

OBSERVER PRESENCE AND PAIRED-ASSOCIATE LEARNING OF
NEUTRAL AND SEXUAL WORDS

by

Audelle Cormode

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Thesis supervisor: Dr. David G. Martin



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INTRODUCTION

"Neurotics" are described by Dollard and Miller (1950) as "neurotically stupid." For some reason, they do not learn new behaviors for dealing with anxiety situations but stick with their neurotic symptoms which, in most cases, are a distinct hindrance to them in their daily living. Neurotic behavior serves to avoid conflict cues in an anxious situation and thus, to a certain extent, avoids anxiety. Unfortunately, the perseveration of this behavior prevents the relearning of new, more adaptive behavior from taking place in conflict situations. The person with neurotic symptoms restricts exploration, which in the past has been painful for him, and thus new learning does not have a chance to evolve.

The question can then be asked, "Why do people with neurotic symptoms persist in their neurotic behavior at the expense of learning new, more adaptive responses?" or "Why do people with neurotic symptoms show a deficiency in learning in conflict or stressful situations?" There are at least two possible answers to this question. Some evidence is available which suggests that increased drive (anxiety) is associated with a reduction in the range of cue utilization (Bruning, Capage, Kozuh, Young and Young, 1968; Easterbrook, 1959; Eysenck and Willett, 1962; Kausler and Trapp, 1960). This reduction involves basically a focusing of attention or a narrowing of the perceptual field. Zaffy and Bruning (1966) found that high anxious subjects tended to ignore additional cues and responded in the same manner

as when no cues were present. Thus, high drive (anxiety) is associated with a decreased range of cue utilization. Since the neurotic can be described as being in a state of constant high drive or anxiety, it is possible to suggest that this anxiety decreases his range of cue utilization thus hindering his learning ability in new situations.

Another possible answer to the question of the neurotic's hampered learning in stressful situations is that of repression. Repression is an anxiety-avoiding behavior. The person manifesting neurotic symptoms can somewhat control his anxiety by unintentionally forgetting anxiety-arousing stimuli or thoughts which he would have remembered under normal circumstances. This process is automatic; that is, the person is unaware of his repressing painful material. Dollard and Miller (1950) attribute repression to the inhibition of performing responses of thinking particular thoughts. However, whatever the process involves, if it occurs, it hinders the neurotic's abilities to learn new modes of behavior in anxiety-arousing situations.

Central to both of these possible answers is the supposition that the neurotic does not seem to learn stressful or anxiety-arousing material in his constant state of high anxiety. In order to test this assumption, the present study was designed to determine whether subjects in an anxiety-provoking situation would demonstrate deficiencies in learning anxiety-arousing material. The situation of the subject could then possibly be compared to that of the person with neurotic symptoms.

In order to place the subject in a high anxious situation, the presence of an audience was manipulated. Evidence suggests that the presence of others influences the level of drive of a subject (Cottrell, Rittle and Wack, 1967; Ganzer, 1968; Martens, 1969; Matlin and Zajonc, 1968; Zajonc and Sales, 1966). If this increased drive level or level of arousal can be compared to an anxiety state, then the emotional state of a subject performing a task in the presence of an audience could be comparable to that of a person suffering from neurotic anxiety. Both are in a state of high drive or arousal. Thus, in the present experiment, the level of arousal was manipulated through an Audience Present and an Audience Absent situation. In one condition, the Audience was present while the subject learned the material and in the other condition, the subject was alone while he performed the task.

The subject's task was to learn anxiety-arousing material while in the anxiety-provoking situation. Evidence suggests that the recognition and verbalization of taboo words in the presence of an experimenter is anxiety-arousing for a subject (Bruner and Postman, 1947; DeLucia and Stagner, 1954; Lazarus and McCleary, 1951; Worthington, 1964; Zajonc, 1962). Thus, taboo words can be assumed to be anxiety-arousing material for the subject, and the task of learning and verbalizing such taboo words can be assumed to be an anxiety-arousing one. In the experiment the taboo words used were "sexual" words as opposed to non-anxiety-provoking "neutral" words. To further increase the level of anxiety produced by repeating taboo words in the

presence of others, male subjects with female experimenters were used.

The main hypothesis of the experiment was that there would be a statistical interaction resulting from a greater difference between the speed of learning of the sexual and neutral words in the Audience Present than the Audience Absent conditions, that is, that subjects would exhibit poorer learning of anxiety-provoking material than of non-anxiety-provoking material in an anxiety-arousing situation. It was expected that in the Audience Present condition, the subjects would feel more anxious than in the Audience Absent condition and would thus have greater difficulty in learning the sexual words due to their anxiety-provoking qualities. Conversely, in the Audience Absent condition, the subjects would not feel particularly anxious, it was thought, and would thus have less difficulty in learning the sexual words than those subjects in the Audience Present or anxiety-arousing condition.

A recall trial was also included in the design of the experiment. The experimenter left the room for all subjects in both conditions during this trial. If the main hypothesis predicted for the experimental words presented in the experimental trials, is a true effect, then it should also be evident in the analysis of the data of the Recall trial. That is, if there really is a greater difference between the speed of learning of the sexual and neutral words in the Audience Present than in the Audience Absent conditions, then the absence of the experimenter during the Recall trial should not make any difference to the level of retention of the words by the subjects. Thus, if the subjects are just not saying the sexual words while the experimenter is present in the room, they should feel able to say them during the

Recall trial when the experimenter is out of the room. Therefore, it was hypothesized that the effect predicted for the experimental trials would also be evident on the Recall trial.

No attempt was made to discover the processes which might account for the inferior learning of the anxiety-provoking material. At best, cue utilization or a process analogous to repression could be possible suggestions.

Thus, in the experiment, the subject was in an anxiety-arousing situation and was attempting to learn anxiety-provoking material. This situation is possibly comparable to the person with neurotic symptoms who is suffering from pervasive anxiety and is faced with anxiety-provoking stimuli in the course of his daily life. The comparison between neurotic anxiety and the socially induced anxiety in the present study is limited, since neurotic anxiety is probably more strongly associated with internal cues than is socially induced anxiety. Our interest, however, is in demonstrating a general effect of anxiety on learning. Later studies might attempt to strengthen the analogy between neurotic anxiety and an experimental situation.

METHOD

Subjects

Thirty-six male students, currently enrolled in the introductory course in Psychology at the University of Manitoba, participated as subjects in this study in order to fulfill their course requirement. These subjects were randomly assigned, by means of a procedure to be explained later, to two treatment conditions which are as follows:

Audience Present - The experimenter was present in the room while the the subject performed the task.

Audience Absent - The subject was alone while he performed the task. Of the thirty-six subjects, eighteen were in the Audience Absent group and eighteen were in the Audience Present group. Male subjects only were used, with female experimenters, in order to create the required anxiety-arousing conditions and also in order to clarify the findings of the study.

Experimenters

Two female experimenters, both Psychology students, tested the subjects.

Apparatus

A Lafayette-type memory drum was used in the experiment to present the paired-associate learning task to the subjects. A Phillips tape recorder was used to record the subjects' responses.

Task

The task of the subject was to learn a list of twelve paired-associates. The list was composed of six "sexual" words (bosom, crotch, genitals, nipple, orgasm, vagina) and six "neutral" words (cougar, donkey, giraffe, muskrat, puppy, squirrel). Each word was paired with a different nonsense syllable.

Stimulus Material

The twelve stimulus words were chosen from among one hundred words which were presented to one hundred and eighty students enrolled in a third year Psychology course at the University of Manitoba (See Appendix A for a copy of the questionnaire). The students were asked to rate each word on a five-point scale according to how often they had seen or heard or used it (Never, Rarely, Sometimes, Often, Very Often).

These ratings were then used to gather familiarity norms by calculating the mean rating for each word. Two concepts were chosen, one sexual and one neutral, so that the individual words within each concept had similar mean ratings and so that the means of the mean ratings for both concepts were similar. The end result was six words representing a sexual concept and six words representing a neutral (animal) concept (See Table 1 for the mean ratings of the twelve words). Care was also exercised to choose words which were of approximately equal length (five to seven letters) as well as those which began with a different letter within each concept. Thus, intralist

similarity was the same for both concepts as it can be assumed that if the mean ratings of the two concepts are equal, the words are of equal familiarity and thus are similar for each subject in both conditions.

These twelve words were then used to compose lists which consisted of two practice trials, ten experimental trials, and one recall trial. The practice trials were composed of four paired-associates which were presented in random order on each trial. These trials gave the subject a chance to learn the procedure of the lists before he began the actual experimental words. The experimental trials consisted of the twelve experimental words which were also presented in random order on each of the ten trials. The random presentation of the words on each trial controlled for any order effects which may have been effective while the subjects learned the words. The recall trial consisted of the nonsense syllables alone which were presented one after another. On each of the experimental trials, the sexual and neutral words were randomly mixed for presentation. The nonsense syllables on the recall trial, associated with these words, were also randomly mixed on presentation. An inter-trial interval of eight seconds and an inter-item interval of two seconds was used for each list.

Three lists, differing in only one respect, were assigned randomly across subjects (with the aid of a table of Random Numbers). The same words and nonsense syllables were used for each list, however, they were paired differently in each case. In this way, precautions were taken against

the subject's learning the pairs due to some characteristic of the nonsense syllable itself and its word pair. Thus, any differences observed in learning and retention can be attributed to the concept as a whole rather than to any aspect of the words or lists themselves. These lists are presented in Appendix B.

Procedure

The procedure for the Audience Absent condition was the same as that for the Audience Present condition except that in the former, the experimenter left the room after the practice trials and returned immediately before the recall trial. In the latter, the experimenter remained in the room for the practice and the experimental trials and left only for the recall trial.

Each subject was seated before the memory drum and was then read the following instructions:

This is a learning experiment in which you will learn to associate syllables and words. It is very important that you follow the instructions to the best of your ability. Should you fail to follow any instruction, be sure to tell me since the interpretation of the results may be affected.

This list will consist of 12 pairs of items like the pair on this card.

The subject was shown a card on which the following appeared:

TYJ

TYJ

MACHINE

The experimenter then continued with the following instructions:

These pairs will be presented in the window in front of you. When we begin, the syllable will always appear in the window alone like this (Experimenter demonstrates by covering lower half of card). After a short time, the paper will advance and reveal the syllable and the word together, like this (Experimenter demonstrates by covering top half of card). Your task is to associate or connect the syllable with the word, so that you will be able to say the word while the syllable is in the window alone, that is, before the paper advances to reveal both the syllable and the word.

Since the order in which the pairs follow each other will not always be the same, you must learn these pairs as pairs and not in the particular order in which the pairs follow each other.

To familiarize you with the procedure, several practice items will be used. When I start the machine, we will go through a list of 4 practice items with both the syllable and word together so that you can study the list and try to make associations between the members of the pairs. After we have gone through the 4 pairs once, two lines of asterisks will appear and then one of the syllables will appear alone. It is at this time that, when the syllable appears, you must begin trying to say the word that goes with it before the word appears in the window. We will then continue to go through the practice list while you attempt to anticipate the second members of the pairs before they appear in the window. There will be 2 practice trials. That is, you will go through the 4 practice items 2 times, each time in a different order.

Always try to anticipate the word just after the syllable has appeared. If you are able to say the word before the paper advances, we will count it correct: on the other hand, if you say nothing or say the word after the paper advances, we will count it as incorrect.

Your responses will be recorded by this tape recorder so they can be scored later. Be sure to speak at a normal volume so that the recorder will pick up your voice. Do you have any questions before we do the practice items?

The subject then went through the practice trials while the Experimenter was present to answer any questions which might have arisen. When the

practice trials had been completed, the experimenter continued with the following instructions:

Do you have any questions now? When I turn on the machine again, we will begin the actual experimental items - which will be entirely different from the practice items - which you no longer need remember.

The procedure which follows will be the same as with the practice items except that there will be 12 pairs and 10 trials. That is, you will go through the 12 pairs 10 times.

Always try to get as many of the pairs correct as you can on each trial. You should try to do the best that you can on each trial, even though you may have them all correct on some of the preceding trials. If you are having trouble anticipating some of the words or are giving some incorrectly, try not to let this discourage you or prevent you from doing the best that you can. We have found that most students find this type of learning a little more difficult than they first thought it would be. Do you have any questions?

At this point, to minimize potential experimenter bias effects, the experimenter referred to a deck of cards divided into two colors, one color for the Audience Absent condition and the other color for the Audience Present condition. These cards were shuffled together and were placed so that the subject could not see them and so that the experimenter could see which color was chosen only after he had chosen it. Thus, the experimenter did not know which condition would be run until after the instructions had been read.

If the Audience Present condition was chosen, the experimenter then turned on the memory drum saying "I'll start the machine and you can go through the list." She then sat on a chair placed behind the subject (about

six feet away from him) by the door. In order to control for any differential effects between subjects, the experimenter remained as quiet as possible.

In the Audience Absent condition, the experimenter told the subject ...

I have to do some work in the next room, but I'll know when you're done because the procedure takes about 12 minutes, and I'll know when to come back. When the machine says "wait for further instructions, just sit till I come back."

She then left the room and shut the door audibly.

For each subject, in both conditions, the experimenter appeared again at the end of the experimental trials to read the following instructions for the recall trial:

There is one more procedure which will take about a minute. When I start the machine again, you will see the syllables one more time each, and you are to try to say the word that goes with each syllable before the machine advances. This time, however, the syllables will follow right after each other. There will be no appearance of syllable and word together. When a syllable appears, you must say the word association with it before the machine advances to the next syllable. I have to go to the next room to get ready for another subject, so when the machine stops, just sit till I come back.

The experimenter returned at the end of the recall trial in order to ask the subject if there had been any equipment failures of any sort or any other problems in the experiment of which he was aware. Any equipment failure was also evident from listening to the tape recordings of the experiment during later scoring. A further check for equipment failures was that of

checking the twelve minute time interval between the first and last experimental trials.

The recall trial was included in the design of the experiment to help control for the problem that the subjects might be learning the sexual words as well as the neutral words but might just not be saying them. If this were the case, the subject should not feel hesitant to say the sexual words during the recall trial when the experimenter was no longer in the room. Thus, any problems in this respect would hopefully be evident from the analysis of the data of the recall trial.

RESULTS

Main Analysis

A mixed design analysis of variance with one between subjects factor (Audience Present or Absent) and two within subjects factors (Sexual or Neutral Words, Trials) was conducted on the data. The dependent measure was the number of words correct on each trial. The results of this analysis are summarized in Table 2.

Two significant effects are evident from the table. The Trials effect was significant ($F_{9,306} = 43.34$, $p < .001$), however this effect is trivial, as the subjects would be expected to learn more words as they were increasingly exposed to them over the ten trials.

The Audience x Words x Trials interaction was also significant ($F_{9,306} = 2.04$, $p < .05$). This supports the hypothesis that there would be a statistical interaction resulting from a greater difference between the speed of learning of the sexual and neutral words in the Audience Present condition than in the Audience Absent condition.

The graph in Figure 1 indicates that in the Audience Absent condition, the subjects learned the sexual words better than they did the neutral words on the earlier trials. Toward the later trials, however, these differences tended to disappear.

In the Audience Present condition, as illustrated by Figure 2, the subjects learned the neutral words better on early trials although these

differences also tended to be obscured on later trials.

From a consideration of these results, it appeared that the hypothesized effect was significant only on early trials. To confirm this assumption, an analysis of variance of the first five trials and of the last five trials was carried out on the data. These results are summarized in Tables 3 and 4, respectively. As expected, in the analysis of the first five trials, a significant Audience x Words effect was found ($F_{1,34} = 6.49, p < .025$). Thus, relative to the Audience Absent condition, the neutral words were learned significantly better than the sexual words in the Audience Present condition. In the Audience Absent condition, the reverse was the case. There was also a significant Trials effect ($F_{4,136} = 20.23, p < .001$) which is to be expected and as well, a significant Words x Trials effect ($F_{4,136} = 2.35, p < .05$). That is, relative to the Audience Present condition, in the Audience Absent condition the sexual words were recalled to a significantly greater degree than were the neutral words, on early trials. Thus, in the Audience Present condition, more neutral words were learned over the first five trials than sexual words while in the Audience Absent condition, more sexual words than neutral words were learned over the first five trials.

The analysis of variance of the second five trials, summarized in Table 4, indicated that there were no significant effects for these trials except a Trials effect ($F_{4,136} = 10.22, p < .001$). This effect is to be

expected, however, from the analysis of the ten trials as a whole, as well as from the fact of the increased exposure of the subjects to the words as they progressed through the trials.

Additional Analyses

Practice Trials

The analysis of variance conducted on the practice trials data, as summarized in Table 5, revealed only one significant effect, that of Trials ($F_{1,34} = 11.59, p < .005$). The effect of Trials x Audience was not significant. The dependent measure was, again, the number of words correct on each trial. Thus, from the results it can be assumed that the subjects in both conditions- Audience Present and Audience Absent - began to learn the experimental words on an equal basis.

The trials effect is to be expected as the subjects should learn more pairs as they are increasingly exposed to them. Thus, this effect is trivial for the purpose of this experiment.

Although the analysis of the Practice Trials data does support a necessary condition of this experiment-that of the subject's being on an equal footing to learn the experimental words, thus confirming the randomization process used in assigning subjects to the two conditions - a great deal of importance cannot be placed on it due to the small number of trials given. A greater number of practice trials would have allowed an even greater significance to be placed on their results in support of the necessary condition of equality of

subjects prior to the experimental trials.

Recall Trial

A mixed design analysis of variance with a between subjects factor of Audience and a within subjects factor of Words, computed on the data from the recall trial, revealed no significant effects whatever. The dependent measure was the number of words correct on the recall trial. The results of this analysis are summarized in Table 6.

DISCUSSION

The hypothesis that there would be a statistical interaction resulting from a greater difference between the speed of learning of the sexual and neutral words in the Audience Present than in the Audience Absent conditions was supported.

The significance of the Audience x Words x Trials interaction lends support to the assumption that the sexual words are more anxiety producing than the neutral words by virtue of the fact that the only differences between the two groups, as far as the results were concerned, was in the different achievement levels of the subjects for the two types of words.

In the Audience Absent situation, more sexual words were learned on the earlier trials while in the Audience Present condition, more neutral words were learned on the earlier trials. This, thus, lends support to the assumption that the Audience Present condition was an anxiety-provoking situation due to the fact that there was a difference in the type of words learned on the early trials and yet the only systematic difference between the subjects in the experiment was the Audience variable.

Thus, the subjects learned more of the non-anxiety-provoking words in the anxiety-provoking condition and more of the anxiety-producing words in the non-anxiety-provoking condition, on early trials. This trend is evident from the significant Audience x Words interaction found in the analysis of variance of the first five trials.

These differences converged on later trials and in both cases, tended to reverse. In the Audience Absent condition, in general more neutral words were recalled while in the Audience Present condition, more of the sexual words were recalled, on later trials. This tendency was not significant, however, as is evident from the analysis of variance of the last five trials. The seeming reversal is perhaps due to the fact that, on later trials, almost all of the words of both types were learned to a level approaching ceiling for all subjects. Another possible explanation is that the subjects adapted to the anxiety-provoking words due to their repeated presentation, that is, the subjects' anxiety extinguished. In any case, any differences evident on the early trials were obscured in the later trials. This trend was also evident from the data on the Recall trial when no significant effects of any kind were found.

The result of no significant effects obtained on the Recall Trial, was contrary to that expected in the hypothesis, which predicted that the interaction effect would also be evident on the Recall trial. However, since the effect was obscured on the later trials, it is entirely consistent with the findings that this effect should also be obscured on the Recall trial. In this way, the previous assumptions that, on later trials, the words were either learned to a level approaching ceiling or else the subjects' anxiety extinguished and thus differences were not evident, can be supported by the fact that no significant effects were found on the Recall trial either, when all subjects experienced

the same condition—that of Audience Absent. Thus, it can be assumed that any true differences were hidden by the level of learning of the words attained by the subjects. As a result, one can presuppose that the subjects were actually learning the neutral words to a greater extent than the sexual words, in the Audience Present condition.

At this point, the argument could be advanced that, in the Audience Present condition, the subjects were learning the neutral and sexual words to the same extent but were just not saying the sexual words. This argument is not completely valid, however, because, on later trials, the subjects were saying the sexual words as well as the neutral words in the Audience Present condition as is evident from the fact that there are no significant differences on the last five trials or on the Recall trial. This then indicates that there was a difference between the learning of the sexual and neutral words in the Audience Present condition, on early trials.

The results of the study in general lend support to the assumption that a high level of drive or anxiety has an effect on the ability of the individual to learn anxiety-provoking material. Subjects tended to learn the anxiety-provoking material more slowly over the first 5 trials. These findings could lend support to the speculation that people with neurotic symptoms develop their behavior due to deficiencies in learning new responses to anxiety-arousing material in anxiety-provoking situations. The material is so stressful that automatic processes are called into action to avoid the

stimuli. As a result, learning in a stressful situation is incapacitated. New modes of behavior to cope with anxiety situations are not learned either because relevant cues are not utilized or because thoughts relevant to the situation are repressed or inhibited. The individual has no information on which to build a sounder, more socially acceptable behavior pattern. Thus, a deficiency in the learning of anxiety-provoking material in a state of neurotic anxiety could be one reason for the persistent, unacceptable, incapacitating behavior of the person with neurotic symptoms.

Some improvements in the design of the experiment might have increased the significance of the results in the direction predicted by the hypothesis. The findings might have lent themselves more readily to interpretation if the subjects had been tested previously with the Manifest Anxiety Scale to obtain their anxiety scores. If this had been done, the subjects in each of the Audience Absent and the Audience Present conditions could have been grouped according to their scores and thus the effects of the anxiety-provoking situation as related to the learning of anxiety-provoking material could have been studied in more detail.

A longer word list and more trials might also have produced different results or might have enlarged the differences found in this study to a point where different interpretations would have to be made.

A greater number of practice trials may also have pointed out significant differences between the subjects in each of the conditions, which would again

have affected the interpretation of the results.

However, assuming the results of this study to be replicable, these findings have implications for future research. A parallel study with female subjects and male experimenters might prove interesting.

In addition, these reported results could be applied to research in the area of neuroticism. If neuroticism can be compared to a state of perpetual high anxiety, and if anxiety-provoking material for the person with neurotic characteristics can be compared to anxiety-provoking material on a paired-associate task, then implications from this study for the study and correction of neurotic tendencies through further study of anxiety and its effects on learning are far-reaching. The suggestion that deficiencies in learning in anxiety situations could be due to restricted cue utilization needs further research, as does that suggestion that it may be due to repression.

The results of this study also lend themselves to work in the areas of systematic desensitization, covert sensitization, and other therapeutic processes involved with the treatment of neurotic symptoms. If there is indeed an effect on learning as a result of anxiety, then a learning task given to the subject at the end of therapy would be a valuable tool in assessing the efficacy of the therapy. During therapy, the anxiety of the person manifesting neurotic symptoms to certain stimuli should be gradually reduced or obliterated. Thus, there should be a difference in achievement on a learning task given before and after therapy. If performance is

improved, then the therapy may be assumed to be effective.

Thus, the results of this study are valuable for future research in the area of neuroticism as well as for future advances in therapy.

SUMMARY

This study investigated the effects of an anxiety-provoking situation on the learning and retention of anxiety-provoking and non-anxiety-provoking material. Thirty-six male undergraduate students, enrolled in an introductory psychology course, participated as subjects in a paired-associates learning task involving sexual and neutral words. These subjects were randomly assigned to two treatment conditions: Audience Absent and Audience Present.

The hypothesis tested was that there would be a statistical interaction resulting from a greater difference between the speed of learning of the sexual and neutral words in the Audience Present than in the Audience Absent conditions, with the neutral words being learned to a greater extent in the Audience Present condition. The results tended to support the hypothesis.

The implications for these findings in the area of research on neuroticism and in the area of treatment of neurotic symptoms were mentioned.

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TABLE 1

MEAN FAMILIARITY RATINGS OF SEXUAL AND NEUTRAL WORDS

Sexual Words	Mean	Neutral Words	Mean
Bosom	3.617	Cougar	3.565
Crotch	3.217	Donkey	3.468
Genitals	3.521	Giraffe	3.064
Nipple	3.511	Muskrat	3.152
Orgasm	3.681	Puppy	3.891
Vagina	3.362	Squirrel	3.543
Mean	3.494	Mean	3.447

TABLE 2

ANALYSIS OF VARIANCE OF SPEED OF LEARNING ON EXPERIMENTAL TRIALS

Source of Variation	DF	SS	MS	F
Aud	1	3.3354	3.3354	0.137
Error 1	34	825.1328	24.2686	
Wds	1	0.4966	0.4966	0.111
Aud Wds	1	4.8384	4.8384	1.084
Error 2	34	151.7813	4.4642	
Trl	9	438.9836	48.7760	43.343*
Aud Trl	9	5.6470	0.6274	0.558
Error 3	306	344.3555	1.1253	
Wds Trl	9	10.4282	1.1587	1.468
Aud Wds Trl	9	14.4668	1.6074	2.037**
Error 4	306	241.4766	0.7891	
Error due to approximation		-0.0086		
Total	719	2040.9336		

* $p. < .001$

** $p. < .05$

TABLE 3
ANALYSIS OF VARIANCE OF FIRST FIVE TRIALS

Source of Variation	DF	SS	MS	F
Aud	1	4.0166	4.0166	0.490
Error 1	34	278.9702	8.2050	
Wds	1	0.4043	0.4043	0.182
Aud Wds	1	14.3921	14.3921	6.490*
Error 2	34	75.3970	2.2176	
Trl	4	63.8657	15.9664	20.225**
Aud Trl	4	2.1797	0.5449	0.690
Error 3	136	107.3645	0.7894	
Wds Trl	4	7.1235	1.7809	2.533***
Aud Wds Trl	4	3.0806	0.7701	1.096
Error 4	136	95.6045	0.7030	
Error due to approximation		-0.0081		
Total	359	652.3906		

* $p < .025$

** $p < .001$

*** $p < .05$

TABLE 4
ANALYSIS OF VARIANCE OF SECOND FIVE TRIALS

Source of Variation	DF	SS	MS	F
Aud	1	0.3406	0.3406	0.018
Error 1	34	658.1357	19.3569	
Wds	1	0.1406	0.1406	0.041
Aud Wds	1	0.4705	0.4705	0.136
Error 2	34	117.4919	3.4556	
Trl	4	37.5606	9.3902	10.216*
Aud Trl	4	2.4502	0.6126	0.666
Error 3	136	125.0039	0.9191	
Wds Trl	4	3.2610	0.8153	1.058
Aud Wds Trl	4	1.3771	0.3443	0.447
Error 4	136	104.7590	0.7703	
Error due to approximation		-0.0165		
Total	359	1050.9751		

* $p < .001$

TABLE 5

ANALYSIS OF VARIANCE OF SPEED OF LEARNING ON PRACTICE TRIALS

Source of Variation	DF	SS	MS	F
Aud	1	0.3494	0.3494	0.205
Error 1	34	58.0281	1.7067	
Trl	1	8.6828	8.6828	11.590*
Aud Trl	1	0.3450	0.3450	0.460
Error 2	34	25.4722	0.7492	
Error due to approximation		-0.0023		
Total	71	92.8750		

*p. \leq 005

TABLE 6
ANALYSIS OF VARIANCE OF RECALL TRIAL

Source of Variation	DF	SS	MS	F
Aud	1	0.6803	0.6803	0.155
Error 1	34	148.8056	4.3766	
Wds	1	4.0136	4.0136	2.881
Aud Wds	1	1.1253	1.1253	0.808
Error 2	34	47.3612	1.3930	
Error due to approximation		0.0004		
Total	71	201.9863		

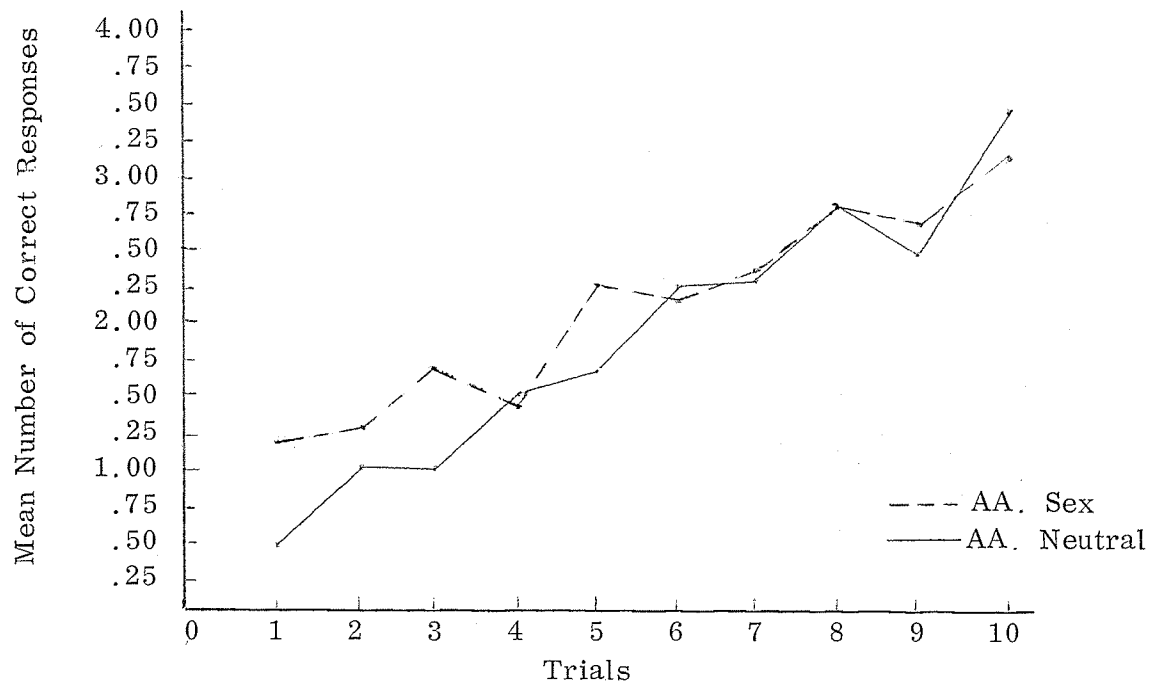


Fig. 1. Mean Number of Correct Responses by Trials in the Audience Absent Condition.

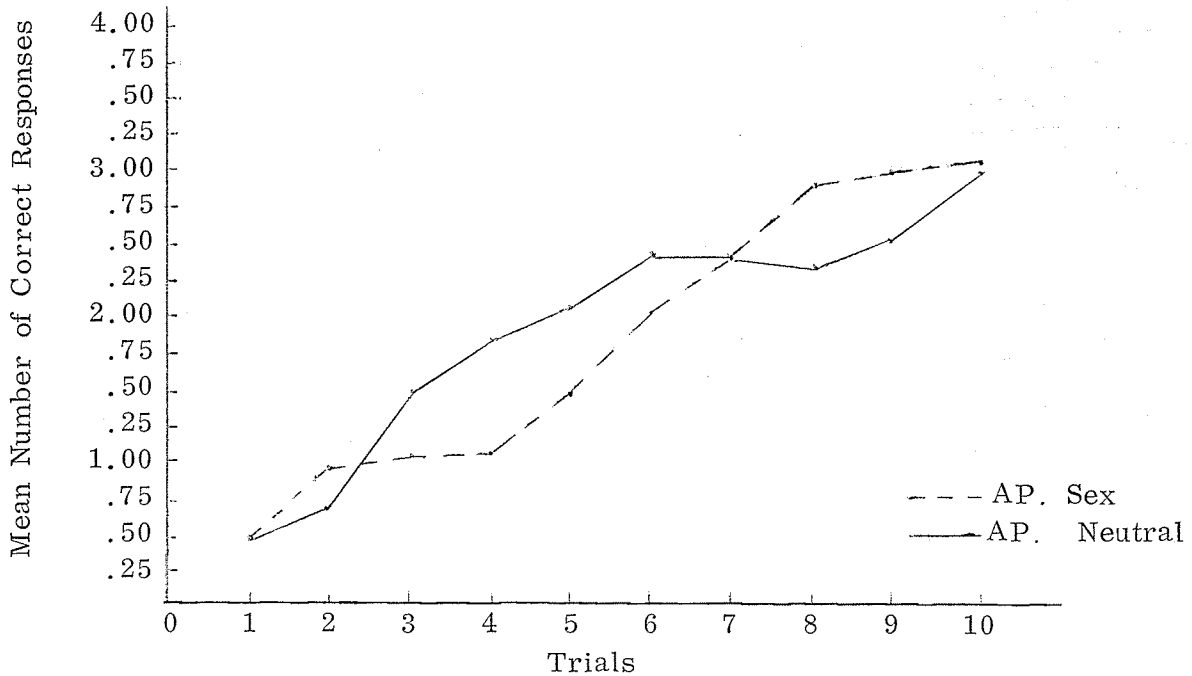


Fig. 2. Mean Number of Correct Responses by Trial in the Audience Present Condition.

APPENDICES

APPENDIX A

Questionnaire Used to Gather Familiarity Norms

(presented to students with word groups of
ten in several different random orders)

Master Rating Scale

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

NEVER - you have never seen or heard or used the word in your life.

RARELY - you have seen or heard or used the word at least once before, but only rarely.

SOMETIMES - you have sometimes seen or heard or used the word, but not often.

OFTEN - you have often seen or heard or used the word, but not very often.

VERY OFTEN - you have seen or heard or used the word nearly every day of your life.

This is a test to find out how often you have come in contact with certain words.

You will be given a list of 100 words and you are to rate each one as to the number of times you have experienced it by simply filling in the space of the appropriate number rating on the separate answer sheet provided.

The five possible ratings are described by the words NEVER, RARELY, SOMETIMES, OFTEN, and VERY OFTEN. This means that you have seen or heard or used the particular word (in writing or in speech) the number of times indicated on the Master Rating Scale. (See the attached Master Rating Scale.)

Do not be bothered if you are unable to give a definition of some of the words. Simply rate each one as to the number of times you have come in contact with it regardless of its meaning.

There may be some words which you have used or heard more often than you have seen them. Or there may be other words which you have seen more often than you have used or heard them. In such cases, always give the word the highest rating of the three.

For example, you may use or hear the word FRATERNITY often, but you may never have seen it in print. In this case, you would rate FRATERNITY as "Often" (number 4 on the answer sheet).

Be as honest in your ratings as you can. You may not have come in contact with all of them. Just make the best estimates you are capable of.

Be sure to indicate your ratings for each page of words and for each word in the correct number on the answer sheet.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often
1. footsore	26. mouse	51. squirrel	76. talcum	
2. purvey	27. cat	52. puppy	77. embrace	
3. horse	28. celery	53. cumquat	78. tryst	
4. stoke	29. deer	54. mare	79. breast	
5. parsley	30. orgasm	55. muskrat	80. whelk	
6. bean	31. rosary	56. cariboo	81. uncut	
7. patio	32. lucre	57. monkey	82. elective	
8. doe	33. reheat	58. erection	83. leek	
9. giraffe	34. cattle	59. intern	84. torso	
10. beet	35. inky	60. aardvark	85. nester	
11. melon	36. testicles	61. minuet	86. cow	
12. soggy	37. pomfret	62. cabbage	87. rayon	
13. collie	38. tomato	63. nipple	88. vagina	
14. crotch	39. parsnip	64. peas	89. reindeer	
15. visor	40. sheep	65. prostitute	90. pomegranate	
16. genitals	41. nectarine	66. petting	91. cosmos	
17. mule	42. placer	67. ovary	92. turnip	
18. lettuce	43. dog	68. bosom	93. asparagus	
19. lemming	44. rabbit	69. squash	94. chicken	
20. coitus	45. spinach	70. potato	95. corn	
21. carrot	46. cougar	71. pomelo	97. lion	
22. yam	47. ejaculation	72. calculus	98. onion	
23. thigh	48. posse	73. semen	99. platypus	
24. hobo	49. simper	74. heifer	100. antelope	
25. deceiver	50. sperm	75. broccoli		

APPENDIX B

Presentation of Experimental Words

List #1

QAS	GENITALS
QEM	BOSOM
ZUB	COUGAR
PIW	MUSKRAT
HYJ	DONKEY
PYB	CROTCH
ZOF	VAGINA
KYF	NIPPLE
XEJ	SQUIRREL
KOJ	ORGASM
XUM	PUPPY
HUW	GIRAFFE

List #2

QAS	DONKEY
ZUB	SQUIRREL
XUM	ORGASM
KOJ	PUPPY
ZOF	GIRAFFE
KYF	NIPPLE
HUW	BOSOM
HYJ	COUGAR
QEM	GENITALS
PIW	VAGINA
XEJ	MUSKRAT
PYB	CROTCH

List #3

ZOF	NIPPLE
ZUB	COUGAR
XEJ	GIRAFFE
HYJ	MUSKRAT
KOJ	CROTCH
PIW	PUPPY
QEM	DONKEY
HUW	GENITALS
KYF	VAGINA
PYB	SQUIRREL
QAS	ORGASM
XUM	BOSOM