REPRESSION AS A FUNCTION OF PERSONALITY CLASSIFICATION AND INDUCTION OF THREAT TO SELF-ESTEEM

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CHAPTER I

HISTORICAL DEVELOPMENTS

The most succinct and formal definition of repression appeared in 1915 in an article entitled "Repression": "... the essence of repression lies simply in turning something away, and keeping it at a distance, from the conscious" (Freud, 1915, p. 147). In formulating his repression theory Freud made no attempt to set down a system of rules by which one could forecast consequent behavior given the knowledge of environmental conditions and individual predisposition. Freud made his observations under uncontrolled conditions and many of the psychoanalytic propositions set down by Freud do not adequately lend themselves to operational language and empirical examination. Kubie, a prominent psychoanalyst, soberly notes that "... the limitations can be summarized by saying that... the difficulties of recording and reproducing primary observations, the consequent difficulty in deriving the basic conceptual structure, the difficulties in appraising quantitatively the multiplicity of variables, ... the precision of its hypotheses and the validity of its predictions are among the basic scientific problems which remain to be solved" (1953, pp. 143-144). Sears takes a more pessimistic outlook: "It seems doubtful whether the sheer testing of psychoanalytic theory is an appropriate task for experimental psychology. Its general method is estimable but its available techniques are clumsy" (1944, p. 329).

Dollard and Miller (1950) have attempted to restate the

psychoanalytic theory of repression within a framework of experimental learning principles. With this attempt they hoped to render a service to both disciplines without distorting or destroying the basic propositions of either orientation (1950, p. 3). The principal concept with which they hoped to achieve this rapprochment was fear, an intrinsic notion within both disciplines. Dollard and Miller conclude that the occurence of forbidden, illicit, or demeaning thoughts may result in heightened emotional arousal or fear, a fear that these ominous thoughts will become known to others resulting in punishment and condemnation. Because fear has motivational properties it initiates considerable activity on the part of the individual in his search for an instrumental act which would remove the source of the fear. Unable to physically remove himself from a threat from within, the threatened individual seeks ways to remove himself from the threatening thought. He may momentarily remove the thought by diverting his attention to something else or he may attempt to suppress it. This form of avoidance would seem to be transitory. Shifts in the attention level maintained by the individual may produce momentary periods of thinking free of the fearful thought, but immediate environmental cues would probably shift attention back to the source of the disturbance. Surprisingly, these supposed momentary shifts of attention are often found to be permanent (Dollard & Miller, 1950, pp. 200-204). These momentary shifts in attention, however, are not haphazard but are truly instrumental in nature. Inattention or suppression are instrumental acts which when followed by the reinforcing event of fear-reduction tend to strengthen the preceding behavior of "Not Thinking." As the individual continues to avoid the threatening thought he is forever reinforcing its nonoccurence.

The following sections will consider four areas of the experimental literature. An attempt will be made to integrate what may seem like disparate areas of investigation into a meaningful context. The resulting ideas and guidelines for experimentation will hopefully lead to the natural and logical next step in the empirical investigation of repression. First, an experimental paradigm of repression will be enumerated. The paradigm will act as the working model for the experimental procedures found later in the paper. Second, consideration of a special case of Zeigarnik's (1927) interrupted-task procedure will be explored and provide an empirical basis for the relevance of the major variables being considered in this study: threat induction and personality classification associated with the avoidance of threatening materials. Third, an extention of a model proposed by Inglis (1961) will be discussed and predictions concerned with the above mentioned variables will be generated. Fourth, a number of experimental techniques used extensively in the selection of Ss expected to exhibit differential recall of threatening materials will be discussed. The discussion will conclude with the enumeration of the personality scales that will be used in the present study.

An Experimental Paradigm of Repression

The concept of repression, the cornerstone of psychoanalytic theory, has received considerable attention in the literature as evidenced by the lengthy reviews of Sears (1936), Zeller (1950), and Weiner (1966). In an effort to approximate the conditions of disruption and disturbance so often discussed in Freud's writings the experimental procedures used to demonstrate repression have become more refined over the years. Initial

experimentation in this area seemed most concerned with the free recall of personal experiences of pleasantness and unpleasantness. In one of the earliest experiments, Meltzer (1930) asked college men and women to describe and rate their Christmas vacation experiences. A test of free recall six weeks later produced a significantly greater number of pleasant memories than unpleasant memories. Today, rather than working with natural experiences, the standard procedure is that of inducing distress, discomfort, or discouragement in the laboratory and associating the affect with previously neutral materials (Eriksen, 1966).

In a logical analysis of repression, Zeller (1950a) listed three conditions which he thought had to be met in order to demonstrate repression experimentally:

1. It must be demonstrated that the material in question has been learned by the individual.
2. It must be shown that introduction of an inhibiting factor causes either an inability to recall or at least a significant decrease in recall.
3. It must be demonstrated that the removal of the inhibiting factor results in the reinstatement of the ability to recall the material.

The third condition has unfortunately been omitted from the design of most experiments. Zeller states that no test of repression can be considered adequate until the removal of the repression factor has resulted in the restoration to consciousness of the repressed material.

In the second of a pair of experiments, Zeller (1951) concluded that "when failure, although associated with a specific task, is by inference generalized to associated tasks, the failure is as disruptive to the

performance on the associated tasks as if failure had been specific to them. Previously known material which has become associated with an unpleasant emotional experience is less well recalled, and a later association with success at the task at which failure was induced leads to an increase in measured recall of the original material."

In utilizing the three conditions that he had proposed as being necessary components for all experimental designs measuring repression, Zeller believed that his results, as stated above, demonstrated the reliability of this phenomenon. In the first of a pair of experiments Zeller (1950a) found that Ss experiencing induced-failure on a block-tapping task took longer to relearn a series of nonsense syllables than control Ss not subjected to the failure experience. Induced-success at the task which had previously led to failure served to increase the ability to relearn the nonsense syllables. Similar results were noted in the second study (1951) which considered immediate recall rather than relearning as the criterion variable. On the other hand, Truax (1957), Underwood (1957, p. 77) and Zeller himself (1950b, 1951) have pointed out that Zeller's results can be explained in terms of lowered motivation rather than repression. Thus it appears that at least one more condition is necessary in order to demonstrate unequivocally the phenomenon of experimental repression: (4) It must be shown that the process of repression is indeed selective. Only the material that has taken on the aspect of unacceptance and disturbance, because of the anxiety-arousing nature of the experimental situation, should be repressed. If other adjacent material is not directly concerned with threat but is influenced adversely and to the same degree as the repressed material, an interpretation in terms of emotional blocking may

easily be made. Such results could not be considered to demonstrate repression, but simply the nonselective effects of lowered motivation. Like Zeller, Flavell (1955) and D'Zurilla (1965) have omitted this vital condition and their results may easily be interpreted in terms of lowered motivation rather than repression.

In making use of the above paradigm of repression and a variety of personality measures, Millimet (1965) hypothesized that Ss classified as High Repressors would forget more words associated with threat than words associated with non-threat, while Ss classified as Low Repressors were expected to exhibit no differential forgetting of these words. In addition, it was hypothesized that the threatening words forgotten by High Repressors during the repression phase of the experiment would be recovered upon removal of the threatening situation. Contrary to hypothesis, results exhibited the exact opposite effects. Words associated with both threat and non-threat were equally well retained by Ss in the High Repressor group, while Ss in the Low Repressor group recalled considerably more words associated with threat than with non-threat. Upon removal of the threatening situation, the High Repressors recovered more threatening words and the Low Repressors recovered more non-threatening words. The results were interpreted as a special case of the Zeigarnik effect (Zeigarnik, 1927). This interpretation will appear in the next section of this paper.

The Zeigarnik Effect

The Zeigarnik effect, the tendency for Ss to recall more incompleted (I) tasks than completed (C) tasks, has been replicated many times (Cartwright, 1942; Gebhard, 1948; Martin, 1940; McKinney,

1935). However, a number of studies have found that the opposite result has occurred (Boguslavsky, 1951; Boguslavsky & Guthrie, 1941; Crafts et. al., 1950; Glixman, 1949; Prentice, 1944). That is, the number of C tasks outweighed the I tasks in a test of recall. Rosenzweig (1943) was the first investigator to show that at least one reason for this inconsistency is the amount of ego-involvement and test anxiety experienced by S. In this regard, other investigators (Forrest, 1959; Gilmore, 1954; Kendler, 1949; Lewis & Franklin, 1944) have found that the relative recall of C tasks to I tasks increases as stress increases. Still other investigators have found that this relationship does not hold for all Ss. Alper (1946, 1948) showed that Ss who recalled more I tasks were of different personality type than Ss who recalled more C tasks, and that Ss unselected for personality factors exhibited no differential recall of I and C tasks. Postman and Solomon (1950) noted similar findings as Ss unselected for personality differences exhibited nonsignificant differential recognition thresholds for I and C tasks. Alper (1948) found that strong egos recalled more I tasks in low stress situations and more C tasks in high stress situations. On the other hand, weak egos recalled more C tasks in low stress situations and more I tasks in high stress situations.

In summary, Caron and Wallach (1957) conclude that "no experimental approach to repression has received more attention than the attempt to administer Zeigarnik's interrupted-task procedure under ego-involving instructions. The rationale underlying this use of the Zeigarnik technique holds that ego-involvement would cause incompleted and completed tasks to be viewed as failures and successes respectively and in accordance with repression theory would lead to the expulsion of

incompleted items from consciousness."[1] The prediction followed that the typical "Zeigarnik" recall pattern (superior recall of incompleted tasks) would be replaced by a "Repressive" recall pattern (superior recall of completed tasks). Caron and Wallach point out, however, that such a reversal of the Zeigarnik ratio is not a function of threat alone, but is also contingent on personality factors. Some individuals recall a preponderance of successes under threatening conditions, while others recall more failures.

In addition, Caron and Wallach warn against a possible misinterpretation of these experimental results. They question whether the repression of failures in the case of selective recall of successes or the expression of failures in the case of the selective recall of failures is caused by selective learning rather than selective remembering. Finding a selective recall for success items under threat does not necessarily indicate that the failure items were repressed. Of course, a similar interpretation may be made when a selective recall of failure items is in evidence. Selective learning may not be ruled out in either case. Caron and Wallach suggest that if failure items have been truly repressed then the alleviation of the threatening circumstances should be followed by the reemerging into consciousness of the repressed events.[2] This interpretation stems from the Freudian notion that repressed events persist in an unconscious state and are never irretrievably lost. The selective learning position, on the other

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[1]Weiner (1966) points out that Caron and Wallach are not alone in making this distinction as numerous other investigators (e.g. Atkinson, 1953; Rosenzweig, 1943) have made similar interpretations.

[2]This position is in accord with Zeller's third condition.

hand, implies no such restoration for forgotten items. It maintains that decreased recall results entirely from a deficiency in original learning and no restoration to consciousness should occur upon alleviating the threatening circumstances.

In Millimet's study, the Low Repressors recalled a significantly greater amount of failed or incompleted material (threat words) than successful or completed material (non-threat words), while the High Repressors recalled approximately equal numbers of incompleted and completed material. Upon removal of the threatening situation the High Repressor group recovered more incompleted words and the Low Repressor group recovered more completed words. These results are in accord with the conditions specified by Zeller and Caron and Wallach and support a selective memory interpretation. In a similar study, Caron and Wallach (1957) found that although the expected interaction between personality classification and level of threat was very much in evidence in immediate recall, the removal of the threatening circumstances did not significantly enhance subsequent recall. It was therefore concluded that the initial differences in recall were due to selective learning rather than to selective retention.

For further discussion of experiments investigating the recall of completed and incompleted tasks the reader is directed to reviews by Alper (1952), Butterfield (1964), and Weiner (1966).

This section was concerned with a special case of the Zeigarnik effect. It was shown that a number of investigations have found a reversal of the Zeigarnik ratio, i.e. the superior recall of completed tasks, while many studies have supported the original Zeigarnik finding, i.e. the superior recall of incompleted tasks. Moreover, experimentation

considering the variables of threat and personality classification have regularly noted an interaction between these variables and the resulting pattern of recall. A valuable addition to this area of investigation would be some integrating or unifying consideration or mechanism that could systematically account for these data. It is to this consideration that this study now turns.

Inglis' Model

An inverted U-curve similar to the one proposed by Hebb (1955) and Duffy (1957) has been adapted to illustrate the curvilinear relationship between degree of threat and efficiency of performance (Inglis, 1961; Iverson & Reuder, 1956). The extremes of the curve are characterized by disruptive and inefficient behavior, while facilitation of performance is expected at the middle of the curve. In using an extraversion-introversion dimension (Eysenck, 1947; 1957),[3] Inglis has proposed a model for predicting differential recall of I and C tasks for situations involving threat and individual personality differences (see Fig. 1).

The model is based on the following seven implicit assumptions:

1. All Ss possess some degree of effectiveness for the avoidance of threatening materials regardless of degree of extraversion-introversion.
2. Extraverts and Introverts manifest characteristic

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[3]Eysenck reports that Ss high on the extraversion pole are little bothered by failure, while Ss falling at the introversion pole become preoccupied with their failures. Such reaction to failure would seem to be related to differential memory for completed and incompleted tasks. By emphasizing the successful tasks, and ignoring the failed ones, Extraverts would be expected to recall relatively more completed than incompleted tasks, while for the Introverts this tendency would be reversed.

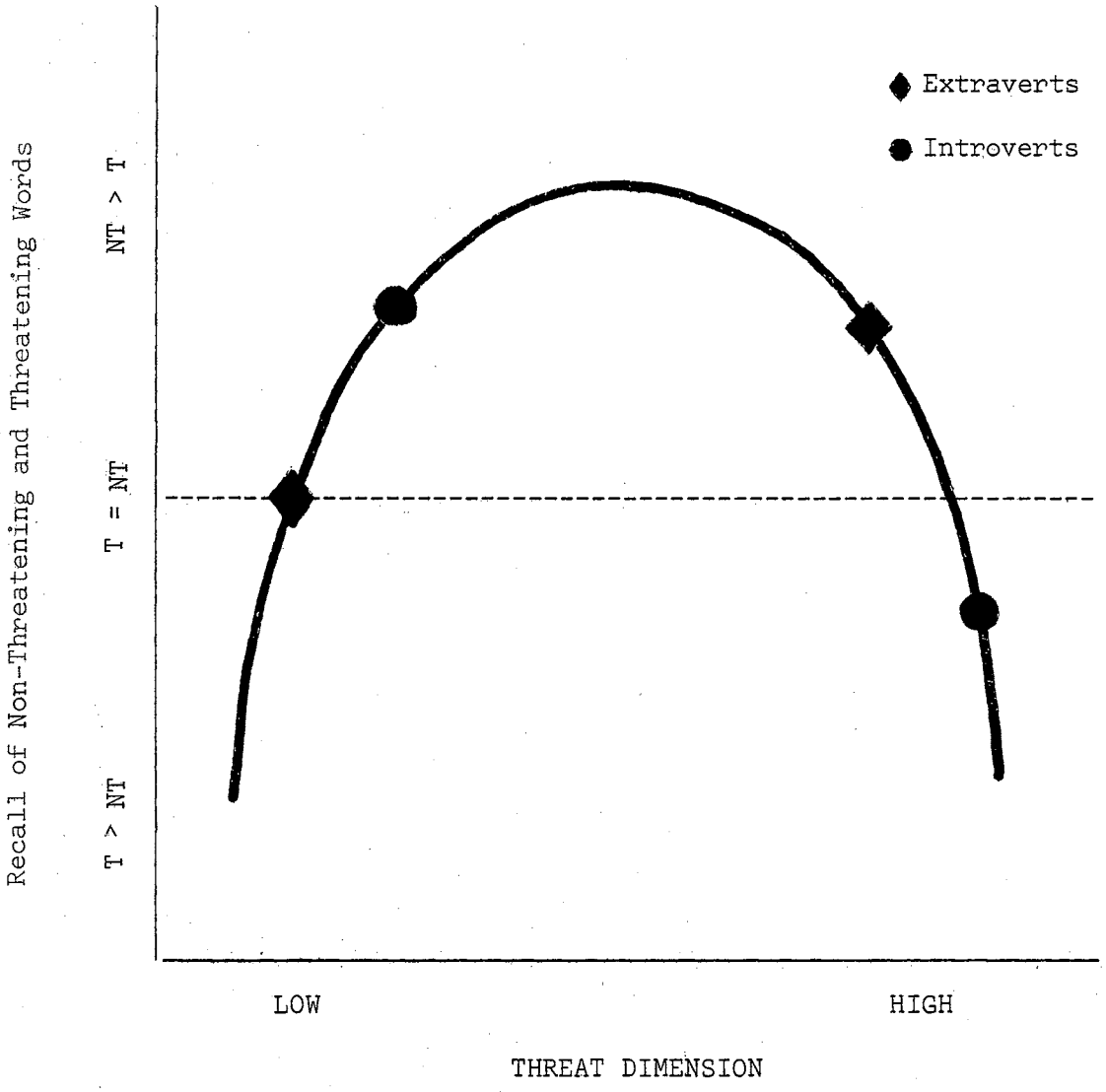

Figure 1. Inglis' Model for the Prediction of Recall of Threatening and Non-Threatening Words Under Low and High Threat Conditions.

differences in response to threatening stimuli along an avoidance continuum.

3. Introverts have a lower threshold for threat than Extraverts.
4. At low levels of threat Extraverts perceive no threat.
5. At low levels of threat Introverts perceive threat and respond with whatever amount of avoidance they can command.
6. At high levels of threat Extraverts perceive threat and respond with whatever amount of avoidance they can command.
7. At high levels of threat Introverts perceive considerable threat but are lacking in high avoidance and are compelled to experience the threatening stimuli.

The model predicts that at low levels of threat the limited avoidance mechanism of Introverts proves sufficient and non-threatening materials are expected to predominate in recall. At high levels of threat, the limited avoidance capability of Introverts should prove to be inadequate, and threatening materials are expected to predominate in recall. Extraverts, on the other hand, do not feel threatened at low levels of threat and are expected to recall as many threatening materials as non-threatening materials. At high levels of threat extraverts make use of their superior avoidance capability and should effectively avoid threatening materials with non-threatening materials expected to predominate in recall.

Although Inglis' model was devised to make predictions about the recall scores of Ss selected from an extraversion-introversion dimension, its use should not necessarily be curtailed simply because some other dimension of personality is proposed. Eysenck (1957) and his followers

(e.g. Franks, 1961; Gwynne, 1961; Lovibond, 1964) recognize that a number of personality orientations while not embracing the extraversion-introversion dimension have nevertheless made use of constructs and measuring instruments which satisfactorily reflect the extraversion-introversion dimension. For example, the Taylor-Spence theory of Drive and manifest anxiety and Taylor's Manifest Anxiety Scale (1953) are cited as supporting this position. Lovibond (1964) suggests that for Eysenck the personality dimension which is related to conditionability is extraversion-introversion, while for Taylor and Spence it is anxiety. Jones (1961) and Franks (1961) suggest that while the MAS is perhaps a better indicator of neuroticism, it does indeed measure extraversion-introversion. If this position is accepted then predictions concerning extraversion-introversion and manifest anxiety should be nearly identical. While the accuracy of this notion may be questioned when the position is adopted that an extraversion-introversion dimension reflects an associative variable and a manifest anxiety dimension reflects a motivational variable, a number of investigators (Child, 1954; Eriksen & Davids, 1955; Hilgard, 1953; Truax, 1957) have indicated that manifest anxiety as defined by the Manifest Anxiety Scale reflects associative qualities when the criterion under consideration is the differential recall of threatening materials. People scoring at the high end of the Manifest Anxiety Scale are thus expected to exhibit recall scores similar to those expected for individuals scoring at the introversion pole, whereas people scoring at the low end of the Manifest Anxiety Scale are expected to exhibit recall scores similar to those expected for individuals scoring at the extraversion pole.

This section was primarily concerned with advancing a major

theoretical position in an attempt to account for the large body of data concerned with the recall of completed and incompleted tasks discussed in the previous section. By proposing an inverted-U function Inglis' model attempts to account for the frequently noted interaction between threat and personality classification and subsequent patterns of recall. Having established that personality classification is a vital segment of the model, the study now turns to the consideration of selection of Ss.

Subject Selection

A number of divergent methods have been employed by numerous investigators in the selection of Ss expected to exhibit differential recall of threatening materials. Most attempts have made use of one or more subscales of the Minnesota Multiphasic Personality Inventory (MMPI). Some investigators have used MMPI subscales originally devised for measuring other aspects of personality, while others have manufactured new scales believed to more adequately reflect a dimension of repression.

The subscales receiving the most attention and use have been: Lie (L) (Badenhausen, 1956; Gordon, 1957; Page & Markowitz, 1955; Tart, 1962); Defensiveness (K) (Gordon, 1957; Nowlis & Nowlis, 1956; Page & Markowitz, 1955); Manifest Anxiety (MA) (Badenhausen, 1956; Eriksen & Davids, 1955; Gordon, 1957, 1959; Sarason, 1956, 1957a, 1957b); Admission of symptoms (Ad) (Gordon, 1959); Denial of symptoms (Dn) (Carlson, 1954; Gordon, 1959; Nowlis & Nowlis, 1956); Hysteria (Hy) Eriksen, 1954; Mathews & Wertheimer, 1958; Medini, 1957); Psychasthenia (Pt) (Carlson, 1953, 1954; Eriksen, 1954; Eriksen & Browne, 1956; Eriksen, Kuethe & Sullivan, 1958; Fulkerson, 1955; Mathews & Wertheimer, 1958; Medini, 1957); Anxiety (A) (Apfelbaum & Sherriffs, 1954; Chance,

1956; Tart, 1962; Van de Castle, 1958); Repression (R) (Chance, 1956; Nowlis & Nowlis, 1956; Tart, 1962; Van de Castle, 1958); Ego Strength (Es) (Tart, 1962); Hy-Pt index (Carlson, 1954; Eriksen & Davids, 1955; Truax, 1957).

More recently the trend for the selection of subjects has shifted to the use of a combination of two or more scales. Obrist (1958) formed a composite scale by pooling the items from the Hy, Pt, K, A, and R scales. Rather than pooling all items, Altrocchi, Parsons, and Dickoff (1960) subtracted the pooled L, K, and Dn scales from the pooled D (Depression), Pt, and A scales in their attempt at finding an adequate index of repression. Byrne (1961) criticized the latter procedure on the grounds that a bias was being introduced because of considerable item overlap among the scales under consideration. To eliminate this problem Byrne pooled the six scales and removed all inconsistantly scored items. The result was the Repression-Sensitization Scale which was later revised by item analysis methods (Byrne, Barry, & Nelson, 1963). Using a different approach, Ullmann (1958) administered all 550 MMPI items to 38 facilitators (Low Repressors) and 24 inhibitors (High Repressors) as identified from case histories. Three item analyses were performed in three cross-validation studies and the result was the Facilitation-Inhibition Scale with 44 items. Millimet (1967) pooled the A, R, Pt, MAS, Ad, Dn, L, K, Es, and Ne (neuroticism) scales, eliminated all inconsistently scored items, and performed an item analysis on 100 male and 100 female protocols. The result was a scale of 70 items with separate male and female forms. The removing of a sex bias toward certain items was expected to improve upon the accuracy of prediction of this type of scale. The preparation of this scale and two validity

studies are presented in greater detail in the next chapter.

CHAPTER II

THE DEVELOPMENT OF A SCALE OF REPRESSION

In a study concerned with the avoidance of threatening materials the writer (1965) considered the profile of the A, R, Pt, MAS, Ad, Dn, L, K, Es, and Ne scales from the MMPI in selecting Ss of low and high repression. This selection procedure, rather than being based on a precise set of norms, was largely intuitive. Without benefit of norms, this procedure became terribly unweildy and difficult to maintain without introducing considerable error. Fortunately, the experimental results were positive. It then seemed desirable to expend an effort in the formulation of a single scale which would retain the same measure of predictability. In addition, the need for two scales, one for males and one for females, seemed to be desirable. All other investigations have considered the same scale for both sexes. In proposing two scales it was hoped that the reduction in error as a result of the removal of a sex bias toward certain items would improve upon the accuracy of prediction of this type of scale.

This chapter will examine the developments of an item analysis of a composite of the ten scales mentioned above. In addition, a number of normative studies will be considered.

Method and Results

Study I: Defining Sample. The items composing the ten MMPI Scales

were pooled to form a 251-item composite scale. Because many of the same items appeared on more than one subscale only the items which were scored in the same direction were retained. Eight items were removed as a result of this procedure. The remaining 243 items were submitted to 100 male and 100 female introductory psychology students at Oklahoma State University. A score at the low end of the composite scale was considered to be indicative of a high repressor, while a score at the high end of the composite scale was considered to be indicative of a low repressor.

Using an item analysis technique advocated by Kelley (1939), the protocols of the high 27 and low 27 scorers of both the male and female samples were selected for further consideration. The percentage of high and low scorers endorsing an item in the scorable direction was determined for every item. These percentages were referred to tables prepared by Flanagan (1939), for estimating tetrachoric correlations necessary for determining the discriminative power of the 243 items under consideration. The 243 items were then ranked in order of discriminative power and the best 70 items were chosen (see Appendix A). The process was repeated for both the male and female samples (see Table I and Table II for the corresponding MMPI group form number).

Means, standard deviations, and intercorrelations were computed for the ten original scales, composite scale, and the two scales derived by item analysis procedures (see Table III and Table IV). Examination of the intercorrelations indicates that 116 of the 132 correlations are significant. In particular, the item analysis scales (MARS) correlate with the Pt, MAS, and A scales, scales purported to reflect anxiety, at a magnitude as high as the reliability coefficients of the scales

TABLE I

MANIFEST ANXIETY-REPRESSION SCALE

MALE FORM

Corresponding MMPI group form number

TRUE:												
32	39	41	62	86	89	94	106	124	129	136	138	142
145	147	148	165	171	172	179	186	189	191	201	217	236
238	244	267	278	301	305	317	322	335	336	337	340	345
346	349	352	356	357	358	359	361	382	383	384	389	396
397	398	411	414	418	424	511	530	544	549	555		
FALSE:												
3	68	107	152	371	379	407						

TABLE II

MANIFEST ANXIETY-REPRESSION SCALE

FEMALE FORM

Corresponding MMPI group form number

TRUE:												
15	62	67	82	86	94	100	124	129	136	138	142	147
171	172	179	201	217	236	238	259	278	304	305	317	321
322	335	336	337	343	345	349	356	357	358	359	361	382
383	389	396	397	398	406	411	414	418	424	431	439	442
443	468	499	506	511	518	530	541	544	549	555		
FALSE:												
152	163	353	367	371	379	407						

TABLE III

MEANS, STANDARD DEVIATIONS AND INTERCORRELATION MATRIX FOR MMPI SUBSCALES

Male sample
(N = 100)

	L	K	A	R	Ad	Dn	Pt	MAS	Ne	Es	Com	MARS
$\overline{X}$	2.27	12.14	16.55	14.49	6.12	12.72	16.52	17.90	5.78	47.26	101.81	29.56
SD	1.78	4.45	8.51	4.14	4.32	3.84	7.93	8.42	3.90	5.88	23.75	14.38

L												
K	.323											
A	-.247	-.724										
R	.253	.398	-.144									
Ad	-.029	-.440	.702	-.058								
Dn	.208	.831	-.591	.304	-.336							
Pt	-.203	-.646	.915	-.109	.731	-.513						
MAS	-.198	-.658	.906	-.142	.773	-.485	.911					
Ne	.006	-.468	.746	-.004	.884	-.399	.812	.825				
Es	-.017	.397	-.619	-.031	-.542	.314	-.716	-.598	-.644			
Com	-.287	-.803	.922	-.339	.725	-.667	.925	.906	.782	-.710		
MARS	-.294	-.783	.954	-.205	.714	-.642	.936	.922	.767	-.634	.950	

$r = \pm.20$; $p<.05$
$r = \pm.26$; $p<.01$
$r = \pm.33$; $p<.001$

TABLE IV

MEANS, STANDARD DEVIATIONS AND INTERCORRELATION MATRIX FOR MMPI SUBSCALES

Female sample
(N = 100)

	L	K	A	R	Ad	Dn	Pt	MAS	Ne	Es	Com	MARS
$\overline{X}$	3.33	13.65	15.99	16.30	5.75	14.93	15.80	18.66	4.70	43.74	99.77	30.26
SD	2.46	4.24	8.31	3.85	3.50	4.04	7.62	8.55	3.25	4.75	23.89	15.19

L												
K	.421											
A	-.298	-.736										
R	.312	.412	-.198									
Ad	-.097	-.422	.649	-.042								
Dn	.367	.782	-.726	.266	-.389							
Pt	-.343	-.687	.901	-.152	.706	-.651						
MAS	-.221	-.711	.856	-.209	.734	-.624	.881					
Ne	.019	-.443	.619	.033	.850	-.396	.651	.723				
Es	.053	.485	-.619	.045	-.563	.446	-.674	-.610	-.548			
Com	-.383	-.822	.924	-.368	.702	-.777	.922	.911	.661	-.710		
MARS	-.337	-.793	.955	-.261	.646	-.762	.928	.920	.611	-.635	.962	

$r = \pm.20$; $p<.05$
$r = \pm.26$; $p<.01$
$r = \pm.33$; $p<.001$

themselves. It is important to recognize, however, that a portion of the size of the correlations is the result in some cases of considerable item overlap. Table V indicates the number of items each scale has in common with the item analysis scales and the minimum correlation expected as a result of the shared items. The number of common items notwithstanding, examination of the intercorrelations renders considerable support for the assumption made earlier that the original ten scales are measuring very much the same thing and that pooling the items for the item analysis did not subvert the original meaning of the scales or constitute a marked departure from item homogeneity. With regard to this assumption, the employment of the Kuder-Richardson Formula 21 found a coefficient of .90 for both the male and female composite scales. This estimate of internal consistency rendered considerable support for the assumption of test homogeneity of the ten scales used to form the composite.

The item-test correlations of the item analysis scales ranged from .41 to .82 for the male scale and .42 to .86 for the female scale. The average item-test correlation was found to be .60 for both scales. Richardson (1936) has shown that squaring the average item-test correlation results in a satisfactory estimate of the average item intercorrelation. An application of this technique resulted in an estimated average item intercorrelation of .36 for both the male and female scales.

Thorndike (1949) has shown that an item has its maximum discriminative power at the 50 per cent level of difficulty. However, Guion (1965) suggests that a truly homogeneous test must possess items of varying levels of difficulty. Nevertheless, Guion states that the

TABLE V

NUMBER OF ITEMS COMMON TO THE ITEM ANALYSIS SCALE AND THE TEN SUBSCALES (COMMON ITEMS/TOTAL ITEMS) AND THE MINIMUM CORRELATION EXPECTED AS A RESULT OF THE SHARED ITEMS

Male form

L	K	A	R	Ad
0/15	14/30	28/39	3/40	6/32
.000	-.306	.536	-.057	.127
Dn	Pt	MAS	Ne	Es
8/26	25/48	24/50	9/30	13/68
-.188	.431	.406	.196	-.188

TABLE VI

NUMBER OF ITEMS COMMON TO THE ITEM ANALYSIS SCALE AND THE TEN SUBSCALES (COMMON ITEMS/TOTAL ITEMS) AND THE MINIMUM CORRELATION EXPECTED AS A RESULT OF THE SHARED ITEMS

Female form

L	K	A	R	Ad
0/15	11/30	30/39	2/40	4/32
.000	-.240	.574	-.038	.085
Dn	Pt	MAS	Ne	Es
6/26	22/48	24/50	2/30	13/68
-.141	.380	.406	.044	-.188

average item difficulty should be maintained as close to .50 as possible. The average item difficulty was found to be .47 for both the male and female scales as computed from item difficulty tables prepared by Davis (1946).

Reliability. Three estimates of reliability were determined. A test-retest (2 month delay) correlation coefficient was found to be .95 for both the male (N = 27) and female (N = 40) scales. A split-half half correlation coefficient of .89 was found when the odd vs. even item split was corrected by the Spearman-Brown Formula. The application of the Kuder-Richardson Formula 21, a lower-bound reliability estimate, found an internal consistency coefficient of .88. As in the test-retest analysis the latter two reliability coefficients were identical for both the male and female scales.

Validity. The index of reliability is often computed to estimate the upper limit of test validity. The basic assumption underlying the index of reliability is the understanding that a perfect positive correlation exists between all items composing the scale under consideration. This is a rather rigid assumption. However, Thorndike (1949) has devised a statistical procedure to estimate maximum test validity when the average item intercorrelation is known. Application of Thorndike's procedure to the present data resulted in a maximum test validity coefficient of .71 for both the male and female scales.

Study II. Normative Sample. The newly formed 70-item male and female scales were administered to 262 males and 292 females enrolled in introductory psychology courses at Oklahoma State University. The means and standard deviations for these samples may be found in Table VII. Unlike the nonsignificant difference between the male and female means

TABLE VII

MEAN MARS SCORE AND STANDARD DEVIATION FOR MALE AND FEMALE SAMPLES

	$\overline{X}$	SD
Defining Sample		
M	29.56	14.38
F	30.26	15.19
Normative sample		
M	24.75	10.86
F	27.69	11.06
Psychiatric sample		
M	28.08	15.57
F	30.18	17.07
Reading sample		
M	30.97	11.00
F	35.53	10.89

of the Defining study ($t(198) = 0.312$, $p>.75$), the male and female means of the normative study were significantly different ($t(552) = 3.143$, $p<.01$).

Study III: Psychiatric Sample. The item analysis scales were submitted to a random selection of male (N = 75) and female (N = 100) psychiatric patients at Creedmoor State Hospital in Queens Village, New York. No attempt was made to select individuals for testing who had previously exhibited differential behavioral manifestations of repression, anxiety, or for that matter, any distinguishing characteristic associated with personality structure. It was hypothesized that the scores of the psychiatric patients would not significantly differ from the scores of the individuals found in the Normative study. The rationale for this prediction evolved from the consideration that the formation of a system of defense is an independent component of personality, irrespective of psychiatric classification. Examination of Table VII shows that the means of the male and female psychiatric patients were higher than the corresponding means found in the Normative study, but the differences between them only approached significance ($t(Z) = 1.73$, $p<.10$ for the male analysis; $t(Z) = 1.37$, $p<.20$ for the female analysis). The difference between the means of the male and female psychiatric patients was not significant ($t(173) = 0.833$, $p>.80$).

Study IV: Reading Improvement Sample. The item analysis scales were submitted to a sample of predominantly freshman male (N = 149) and female (N = 90) students enrolled in reading improvement courses at Oklahoma State University. The reading improvement course is offered to students who desire to improve their reading rate and comprehension.

For the most part, enrollment in these courses is on a self-indulgent basis rather than in fulfillment of curriculum requirements. As the individual receives no course credit or tuition fee remuneration his presence in the course would seem to reflect a genuine plea for help and assistance. It may be understood that the benefits an individual seeks to gain from a course of this nature reside, at least in part, in the reduction of anxiety associated with fear of impending academic difficulty. On the basis of this notion it was hypothesized that students enrolled in reading improvement courses would most likely possess considerably higher levels of anxiety than would be expected of individuals selected on the basis of a less restricted sampling procedure, say those students found in the Normative study. If these differences, in fact, are truly extant, they should be reflected in test performance. Although the reading improvement students and the students found in the Normative study were primarily composed of freshman and the data collected at approximately the same time of year, within the same university setting, the means for the male and female reading improvement students (see Table VII) proved to be significantly higher than their counterparts in the Normative study ($t(408) = 5.70$, $p<.001$, for the male analysis; $t(308) = 5.87$, $p<.001$, for the female analysis). Furthermore, the reading improvement students exhibited higher means than were noted for the psychiatric patients. The male analysis approached significance ($t(Z) = 1.37$, $p<.20$), while the female analysis was highly significant ($t(Z) = 2.60$, $p<.001$).

Discussion

In general, the results of the four studies may be stated as

follows: 70-item male and female scales were developed by item analysis techniques. The means, in rounded form, were 24 for males and 27 for females, while the standard deviation was 11 in both instances. The average item-test correlation, the average item intercorrelation, and the average item difficulty level were found to be .60, .36, and .47, respectively, for both male and female scales. Estimates of reliability ranged from .88 (internal consistency) to .95 (test-retest, 2 month interval). An estimate of maximum test validity was found to be .71. Estimates of reliability and validity were identical for the male and female scales. The first of two comparative studies showed that the means of a sample of male and female psychiatric patients were not significantly higher than the corresponding means found in the Normative group. On the other hand, the means for a Reading Improvement group proved to be significantly higher than the corresponding means found in the Normative group.

Unfortunately, no cross-validation data was collected to support the initial choice of items. Data has since been collected, however, and the analysis is now in progress. While it may be expected that this analysis will reduce the number of items now composing the two 70-item scales, it seems likely that this item reduction and the concommitant increase in item homogeneity and test reliability will be small.

The item analysis procedure was designed to select the most discriminating items from ten scales which have been used extensively in experimentation concerned with the recall of threatening materials. It was assumed that the resulting scale would be a more accurate measure of individual ability to avoid threatening materials. The item which

exhibited the greatest discrimination ("I am apt to take disappointments so keenly that I can't put them out of my mind.") supports an appeal to content validity using the definition of repression for which the scale was initially proposed. On the other hand, the magnitude of the intercorrelations between the Pt, MAS, A, and the item analysis scales were as high as estimates of the reliabilities of the scales themselves. It cannot be denied that these four scales are measuring the same variable or variables, but the question remains as to whether it is repression or anxiety or both. A number of investigators (Child, 1954; Deese, Lazarus, & Keenan, 1953; Eriksen & Davids, 1955; Hilgard, 1953; Truax, 1957) have suggested that anxiety scales measure how individuals defend themselves against anxiety, i.e., are measures of habit rather than motivation. In fact, Hilgard (1953) has concluded that an appeal to strong defensive or avoidance habits can effectively account for all of the data typically discussed within a motivational framework. On the other hand, a number of studies have found a high relationship between tested anxiety and the independent clinical determination of anxiety (e.g., Buss, Weiner, Durkee, & Baer, 1955; Gleser & Ulett, 1952; Hoyt & Magoon, 1954; Kendall, 1954). Evidence that the item analysis scales are indeed measuring anxiety was noted in the analysis of the scores of the reading improvement students. It had been hypothesized that students enrolled in reading improvement courses possess significantly higher levels of anxiety than the students found in the Normative study. This hypothesis was based on the assumption that students enrolling in reading improvement courses have a greater fear of impending academic difficulty. A test of the results supported

this hypothesis.

On the basis of the above findings and interpretations it seems reasonable to conclude that anxiety and the avoidance of threatening materials are concommitant variables. Whether or not these two variables are inversely related, as the results seem to suggest, is still very much open to investigation. However, the findings of the present study seem to add support to this interpretation.

As the item analysis scales have been shown to account for considerable test variance associated with manifest anxiety, it may be interpreted that the findings of the Normative study are consistent with the results of a number of similar investigations. The significant difference between the male and female means and the direction of this difference is in agreement with the empirical finding that females typically score higher than males on scales reflecting manifest anxiety (Bendig, 1954; Goodstein & Goldberger, 1955; Jahnke, Crannell, & Morrissette, 1964; Taylor, 1953; Sarason, 1961; Smith, Powell, & Ross, 1955). Moffitt and Stagner (1956) have interpreted the finding that males and females respond differently to anxiety scales by appealing to the cultural determination of females as more anxious than males. Jahnke, Crannell, and Morrissette (1964) examined the possibility that the sex differential results, at least in part, because of a sex bias in response to certain items found in scales of this nature. These investigators showed that a number of items found on the MAS were biased in favor of males, while other items were biased in favor of females. Their conclusion was that no overall sex bias was responsible for the difference between the male and female means. This result is consistent with the results of the present study which

eliminated all sex bias by considering separate male and female scales. Nevertheless, the distinctive difference between male and female means remained in evidence.

Following the assumption that high anxiety was a natural phenomenon among hospitalized psychiatric patients, Taylor (1953) hypothesized that a group of psychiatric patients would exhibit heightened scores on the MAS. A test supporting this hypothesis was reported (Taylor, 1953). Unfortunately, Taylor did not specify the procedure used in the selection of the patients. This study assumed that a random selection of hospitalized psychiatric patients would possess no differential personality characteristic, as a system of defense should be independent of psychiatric classification. Although the results tend to support this hypothesis, the means of the psychiatric patients were higher than the corresponding means found in the Normative study and nearly reached statistical significance. Confounding this result is that the psychiatric patients were predominantly from New York City, while the Normative group were predominantly from Oklahoma. Furthermore, all respondents were compelled to place their name at the top of the answer sheet. While this procedure probably threatened all respondents to some degree, it may have more extensively inhibited one or the other group. Needless to say, it appears that the level of anxiety maintained by a random sample of hospitalized psychiatric patients remains very much open to empirical verification.

The reason for the significant decrease in the scale parameters from the Defining study to the Normative study is not readily understood. An appeal to differential adaptation levels may possibly hold an

explanation. In the Defining study, the 70 items, as yet undifferentiated, were part of a 243-item pool. These same 70 items were presented in absence of additional items in the Normative study. Quite possibly the adaptation level maintained for all 243 items of the composite scale were higher than the adaptation level maintained when the newly formed 70-item scales were presented alone, without support of additional "buffer" items. However, an appeal to adaptation level alone would seem to be insufficient in interpreting the significant difference between the male and female means found in the Normative study. This dilemma might be overcome if it could be shown that males and females maintain differing levels of adaptation to items of the kind found in these scales. This contention is not inconsistent with the interpretation of Moffitt and Stagner (1956) made earlier in the paper that the cultural determination of females as more anxious than males is responsible for the typical finding that females score higher than males on scales of anxiety.

CHAPTER III

STATEMENT OF THE PROBLEM

The current study is primarily concerned with the interaction of personality classification associated with the avoidance of threatening materials and the induction of three levels of threat upon words associated and not associated with threat to self-esteem.

Zeller's three conditions and Millimet's fourth condition for the experimental demonstration of repression will comprise the procedures of this study. They are as follows:

1. Ss will be given the opportunity to learn a series of words.
2. Upon completion of the learning task Ss will be subjected to a threatening situation during which time they will come in contact with a portion of the words they had previously been asked to learn.
3. Ss will be asked to recall the original word list.
4. It must be shown that the portion of words associated with threat are differentially recalled (enhanced or lost) when compared to the words unassociated with threat.
5. The source of the threatening situation will be removed.
6. Ss will be asked to recall the original word list.
7. Removal of the threatening circumstances should restore those words to consciousness which had not been retained

under the threatening circumstances.

Usually in studies of this nature Ss are examined individually. This practice often leads to a considerable investment of time and energy, not to mention the increased probability of experimenter bias. The present study will examine six Ss during a single experimental session. In this manner the effects of group pressure may be used effectively to complement the induction of threat.

Inglis' model will be employed in making predictions concerning the Repression Stage of this study. Although Inglis' model does not provide for the consideration of variables sampled midway along a dimension this does not impose a major problem; the consideration of a moderate repressor group of Ss is a simple extention of the model, as is the consideration of a moderate level of threat (see Fig. 2).

Hypotheses Repression Stage

Under low threat conditions (LT) Low Repressors (LR) are expected to recall more non-threatening words than threatening words, while High Repressors (HR) are not expected to exhibit any differential recall of the word-sets.

Under moderate threat conditions (MT) HR, MR, and LR are expected to recall more non-threatening words than threatening words with MR exhibiting the highest ratio of recall.

Under high threat conditions (HT) HR are expected to recall more non-threatening words than threatening words, while LR are expected to recall more threatening than non-threatening words.

MR are expected to exhibit recall ratios for non-threatening and threatening words falling midway between the recall ratios of the LR

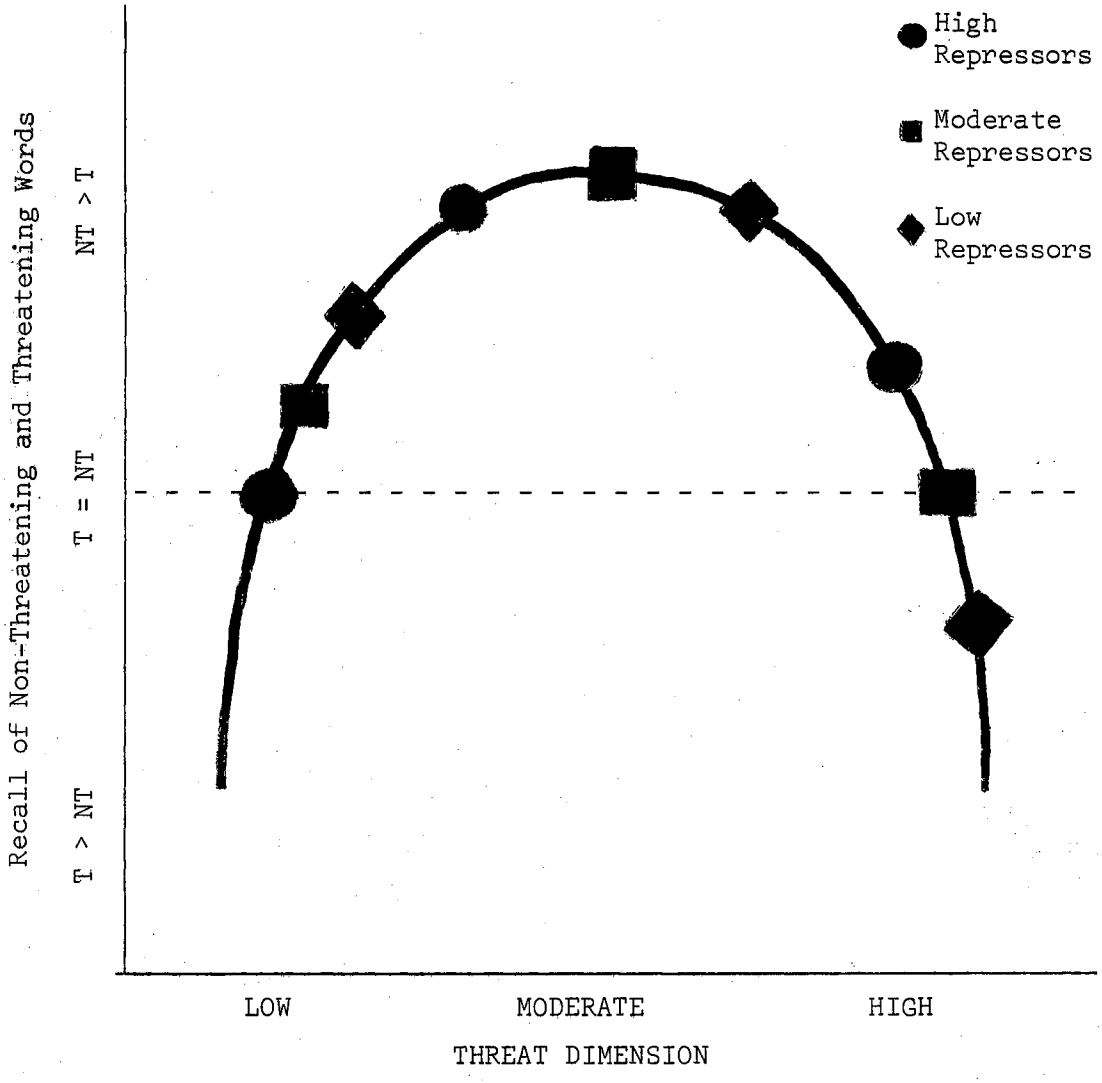

Figure 2. An Extension of Inglis' Model for the Prediction of Recall of Non-Threatening and Threatening Words Under Low, Moderate, and High Threat Conditions.

under LT and HT conditions.

Hypotheses Recovery Stage

In general, removal of the threatening circumstances should enhance the recall of the words expected to be lost during the Repression Stage of the experiment. If no differential loss was expected for the word-sets during the Repression Stage then no differential retrieval should occur during the Recovery Stage. More specifically, the removal of the threatening circumstances should:

1. Restore non-threatening words to LR Ss under LT and MT, MR Ss under LT and MT, HR Ss under MT and HT.
2. Restore threatening words to LR Ss under HT.
3. Result in no differential retrieval of either word-set for HR Ss under LT and MR Ss under HT.

CHAPTER IV

METHOD

Subjects. Ss were drawn from a group of 263 undergraduate women enrolled in introductory psychology classes at Oklahoma State University, the vast majority of which were first-semester freshmen. Each person completed the Repression Scale (Millimet, 1967) and the Manifest Anxiety Scale (Taylor, 1953).[1] A multiple cut-off procedure was employed and 90 individuals were selected as Ss for further testing.[2] Thirty of these Ss had scores falling at least one standard deviation below the mean of both scales which assigned them to the classification of High Repressor (HR); 30 Ss had scores falling on or near the mean of both scales which assigned them to the classification of Moderate Repressor (MR); and, 30 Ss had scores falling at least one standard deviation above the mean of both scales which assigned them to the classification of Low Repressor (LR).

Procedure and Materials. To complete the factorial arrangement the 30 individuals composing each personality classification were randomly distributed into groups of 10 Ss and randomly assigned to three differential threat conditions: (a) Success, (b) Neutrality, and (c)

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[1]Millimet (1967) has found the correlation between the Repression Scale and the Manifest Anxiety Scale to be .920 (N = 100) and .913 (N = 263).

[2]The means and standard deviations were $\overline{X}$ = 28 and s = 12 and $\overline{X}$ = 18 and s = 8 for the Millimet and Taylor Scales, respectively.

Failure.

Upon arrival at the laboratory the Ss were randomly assigned to six partitioned stalls such that no S could see another. Although no attempt was made to physically stifle discussion (the stalls being open at front, rear, and above), Ss were informed at the beginning of experimentation that discussion among them would not be necessary or permitted. The only verbal communication permitted during experimentation would be that delivered periodically by E with reference to general instruction and test results. In addition, Ss were told a number (1-6), placed within an envelope on the desk before them, would act as a code and preface all verbal information concerning their individual performance. After seating, Ss were told to open the envelope and view its contents. Ss were informed that with this information any aspect of their performance could be relayed to them while preserving their anonymity (see Appendix B).

The stimuli were 20 five-letter A-frequency words (Thorndike & Lorge, 1944). The stimulus words were as follows: TEETH, CLOTH, APPLE, ROUTE, CHAIN, SCORE, FRAME, SCALE, TITLE, MATCH, BIRTH, METAL, LEVEL, RANGE, NURSE, LIMIT, FENCE, GUEST, TRACK, and BLOCK. 2 x 2-in. slides of the words were prepared and projected on a screen 6 ft. from S by a Kodak Carousel projector. There were three different random orders of presentation of the stimulus words. The only restriction placed on this randomization procedure was the successive alternation of the to-be threatening words and non-threatening words. It was expected that the three random orders of presentation and the successive alternation of the stimulus words would help to minimize the serial position effect or J-curve that is often noted in this kind of learning situation.

Two tests of 20 analogies each with titles intended to induce high motivation were designed by E and were administered consecutively to each S following appropriate instruction (see Appendix C). On each test only five of the first six analogies had correct solutions, while the remaining were specifically intended to be ambiguous and frustrating. Ten of the fifteen ambiguous analogies, all of which were in the form A : B :: C _____, had in the C position a stimulus word chosen at random from the original set of 20. The remaining ten words in the C position were common words intended not to be discriminately different from other remaining words used in the analogies.

Finally, after all preliminary instructions were read (see Appendix D), the slides were projected, one at a time, at 1-sec. intervals. Upon completion of each presentation, Ss recalled on paper in any order they chose, the stimulus words list. Learning trials, followed immediately by 60-sec. test trials, were alternated until eight learning and eight recall trials had been reached.[3] After each written recall trial Ss placed the recall sheet into a receptacle provided for this purpose. This procedure attempted to minimize further explicit rehearsal of the word list. Each recall sheet was numbered so that comparisons could be made between original learning and later recall.

Upon completion of the learning trials Ss were administered the test of analogies Form A for which a 12 minute time limit was given. Ss were told that the analogies test was being used as a check against their present college standing and a reflection of their intellectual

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[3]Previous experimentation (Millimet, 1965) has shown that eight trials was the average number of trials for learning the word list.

capacity. A table of norms was placed on the side of each stall allowing S to readily compare his score with those scores expected for academic levels ranging from Freshmen in high school to Senior in college (see Appendix E).

At the end of the allotted time Ss analogy tests were collected. Following a brief duration of time in which E pretended to grade the tests, Ss were verbally informed of their scores by use of the above mentioned code numbers. In actual fact, each S received the same code number (4). When test scores were recited aloud by E, each S was led to believe that the scores following the code numbers 1, 2, 3, 5, and 6, were distributed among his fellow Ss while his score was the one following code number 4. Yet, Ss 1, 2, 3, 5, and 6, like all test scores and norms, were fictitious. In effect, each S was receiving identical information, i.e., code number, test scores, test norms, and group pressure.

At this point one of three threat conditions was administered to each experimental group. It should be noted that the six Ss composing each group were randomly selected from the previously determined subject pool of High, Moderate, and Low Repressor groups. This procedure was carried out in an attempt to minimize any experimenter bias present during the course of the experiment.

The three threat conditions were as follows:

(a) Success: I will now read your scores. Remember to listen for your code number. You might like to compare your score with the table of norms placed at the side of your desk....Hmm, I'm sorry to say that five of you have only done moderately well, while the sixth has done exceptionally well. Here are your scores. Number one got 11 correct. As you can see, a score of 11 is usually made by a lower senior in high school. Number two got 8 correct. A score of 8 is usually made by an upper sophomore in high school. Number three, like Number one,

got 11 correct. Number four got 18 correct. Number five got 10 correct. And Number six got 12 correct. For your own information you may wish to know what these scores mean. It has been shown that people who score two or more years above their present college level find college much easier than most students and usually go on to do very well. People who score just about what is expected for their age and year level find about the average number of problems and difficulties in college, while those people who score two or more years below their present college standing usually find college exceedingly difficult and many have problems finishing.

(b) Neutral: I will now read your scores. Remember to listen for your code number. You might like to compare your score with the table of norms placed at the side of your desk.... Hmm, I see that you all did sufficiently well. Here are your scores. Number one got 13 correct. As you can see, a score of 13 is usually made by a lower freshman in college. Number two got 14 correct. A score of 14 is usually made by an upper freshman in college. Number three had 13 correct. Number four had 14 correct. Number five, like Number one and Number three, got 13 correct. And Number six got 12 correct. As you can see, you all did pretty much the same and about what is expected for your class standing.

(c) Failure: I will now read your scores. Remember to listen for your code number. You might like to compare your score with the table of norms placed at the side of your desk.... Hmm, I see that five of you did very nicely while the sixth I'm sorry to say has not done as well. Here are your scores. Number one got 15 correct. As you can see, a score of 15 is usually made by a lower sophomore in college. Number two got 13 correct. A score of 13 is usually made by lower freshman in college. Number three got 14 correct. Number four got 8 correct. Number five, like Number one got 15 correct. And number six got 13 correct. For your own information you may wish to know what these scores mean. It has been shown that people who score two or more years above their present college level find college much easier than most students and usually go on to do very well. People who score just about what is expected for their age and year level find about the average number of problems and difficulties in college, while those people who score two or more years below their present college standing usually find college exceedingly difficult and many have problems finishing.

Upon the completion of each threat condition Ss were told the following:

I'll now give you Form B, an alternate form of the test that you have just completed. This is simply a formality, a

> reliability check on the first test. You may notice that many of the same items that appeared on Form A appear again on Form B. Only the stem of these analogies will have changed, the four alternatives will have remained the same. Most people usually score just about what they did the first time. I'm sure you will too![4]

Although all three groups of Ss were asked to take the alternate form of the analogies test their mental set was probably different. The "Failed" Ss were led to believe that they had fallen far short of what was expected of them. And, more importantly, that their esteem and academic futures were in jeopardy. The "Neutral" Ss were led to believe that they had achieved no more or no less than was asked of them and were simply going through the motion of completing another harmless task. The "Successful" Ss, on the other hand, were being given the opportunity of taking an alternate form of a test that had already secured them high esteem and could only bring them to still greater heights.

Again Ss were given a twelve minute time limit in which to complete the analogies. At this time the analogies were collected but not "scored." Ss were told only that their score on Form B was probably the same as their score on Form A.

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[4]A question may be raised as to the relevance of Form B of the analogies. This procedure is crucial and is frequently missing from studies of this nature. It may be seen that while in the midst of taking Form A Ss could make no accurate estimate of the quality of their performance. Failure or success could only be guessed at by S prior to E's pronouncement of the results. When the results were announced it was hoped that the above mental sets would be formed. But was the formation of these mental sets sufficient in achieving the desired result, that of associating the ten stimulus words found on Form A with the induction of threat. Probably not. Therefore it would seem advisable to reintroduce the ten stimulus words in such a manner as to bring them into closer association with the ongoing mental set. In achieving this aim use of Form B seemed desirable.

At this point Ss were asked to recall the words that they had originally been asked to learn. Again a 60-sec. time limit was given. After completing this task, Ss were informed of the true nature of the experimental procedures. They were told that the supposed scores they attained on the analogies were falsified and they could rest assured that in no way had their actual mental functioning been indicated. Finally, Ss were asked to recall the words they had previously learned. Before leaving the laboratory Ss were asked to complete a brief questionnaire concerning their perception and understanding of the experimental procedures (see Appendix F).

CHAPTER V

RESULTS

The raw data used in the Repression and Recovery analysis are presented in Appendix G. The mean number of words recalled by the Repressor groups, the mean number of words recalled at the low, moderate, and high levels of threat, and the mean recall of threatening and non-threatening words for these analyses are presented in Table VIII.

Preliminary Analysis

A Repeated Measures analysis of variance (Winer, 1962, pp. 337-348) performed on the total number of words recalled during learning (see Table IX) shows that the words to-be associated with the analogies test (threatening words) were recalled considerably better during the eight learning trials than the words to-be unassociated with the analogies test (non-threatening words) ($F(1, 81) = 137.322$, $p<.001$). Although the two sets of words were randomly selected from a list of words considered to be comparable in frequency of occurrence, it is apparent that they significantly differ in associative strength and were not equally well learned. Furthermore, the Groups x Words interaction was also statistically significant ($F(2, 81) = 8.016$, $p<.001$).

Although a Repeated Measures analysis of covariance would seem to be appropriate for these data, a number of investigators (Cochran, 1957; Evans & Anastasio, 1968; Winer, 1962) suggest that in a situation where

TABLE VIII

ADJUSTED MEAN NUMBER OF WORDS RECALLED
AFTER INDUCTION OF THREAT

LR	MR	HR	LT	MT	HT	T Words	NT Words
4.844	4.976	4.938	4.825	5.043	4.899	4.737	5.096

ADJUSTED MEAN NUMBER OF WORDS RECALLED
AFTER REMOVAL OF THREAT

LR	MR	HR	LT	MT	HT	T Words	NT Words
4.836	4.886	5.045	4.785	5.133	4.850	4.748	4.919

ADJUSTED CELL MEANS OF NUMBER OF WORDS
RECALLED AFTER INDUCTION OF THREAT

		T Words	NT Words
LR	LT	4.691	5.244
	MT	4.971	4.742
	HT	4.269	5.142
MR	LT	4.458	5.162
	MT	5.111	5.266
	HT	4.574	5.284
HR	LT	4,586	4,808
	MT	4,970	5,199
	HT	5,009	5,055

TABLE IX

ANALYSIS OF VARIANCE FOR WORDS RECALLED DURING LEARNING (20 WORDS)

SOURCE	df	MS	F	
BETWEEN Ss	89			
A (GROUPS)	2	128.33887	1.427	
B (THREAT)	2	187.07221	2.080	
AB	4	159.15554	1.769	
Ss w. GPS.	81	89.95368		
WITHIN Ss	90			
C (WORDS)	1	2856.04993	137.322	p<<.001
AC	2	166.71664	8.016	p <.001
BC	2	6.81664	-----	
ABC	4	36.18250	1.740	
C x Ss w. GPS.	81	20.79814		

TABLE X

ANALYSIS OF VARIANCE FOR WORDS RECALLED DURING LEARNING (14 WORDS)

SOURCE	df	MS	F	
BETWEEN Ss	89			
A (GROUPS)	2	166.39998	2.739	
B (THREAT)	2	75.05000	1.235	
AB	4	136.02499	2.239	
Ss w. GPS.	81	60.74628		
WITHIN Ss	90			
C (WORDS)	1	0.27222	-----	
AC	2	104.42222	4.863	p<.01
BC	2	44.93888	2.093	
ABC	4	32.76352	1.526	
C x Ss w. GPS.	81	21.47468		

intact groups are being considered and the difference between the covariate means is large then the treatment-covariate correlation will be large and a covariance adjustment of these data is statistically unsound.

Upon examining the data more closely it was determined that the high rate of recall for the words BIRTH, NURSE, and APPLE of the to-be threatening words and the low rate of recall for the words SCALE, ROUTE, and MATCH of the to-be non-threatening words were directly responsible for the large difference between the covariate means. It was decided to eliminate these words from further consideration, reconsider the covariate and variate means in the absence of these words, and perform the appropriate analyses.

After the six words were removed an analysis of variance was again performed on the total number of words recalled during learning (see Table XI). As had been expected the main effect of Words was no longer statistically significant ($F<1$). However, further inspection of Table XI indicates that the Groups x Words interaction, although reduced in magnitude, remains statistically significant ($F(2, 81) = 4.863$, $p<.05$). The use of a covariance analysis again seems to be appropriate.

It has been shown (e.g. Evans & Anastasio, 1968) that if the assumption of homogeneity of between-group and within-group regression is tenable then the treatment-covariate correlation will be small and the use of an analysis of covariance would be appropriate. For the present data, the between-group and within-group regressions (.129 and .109, respectively) were not found to be significantly different ($t(Z) = 0.698$, $p>.50$). Now that the covariate means are fixed and the assumption of homogeneity of between- and within-group regression is

TABLE XI

ANALYSIS OF COVARIANCE FOR WORDS RECALLED AFTER INDUCTION OF THREAT

SOURCE	df	MS	F	
BETWEEN Ss	88			
A (GROUPS)	2	1.41245	1.387	
B (THREAT)	2	3.91265	3.841	p<.05
AB	4	2.31683	2.275	p<.07
Ss w. GPS.	80	1.01856		
WITHIN Ss	89			
C (WORDS)	1	5.77227	5.140	p<.05
AC	2	0.01383	-----	
BC	2	1.03413	-----	
ABC	4	0.73333	-----	
C x Ss w. GPS.	80	1.12300		

TABLE XII

ANALYSIS OF VARIANCE OF DIFFERENCE SCORES FOLLOWING REMOVAL OF THREAT INDUCTION

SOURCE	df	MS	F
BETWEEN Ss	89		
A (GROUPS)	2	0.28889	-----
B (THREAT)	2	0.57222	-----
AB	4	1,30556	1.838
Ss w. GPS.	81	0,71049	
WITHIN Ss	90		
C (WORDS)	1	0.00556	-----
AC	2	0.62222	-----
BC	2	0.03889	-----
ABC	4	0.40555	-----
C x Ss w. GPS.	81	0.83395	

tenable the use of an analysis of covariance on the revised data is advisable.

Repression Analysis

The results of the analysis of covariance (Winer, 1962, pp. 606-618) of threatening and non-threatening words recalled after threat induction are presented in Table XII. Examination of these results show that the main effect of Words is statistically significant ($F(1, 80) = 5.140$, $P<.03$). Inspection of Table VIII shows that more non-threatening words than threatening words were recalled after threat induction. The main effect of threat induction is also statistically significant ($F(2, 80) = 3.841$, $p<.03$), but interpretation of this variable should not be discussed independently of the Repressor groups as the Groups x Threat Induction interaction approaches statistical significance ($F(4, 80) = 2.275$, $p<.07$). The profile corresponding to this interaction effect is shown in Fig. 3. Inspection of this profile and the adjusted threat induction means in Table VIII indicate that MR, under MT, exhibit the largest total number of words recalled. The main source of interaction, it may be seen, resides in the differential recall of HR and LR under HT and LT conditions; HR recalled more words under HT than under LT, while LR recalled more words under LT than under HT. Tests of these simple effects, however, resulted in nonsignificance for each effect ($F<1$ in all cases). This disturbing development is not easily understood. For whatever reason, the simple effects are not significant when considered separately, but when considered together in the overall interaction the effect approaches statistical significance.

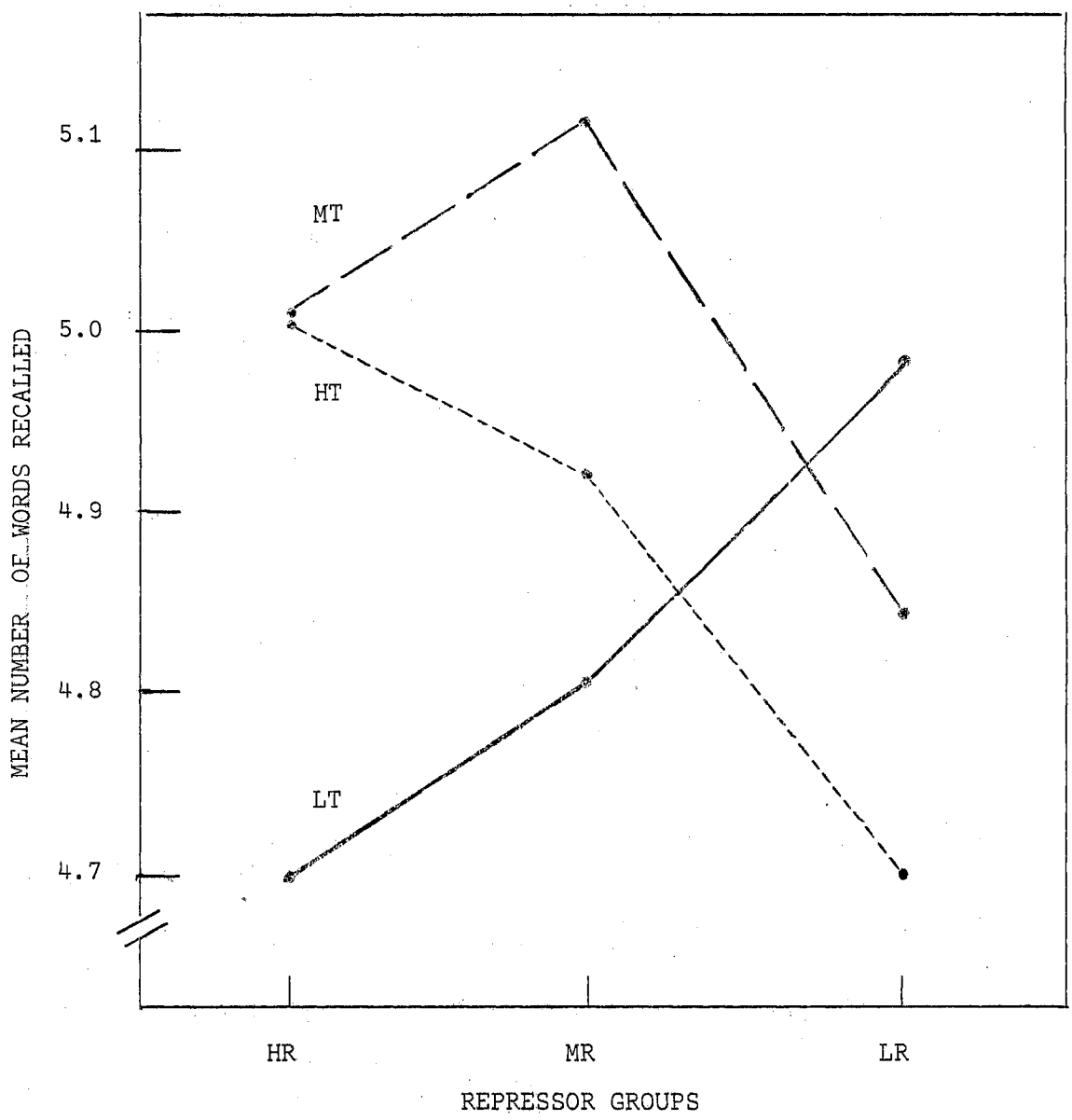

Figure 3. The AB Interaction for Combined Words Recalled After the Induction of Threat

In order to support the hypotheses made prior to the experiment it was necessary to find statistical significance for the Groups x Threat Induction x Words interaction. Examination of Table XI indicates that the three-factor interaction is not statistically significant ($F<1$). However, as a number of comparisons were planned prior to the experiment, further examination of the cell means is appropriate. Comparisons were made between the adjusted mean number of threatening and non-threatening words recalled for each of the nine Between Ss treatment combinations found in Table VIII. Except for the HR-LT comparison and MR-HT comparison in which the hypothesis was that of no difference between means, the direction of the mean differences had been predicted for all comparisons. Hence a one-tail test was used for the latter comparisons, while a two-tail test was used for the former comparisons. The application of a Least Significant Difference (LSD) statistical technique (Steel & Torrie, 1960, pp. 106-107) resulted in three statistically significant comparisons: MR-LT ($p<.025$); LR-LT ($p<.05$); MR-HT ($p<.05$). Examination of Table VIII shows that more non-threatening words than threatening words were recalled in each of the statistically significant comparisons. As noted above, however, the expectation for the MR-HT comparison, unlike the MR-LT and LR-LT comparisons, was that of no difference between means of the two word-sets. Similarly, the LR-HT comparison exhibited the largest difference between the threatening and non-threatening means ($p<.01$), but the hypothesis could not be supported because a one-tail test had been employed and the prediction was in the opposite direction.

In summary, only three of the nine hypotheses were supported. This includes the HR-LT comparison ($p>.05$) for which no difference between

the word-sets was expected. In addition to this lack of support for the hypotheses of the study, the MR-HT comparison was found to be statistically significant although no difference between the word-sets had been expected. Moreover, the LR-HT comparison was found to be statistically significant in the direction opposite to the hypothesis. It may be noted, however, that the trend for five of the seven one-tail comparisons was in the predicted direction.

Recovery Analysis

The response measure used in the analysis of the recovery data was the difference score obtained for each S subtracting separately for threatening and non-threatening words, the number of words recalled after threat induction from the number of words recalled after the removal of threat induction. The results of a Repeated Measures analysis of variance (Winer, 1962, pp. 337-349) of these data are presented in Table XII. As in the Repression Analysis it was necessary to find statistical significance for the Groups x Threat Induction x Words interaction in order to find support for the hypotheses. However, inspection of Table XII reveals no significant main effect or interaction. As in the Repression Analysis, it is appropriate to perform all preplanned comparisons regardless of the nonsignificant three-factor interaction. As before, an LSD statistical technique was employed to test the difference scores for threatening and non-threatening words for each of the nine Between Ss treatment combinations. It was expected that each comparison would exhibit an increase in recall for the type of words expected to be lost during the Repression Stage of the experiment. Conversely, if no loss had been

expected in Repression then no gain should be expected in Recovery.

The analyses showed that none of the comparisons were statistically significant ($p>.05$ for all nine comparisons). Of course, by virtue of these results the hypothesis of no difference for the HR-LT and LR-MT comparisons would seem to find support, but in light of the nonsignificant results found for the seven comparisons for which the direction of the difference had been hypothesized it would seem inadvisable to overstate the meaningfulness of these nonsignificant comparisons.

Questionnaire Analysis

A Chi-square technique (Seigel, 1956, p. 175-179) was applied to the responses to questions 1 and 2 of the questionnaire completed by Ss following the completing of the experiment. Question 1 was concerned with the degree of relief or disturbance experienced by S after being informed of his score on the analogies test. The analysis showed 28 of the 30 Ss in the high threat condition (Failure) were very much disturbed by the information that they had done very poorly on the analogies test, while 26 of the 30 Ss in the low threat condition (Success) were very much relieved by the information that they had done very well on the analogies test. Twenty-seven of the 30 Ss in the moderate threat condition (Neutral) tended to endorse statements lying midway between very much relieved and very much disturbed. The analysis of these data was highly significant ($\chi^2 = 32.60$, $df = 8$, $p<.001$). A second analysis indicated that the LR, MR, and HR groups did not significantly differ in the experience of relief or disturbance following the announcement of their scores on the analogies test

(χ^2 = 3.65, df = 8, p>.80).

Question 2 was concerned with the degree to which Ss were deceived by the experimental procedures. The results show that 76 of the 90 Ss were considerably deceived by the experimental procedures (χ^2 = 105.33, df = 3, p<.001), while neither Ss in the Repressor groups (χ^2 = 1.19, df = 6, p>.90) nor the Ss in the threat conditions (χ^2 = 2.45, df = 6, p>.85) were differentially affected and, thus, were equally deceived.

Question 3 was concerned with Ss degree of awareness of the ten stimulus words circulated throughout the analogies test. Seventy of the 90 Ss reported that they were unaware of the presence of these words. A binomial test of these data was highly significant (Z = 5.296, p<.000003), while neither Ss in the Repressor groups (χ^2 = 3.21, df = 2, p>.20) nor the Ss in the threat conditions (χ^2 = 2.44, df = 2, p>.30) were differentially aware of the presence of these words.

CHAPTER VI

DISCUSSION

In light of the generally unfavorable results, it would seem advisable to examine several aspects of the experimental design and statistical procedures before questioning the merit of the theoretical position being considered in this study. This digression considers the objection that the results are a function of methodological error rather than a function of the independent variables.

One of the conditions to be met in the demonstration of repression requires that the personality groups not be significantly different in their ability to learn. In the present study, the HR, MR, and LR groups were each allotted eight trials to learn the stimulus word list, but this procedure did not, in itself, guarantee equivalent levels of learning. Unfortunately, the word-sets were not equally well learned, irrespective of personality classification. This problem was handled by eliminating from consideration three words from each word-set. This procedure, however, did not eliminate the significant Groups x Words interaction. Although the correction fixed the associative strength of the covariate, it apparantly failed to correct some other aspect of learning responsible for the significant interaction.

It is generally accepted that the two variables most apt to affect serial learning are associative strength and intralist similarity. If this presumption is allowed then the occurrence of the significant

interaction is not surprising. Although the precise relationship is still unclear, there is some evidence that a relationship exists between repression and anxiety. Several investigators (e.g. Lucas, 1952; Montague, 1953) have shown that low anxiety Ss recall more words of high intralist similarity, while high anxiety Ss recall more words of low intralist similarity. In light of the relationship between repression and anxiety, the level of anxiety maintained by Ss could certainly account for the Groups x Words interaction. The significant interaction did not present a serious problem as an analysis of covariance was used to adjust the criterion scores for this initial learning bias.

It seemed clear that an analysis of covariance based on such a large difference between the covariate means was statistically unsound and would have led to a severe reduction in sensitivity in testing treatment effects. For this reason the use of an analysis of covariance on the data as collected was eliminated from consideration. Having exhausted all other alternatives it was decided to equate the covariate means by eliminating an equal number of words from each word-set. Certainly this is non-conventional experimental procedure and its affect on the remaining words in each word-set is difficult to assess, but this procedure seemed to present the only workable alternative. As the same number of words were eliminated from each word-set, it was hypothesized that the resultant effect of their removal would be an unbiased influence on the remaining words of the two sets of words. Because this contention cannot be stated with any high degree of assurance, conservatism in the interpretation of the results of this study is recommended.

It must be shown that the HR, MR, and LR groups did not benefit

differentially from rehearsals of either the threatening or non-threatening words. After the eight learning trials were completed Ss never again received formal presentation of the 20 stimulus words. Because their time was filled with other tasks, Ss had little opportunity to engage in conscious implicit rehearsals after the criterion of learning had been reached. However, it may be argued that the subsequent presentation of the 10 stimulus words on the test of analogies may have significantly increased their habit strength. While this may be true, all three groups were given the same opportunity for rehearsal, and, of course, Ss could not anticipate that their recall of words would ever be required later. Further, the level of awareness maintained by S is of prime importance. If the majority of Ss had readily identified the stimulus words, as they appeared on the test of analogies, as the same words which partially composed the 20 stimulus word list, such awareness could lead to added rehearsals and higher degree of learning of these words. Moreover, such an occurrence would serve to counteract any loss of retention attributable to repression. In addition, it was necessary to independently assess the degree of threat experienced by Ss during the Repression Stage of the experiment. If threat induction was insufficient in arousing in Ss the necessary emotion to be associated with the threatening and non-threatening words, then a vital condition of Inglis' model would be violated and the resultant effects would be inconclusive and subject to qualification. Similarly, if Ss had seen through the falsified information conveyed to them during the course of the experiment, the appropriate mental set would have been lost and the resultant effects would be clouded and, again, subject to qualification. For these reasons, Ss were questioned

before leaving the laboratory about their awareness of the appearance of the ten stimulus words on the test of analogies, their emotional reaction upon hearing their score on the test of analogies, and their awareness of the true nature of the experimental proceedings. The results clearly indicate that Ss reported no awareness of the presence of the stimulus words on the test of analogies. Of course, there is no defense against the argument that learning can be improved by practice without awareness, but as the time limit for completing both forms of the test of analogies was the same for the three Repressor groups it is doubtful that any group could have differentially benefitted. Neither were Ss instructed to learn or remember any of the words appearing on the test forms. If some learning of these words did occur, it would have been under incidental learning conditions which in the case of the present study were probably not well-suited for learning. Moreover, it was the non-threatening words which were retained. A position emphasizing habit strength would predict that threatening words would be retained by virtue of their added appearance.

The results also indicated that the induction of threat was effectively administered and that Ss reacted with the expected amount of disturbance and relief. In addition, the results showed that Ss were effectively deceived by the experimental proceedings and that the three Respressor groups were equally deceived. These results and those previously stated reflect the effectiveness of the experimental operations. In summary, all possible sources of methodological bias have been considered and that the results are best interpreted as a function of the independent variables.

While it is clear that the major hypotheses of the study have not

found statistical support, the reason for this discordance is difficult to assess. Cronbach and Meehl (1955) suggest three sources of error that may be considered in the attempt at reconciling a discrepancy between prediction and result:

1. The test does not measure the construct variable.
2. The theoretical network which generated the hypothesis is incorrect.
3. The experimental design failed to test the hypothesis properly.

The Taylor Manifest Anxiety Scale and the Millimet Repression Scale were used in a multiple cut-off procedure in the selection of Ss for this study. Although originally devised to estimate Drive, a motivational variable, the Taylor Scale has been shown to reflect an associative dimension in the presence of noxious stimulation or stressful information. While the Taylor Scale was derived by a rational approach, the Millimet Scale was derived by an empirical approach; Taylor selected items consensually believed to reflect manifest anxiety, while Millimet selected items based on statistical item analysis procedures performed on a 243-item pool. The ten scales completing the pool had been shown to be extensively used in numerous studies concerned with the recall of threatening materials. Although these approaches are quite dissimilar, they apparently have led to the measurement of the same construct. As noted earlier, the correlation coefficient for these scales has been found to be approximately .92. While there is no defense against the argument that these two scales may be measuring a construct other than the one presently under consideration, evidence cited earlier in the study renders considerable

support for the position that the scales reflect a dimension of differential forgetting of threatening materials.

As Inglis' model has not received very much attention in the experimental literature, it is difficult to assess the merit of the theoretical position being advanced in this study. Moreover, Eysenck's theory in general has failed to inspire experimental psychology in the United States. Inglis valiantly attempts to secure support for the model by citing numerous studies in which the results are consistent with the predictions of the model, but whose investigators had not considered the model in the design of their experiments. Although these post hoc interpretations are interesting, the model must find direct empirical support before any meaningful conclusion concerning its efficacy may be made.

Clearly, the present study did not find statistical support for Inglis' model. In light of having already accepted the efficiency of the personality tests and the experimental design employed in this study one seems compelled to cast doubt on the theoretical position advanced prior to experimentation. Perhaps this conclusion is too broadly stated. Cronbach and Meehl (1955) contend that a modification, rather than a complete revision of a theoretical position, may preserve a considerable amount of worthwhile theoretical material. So, in an attempt at preserving the major hypotheses of Inglis' model, the notion of boundary conditions will be considered. Interestingly, the ensuing discussion of boundary conditions will primarily consider aspects of the experimental design rather than components of the model itself.

Kris, a psychoanalyst and an outspoken critic of the experimental approach to the understanding of psychoanalytic theory, argues that a

considerable amount of time and energy is wasted in attempting to approximate in the laboratory the dangers, real or imaginary, that befall an individual and cause him to defend himself against (say) mounting Oedipal anxiety. Moreover, Kris (1947, p. 255) takes the position that repression is perhaps the least likely psychoanalytic proposition to find support in the laboratory: "The limitations of the laboratory to quasi needs and quasi dangers seriously restrict the area of propositions that can be experimentally verified. In fact, up to the present, experimental approaches have been more successful in dealing with (other) propositions than they have been with propositions concerning repression."

Assuming that the criticisms of Kris have some foundation one must question the effectiveness of the threat variable employed in this study. While it has been independently shown that Ss experienced heightened emotional disturbance at the high level of threat and relief at the low level of threat, it does not necessarily follow that the procedures used in the experiment introduced an effective upper and lower limit of threat with moderate threat falling midway between these extremes. Although the failure condition was perceived by Ss as more disturbing than the neutral and success conditions, it may not have been sufficiently severe as to bring about the expected defensive reaction. If it is accepted that the procedure used to induce high threat was not sufficient in arousing the desire defensive reaction, then it may also be argued that this procedure, rather than being completely inappropriate, was simply mislabeled and might have better represented a moderate or even a low threat condition. If this was truly the situation the results of the experiment are not as damaging to the

hypotheses as originally indicated. Examination of the three-factor summary table presented in Table VIII and the results of the LSD analysis made on the difference between the number of threatening and non-threatening words recalled by the LR, MR, and HR groups at the "high" level of threat reflects the precise pattern of recall expected at the low threat condition of Inglis' model. That is, at the low threat condition the HR group is expected to recall as many threatening words as non-threatening words, the MR group is expected to recall significantly more non-threatening words than threatening words, and the LR group is expected to recall still more non-threatening words than threatening words. The LSD analysis showed that the difference between the word-sets for the HR group was negligible (.046, $p>.90$), the difference for the MR group was considerably greater (.710, $p<.05$), and the difference for the LR group greater still (.873, $p<.01$). Of course, a number of loose assumptions and post hoc interpretations had to be made before reaching this conclusion. It must be recognized that the initial hypotheses are still very much open to question.

The reason for selecting a relatively weak high threat condition was not unintentional. In an earlier study performed by the writer (Millimet, 1965) an experimental design, similar to the one presented in this study, was employed. Rather than considering six Ss during an experimental session, the writer worked with one S at a time. Although the procedure was time consuming, it allowed the writer to monitor and channel the developing dialogue of S. In effect, the writer was probing S for meaningful, personal life experiences for which the poor showing on the test of analogies could be associated. Inevitably S would call to mind long forgotten scenes of past failure and, with the

aid of the writer, attribute them to lowered intellectual capacity. In this manner, S was forced to face the fact that he may not successfully complete his college education. While this procedure was most effective in achieving the desired level of high threat, it led to a number of disturbing events. For example, one hostile male S threatened the writer with physical violence should he make known the results of the test of analogies. Far less comical was the boy who became mute for some minutes before slowly regaining his normal pattern of speech, or the girl who broke down and cried at length. The presence of tears at this point in the experiment was not uncommon, but in this instance S had been informed, earlier that same day by the university counseling service, that her intellectual capacity was, indeed, lower than most college students. The negative test results, by this time all too real and unrelenting, were too much for her to bear.

Needless to say, any investigator is expected to maintain the highest ethical standards of his profession. Unfortunately, in respecting these standards the probability for finding support for the hypotheses under consideration is often significantly reduced. However, events like those mentioned above were enough to make the writer realize that attaining positive experimental results was not worth the risk of inflicting permanent psychological injury. With this in mind the high threat condition was purposely modified.

Not all the results are as unclear as those discussed above. In fact, the results of the Between Ss Repression analysis lend support to a number of major theoretical positions. Before directly considering these results it becomes necessary to view the Repressor groups as possessing differing amounts of manifest anxiety. As Ss were selected

on the basis of the Taylor Manifest Anxiety Scale and the Millimet Repression Scale, a scale known to be highly correlated with the Taylor Scale, it does not seem unreasonable to make this distinction. While there is some evidence that repression and anxiety are inversely related (Eriksen & Davids, 1955; Truax, 1957) it would perhaps be premature to make a final commitment to this provisional proposition. Nevertheless, as the LR Ss were selected from the high end of the two scales their classification would be High Anxiety (HA) and, conversely, the HR Ss, selected from the low end of the two scales, would be classified as Low Anxiety (LA). The MR Ss, selected from the middle region of the two scales, would be classified as Moderate Anxiety (MA). With these distinctions in mind, the results show an inverse relationship between level of anxiety and degree of threat: HA Ss recalled a greater number of words under low threat than under high threat, whereas LA Ss recalled a greater number of words under high threat than under low threat. However, the greatest number of words were recalled by MA Ss under moderate threat. Inspection of Fig. 3 leads to the unmistakeable conclusion that the results most accurately conform to an inverted-U function.

The inverted-U hypothesis was initially developed by Yerkes and Dodson (1908) in one of the earliest experimentally-based statements of relationship between drive and learning (Levitt, 1967, p. 117). Essentially, the Yerkes-Dodson Law considers the relationship between drive and learning to be curvilinear. Low levels of drive do not readily facilitate performance, presumably because this level of motivation is insufficient in maintaining the desired activity. Performance is also negatively affected at high levels of drive,

presumably because of the considerable amount of interference associated with a high motivational state. The level of drive which is expected to lead to optimal performance whould be found somewhere in the middle range of the drive continuum. The Law becomes somewhat more complicated with the consideration of task complexity. When the task is simple the optimal level of drive will be higher than when the task is complex.

In developing his Activation theory, Malmo (1957, 1958, 1959) has essentially adopted the Yerkes-Dodson Law and the inverted-U function. For Malmo, performance is assumed to increase with increasing activation up to some optimal point, after which further increases in activation hinder performance. Furthermore, the optimal motivation level of S varies inversely with the difficulty of the task.

The implication of Malmo's theorizing concerning the variables of psychological stress and test-defined anxiety are clear. The introduction of stressful instructions will increase the total amount of motivation for any S, regardless of his level of anxiety. Performance will be most effective as the combinations of stress and anxiety approach the optimal level of motivation (which is determined by the complexity of the task under consideration). As the varying combinations of stress and anxiety begin to surpass or fall below the optimal level the effect will be a reduction in the quality of performance.

Spence and Spence (1966) have criticized advocates of the inverted-U hypothesis in their use of the Taylor Scale as a measure of drive or arousal level. Spence and Spence insist that experimentation in which the experimental design consists of comparing the performance of low and high anxiety Ss in low and high stress situations, with the expectation that low anxiety Ss in the low stress condition and high

anxiety Ss in the high stress condition will perform less effectively than Ss in the remaining two combinations of anxiety and stress, is insufficient in putting the inverted-U hypothesis to a test.

A number of verbal learning studies (Gordon & Berlyne, 1954; Lucas, 1952; Nicholson, 1958; Sarason, 1956, 1957a, 1957b; Spielberger & Smith, 1966; Walker, 1961) have found that stress induced by ego-involving or failure instructions retarded the performance of HA Ss. The performance of LA Ss, on the other hand, improved with the introduction of stress conditions. As Spence and Spence point out, however, no study has reached the literature in which moderate anxiety and moderate stress have been effectively employed in testing the inverted-U hypothesis. Clearly, the present study, in making use of these variables, has found support for the inverted-U hypothesis. Interestingly, these results are also compatible with the Hull-Spence formulation of drive and performance. Unlike Malmo who discusses the empirical findings in terms of the inverted-U function and an optimal level of motivation, Spence discusses the results in terms of response interference (Spence & Spence, 1966). Child (1954) and Mandler and Sarason (1952) have made similar response interference interpretations.

The Hull-Spence theory considers two types of tasks: simple tasks and complex tasks. Simple tasks are noted by a lack of competition among the learnable elements, whereas complex tasks are characterized by a high degree of competition among the learnable elements. High drive should lead to superior performance on simple or noncompetitional tasks, while low drive should lead to superior performance on complex or competitional tasks. Clearly, the Hull-Spence theory and Malmo's theory predict that performance will vary inversely with task

difficulty when difficulty is defined in terms of the degree of intratask response competition (Goulet, 1968).

It was not too many years ago (Zeller, 1950b, 1951) when it was sufficient to find a significant difference between the recall of threatening and neutral materials as the lone condition in concluding that repression had been effectively demonstrated. If this understanding was still present then certainly the major conclusion of this study would be statistical support for the hypothesis. The statistically significant Words variable, coupled with Ss naivete concerning the presence of the stimulus words on the test of analogies, would have been sufficient evidence to support the hypothesis. Unfortunately, all these results now show is some evidence for the conclusion that, in general, Ss tend to avoid threatening materials. Furthermore, as no recovery of these words took place, the results may not be attributed to personality adaptation, but rather to some aspect of learning below the level of conscious awareness.

CHAPTER VII

SUMMARY

An attempt to demonstrate repression was made by adding a fourth condition to the paradigm proposed by Zeller (1950a). Predictions concerning the expected results were generated from a model proposed by Inglis (1961), based on Eysenck's extraversion-introbersion dimension.

Ss were selected in terms of High Repression, Moderate Repression, and Low Repression, as defined by scores on the Taylor Manifest Anxiety Scale (1953) and the Millimet Repression Scale (1967). Ss were given eight learning and eight recall trials to learn a 20-item word list. Ss were then subjected to one of three threat conditions: high threat (Failure), moderate threat (Neutral), and low threat (Success). Ten of the previously learned stimulus words were associated with the threat conditions (threatening words), while the remaining ten words were not (non-threatening words). A recall test following threat induction showed that the major hypotheses of the study were not supported. These results were discussed in terms of a possible violation of the necessary boundary conditions. It was questioned whether the high threat condition was not mislabeled. After reconsidering the boundary conditions some support was found for Inglis' model and the major hypotheses of the study.

While it was shown that all Ss were characterized by an avoidance of words associated with threat, no recovery of these words was noted

after the removal of the threat conditions. An interpretation of selective learning, i.e. differential registration of the two word-sets prior to threat induction, rather than an interpretation of selective retention, was employed to account for this memory decrement. In addition, it was independently shown that all effects were achieved below the level of conscious awareness.

The results also showed that an inverted-U curve was an excellent approximation to the results of the Between Ss analysis. The results were discussed in terms of Malmo's theory of activation and the Hull-Spence theory of response competition. Before this point was reached it was necessary to assume that repression and anxiety were inversely related. As Ss were selected on the basis of the Taylor Manifest Anxiety Scale and the Millimet Repression Scale, a scale known to be highly correlated with the Taylor Scale, this assumption did not seem unreasonable.

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APPENDIX A

REPRESSION SCALE

Female Only

This inventory consists of numbered statements. Read each statement and decide whether it is true as applied to you or false as applied to you.

You are to mark your answers on the answer sheet you have. If a statement is TRUE or MOSTLY TRUE, as applied to you, blacken in the lines in the column headed T. If the statement is FALSE or NOT USUALLY TRUE, as applied to you, blacken between the lines in the column headed F. Follow the statement numbers on the answer sheet as they appear on this sheet.

1. Once in a while I think of things too bad to talk about.
2. Parts of my body often have feelings like burning, tingling, crawling, or like "going to sleep."
3. I wish I could be as happy as others seem to be.
4. I am easily downed in a argument.
5. I am certainly lacking in self-confidence.
6. I do many things which I regret afterwards (I regret things more or more often than others seem to.)
7. I have met problems so full of possibilities that I have been unable to make up my mind about them.
8. Most people will use somewhat unfair means to gain profit or an advantage rather than lose it.
9. Often I can't understand why I have been so cross or grouchy.
10. I commonly wonder what hidden reason another person may have for doing something nice for me.
11. Criticism or scolding hurts me terribly.
12. I certainly feel useless at times.
13. I have often lost out on things because I couldn't get going or make up my mind soon enough.

14. Most nights I go to sleep without thoughts or ideas bothering me.

15. I do not tire quickly.

16. It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of thing.

17. I frequently have to fight against showing that I am bashful.

18. I am worried about sex matters.

19. I wish I were not so shy.

20. I frequently find myself worrying about something.

21. I brood a great deal.

22. I have periods of such great restlessness that I cannot sit long in a chair.

23. I have difficulty in starting to do things.

24. I have often felt that strangers were looking at me critically.

25. In school I find it very hard to speak before the class.

26. Even when I am with people I feel lonely much of the time.

27. I am more sensitive than most other people.

28. I am easily embarrassed.

29. I worry over money and business.

30. I cannot keep my mind on one thing.

31. I easily become impatient with people.

32. I feel anxiety about something or someone almost all the time.

33. I usually have to stop and think before I act even in trifling matters.

34. I often feel as if things were not real.

35. I have strange and peculiar thoughts.

36. I have no dread of going into a room by myself where other people have already gathered and are talking.

37. I have more trouble concentrating than others seem to have.

38. I have several times given up doing a thing because I thought too little of my ability.

39. Bad words, often terrible words, come into my mind and bother me for days

40. I am inclined to take things hard.

41. I am not afraid of fire.

42. I am not usually self-conscious.

43. I very seldom have spells of the blues.

44. I wish I could get over worrying about things I have said that may have injured other people's feelings.

45. People often disappoint me.

46. My plans have frequently seemed so full of difficulties that I have often had to give them up.

47. Often, even though everything is going fine for me, I feel that I don't care about anything.

48. I have often felt that difficulties were piling up so high that I could not overcome them.

49. I often think, "I wish I were a child again."

50. I have often met people who were supposed to be experts who were no better than I.

51. I am usually calm and not easily upset.

52. It makes me feel like a failure when I hear of the success of someone I know.

53. Sometimes some unimportant thought will run through my mind and bother me for days.

54. I am to take disappointments so keenly that I can't put them out of my mind.

55. At times I think I am no good at all.

56. I feel hungry almost all of the time.

57. I worry quite a bit over possible misfortunes.

58. It makes me nervous to have to wait.

59. I have had periods in which I lost sleep over worry.

60. I am apt to pass up something I want to do because others feel that I am not going about it in the right way.

61. I am often sorry because I am so cross and grouchy.

62. I must admit that I have at times been worried beyond reason over something that really did not matter.

63. I am a high-strung person.

64. I have often felt guilty because I have pretended to feel more sorry about something than I really was.

65. I am often afraid that I am going to blush.

66. My skin seems to be unusually sensitive to touch.

67. I feel tired a good deal of the time.

68. I shrink from facing a crisis or difficulty.

69. I sometimes feel that I am about to go to pieces.

70. I have a daydream life about which I do not tell other people.

Male Only

This inventory consists of numbered statements. Read each statement and decide whether it is true as applied to you or false as applied to you.

You are to mark your answers on the answer sheet you have. If a statement is TRUE or MOSTLY TRUE as applied to you, blacken in the lines in the column headed T. If the statement is FALSE or NOT USUALLY TRUE, as applied to you, blacken between the lines in the column headed F. Follow the statement numbers on the answer sheet as they appear on this sheet.

1. I wake up fresh and rested most mornings.
2. I find it hard to keep my mind on a task or job.
3. At times I feel like smashing things.
4. I have had periods of days, weeks, or months when I couldn't take care of things because I couldn't "get going."
5. Parts of my body often have feelings like burning, tingling, crawling, or like "going to sleep."
6. I hardly ever feel pain in the back of the neck.
7. I am certainly lacking in self-confidence.
8. It takes a lot of argument to convince most people of the truth.
9. I do many things which I regret afterwards (I regret things more or more often than others seem to.)
10. Much of the time I feel as if I have done something wrong or evil.
11. Most people will use somewhat unfair means to gain profit or an advantage rather than to lose it.
12. Often I can't understand why I have been so cross and grouchy.
13. I commonly wonder what hidden reason another person may have for doing something nice for me.
14. I brood a great deal.
15. Criticism or scolding hurts me terribly.
16. I certainly feel useless at times.
17. At times I feel like picking a fist fight with someone.
18. I have often lost out on things because I couldn't make up my mind soon enough.
19. It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important.
20. Most nights I go to sleep without thoughts or ideas bothering me.

21. I like to know some important people because it makes me feel important.

22. It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of thing.

23. I frequently have to fight against showing that I am bashful.

24. I am worried about sex matters.

25. I frequently notice my hand shakes when I try to do something.

26. I feel weak all over much of the time.

27. Sometimes, when embarrassed, I break out in a sweat which annoys me greatly.

28. I wish I were not so shy.

29. I frequently find myself worrying about something.

30. Life is a strain for me much of the time.

31. I have periods of such great restlessness that I cannot sit long in a chair.

32. My way of doing things is apt to be misunderstood by others.

33. When in a group of people I have trouble thinking of the right things to talk about.

34. I have often felt that strangers were looking at me critically.

35. Even when I am with people I feel lonely much of the time.

36. I am more sensitive than most other people.

37. I worry over money and business.

38. I cannot keep my mind on one thing.

39. I easily become impatient with people.

40. I feel anxiety about something or someone almost all the time.

41. Sometimes I become so excited that I find it hard to get to sleep.

42. I often feel as if things were not real.

43. I have a habit of counting things that are not important such as bulbs on an electric sign, and so forth.

44. I have strange and peculiar thoughts.

45. I have been afraid of things or people that I knew could not hurt me.

46. I have more trouble concentrating than others seem to have.

47. I have several times given up doing something because I thought too little of my ability.

48. Bad words, often terrible words, come into my mind and I cannot get rid of them.

49. Sometimes some important thought will run through my mind and bother me for days.

50. I am inclined to take things hard.

51. I am not usually self-conscious.

52. I very seldom have spells of the blues.

53. I wish I could get over worrying about things I have said that may have injured other people's feelings.

54. People often disappoint me.

55. I am unable to tell anyone all about myself.

56. My plans have frequently seemed so full of difficulties that I have had to give them up.

57. Often, even though everything is going fine for me, I feel that I don't care about anything.

58. I have sometimes felt that difficulties were piling up so high that I could not overcome them.

59. I often think, "I wish I were a child again."

60. I am usually calm and not easily upset.

61. It makes me feel like a failure when I hear of the success of someone I know well.

62. I am apt to take disappointments so keenly that I can't put them out of my mind.

63. At times I think I am no good at all.

64. I feel hungry almost all the time.

65. I am often afraid that I am going to blush.

66. I feel tired a good deal of time.

67. I shrink from facing a crisis or difficulty.

68. I sometimes feel that I am about to go to pieces.

69. I have a daydream life about which I do not tell other people.

70. I am happy most of the time.

APPENDIX B

INSTRUCTIONS UPON ENTERING LABORATORY

From this moment on I shall ask you not to speak or make any sound. Please sit straight in your seat, eyes looking forward. There should be no need for questions and no questions will be answered. You will receive the necessary instructions in order to successfully complete the assigned tasks.

Placed on the desk before you is an envelope. Inside the envelope is a number card and a packet of numbered index cards. Please remove these objects at this time and take note of the number that is assigned to you. Any information that I wish to convey to you will be prefaced by this number. In this way, your anonymity will be preserved. Once you have done this, please return the number card and put the envelope aside.

APPENDIX C

HARVARD QUICK-SCORING ANALOGIES OF INTELLECTUAL CAPACITY

SOUTHWESTERN EDITION FORM A

This new test has been found to be a highly predictive, quick-scoring method for determining intellectual capacity. It is particularly effective at the college level. Do not underestimate the simplicity and ease in completing this test: The most obvious answer is not necessarily the most correct as content is not always the critical factor. Read each analogy carefully.

1. Animals : Zoology :: Plants : _____

   A. Physiology B. Astronomy C. Botany D. Chemistry

2. Red : Ruby :: Green : _____

   A. Opal B. Emerald C. Sapphire D. Topaz

3. Hamlet : Shakespeare :: Old Man : _____

   A. Spillane B. Faulkner C. Salinger D. Hemingway

4. Achilles : Heel :: Samson : _____

   A. Jawbone B. Hair C. Riddle D. Grapes

5. Hammer : Chisel :: Knife : _____

   A. Fork B. Dish C. Spoon D. Steak

6. Rabbi : Priest :: Senator : _____

   A. President B. Judge C. Vice-President D. Representative

7. Fish : Trout :: Fence : _____

   A. Barbwire B. Wooden C. Picket D. Corral

8. Radio : Telephone :: Frame : _____

   A. Painter B. Oil C. Photograph D. Picture

9. Sculpture : Art :: Track : _____

A. Team B. Meet C. Animal D. Race

10. Rain : Snow :: Lightning : _____

A. Cyclone B. Hurricane C. Tornado D. Monsoon

11. Psychologist : Archaeologist :: Nurse : _____

A. Lawyer B. Farmer C. Glassblower D. Accountant

12. Spanish : French :: Apple : _____

A. Cherry B. Plum C. Peach D. Apricot

13. Chaucer : Spencer :: Freud : _____

A. Jung B. Adler C. Breuer D. Charcot

14. Retina : Eye :: Teeth : _____

A. Mouth B. Face C. Stomach D. Head

15. Paper : Clip :: Chain : _____

A. Store B. Gang C. Lock D. Saw

16. Burn : Melt :: Destroy : _____

A. Ravage B. Conquer C. Defeat D. Undo

17. Queen : England :: Title : _____

A. Nobility B. Crown C. Monarchy D. Oligarchy

18. Death : Decay :: Birth : _____

A. Life B. Liberty C. Beauty D. Baby

19. Direction : North :: Level : _____

A. Ground B. Head C. Sky D. Load

20. Candle : Illumination :: Atom : _____

A. Proton B. Neutron C. Electron D. Alpha Particle

HARVARD QUICK-SCORING ANALOGIES OF INTELLECTUAL CAPACITY

SOUTHWESTERN EDITION FORM B

This new test has been found to be a highly predictive, quick-scoring method for determining intellectual capacity. It is particularly effective at the college level. Do not underestimate the simplicity and ease in completing this test: The most obvious answer is not necessarily the most correct as content is not always the critical factor. Read each analogy carefully.

1. Stop : Go :: Red : _____

   A. Green B. Blue C. Brown D. Violet

2. Numbers : Arithmetic :: Letters : _____

   A. Books B. Post Office C. Alphabet D. Typewriter

3. Old Man : Hemingway :: Oliver Twist : _____

   A. Maughm B. Shakespeare C. Sheridan D. Dickens

4. Moby Dick : Whale :: Lassie : _____

   A. Collie B. Dog C. Female D. Wolf

5. Pilot : Airplane :: Helmsman : _____

   A. Boat B. Ship C. Vessel D. Vehicle

6. Football : Baseball :: Eleven : _____

   A. Five B. Seven C. Nine D. Fourteen

7. Bird : Blue Jay :: Fence : _____

   A. Barbwire B. Wooden C. Picket D. Corral

8. Telegraph : Television :: Frame : _____

   A. Painter B. Oil C. Photograph D. Picture

9. Athletics : Olympics :: Track : _____

   A. Team B. Meet C. Animal D. Race

10. Judge : Verdict :: Court : _____

    A. Law B. Prison C. Jury D. Lawyer

11. Veternarian : Historian :: Nurse : _____

A. Lawyer B. Farmer C. Glassblower D. Accountant

12. Geometry : Geology :: Apple : _____

A. Cherry B. Plum C. Peach D. Apricot

13. Roosevelt : Truman :: Freud : _____

A. Jung B. Adler C. Breuer D. Charcot

14. Nail : Finger :: Teeth : _____

A. Mouth B. Face C. Stomach D. Head

15. Horse : Shoe :: Chain : _____

A. Store B. Gang C. Lock D. Saw

16. Tangent : Adjacent :: South : _____

A. East B. West C. North D. Pole

17. Maharajah : India :: Title : _____

A. Nobility B. Crown C. Monarchy D. Oligarchy

18. Rust : Ruin :: Birth : _____

A. Life B. Liberty C. Beauty D. Baby

19. Measurement : Length :: Level : _____

A. Ground B. Head C. Sky D. Load

20. Square : Circle :: Tetrahedron : _____

A. Hexagon B. Octagon C. Pentagon D. Triangle

APPENDIX D

INSTRUCTION FOR Ss IN LEARNING WORD LIST PRIOR TO RECALL

You will see projected before you a series of words, one at a time. These words are common, everyday words and you should have no difficulty recognizing them. Look at them carefully and try to remember them as best you can. You will be asked to write them on paper when the series is completed. You do not necessarily have to remember them in the order that they are presented.

APPENDIX E

HARVARD QUICK-SCORING ANALOGIES OF INTELLECTUAL CAPACITY

SOUTHWESTERN EDITION

NORMS

HIGH SCHOOL		COLLEGE
5	LOWER FRESHMAN	13
6	UPPER FRESHMAN	14
7	LOWER SOPHOMORE	15
8	UPPER SOPHOMORE	16
9	LOWER JUNIOR	17
10	UPPER JUNIOR	18
11	LOWER SENIOR	19
12	UPPER SENIOR	20

APPENDIX F

QUESTIONNAIRE COMPLETED PRIOR TO Ss LEAVING LABORATORY

Name_____

1. Upon hearing your "score" on the test of analogies describe your feelings. (Circle one)

VERY MUCH DISTURBED	DISTURBED	NEUTRAL	RELIEVED	VERY MUCH RELIEVED
1	2	3	4	5

2. To what extent would you say you were "taken-in" during the course of the experiment? (Circle one)

VERY MUCH TAKEN-IN	SOMEWHAT TAKEN-IN	DIDN'T REALLY CARE	SOMEWHAT SUSPICIOUS	VERY MUCH SUSPICIOUS
1	2	3	4	5

3. While taking the test of analogies did you notice anything about them which reminded you of the words you were asked to learn earlier? If yes, in what way.

YES. NO. (Circle one)

APPENDIX G

RAW DATA. SCORE ON THE MARS (1) AND MAS (2); COVARIATE FOR THE THREATENING WORDS (3) AND NON-THREATENING WORDS (4); THREATENING WORDS (5) AND NON-THREATENING WORDS (6) RECALLED AFTER THREAT: THREATENING WORDS (7) AND NON-THREATENING WORDS (8) RECALLED AFTER THE REMOVAL OF THREAT.

High Repressor Group

		1	2	3	4	5	6	7	8
SUCCESS	1	9	9	26	31	3	6	4	7
	2	10	9	32	31	7	4	5	5
	3	6	2	31	30	4	7	5	6
	4	8	6	38	29	6	5	6	5
	5	12	10	33	18	3	3	2	3
	6	8	2	31	21	2	4	3	3
	7	12	8	36	36	4	5	4	6
	8	14	8	41	41	5	5	7	5
	9	14	8	34	25	5	2	5	1
	10	14	8	40	43	6	7	5	6
NEUTRAL	1	10	5	26	29	4	5	2	4
	2	3	1	35	32	5	6	4	6
	3	8	5	44	30	7	4	6	5
	4	12	9	53	49	7	7	7	7
	5	12	10	46	40	6	5	7	4
	6	10	8	40	37	5	6	7	6
	7	4	1	37	43	5	5	5	7
	8	10	8	35	36	5	6	6	6
	9	7	3	39	40	5	5	7	6
	10	12	6	41	39	7	7	7	6
FAILURE	1	8	10	25	32	4	4	4	4
	2	3	8	33	28	4	5	4	5
	3	6	7	35	25	7	3	6	4
	4	14	6	33	38	5	6	5	6
	5	14	7	34	34	3	5	3	4
	6	5	6	30	30	5	6	5	5
	7	14	8	22	37	4	4	4	5
	8	11	10	30	38	4	5	4	6
	9	12	9	36	34	6	6	5	7
	10	9	5	41	28	6	5	7	6

Moderate Repressor Group

		1	2	3	4	5	6	7	8
SUCCESS	1	28	16	35	32	5	5	5	4
	2	30	23	35	41	6	4	6	5
	3	28	20	43	36	6	5	7	6
	4	26	20	34	36	4	7	4	7
	5	27	20	47	41	7	6	7	6
	6	28	18	39	46	6	5	6	5
	7	26	16	40	41	4	5	6	6
	8	31	20	27	43	3	7	4	6
	9	28	16	34	23	4	4	4	4
	10	26	16	33	26	4	3	4	3
NEUTRAL	1	27	16	31	40	5	6	4	6
	2	24	19	21	39	4	6	4	6
	3	31	20	32	33	4	5	5	5
	4	25	16	22	29	5	3	5	3
	5	28	16	35	42	6	7	6	6
	6	26	20	42	51	6	6	5	7
	7	30	20	35	39	6	6	6	6
	8	29	16	32	34	5	6	6	6
	9	28	19	40	31	5	6	4	6
	10	26	20	38	40	4	6	5	6
FAILURE	1	28	20	21	23	3	3	3	3
	2	29	20	37	42	6	5	5	5
	3	26	16	32	38	5	7	3	7
	4	31	19	32	42	4	7	4	7
	5	25	20	22	26	4	5	5	5
	6	26	17	43	40	4	6	4	6
	7	26	16	33	34	4	6	4	5
	8	25	16	41	43	5	7	6	6
	9	29	18	27	42	4	6	4	5
	10	26	16	25	28	4	3	4	3

Low Repressor Group

		1	2	3	4	5	6	7	8
SUCCESS	1	49	31	27	37	5	6	3	7
	2	49	28	39	35	4	4	3	2
	3	52	34	39	42	5	5	5	6
	4	55	32	31	28	2	2	1	3
	5	44	31	43	36	7	7	7	7
	6	52	35	29	17	4	5	4	4
	7	46	27	24	24	5	4	5	4
	8	48	33	37	36	5	5	5	4
	9	45	33	25	35	3	7	3	6
	10	45	32	45	35	7	6	6	6
NEUTRAL	1	49	35	24	31	4	4	5	5
	2	56	37	28	32	3	6	3	5
	3	48	27	41	32	6	5	6	7
	4	45	27	33	34	5	4	5	4
	5	53	35	24	31	2	4	3	4
	6	54	31	37	42	6	6	6	4
	7	50	32	18	26	3	4	2	4
	8	48	32	31	32	6	5	5	6
	9	51	31	31	31	5	5	5	5
	10	44	28	28	25	5	2	6	4
FAILURE	1	48	27	37	35	6	7	6	7
	2	50	35	25	27	0	5	0	5
	3	55	34	33	29	4	4	3	5
	4	50	32	40	35	6	4	6	5
	5	47	28	28	21	3	2	3	2
	6	50	38	35	32	4	4	5	4
	7	48	32	32	32	5	6	5	5
	8	48	27	34	27	4	5	4	4
	9	62	41	40	29	5	5	4	6
	10	67	41	37	34	6	5	7	4

VITA

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Candidate for the Degree of

Doctor of Philosophy

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