and that the reinforcing effects of the "positive" adjectives are not substantially more positive than those of the "neutral" adjectives.

Additionally, similar analyses were conducted for each of the constituent dimensions of the FES. The predicted effect for affective pairing achieved significance in only two of these dimensions. Thus, the "good-bad" dimension reflected the effect for affective pairing of the UCS with the neutral stimulus ($F_{(2,75)}=3.51$, $p<.05$) as did the "negative-positive" dimension ($F_{(2,75)}=4.91$, $p<.01$). However, there was no significant effect of affective pairing in the remaining dimensions of "pleasant-unpleasant", "like-dislike", "attractive-unattractive", and "interesting-uninteresting". Again, this may be due, as previously suggested, to the "inapplicability" of these specific dimensions with respect to the specific stimuli employed. Thus, while it may be appropriate to S to evaluate an ambiguous figure along a somewhat crude and undifferentiated affective dimension of "good-bad" or "negative-positive", it may not be appropriate to S to respond in terms of "attractive-unattractive" or "pleasant-unpleasant", etc. These latter dimensions may serve to direct S's attention to a consideration of the properties

Table V. Summary table of analysis of variance of FES evaluative responses to initial UCS-CS presentation only.

Source	DF	SS	MS	F
Total	89	5370.62		
Exposure Duration	4	326.84	81.71	1.71
Affective Pairing	2	325.49	162.74	3.40*
EDxAP	8	1123.96	140.49	2.93**
Error	75	3594.33	47.92	

* $p<.05$
** $p<.01$

Table VI. Mean evaluative responses to the initially presented CS following pairing with either negative, neutral or positive trait adjectives. Responses shown are to the first UCS-CS pairings within the constituent dimensions of "good-bad", "negative-positive" and to the summed FES scores.

	Affective UCS-CS Pairing		
Evaluative Dimension	NPS	OPS	PPS
"good-bad"	4.20a	4.93b	5.10c*
"negative-positive"	3.70a	4.73b	4.83b
Summed FES scores	25.57a	29.37b	29.80b

*Means are compared within dimensions only. Subscripts not commonly shared indicate that the means differ at less than the $p<.05$ level of significance. All comparisons are by means of Duncan's Multiple Range Test.

of the stimulus, while the former may serve to elicit responses based more upon S's internal affective response.

Reference to table VI reveals that the ordering of the MERs to PPS, OPS, and NPS within both the "good-bad" and "negative-positive" dimensions is consistent with the ordering obtained for the mean FES scores. Furthermore, within the "good-bad" dimension the mean response to NPS (4.20) is significantly less positive than the mean evaluations of either OPS (4.93) or PPS (5.10) while the latter two also differ significantly, PPS being evaluated more positively than is OPS. Within the "negative-positive" dimension, similar results were obtained with the exception that evaluations of PPS and OPS did not differ significantly, while both were evaluated significantly more positively than was NPS. These results, while tentative at best due to the nature of the analysis, do appear to suggest that evaluative responses are conditioned to neutral stimuli through association with affective stimuli in accordance with the affective conditioning model proposed by Byrne and Clore (1970). They also suggest that had the positive, neutral, and negative reinforcing stimuli been varied completely between groups, rather than within subjects, the conditioning effects would have been more clearly obtained.

The Effect of Sequence of Presentation of the UCS Adjectives.

In contrast to the somewhat ambiguous nature of the results regarding the conditioning of evaluative responses, reference to both table I and table III reveals the presence of a persistent and statistically significant word presentation sequence X affective pairing (WPSxAP) interaction in the summed FES scores ($F_{(4,120)}=5.68$, $p<.01$) as well as in the "negative-positive" dimension ($F_{(4,120)}=3.46$, $p<.05$). The presence of this interaction was not expected as Griffitt and Guay (1969) did not report obtaining "order" effects in evaluations of non-human stimuli. One important difference

between the two studies, however, is that Griffitt and Guay employed more discriminable stimuli (TAT CARDS) paired with verbal reinforcement (creativity ratings) which may have been somewhat more effective in eliciting an affective response. It is possible that this difference may account, at least in part, for the difference in the results of the two experiments.

The experimental design employed in this study, if the sex of subject variable is disregarded, can be described as a 3x3 latin square with five (e.g., exposure duration conditions) replications. There are two primary reasons that led to a latin square analysis of the data. First, a cursory examination of the data suggested that, although the figures had been equated with respect to evaluative responses in pre-testing, nevertheless apparent figure effects were present. Since these effects are confounded in the initial analysis of variance conducted, the latin square analysis seemed the most reasonable way to examine the extent of those effects. Secondly, since the sex of subject variable had yielded neither significant main effects nor interactive effects, it was deemed appropriate to disregard that variable. Thus, a latin square analysis of variance was performed upon the evaluative responses within the "negative-positive" dimension. The results of that analysis are summarized in table VII. These results show that, indeed, there is a significant "figure" effect, indicating that subjects evaluated the CS figures differentially without respect to the UCS-CS pairings ($F_{(2,150)}=5.85$, $p<.01$), but that in addition there was also a significant effect ($F_{(2,150)}=4.39$, $p<.05$) for affective pairing of the UCS with the CS figures.

The presence of these figure effects may serve to assist in explanation of the unexpected significant WPSxAP interaction obtained in the analysis of both the summed FES and "negative-positive" evaluations. Table VIII presents the mean evaluations to each CS figure in the order of presentation to S. As can readily be seen, both the first figure and the last figure presented were

Table VII. Summary table of latin square analysis of variance of "negative-positive" evaluative responses.

Source	df	SS	MS	F
Between S's	89	181.10		
C (Exposure Duration)	4	9.84	2.46	1.19
Rows (WPS)	2	2.45	1.23	1
C x Rows	8	13.81	1.73	1
Error (b)	75	155.00	2.07	
Within S's	180	564.00		
A (CS figure)	2	33.03	16.51	5.85**
B (Affective Pairing)	2	24.76	12.38	4.39*
AxC	8	10.12	1.65	1
BxC	8	45.05	5.63	1.99
(AB')	2	3.39	1.69	1
(ABC')	8	24.23	3.04	1.08
Error (w)	150	423.33	2.82	

* $p<.05$
** $p<.01$

Table VIII. Mean "negative-positive" evaluative response to each CS in the order of presentation without respect to the affective UCS-CS pairing.

CS_1	CS_2	CS_3
4.39_a	3.61_b	4.31_a*

*Means not sharing a common subscript differ at the $p<.01$ level of significance by means of Duncan's Multiple Range Test.

evaluated significantly more positively by S than was the second figure presented. Thus, for some reason Ss responded more positively to the first and last stimuli within this three stimulus sequence than they did to the second, resulting in an apparent combination "primacy-recency" effect.

In view of these results, the clearest interpretation of the WPSxAP interaction would seem to be provided in terms of the "primacy-recency" effect in the evaluation of the figures themselves. While consideration of the mean FES evaluative responses (presented in table IX) and the "negative-positive" evaluative responses (presented in table X) suggests that Ss within the WPS-1 condition performed in the predicted manner, whereas Ss in the remaining two WPS conditions did not, the results are confounded by the obtained "primacy-recency" effects in the figure evaluations. Thus, in light of the relatively low evaluation given the second stimulus figure, the fact that NPS appears in that position within the WPS-1 condition probably responsible to a large degree for the obtained negative evaluation. Similarly, the relatively low evaluation given to PPS in the WPS-2 condition is probably due to its presentation as the second CS figure in that sequence. It appears, however, that the combined "primacy-recency" effect was not obtained in the WPS-3 condition. Reordering the evaluative responses to each stimulus with regard to the order in which it was presented provides a clearer visualization of the pattern of the results. This reordering is presented in figure 1.

As figure 1 suggests, there appears to be some effect of the initial UCS list which S is presented. Thus, if the initial UCS list is composed of either positive or neutral adjectives (as in the WPS-1 and the WPS-2 conditions, respectively) evaluations of the first and the last CS are more positive than evaluations of the second CS irrespective of the specific affective value of the adjectives paired with the second and third CS figures.

Table IX. Mean FES evaluative responses to PPS, NPS and OPS within each word presentation sequence.

Word Presentation Sequence	NPS	OPS	PPS
WPS-1 (PPS-NPS-OPS)	21.50^{a}_{A}	28.13^{b}_{B}	29.70^{b*}_{C}
WPS-2 (OPS-PPS-NPS)	26.33^{cd}_{A}	28.87^{c}_{B}	21.87^{d}_{D}
WPS-3 (NPS-OPS-PPS)	25.03^{e}_{A}	24.27^{e}_{B}	25.53^{e}_{CD}

* Means are compared within each sequence and across sequences for NPS, OPS, and PPS. Means not sharing a common lower case subscript differ within sequences at the $p<.01$ level of significance. Means not sharing an upper case subscript differ between conditions at the $p<.01$ level of significance.

Table X. Mean "negative-positive" evaluative response to NPS, OPS, and PPS within each word presentation sequence.

Word Presentation Sequence	NPS	OPS	PPS
WPS-1 (PPS-NPS-OPS)	3.27^{a}_{A}	4.53^{b}_{B}	4.73^{b*}_{C}
WPS-2 (OPS-PPS-NPS)	4.10^{c}_{A}	4.60^{c}_{B}	3.67^{c}_{C}
WPS-3 (NPS-OPS-PPS)	3.73^{d}_{A}	3.87^{d}_{B}	4.33^{d}_{C}

*Means are compared within and across each WPS condition. Means not sharing a common subscript either within or across conditions differ at the $p<.01$ level of significance.

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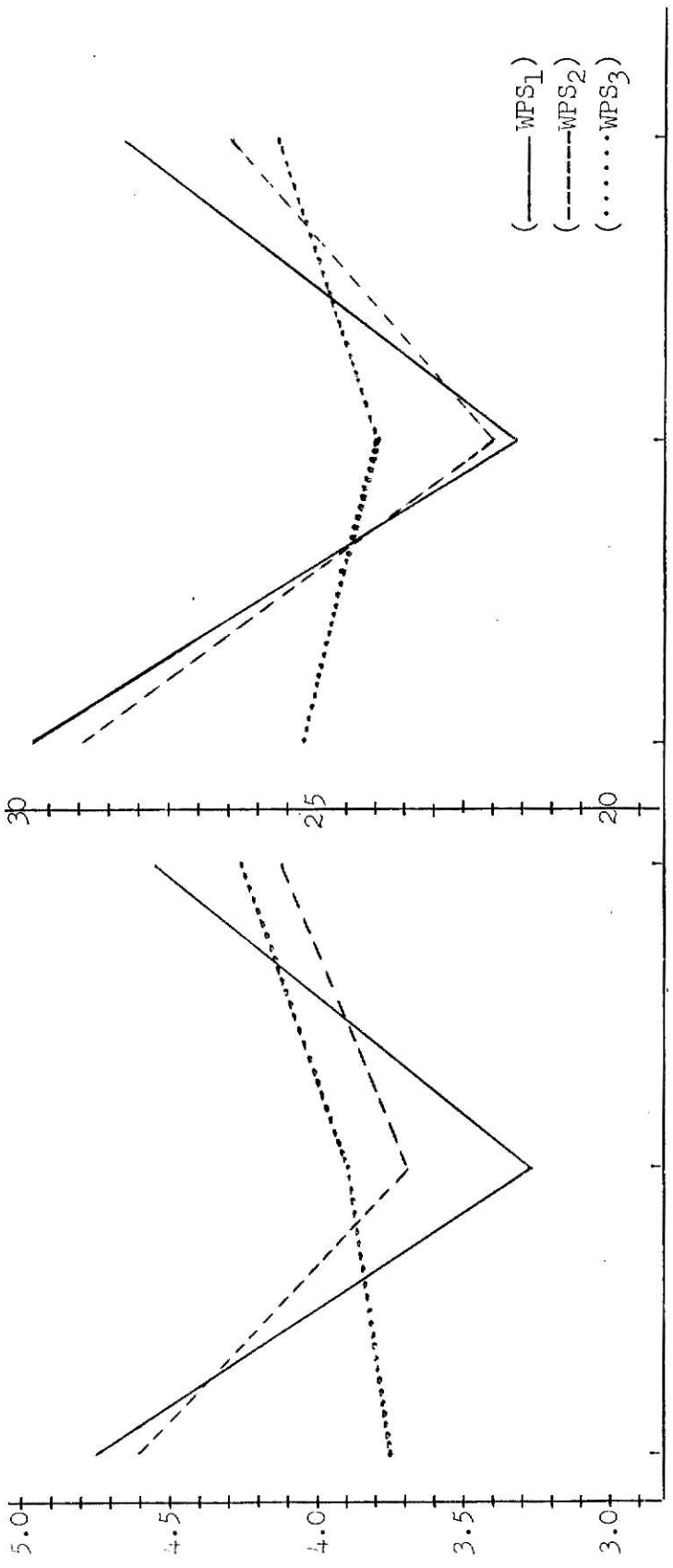

Figure 1. Mean "negative-positive" and FES evaluative responses as a function of the sequence of presentation (order) of the CS stimuli. CS_1=the first stimulus presented; CS_2=the second, and CS_3=the third. The UCS-CS pairings are disregarded.

However, if the negative UCS list is presented first (as in the WPS-3 condition), the pattern changes slightly and the primacy effect disappears while there is a slight increase in the evaluation of the second CS figure. With respect to the summed FES scores, this function very nearly approximates a horizontal line. In the "negative-positive" dimension, the primacy effect seems to have disappeared completely, but a slight recency effect remains. There appears to be some effect, then, with regard to the initial affective UCS list which S encounters, but this effect is only present in the evaluation of the first CS figure. The WPSxAP interaction, itself, probably represents a confounding of the apparent differences in the evaluations of each CS with respect to the serial order of presentation of the UCS-CS pairings and primacy-recency performance of S in evaluations of the specific CS figures. As a result, this confounding serves to make any conclusions about the effects of conditioning of evaluative responses within this experimental context somewhat unclear and tenuous.

Figure Preference Questionnaire responses: Ss were asked to respond to the Figure Preference Questionnaire (FPQ) which asked how much S felt he liked each specific CS and how much he might like to own a copy of that CS. Whereas Sachs and Byrne (1970), using a similar measure, obtained an effect for differentially reinforcing attitude statements paired with neutral stimuli, no comparable effect for affective pairing was obtained in this experiment with respect to the summed responses to the FPQ or to each of the two individual questions comprising the measure. It is likely that the differences in experimental design and procedure, and possibly the nature of the reinforcing stimuli, account for the difference in the results of the two studies. Sachs and Byrne (1970) presented reinforcing attitude statements differentially paired with two random figures by means of tape recordings. The use of adjectives of differing affective valence, presented in a

relatively brief visual display, and the inclusion of a "neutral" condition involving a third conditioned stimulus figure in the present study may well account for the differing results.

Since significant effects for affective pairing were not obtained in the constituent evaluative dimension of "like-dislike" of the FES scale, it is not unexpected that the responses to a question concerning "liking" for the stimulus did not yield any significant effects for affective pairing of an UCS with a neutral CS. Apparently the factors underlying the failure to obtain effects for the evaluative dimension of "like-dislike" in the FES scores had a similar effect with regard to this specific response as well. Similarly, the responses obtained when S is asked to express his degree of liking for the CS and when he is asked how much he might like to own a copy of the figure should be highly related. Possibly asking the one question is nothing more than asking the other in a slightly different form. Again, the failure of the specific dimensions employed to reflect the conditioning effects of affective pairing of the UCS adjectives may be due, in part, to the structure of the experimental situation and to the specific CS used with respect to the specific scales on which S was asked to respond.

Identification and Recognition of Affective Word Stimuli: The second hypothesis proposed, on the basis of experimental evidence obtained by Wickens, et. al., (1971), was that the conditioning of evaluative responses would occur independently of S's ability to correctly identify the specific affective word stimuli which he was presented. Two measures of S's ability to correctly establish the identity of the specific UCS items presented were employed: Identification of the word at the initial exposure and recognition of the word at a later time through selection from a list within which it was embedded.

Significant effects were obtained for exposure duration within each

variable, with the identification measure yielding an F-ratio of 11.34 (df= 4,60, $p<.01$) and the recognition measure an F-ratio of 7.21 (df=4,60, $p<.01$). The mean number of correct identifications and recognitions of the UCS adjectives are presented in table XI. These results clearly suggest that as exposure duration (ED) increased, Ss tended to identify an increasing number of adjectives correctly. While the mean number identified was significantly greater at the longest (2000 msec.) ED condition when compared to all shorter EDs, no differences were obtained among the shorter durations. Comparable results were obtained in a comparison of the mean number of adjectives correctly recognized within each ED condition, with the exception that the mean number correctly recognized by S's in the 150 msec. ED condition did not differ from the mean number correctly identified at either the longest (2000 msec.) ED condition nor from those within the three shorter ED conditions.

The correlation obtained between the two measures is substantial and positive ($r=.90$, df=88, $p<.01$) suggesting a high degree of relationship between the measures of identification and recognition. Apparently, if S was able to correctly identify a large proportion of the tachistoscopically presented adjectives he was also able to correctly indicate which of the adjectives in the embedded list he had been presented.

An examination of the individual responses obtained from each S suggests that there was a great deal of individual variability in the ability of individual Ss to correctly identify and/or recognize the UCS adjectives with respect to the exposure duration at which the adjectives were presented. For example, a number of S's in the shortest (75 msec.) ED condition appeared to be able to identify and/or recognize a large proportion of the adjectives presented, while at the same time, there did not appear to be a general increase across exposure durations in the number of S's who were able to do so. Thus, it is possible that the differential "negative-positive"

Table XI. Mean number of adjectives correctly identified and correctly recognized within each exposure duration.

	Exposure Duration in Milliseconds				
Mode of Response	75	100	125	150	2000
Identification	4.20a	4.54a	4.65a	5.94a	9.74b*
Recognition	6.82a	6.94a	7.15a	7.50b	8.95b

*Mean identification and recognition of adjectives are compared within the individual response modes across durations. Means within each response mode not sharing a common subscript differ at less than the p=.05 level of significance on the basis of comparisons by Duncan's multiple range test.

evaluations obtained may have primarily resulted from that proportion of S's who correctly identified a greater number of the affective UCS adjectives and responded in terms of the adjectives identified.

At the same time, comparison of the mean number of adjectives correctly identified with the mean number correctly recognized at each exposure duration, suggests that Ss identified fewer adjectives within the four shorter exposure duration conditions than they were able to later recognize by indicating the adjectives that had been presented. At the 2000 msec. exposure duration, the situation is reversed, with more adjectives identified than recognized. A test of the differences between the total number of adjectives identified versus the total number identified at each duration indicated that these differences were all significant at less than the p=.05 level of significance.

The difference between the number identified and that recognized at the 2000 msec. ED condition can readily be explained in terms of a simple process of forgetting. That is, since a series of response measures, not to mention a period of time approximating 10-15 minutes, intervened between the initial identification of the adjective and the procurring of the recognition measure, it is not unreasonable to expect that S's "forgot" some of the adjectives they had initially identified correctly.

In light of this result, the finding that Ss were able to recognize more adjectives than they were able to identify at the four shorter durations has two implications. First, that Ss in the four shorter exposure duration conditions were able to recognize more adjectives than they identified suggests that the Ss may have actually "seen" more than they reported in the identification measure, even though they were encouraged to guess. Bricker and Chapanis (1953) observed a similar finding among their subjects and posited a "negative response bias" as accounting for the results. It seems likely that

a similar "negative response bias" operated in this study to the extent that Ss clearly appeared not to report the identity of adjectives presented for a relatively brief time, although later they are able to recognize a significantly greater number of them.

Secondly, that Ss in the 2000 msec. condition appeared to "forget" some of the adjectives which they had previously identified raises the same question with regard to Ss in the shorter ED conditions. It is questionable that only Ss in the 2000 msec. condition would experience forgetting, while Ss in the four shorter ED conditions did not. Since it is not possible to obtain any estimate of the possible degree of "forgetting" among these Ss, the question as to whether and to what extent the adjectives were correctly identified by the Ss remains an open one.

In an attempt to assess the possible effect which might be due to differential responding to the evaluative dimension as a function of correctly identifying a greater proportion of the UCS adjectives, an additional post-hoc analysis was conducted with respect to the evaluative responses within the "negative-positive" dimension. Due to the high degree of relationship between the measures of identification and recognition, it was considered that an assessment of the probability of correctly recognizing the affective adjectives at a rate beyond that which could be expected on the basis of a chance performance on the part of S might also serve as an indicant of the degree to which S correctly identified the word at the initial presentation. Thus, since the Word Recognition task required S to select 30 out of the 60 adjectives included, the probability that any one adjective would be selected by chance would be equal to .50. Therefore, the probability of selection of one-half of the correct adjectives (or 15) would also be equal to .50. A selection, on the part of S, of substantially more than 15 adjectives should then be some indication of the degree to which S "saw" the adjectives when

they were initially presented to him. Chi square analyses were computed with regard to individual S's recognition scores yielding a total of 50 Ss who surpassed the criterion thus established (i.e., the correct recognition of 23 or more adjectives), including all 18 Ss in the 2000 msec. ED condition. This left a total of 40 Ss who did not meet the criterion.

An unweighted means analysis of variance was conducted with regard to the evaluative responses within the "negative-positive" dimension, employing the same independent variables as the previous analyses with the exception that "recognition" with two levels (either above or below criterion) replaced the exposure duration variable. This resulted in a 2x2x3x3 design with the variables of sex of subject, "recognition", word presentation sequence, and affective pairing of the UCS with the CS. The latter variable, as before, was a within subjects variable; the others varying between groups.

The rationale for this analysis rests on the assumption that if Ss responded differently in evaluations of the CS along the "negative-positive" dimension, then the interaction between "recognition" and "affective pairing" should reach significance. Thus, if Ss exceeding the "recognition" criterion evaluated the CS differently than did Ss not achieving that criterion, the differential performance should be reflected in the "recognition" x "affective pairing" interaction, with the expectation that Ss exceeding the criterion should evaluate either NPS more negatively than Ss not exceeding that criterion, or that they would evaluate PPS more positively than did Ss not meeting the criterion, or both. No such interaction was obtained. The observed F-ratio for that interaction was less than one ($F_{(4,156)}=0.53$, ns). There was, however, the expected main effect for affective pairing ($F_{(2,156)}=4.48$, $p<.05$) as well as a significant WPSxAP interaction ($F_{(4,156)}=3.03$, $p<.05$). An analysis of the identification measure using the same design resulted in an obtained main effect for the "recognition" variable

($F_{(1,78)}$=179.19, p<.005) with Ss exceeding the recognition criterion also identifying a greater number of adjectives correctly ($\bar{X}$=8.3) than did Ss not attaining that criterion ($\bar{X}$=2.8).

Taken together, these results indicate that the evaluation of the individual CS along a "negative-positive" dimension proceeded in much the same fashion without respect to whether or not Ss could correctly recognize and/or identify with greater than chance accuracy the adjectives paired with that CS. To the extent that the measure of recognition reflects the Ss' ability to correctly identify the adjectives presented, then, it would appear that the second hypothesis is supported. The presence of the significant WPSxAP interaction apparently reflects the same factors which were discussed with respect to that interaction in the discussion of the initial analysis.

There was, however, a differential effect with regard to the identification of the affective adjectives ($F_{(2,156)}$=8.63, p<.01) but not with respect to recognition of those adjectives ($F_{(2,156)}$=0.88, ns). Reference to table XII, containing the mean number of positive, neutral and negative adjectives correctly identified reveals that a significantly greater number of positive, as compared to either neutral or negative, adjectives were correctly identified overall. This, in combination with the apparent lack of extremely negative evaluations of all CS figures (irrespective of affective pairing and in comparison with the pre-testing mean evaluation), suggests that the differential evaluations may have been the result of Ss "seeing" a greater number of positive adjectives and evaluating PPS on that basis. If this were the case, a significant and positive correlation could be expected between the positiveness of the evaluative response to PPS and the number of positive adjectives correctly identified. This correlation is likely to be most enhanced among those Ss not meeting the criterion established for "recognition" of the affective stimuli. The obtained correlation (r=.21, df=38,

Table XII. Mean number of correctly identified positive, neutral, and negative UCS adjectives.

Affective value of the UCS adjectives

negative	neutral	positive
5.33a	5.32a	6.02b*

*Means not sharing a common subscript differ at the $p<.05$ level of significance by Duncan's Multiple Range Test.

ns), while in the positive direction, did not attain significance. Furthermore, evaluations of OPS did not differ from evaluations to PPS (as reference to table IV readily shows) and, in fact, evaluations of OPS were slightly more positive than were evaluations of PPS. Again, there was no relationship between the number of "neutral" adjectives correctly identified and evaluations of OPS ($r=.12$, $df=38$). A similar correlation computed between the number of correct identifications of negative adjectives (NUCS) and evaluative response to NPS within the "non-recognition" group revealed no relationship between those two measures ($r=.04$, $df=38$).

On the other hand, among those Ss exceeding the criterion for recognition, there was a significant negative relationship between the number of correct identifications of NUCS and the positiveness of the evaluative response of NPS ($r=-.29$, $df=48$, $p<.05$). There was no relationship, however, between either the number of correct identifications of PUCS and the evaluation of PPS ($r=-.05$, $df=48$), or the number of OUCS correctly identified and the evaluations of OPS ($r=.07$, $df=48$).

These results suggest that the evaluation of the CS figure by those Ss not meeting the criterion for "recognition" is unrelated to whether or not the S's were able to identify the UCS adjectives associated with that CS. At the same time, there is a non-significant tendency among these Ss to evaluate PPS with respect to the total number of positive adjectives correctly identified, as indicated by the low, but positive correlation between the two measures. However, it appears that among Ss exceeding the "recognition" criterion there is a negative relationship between the number of negative adjectives correctly identified and the evaluation given the associated CS. Thus, evaluations of NPS are affected to some degree by the

number of negative adjectives which S has seen associated with the CS figure, at least among those Ss who "see" a majority of the adjectives presented. In this case, the negative evaluations seem to be due to S's ability to identify the negative adjectives associated with the CS figure evaluated.

Although it appears that the performance of Ss exceeding the "recognition" criterion may best be explained in terms of the relationship between the negative adjectives identified and the evaluation of the associated CS, the fact remains that Ss not meeting that criterion evaluate the CS figures essentially no differently. What, then, is the basis of the evaluative responding on the part of those Ss not meeting the recognition criterion? One possibility is that these Ss not attaining the "recognition" criterion experience a great deal of uncertainty with respect to the identity of the adjectives they encounter. Thus, when Ss are able to identify an adjective with a high degree of certainty, this may constitute a reinforcing event which serves to elicit a positive affective response which then mediates the evaluative response to the associated CS. Although specific "certainty" ratings were not obtained, the total number of adjectives in any one category (i.e., positive, neutral or negative) which were correctly identified may serve as an indicant of the degree of certainty with which adjectives in that particular category were identified. If this were the case, one might expect to find a positive relationship between the number of adjectives correctly identified and the positiveness of the evaluation of the CS associated with those adjectives.

For these Ss not attaining the "recognition" criterion, a positive relationship was found between the number of adjectives correctly identified (irrespective of affective value) in association with CS_1 and the positiveness of the evaluation of CS_1 ($r=.43$, $df=38$, $p<.01$). This relationship was not obtained, however, with respect to the number of adjectives correctly

identified in association with either CS_2 (r=-.11) or CS_3 (r=-.06).

The finding that the evaluation of CS_1 is positively related to the number of adjectives correctly identified in conjunction with that CS provides some support for the suggestion that the correct identification of the adjectives constituted a reinforcing event which elicited a positive affective response which then mediated the evaluative response. Furthermore, additional evidence supportive of this suggestion is provided by the observation that the relationship between the evaluation of CS_1 and the number of positive, neutral, and negative adjectives identified, while not significant, is nevertheless in the positive direction. The rs are .25, .28, and .37 respectively. If the evaluation of the CS figure had been a function of the affective valence of the adjectives paired with it, then a negative relationship should have been observed between the number of negative adjectives correctly identified and the positiveness of the evaluation of the figure. That the relationship was in the positive direction is indicated by the low, but positive correlation (r=.37) obtained.

The failure to obtain the same relationship with respect to CS_2 and CS_3 may undoubtedly be attributed in part to the confounding effects of the differential figure evaluations previously mentioned. The fact that the evaluation of the figures reflected the apparent "primacy-recency" effect would indicate that any relationship between evaluative response and the number of adjectives correctly identified would be confounded by that same factor.

The effects of exposure duration on evaluation: It was suggested that as exposure duration was increased, permitting the affective adjectives to be more completely encoded, that the evaluations of the CS with which they were paired might become increasingly polarized. Reference to table III (p. 23) containing the summary table of the analysis of variance performed on the

evaluative responses to CS within the "negative-positive dimension of the FES scale, reveals that a significant exposure duration x affective pairing interaction ($F_{(8,120)}=3.46$, $p<.05$) was obtained. Examination of the individual means, presented in table XIII, indicates that only slight support was obtained for the hypothesis as stated. Individual comparisons were made between evaluations of PPS, OPS, and NPS within each exposure duration, while comparisons across durations were limited to a consideration of differences in evaluations of CS paired with common affective UCS (i.e., PPS at all durations, OPS at all durations, or NPS at all durations) but no comparisons were made between differentially paired CS figures across exposure durations.

The results show that there were no differences in evaluations of PPS, OPS, and NPS within the 75 or 125 msec. exposure durations. However, within the exposure durations in which the UCS adjectives were exposed for either 100 or 2000 msec., the difference between evaluations to PPS and NPS did attain significance at less than the $p=.05$ level, with PPS receiving the more positive evaluation. Furthermore, while the evaluations to the three CS approximate a flat function within the 75 msec exposure duration (ED) condition, evaluations to PPS, OPS, and NPS, although not differing significantly, are ordered in the predicted direction within the 125 msec ED condition. This is not the case for the evaluations to these three stimuli within the 150 msec ED condition. The apparent reversal in direction of ordering at this exposure duration is somewhat perplexing, the more so since evaluations of NPS and OPS, while not differing from each other, are both evaluated marginally more positively than is PPS ($p<.10$). It is not clear as to why this particular result was obtained.

Comparisons between groups reveal that there are no highly significant differences between evaluations of any particular CS, although evaluations to PPS at 100 and 125 msec. are marginally ($p<.10$) more positive than evaluations

Table XIII. Mean "negative-positive" evaluative responses to NPS, OPS, and PPS at each exposure duration.

Exposure Duration in Milliseconds	NPS	OPS	PPS
75	3.83^{a}_{A}	4.28^{a}_{B}	3.89^{a*}_{CD}
100	3.44^{b}_{A}	4.06^{bc}_{B}	4.83^{c}_{C}
125	3.83^{d}_{A}	4.67^{d}_{B}	4.83^{d}_{C}
150**	4.39^{e}_{A}	4.61^{e}_{B}	3.33^{e}_{D}
2000	3.00^{f}_{A}	4.17^{fg}_{B}	4.50^{g}_{CD}

* Lower case subscripts in common within each exposure duration indicates that the mean evaluations within durations do not differ. Means not sharing a common subscript within exposure durations differ at the $p<.05$ level of significance. Upper case subscripts refer to comparisons across exposure durations for each UCS-CS pairing. Means across durations not sharing an upper case subscript in common differ at the $p<.10$ level of significance.

**Within the 150 msec. exposure duration only, evaluations of NPS and OPS do not differ from each other, but both differ from the evaluation to PPS at the $p<.10$ level of significance.

to PPS at 150 msec. This finding, along with the marginally more positive evaluations to OPS and NPS within the 150 msec ED condition, suggests that the process responsible for the reversal in the ordering of the direction of the evaluations occurs at that exposure duration and is probably responsible, to a considerable extent, for the presence of the significant interaction.

A somewhat clearer picture as to what Ss may be responding to is provided by an examination of the significant EDxAP interaction obtained for the measure of the number of correct adjectives recognized ($F_{(8,120)}=3.20$, $p<.01$. The mean number of correct recognitions of negative, positive, and neutral adjectives within each exposure duration is presented in table XIV. Comparisons between exposure durations reveal that there are no differences across exposure durations with regard to the number of positive adjectives correctly recognized. The number of neutral adjectives correctly recognized is significantly greater at 2000 msec. ($p<.05$) as compared to all shorter exposure durations. A similar pattern is observed in the comparison of the number of correct recognitions of negative adjectives across exposure durations. Again the greatest number of correct recognitions occurs at 2000 msec., with the mean number recognized at this duration significantly greater than at the two shortest durations (e.g., 75 and 100 msec, $p<.05$). The two remaining durations (125 and 150 msec.) do not yield any significant difference in the number of recognitions of the negative adjectives as compared to all other durations.

Comparisons within durations indicate that Ss "see" reliably more positive than neutral or negative adjectives within the shortest (75 msec.) exposure duration. With an increase in exposure duration of 25 msec, to a duration of 100 msec., a slight increase results in the number of neutral adjectives correctly recognized, such that, although more positive than negative adjectives are recognized, there are no differences between the two

Table XIV. Mean number of negative, neutral and positive adjectives recognized within each exposure duration.

Exposure Duration (in Milliseconds)	Affective value of the UCS adjectives		
	Negative	Neutral	Positive
75	6.44^{a}_{A}	6.33^{a}_{C}	7.67^{b*}_{E}
100	6.22^{c}_{A}	7.11^{cd}_{C}	7.50^{d}_{E}
125	7.33^{e}_{AB}	7.11^{e}_{C}	7.00^{e}_{E}
150	8.17^{f}_{AB}	6.89^{g}_{C}	7.44^{fg}_{E}
2000	8.94^{h}_{B}	9.11^{h}_{D}	8.50^{h}_{E}

*Means are compared both within and across durations. Lower case subscripts refer to within duration comparison, upper case subscripts to between duration comparisons for negative, neutral, and positive adjectives only. Means not sharing a subscript in common differ at the $p<.05$ level of significance.

former measures and the mean number of neutral adjectives recognized. Further increases in exposure duration of 25 msec. (to 125 msec.) completely obliterates any differences between the number of positive, neutral and negative adjectives recognized. At 150 msec. of exposure duration, however, there is something of a reversal in the pattern so far observed. At this point, Ss appear to recognize significantly more negative than neutral adjectives ($p<.05$) but there are no differences in recognition of positive adjectives as compared to either the negative or neutral adjectives. Increasing duration again, to 2000 msec., results in no differences between the number of positive, neutral or negative adjectives recognized.

In the absence of a similar interaction with respect to the identification measure, these results would appear to be due to some process in memory, possibly such that positive adjectives are more easily processed than are neutral or negative adjectives, thus gaining more ready access to memory storage. Neutral adjectives may require a somewhat longer duration of exposure and negative adjectives a still longer exposure duration in order for the subject to sufficiently encode them for storage in memory.

Since the evaluation of each CS took place after the initial presentation of the UCS adjectives (and after the identification measure had been obtained), it might be reasonable to expect that the memory process would be related to the evaluations obtained. This relationship would be expected to be reflected in a correlation between the recognition measure and the evaluative responses. Yet the only significant correlations obtained indicated that a negative relationship existed between the number of positive adjectives correctly recognized and the evaluations to PPS within the 150 ($r=-.53$, $p<.05$) and 2000 ($r=-.63$, $p<.01$) msec. ED conditions. While this relationship would seem to reflect the relatively negative evaluations to PPS within the 150 msec. ED condition, no clear explanation can be offered to account for

the relationship. By the same token, the negative relationship between the two measures within the 2000 msec. ED condition cannot readily be explained.

DISCUSSION

The failure to obtain the expected differential responses for the FES measure as a function of the affective valence of the adjectives paired with the evaluated CS figure appears to be due to a number of factors. Since the differentially conditioned evaluative responses were obtained in an analysis of the evaluative responses to the first CS figure (CS_1), the possibility of "carry-over" effects in affective responding is suggested. This explanation assumes that the affective mediating response is not an instantaneous event, but occurs over time. Both the elicitation of the response and the dissipation may require a certain length of time to occur. Therefore, presentation of a second series of affective adjectives and the associated CS before the initial affective response had dissipated could have resulted in "carry-over" effects which served to influence the evaluations of the subsequent figures. However, the time required to present each series of UCS-CS pairings within the present experiment was approximately one minute. This was nearly twice the length of time required for similar presentations in the Sachs and Byrne (1970) experiment, in which no such "carry-over" effects appeared to be present. Thus, if "carry-over" effects did exert an influence they would, of necessity, have to be related to the specific UCS items used (adjectives vs. attitudes), to the use of three UCS-CS pairings as opposed to two, or present at the time of evaluative responding.

One difference between the two studies seems to involve the nature of the evaluative scales used. Sachs and Byrne employed six evaluative scales from the Semantic Differential: "comfortable-uncomfortable", "good-bad", "pleasant-unpleasant", "high-low", "sad-happy" and "negative-positive". Only three of these, the "good-bad", "pleasant-unpleasant" and the "negative-

positive", were employed in the present study. It seems possible that the use of different evaluative dimensions may have had an effect upon the evaluative responses obtained.

Schachter and Singer (1962) reported that the interpretation of an emotional response was influenced by the experienced physiological arousal and the external stimulus conditions in association with which that arousal occurred. To the extent that an affective response is related to the physiological processes underlying emotional responses, a similar process may have operated within the present experimental context. Thus, when S is asked to respond evaluatively to a relatively ambiguous external stimulus, the evaluation itself reflects both cognitions about the stimulus and an appraisal of the experienced affective state. The use of a relatively general feeling dimension such as "negative-positive" may lead S to attend primarily to the affective response which is elicited, while a dimension such as "attractive-unattractive" leads to a greater focus upon the properties of the stimulus itself. Responding to the latter dimension possibly involves some cognitions about what sort of stimulus configurations can be considered either "attractive" or "unattractive" which S then employs idiosyncratically to arrive at his evaluation. Thus, the dimensions used in the Sachs and Byrne study may have served to provide S with cues which focused attention upon the affective response, while the dimensions used in the present study led to a somewhat greater focus on specific properties of the stimulus figure itself.

One further point requires discussion as well. A number of studies (cf. Kimble, 1961) have noted that a stimulus having greater effective reinforcing properties (i.e., a more effective stimulus) elicits a broader response generalization gradient than does a less effective stimulus. While no comparisons of relative reinforcing strength of attitudinal material and affec-

tive adjectives has been made, it is likely that attitude similarity-dissimilarity constitutes a more effective reinforcing stimulus than does the tachistoscopic presentation of affective adjectives. Clearly then, additional research is necessary with respect to both the nature of the evaluative dimensions used and the effectiveness of the reinforcing stimuli in order to determine the effect of each upon evaluative responses.

The WPSxAP interaction which attained significance in both evaluative responses and measures of identification seems to represent a confounded factor involving the sequence in which the adjectives were presented, the affective value of the adjectives and the differential figure effects observed. The confounding of these variables renders any meaningful interpretation of this interaction virtually impossible.

The observed figure effects are also something of a mystery. While serial order effects have been commonly found in tasks involving the retention of memorized verbal material (Neisser, 1966; Hovland, 1951), the effects are most often present as either primacy or recency. Similarly, serial order effects have been found in studies of personality impression formation (Luchins, 1957; 1958) although their cause remains unknown (Anderson, 1972). Anderson (1965) has suggested that they may result from factors which lead to a decrease in attention over serial presentations. Tessor (1968) reported that the primacy effect could be changed to a recency effect simply by having S's pronounce the adjectives aloud. The present study, while not analgous to either of the above mentioned experiments, contains elements common to both. Ss in this study were both advised that they would have to recall the adjectives presented and required to pronounce the adjectives aloud. These twin requirements may have caused Ss to attend to both the first and third CS figures to a greater extent than to the second. When required to evaluate the different CS figures, the differential attention accorded each figure led

to differential evaluative ratings.

The second hypothesis suggesting that the evaluative response would be conditioned without the necessity of Ss identifying the affective stimulus to which they were responding becomes somewhat difficult to deal with in light of the relatively ambiguous findings involving the first hypothesis. However, certain factors do seem to require discussion.

Wickens, et. al., (1971) suggested that their subjects were responding to the dimensional matching task at both ends of an affective dimension. While there is no requirement in the Wickens, et. al., formulation which necessitates that identification rates should be equal for both positive and negative adjectives, the results of the present study clearly indicate that the identification rates do differ. The finding that Ss did identify a reliably greater number of positive than either neutral or negative adjectives, which is consistent with results reported by Johnson, Thompson and Frincke (1960), requires that some explanation be offered to account for the difference.

It is possible that the differential identification rates observed are due to a negative response bias (Bricker and Chapanis, 1953) which affects the identification responses to negative and neutral adjectives to a greater degree than identifications of positive adjectives. The presence of negative response bias effects at the shorter exposure durations is indicated by the greater number of correct recognitions than of correct identifications of the adjectives at those durations. As in the Wickens, et. al., study, Ss were encouraged to guess as to the identity of the adjectives, thus these results suggest that Ss may have actually obtained a greater amount of information about the adjectives than was indicated in the analysis of the identification response measure alone.

The division of Ss into two groups on the basis of a "recognition"

criterion, led to the observation that Ss exceeding the criterion appear to be evaluating the negatively paired stimulus with respect to the number of negative adjectives which they have correctly identified in association with that CS. The negative relationship observed between the two measures suggests that these Ss did respond to the affective dimension represented by the adjectives presented, but that in this case the response was primarily confined to the negative end of that dimension.

While the overall pattern of evaluative responding by Ss not attaining the "recognition" criterion did not essentially differ from that of the Ss exceeding that criterion, an examination of the identification-"negative-positive" evaluation relationship suggested that a somewhat different process was responsible for the responding. The positive relationship between the number of correctly identified adjectives (irrespective of the affective valence) and the positiveness of the evaluative response to CS_1 suggests that, with respect to this CS, correctly identifying the adjectives presented was a positively reinforcing event itself. The failure to obtain the same relationship with respect to CS_2 and CS_3 is quite probably due to the fact that evaluative responses to those CS figures were confounded with the differential figure effects.

In general, the results suggest that when Ss were able to identify the adjectives with some degree of certainty, that the subsequent evaluative responses were made with respect to the negative affective UCS-CS pairings. When unable to clearly recognize the adjectives at any better than a chance rate, the relationship between identification and evaluative responding appears to change. The positive relationship obtained between the two measures with respect to CS_1 suggests that Ss found correctly identifying the adjectives to be a positively reinforcing event in itself. Thus, it is probably this factor, rather than correctly ascertaining the affective

valence of the adjectives presented, which influenced the differential evaluative responding among these subjects.

Unfortunately, a clear interpretation of the results of this experiment is rendered difficult by the difficulties encountered. A simplification of the design through elimination of the "neutral" UCS-CS pairing may have provided clearer results. It is almost certain that the use of a between groups design would have yielded results that could have been more readily interpreted. As it stands, the results of the present study, while suggestive of certain relations between evaluative responses conditioned to neutral stimuli and the identification of the UCS responsible for eliciting the differential responses, are by no means totally clear. Further research would be required to untangle the interwoven skein of factors that are apparently involved.

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APPENDIX I

Listed below are the personality trait adjectives of differential positive, neutral and negative affective value which constitute the unconditioned stimuli for this experiment. The adjectives are selected from Anderson's (1968) list on the basis of their scaled value on a "likeableness" dimension.

POSITIVE	NEUTRAL	NEGATIVE
amusing	normal	jealous
alert	cunning	petty
helpful	strict	cruel
earnest	bold	rude
loyal	shrewd	selfish
sincere	blunt	hostile
mature	stern	vulgar
clever	solemn	greedy
polite	prudent	liar
prompt	subtle	crude

APPENDIX II

FIGURE EVALUATION SCALE

good	: : : : : :	bad
dislike	: : : : : :	like
negative	: : : : : :	positive
attractive	: : : : : :	unattractive
interesting	: : : : : :	uninteresting
unpleasant	: : : : : :	pleasant

APPENDIX III

Shown below are three random-sided figures used as the conditioned stimulus (CS) in this experiment. (Redrawn from Munsinger and Kessen, 1964). Figures I and III are both 10-sided figures; figure II is a 13-sided figure.

Figure I

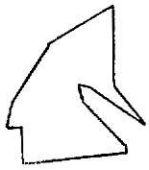

Figure II

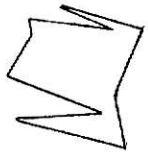

Figure III

APPENDIX IV

Shown in the table below are the means and variances obtained from a pre-testing of Figures I, II, and III on a Figure Evaluation Scale.

		Figure I	Figure II	Figure III
Males	mean	25.11	24.47	23.95
	variance	96.47	64.27	51.16
Females	mean	25.53	23.38	24.15
	variance	78.73	43.46	57.42

APPENDIX V

In the table below is presented the illumination in foot-candles for each of the three channels of the tachistoscope. The illumination values were obtained on the basis of an average of 5 observations per channel with a McBeth Illuminometer.

Channel I	Channel II	Channel III
4.42	4.45	4.53

APPENDIX VI

FIGURE PREFERENCE QUESTIONNAIRE

For both items "A" and "B" below, mark the appropriate statement which would indicate your feelings about the figure shown if it were an abstract art drawing.

A

1._____ I feel this figure is very attractive.
2._____ I feel this figure is moderately attractive.
3._____ I feel this figure is slightly attractive.
4._____ I feel this figure is neither particularly attractive nor unattractive.
5._____ I feel this figure is slightly unattractive.
6._____ I feel this figure is moderately unattractive.
7._____ I feel this figure is very unattractive.

B

1._____ I feel I would definitely dislike owning a copy of this figure.
2._____ I feel I would probably dislike owning a copy of this figure.
3._____ I feel I would slightly dislike owning a copy of this figure.
4._____ I feel I would neither dislike nor like owning a copy of this figure.
5._____ I feel I would slightly like owning a copy of this figure.
6._____ I feel I would probably like owning a copy of this figure.
7._____ I feel I would definitely like owning a copy of this figure.

APPENDIX VII

Word Recall Test

_____

_____

_____

_____

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_____

APPENDIX VIII

Experiment Evaluation Scale

Experiment in general

good	: : : : :	bad
unscientific	: : : : :	scientific
unpleasant	: : : : :	pleasant
efficient	: : : : :	inefficient
negative	: : : : :	positive
well designed	: : : : :	poorly designed

Experimental Room

good	: : : : :	bad
attractive	: : : : :	unattractive
unpleasant	: : : : :	pleasant
cold	: : : : :	warm
inefficient	: : : : :	efficient

Experimenter

good	: : : : :	bad
unpleasant	: : : : :	pleasant
positive	: : : : :	negative
cold	: : : : :	warm
attractive	: : : : :	unattractive
inefficient	: : : : :	efficient

APPENDIX VIII (CONT.)

Apparatus

bad	: : : : :	good
attractive	: : : : :	unattractive
unpleasant	: : : : :	pleasant
scientific	: : : : :	unscientific
negative	: : : : :	positive
well designed	: : : : :	poorly designed

APPENDIX IX

General Questionnaire

Please answer these questions briefly on the back of the preceding page.

1. What do you think the purpose of this experiment was?
2. How did you decide what word to say?
3. Did you usually see a word or were you unable to see a word?
4. How certain were you that the word you said was the word actually shown?
5. Did you notice anything unusual or particular about the words that you saw during the experiment? If so, what was it?
6. Did you notice anything in particular about the figures which you saw with the words? If so, what was it?
7. Did you notice that both pleasant and unpleasant words were used?
8. Did you notice that pleasant words were associated with any one particular figure? If so, which one?
9. Did you notice that unpleasant words were associated with any one particular figure? If so, which one?
10. Did you notice whether there were any words used which were neither particularly pleasant or unpleasant? If so, were they associated with any one particular figure? If so, which one?

CONDITIONING OF EVALUATIVE RESPONSES TO PREVIOUSLY NEUTRAL STIMULI WITH A TACHISTOSCOPIC PRESENTATION OF THE UCS

by

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AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

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1972

Ninety undergraduate volunteers (45 of each sex) were exposed to thirty tachistoscopically presented affectively evaluative personality trait adjectives paired with a series of three previously neutral "ambiguous" lineate figures in a classical conditioning paradigm. The personality trait adjectives were selected from Anderson's (1968) list on the basis of obtained "likeableness" ratings so as to comprise three lists of 10 adjectives each: a positive, a neutral, and a negative list.

Each of the three "ambiguous" figures was paired equally often with the differential evaluative adjectival lists. Presentation of the lists was counterbalanced across subjects to control for sequence effects. Five tachistoscopic exposure durations of the UCS adjectives were employed, with 18 Ss assigned to each duration condition. The exposure durations consisted of either 75, 100, 125, 150 or 2000 msec. presentation of the UCS adjectives.

Evaluative responses were obtained to each of the CS figures on a Figure Evaluation Scale (FES) comprised of six evaluative semantic-differential dimensions. The responses to a Figure-Preference Questionnaire were also obtained, as were the number of adjectives correctly identified at the initial presentation and the number of adjectives correctly recognized from a later embedded list.

The results provide some support for a reinforcement-conditioning model of evaluative responding, as differential evaluative responses were conditioned to the previously neutral stimuli within the "negative-positive" dimension of the FES. A post-hoc analysis of the first CS figure evaluated also provided support for a reinforcement-conditioning view of evaluative responding. Differential evaluations were obtained to this figure as a function of the UCS adjectives paired with it. The main effect was obtained in two of the constituent FES

dimensions: the "negative-positive" and the "good-bad" dimensions. Although these results are somewhat questionable due to the post-hoc nature of the analysis, they do support an interpretation which suggests that the conditioning effect obtained with the use of these relatively ambiguous CS figures was most potent with regard to those dimensions that were relatively more diffuse and undifferentiated as opposed to those dimensions that deal with a more clearly specified aspect of the stimulus. The results are also taken to suggest that the evaluative process involves cognitive as well as affective components.

The basis for the conditioning effect seemed to differ among two groups of subjects differentiated on the basis of a "recognition" criterion. Those Ss exceeding the criterion appeared to be responding to the negative evaluative UCS stimuli, as evidenced by a statistically significant negative relationship between the number of negative adjectives identified and the evaluation of the CS figure paired with those adjectives. On the other hand, Ss not meeting the "recognition" criterion appeared to evaluate the initial CS stimuli with respect to their evaluative meaning. A significant positive relationship was obtained between the number of adjectives identified and the positiveness of the evaluation of the initially presented CS figure among these subjects.

The effect of exposure duration upon evaluations was found to be somewhat complex and not clearly interpretable. Ss exposed to the adjectival UCS for 2000 msec. performed as predicted within the "negative-positive" evaluative dimension. Ss exposed to the UCS adjectives at longer durations did not show increased polarization in evaluative responding as was hypothesized to occur, and at an exposure duration of 150 msec. an unaccountable reversal occurred, suggesting that the encoding of visual stimuli with respect to memory processes may have a discontinuity effect upon evaluative conditioning.