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Ego Threat and Noxious Stimulation as a Means of Inducing the Inhibition of Associative Recall

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EGO THREAT AND NOXIOUS STIMULATION AS A MEANS OF INDUCING
" THE INHIBITION OF ASSOCIATIVE RECALL

A Thesis

Presented to

The Faculty of the Department of Psychology
The College of William and Mary in Virginia

In Partial Fulfillment

Of the Requirements for the Degree of
Master of Arts

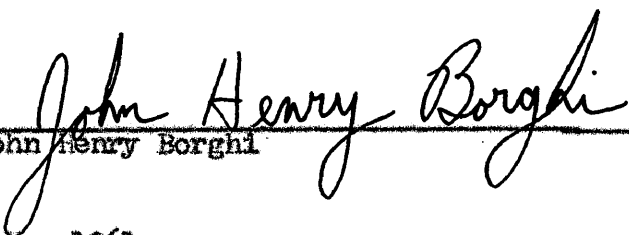
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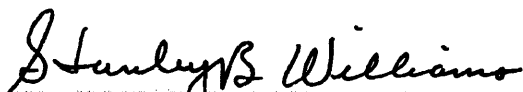
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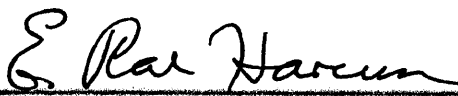
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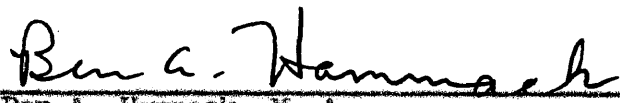
This thesis is submitted in partial fulfillment of
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Master of Arts


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ABSTRACT

An inhibition of associative recall was observed for responses followed by a raucous buzzer alone and for ego-threat alone, but no inhibition was found for responses followed by both variables.

One-hundred Ss were asked to respond to 100 Kent-Rosanoff words. Twenty-five Ss were buzzed for certain "critical," responses, 25 threatened for "critical," responses, 25 both buzzed and threatened, and 25 Ss neither buzzed nor threatened served as a control group. Following the administration of a 15-minute neutral task, Ss were asked to recall all 100 associative responses. There was significantly less recall of "critical," words for Ss either buzzed or threatened when compared with the control group. However, Ss both buzzed and threatened made the same number of errors on "critical," words as the controls.

It was suggested that Ss either buzzed or threatened on "critical," words initially responded with a conditioned fear which generalized to thinking about the word. The inhibition found on recall was interpreted as the reduction of a learned fear drive.

For Ss both buzzed and threatened it was hypothesized that a discriminative emphasis variable intensified the "critical," words tending to neutralize the effects of this compound variable. Testing of the hypothesis by systematically increasing and decreasing the independent variables of noxious stimulation and ego-threat was suggested.

EGO THREAT AND NOXIOUS STIMULATION AS A MEANS OF INDUCING
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INTRODUCTION

In the clinical setting the term for the forgetting of painful or unpleasant material is of course repression. The experimental problem of investigating the phenomenon involves eliciting this special instance of forgetting by introducing certain variables. The present paper attempts to establish these conditions and relate the process to the principles of learning.

The Freudian Construct:

A paper entitled "On the Psychic Mechanisms of Hysterical Phenomena," jointly published in 1893 by Freud and Josef Breuer contained the initial reference to a theory which was to become as Freud later wrote, "the pillar upon which the edifice of psychoanalysis rests," (1938). The authors, in this paper, discussed the treatment by the "cathartic method," of an hysterical girl. They concluded that the successful treatment of the patient was based on an emotional purging or catharsis experienced by the young girl. They further added that hysteria was a disease of the past, in which symptoms represented some disagreeable, forgotten event of the patient's life. The full outline of the theory of repression appeared in 1915.

One of the vicissitudes an instinctual impulse may undergo is to meet with resistances the aim of which is to make the impulse inoperative. Under certain conditions, which we shall presently investigate more closely, the impulse then passes into the state of repression. (1953, p.84)

With this statement Freud begins his analysis of repression. At its simplest, Freud described repression in but 17 words. "The essence of repression lies simply in the function of rejecting and keeping something out of consciousness." (1953, p.86) The best example of this simple rejection of material is in the forgetting of proper names. For Freud, the conditions necessary for the forgetting of a name includes some disposition to do so, which usually means some manner of unpleasant or painful association with the name (1938).

Learning theory:

Following Hullian learning theory Dollard and Miller (1950) have treated the Freudian construct of repression in terms of a tendency for certain thoughts to be avoided. Thus, "...repression is the symptom of avoiding certain thoughts; it is reinforced by drive reduction..." (1950, p.201). They describe how children learn to fear certain words spoken out loud. The child may be physically punished for uttering the "nasty," word or the general attitude of disapproval evoked from the parent may give rise to a response of fear. An experiment by Miller (1948) further demonstrates that the conditioned response of fear linked to a word spoken aloud may become attached to thinking of the word by means of the mechanism of generalization. By presenting the letter "T" and the figure "4" to Ss Miller (1948) was able to produce a large conditioned galvanic skin response to the "T" when followed by a shock. Interpreting this response as fear, Miller then presented Ss with a series of dots instructing Ss to "think," of a "T" and

"4" alternately. Results showed large galvanic responses for those alternate dots which Ss were instructed to associate with "T" but none for "4." In view of these findings Dollard and Miller (1950) conclude that they "would expect the fears that are attached to saying forbidden words...to generalize to thinking these words..." (1950, p.205).

Present Theoretical Approach:

The theoretical approach of the present study will interpret repression as the symptom of avoiding certain thoughts. This symptom will be seen as tending to reduce a postulated fear drive learned by certain Ss as a response to the independent variables of noxious stimulation and ego-threat where the initial response is a conditioned fear.

The present experiment is therefore not measuring repression by itself or even any manner of conditioned avoidance per se. Instead, an attempt has been made to manipulate certain independent variables in order to examine their effect on the recall of associative responses.

Before proceeding with a detailed outline of this present study however, a survey of previous experiments is in order. Many of these studies have purported to be testing for "repression," and we will not quarrel with their semantics at this point except where others have noted basic flaws in design.

History of the Problem:

Pleasantness-Unpleasantness: Most studies related to the mechanism

of "repression," prior to 1935 were concerned with the recall of pleasant or unpleasant material. These studies ranged from the pairing of pleasant and unpleasant odors with nonsense syllables and subsequent testing for recall to the simple recollection of pleasant and unpleasant life experiences. Zeller (1950a) notes that the tally for these kinds of studies is 32 to 14, favoring recall of pleasant over the unpleasant. One of the more extensive investigations of this kind conducted by Ratliff (1938), utilized odors, colors, and pitches in terms of pleasantness and unpleasantness. For olfaction he found the unpleasant to be recalled more effectively, while the visual and auditory recollection was superior for pleasant items.

The recall of life experiences is an attempt to examine actual events in the S's past with respect to how effectively the unpleasant as opposed to the pleasant is recalled. The basic, and probably incorrect premise that these events occur with equal frequency will be discussed shortly. Meltzer (1930a, 1930c, 1931), is one of the most prolific and enthusiastic experimenters in this area. (See Appendix A:1) Others, including Jersild (1931), Waters and Leeper (1936), Menzies (1936), and O'Kelly and Steckle (1940), have also used holiday experiences to explore the possibility of greater recall of pleasant life events. But the findings of at least two other investigators, Cason (1932), and Wohlgenuth (1923), would seem to contradict such results as reported above. Wohlgenuth in fact, felt that he had disproved the Freudian theory

of forgetting when he found no evidence for the more effective recall of pleasant over unpleasant experiences. His study brings into prominence the variable which may account for some investigators having found support for the Freudian repression hypothesis---namely, the disproportionate frequencies of pleasant over unpleasant experiences in the first place. It is most unlikely that pleasant and unpleasant life events occur with equal frequency, which would be the proper condition for this particular design to approximate the measurement of repression. So this flaw would tend to discredit those experiments dealing simply with the recall of life experiences.

Ego-Threat and Success-Failure: It was the independent work of Sears and Rosenzweig which pointed out a crucial mistake in most of the previous studies of repression. Sears (1939), choosing to explain repression within the boundaries of stimulus-response theory, noted that the absence of ego-threat in the experimental situation failed to fulfill the requirements for repression to operate. Rosenzweig (1938), in addition to noting the erroneous idea that unpleasant and pleasant experiences occur with equal frequency, concurred with Sears in insisting that if repression is an ego-defense mechanism there must be present in the experimental situation some threat to the S's self-esteem or ego. (See Appendix A:2) In a series of experiments (1941, 1943), Rosenzweig reported task orientation resulted in superior recall of uncompleted tasks, while ego-involvement resulted in

superior recall of completed tasks. Prior to this Sears (1937) had already employed the success-failure design using card sorting as the task, preceded and followed by the learning of nonsense syllables. Those Ss who were "successful," at card sorting were significantly superior in learning the second list of nonsense syllables compared with the "failure," group. As Zeller (1959a) has noted however, the difference here may well be due to motivational factors in the form of reduced aspiration for the "failure," group to learn the second list.

Zeller (1950a) maintains that in order for there to be a valid test of repression there must be a "restoration to consciousness of the repressed material." Using induced-failure as the variable of ego-threat, Zeller (1950b), subsequently found that recall was reduced for material that had been previously learned when that material (nonsense syllables) was associated with a failure task (Knox tapping cubes). He further found that success at the task (removal of the repression) increased recall of the original material.

Individual Differences: In a study touching on repression Huston, Shakow, and Erickson (1934) used hypnosis to induce a complex in four men and eight women Ss. The Luria method (1960) of detecting affective conflicts was employed. (See Appendix A:3) The procedure involved suggesting to the S that while visiting some friends he had accidentally burned a cigarette hole in the dress of a girl to whom he was much attracted. When the

girl finally noticed the burn she attributed it to her own carelessness. It was suggested to the S that he failed to correct her mistaken impression and the next day, when he finally summoned up enough courage to tell her the truth, he found she had left town. Ss were then asked to make verbal responses to 100 words while simultaneously initiating a slight pressure with their hand on a tambour. Within the 100 words were contained ten critical words, (e.g.: dress, cigarette, burned, etc.) relating to the cigarette-burning incident. Results showed that in six of the nine subjects some motor aspect of behavior indicated a conflict in either the hypnotic or subsequent waking state. Continued experimental sessions with each "conflict," S indicated a slow lessening of motor disturbances from day to day. The authors conclude that this gradual decline illustrates a forgetting or "abreactive," factor. The fact that three out of the nine failed to accept the suggestion that they could have committed such an act points up the importance of individual dynamics. Along these same lines, Rosenzweig (1952) has admirably noted that "experimentation on repression and related concepts must invariably consider the idioverse of the subject--- the balance of experimental conditions and personality variables as these are blended in the dynamic experience of the person." Rosenzweig (1951) suggests calling this orientation which concerns itself with the dynamics of the individual---"idiodynamics."

In a more recent study Truax (1957) has to some degree, but

without acknowledging Rosenzweig, explored this personality-oriented dimension. Truax attempts to test the Freudian theory in relation to a repression index derived from two scales of the MMPI---the Hysteria and Psychasthenia scales. Following Eriksen's (1952, 1954) suggestion that the repression index differentiates Ss who characteristically utilize repression as a reaction to anxiety from Ss who would use other means, Truax proceeded to employ an implied-failure technique. Pairing nonsense syllables with words deemed "traumatic," due to their association with unfinished tasks, he tested for relearning of 18 paired-associates after the implied-failure "intelligence test." He again tested for relearning proficiency after the removal, ("Actually, that wasn't an intelligence test at all...") of this anxiety-provoking situation. Truax interprets his results as being consistent with the Freudian hypothesis. More importantly, his case for repressors and non-repressors reinforces Rosenzweig's concept of idiodynamics. Specifically, Truax finds the difference between repressors and non-repressors (as measured by the index) during learning-relearning sessions to be statistically significant (beyond the .001 level). He interprets this as indicating the need for a closer look at the individual repression habits of Ss responding to anxiety.

Noxious Stimulation: A particular form of unpleasantness-pleasantness might be the ordinary shocks, buzzers, and noxious stimuli of the laboratory. McGranahan (1948) claims to have elicited repression in an association test by means of electric

shock alone. (See Appendix A:4) His experiment however, is complicated by other factors including conscious intention, and it can not be regarded as a pure experimental test of the effects of noxious stimuli on association or recall. Diven (1937) also used electric shock to demonstrate repression (as well as displacement and certain other Freudian mechanisms). But he did this by means of an hypnotic technique, similar to Luria's, which prevents it from being an uncomplicated test of noxious stimulation alone. Thus, it would seem we have no data available today on the effect of a simple buzzer on acts of recall in human Ss.

We have briefly seen how psychologists have attempted to explore the conditions conducive to repression. Simple "unpleasantness," is evidently not enough, as least as it has usually been defined experimentally. Rather severe ego-threats, induced by experiences of failures, apparently can be effective. Hypnosis is evidentially also effective. Studies of very simple noxious stimuli are few and inconclusive.

The Present Experiment:

The present experiment grew out of a previous study (Borghi, 1960) which seemed to demonstrate a repression-like associative inhibition when verbal responses were followed by a raucous buzzer. The initial instructions in that study had contained a slight ego-threat to Ss by suggesting that buzzed responses were "poor." Ss recalled significantly fewer of these buzzed responses

when compared with non-buzzed words having the same statistical tendency to occur. These results were interpreted as indicating some support for the hypothesis that mild stimulation could induce differential forgetting. However, the buzzer had been labeled "poor," thus confounding it with ego-threat. Therefore, the experiment only showed that a mild compounded variable could induce a certain degree of forgetting. The present study was designed to repeat that experiment and to test the respective separate effects of the raucous buzzer alone, ego-threat alone, and both variables together. Since the first study used essentially two confounded variables (noxious stimulation and implied ego-threat) separation as well as intensification of the independent variables was deemed desirable in order to more carefully assess the resulting memory loss.

The present paper therefore, concerns itself with a demonstration of how the manipulation of the variables of noxious stimulation and ego-threat may affect recall.

METHOD AND PROCEDURE

Subjects:

The Ss were 100 College of William and Mary undergraduates, mostly sophomores and juniors. Seventy women and thirty men served in the experiment, one of a number of requirements Ss had to fulfill in an Introductory Psychology course. Each S was assigned to one of three experimental and one control groups by means of a card shuffle. (See Table 1)

Procedure:

The S was seated in a sound-deadening room facing the E who stood outside the room. Verbal contact was maintained through an open window. In connection with Groups I and III a ten-inch loud speaker was placed six feet behind the S on a back wall. A loud, raucous noise had been recorded by taping and amplifying the buzz of a vibrating electric engraver. This noxious stimulus could be presented by the E's depressing a micro-switch attached to a table out of the S's field of vision. The sound produced lasted one and one-half seconds and was standard for all Ss treated in this manner.

TABLE 1

THE NUMBER OF MEN AND WOMEN Ss IN THE RESPECTIVE GROUPS

Group	Variable	Women	Men
I	Noxious-stimulation	16	9
II	Ego-threat	17	8
III	Noxious-stimulation and Ego-threat	20	5
IV	Presentation of list alone	17	8

One-hundred words after Kent-Rosanoff (1927) (including a slightly different word-ordering and the substitution of one word) were presented to all 100 Ss. (These words are shown in Table 2.) More specifically, each group received the following instructions:

Group I: (Noxious stimulus)

This is a study of the kind of thinking an individual does during a word-association test. I am going to read a list of words to you. I want you to respond with the first word that pops into your head as this is also a test of how fast you can think. Here are some practice words.

On the third practice response, and regardless of the response, the S was buzzed. Subsequent to the five practice words Ss were buzzed when they responded with the arbitrarily selected twenty "critical," words, also shown in Table 2.

Group II: (Ego-threat)

This is a study of the kind of thinking an individual does during a word-association test. I am going to read a list of words to you. I want you to respond with the first word that pops into your head as this is also a test of how fast you can think. Now in the course of this experiment you may make some good responses and some poor ones. Here are some practice words.

On the third response, and regardless of the response, the S was told: "I'm sorry, that's a poor one. Well, let's continue with the first word that pops into your head." Subsequent to the practice words, Ss were told they had made a "poor," response whenever the response was one of the "critical," words.

Group III: (Both variables)

This is a study of the kind of thinking an individual does during a word-association test. I am going to read a list of words to you. I want you to respond with the first word that

TABLE 2

100 STIMULUS WORDS AFTER KENT-ROSANOFF WITH "CRITICAL," RESPONSES
SHOWN IN PARENTHESES

1 DARK	51 JUSTICE
2 MUSIC	52 CHAIR (TABLE)
3 MAN	53 LIGHT
4 TABLE (CHAIR)	54 BIBLE
5 DEEP	55 HEALTH (SICKNESS)
6 HAND (FOOT)	56 MEMORY
7 EATING	57 SHEEP
8 SICKNESS (HEALTH)	58 FOOT (HAND)
9 MOUNTAIN	59 BATH
10 HOUSE	60 ROUGH (SMOOTH)
11 MUTTON	61 COTTAGE
12 SHORT (LONG)	62 SWIFT
13 COMFORT	63 BLUE
14 FRUIT	64 HUNGRY
15 SMOOTH (ROUGH)	65 LONG (SHORT)
16 BUTTERFLY	66 PRIEST
17 COMMAND	67 OCEAN
18 WHISTLE	68 HEAD
19 WOMAN	69 STOVE
20 SWEET (SOUR)	70 RELIGION
21 COLD	71 WHISKEY
22 SLOW	72 HARD (SOFT)
23 WISH	73 SNOW
24 RIVER	74 HAMMER
25 BEAUTIFUL	75 THIRSTY
26 WINDOW	76 CITY
27 CITIZEN	77 SQUARE
28 SPIDER	78 BUTTER
29 GIRL (BOY)	79 DOCTOR
30 SOFT (HARD)	80 LOUD
31 NEEDLE	81 THIEF
32 RED	82 SOUR (SWEET)
33 SLEEP	83 LION
34 ANGER	84 JOY
35 CARPET	85 BED
36 HIGH	86 HEAVY
37 WORKING	87 WHITE (BLACK)
38 EARTH	88 TOBACCO
39 TROUBLE	89 MOON
40 BLACK (WHITE)	90 BOY (GIRL)
41 SOLDIER	91 SCISSORS
42 BABY (CHILD)	92 QUIET
43 CABBAGE	93 GREEN
44 EAGLE	94 SALT
45 STOMACH	95 STREET
46 STEM	96 CHILD (BABY)
47 LAMP	97 KING
48 DREAM	98 CHEESE
49 YELLOW	99 BLOSSOM
50 BREAD	100 AFRAID

pops into your head as this is also a test of how fast you can think. Now in the course of this experiment you may make some good responses and some poor ones. Here are some practice words.

On the third practice word the S was buzzed and told he had made a "poor," response. Subsequently, S was buzzed and threatened for "critical," responses on the list itself.

Group IV: (Control)

This is a study of the kind of thinking an individual does during a word-association test. I am going to read a list of words to you. I want you to respond with the first word that pops into your head as this is also a test of how fast you can think. Here are some practice words.

For these Control Ss there was neither buzzer nor ego-threat.

Following presentation of the 100 words, each S was taken to a different room where the Taylor Anxiety Scale (1953) and a portion of the MMPI was administered. This was done partly as a time-filling neutral task, but also to investigate any possible correlation between anxiety (as measured by the MAS) and forgetting. After exactly fifteen minutes the E tested S's ability to recall his responses to the original list (the dependent variable) with the following instructions:

Now I would like to see how well you can recall the responses that you just made in the other room. In other words, when I said "dark," what did you say?

Shortened to: "When I said---"(followed by the appropriate stimulus) the list was given in the same order. (See Table 3)

TABLE 3

SEQUENCE OF STEPS IN THE COMPLETE EXPERIMENT

Step	Duration	Operation Involved
Pre- Experimental	—————	Selection of 20 "critical," words within Kent-Rosanoff list.
1	9-12 minutes	Administration of word- association list. Ss exposed to independent variable, (buzzed, threatened or both) except for Control Group.
2	15 minutes	Administration of TAS and portion of MMPI.
3	14-18 minutes	Test for recall.

RESULTS

An inspection of Table 4 shows the relative debilitating effects of noxious stimulation and ego-threat for the respective groups. Appendix B shows the individual raw data. The greatest memory loss occurs in Group II, where the Ss were threatened when they responded with "critical," words. Compared with the control (Group IV) Ss' score of nine "critical," errors, the ego-threatened Ss (Group II) made almost three times as many errors (i.e., 25). The buzzed group made over twice as many errors, (i.e., 23). Each of these totals is statistically different from the controls at the 5% level of confidence. Thus, a t-test between Group II and Group IV yields a t of 2.37, and between Group I and Group IV a t of 2.15.

The reader may note that Group III which was both buzzed and threatened, made exactly the same (small) number of errors as did the controls. Although not specifically predicted the E would have expected the greatest memory loss in Group III (both variables) with Group II (ego-threat alone), Group I (buzzer alone), and Group IV (control) showing respectively less memory loss. This estimation is indeed, confirmed by inspection of the "Total Errors," in Table 4. Although the

TABLE 4

DATA TOTALS FOR GROUPS I, II, III, AND IV WHERE N IS 100

	Critical Responses*	Critical Recalls	Critical Errors	Non-critical Errors	Total Errors
Group I (Buzzed)	239	216	23	429	452
Group II (Threatened)	219	194	25	440	465
Group III (Both)	164	155	9	472	481
Group IV (Control)	204	195	9	436	445

* Critical responses for Group I is also times buzzed, for Group II times threatened, and for Group III times buzzed and threatened. Group IV is the control group.

differences in "Total Errors," is not statistically different, these differences do provide some basis for a discussion of what might be termed a "discriminative emphasis," versus a "summation effect." Elaboration of these concepts will be contained in the Discussion.

Fig. 1 shows the distribution of the "A" scale of the TAS. (Fig. 2 shows the distribution of the "A" scores for the pilot study already mentioned.) A Pearson Product-Moment correlation between the "A" scale values and the total errors of all Ss in the present study yields an r of .07. The same test correlating the "k" scale (purported to measure defensiveness in a test-taking situation) and total errors for all Ss yields an r of .03. Neither of these coefficients is significantly different from zero.

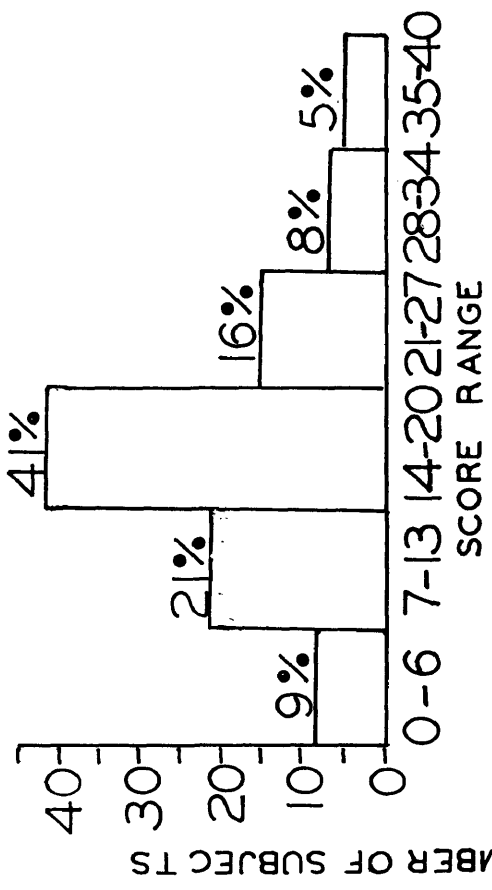


FIG. 1. DISTRIBUTION OF A SCORES FOR 100 W+M UNDERGRADUATES

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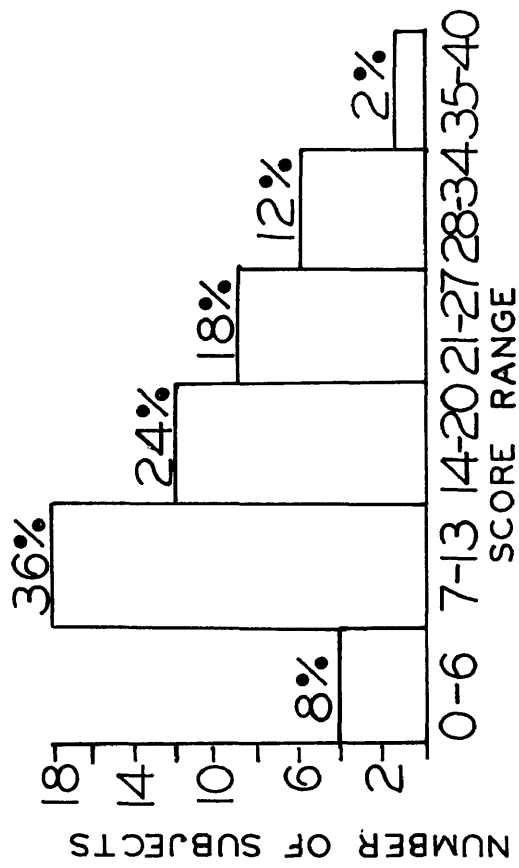


FIG. 2. DISTRIBUTION OF A SCORES FOR 50 W+M UNDERGRADUATES

1960

DISCUSSION

Group I and Group II:

It will be remembered that this experiment was designed to separate and intensify the compound variables found to have been effective in reducing recall scores in a previous study (Borghi, 1960).

Appendix C shows the results of that earlier study in which the independent variable was the same noxious stimulation of the present study, but with the somewhat different instructions shown in Appendix D. Table 5 compares the totals of the previous study (Experiment A) with Group I of the present study. It will be noted that the Ns are different. The 50 Ss in Experiment A however, had only ten opportunities to respond with "critical," words while the 25 Ss in Group I had 20 opportunities to make "critical," responses. (i.e., the "extra," ten opportunities for Group I to respond with "critical," words seems to proportionately equalize the "extra," 25 Ss in Experiment A.) Additionally, in Experiment A, the ego-threat was "implied;" that is, it was made only once, as a qualifier of the buzzer, and was not continuously repeated. But for essentially the same design (introduction of a raucous buzzer) the results are quite similar. The debilitating effects on memory evidenced by ego-threat (Group II) would seem to be roughly equal to those induced by noxious stimulation alone (Group I). The

TABLE 5

COMPARISON OF TOTALS FROM EXPERIMENT A WITH GROUP I OF PRESENT
STUDY

	N	Times Buzzed	Critical Recalls	Critical Errors
Experiment A	50	238	215	23
Group I	25	239	216	23

difference is only two "critical," errors.

Theoretical Implications: The experiment by Miller (1951) previously mentioned in which S's fear (as measured by the galvanic skin response) of the letter "T" was generalized to thinking of the "T" may now be re-examined in light of the findings in Group I and Group II.

When Ss in these two groups were initially told they had responded in a "poor," manner or when they were buzzed, it is suggested here that they responded with fear---either to the loud, raucous noise or to the fear of reduction of their self-esteem. Upon being requested to recall these "critical," words, Ss proceeded to generalize the fear attached to making the original response to simply thinking about the response. Ss' failure to recall the response or to make an incorrect response may then be explained in terms of a fear strong enough to result in the avoidance of even the thought of the word. Diagrammatically this might be expressed as follows:

<u>Critical response associated with fear as induced by ego-threat or buzzer</u>	_____	Resulting in
<u>Reduction of fear when <u>S</u> inhibits cue-producing response</u>	_____	As measured by "critical," errors on recall

The reduction of fear in terms of reducing fear of disenchantment of self-esteem would thus also satisfy the Miller-Dollard explanation of repression. Later, we shall see how this proposition might be tested by means of reducing the fear drive before the S has opportunity to inhibit the cue-producing response.

Now let us turn to the puzzling results found in Group III.

Group III:

As already mentioned, the E would have estimated that the greatest memory loss would have occurred in Group III (both variables). Table 4 shows this estimation to hold true but only for "non-critical," words (unbuzzed and unthreatened); not "critical," words. In "critical," words, Group III is no different from the controls. Thus, Ss in Group III missed 472 "non-critical," words, more than any other group. These differences, although not statistically significant, raise the possibility of a spread of effect---a tendency for the double variable to produce indirect effects on "neutral," words while at the same time marking the "critical," words for extra emphasis and easy recall. Although Group III therefore does not conform to expectation, the total errors for all Ss in their respective groups do tend to go in the direction of an overall summation effect. Unfortunately, this interesting speculation rests on unreliable evidence.

But let us more fully explore the "puzzle," of Group III on three separate levels:

- (1) We may have a frequency problem not unlike the one which plagued early investigators of repression, or
- (2) We may have an anxiety variable exercising some effect, or
- (3) There may be some unknown variable or variables.

The Frequency Factor: This explanation is a sampling problem based on the relative number of opportunities each S had to recall "critical," words after being buzzed, threatened, etc. It will be remembered that this sort of frequency problem was overlooked by earlier studies which tested for recall of pleasant and unpleasant

holiday experiences.

For the present study, frequency refers to the number of times buzzed, threatened, buzzed and threatened, and "critical," responses for the respective groups, (see first column, Table 4). It will be noted that Group III had the smallest number of opportunities to miss words buzzed and threatened having been exposed to this compound variable only 164 times. Tables 6 and 7 however, show with respect to frequency, an analysis of variance between Groups III and IV, and a four-way analysis of variance for all groups. In addition, Bartlett's Test of Homogeneity (see Appendix E) for all four groups yields a "corrected," X^2 value of 4.247. All three of these tests would support the hypothesis that the sample taken is from the same population. Hence, Group III is not reliably different in terms of frequency of exposure.

The Anxiety Factor: The relation between performance and drive as defined by scores on Taylor's Manifest Anxiety Scale (1953) has been the object of a number of studies. Taylor (1956) and Taylor and Chapman (1955), have hypothesized that high anxious Ss should perform in a more superior manner than low anxious Ss when a single S-R tendency is present, but when competing tendencies prevail the performance of high anxious Ss should be impaired. In terms of our problem with Group III we might wonder if these Ss are deviate with respect to MAS scores.

The mean for all 100 Ss on the MAS is somewhat higher than reported by other investigators, (see Table 8) but the means for each respective group do not differ widely. (See Table 9.) If we choose to compare the performance of high anxious versus low

TABLE 6

SUMMARY OF TWO-WAY ANALYSIS OF VARIANCE FOR FREQUENCY VALUES
IN GROUP III AND GROUP IV

SOURCE OF VARIATION	SS	df	MS	F
Between groups	32.	1	32.	1.74
Within groups	<u>881.52</u>	<u>48</u>	18.37	<u> </u>
Total	913.52	49		

TABLE 7

SUMMARY OF FOUR-WAY ANALYSIS OF VARIANCE FOR FREQUENCY VALUES
IN GROUPS I, II, III, AND IV

SOURCE OF VARIATION	SS	df	MS	F
Between groups	121.	3	40.33	2.46
Within groups	<u>1576.24</u>	<u>96</u>	16.42	<u> </u>
Total	1697.24	99		

anxious Ss in terms of total misses (see Table 10), it would appear at first glance that low anxious Ss are superior.

However, a t test between these two groups yields an insignificant t of 1.76. One other index of the Taylor Scale, the K scale, may be mentioned. This scale, which measures defensiveness or lack of it in the test taking situation, is also found in Table 9 and once again, the means of the respective groups do not differ significantly. This evidence, coupled with the Pearson Product-Moment Correlation Coefficient of .07 between the MAS and total misses by all Ss, tends to rule out any anxiety or K score differences in Group III which might account for these Ss showing a paucity of "critical," errors.

Intensity Factor: The writer's speculative interpretation, previously suggested, of the data for Group III is based on the assumption of a doubled intensity or discriminative emphasis achieved by the coupled buzzer and threat. Whereas separately they only signal fear or warning to the S, together they may provide sufficient emphasis to keep the "critical," response from being forgotten.

It is suggested here that there may be a continuum---that some material simply cannot be repressed because its content or impact is too vivid. Clinically, this might be why we can forget the name of someone we merely dislike, but are unable to forget the name of someone we hate or fear. (The writer vividly recalls the name of the five-year-old classmate who gave the author his first black eye twenty years ago.)

TABLE 8

MAS MEANS FROM FOUR SAMPLES

Experimenter	N	Population	M
Kanfer	335	Washington University Elementary Psychology Classes.	14.65
Borghl I	50	William and Mary Introductory Psychology Classes.	16.92
Borghl II	100	William and Mary Introductory Psychology Classes.	17.64
Taylor	1971	State University of Iowa Introductory Psychology Classes.	14.56

TABLE 9

MAS AND K SCALE MEANS IN GROUPS I, II, III, AND IV

	MAS	K
Group I	15.88	17.12
Group II	20.24	13.84
Group III	17.16	15.72
Group IV	17.28	15.56

TABLE 10

COMPARISON OF TOP 5% ANXIOUS Ss AND TOP 5% NON-ANXIOUS Ss WITH
RESPECT TO TOTAL ERRORS

High Anxious (5%)	A Score	Total Errors
S-1	35	15
S-12	37	21
S-15	39	30
S-22	35	20
S-49	<u>36</u>	<u>37</u>
	M= 36.4	M= 24.6
Low Anxious (5%)	A Score	Total Errors
S-3	5	23
S-26	5	19
S-68	4	19
S-78	5	12
S-98	<u>3</u>	<u>8</u>
	M= 4.4	M= 16.2

Note:

The mean for the 35 Ss ("repressors,") showing one or more "critical," errors in the three experimental groups is 18., not significantly different from the 17.64 mean for all Ss.

If this argument were valid it might also explain the failure of some Es to find any evidence for repression. This kind of approach would tend to place more emphasis on the mechanism of repression itself as a crippling agent rather than the material repressed; clinically, this would mean that a quite minor occurrence if repressed, would have more adverse effects than the most hideous, but remembered event of the past.

FURTHER AREAS OF STUDY

Area 1: The testing of the vividness hypothesis would involve systematically increasing and decreasing the independent variables of noxious stimulation and ego-threat. For this, a refined scaling of the variables would be required, which is not presently available.

An attempt might be made initially to reduce the intensity of the ego-threat---perhaps simply a shake of the head for "poor," responses rather than the verbal: "I'm sorry that's a poor response." For this design, it would be predicted that errors on "critical," recalls would begin to more closely correspond with the errors evidenced in Groups I and II of the present study. If this prediction were to be confirmed, further study would involve gradually increasing the ego-threat (i.e., simply the word "poor," on critical responses, then "poor response," etc.) until that point was reached at which theoretically the "threat," becomes too intense and "critical," errors decline.

Similar systematic increments and decrements would be suitable for manipulation of the noxious stimulus. Employing a design identical with the procedure followed for Group I, it would be profitable to investigate the possible decline or increase in "critical," errors when a corresponding decrease and increase in the loudness of the buzzer is instituted.

Following these suggested lines of study should help to resolve the postulated intensity variable as well as more precisely define the respective potentials of ego-threat and noxious stimulation

as inhibiting agents.

Area 2: According to Miller (1951) fear may be reduced by reinforcing the response of "stopping being afraid." Within the framework of the present study and the diagram on page 25, exploration of this hypothesis would necessitate the removal of the fear induced by the E. This could perhaps be accomplished by a full explanation to the S that there is no such thing as a "poor" response for this kind of task. This attempt at initiating a "stopping being afraid," response might be inserted just prior to the test for recall (see Table 3). Instructions at this point would be as follows:

You will remember that I told you some of your response were poor ones. Actually, I was trying to make you forget those responses. Of course there are no good or poor responses on this kind of task. Let's see as we go through the list again if you can remember what words I said were poor responses.

A correct response on a "critical," word might be greeted with a: "Good. That was one I told you was poor," from the E. In this way the "stopping being afraid," response would be reinforced.

Instructions aimed at inducing the "stopping being afraid," response from Ss who were buzzed might follow similar lines emphasizing that there was no real significance attached to the buzzer. A control group would of course be treated in the same manner as Group I or II of the present study.

Area 3: Finally, a most profitable experiment would explore the role of the E in this kind of investigation. Attempts have often been made to "repeat," the experiments of other investigators. It is commonplace to observe that it is impossible to truly replicate the work of another, perhaps too frequently attempted by individuals

with divergent views concerning the outcome of such studies. But the area of inducing cognitive inhibition is crucially dependent, the author feels, on the E. And, in fact, the present design is quite suitable for this kind of "Investigation of the investigator." It would be most interesting for two Es, identical in their "delivery," of instructions, etc., to provide the ego-threat on alternate sessions. Thus, for 100 Ss, 50 would be randomly exposed to the variables as presented by Experimenter A, and 50 Ss exposed to these "same," variables as presented by Experimenter B.

An experiment of this kind may well be quite revealing with regard to the subtle, but important, exchanges between E and S.

SUMMARY

An inhibition of associative recall was observed for responses followed by a raucous buzzer alone and for ego-threat alone, but no inhibition was found for responses followed by both variables.

One-hundred Ss were asked to respond to 100 Kent-Rosanoff words. Twenty-five Ss were buzzed for certain "critical," responses, 25 threatened for "critical," responses, 25 both buzzed and threatened, and 25 Ss neither buzzed nor threatened served as a control group. Following the administration of a 15-minute neutral task, Ss were asked to recall all 100 associative responses. There was significantly less recall of "critical," words for Ss either buzzed or threatened when compared with the control group. However, Ss both buzzed and threatened made the same number of errors on "critical," words as the controls.

It was suggested that Ss either buzzed or threatened on "critical," words initially responded with a conditioned fear which generalized to thinking about the word. The inhibition found on recall was interpreted as the reduction of a learned fear drive.

For Ss both buzzed and threatened it was hypothesized that a discriminative emphasis variable intensified the "critical," words tending to neutralize the effects of this compound variable. Testing of the hypothesis by systematically increasing and decreasing the independent variables of noxious stimulation and ego-threat was suggested.

APPENDIX A

NOTES ON PREVIOUS STUDIES

- A:1 One of Meltzer's first attempts (1930b) was simply to ask 132 college men and women to list their experiences over the Christmas holiday and rate each event as pleasant, unpleasant, or indifferent. After six weeks had passed he requested them to list again those experiences they had recalled previously. His results showed that Ss recalled more pleasant experiences immediately after vacation and an even greater number as compared to unpleasant experiences after six weeks.
- A:2 Rosenzweig (1938) utilized the concept of induced-failure in an attempt to explore the validity of the theory of repression. Ss were allowed to succeed in half of certain tasks involving jig-saw picture-puzzle completion. Subsequently, Ss were asked to list the names of the puzzles included in the test.
- A:3 The Luria technique takes the premise that disturbances occurring in the higher central nervous system will be disclosed in voluntary movement. These affective disturbances are studied by recording voluntary movements as well as verbal, involuntary, and respiratory responses.
- A:4 McGranahan's Ss (1948) were asked to respond to nouns selected to elicit color responses. However, they were instructed that any color responses would result in their being shocked. Results were compared with pursuit-motor performances to distinguish between Ss "who were most disorganized and overwhelmed by fear during motor performance," and those least disturbed. McGranahan found that the "disorganized," and fearful Ss were "least able to execute cognitive repression."

APPENDIX B

RAW DATA FOR GROUPS I, II, III, AND IV WHERE N IS 100

Group I (Noxious stimulation)	Times Buzzed	Critical Recalls	Score or Errors	Total Errors
S-4	8	8	0	17
S-6	11	10	1	28
S-11	10	9	1	21
S-13	13	13	0	12
S-20	3	0	3	65
S-22	15	15	0	20
S-25	14	14	0	3
S-29	14	14	0	17
S-36	15	14	1	3
S-39	12	12	0	16
S-41	12	11	1	8
S-45	2	2	0	19
S-50	13	10	3	22
S-55	14	13	1	17
S-58	15	15	0	12
S-64	12	9	3	20
S-65	3	2	1	12
S-69	9	9	0	11
S-74	6	6	0	8
S-80	5	5	0	16
S-83	13	13	0	26
S-87	4	3	1	12
S-89	5	3	2	10
S-95	7	4	3	34
S-99	4	2	2	23
Totals	239	216	23	452

APPENDIX B (Continued)

Group II (Ego-threat)	Times Threatened	Critical Recalls	Score or Errors	Total Errors
S-1	9	7	2	15
S-7	12	11	1	17
S-12	7	6	1	21
S-16	7	4	3	18
S-18	2	2	0	19
S-23	10	8	2	34
S-27	8	8	0	22
S-32	14	13	1	6
S-33	11	11	0	21
S-37	12	9	3	20
S-44	10	7	3	21
S-48	12	12	2	21
S-49	1	1	0	37
S-56	6	4	2	22
S-57	8	5	3	31
S-62	6	6	0	12
S-66	9	8	1	23
S-72	10	9	1	12
S-75	7	7	0	17
S-77	8	8	0	11
S-84	8	8	0	16
S-86	9	9	0	16
S-91	12	12	0	8
S-94	9	9	0	12
S-97	<u>12</u>	<u>12</u>	<u>0</u>	<u>13</u>
Totals	219	194	25	465

APPENDIX B (Continued)

Group III (Both variables)	Times Buzzed and Threatened	Critical Recalls	Score or Errors	Total Errors
S-3	4	3	1	23
S-5	11	11	0	13
S-10	8	7	1	30
S-15	12	12	0	30
S-17	3	3	0	7
S-21	5	4	1	13
S-28	11	10	1	23
S-31	0	0	0	20
S-35	4	4	0	15
S-38	1	1	0	25
S-43	6	5	1	43
S-47	9	9	0	31
S-52	0	0	0	22
S-54	1	1	0	18
S-59	8	8	0	16
S-63	6	6	0	16
S-67	7	6	1	14
S-71	4	3	1	10
S-73	11	11	0	19
S-78	12	12	0	12
S-81	10	9	1	4
S-85	2	2	0	27
S-90	12	12	0	8
S-96	10	10	0	22
S-100	<u>7</u>	<u>6</u>	<u>1</u>	<u>20</u>
Totals	164	155	9	481

APPENDIX B (Continued)

Group IV (Control)	Critical Responses	Critical Recalls	Score or Errors	Total Errors
S-2	9	6	3	36
S-8	4	4	0	22
S-9	12	12	0	7
S-14	9	9	0	3
S-19	6	5	1	31
S-24	4	4	0	10
S-26	13	13	0	19
S-30	5	5	0	36
S-34	10	10	0	16
S-40	17	16	1	15
S-42	12	12	0	21
S-46	5	5	0	15
S-51	13	11	2	9
S-53	7	6	1	26
S-60	12	12	0	12
S-61	5	5	0	26
S-68	1	1	0	19
S-70	7	7	0	12
S-76	12	12	0	19
S-79	3	3	0	19
S-82	14	14	0	8
S-88	0	0	0	15
S-92	12	12	0	19
S-93	10	9	1	22
S-98	<u>2</u>	<u>2</u>	<u>0</u>	<u>8</u>
Totals	204	195	9	445

APPENDIX C

EXPERIMENT A RESULTS WHERE N IS FIFTY

Subject	Times Buzzed	Recalls	Critical Errors	Subject	Times Buzzed	Recalls	Critical Errors
1	9	8	1	26	5	4	1
2	6	5	1	27	0	0	0
3	1	1	0	28	3	3	0
4	3	2	1	29	5	4	1
5	5	4	1	30	4	4	0
6	5	4	1	31	9	9	0
7	8	8	0	32	3	1	2
8	0	0	0	33	8	8	0
9	4	3	1	34	8	6	2
10	5	4	1	35	1	1	0
11	9	6	3	36	1	0	1
12	6	6	0	37	6	6	0
13	6	6	0	38	3	2	1
14	4	3	1	39	5	5	0
15	8	8	0	40	8	8	0
16	6	6	0	41	6	6	0
17	4	3	1	42	0	0	0
18	1	0	1	43	8	7	1
19	8	8	0	44	7	7	0
20	3	3	0	45	0	0	0
21	6	6	0	46	5	5	0
22	6	6	0	47	7	7	0
23	2	2	0	48	4	4	0
24	3	2	1	49	4	4	0
25	7	7	0	50	3	3	0
Totals					238	215	23

Explanation:

This pilot study (1960) the results of which appear above, contained 50 ss with each S acting as his own control. The 23 "critical," errors on the buzzed words is compared in the text with the 23 errors made by Group I of the present study.

APPENDIX D

INSTRUCTIONS FOR Ss IN EXPERIMENT A WHERE N IS FIFTY

This is a study of the kind of thinking an individual does during a word-association test. I am going to read a list of words to you. I want you to respond with the first word that pops into your head as this is also a test of how fast you can think. Now in the course of this experiment you will make some good responses and some poor ones.

At this point and with some emphasis on the word "poor," the E depressed the micro-switch introducing the S to the raucous buzzer. After five practice words, Ss responded to the list itself. It will be noted that this procedure is almost identical with the procedure followed for Group I, except that there was some implied ego-threat (the word "poor," joined with the buzzer during the instructions above) for Ss in Experiment A. Ss in Group I were buzzed only.

APPENDIX B

BARTLETT'S TEST OF HOMOGENEITY OF VARIANCE FOR THE FOUR GROUPS

	N	df	$\sum x^2$	s^2	$\log s^2$
Group I	25	24	472.16	19.67	1.29381
II	25	24	222.56	9.27	.96708
III	25	24	386.16	16.09	1.20656
IV	25	24	<u>495.36</u>	<u>20.64</u>	<u>1.31471</u>
Sum			1576.24	65.67	4.78216

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