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THE EFFECT OF ANXIETY,

NEUROTICISM AND TASK DIFFICULTY

ON SERIAL LEARNING

by

F. XAVIER PLAUS
B.A., Assumption University of Windsor, 1963

A Thesis
Submitted to the Faculty of Graduate Studies
through the Department of Psychology in
Partial Fulfillment of the Requirements
for the Degree of Master of Arts at
the University of Windsor

Windsor, Ontario, Canada
1965

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ABSTRACT

This study was an attempt to demonstrate the Yerkes-Dodson law. Specifically, the combined effects of motivation and task difficulty on sequential learning were investigated.

The experimental group consisted of 64 Ss assigned to four difficulty levels; each level was split on the median first on the basis of scores on the Taylor Manifest Anxiety Scale and secondly on the basis of the neuroticism scale of the Maudsley Personality Inventory. The levels of difficulty of the task which the Ss were required to learn was pre-determined by the number of alternate responses in the sequence of numbers.

Analysis of variance yielded a statistically significant interaction between anxiety and task difficulty; there was, however, no significant interaction between neuroticism and task difficulty.

PREFACE

This study began as a result of my interest in the relationship of personality variables to learning. The specific techniques employed, i.e, the Taylor Manifest Anxiety Scale and the Maudsley Personality Inventory, were adopted because of the author's experience with them in a clinical situation and a desire to learn more about their applicability in an experimental situation.

I would like to express my appreciation to Dr. A.A. Smith under whose direction this study was undertaken and without whose assistance it would never have been completed; to my readers Fr. R.C. Fehr Ph.D. and Fr. C.P.J. Crowley Ph.D. for their non-directive guidance; and to John and Mary Bonner for their encouragement and empathy during the writing.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

vii

CHAPTER I

INTRODUCTION

The current period in psychology is marked by widespread and energetic attempts to incorporate motivational variables into models of behavior. There is less effort spent in trying to rule out those conditions which, in any theoretical language, can be called motivational. The result of this union of personality theory and classical experimental psychology can, at the risk of oversimplification, be divided into two general approaches or techniques. The first approach is the antecedent measurement of personality traits as they bear on variations in performance, while the second is the deliberate and controlled manipulation of extrinsic motivational variables to determine their effect on performance. Following Hebb (1955), motivation refers in a rather general sense to the energizing of behavior.

In the specific area of the applications of learning theory to the problems of personality and especially to motivation, the concept of anxiety has, for many years, occupied a central position. The general point of view is that anxiety plays a double role, being on the

-1-

one hand a drive, and on the other a source of reinforce-
ment through its reduction. No attempt will be made here
to review the vast amount of literature concerned with the
concept of anxiety as reinforcement through its reduction.

Young (1961) has clearly outlined the dimensions
of the concept of drive. Following him, if the behavioral
(descriptive) views of drive are disregarded, there
remains a general agreement upon the following points:
Drive is an organic motivation rather than something
environmental. Drive is persisting motivation rather than
a brief stimulation. Finally, drive is an activating,
energizing process. The functions of drive can be summed up
as instigating, sustaining, regulating and organizing
behavior.

As an abstract formulation, the above statements
have certain summary values. For experimental purposes,
however, some more operational definition is needed. In
learning situations with rats, the position is relatively
straightforward: hunger and thirst can be employed, with the
assumption, justifiable within certain limits, that drive
increases monotonically with the number of hours of
deprivation of food or water.

In studies of human learning, however, such a
simple manipulation of basic needs is not generally prac-
tical. Spence, basing his hypothesis on experiments such

as that of Spence and Taylor (1951) and Taylor (1951), has suggested that drive in human subjects might be measured by the level of anxiety, as determined by scores on the Taylor Manifest Anxiety Scale (TMAS). He and his associates, as we shall see, have shown that high-anxious subjects condition more rapidly than those lower on the TMAS.

Eyelid conditioning, as used by Spence (1951), is a relatively simple form of learning. When the acquisition of more difficult habits is investigated, the position, as we shall also see, is reversed; highly anxious subjects learn more slowly than those with presumably lower levels of drive. How is this apparent contradiction to be resolved?

Before attempting to answer this question, it is necessary to digress briefly, and decide what shall be meant by the term "difficult", as applied to a learning situation. Two definitions may be considered. One, which might be called "a priori difficulty", equates difficulty with stimulus and/or response complexity. That is to say, simple conditioning is simple precisely because it involves only one or two stimuli and one or two responses. On the other hand, the learning of a list of words would be judged more difficult because it involves a much larger set of potential stimulus-response connections. This definition of difficulty is a priori because it is possible

to order tasks in this sense prior to any information as to
how well people will actually perform. Most investigations,
including the present one, which have studied the effects
of task difficulty, have defined difficulty in this
a priori sense.

Difficulty could, however, be defined in another
way; in fact, in the common sense way which asserts that
the harder it is to learn something, the more difficult must
be the task. This, of course, is "a posteriori difficulty".
Its experimental use could entail the use of a standardized,
or "calibration" group of subjects, with mean trials to
criterion, or some similar performance score on a number of
trials, being taken as the difficulty measure. So far as
the present investigation is aware, only one recent study
has used this procedure.

It should be clear, however, that, in the sense
of proof, these definitions are by no means necessarily
synonymous. With this in mind, it is now possible to return
to the apparently paradoxical relationship between drive
and difficulty in learning, and point to one possible
resolution of this paradox.

Yerkes and Dodson (1908) have probably formulated
the earliest clear statement regarding this in what is now
known as the Yerkes-Dodson law. They stated that "an
easily acquired habit ... may be readily formed under strong
stimulation whereas a difficult habit may be readily

acquired only under relatively weak stimulation." (Yerkes and Dodson; 1908, P. 482) .Jones (1961, P. 493) in applying this principle to learning situations, stated it in terms of two general tenets:

1. Efficiency of learning is a curvilinear function of drive strength, some inter-mediate level of drive being optimal.

2. Optimal drive is an inverse function of the difficulty of a learning task.

Young (1936) in reviewing previous studies found that this law held true for both animals and humans. Further work, such as Broadhurst (1957) with rats and Eysenck (1963) with humans, have continued to support this law. In Broadhurst's experiment, the motivation was supplied by keeping the rats deprived of air (underwater) for various periods up to eight seconds, before releasing them to attempt a discrimination task. The three levels of difficulty were established by employing three levels of illumination in the discrimination task. The results of Broadhurst's experiment are presented in Figure 1.

Assuming that the Yerkes-Dodson law has a certain range of generality, its significance according to Broadhurst (1959, P. 330) is "in its relevance to some problems arising from the current integration of Hullian learning theory most closely associated with the names of Spence and Eysenck."
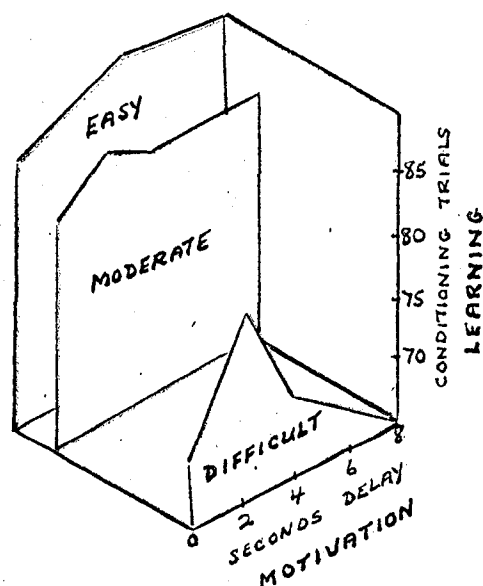
Fig. 1. Learning is a monotonic function of the
difficulty of the task, as a curvilinear function
of degree of motivation, and as a function of
interaction between these two variables.

Writers, such as Spence and Taylor (1952, 1956,
1958), and Mandler (1952) and Sarason (1958), although they
sought to explain, in terms of Hullian learning theory, the
differential effects of anxiety upon simple and complex
learning, make no mention of the Yerkes-Dodson law. However,
Eysenck (1957) and Broadhurst (1959) have related this
principle to Hullian theory and it is their theoretical
deductions upon which this study is based. No attempt,
however, will be made to employ Hull's theoretical system,
rather the hypotheses that have resulted from Hull's system
and actual experimentation will be considered in relation to
the Yerkes-Dodson law as a general construct of motivation.

In this regard, the fundamental concept is the notion of anxiety as a drive. Mowrer (1939) first postulated this concept and subsequent work (Miller, 1951; Farber, 1954; Taylor, 1956; and Spence, 1958) have since put this notion on a firm basis. One study that particularly pertains is that of Malmo and Amsel (1948). They investigated the effect of neurotic anxiety upon rote learning in which the subjects were required to learn a list of eight nonsense syllables. They found slower serial learning with anxious subjects than with non-anxious controls. Thus, in relation to anxiety, this study exemplifies the Yerkes-Dodson law for a difficult task.

Several theories have been postulated to account for the Yerkes-Dodson effect. The first hypothesis was put forward by Spence and his associates; their position has been reviewed in many articles in the past decade (Taylor & Spence, 1952; Farber, 1954; Taylor, 1956; and Spence, 1958). A succinct statement of Spence's position seems to be that of Broadhurst (1959, P.331). According to him,

> it may be that the increase of motivation may operate not only on the potentially correct habit tending to the solution of the problem in a complex situation, but also upon incorrect habits as well and consequently the emergence of the correct habit will be delayed. In a simple situation, however, there will be far fewer incorrect habits available to be energized in this way and consequently increased motivation will tend to energize exclusively the only available habit, the correct one, thus giving rise to an improved performance for the highly motivated group.

The major alternative to Spence's conception of the Yerkes-Dodson effect is the hypothesis postulated by Mandler and Sarason (1952) and also supported by Child (1954) concerning the possible distracting effects of the stimuli arising from the drive itself. With increasing drive, the intensity of the drive stimulus is also increased with the result that task-interfering responses are generated and consequently the performance of the correct habit is impeded. The argument here is that in a simple task, such as eyelid conditioning, where there is a stable relationship between a single stimulus and a single response. Whatever internal responses the subject is making at the time, they are not sufficient in number or intensity to have any effect, thus the presence of high drive makes for improved performance. However, in complex situations, where the subject is already in conflict between various response tendencies relevant to the task, the presence of irrelevant responses made to the anxiety interferes with performance to a greater extent than the increased drive improves it.

A survey of the possible theoretical interpretations of the Yerkes-Dodson law has been also contributed by Jones (1961). He stresses two further aspects in addition to the two mentioned above. The third possible effect of changes in drive concerns the stimulus properties of drive. According to Jones (1961, P. 494), "the stronger the drive,

the more intense the drive stimulus, the greater its share
of the stimulus complex, the greater the similarity between
the positive and negative stimuli and, therefore, the great-
er the difficulty of discrimination." He goes on to state
that this effect would be opposed to any energizing value
of increased drive and the interaction of the two effects
would determine the optimal level of drive, thus producing
a pattern of results similar to those reported by Yerkes
and Dodson.

The fourth possible hypothesis is that there
exists a stable curvilinear relationship between drive and
efficiency with a stable optimum drive value (Hebb, 1955).
However, increasing task difficulty increases the individ-
ual's general drive state in a manner analogous to the
drive increment postulated as following frustration (Brown
& Farber, 1951; Child & Waterhouse, 1953; and Marx, 1956).
If so the optimum pretask drive level would be lower the more
difficult the task.

Broadhurst (1959) adds a fifth interpretation for
the Yerkes-Dodson law which is due to Easterbrook (1959) and
concerns the reduction in the range of perceptual cues
utilized in learning when motivation is increased or when
anxiety is present. According to Easterbrook (1959, P. 197),
"on some tasks reduction in the range of cue utilization
improves performance. Irrelevant cues are excluded and

drive is then said to be organizing or motivating. In other tasks, proficiency demands the use of a wide range of cues and drive is disorganizing or emotional." Easterbrook postulates that there is an optimal level of cues utilization, beyond which the effect of task-irrelevant cues is deleterious to the subjects' performance.

Jones (1961, P. 495) concludes that the,.. "hypotheses are not mutually exclusive and the postulated effect may contribute to the nature of the interaction between drive and performance." He goes on to point out that their relative importance may vary from situation to situation but all are likely to produce the type of relationship reported by Yerkes and Dodson.

BACKGROUND OF RELATED RESEARCH

In research concerning the concept of anxiety as having the energizing properties of a drive, many have employed the TMAS (Taylor, 1953). It is principally these studies which will be reviewed here, along with incidental investigations which elucidate the five theories presented above.

Spence and Taylor (1951) and Taylor (1951) conducted the original studies in this regard and they employed eyelid conditioning as the learning procedure. They hypothesized that in a simple experimental arrangement involving

only a single habit tendency the performance level of high
drive subjects (Ss) should be greater than for low drive
groups. The results were in the predicted direction
(see Fig. 2) and were also obtained in a number of other
studies (Spence, Farber and E. Taylor, 1954; and Spence and
Ross, 1957).
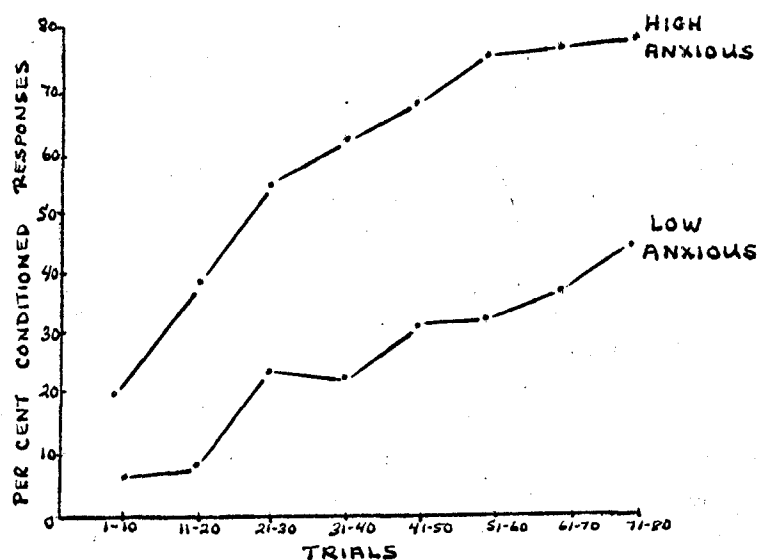
Fig. 2 Conditioning curves for high- and
low-anxiety subjects. (Taylor, 1951)

Spence and Taylor (1952) conducted an experiment
in serial learning. Here the hypothesis was that the per-
formance of high-anxious Ss would be inferior to that of low-
anxious Ss in a learning situation that involved competing
responses. The learning task consisted of a series of
twenty choices between two responses, the words left and
right. The appropriate response was indicated either by the

word "right" appearing in the right window of a memory drum or the word "left" in the left window. The Ss were required to anticipate whether the correct response would be to the left or right. The results were in agreement with the theoretical expectation. The mean number of trials for the anxious Ss to reach criterion of two consecutive errorless trials was 32.78, while the mean number of trials for the nonanxious Ss was 25.12 which was a significant difference at the .01 level of confidence. Another study by Farber and Spence (1953) on serial learning also supported the hypothesis that high anxious Ss would be inferior on complex tasks.

Montague (1953) investigated the effect of anxiety upon performance as a function of the relative number and strength of correct and incorrect response tendencies elicited in the experimental situation. Ss were given three verbal tasks, which had been made to vary in the relative number of correct and incorrect tendencies elicited, by the manipulation of intralist similarity and association value of the nonsense syllables employed. It was found that anxious Ss performed less well than nonanxious Ss on the difficult task with many incorrect response tendencies, showed greater improvement of performance as the task became easier and surpassed non-anxious Ss on the task with the least number of incorrect tendencies.

Lucas (1952) attempted to determine the reason for

the lowered performance of anxious Ss. He studied the effect of anxiety on performance concomitantly with two other variables, failure and intra-serial duplication. He found that the low anxious Ss were significantly superior to high anxious Ss in immediate recall for consonant lists which contained confusing duplications. Also there was a significant interaction between anxiety and failure and also anxiety and duplication. He found that the greater the number of failure reports given to the Ss, the greater was the superiority of the low anxious Ss.

Deese, Lazarus and Keenan (1953) showed that there was an important interaction between scores obtained on a neuroticism questionaire and the conditions of stress under which learning takes place. Under control conditions, high neuroticism was associated with slightly more correct responses than low neuroticism. Under a second condition (avoidance) in which incorrect responses were followed by an electric shock, there was a very large difference between the high and low neuroticism groups. The high neuroticism group showed some facilitation in performance over the comparable control group. The low neuroticism group showed considerable impairment in performance as a consequence of the electric shock. In a third condition (non-avoidance), in which shock was administered randomly, no alteration of performance for the high neuroticism group was observed. However, the low neuroticism group suffered a marked decre-

ment. When the same Ss were later selected on the basis of their TMAS scores, the relationships between anxiety score and performance remained the same as those found for neuroticism. Lazarus, Deese and Hamilton (1954) conducted another study which was essentially the same as the first. However, in this study, the task was made more difficult by including intraserial duplication; the high anxiety groups were consistently though only slightly poorer than the low anxious Ss. The results are presented in Table 1 and were in accord with the results reported by Montague and Lucas.

TABLE 1

Mean Learning Scores (correct responses)

	Deese et al.		Lazarus et al.	
Condition (anxiety)	high	low	high	low
control	31.40	27.87	10.00	10.36
avoidance	37.07	19.53	12.21	13.20
non-avoidance	27.53	20.47	10.64	10.87

The investigations on serial learning of Raymond (1953); Spence, Farber and McFann (1956); Spence, Taylor and Ketchell (1956); and Taylor and Chapman (1955) have continued to demonstrate the superiority of high anxious Ss in tasks with minimal intralist interference. Also the results of Montague (1954) and Raymond (1953) have clearly indicated that the quality of performance in complex learning situations is

inversely related to Ss' degree of anxiety, as measured by
the TMAS, and furthermore that the advantage of the non-
anxious over the anxious Ss is positively related to the prob-
able number and strength of competing responses elicited.

Raymond's study is of particular interest; he em-
ployed a choice-learning situation. The Ss had to choose one
of two alternative response words for each of sixteen stim-
ulus words. In one half of the items the associative connec-
tion of the correct word was stronger than the incorrect word;
in the other half the incorrect word was stronger. It was
found that under the condition in which the incorrect word
was stronger, the high anxious Ss did significantly worse than
the low anxious Ss, but under the reverse condition there was
not a significant difference in overall performance. Al-
though the high anxious Ss started out better, they subse-
quently became poorer than the low anxious Ss in the latter
portion of the learning. Since the task-interfering behavior,
if there was any, would be presumably equal for the two kinds
of learning items, which were intermixed with each other in
the list, the relatively inferior performance of the high
anxious Ss with one set of items must be accounted for by
something other than distracting task-interfering responses.
Spence, Farber and McFann (1956) posit the explanation that
once again the greater drive level of the high anxious Ss in-
creased the strength of the incorrect responses and thus lead
to a greater likelihood of occurence of such erroneous

responses.

Saltz and Hoehn tried to control both competing responses and the level of task difficulty to determine their respective effects. In the first experiment, competing and noncompeting lists of nonsense syllables were selected which had been empirically determined (a posteriori) to have equal difficulty levels for a group of low anxious Ss. The prediction on the basis of the Taylor-Spence theory, was that high anxious Ss should do more poorly on the competing material than on the noncompeting since the increased drive of the high anxious Ss should increase the strength of competing erroneous responses. The results do not support this prediction. Table 2 shows the mean learning rates.

TABLE 2

Mean number of trials to criterion for high and low anxious Ss on "easy" material. (Saltz & Hoehn, 1957)

	High Anxious	Low Anxious
Noncompeting 13% association material	31.09	27.83
Competing 90% association material	28.09	28.44

The difference in means between the two high anxious groups was not significant at the .05 level and in fact was in the opposite direction.

Their second experiment attempted to compare the performance of high anxious Ss on easy but competing material with their performance on difficult but noncompeting material. The prediction from the Taylor-Spence theory was that high anxious Ss should learn faster (relative to low anxious Ss) when competition is reduced, even though difficulty is increased. The results are contrary to this prediction. As can be seen in Fig. 3 the deterioration of performance between the easy but competing material was much greater for the high anxious than for the low anxious Ss.
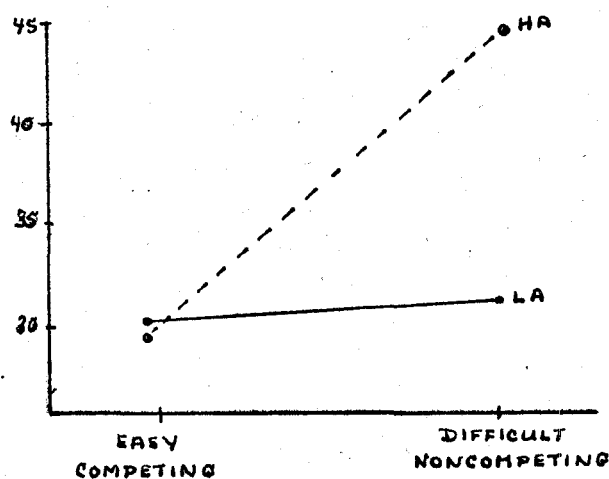
Fig. 3. The performance of anxious and non-anxious Ss when level of difficulty and degree of competition are inversely related.

In contrast to the theoretical approach taken by Spence and Taylor. Child (1954, P. 154) states "that the most plausible general interpretation of these findings about

task complexity is that the disruptive effects of various responses to anxiety vary with the nature of the task."

As mentioned earlier, this is also the theoretical approach taken by Mandler and Sarason in their studies. Mandler and Sarason (1952) also developed a questionaire but it was intended not as a measure of general anxiety but of anxiety in the situation being tested. Their hypothesis is that Ss scoring high on their test respond not only with increased drive, but also with previously learned task-irrelevant responses to their anxiety which interfere with performance. Predictions, derived from this hypothesis, are made concerning the results of an experiment involving repeated testing with items of Koh's Block Design Test and versions of the Wechsler Digit Symbol Test. Stress was experimentally varied by success, neutral and failure reports to the Ss at the half way stage. As predicted, during the non-stress period, anxious Ss tended to be inferior but not always to a significant degree. Under stress, the anxious Ss were expected to deteriorate, owing to interfering tendencies, while the non-anxious were expected to improve owing to increased drive. Appropriate results were obtained for the Koh's designs but no significant effects were observed on the Digit Symbol Test. Success tended to produce effects similar to failure stimulation though to a lesser degree. In a second experiment, Sarason, Mandler and

Craighill (1952) made a similar digit symbol task sufficient-
ly long to ensure that no subject could complete it on any
one trial. Stress was varied by telling the Ss that they
either should or should not be able to finish in the time
allowed. As predicted, anxious Ss were inferior but sig-
nificantly so only for the stress condition. Stress, as
expected, improved the performance of nonanxious Ss but had
no apparent effect on the anxious group.

In a later experiment, Sarason (1956) was concern-
ed with the effects of three motivational variables on per-
formance in serial learning. The levels of the variables
employed were a) high, middle, and low anxiety as defined
by the Ss' scores on the TMAS; b) high and low motivating
instructions; and c) administration of failure and non-
failure reports. The results obtained in this study were
that high anxious, high motivating groups performed at a
lower level than did high anxious, low motivating groups.
The reverse was the case among low- and middle anxious groups,
with high motivation instructions resulting in a higher level
of performance than with low motivation instructions. In
this experiment, either the Spence-Taylor hypothesis or the
Mandler-Sarason hypothesis could provide the basis for the
interaction between anxiety and motivational instructions.
For the high anxious subjects, the addition of high motiva-
tion instructions increased the drive level beyond an

optimum, thus resulting in a deterioration of performance.
Spence and Taylor would hypothesize that the increased drive
accentuates task-incorrect responses while Mandler and
Sarason would hypothesize that the increased drive produces
task-interfering responses. However, whether, in this
particular situation, the former or the latter hypothesis
is the more relevant, the result remains the same. The
result is a deterioration in performance of high anxious,
high motivating groups in relation to high anxious subjects
with low motivation instructions.

All groups in the study who received failure
reports, regardless of TMAS scores, showed marked decrements
in level of performance immediatley after failure. In terms
of an optimal facilitative drive level, the failure reports
can be viewed as increasing drive level of all failed groups
beyond the optimal point.

Sarason (1957), in a further study on anxiety,
motivating instructions, and verbal learning, seems to
demonstrate once again the difficulty in really separating
the two theories. In this experiment, two kinds of motivating
instructions were employed. The first, called subject-orient-
ed, emphasized the need for Ss to perform well in order to
maintain their self-esteem. The second kind, experimenter-
oriented, involved enlisting Ss to help the experimenter by

performing well. It was found that under both sets of instructions the performance of the high anxious Ss was deleteriously affected. However, the detrimental effect of the experimenter-oriented motivation of the high anxious Ss tended to be less than the effect obtained with subject-oriented instructions. For all medium and low anxious Ss the subject-oriented motivations led to better performance than did the experimenter-oriented instructions. However, the problem is that the poorer performance for the high anxious Ss could just as well be due to the increased drive accentuating task-incorrect responses (Spence-Taylor) as to the accentuating of task-irrelevant responses (Mandler-Sarason).

The final study to be reviewed here is an experimental arrangement designed by Taylor (1958) in which the effects of increasing drive levels would be expected to result in a difference between high and low anxious Ss in the opposite direction to those expected if extratask-interfering responses were aroused by the stress condition. If the introduction of stress results simply in an increase in drive level, and, further high anxious Ss are more reactive to such stress, these Ss should increase their margin of superiority over the low anxious (when compared to neutral groups). If, on the other hand, the major effect of stress is to arouse competing extratask responses the high anxious

group should no longer exhibit a performance superior to the low anxious and may even be inferior to them. The results of Taylor's study were that high anxious Ss under neutral nonstress conditions performed at a superior level to the low anxious group, as predicted by drive theory. The subgroups told that their performance had been inadequate showed a significant decrement in subsequent performance when compared to their neutral controls. According to Taylor, no evidence was found to support the contention that high anxious Ss are more prone to exhibit extratask responses, i.e., there was no interaction between anxiety level and the stress-neutral conditions.

The first two hypotheses presented in the introduction are the basic theoretical constructs which have prompted the proliferation of studies just outlined. Since the other three theories were not touched on in relation to studies concerned with the TMAS, they will not be elaborated on any further, at least as far as previous research is concerned. However, the experimenter takes the position (following Eysenck, 1957; and Broadhurst, 1959) that all five theories can be subsumed under the Yerkes-Dodson law as a general construct of motivation. The evidence presented in the various studies suggest very strongly that the two hypotheses dealt with have an element of truth in them and that therefore the Yerkes-Dodson law, as an empirical statement

of relationships, may be the result of quite different causal sets of influences.

One problem of vital importance is the dimensional aspects of the term "anxiety". Eysenck has suggested that with respect to complex tasks, the relevant portion of the variance of the scale is that related to neuroticism. This hypothesis then would relate neuroticism directly to the Yerkes-Dodson law as a kind of multivariate personality variable interacting with the objective drive stimuli. There is some evidence which would suggest this interpretation. Bendig (1957) found a correlation of .77 between the TMAS and the N scale of the Maudsley Personality Inventory (Eysenck, 1958; and Jensen, 1958). Franks (1956) found a correlation of .86 between anxiety as measured by the TMAS and general neuroticism (Guilford's scales D & C). Indirect evidence also gives partial support from such findings as the inferiority of neurotics as compared with normals, matched for sex, age, and intelligence, on complex motor skills such as those involved in manual and finger dexterity (Eysenck. 1947, 1952). Such differences in performance could be rationalized in terms of the Yerkes-Dodson law and might be regarded as a prototype of a whole group of performances of a complex nature in which neurotics have been found inferior to normals.

Purpose of the Study

The essence of the Yerkes-Dodson law is that there is a decrease in the appropriate level of motivation with increasing difficulty of a task. The studies reviewed amply demonstrate that there is an optimum level of motivation beyond which it has a deleterious effect on performance. However, the effect of task difficulty appears to have been less systematically undertaken. The tasks involved in the studies cited were ones of high complexity, and attention was not focused on task difference. One exception was the previously mentioned work of Saltz and Hoehn (1957). They concluded from their results that TMAS scores are related to difficulty level rather than response competition, and, suggest that greater difficulty imposes greater stress, and, therefore, releases potential energy. This view is consistent with the fourth hypothesis mentioned in the introduction. The trend of research in this area, however, has been to deal with the interaction of personality differences not with task variables but with a set of experimental variables which might all be regarded as falling in the general class of experimental manipulation of anxiety arousal.

The problems in this study are (1) to investigate the interactive effects of the level of motivation (specifically anxiety) and the degree of neuroticism with the level of task difficulty on performance; (2) to determine if there

is a significant difference between the level of anxiety and degree of neuroticism in their effects on learning.

It is hypothesized in the light of the Yerkes-Dodson law that:

1. The optimum level of motivation for a task decreases with increasing a priori difficulty of the task.

More specifically that:

2. In simple tasks, low anxiety subjects will be inferior in performance to high anxiety subjects..

3. In simple tasks, low neuroticism subjects will be inferior in performance to high neuroticism subjects.

4. In difficult tasks, low anxiety subjects will be superior in performance to high anxiety subjects.

5. In difficult tasks, low neuroticism subjects will be superior in performance to high neuroticism subjects.

CHAPTER II

METHODOLOGY AND PROCEDURE

Experimental Sample

Sixty-four undergraduate female university students from the University of windsor were employed for this study. Initially one hundred and two Ss from an introductory psychology class were randomly distributed into three groups from which the first sixteen available Ss in each group were selected to participate in the study. Later, when it was decided to add another experimental group, 2 Ss were obtained from the original group, 6 others from the same introductory psychology class; the remaining 8 Ss were obtained from the general female population of the university. The only controls imposed in regard to subjects were that they were between the ages of eighteen and twenty-five and that they were naive concerning the apparatus employed and the theoretical problem of concern in this study.

Testing Materials

The Taylor Manifest Anxiety Scale (TMAS) and the Maudsley Personality Inventory (MPI) (see Appendix A) were selected to measure the level of anxiety and the degree of

-26-

neuroticism respectively, because of simplicity of adminis-
tration and objective scoring system. The TMAS is composed
of fifty items from the Minnesota Multiphasic Personality
Inventory (MMPI) that clinicians have judged to be indica-
tive of chronic anxiety. In the main, these items are one-
sentence descriptions of anxiety symptoms and the S is asked
to indicate whether each is characteristic of him. The
measure of anxiety is the number of such symptoms to which
the S admits. The possible range of scores is from 0 to 50.
The MPI consists of forty-eight one-sentence items, twenty-
four of which make up the neuroticism scale, while the other
twenty-four items make up an extraversion scale. The develop-
ment of the MPI has been described in great detail by
Eysenck (1958). The E and N scales of the MPI were derived
from rather elaborate procedures involving item analysis and
factor analysis of other personality inventories, principally
the Guilford inventory of factors S, T, D, C and R and the
Maudsley Medical Questionnaire. Although the whole of the
MPI was given to all Ss the E scale was not employed in this
investigation.

Experimental Procedure and Apparatus

The TMAS and the MPI were administered to all
students, both males and females, in the introductory psycho-
logy class of the University of Windsor. From this group the
one hundred and two Ss were selected on the basis of the

controls previously mentioned. The Ss, from this group,
who agreed to take part in the experiment proper, were run
on the learning apparatus at a later date. The Ss who were
later obtained from the general female population of the
university, were administered the personality tests just
before being given the learning task. The instructions
for the personality tests were read to the Ss, and are
presented in Appendix B.

The Ss were contacted either in person or by tele-
phone and asked to participate, for approximately an hour,
in an experiment being run in the Psychology department.
For those that agreed to participate, a time was then
arranged for them to come to the laboratory.

The Ss were ushered into the laboratory in which
there was six panels arranged around a hexagonal table, with
barriers between each subject's section. On each panel
there was an arrangement of lights and buttons (see Fig. 4).
At the top of the panel there was a blue warning light;
beneath this light, to the left and right of it, there was
a green light and a red light, labelled respectively "group
success" and "group failure". In the centre of the panel
there were two horizontal rows of six lights and a horizontal
row of six buttons. The uppermost row of lights were white,
numbered 1 to 6, and labelled "stimulus lights", while the
second row was orange and labelled "cue lights". The buttons
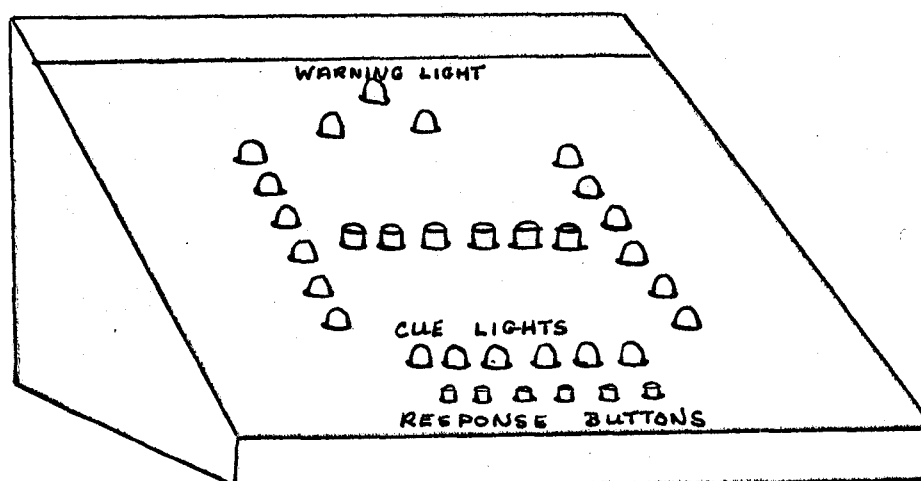
Fig. 4. Individual subject panel of the
General Learning Apparatus.

were simply designated as "response buttons and also labell-
ed 1 to 6. On either side of these horizontal rows of
lights and buttons, there was a vertical row of lights. The
lights on the left were green, labelled "individual success"
and lettered A to F corresponding to the six panels of the
hexagon. The lights on the right were red, labelled
"individual failure" and also lettered A to F.

The Ss were each seated in front of a panel and
read a set of instructions by the experimenter (see Appendix
C). The instructions were essentially the same for all
groups with the exception that groups one and two were inform-
ed of the patterning in their sequence (see below). They
were first informed that they were only to be concerned with
the blue light, the orange lights, and the response buttons.

The experimental procedure was then outlined. First the blue light came on for two seconds; this light simply served as a warning light and a pacer. Following this light, one of the six orange lights came on for four seconds. The Ss were told that their task was to learn which orange light would be following the blue light and that they were to indicate their choice by pressing a response button. The Ss were allowed four seconds in which to make their response. The onset, offset, and duration times of the lights and the inter-trial interval were preprogramed and automatically controlled. There were alternating test and training phases. In the training phases the Ss received the blue light and then the orange lights to respond to, while in the test phases, they received only the blue light. It was explained to the Ss that they had to remember the sequence in which the orange lights cameon during the training phase and then indicate this by pressing the response buttons in the same order or sequence. The Ss were also told that, during the test phase, they were not to press a button until the blue light went out. The beginning of a test phase was to be indicated by the sounding once of a buzzer, while the beginning of the training phase was indicated when the buzzer sounded twice. The Ss were then given the instructions to read over and any questions were answered. When the experimenter felt that the Ss understood the task required, the experiment

was then begun, commencing with a test phase.

The Ss were divided at random into four groups; to each group a task of different a priori difficulty was assigned. Task difficulty was measured by the number of possible alternative responses, consistent with the instructions. To take a simple example, consider a subject who is told that he is to learn to press six buttons in a random sequence, with the only restriction being that no button is to be pressed more than once in the sequence of six. For his first response, he has six possibilities; for his second, five; and so on, for a total difficulty measure of 6 + 5 + 4 + 3 + 2 + 1 = 21. If he has to learn two such sequences, each independent of the other, he will have a difficulty measure of 2 x 21 = 42; and for three independent sequences, the difficulty will be 3 x 21 = 63.

If, however, he is also told to consider the response sequence divided into two halves, the responses of pressing buttons 1, 2, and 3 being one half, and 4, 5, and 6 being the other; and further, that no two consecutive responses are to fall in the same halves, or sub-sets: his possible responses are six for the first, three for the second, two for the third and fourth, and one for the fifth and sixth. For such a restricted sequence of six, the difficulty measure will be 6 + 3 + 2 + 2 + 1 + 1 = 15. For two such sequences, if independent, the measure will be 30;

but for two such sequences, when the second is a replica of the first, the difficulty will also be taken as 15.

In the present experiment, the task difficulties were

a) level 1 - two restricted but repeated sequences (difficulty 15).

b) level 2 - two restricted, independent sequences (difficulty 30).

c) level 3 - two random, independent sequences (difficulty 42).

d) level 4 - three random, independent sequences (difficulty 63).

Twelve consecutive correct responses were required at the first three levels; eighteen were required for the more difficult task.

On the basis of the scores obtained on the TMAS, each of the experimental groups was further subdivided into a high anxiety and a low anxiety group. The median was employed to distinguish the two groups. The Ss in each experimental group were also redistributed into high neuroticism and low neuroticism groups. The median for the scores of each group on the MPI was employed to distinguish the Ss on this basis.

In each experimental session, a preliminary test phase (no cue lights) preceded the first training phase. Through this procedure, the naivete of the Ss concerning the sequence employed, was established. The sequences of

numbers used for the four experimental groups are presented in Appendix D.

From one to three Ss, depending on the number able to participate at each session, were run on the learning apparatus. In each session, the experiment was run until each S correctly completed the sequence one during a test block.

CHAPTER III

PRESENTATION AND ANALYSIS OF RESULTS

Since this study was concerned with investigating the effects of anxiety and neuroticism on task difficulty in serial learning, a test for correlation was first performed on the scores obtained from the TMAS and MPI. The correlation coefficient between anxiety and neuroticism was .79. This score compares favourably with other research presented in the literature (Bendig, 1957).

The primary data consisted of the number of test blocks required by each S to reach a criterion, which was pre-established as the first correct completion of the sequence. The mean performance scores for each difficulty level, as subdivided into high and low anxiety, are presented in Table 3.

TABLE 3

Mean Performance Scores (mean test blocks to criterion for high and low Ss according to difficulty level)

	Difficulty Level			
	1	2	3	4
Low Anxiety	4.88	6.50	5.50	5.88
High Anxiety	3.13	6.63	5.38	9.13

The statistical significance of these results was assessed by analysis of variance, which is summarized in Table 4.

TABLE 4

Analysis of Variance of Test Blocks to Criterion for Degree of Anxiety and Level of Task Difficulty

Source of Variation	Sums of Squares	df	Mean Squares	F
A (Anxiety)	2.64	1	2.64	
B (Task Difficulty)	107.79	3	35.93	5.17**
AB	52.18	3	17.39	2.50*
Within cells (error)	389.12	56	6.95	
Total	551.73	63		

** F.99 (3,56) = 4.17
* F.90 (3,56) = 2.20

The results of this analysis indicated that, while the level of task difficulty significantly influenced performance, there was no demonstrable overall effect for anxiety. There was, however, a significant interaction between task difficulty and degree of anxiety. The low anxious subjects performed better than high anxious subjects on the most difficult task, and the reverse effect was obtained for the least difficult task. (Fig. 5)

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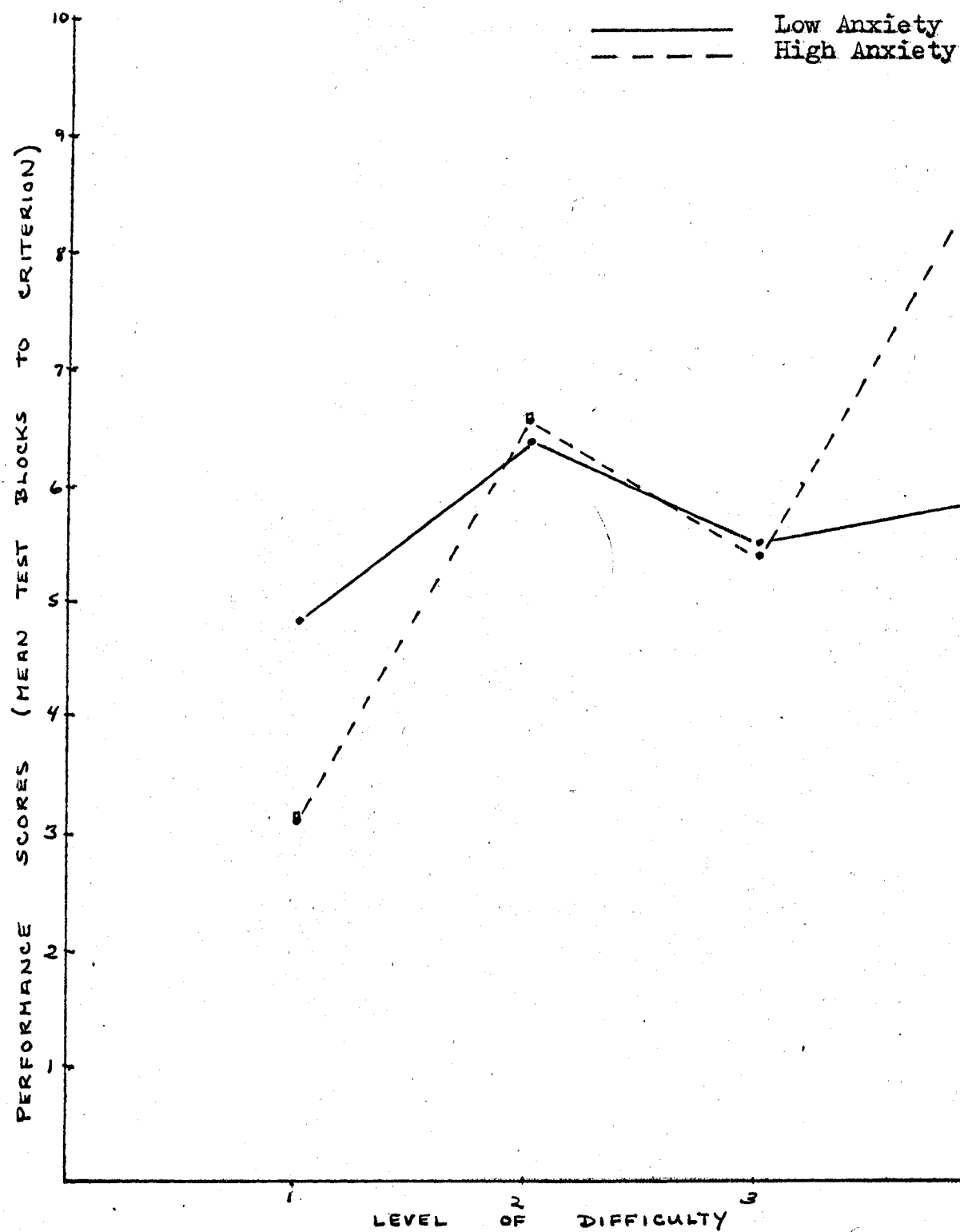
Fig. 5 The effects of anxiety and task difficulty on performance.

Tests were carried out for the effects of anxiety at each difficulty level and similarly for the effects of task difficulty at each level of anxiety. The results of this analysis are presented in Table 5.

TABLE 5

Analysis of Variance for Simple Effects of Anxiety and Task Difficulty

Source of Variation	Sums of Squares	df	Mean Squares	F
A for B_1 (Anxiety for 1st. level of difficulty)	12.25	1	12.25	1.76
A for B_2	.25	1	.25	.04
A for B_3	.07	1	.07	.01
A for B_4	42.25	1	42.25	6.08*
B for A_1 (Difficult for low anxiety)	9.60	3	3.20	.46
B for A_2	150.37	3	50.12	7.21**
Within	389.12	56	6.95	

  *   F. 95 (1, 56) = 4.02
  ** F. 99 (3, 56) = 6.27

   The results indicate that the effect of anxiety was significant only at the most difficult level, although there was a trend toward significance for the effect of anxiety on the least difficult task. As regards difficulty level, the results indicated that this factor was significant for only the high anxiety level.

A trend analysis was also carried out on the means shown in Table 3. For the low anxiety group, there were no significant linear, quadratic, or cubic trends. For the high anxiety group, however, significant linear (1%) and cubic (5% level of significance) components of trend were demonstrated.

The data can also be considered with respect to neuroticism; the mean performance scores for each difficulty level, as subdivided into high and low neuroticism, are presented in Table 6.

TABLE 6

Mean Performance Scores (mean test blocks to criterion for for high and low neuroticism subjects according to difficulty level of task)

| | Difficulty Level | | | |
	1	2	3	4
Low Neuroticism	4.00	6.38	5.13	6.00
High Neuroticism	4.00	6.63	5.76	9.00

These means are graphically presented in Fig. 6. The main statistical analysis of these results are presented in Table 7.
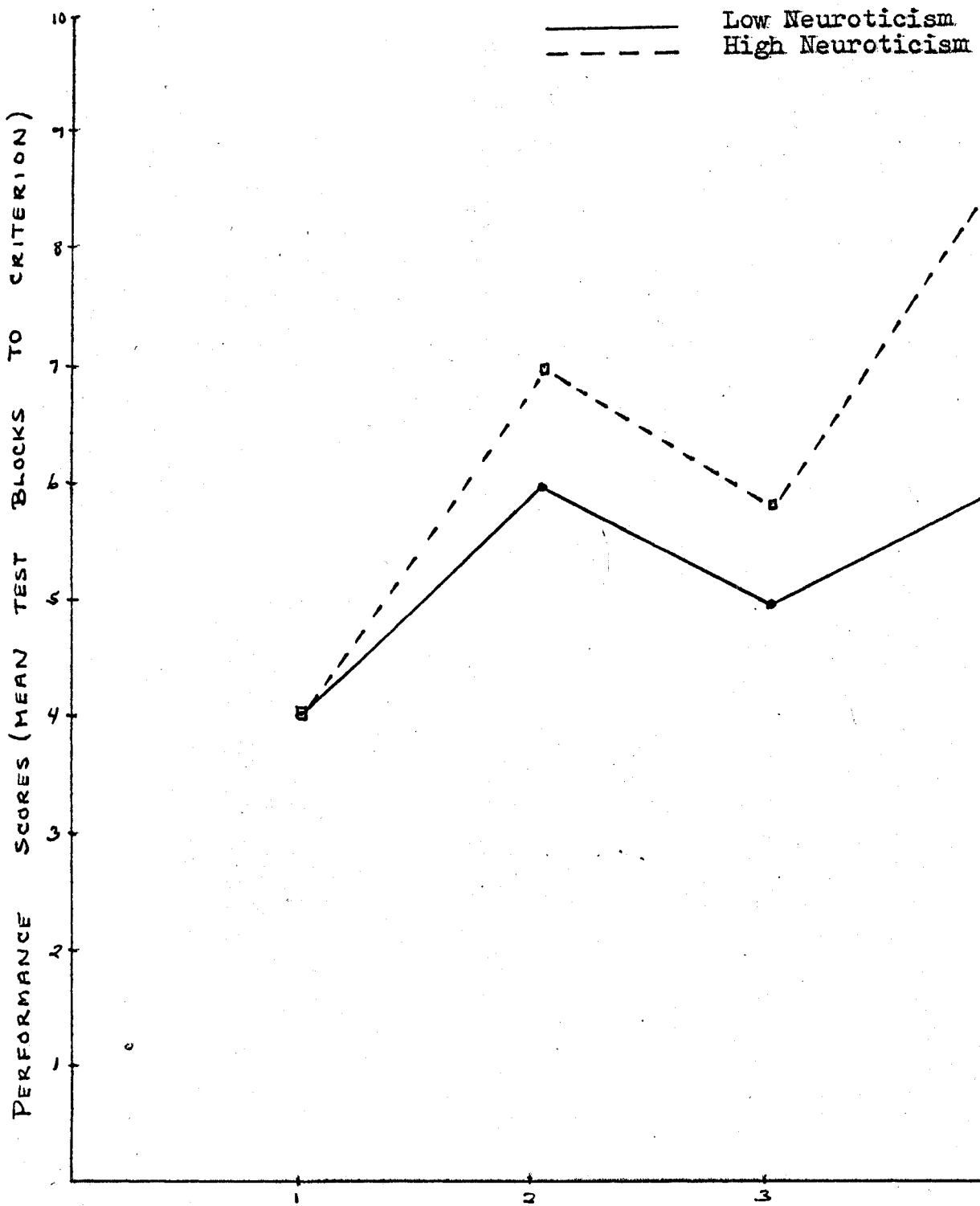
Fig. 6. The effects of neuroticism and task difficulty on performance.

TABLE 7

Analysis of Variance of Test Blocks to Criterion for
Degree of Neuroticism and Level of Task Difficulty

Source of Variation	Sums of Squares	df	Mean Squares	F
A (Neuroticism)	15.01	1	15.01	2.02
B (Task Difficulty)	107.79	3	35.93	5.17*
AB	22.81	3	7.60	
Within	406.12	56	7.25	
Total	551.73	63		

* $F_{.99}$ (3, 56) = 4.17

CHAPTER IV

DISCUSSION OF RESULTS

Research Hypotheses Reconsidered

The hypotheses underlying this study were stated as follows in Chapter 1:

1. The optimum level of motivation for a task decreases with increasing a priori difficulty of the task.

2. On simple tasks, low anxiety subjects will be inferior in performance to high anxiety subjects.

3. On simple tasks, low neuroticism subjects will be inferior in performance to high neuroticism subjects.

4. On difficult tasks, low anxiety subjects will be superior in performance to high anxiety subjects.

5. On difficult tasks, low neuroticism subjects will be superior in performance to high neuroticism subjects.

Only in part, did the results obtained in this study support the hypotheses outlined above. The fourth hypothesis was statistically confirmed, that is, on difficult tasks, low anxiety subjects were significantly superior in performance to high anxiety subjects. In regard to the second hypothesis, the low anxiety subjects were inferior in performance to high anxious subjects, however, this hypothesis was not

-41-

statistically significant. Similarly, the fifth hypothesis
was not statistically confirmed although the results were
in the predicted direction. In contradiction to the third
hypothesis, on simple tasks, there was no distinction be-
tween high and low neuroticism subjects.

The results of the present study seem to fit
neatly into place with the earlier findings of Spence and
his co-workers. They found, it will be recalled, that high
anxious subjects condition more rapidly, but were slower in
serial verbal learning. In terms of the present concept of
a priori difficulty (as measured by the number of possible
alternative responses), eyelid conditioning is a learning
task of much lower level of difficulty than any employed
here. On the other hand, his serial learning tasks are prob-
ably more difficult (their exact measure possibly depending
on S's vocabulary size and a priori familiarity with nonsense
syllables). The tentative hypothesis might then be advanced
that even the simplest of the present trials was still too
difficult to admit of any significant superiority in per-
formance for subjects with high anxiety.

Results Considered in Relation to the Yerkes-Dodson Law

The results of this study on the whole support the
Yerkes-Dodson law as an empirical statement of the relation-
ship between motivation and task difficulty. Problems arise,

however, when an attempt is made to elucidate the underlying
mechanisms which bring about the results covered in the
Yerkes-Dodson law. As indicated earlier, the position of
the experimenter is that the five hypotheses outlined in the
first chapter are subsumed under this law and provide some
explanation for the causal influences that result. The
deterioration in performance resulting from (a) an increase
in motivation beyond an optimum, (b) an increase in task
difficulty, or (c) a combination of both, could, following
Spence and Taylor, be at least partly due to an increase in
task-incorrect responses. The difficulty with this hypo-
thesis, especially in regard to serial learning, is that the
experimenter has no way of measuring the relative strengths
of the competing responses. Similarly, in regard to the
hypothesis put forward by Mandler and Sarason, it is granted
that such distracting, task-interfering responses will occur.
However, it is difficult to know when and to what extent
they function in a particular situation. In serial learning
situations, one can not be certain if the decrement in per-
formance was due, even partly, to greater task-interfering
responses on the part of more anxious subjects. These situa-
tions simply do not permit the separating of the role played
by this factor and that of drive level per se.

From the studies reviewed earlier it appears that
the kind of anxiety measured by the TMAS is activated as a

drive variable only when threatening or noxious stimuli
are present. Where anxiety as measured by the TMAS does
show an effect, it is always compared to the effect of
threat-induced anxiety. The fourth hypothesis appears to
be the most relevant to this study. This hypothesis once
again is that there exists a stable curvilinear relationship
between drive and efficiency with a stable optimum drive
value but that increasing task difficulty increases drive
and thereby produces a decrease in the quality of perform-
ance. This appears, then, to be the underlying mechanism
involved in this study, that is, that the increasing diffi-
culty of the task imposed greater stress, generated increased
anxiety and thereby adversely affected performance. Task-
incorrect responses and/or task-irrelevant responses pro-
duced by the anxiety would be taken as the specific manner
in which the increased motivation adversely affected motiva-
tion. For the low anxiety subjects, their pre-task drive
level was so low that the increase in task difficulty was
not sufficient to generate enough anxiety to adversely affect
performance. For the high anxiety subjects, on the other
hand, their pre-task drive level was so high that for the
difficult task group the level of motivation was increased
beyond the optimum level of drive resulting in a deteriora-
tion of performance.

It can be argued that the type of anxiety that has drive properties may always be brought on by the situation and that its effects can not be studied or even demonstrated unless it is aroused in relation to the phenomena under consideration. The anxiety that originally caused or perhaps sustained neurotic symptoms may not be a relevant drive in the laboratory experiment. If anxiety is an emotional reaction, it should be reflected in certain autonomic reactions. Thus if physiological activity is the key to distinguishing high drive from low drive subjects, then direct physiological measurements would appear not only preferable but necessary. Unfortunately, the appropriate physiological indices are not available.

In summary, support was found in this study for the hypothesis that the optimal level of motivation for a task decreases with increasing difficulty of the task. However, the relative difficulty of the experimental task is clearly of importance in determining the nature and direction of group differences in learning, and appears to be the most important single factor. It is felt that although the validity of the Yerkes-Dodson law has been confirmed its underlying dynamics need further elucidation.

CHAPTER V

SUMMARY AND CONCLUSIONS

This study attempted to demonstrate the validity of the Yerkes-Dodson law as applied to human serial learning; the law, in essence, states that the optimum level of motivation for a task decreases with increasing difficulty of a task. The level of motivation was measured in terms of anxiety by the Taylor Manifest Anxiety Scale, and in terms of neuroticism by the Maudsley Personality Inventory.

Sixty-four female undergraduate college students participated in this study. They were first given the TMAS and the MPI, and on the basis of the TMAS scores, the subjects were split into four experimental groups. These four groups were distinguished on the basis of the difficulty of a sequence of numbers which they were required to learn.

The experimental procedure employed was that each subject was brought into a laboratory and seated in front of a panel on which there were a row of numbered lights and a corresponding row of numbered buttons. The subjects were told that they were required to learn a sequence of numbers. This sequence was indicated to the subjects through the lights flashing in a certain order. The subjects indicated

-46-

that they were learning the sequence by pressing a button corresponding to each light in the same order that the lights flashed.

Analysis of variance revealed that there was a significant interaction (.01 level of confidence) between anxiety and task difficulty, but not between neuroticism and task difficulty. The data revealed that for an easy task, high anxiety subjects were superior in performance on a serial learning task than were low anxiety subjects. However, on a difficult task, the low anxiety subjects were superior in performance to the high anxiety subjects. Thus the general hypothesis that with increasing task difficulty the optimum level of motivation decreases, was confirmed.

In conclusion, it was felt that this study has demonstrated the need for further research into the relationship of level of motivation to task difficulty in human learning and it is suggested that the most appropriate measure would be physiological techniques.

APPENDIX A

Taylor Manifest Anxiety Scale

1. I believe I am no more nervous than most others.   T F

2. I work under a great deal of tension.   T F

3. I can not keep my mind on one thing.   T F

4. I am more sensitive than most other people.   T F

5. I frequently find myself worrying about something.   T F

6. I am usually calm and not easily upset.   T F

7. I feel anxiety about someone or something almost all the time.   T F

8. I am happy most of the time.   T F

9. I have periods of such great restlessness that I can not sit long in a chair.   T F

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

11. My sleep is fitful and disturbed.   T F

12. I am not usually self-conscious.   T F

13. I am inclined to take things hard.   T F

14. Life is a strain for me much of the time.   T F

15. At times I think that I am no good at all.   T F

16. I am certainly lacking in self-confidence.   T F

17. I do not tire quickly.   T F

18. I have few headaches.   T F

19. I frequently notice my hand shakes when I try to do something.   T F

20. I worry quite a bit over possible misfortunes.   T F

21. I am very seldom troubled by constipation.   T F

22. I have a great deal of stomach trouble.   T   F

23. I have had periods in which I lost sleep over   T   F
    worry.

24. I find it hard to keep my mind on a task or job.   T   F

25. I wish I could be as happy as others seem to be.   T   F

26. I sweat very easily even on cool days.   T   F

27. It makes me nervous to have to wait.   T   F

28. I have been afraid of things or people that I   T   F
    know could not hurt me.

29. I certainly feel useless at times.   T   F

30. I am a high-strung person.   T   F

31. I sometimes feel that I am about to go to pieces.   T   F

32. I practically never blush.   T   F

33. I am certainly self-confident.   T   F

34. I am troubled by attacks of nausea.   T   F

35. I worry over money and business.   T   F

36. I blush no more than others.   T   F

37. I have diarrhea once a month or more.   T   F

38. I shrink from facing a crisis or difficulty.   T   F

39. I am often afraid that I am going to blush.   T   F

40. I have nightmares every few nights.   T   F

41. My hands and feet are usually warm enough.   T   F

42. I cry easily.   T   F

43. Sometimes when embarrassed, I break out in a   T   F
    sweat which annoys me greatly.

44. I hardly ever notice my heart pounding and I am   T   F
    seldom short of breath.

45. I feel hungry almost all the time.   T   F

46. I dream frequently about things that are best   T   F
kept to myself.

47. I am easily embarrassed.   T   F

48. I sometimes become so excited that I find it   T   F
hard to get to sleep.

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

50. I have very few worries compared to my friends.   T   F

Maudsley Personality Inventory

1. Are you happiest when you get involved in   Yes ? No
some project that calls for rapid action?

2. Do you sometimes feel happy, sometimes   Yes ? No
depressed without any apparent reason?

3. Does your mind often wander while you are   Yes ? No
trying to concentrate?

4. Do you usually take the initiative in   Yes ? No
making new friends?

5. Are you inclined to be quick and sure in   Yes ? No
your actions?

6. Are you frequently "lost in thought" even   Yes ? No
when supposed to be taking part in a
conversation?

7. Are you sometimes bubbling over with energy   Yes ? No
and sometimes very sluggish?

8. Would you rate yourself as a lively   Yes ? No
individual?

9. Would you be very unhappy if you were   Yes ? No
prevented from making numerous social
contacts?

10. Are you inclined to be moody?   Yes ? No

11. Do you have frequent ups and downs in mood,   Yes ? No
    either with or without apparent cause?

12. Do you prefer action to planning for action?   Yes ? No

13. Are your daydreams frequently about things   Yes ? No
    that can never come true?

14. Are you inclined to keep in the background   Yes ? No
    on social occassions?

15. Are you inclined to ponder over your past?   Yes ? No

16. Is it difficult to "lose yourself" even at a   Yes ? No
    lively party?

17. Do you ever feel "just miserable" for no   Yes ? No
    good reason at all?

18. Are you inclined to be overconscientious?   Yes ? No

19. Do you often find that you have made up your   Yes ? No
    mind too late?

20. Do you like to mix socially with people?   Yes ? No

21. Have you often lost sleep over your worries?   Yes ? No

22. Are you inclined to limit your acquaintances   Yes ? No
    to a select few?

23. Are you often troubled about feelings of guilt? Yes ? No

24. Do you ever take your work as if it were a   Yes ? No
    matter of life or death?

25. Are your feelings rather easily hurt?   Yes ? No

26. Do you like to have many social engagements?   Yes ? No

27. Would you rate yourself as a tense or   Yes ? No
    "highly-strung" individual?

28. Do you generally prefer to take the lead in   Yes ? No
    group activities?

29. Do you often experience periods of loneliness?   Yes ? No

30. Are you inclined to be shy in the presence of   Yes ? No
    the opposite sex?

31. Do you like to indulge in a reverie   Yes ? No
    (daydreaming)?

32. Do you nearly always have a "ready answer" for remarks directed at you? Yes ? No

33. Do you spend much time in thinking over good times you have had in the past? Yes ? No

34. Would you rate yourself as a happy-go-lucky individual? Yes ? No

35. Have you often felt listless and tired for no good reason? Yes ? No

36. Are you inclined to keep quiet when out in a social group? Yes ? No

37. After a critical moment is over, do you usually think of something you should have done and failed to do so? Yes ? No

38. Can you usually let yourself go and have a hilariously good time at a gay party? Yes ? No

39. Do ideas run through your head so that you cannot sleep? Yes ? No

40. Do you like work that requires considerable attention? Yes ? No

41. Have you ever been bothered by having a useless thought come into your mind repeatedly? Yes ? No

42. Are you inclined to take your work casually, that is as a matter of course? Yes ? No

43. Are you touchy on various subjects? Yes ? No

44. Do other people regard you as a lively individual? Yes ? No

45. Do you often feel disgruntled? Yes ? No

46. Would you rate yourself as a talkative individual? Yes ? No

47. Do you have periods of such great restlessness that you cannot sit long in a chair? Yes ? No

48. Do you like to play pranks on others? Yes ? No

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