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Influence of affectivity on the serial learning of CVC syllables

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THE INFLUENCE OF AFFECTIVITY ON THE SERIAL LEARNING OF CVC SYLLABLES

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CHAPTER I

INTRODUCTION

Much verbal learning research has made use of nonsense syllables (hereafter called trigrams of the CVC kind), since Ebbinghaus, in 1885, devised lists of trigrams as learning material, to control for previous learning associated with the material Ss were required to learn. Since that time several variables have been shown to have an effect on the efficiency of learning trigrams. Some of these variables are meaningfulness, familiarity, similarity to actual three letter words, pronunciability, and association value. As a result of the difficulty of controlling some of these variables, Ebbinghaus's attempt to get at "pure" learning through the use of trigrams has not been as easy as he had thought. Not only has the study of verbal learning been expanded by the discovery of these new variables, but the determination of the parameters of the variables themselves has led to much research concerned with trying to define just what they are. In addition to the variables mentioned above, another variable may be "affective tone" or "affect" or the locations of trigrams on a "pleasant vs. unpleasant" dimension. A few of the questions asked here could be: (1) are those things which are "pleasant" easier to learn and retain than those things which are "unpleasant"? or, (2) are neutral stimuli more easily learned?

Interest in these latter type questions may have grown out of the psychonalytical interest in the concept of repression. Gener-

ally speaking, a proposition which has been deduced from the concept of repression is that those things in the past which were "pleasant" are recalled more readily than those things which were "unpleasant". From this it may look as if forgetting may be motivated by the desire not to bring back "bad memories". Such "bad memories" are said to undergo repression.

Tied in with the concept of repression is the phenomenen of perceptual defense. Perceptual defense seems to operate by the mechanism of selective attention. For example, a person being tested at or near the threshold of the particular sensory system involved more often than not will be able to detect pleasant stimuli sooner than unpleasant stimuli. Johnson, et. al. (1960), in a study of visual duration thresholds in relation to word value and word frequency, found that for words matched in frequency, but varying in rated "goodness", there was a difference in threshold between those words rated "good" and those rated "bad". The "good" words were recognized at a significantly lower threshold; also frequent words were recognized faster than infrequent ones, when the words were matched for "goodness". The frequencies of the words in this study were obtained from the Thorndike-Lorge G count and the "goodness" ratings were done on the basis of the semantic differential's good-bad dimension. The "goodness" ratings were done by more than one group of Ss, and the Ss used in the visual duration threshold part of the study were different from those who had done the ratings. There were 17 pairs of words in each condition. Johnson et. al. in

building up to the visual duration threshold experiment first ran a number of studies on frequency and "goodness" of words, trigrams, and nonsense words. One of the ideas behind this was to see whether word value and word frequency were related -- that is, to see whether words which are more frequent are also rated as more "good". In the first of these experiments they used words rated on the good-bad scale of the semantic differential and used the Thorndike-Lorge tables to get the frequency counts for the words. Three different groups of Ss each rated a different group of 50 words, with the 50 words being composed of two words from each letter category of the alphabet with the exception of X. The words were randomly selected from each category. The three rank order correlations obtained between frequency and rated "goodness" were all significant at the .01 level. In the second experiment they used 30 frequent and 30 infrequent words which Solomon and Howes (Johnson, et. al., 1960) had used, which were related to six value areas of the Allport-Vernon Study of Values. Johnson et. al. took these 60 words and paired the most frequent with the most infrequent, and so on through the list, until they had matched them all. The positions of the first members of the pairs were determined by the flip of a coin. They then gave the list of 30 paired words to a group of Ss and had them circle the word of the pair which the S considered to be the most "pleasantly" toned. A sign test showed that the Ss' choices of the more frequent words as also being chosen more "pleasant" in 26 out of the 30 choices would occur by chance less than one time in a hundred. This

also shows that the more frequent word was also rated as more "pleasant". In the third experiment they took trigrams from three association value levels (Glaze, 1928). The association value levels were, the 100%, 47-53%, and the 0%. They made two lists of 24 trigrams with each list containing eight syllables from each of the three association value levels. The Ss rated both lists of trigrams on "goodness", using the semantic differential, with the ratings being done a week apart for the two lists. Johnson et. al. assumed that association value is determined by frequency of occurrence in words and that the higher the association value the "better" the trigrams would be rated. Their results show that, just as the frequency for words is related to ratings of "goodness", the ratings of trigrams are also related. The higher the association value the higher the rating of "goodness". For one of the lists the only statistically significant difference was between the 47-53% and the 0% list. For the other list of 24 the comparison between the 100% and the 47-53% as well as between the 47-53% and 0% association value level, the differences were statistically significant. Johnson et. al. in their fourth experiment tried to give Ss differential experience with nonsense words to see if this differential familiarity would change the ratings of "goodness" for the nonsense words after the "built in" frequency exposure. That is, the Ss rated the nonsense words for "goodness" and then a week later were given the differential experience with the words and were then asked to rate them for "goodness" immediately after this training. The differences in

rated "goodness" between the ratings of the words on the first rating were not significant, but after the training "goodness" differences were found to be statistically significant between the nonsense words which had been shown to the Ss more often by means of the "built in" frequency exposure than those nonsense words which were exposed to them less often. These four experiments then led up to the experiment word frequency on visual duration threshold.

Newbigging (1961), also, interpreted his results on the recognition threshold of words rated on a "good - bad" scale in terms of a perceptual defense mechanism. He used three groups of words representing three levels of "affectivity", as determined by the good-bad scale of the semantic differential. One group of words was rated at the "good" end, one rated at the "bad" end, and the third group near the middle. The words were taken from a list published by Jenkins, Russell, and Suci (1958). The words were equated as closely as possible for frequency of occurrence and for length. Newbigging found that: (a) "bad" words had a higher threshold than "good" or "neutral" words, (b) "bad" words required a longer exposure time for recognition in redintegration from a fragment of the "bad" word, and (c) the response time for the response preceeding recognition, and for the correct response was longer for "bad" words than for "good" words.

Goss and Nodine (1965) pointed out, in their comprehensive review of paired associated (PA) learning, that, over a forty year span, a persistent attempt has been made to show the relationship be-

tween "affectivity" or "emotionality" and the ease with which words in a PA task can be learned. These authors felt that because some of the methods used to determine the affectivity of the words were defective, and/or because of failure to control other factors which may operate in a PA task, such as the difference in meaningfulness, the results of the studies were ambiguous. They did, however, point out that some studies have controlled some of the factors about which they were objecting. For example, Anisfeld and Lambert (1966) studied the role of "pleasantness" vs. "unpleasantness" of words by a variety of methods. Most of these methods involved PA tasks in which a trigram was paired with a "pleasant" or "unpleasant" word either as a stimulus for the word or as a response for the word. They also investigated the "pleasant" vs. "unpleasant" dimension in a serial learning task. The only situation in which "pleasant" words were learned faster than "unpleasant" words was in the trigram-word paradigm. The words chosen were equated for frequency according to Thorndike and Lorge's (1944) word count and the words were equated for meaningfulness by means of Nobles' procedures developed in 1952. The words were also classified on a pleasant-unpleasant dimension by means of the evaluative scale of the semantic differential. The evaluative ratings of the words were either taken from Jenkins' (1960) atlas or were rated by students under the direction of Anisfeld and Lambert. In the serial learning task Anisfeld and Lambert gave their Ss only three trials on each list and then had them recall as many as they could. There

actually was no chance for the Ss to learn either list. The results for the serial task were scored by these investigators on the basis of order and position of the words and in both cases the differences were not significant. In discussing the results of the variety of paradigms they used, they felt that the reason for the superiority of the trigram-pleasant word PA task was that the trigrams acquired the connotative meanings of the words with which they had been paired. In the other experiments they paired the response "pleasant" and "unpleasant" words with other words and with numbers and found that these latter two did not take on the connotative meanings of the response word as had the trigrams. They felt that in the task of learning the numbers in combination with words, the numbers themselves make the task sufficiently hard to destory the effect obtained, because of a lack of mediators which can link numbers to words, and also, because numbers are hard to differentiate from one another. In the case of words, they assumed that the words and their own unique connotations or other types of reactions are stable enough that they don't get the conditioning effect. In both cases if there was any conditioning it was minimal and didn't show up the differences along the "pleasant" - "unpleasant" dimension.

Other investigators have shown that when a trigram is in the stimulus position of a PA task it and the response with which it is paired are learned faster when the response item is "pleasant" than when the response item is emotionally "neutral". Silverstein

and McCreary (1964) used "pleasant" photographs and "indifferent" photographs as the response items of the pair and trigrams as the stimuli. The Ss in this experiment were instructed to learn their own labels for the photographs when they were presented with the trigram - photograph pair in the PA task. The sixty photographs were rated either as "pleasant" or "indifferent" by a group of 14 Ss independent from those taking part in the PA task. Immediately after the first rating the Ss rated the sixty photographs again, and found the retest reliability to be .96. From the original sixty photographs rated on a nine point scale of subjective "unpleasantness", four photographs were chosen which were in the "highly pleasant" end and four were chosen which were in the "indifferent" range. Both groups represented those photographs which showed the smallest standard deviations within the class. The eight trigrams used were chosen from Glaze's (1928) list of trigrams and came from the 47% association value level. A reason given by the investigators for using this level was that the level represented the lowest level containing easily pronunciable trigrams. The two digit numbers used in the second part of the experiment were selected from those having the lowest association value, as determined by (Battig & Spera, 1962). After showing that the trigram - pleasant photograph PA was learned faster than the trigram - indifferent photograph, these investigators then paired the trigrams as the responses to two-digit numbers in a second paired associate task. In this phase of the experiment the

trigrams, previously paired with the pleasant photographs, now paired with numbers, were learned faster than those trigrams which had been paired originally with an indifferent photograph, and were now paired with the two-digit numbers. The investigators also had another group of Ss complete the first phase of the experiment and then had them rate the "affectivity" of the trigrams, after being paired with the photographs. The ratings were done on a seven point scale of pleasantness. The ratings of this latter group of Ss showed that those syllables which were paired with the "pleasant" photographs were rated as more "pleasant" than those which were paired with the "indifferent" photographs and this difference was highly reliable.

Silverstein (1966) in a replication and extension of the Silverstein & McCreary (1964) study found the same results as before when photographs differing in "affective" tone and trigrams were paired in a PA task, but in addition he was looking for the effects of the difference in "affectivity" upon immediate recall of the trigrams vs. recall of them after seven days. The photographs in this study were different from those used in the earlier study and as in the earlier study an independent group of Ss rated sixty photographs from which eight were chosen. Silverstein used the same numbers and trigrams as before. There was no difference in recall either immediately after the PA task or after seven days for the trigrams varying in affective tone. The investigators say that this suggests that rate of forgetting for the syllables

is about the same even though in the original learning of the task the "pleasant" factors are learned more quickly. Following the PA task the Ss were instructed to rate the trigrams for "pleasantness" and as in the 1964 study the trigrams paired with the "pleasant" photographs were given a higher rating than those paired with the "indifferent" photographs. The ratings given the trigrams after seven days did not show any differences in rated affectivity.

Silverstein and Dienstbier (1968) tried to condition trigrams to take on the meaningfulness and the pleasantness of words (two syllable nouns) which varied on one of the dimensions while being held constant on the other and then vice versa. That is, the words were either "pleasant" or "indifferent" but equated on meaningfulness and used as the response term in a PA task with the trigram used as the stimulus. In the other condition the words were equated on "pleasantness" while varying in meaningfulness and used in the same type of PA task. The trigrams were then paired as responses with two-digit numbers as the stimuli in a second PA task to see if the trigrams would take on the meaningfulness or "pleasantness", whichever the case, and by taking on this conditioning would then facilitate the learning in the number-trigram part. The transfer design thus being of the A-B, C-A type. One experiment used women Ss only and words which had been previously rated by two independent groups of women Ss on both meaningfulness and "pleasantness". The words used in the experiment came from a pool of 153 words, and

from this pool eight words were drawn from each of the meaningfulness and pleasantness dimension. Four of the words came from the high end of the rated dimension and four from the indifferent level. The words were rated for "pleasantness" on a seven-point scale with seven being very pleasant, four as neutral, and one as very unpleasant. The four indifferent words came from the neutral range. The four words from each dimension were put into one list so that it was a mixed list of eight words. For the meaningfulness ratings, procedures like those of Noble (Noble & Parker, 1960) were used, which consists of a 5-point scale, from 1 (low) to 5 (high). From these two rating scales then two lists were made up so that the words were equated on meaningfulness, with frequency of occurrence roughly equated, but varying in "pleasantness" and the second list equated on "pleasantness" but varying in meaningfulness with frequency of occurrence covarying with it. Half were at low meaningfulness and half were at high meaningfulness. Eight trigrams and eight two-digit numbers were also chosen with the trigrams coming from the 47% and 53% association value levels as determined by Glaze (1948) and the numbers coming from the .79 to 1.22 association value ratings as determined by Battig & Spera (1962). In the trigram word pairings two different pairings were set up, in both the meaningfulness and pleasantness condition, so that the trigrams were paired with a high or low meaningfulness word or a pleasant or unpleasant word equally often. The same manipulation held true when the numbers were paired with the trigrams in the second

phase of the experiment. The 48 women Ss were divided equally between the two main tasks and then equally divided on the sub-phase. The investigators after the Ss had finished both paired associate tasks had the Ss in each condition rate the trigrams on the dimension pertinent to their condition. The ratings for pleasantness were done on a seven-point thermometer type scale. The ratings for meaningfulness were done by Nobles' (1961) scale which ranges from "very many associations" (5) to "low association" (1). The investigators also ran a second experiment only this time they used 32 male Ss. As before the ratings of the words were done by two independent groups of men and there were 101 nouns common to the men's and women's lists. The experimental conditions were the same for the men as for the women. The results showed that for the trigram-high meaningful vs. the trigram-low meaningful word PA task that the high meaningful words were learned significantly faster, for both the men and women Ss and that for both groups this difference in learning rate did not condition itself to the trigrams when they were paired with the numbers in the second phase of the experiment. After the two tasks the ratings given the trigrams paired with the words varying on meaningfulness showed for both the men and the women that they weren't rated any differently. In the pleasant vs. unpleasant condition the pleasant trigram-word-pairs were learned significantly faster by the men, but not by the women and for the men this difference did not transfer to the trigrams when they were paired with the numbers. The ratings given the

syllables after both PA tasks were significantly different for the men on the pleasant vs. unpleasant dimension but showed no difference for the women. These investigators felt, on the basis of some of their previous research that one reason the women did not learn the pleasant words faster was that they had a higher level of test anxiety than men. They felt that any differences in affectivity of the words were wiped out by the presence of this test anxiety. They further reported that some preliminary work of theirs had shown that when the list was learned under an incidental learning situation, the women Ss did learn the pleasant words faster.

Kendall (1955) in a serial learning task tried to manipulate anxiety level of the S and the emotional level of the words to see if either, alone or in combination, would effect the learning rate and the retention of the words would be different. In order to make the words comparable in familiarity the neutral and emotional words were equated for frequency of word usage. No other details on the words were immediately available to tell whether the "emotionality" of the words came from the "unpleasant" or "pleasant" end of a scale and what type of scale was used to determine the affectivity. In none of his manipulations was there any statistically significant difference found.

Strassburger and Wertheimer (1959) had Ss rate the "affectivity" of trigrams chosen from four different levels of association value and interpreted the results within the framework of McClelland's adaptation level hypothesis. They hypothesized that the

closer a trigram is to an actual English word or the closer it comes to sounding like an English word, the higher it will be rated on a pleasant-unpleasant scale. Reasoning from the adaptation level notion these investigators felt that large deviations from everyday language would produce negative "affect" and small deviations would produce more "positive" affect in relation to them. Five trigrams were taken from each of four association value levels found in Hilgard's list in Stevens (1951) so that four lists were made. The levels were: 0%, 47%, 80%, and 100%, so that each list had homogeneous items contained in it. The investigators then had twenty-five Ss rate the trigrams on a pleasant-unpleasant scale ranging from one (very unpleasant) to five (very pleasant) when the trigrams were read aloud to them from a combined list in a randomized order. The results confirmed the hypothesis at beyond the .01 level of significance. Some studies, such as this one, have been criticized on the basis that the Ss were actually rating the trigrams on some other dimension, such as pronunciability.

Wilson and Becknell (1961) had 39 female Ss rank trigrams taken from the 100% association value level and from the 0% association value level of Glaze (1928). Nine trigrams were taken from each association value level and these were then broken down into three lists of six trigrams each, with three of the trigrams being from the high level and three from the low level in each list. The Ss then ranken the three lists of trigrams under three sets of instructions: (a) how easily they could be pronounced; (b) how much

the Ss liked them; (c) with the trigram as a brand name for a product how inclined the S would be to buy the product. The order in which the Ss received the instructions for ranking were randomized. The rankings given the trigrams on (b) and (c) were considered to be a measure of their affective value. Wilson's and Becknell's hypothesis was that since association value and pronunciability have been shown to predict rate or ease of learning they wanted to see whether these same two variables could influence preference or choice behavior. By comparing the rankings obtained, their hypothesis was confirmed, showing a strong relationship between association value and pronunciability and affectivity.

Keppel (1963) performed two experiments in which he tried to determine the relationship between ratings of "goodness" and verbal learning. In the first experiment he tried to show through the use of trigrams the effectiveness of ratings of "goodness" of trigrams and the association value of the trigrams on how good each are as predictors in the learning of trigrams. He used eight trigrams from each of three association value levels determined originally by Glaze, (1928). The 100%, 47-53%, and 0% levels were used. However, he used the current association values of Noble's (1961) in his analysis. A second set of 24 trigrams was also taken from the same three levels and these and the first set were rated on the "good"-"bad" scale of the semantic differential. A total of 44 Ss rated the trigrams, one half of them starting with the first sample of 24 and one half starting with the second sample of 24. Each of the

44 Ss rated each of the 48 trigrams. The "goodness" ratings of this experiment correlated highly with the results of Johnson et. al. (1960). From this pool of items two lists of six trigrams each were set up, in a PA task with the trigrams as the response items and numbers as the stimuli for them. The first list consisted of three pairs of trigrams representing the three levels of meaningfulness or association value with the members of each pair differing as widely as possible on rated "goodness". The second list of three pairs of trigrams consisted of pairs which were matched in "goodness" while the three levels of associaticn value were compared in three ways. The comparisons of the association value levels were, high-low, high-medium, and medium-low. Thirty-six Ss then learned both lists with half of them learning list I first and the other half learning list II first. The Ss were given twelve learning trials in the PA task and the number of correct responses was compared for the trigrams varying on the dimensions mentioned above. The results indicate that the list I "bad" trigrams were learned significantly slower than the "good" trigrams and that those trigrams used in list II which varied on association value, with those of higher association value being learned faster, predicted even more significantly the rate with which trigrams can be learned. In discussing the results Keppel says that, even though both of the variables are good predictors of rate of learning, it appeared that the trigrams may have varied along another dimension, ie. pronunciability. He then had 36 Ss different from those in the learning

experiment rate the 48 trigrams plus 12 more taken from the extremes of the pronunciability scale described by Underwood and Schulz (1960, pp. 23-24). Correlations carried out with the three variables show that high-association-value trigrams were rated as more pronunciable and as more "good". However, the significant relationship between "goodness" and association value was reduced to a non-significant level when pronunciability was removed by means of a partial correlation. The correlations between pronunciability and association value were lowered, but still significant when the effects of "goodness" were controlled. Because of this, Keppel concluded that the relationship between association value and "goodness" was due to uncontrolled variation in pronunciability. Keppel's second experiment used word pairs which were matched on frequency and meaningfulness, but which varied in "goodness" as the latter was determined by means of the semantic differential. The word pairs were learned in a PA task with numbers as the stimuli and the words varying in "goodness" as the response terms, with the restriction that the words in each matched pair would not appear contiguously in the different orderings used, in order to prevent serial learning. There were no statistically significant differences between the "good" and "bad" words on number of errors obtained and on the different scores obtained between the word pairs.

Lott, Lott, and Walsh (1970) used a PA task in which the stimulus item was a trigram and the response was the name of a person whom the S either liked, disliked, or was indifferent to. The

differentially liked names were 16 publically known names which were prominent in the national news at the time the study was run. The names were drawn from both a white and black population and 60 Ss were asked to put the people's names into three groups, on the basis of how the Ss felt about them. The three categories were like, dislike, and neutral. The Ss were then given a step type scale going from +15 to -15 and were instructed to give for the names they had previously grouped into the three categories, the degree to which they liked the persons. Four names, two of black persons and two of white persons, from each of the three categories for each S were selected for that S which had been given the highest, lowest or most neutrally regarded ratings. The racial differences were used to see in the mediation part of the experiment whether, along with "affect", racial or ethnic factors would speed learning of trigram-trigram pairs. Two lists were drawn up for each S with each list containing six names. The names were then paired with trigrams as the stimuli in a PA task. The trigrams came from Glaze's 1928 list. The PA task was administered to the same Ss from one to two weeks after the ratings had been done. In the analysis of the results the errors from each list were pooled for each S. For each list the task was run until the Ss were correct on two consecutive trials. The results showed that Ss: (a) made most errors in learning the task with neutrally regarded persons, (b) slightly less errors with disliked persons, and (c) the least errors with people they liked. There was a significant difference

between liked and disliked vs. neutral, but no significant difference between liked vs. disliked although this just fell short of significance and was in the right direction. There were no mediation effects either for affect or ethnic group or their combination. The investigators felt that the results could not have been due to the familiarity differences between the persons used as responses in the task, because the public figures used were assumed to be all of equal newsworthiness, as defined by the coverage given in the mass media at the time. These investigators felt that the differentially liked persons transferred their cue and motivational properties or their "affectivity" to the trigrams paired with them. In an attempt to clear up some of the shortcomings of the previous study the investigators performed a second experiment with a different group of Ss, trigrams and people. The names used as the responses in the PA task instead of being public figures and of mixed racial backgrounds were taken from friends of the Ss used in the experiment. The same type of rating scale was used to determine the names of the two most liked friends etc. chosen for the experiment. Six trigrams of 10% or below in meaningfulness from Archer's (1960) list were used. Because each list had to be tailor-made for each S the trigrams had just as good a chance to be paired with any one of the three levels of "affectivity". Trials continued until S had made two consecutive correct trials. S was then told that the names would be given first and S was then to respond with the correct trigram and this continued until S was correct on two consecutive

trials. By doing this the experimenter could be sure that the names and trigrams could act both as stimuli and responses. After this training the S was instructed to respond with a "quick associative reaction" to a trigram with another trigram that had been used for that S. The Ss were then split into a high and a low mediation group, to learn trigram pairs. The high mediation group was to learn trigrams of like "affectivity" and the low mediation group was to learn trigram pairs of unlike "affectivity". The learning in each case was carried to two consecutive correct trials. In both mediation groups the Ss also had to learn to the same criterion of two consecutive correct trials the same trigram pairs as above only the trigrams were switched in their stimulus and response roles. As in the first experiment, the trigrams paired with liked names were learned faster and so on, in the previous order. The statistical differences between liked-disliked and like-neutral were significant. This differs from the first experiment in that the liked-disliked difference did not reach statistical significance in the first experiment. In the second experiment the difference between disliked-neutral did not reach significance while in the first experiment it did. On the free response trials where the S had been instructed to give a "quick associative reaction" to a trigram stimulus with another trigram the investigators compared the results obtained with what could be expected by chance and the results were significant for each case of "affectivity". The deviations from chance were largest in magnitude from liked to disliked

to neutral. The free response trials showed that a trigram previously paired with a liked person would evoke on the trial another trigram of the same affective value. In the high vs. low mediation condition the results were not significant and a reason given by the experimenters for this phase of the study was that the task was too easy for the Ss and many of them didn't make any errors at all in the learning of the trigram pairs. After running a number of Ss and seeing that they weren't making any mistakes the investigators put into each list some new trigram pairs in order to make the lists harder, but even then some of the Ss did not make any mistakes.

Schönpflug and Vetter (1968) correlated and factor analyzed 390 trigrams on a number of variables. The trigrams represented six frequency classes with an equal number of trigrams taken from the classes to constitute the 390 total. They were trigrams which were not listed in German dictionaries. The native language of the 1171 Ss was German. When presented with the trigrams the S was instructed to give his first association to each in the three-second interval allowed for this, and then the S was told to give associations for a 30 second period. Ratings of the trigrams were then performed on familiarity, pronunciability, ease of learning and frequency of occurrence. The Ss also rated the trigrams on the dimensions of activity, potency, and evaluation by means of a German type of the semantic differential. All the ratings were done on a 7-point scale. The results they discuss for the evalua-

tion dimension or factor of the trigrams show that it is contaminated with rated frequency, rated familiarity, rated ease of learning and rated pronunciability. They felt on the basis of their result with the evaluative dimension that the contamination by the other factors are consistent with results such as those obtained by Keppel (1963). In those studies which have tried to show a relation between affectivity and other variables, they reasoned that in those studies which have shown a relationship, the evaluative component was dominant, but that the evaluation ratings can be contaminated by other factors.

CHAPTER II

PROBLEM

From the studies reported it has been shown that the "affective" value of the learning materials can have an effect on how quickly or easily materials can be learned. Most of the studies have shown that those materials rated to be more "pleasant" facilitate learning while "unpleasant" or "indifferent" materials are not learned as quickly or with as few errors. Some of the studies have shown the effect of the "affectivity" of the materials stronger than others; and those studies in which the effect of the "affectivity" was not as strong, the investigators felt that other factors were coming in and interacting with the "affectivity" to mask it's effects. One of the most frequent criticisms leveled against the use of trigrams in studies of "affectivity" and its effects on the learnability of the materials is that the trigrams have varied on some other dimension such as pronunciability. Underwood and Schulz (1960, p. 262) in discussing the results of their work on pronunciability say, "Thus, ease of pronouncing the syllables increases from 0 per cent M to approximately 50 per cent M, with no appreciable change thereafter". The trigrams used in this experiment came from the middle range of Noble's (1961) table showing meaningfulness of trigrams (meaningfulness values ranging from .00 to 4.78).

Most of the previous studies have used the good-bad dimension of the semantic differential to determine the "affective" value of the materials. Even though the materials can be rated "good" or

"bad" by this method, it doesn't necessarily show the degree of "liking". Only two studies had Ss rate the material on how much the Ss "liked" the material. The present experiment determined the "affective" value of the material by means of a Q sort which allowed the Ss to indicate the degree of "liking".

Most of the studies in which learning was involved used a PA task in which the materials differing on "affectivity" were presented within the same list. The present experiment used a serial learning task comparing three lists of 12 items each which contained materials of homogeneous"affectivity" within a list, while a fourth list contained equal numbers of "high" and "low" levels of "affectivity". In the PA tasks the "affectivity" of the materials was first conditioned to trigrams and then the trigrams were put into another PA task to determine whether this conditioning of "affectivity" would then hold up in the second PA task. The present experiment used trigrams which were rated on "affectivity" themselves and didn't have to depend on conditioning to get the differences in "affectivity".

The hypotheses for the present experiment were that: (a) a list of high "affective" trigrams should be learned faster or in fewer trials than either a low, middle, or mixed "affective" list, (b) if there should be any conditioning of "affectivity" in the mixed list it should cancel itself out and, in effect, become a neutral list and should be the hardest of the four lists to learn, (c) the median affective values of the trigrams as a whole should be similar in two Q sorts, made before and after the trigrams are used

as learning material, (d) if the median affective value ratings are changed due to differential familiarity with the trigrams, the same lists should be different when the two Q-sort ratings are compared, before and after learning.

CHAPTER III

METHOD

Subjects

The number of Ss needed for the experiment was 96. Forty-eight were females and 48 were males. The Ss were recruited from undergraduate courses in psychology. The only requirement was that the S be naive in the task of learning trigrams. Three Ss were eliminated and replaced in the experiment because they hadn't reached the learning criterion after 120 trials.

Materials & Procedure

Four serial lists of 12 items each were used. (See Appendix A). The first list contained trigrams of "high affective" value; the second list contained trigrams of "low affective" value; the third list contained trigrams of "middle affective" value; and the fourth list contained an equal number of high and low "affective" value trigrams. The six "high affective" trigrams in the mixed list represented the six highest "affectively" rated trigrams of the high list, while the six "low affective" trigrams in the mixed list represented the six highest affectively rated trigrams of the low list. The "affectivity" of the trigrams had previously been determined by having 25 male and 25 female Ss Q-sort the trigrams according to perceived affective value. (See Appendix B). The Ss in this part of the experiment Q-sorted 52 trigrams and were not required to learn the trigrams. The "affectivity" value for each trigram was then determined by computing the median Q-sort

value of each trigram. The 12 high-affective trigrams were those trigrams which had the highest median scores and the 12 low-affective trigrams were those trigrams which had the lowest median scores; the middle affective trigrams were those trigrams which had a middle rating. The median affective values for the high list ranged from 5.90 to 7.75 with a mean value of 6.45; the low list median affective values ranged from 4.20 to 5.00 with a mean value of 4.67; and the middle list median affective values ranged from 5.33 to 5.81 with a mean value of 5.52. The mixed list ranged from 4.66 to 7.75 with a mean value of 5.71.

The 52 trigrams used in the Q-sort came from the middle or 50% range of Noble's 1961 list of trigrams scaled for meaningfulness. Pronunciability, which has been shown to be a factor in the ease of learning trigrams from 0% to 50% meaningfulness, does not make any difference in the ease of learning when the trigrams are 50% or better in scaled meaningfulness. The meaningfulness ratings for the 52 trigrams ranged from 1.92 to 2.27 with a mean value of 2.11.

The trigrams in the high, low, and middle affective lists were equated on a number of dimensions which have been shown to have an effect on ease of learning, while varying in rated affectivity. These dimensions were: (a) Noble's σ (1961), (b) the occurrence of the trigrams in the 30,000 most frequent words as determined by the G count of Thorndike-Lorge, (1944), (c) Underwood & Schulz's (1960) response frequencies to single letter stimuli, (d) Noble's (1961) meaningfulness, (e) Underwood & Schulz's (1960) bigram fre-

quencies, both first and second letters and second and third letters, (f) Noble's (1961) rated associations, and (g) Noble's (1961) association value. The results of *t* tests in comparing the high and low "affective" lists on each of these dimensions can be found in Appendix C, along with *t* tests comparing the high *vs.* low, high *vs.* mixed, high *vs.* middle, low *vs.* mixed, low *vs.* middle and middle *vs.* mixed on the affectivity dimension. Appendix D, shows the values of each list on the above dimensions.

The lists were roughly equated on intralist similiarity. Appendix E, shows the number of times a consonant was used in each list.

Twelve orders of items for each list were used so that each trigram would occur equally often in each serial position. The order of the trigrams for the initial list in each condition and from which the other eleven orders were derived was determined by putting the trigrams from a list into a bowl and drawing them out. The trigram was then assigned the number of the draw and then a table of random numbers (Edwards, 1965) was entered and as each number was then encountered in the table reading horizontally, the trigram was then given the position in the list as it was found in order in the random-number table. One male *S* and one female *S* learned one of the 12 orders for a list. The *Ss* were assigned to the orders and conditions in order of their appearance for the experiment. On the *E's* schedule sheet the order of the lists and conditions were random, with the restriction that each order would

only be used twice. The lists were learned to the criterion of two consecutive errorless trials. Thetype of record sheet used by the E to keep track of the Ss performance can be seen in Appendix F. The instructions for the Ss to read can be seen in Appendix G.

The trigrams were presented on a Gordon N. Stowe & Associates memory drum. The lists were presented at a 2-second rate with 6-seconds between trials.

The statistical analysis was a 2x3 factorial analysis of variance. The model for the analysis was adapted from Winer's (1962, p. 155) Case 1.

After the S completed the learning task the E interviewed the S briefly about how the S went about learning the trigrams. Specifically the E asked the S if the S pronounced the trigrams covertly and then spelled them as instructed. The S was also asked how the S liked the task. After the S had completed the serial learning task the S was asked to perform a Q-sort of the original 52 trigrams.

CHAPTER IV

RESULTS

Learning Results:

The hypothesis that there would be a difference in rate of learning between the lists was supported. The analysis of variance shown in Table 1, page 31, indicates that there was a statistically significant difference in learning between the lists. The F of 9.60 was significant at beyond the .01 level. Further analysis of the learning data by means of *t* tests, comparing each list with each of the others, shows that the low list contributed most of the variance. Table 2, page 32, shows the results of the *t* tests. The results show that the low list differed significantly from the other three lists at or beyond the .01 level of significance. The differences in rate of learning between the high, mixed, and middle lists, although in the predicted direction, were not great enough to reach statistical significance.

Other investigators have shown differences in rate of learning between the sexes. The F of 1.003 for the differences between the sexes, shown in Table 1, page 31, was not statistically significant, which indicates that there were no essential differences in rate of learning between the sexes.. The mean number of trials to criterion for each sex for each list can be seen in Table 3, page 33. Also in Table 3, page 33, the results of one *t* test was computed between the sexes on the high list because it had the highest difference in mean trials to criterion and, as shown in

SUMMARY OF THE ANALYSIS OF VARIANCE

Source of variation	SS	df	MS	F
A (sex)	276.76	1	276.76	1.003
B (list)	7,949.62	3	2,649.87	9.60**
AXB	140.61	3	46.87	.16
Within cell	24,276.92	88	275.87	
Total	32,643.91	95		

**critical value (3,88) F.99 = 4.13

TABLE 1

COMPARISON BETWEEN INDIVIDUAL LISTS TO
REACH LEARNING CRITERION

List	Difference between lists, Mean no. of trials	t
Low vs. High	22.91	4.74*
Mixed vs. High	1.46	.38
Middle vs. High	6.50	1.47
Low vs. Mixed	21.45	4.44*
Low vs. Middle	16.41	3.02*
Middle vs. Mixed	5.04	1.11

*critical value at .01 level with 46 df = 2.70

TABLE 2

MEAN TRIALS TO CRITERION FOR LEARNING LISTS

List	Sex		Difference	t	Combined Mean Trials
	Male	Female			
High	41.75	35.75	6.00	1.17*	38.75
Low	63.25	60.08	3.17		61.66
Mixed	40.00	40.42	.42**		40.21
Middle	47.66	42.83	4.83		45.25

*critical value with 22 df at .05 = 2.07

**Males better on this list

TABLE 3

Table 3., this difference was not statistically significant.

The typical serial position effect was found and the curve of the overall results can be seen in Figure I, Appendix H. Figure II, Appendix I shows the total curve broken into its four parts. Appendix J, Figure III shows the curves for the high and low trigrams of the mixed list at each position.

Q-Sort Results:

The hypothesis that the affective values for the 52 trigrams would be the same for the two Q-sorts (before and after learning) was supported. A Pearson *r* value of .704 was obtained (critical value for *r* with 50df at .01 level = .354). To determine whether the lists remained significantly different from each other after the learning task, further analysis was performed. The results of comparing the lists by means of *t* tests on the affectivity dimension both before and after learning can be seen in Table 4, page 35. The median values on affectivity for each list before learning were computed on the basis of the results of 50 Ss who did not have to learn the trigrams, while the median values in affectivity for the lists in the after-condition were done by 96 Ss who had experience with one of the four sets of 12 of the 52 trigrams. The table shows that, with the exception of the mixed list *vs.* the middle list, all of the comparisons were statistically significant at or beyond the .01 level in the before or original Q-sort condition. In the after condition the *t* values for the comparisons in affectivity were also significant for all

RESULTS OF *t* TESTS BETWEEN LISTS ON THE AFFECTIVITY DIMENSION BEFORE & AFTER LEARNING

List	difference between affectivity means before	t before	difference between affectivity means after	t after
High *vs.* Low	1.78	11.5**	1.14	6.74**
High *vs.* Mixed	.74	5.24**	.38	1.45
High *vs.* Middle	.93	6.10**	.85	4.71**
Mixed *vs.* Low	1.04	7.44**	.76	3.22**
Middle *vs.* Low	.85	3.42**	.29	2.16*
Mixed vs. Mid.	.19	.39	.47	1.93

*critical value at .05 level with 22df = 2.07
**critical value at .01 level with 22df = 2.81

TABLE 4

the comparisons, except in the case of the high vs. the mixed list comparison, for which the difference no longer reached statistical significance.

The fourth hypothesis that if the median affective value ratings, before and after learning, were changed due to differential familiarity with the trigrams, the same lists would be different when the two Q-sort ratings were compared, was partially supported. Table 5, page37 , shows the results of the t tests between the same lists of trigrams before and after learning. The t value for the low vs. the low affective list was significant at beyond the .01 level, while the other lists did not differ statistically. Table 6, page38 , shows the results of t tests comparing the Q-sort ratings by the Ss who learned the trigrams in each list with the Q-sort ratings of those Ss who didn't learn the trigrams within the list. The t value for the low affective list was significant at beyond the .01 level, while the other lists did not differ significantly. Further analysis of the lists and trigrams on the Q-sort ratings can be seen in Tables 7, 8, and 9, (pages,39 ,40, &41). Table 7 shows the comparison between the six high affective trigrams and the six low affective trigrams which were used in the mixed list and which were rated by the 24 Ss who learned the trigrams. The t value was significant at the .05 level. Table 8 shows various comparisons between the ratings of the high affective trigrams and the ratings given them by the Ss who learned them as opposed to those Ss who didn't learn

RESULTS OF t TESTS BETWEEN EACH LIST ON AFFECTIVITY BEFORE & AFTER LEARNING

	Mean affective value rating			
List	Before	After	Difference	t
High vs. High	6.45	6.54	-.09	.78
Low vs. Low	4.67	5.60	-.93	4.15*
Mixed vs. Mixed	5.71	6.02	-.31	.79
Middle vs. Middle	5.52	5.59	-.07	.39

*critical value at .01 level with 22 df = 2.81

TABLE 5

RESULTS OF t TESTS BETWEEN THE SAME LIST ON RATED AFFECTIVITY BY Ss WHO LEARNED THE TRIGRAMS IN THE LIST vs. THOSE Ss WHO DIDN'T LEARN ANY OF THE TRIGRAMS IN THE LIST

List	Mean Q-sort value of Ss who learned the list	Mean Q-Sort value of Ss who did not learn the list	Difference	t
High	6.38	6.03	.35	1.75
Low	5.56	4.85	.71	4.06*
Mixed	6.14	5.54	.60	1.79
Middle	5.59	5.30	.29	1.41

*critical value at .01 level with 22 df = 2.81

TABLE 6

COMPARISON OF THE Q-SORT VALUES OF THE SIX HIGH AFFECTIVE TRIGRAMS OF THE MIXED LIST *vs.* THE VALUES OF THE SIX LOW AFFECTIVE TRIGRAMS OF THE MIXED LIST BY RATINGS OF THE 24 *Ss* OF THE MIXED LIST

	Mean affective value rating			
Mixed List	Mean Q-sort value of the six High trigrams	Mean Q-sort value of the six Low trigrams	Difference	*t*
	6.54	5.49	1.05	3.15*

*critical value at .05 level with 10 df = 2.23

TABLE 7

COMPARISONS OF THE Q-SORT RATINGS FOR THE HIGH AFFECTIVE TRIGRAMS BY Ss WHO LEARNED THEM vs. RATINGS BY Ss WHO DIDN'T LEARN THEM

	Mean Q-sort value	Difference	t*
The six trigrams of the high list learned by 24 Ss of the high list only.	6.24		
vs. the same six trigrams rated by 24 Ss of the middle list plus 24 Ss of the low list.	5.84	.40	2.07
vs. the same six trigrams rated by 24 Ss of the mixed list but not learned by them.	5.80	.44	1.18
The six trigrams used in the high & the mixed lists & learned by a total of 48 Ss.	6.69		
vs. the same six trigrams rated by 24 Ss of the middle list plus 24 Ss of the low list.	6.23	.46	1.46
vs. the same six trigrams rated by & learned by the 24 Ss in the high list	6.84	- .15	.58
The six trigrams used in the high & the mixed lists with just the ratings by those 24 Ss who learned them in the high list only	6.84		
vs. the same six trigrams rated by 24 Ss of the middle list plus 24 Ss of the low list.	6.23	.61	1.98

*critical value at .05 level with 10 df = 2.23

TABLE 8

COMPARISONS OF THE Q-SORT RATINGS FOR THE LOW AFFECTIVE TRIGRAMS BY Ss WHO LEARNED THEM vs. RATINGS BY Ss WHO DIDN'T LEARN THEM

	Mean Q-sort value	Difference	t
The six trigrams of the low list learned by 24 Ss of the low list only.	5.54		
vs. the same six trigrams rated by 24 Ss of the middle list plus 24 Ss of the high list.	4.72	.82	2.81*
vs. the same six trigrams rated by 24 Ss of the mixed list but not learned by them.	4.52	1.02	5.02**
The six trigrams used in the low & the mixed lists & learned by a total of 48 Ss.	5.58		
vs. the same six trigrams rated by 24 Ss of the middle list plus 24 Ss of the high list.	4.98	.60	2.56*
vs. the same six trigrams rated by & learned by the 24 Ss in the low list.	5.67	-.09	.39
The six trigrams used in the low & the mixed lists with just the ratings by those 24 Ss who learned them in the low list only.	5.67		
vs. the same six trigrams rated by 24 Ss of the middle list plus 24 Ss of the high list.	4.98	.69	2.62*

*critical value at .05 level with 10 df = 2.23
**critical value at .01 level with 10 df = 3.17

TABLE 9

them. None of the comparisons reached the .05 level of statistical significance. Table 9 shows the various comparisons of the low affective trigrams by those Ss who learned them as opposed to those Ss who did not learn them. All the comparisons were significant.

Because of the diversity of answers given by the Ss in the brief interview after the learning task the answers given to how the Ss went about learning the trigrams, how the Ss liked the task and whether S pronounced the trigrams covertly, the answers for the first two questions could only be put into general categories. The general categories and percentages for the question of how the S liked the task are: liked, 21%; didn't like, 25%; mixed feelings, 32%; and no direct answer, 22%. To the question of how the S went about the task the categories and percentages are: association with other things, 24%; learned the trigrams in order of first few, last few and then middle, 30%; no direct answer, 29%; and by letters only 17%. To the question of whether the S pronounced the trigrams covertly, 39% said "yes"; 30% said "no", and 31% said "they pronounced some of them and not others.

CHAPTER V

DISCUSSION

The first hypothesis was that the high affective list would be easier to learn than any of the other lists in a serial learning task. This was only partly confirmed, in that the high affective list was not learned faster than the mixed or middle affectively toned lists. The results show the high, mixed, and middle affectively toned lists were significantly easier to learn than the low affectively toned list. The results indicate that there were differences in the predicted direction between the high list and the mixed and middle lists, but the differences failed to reach statistical significance. The results do indicate, however, that affectivity does have an effect on the learnability of trigrams when the trigrams have been equated on other dimensions which have been shown to have an effect on learnability. The present findings suggest that, future experiments using trigrams as the stimulus materials, the variable of affectivity should be controlled.

Some of the studies reported earlier showed results consistent with part of the present results, in that those situations which compared a "good" dimension with a "bad" dimension showed statistically significant differences in the rate of learning. Anisfeld and Lambert (1966), comparing words along a good-bad dimension, in a PA task, found that under certain conditions there was a significant difference in rate of learning between the two. This result is consistent with the learning of the high vs. the low list of affective trigrams used in the serial learning task of the present

experiment. In the studies reported by Lott, Lott & Walsh (1970), one of the studies showed that the "liked" material (names of people Ss liked) used in the PA task was learned significantly faster than the "disliked" material (names of people Ss disliked). The present results, along with the results found by these other investigators, showed, with a variety of materials and conditions, that the affective tone of the material can produce differences in the rate of learning. There have been other studies by both Anisfeld & Lambert (1966) and Lott, Lott & Walsh (1970) which did not show the difference in rate of learning between the different kinds of affective material. Anisfeld & Lambert (1966) found that they could get the conditioning of affectivity and subsequent faster learnability in the PA task only when the paradigm was trigram-affective word and not affective-word trigram or word-word paradigms. Lott, Lott & Walsh (1970), in another study using a PA task, found that the differences in learning between the liked vs. disliked material were in the predicted direction, but that these differences failed to reach statistical significance.

The hypothesis that the mixed list would be the hardest to learn was not supported; in fact, it was found to be easier to learn than the low list in the present experiment. If there was any conditioning interaction between the trigrams in the mixed list to cancel out the affectivity of each so that the list became a "neutral" list, the results could not be interpreted clearly. This result suggests that there was no difference in the trigrams in learn-

ability on the affectivity dimension alone, but doesn't tell whether or not the result was due to a conditioning interaction between the trigrams which, in effect, turned the list as a whole into a "neutral" list. Some studies have shown that a "neutral" or "indifferent" list is harder to learn than a "good" or "bad" list. For example, Silverstein and McCreary, (1964) in a "good" vs. an "indifferent" PA task, found there was a statistically significant difference in rate of learning between the lists. Lott, Lott & Walsh (1970) found that a "neutral" condition was harder to learn than either a "liked" or "disliked" condition. The results of the present experiment are inconsistent with the above results. That is, the mixed list was not learned more slowly than the high list, but was learned more rapidly than the low list. Whether this difference in rate of learning was due to the fact that the mixed list functioned as a "neutral" list cannot be ascertained from the present experiment. In the future, experiments using a mixed list, instead of using just a simple alternation of the high and low and high trigrams, etc. should use a variety of alternations. By doing this, a difference in learning between trigrams of differing affectivity may show itself at the various serial positions in the mixed list and thus may give an indication of whether conditioning between the trigrams was taking place.

One reason for the contradictory findings concerning the affective tone of the material and its influence on rate of learning could be that the difference between the material used in the

various studies was inadequate. As Underwood & Schulz (1960) pointed out a number of times, there has to be a large difference between the different materials before a difference in learning shows up. Silverstein & Dienstbier (1968) hypothesized that one of the reasons for their failure to get a conditioning of affectivity from words to trigrams, when Silverstein & McCreary (1964) had obtained conditioning of affectivity from photographs to trigrams, was that in the trigram-photograph situation the photographs were more potent in getting an emotional response from an S than were words.

In further studies using material of varying degrees of affective tone, in view of the mixed results which have previously been found, it may be a good idea to keep the material as "clean" as possible. That is, as the results from various studies showed, using a PA task, under some conditions there were no differences in learning between the different materials, while in other studies there were significant differences. In a PA task, the results are dependent on conditioning of affectivity to a trigram first and then having this affective conditioning show itself in a subsequent PA task using numbers or whatever is used with the trigram; it may be better to use a task like serial learning, where the material itself is rated on affectivity instead of having affectivity of the material depend on conditioning. Underwood (1957) had this to say about affectivity and its influence on learning, "Another task dimension which has received extensive attention is the affective tone of the material. I would also include here the studies attaching

unpleasant experiences to some items experimentally and not to others, and measuring retention of these two sets of items. Freud is to a large extent responsible for these studies, but he cannot be held responsible for the malformed methodology which characterizes so many of them."

Another factor which may contribute to the inconsistent results found between studies is that the various investigators have used a variety of methods to determine the differences in affectivity. Some of the investigators have used seven-point scales, others have used nine-point scales; and some have even used 30-point scales.

Although there have been some indications that female Ss show test-or task-anxiety when the affectivity of the stimulus material is readily apparent(as in the case of words) and, as a result, do poorly, the present experiment indicates that when the material is not as readily perceived as affective as words are, the female Ss do as well as the males. This finding is also supported by the study of Silverstein & Dienstbier (1968) in which it was found that when female Ss learned the affective material under an incidental learning situation, they did as well as the males, but when the affectivity of the material was apparent they did not perform as well. The important point is that affectivity of the material does have an effect on ease of learning.

The hypothesis that the median affective values of the 52 trigrams as a whole would remain the same between the two Q-sorts, before and after learning, was supported. This result was consistent with other findings like those of Keppel (1963), in that the

same trigrams which had been rated on affectivity by two different groups of Ss showed high correlations. Keppel (1963) correlated his ratings of the trigrams with the ratings of the same trigrams which Johnson et. al. (1960) had obtained. The Ss used by each investigator came from different populations. Johnson et. al. used Ss from a college group & Keppel used a non-college group of Ss. The methods of presentation used to get the affective ratings also varied between the two investigators. These results indicated that affectivity seems to exist as a variable and that it can be separated from other variables. However, as Keppel pointed out and demonstrated in another experiment using the same trigrams, the particular trigrams which were used by the two investigators also varied on pronunciability. The Ss could have been rating them on pronunciability instead of affectivity. The present experiment used trigrams which were equated on variables, such as pronunciability, and the correlation between the two Q-sorts was still high even though the second group of Ss had previous experience with some of the trigrams before rating them on the affectivity dimension by means of the Q-sort.

The hypothesis that, due to differential familiarity with some of the trigrams, a comparison of the same lists on rated affectivity would show a difference, before and after learning, was partially confirmed. The only lists to show a significant difference in rated affectivity between the two Q-sorts were the low lists.

A number of studies have shown that, when an S was given dif-

ferential familiarity with a list of trigrams or other material, as a general rule the most familiar ones were also rated as the most "liked". An example of differential familiarity using nonsense words was done by Johnson et. al. (1960) in which they found that the most familiar nonsense words were rated as the most "liked". Originally they were not rated differently. The finding of a significant difference between the two Q-sort ratings for the low list in the present experiment can't be entirely explained on the basis of differential familiarity. The only difference the low list had over the other three lists was that it took longer to learn than the other three lists. Whether this difference in learning rate and hence greater exposure to the low affective value trigrams was the cause of the difference in rating cannot be determined clearly from the present experiment. If a difference in learning rate was the cause of the difference in Q-sort rating, the finding of no statistical difference between the ratings of the six trigrams used in the mixed and low affective list and rated by the Ss of the list they learned should have been different due to the differential familiarity involved. In order to answer this question some way would have to be devised to give the S an equal number of trials on each list. However, there may be other and equally valid reasons why the ratings for the low list in the present experiment were raised in comparison when no experience vs. experience was a factor. A regression to the mean for the affectivity ratings may be another way of explaining the results.

CHAPTER VI

SUMMARY

Many studies dealing with the affective value of learning material and its influence on the learnability of the material have shown that the affective value of the material can have an effect on the learnability of the material. Other studies have not always shown the influence of the affectivity on learning and in some cases the results of different studies have been contradictory. In some cases comparisons between the studies are difficult in that the studies have only dealt with "good" vs. "bad" or "good" vs. "indifferent" material while in others the studies have dealt with "good" vs. "bad" vs. "indifferent" (neutral) material. The studies have also varied on the methods of determining the affective tone of the material and on the kinds of materials used. Most of the studies used PA tasks to determine the difference in rate of learning and in addition had to depend on conditioning of affectivity to take place in order to show the difference in rate of learning.

The present experiment used a serial learning task to determine the difference in rate of learning between lists of trigrams equated on other variables that have been shown to have an effect on learnability, but which varied on rated affectivity. The hypotheses were: (a) the list of high "affective" trigrams should be learned faster or in fewer trials than either low, middle, or mixed "affective" lists; (b) if there is any conditioning of "affectivity" in the mixed list it should cancel itself out and, in effect, become a

neutral list and should be the hardest of the four lists to learn; (c) the median affective values of the trigrams as a whole should be the same between Q-sorts performed before and after learning; (d) if the median affective value ratings are changed due to differential familiarity with the trigrams, the same lists should be different when the two Q-sort ratings are compared, before and after learning.

The results of the learning part of the experiment showed that in a serial learning task comparing four lists of twelve trigrams, each differing in affective tone, there was a difference in the rate of learning. The low affective-value list differed significantly in rate of learning from the high, mixed, and middle affective-value lists and was the hardest to learn. The differences in learning between the high, mixed (equal numbers of high and low affective trigrams were in this list), and middle affective-value lists did not reach statistical significance. Contrary to predictions, the mixed list was not the hardest to learn. Discrepancies and consistencies between these results and the results from other studies were discussed. The discussion of the learning results was built around the idea that in further studies using affectivity, the material and task should be as "clean" as possible in order to investigate the variable of affectivity. The results concerning agreement in rated affectivity between the two Q-sorts as a whole, showed that there was a significant agreement between them even when some of the Ss in the second Q-sort had received experience

with some of the trigrams. The result comparing the same lists of affectivity between the two Q-sorts, before and after learning, indicated that differential familiarity may have had an effect on how material was rated, but didn't answer the question clearly. The low lists were the only lists to show a difference in rated affectivity between the two Q-sorts. Whether this was due to the significant difference in learning rate between the lists, and hence of higher familiarity with the low affective list, could not be determined from the results of the experiment.

TABLE 1

LISTS USED & MEDIAN SCORES FOR EACH TRIGRAM

High Affectivity	Median Score	Low Affectivity	Median Score	Mixed Affectivity	Median Score	Middle Affectivity	Median Score
NUB	6.38	JUK	4.75	DEY	6.50	WEM	5.33
KOG	5.90	LEZ	4.66	HUX	4.71	HUK	5.50
MAH	6.57	JUV	4.75	ZEL	6.50	YAW	5.38
BIP	7.75	WOG	4.87	VOR	4.87	QIZ	5.57
JEY	5.90	SAQ	5.00	MAH	6.57	KAF	5.76
DOH	6.22	WIV	4.60	WOG	4.87	BEW	5.50
ZEL	6.50	HUX	4.71	ZEN	6.77	CET	5.45
CIP	6.63	VOR	4.87	JUK	4.75	KAW	5.59
ZEN	6.77	WUL	4.55	BIP	7.75	DOX	5.81
FAW	6.14	KAC	4.55	SAQ	5.00	MUZ	5.50
DEY	6.50	JIZ	4.20	CIP	6.63	WOV	5.44
JIB	6.20	QAL	4.55	LEZ	4.66	JAQ	5.44
	$\bar{X} = 6.45$		$\bar{X} = 4.67$		$\bar{X} = 5.71$		$\bar{X} = 5.52$

APPENDIX A

INSTRUCTIONS--SYLLABLE SORTING

PLEASE READ THESE INSTRUCTIONS ALL THE WAY THROUGH BEFORE YOU BEGIN

On each of the 52 cards there is a letter combination, or syllable, that may or may not remind you of a word. First, look through all of the letter combinations to get a general idea of the kinds of syllables you are to deal with.

We would like you to sort the 52 syllables into eleven different groups, according to how much you like the different syllables. Put in each group the number of cards called for at the top of the cardboard pattern.

Syllables in any given group should be syllables that you like more than those you have placed in groups to the left of them, and syllables that you like less than those you have placed in groups to the right of them. Continue to shift syllables from one group to another until you feel reasonably sure that the syllables are all arranged according to how much you like them.

Before you have finished, be sure that each group contains exactly the number of cards called for at the top of the cardboard pattern. Also be sure that the syllables you like most are at the right end, and that syllables you like least are at the left end.

Please avoid discussing the syllables with other students, for we would like to be sure that each person who sorts the syllables will be able to use his own standards and not have his sorting influenced by discussion with others who have sorted the syllables at some earlier time.

Do not take these instructions away with you.

Ask the experimenter to give you a card indicating that you participated in the study.

APPENDIX B

TABLE 2

RESULTS OF t TEST ANALYSIS FOR EQUATING THE TRIGRAMS ON OTHER VARIABLES WITH THE EXCEPTION OF AFFECTIVITY

	Affectivity	Noble's σ values	Occ. of trigrams in words on basis of Thorndike-Lorge Word Count	Underwood's Response frequencies to Single letter stimuli	Noble's Scaled meaningfulness	Underwood's Bigram frequencies- 1st 2 letters & 2nd & 3rd 1st,2nd 2nd,3rd,	Noble's rated association	Noble's association value
Low vs. High list	-11.5**	1.91	-.22	-.61	-.288	-.128 .20	.227	-1.06
High vs. Mixed list	5.24**							
Low vs. Mixed list	-7.44**							
High vs. Middle list	6.10**							
Middle vs. Low list	3.24**							
Mixed vs. Middle list	.39							

*critical value for .05 level with 22 df. = 2.07
** for .01 level with 22 df. = 2.81

TABLE 3
VALUES FOR EACH LIST ON DIMENSIONS SHOWN TO HAVE AN EFFECT ON LEARNING

Dimension	List High	Low	Mixed	Middle
Nobles 0′	13.35	14.26	13.92	12.97
Occurrence in 30,000 most frequent words	412	303	651	268
Response frequency to single letter stimuli	98	76	106	138
Nobles meaningfulness	25.07	24.91	25.00	25.50
Bigram frequency 1st, 2nd	5374	4965	8110	4728
Bigram frequency 2nd, 3rd	6084	6801	7954	3531
Nobles rated association	26.39	26.73	26.32	26.82
Nobles' association value	8.57	8.32	8.43	8.79

APPENDIX D

TABLE 4
NUMBER OF TIMES A CONSONANT APPEARED WITHIN A LIST

List	Frequency of a consonant				
	once	twice	three times	four times	five times
High	7	7	1		
Low	6	3	4		
Middle	10	3	1		1
Mixed	15	3	1		

APPENDIX E

TABLE 5
SUBJECT'S RECORD SHEET*

High Male___Female___

Trial	Syllable										Number Correct
	NUB	KOG	MAH	BIP	JEY	DOH	ZEL	CIP	ZEN	FAW	DEY JIB
1											
2											
3											
4											
5											
6											
7											
8											
.											
.											
.											
.											
n											
Number Correct											

*Adapted from Deese, 1958.

APPENDIX F

SERIAL LEARNING INSTRUCTIONS TO Ss*

This is an experiment in learning a list of nonsense syllables. We are interested in certain complex relationships of the learning process common to all people.

Shortly after the apparatus starts you will see a three-letter syllable in the slot. You are to spell this syllable and those that follow it as you see them. After you have seen the list once, you are to endeavor to anticipate the syllables; in other words, as you see one syllable you are to spell the syllable that will follow it before it appears. If you think you know what a syllable will be, but are not sure, guess, because it will not hurt your score any more than to say nothing, and if you get it right it will count as a success. If you anticipate a syllable incorrectly, correct yourself as soon as it appears. Try always to spell the syllables as distinctly as possible. The start of each new trial will be preceeded by three asteriks.

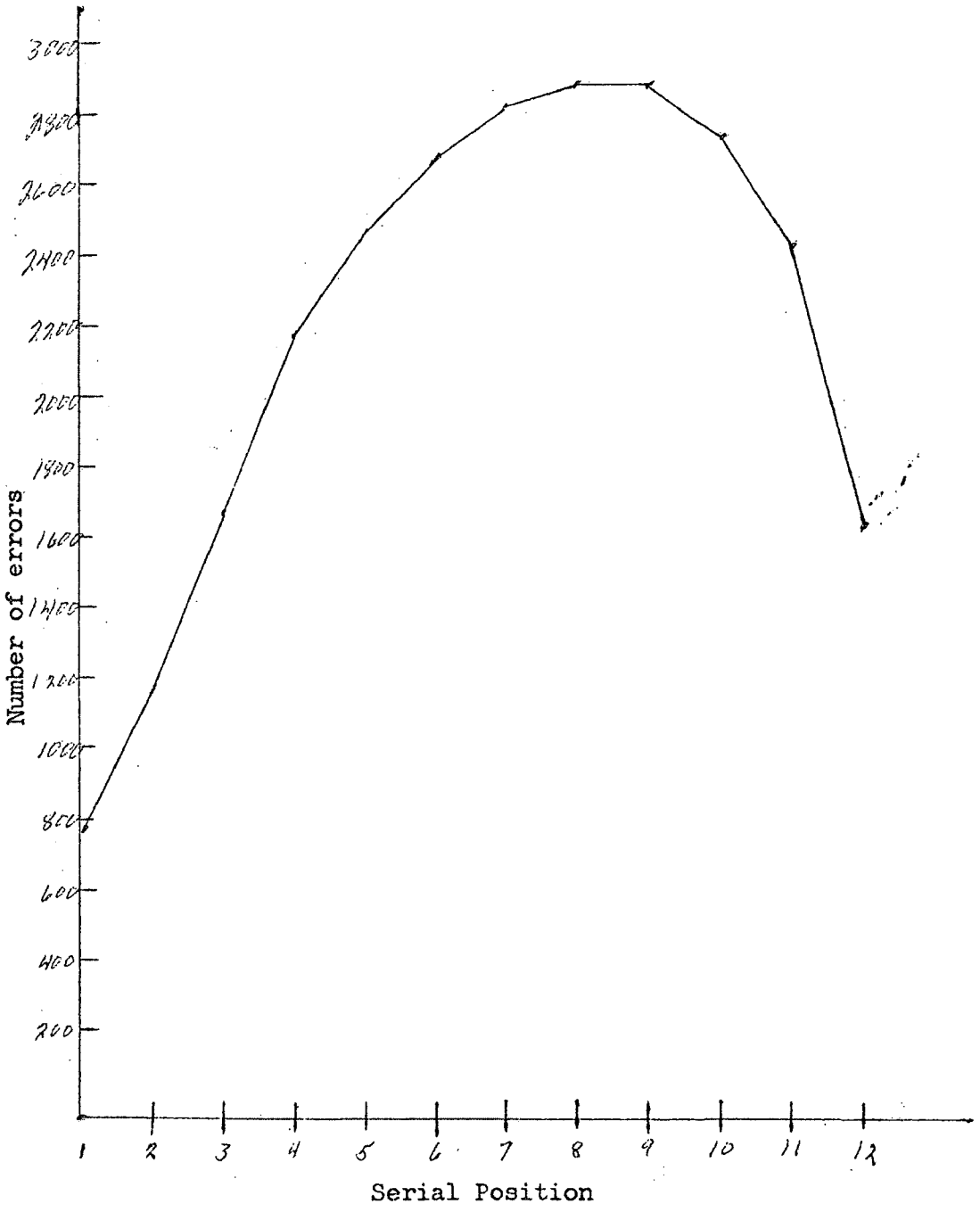
Please, do not take these instructions away with you. Ask the experimenter to give you a card indicating that you participated in the experiment.

*The instructions were paraphrased after Hovland, (1938).

APPENDIX G

FIGURE I

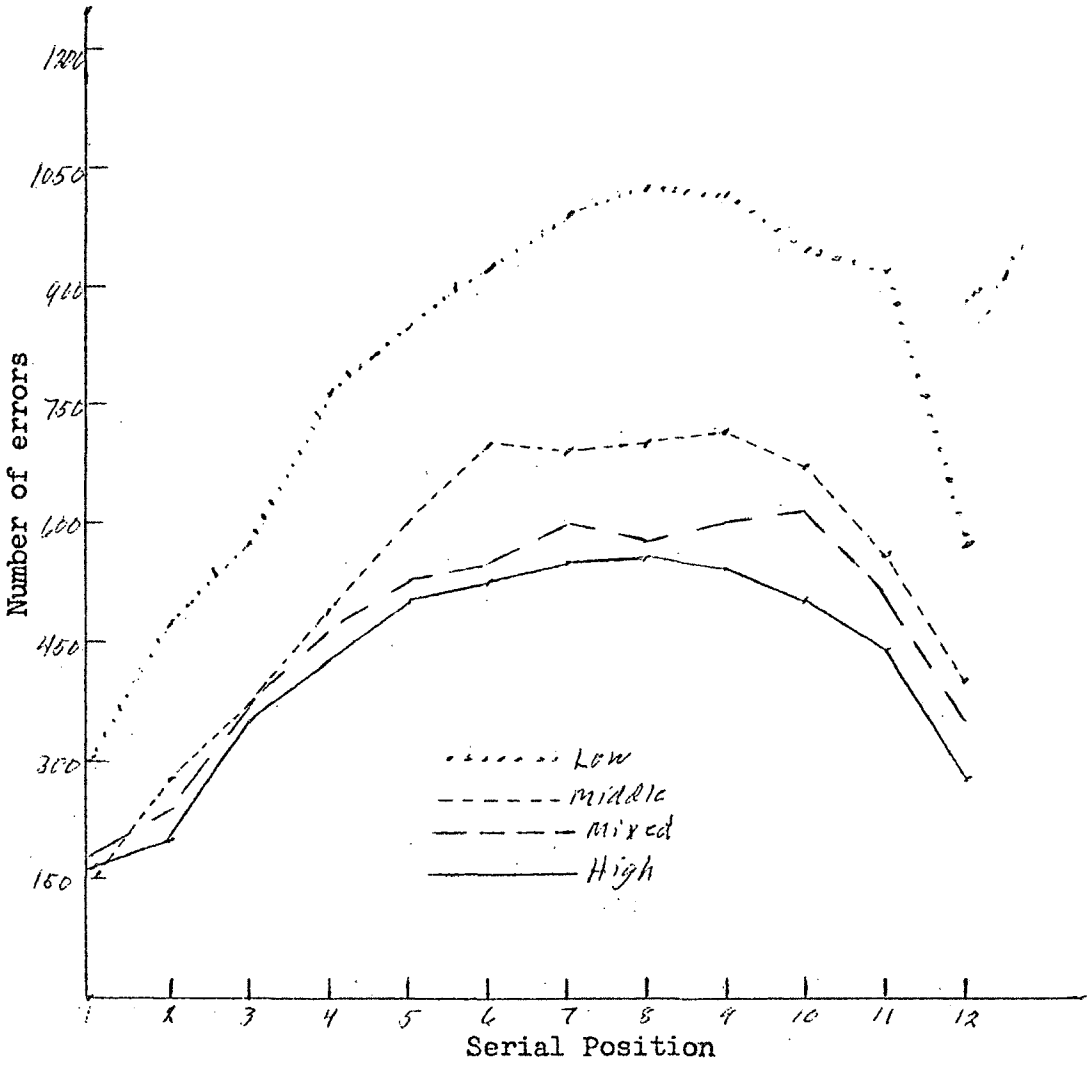
TOTAL NUMBER OF ERRORS AT EACH SERIAL POSITION FOR ALL LISTS COMBINED



APPENDIX H

FIGURE II

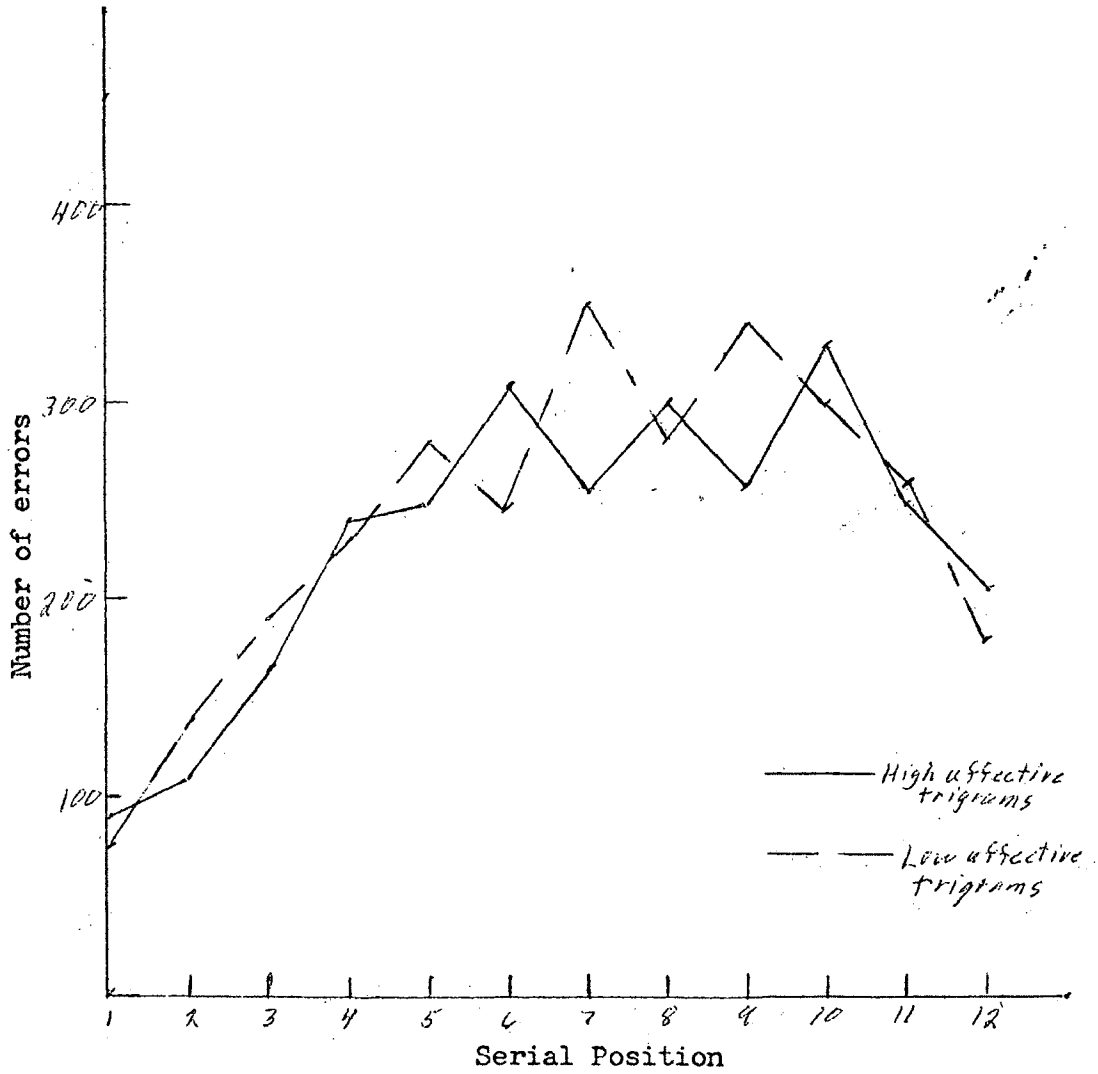
NUMBER OF ERRORS FOR EACH LIST AT
EACH SERIAL POSITION



APPENDIX I

FIGURE III

NUMBER OF ERRORS FOR HIGH & LOW AFFECTIVE TRIGRAMS OF THE MIXED LIST AT EACH SERIAL POSITION



APPENDIX J

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