

AN EXPERIMENTAL INVESTIGATION OF THE INTERACTION BETWEEN
RESULTANT ACHIEVEMENT MOTIVATION AND EXPERIMENTALLY
INDUCED PROBABILITY OF SUCCEEDING AT A TASK

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Thesis presented to the School of Graduate
Studies of the University of Ottawa as
partial fulfillment of the requirements
for the degree of Doctor of Philosophy



Ottawa, Canada, 1975

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ACKNOWLEDGEMENTS

This thesis was prepared under the supervision of Professor Virginia M. Keith, Ph.D., of the Faculty of Education, University of Ottawa, Canada. The writer wishes to express his sincere thanks to her for her scholarly guidance and advice, patiently given during the preparation of the research and the writing of the dissertation.

Grateful acknowledgement is expressed also to the Ottawa Roman Catholic Separate School Board for allowing access to the pupils, to Mrs. F. Smyth, the research officer of the board, and to the staffs of the schools for their cheerful co-operation.

CURRICULUM STUDIORUM

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INTRODUCTION

Of the many theories of motivation few have been extended in a systematic manner to educational situations. As a result, there is very little in the way of motivation theory which is helpful to the classroom teacher.

In education, motivation is one of the major variables affecting classroom performance. This variable can be used to understand, predict, and control classroom behavior.

The theory of achievement motivation formulated by J. W. Atkinson and N. T. Feather in 1966 has shown promise of evolving postulates and hypotheses relevant to the teaching-learning process. This theory has provided possibilities for investigating a variety of behavioral phenomena, including those that can be applied to educational situations. The theory relates characteristics of motivated behavior to the interaction between personality dispositions (achievement-related motives) and environmental influences (expectancy of success at a given task). In fact, the theory is mainly concerned with how specialized situational cues differentially affect certain kinds of persons.

Within the context of the theory, the assumption made by Atkinson and Feather is that any situation presenting a challenge to achieve by arousal of the expectancy that

behavior might produce success will also lead to the arousal of the expectation that action might lead to failure. Therefore, the resultant achievement behavior is the result of a conflict between the motive to approach success (M_s) and the motive to avoid failure (M_{af}) at the time of performance on a given task. The strength of M_s relative to M_{af} determines whether an individual will approach or avoid an achievement task.

Another assumption made by Atkinson and Feather is that the achievement-related motives, M_s and M_{af} , are linked with an affective state aroused by certain stimuli. Different states of arousal are expected to arouse different intensities of motivation. The theory, therefore, puts great emphasis on the importance of environmental influence as a manipulable motivational variable which must be accounted for when making predictions about performance from the theory.

As a whole, it can be seen that performance is a function of individual differences in the strength of achievement-related motives and the perceived difficulty at a given task. Thus, the purpose of the present study is to apply the theory of achievement motivation to performance on one specific educational task. For a given achievement situation, it is hypothesized that persons who are dominated by the motive to approach success are more highly motivated

by a task having an intermediate degree of perceived difficulty, while persons who are dominated by the motive to avoid failure are less inhibited by tasks having small or large degrees of perceived difficulty.

The contributions of the present study are primarily theoretical in that the study seeks to extend the theory of achievement motivation to an educational situation. The findings are expected to have implications for educational practice, particularly for an understanding of how specialized environmental determinants of behavior differentially affect certain kinds of students on the performance of an educational task.

The research report is organized into three chapters. The first presents a review of the theory of achievement motivation, as well as of previous studies based on the theory. This overview leads to the formulation of the research hypotheses to be tested. The second chapter, on the design of the study, includes a description of the sample, a discussion of the measuring instruments, an outline of experimental procedures, and a description of the statistical design and analysis. The results of testing each hypothesis are presented and discussed in the last chapter. This is followed by a summary of the research and a statement of conclusions.

CHAPTER I

REVIEW OF THE LITERATURE

This chapter presents a discussion of the theory of achievement motivation, both theoretical and methodological, which leads to the formulation of the hypotheses to be tested in the present investigation. Sections 1 to 3 review the essential concepts of the theoretical rationale derived from the theory of achievement motivation and their implications. Sections 4 and 5 examine the methodological considerations of early studies based on the theory of achievement motivation regarding the classification of resultant achievement tendency and experimental manipulation of the expectancy of succeeding at a particular task. Section 6 presents an extensive review of early studies based on the theory under three subheadings: (1) choice-preference, (2) persistence, and (3) performance. The chapter ends with a brief summary of the theory of achievement motivation and of related studies, the presentation of two specific assumptions concerned with experimentally manipulating the expectancy of success, and the statement of the problem and of the research hypotheses.

In 1957, Atkinson¹ proposed a theoretical model of achievement motivation in the following form:

$$\text{Motivation} = f (\text{Motive} \times \text{Expectancy} \times \text{Incentive})$$

This model relates characteristics of motivated behavior to the interaction of relatively general and stable personality dispositions (motives) and more specific and transient situational influences (expectancies and incentive values).

The personality disposition (motive) is presumed to be latent until aroused by situational cues which indicate that some performance will be instrumental to achievement. In other words, an individual is viewed as inactive until a stimulus is presented which instigates behavior. Atkinson² conceived that the stimulus engages a motive and initiates a cognitive, inferential process. Different states of arousal are expected to arouse different intensities of motivation.

How is this situational effect on strength of motivation to be conceptualized in a theory of achievement motivation? The guiding principle used in the theory of

1 J. W. Atkinson, "Motivational Determinants of Risk-Taking Behavior", in J. W. Atkinson and N. T. Feather (Eds.), A Theory of Achievement Motivation, New York, Wiley, 1966, p. 13.

2 J. W. Atkinson, An Introduction to Motivation, Princeton, Van Nostrand, 1964, p. 240-268.

achievement motivation is expressed by the Lewinian equation, $B = f(P, E)$. This equation indicates that behavior (B) is considered the result of interaction between the person (P) and his immediate psychological environment (E).

In fact, the theory of achievement motivation is primarily concerned with how specialized situational cues differentially affect certain kinds of persons. It deals with competitive achievement situations in which only motivation to approach success, and motivation to avoid failure, are aroused. When both these types of motivation are aroused simultaneously, the resultant motivation is the algebraic sum of approach and avoidance.

In 1966, Atkinson and Feather³ restated the theory of achievement motivation. They recognized the possibility of misunderstanding, engendered by the use of the term "motivation" in a technical sense, to refer to an activated goal-directed tendency. Without implying any change in meaning, they decided to use the term "tendency", instead of "motivation", when referring to the product of motive, expectancy, and incentive.

Details of the theory of achievement motivation are reviewed in the following sections.

³ J. W. Atkinson and N. T. Feather (Eds.), A Theory of Achievement Motivation, New York, Wiley, 1966, p. 327-328.

1. The Tendency to Approach Success

The tendency to approach success (T_s), usually called the approach tendency, is interpreted as a tendency to undertake an activity that is expected to lead to success. Atkinson and Feather⁴ postulated that T_s is a multiplicative function of the motive to approach success (M_s), the expectancy of success (P_s), and the incentive value of success (I_s). Expressed algebraically, this equation takes the form:

$$T_s = M_s \times P_s \times I_s \quad (\text{Equation 1})$$

M_s , also known as the achievement motive or the need for achievement (n Ach), represents a relatively stable or enduring personality disposition to strive for success. Atkinson defines the achievement motive as a "capacity to experience pride in accomplishment".⁵ The general aim of M_s is to maximize satisfaction of succeeding in a particular task. Operationally, the strength of M_s is generally determined by scoring the n Achievement Test developed by McClelland, Atkinson, Clark, and Lowell⁶ and described in

4 J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 328-330.

5 J. W. Atkinson, op. cit., 1964, p. 241.

6 D. C. McClelland, J. W. Atkinson, R. A. Clark, and E. L. Lowell, The Achievement Motive, New York, Appleton-Century-Crofts, 1953, Chapter IV.

more detail by Atkinson.⁷

P_s represents the probability of success that a given instrumental action will lead to the goal; it denotes a cognitive expectancy that a response made to a given stimulus will lead to the goal stimulus.⁸ In other words, P_s represents a personal belief about the chances of goal attainment. P_s has been manipulated by presenting subjects with false norms (for example, Feather;⁹ Weiner¹⁰), having subjects compete against varying numbers of individuals (for example, Atkinson¹¹), or varying the actual (and perceived) difficulty of the tasks (for example, Atkinson and

7 J. W. Atkinson (Ed.), Motives in Fantasy, Action, and Society: A Method of Assessment and Study, Princeton, Van Nostrand, 1958, p. 179-204.

8 J. W. Atkinson, "Explorations Using Imaginative Thought to Assess the Strength of Human Motivation", in M. R. Jones (Ed.), Nebraska Symposium on Motivation, Lincoln, University of Nebraska Press, 1954, p. 56-112.

9 N. T. Feather, "The Relationship of Persistence at a Task to Expectation of Success and Achievement-Related Motives", Journal of Abnormal and Social Psychology, 1961, 63, 552-561.

10 B. Weiner, "New Conceptions in the Study of Achievement Motivation", in B. A. Maher (Ed.), Progress in Experimental Personality Research (Vol. 5), New York, Academic Press, 1970, p. 67-109.

11 J. W. Atkinson, "Toward Experimental Analysis of Human Motivation in Terms of Motives, Expectancies, and Incentives", in J. W. Atkinson (Ed.), Motives in Fantasy, Action, and Society, Princeton, Van Nostrand, 1958, p. 288-305.

Litwin¹²).

I_s symbolizes the incentive value of success. It is defined as "the amount of satisfaction inherent in successful accomplishment of a particular task".¹³ The incentive value of success is an affect often labelled "pride". Atkinson assumed that the amount of pride in accomplishment is related to the probability of success of the task; that is, one has greater pride accompanying success at a task perceived as difficult (low probability of success on a task) than that accompanying success at a task perceived as easy (high probability of success on a task). Therefore, within the theory of achievement motivation, I_s does not have independent operational existence; I_s is determined by the magnitude of P_s , or $I_s = 1 - P_s$.

Because $I_s = 1 - P_s$, and because I_s and P_s are multiplicatively related, the greatest tendency to approach success occurs when $P_s = 0.50$. In that condition, $P_s \times I_s$ is maximum, or 0.25. As P_s increases or decreases from 0.50, the tendency to approach success decreases.

12 J. W. Atkinson and G. H. Litwin, "Achievement Motive and Test Anxiety Conceived as Motive to Approach Success and Motive to Avoid Failure", in J. W. Atkinson and N. T. Feather (Eds.), A Theory of Achievement Motivation, New York, Wiley, 1966, p. 75-91.

13 J. W. Atkinson and N. T. Feather, op. cit., 1966, p. 327-370.

2. The Tendency to Avoid Failure

The tendency to avoid failure (T_f) usually called the avoidance tendency, is conceptually parallel to that of the approach tendency. This avoidance tendency is interpreted as a tendency to avoid undertaking an activity that is expected to lead to failure. According to Atkinson and Feather,¹⁴ avoidance tendency should always be conceived as inhibitory in character. It always opposes, resists, or dampens the influence of the approach tendency to undertake an activity. They postulated that T_f is a multiplicative function of the motive to avoid failure (M_{af}), of the expectancy of failure (P_f), and of the incentive value of failure (I_f):

$$T_f = M_{af} \times P_f \times I_f \quad (\text{Equation 2})$$

M_{af} , also called anxiety about failure or avoidance motive, represents a relatively stable personality disposition to avoid failure. Atkinson defines the avoidance motive as the "capacity for experiencing shame and humiliation as a consequence of failure".¹⁵ When performance of a task has a possibility of failure, and when it is clear that the outcome of performance will be evaluated, the result is

¹⁴ J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 19.

¹⁵ Ibid., 1966, p. 13.

anxiety. The general aim of M_{af} is to minimize shame. Operationally, the strength of M_{af} is generally assessed by the score on a test anxiety scale or questionnaire.

P_f represents the probability of failure. When performance of a task is to be evaluated, there is usually some promise of success but there is also some threat of failure. Thus, it is assumed that $P_s + P_f = 1.00$, and that $P_f = 1 - P_s$.

I_f represents the incentive value of failure. It is defined as "the shame and humiliation accompanying failure at a particular task".¹⁶ The incentive value of failure is a negative affect often labelled "shame". Atkinson assumed that the sense of shame accompanying failure at a task is also related to the probability of success at a task; that is, one has greater shame accompanying failure at a task perceived as easy (high probability of success on a task) than that accompanying failure at a task perceived as difficult (low probability of success on a task). In other words, the incentive value of failure is increased when the general probability of succeeding at a task is increased. Given this assumption, Atkinson and Feather postulated that

$$I_f = -P_s.$$

Because $P_f = 1 - P_s$, $I_f = -P_s$, and because P_f and I_f are multiplicatively related, the maximum negative tendency

¹⁶ J. W. Atkinson and N. T. Feather (Eds.), op. cit., p. 327-370.

occurs when $P_s = 0.50$, and decreases as P_s increases or decreases from the 0.50 level.

3. The Resultant Achievement-Oriented Tendency

It is assumed that an individual has both a tendency to approach success (T_s) and a tendency to avoid failure (T_f) so that there is inevitably aroused in the person an approach-avoidance conflict at the time of performance. This conflict between approach and avoidance tendencies exists in an achievement-oriented activity. Thus, the resultant tendency to approach or avoid an achievement-oriented activity (T_A) is postulated to be a function of the strength of the tendency to approach the task plus the strength of the tendency to avoid the task:

$$T_A = T_s + T_f$$

$$\text{or } T_A = (M_s \times P_s \times I_s) + (M_{af} \times P_f \times I_f)$$

It has been indicated that $I_s = 1 - P_s$, $P_f = 1 - P_s$, and that $I_f = -P_s$. Simple algebraic substitution yields:

$$\begin{aligned} T_A &= [M_s \times P_s \times (1 - P_s)] + [M_{af} \times (1 - P_s) \times (-P_s)] \\ &= [M_s \times P_s \times (1 - P_s)] - [M_{af} \times (1 - P_s) \times P_s] \\ &= (M_s - M_{af}) [P_s \times (1 - P_s)] \end{aligned}$$

$$T_A = (M_s - M_{af}) (P_s - P_s^2) \quad (\text{Equation 3})$$

This simplification shows clearly that the theory of achievement motivation represents a specification of the personality and environmental determinants as well as an

interaction similar to that summarized in Lewin's equation, $B = f(P, E)$.

Assuming that $M_s - M_{af}$ is constant, Equation 3 indicates a parabolic relationship between T_A and P_s . Moreover, it may be shown by methods of calculus that T_A has a maximum or a minimum value when $P_s = 0.50$.

Equation 3 also reveals that there are two degrees of freedom among the personal determinants of behavior: M_s and M_{af} . However, there is only one degree of freedom among the four environmental determinants of behavior: P_s , I_s , P_f , and I_f . Given that P_s is assigned a value, the numerical strengths of I_s , P_f , and I_f are determined. Obviously, this theory leans heavily on the environmental determinant of behavior, the probability of success (P_s).

Furthermore, Equation 3 indicates clearly that the strength of T_A depends on both the relative strengths of M_s and M_{af} , and the probability of success at a task. The strength of M_s relative to M_{af} determines whether an individual will approach or avoid achievement tasks. If $M_s > M_{af}$, greater weight is given to the approach tendency than to the avoidance tendency. Conversely, if $M_{af} > M_s$, greater weight is given to the avoidance tendency than to the approach tendency.

The substitution of hypothetical values into Equation 3 produces illuminating results. Using such a substitution,

Table I shows the strength of the resultant achievement tendency (T_A) as a function of the probability of succeeding at a task (P_s) according to motive classifications (M_s and M_{af}). The arbitrary values assigned when $M_s > M_{af}$, are $M_s = 2$ and $M_{af} = 1$; when $M_{af} > M_s$, $M_{af} = 2$ and $M_s = 1$. Also, arbitrary values are assigned so that the probability of success at a task differs at three levels, say, $P_s = 0.25$, $P_s = 0.50$, and $P_s = 0.75$.

Inspection of Table I reveals that the resultant achievement tendency varies systematically as a function of the P_s at the task. When $M_s > M_{af}$, the resultant achievement tendency is positive; it is maximum when $P_s = 0.50$, but it is relatively weak when P_s increases or decreases from the 0.50 level. When $M_{af} > M_s$, the resultant achievement tendency is negative; it is most inhibitory when $P_s = 0.50$, but it is least inhibitory when P_s increases or decreases from the 0.50 level. Hence, Atkinson and Litwin stated that "a person so motivated finds all achievement tasks unattractive, particularly ones of intermediate difficulty. He performs then only when constrained by social pressures (otherwise he would 'leave the field')".¹⁷

¹⁷ J. W. Atkinson and G. H. Litwin, op. cit., 1966, p. 76.

Table I

Strength of Resultant Achievement Tendency (T_A) as a
Function of the Probability of Succeeding at a
Task According to Motive Classification

Motive Classification : $M_S > M_{af}$ ($M_S=2, M_{af}=1$)					
Condition	$(M_S - M_{af})$	$[P_S$	x	$(1 - P_S)] =$	T_A
$P_S = 0.25$	(2 - 1)	.25		.75	= .1875
$P_S = 0.50$	(2 - 1)	.50		.50	= .2500
$P_S = 0.75$	(2 - 1)	.75		.25	= .1875
Motive Classification : $M_{af} > M_S$ ($M_{af}=2, M_S=1$)					
Condition	$(M_S - M_{af})$	$[P_S$	x	$(1 - P_S)] =$	T_A
$P_S = 0.25$	(1 - 2)	.25		.75	= -.1875
$P_S = 0.50$	(1 - 2)	.50		.50	= -.2500
$P_S = 0.75$	(1 - 2)	.75		.25	= -.1875

They also suggested that the usual social constraints, (for example, desire for approval, fear of disapproval) are not normally measured in experiments of this sort.¹⁸

4. Classification of Resultant Achievement Tendency

In the preceding sections, the essential concepts of a theoretical rationale of achievement motivation have been presented and discussed. There are still some other important issues, both methodological and theoretical, which relate to the present study and which will be discussed in the following sections.

As stated previously, the strength of the resultant approach or avoidant tendency is in part determined by individual differences in personality determinants of behavior, that is, by the relative strength of M_s and M_{af} . This strength is also in part determined by the environmental determinant of behavior, that is, by the probability of success at a given task. Thus, this section focuses on the discussion of the relative strength of M_s and M_{af} , while the next section will discuss the probability of success at a given task.

Persons in whom the motive to approach success (M_s) is greater than the motive to avoid failure (M_{af}) are usually

18 Ibid., 1966, p. 76.

labelled as high in resultant achievement tendency. On the other hand, persons in whom the motive to avoid failure (M_{af}) is greater than the motive to approach success (M_s) are labelled as low in resultant achievement tendency. At this point, it is reasonable to ask these questions:

How can the strength of M_s and M_{af} be compared, for they are conceptualized as independent dimensions and assessed with different measuring instruments?

How can one be classified as high or low in the resultant achievement tendency?

Generally, Atkinson and other researchers in the area of achievement motivation employed the projective measure of the need for achievement ($n Ach$) obtained from the n Achievement Test^{19,20} by evaluating stories written in response to stimulus pictures, and the objective self-report measure of test anxiety obtained from the Test Anxiety Questionnaire²¹ as methods of assessing the strength of M_s and M_{af} , respectively. Atkinson and Litwin indicated that:

19 D. C. McClelland, et al., op. cit., 1953.

20 J. W. Atkinson (Ed.), op. cit., 1958, p. 179-204.

21 G. Mandler and S. B. Sarason, "A Study of Anxiety and Learning", Journal of Abnormal and Social Psychology, 1952, 47, 166-173.

[...] the measure of n Achievement obtained from thematic apperception (McClelland, et al., 1953; Atkinson, 1958) [...] and the measure of Test Anxiety obtained from the self-knowledge scale developed by Mandler and Sarason are not measures of the same variable. Rather, it is assumed that these particular measures of n Achievement indicate the strength of a motive to approach success, while Mandler-Sarason Test Anxiety score indicate the strength of a motive to avoid failure.²²

From previous research studies, they have shown that the correlation between n Achievement scores obtained from the n Achievement Test and test anxiety scores obtained from Test Anxiety Questionnaire ranges from low negative to low positive. For example, Atkinson and Litwin²³ obtained a correlation between these two measures of -0.15 (N = 47) in their study. Litwin,²⁴ using the same two measuring instruments, obtained a correlation of -0.005 (N = 78). Also, Smith²⁵ found a correlation of 0.11 (N = 125). It can be seen that these two measures of achievement-related motives are not significantly related. However, there is a

22 J. W. Atkinson and G. W. Litwin, op. cit., 1966, p. 76.

23 Ibid., 1966, p. 86.

24 G. H. Litwin, "Achievement Motivation, Expectancy of Success, and Risk-Taking Behavior", in J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 104.

25 C. P. Smith, Situational Determinants of the Expression of Achievement Motivation in Thematic Apperception, a doctoral dissertation presented to the School of Graduate Studies, University of Michigan, 1961.

possibility, as pointed out by Atkinson and Litwin,²⁶ for a person to score high or low on both measures, as well as high on one and low on the other.

The procedure for classification of resultant achievement tendency generally followed by Atkinson and other researchers in this area is that subjects are classified simultaneously on the basis of the median split in the obtained distributions of both n Achievement scores and test anxiety scores. Individuals who score in the upper half (above the median) on the n Achievement Test and also in the lower half (below the median) on the Test Anxiety Questionnaire are classified as high in resultant achievement tendency. For these persons, the motive to approach success (M_s) is thought to be stronger than the motive to avoid failure (M_{af}). Conversely, individuals who score in the upper half (above the median) on the Test Anxiety Questionnaire and also in the lower half (below the median) on the n Achievement Test are classified as low in resultant achievement tendency. For these persons, the motive to avoid failure (M_{af}) is thought to be relatively stronger than the motive to approach success (M_s). Individuals who score in the upper half (above the median) on both measures, and those who score in the lower half (below the median) on both

26 J. W. Atkinson and G. H. Litwin, op. cit., 1966, p. 75-91.

measures, are grouped into a common "intermediate" classification. Table II shows the resultant achievement tendency classification as a function of the relative strengths of M_s and M_{af} .

According to Atkinson and Litwin,²⁷ these two intermediate groups, the High n Achievement-High Test Anxiety group and the Low n Achievement-Low Test Anxiety group, should show more conflict in resultant tendency. Martire²⁸ and Scott²⁹ indicated that persons who are strong in both n Achievement and Test Anxiety may inhibit or distort the expression of achievement related imagery when anxiety about failure has been actively aroused in them by threatening situational cues. However, it is more likely that these two intermediate groups have differentiating characteristics. Thus, a vast majority of previous research studies in this area usually excluded these two intermediate groups from experiments.

With respect to the two extreme groups, persons in whom the motive to approach success (M_s) is stronger than

27 Ibid., 1966, p. 81.

28 J. G. Martire, "Relationships Between the Self Concept and Differences in Strength and Generality of Achievement Motive", Journal of Personality, 1956, 24, 364-375.

29 W. A. Scott, "The Avoidance of Threatening Material in Imaginative Behavior", Journal of Abnormal and Social Psychology, 1956, 52, 338-346.

Table II

Classification of Resultant Achievement Tendency as
a Function of Relative Strength of M_s and M_{af}

Motive to Approach Success (M_s)	Motive to Avoid Failure (M_{af})	Resultant Achievement Tendency (T_A)
High	Low	High
High	High	Intermediate
Low	Low	Intermediate
Low	High	Low

the motive to avoid failure (M_{af}) are classified as high in resultant tendency, whereas persons in whom the motive to avoid failure (M_{af}) is stronger than the motive to approach success (M_s) are classified as low in resultant tendency. According to Atkinson and Feather,³⁰ those persons in whom $M_s > M_{af}$ are called achievement-oriented; in contrast, those persons in whom $M_{af} > M_s$ are called failure-threatened.

5. Experimental Manipulation of the Expectancy of Success

As shown in Equation 3, the theory of achievement motivation puts great emphasis on the importance of the "expectancy of success" as a manipulable motivational variable. Thus, it is necessary to discuss this variable in detail.

An "expectancy", as defined by Atkinson,³¹ "is a cognitive anticipation, usually aroused by cues in a situation, that performance of some act will be followed by a particular consequence". In other words, the expectancy of success (P_s) refers to a cognitive goal expectancy or an anticipation that an instrumental action will lead to the

³⁰ J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 367-370.

³¹ J. W. Atkinson, "Motivational Determinants of Risk-Taking Behavior", in J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 12.

goal. Atkinson and McClelland³² believed that achievement-related motives are linked with an affective state aroused by certain stimuli. Different states of arousal are expected to arouse different intensities of motivation.

Atkinson and Feather³³ suggested that there are several different procedures for experimentally manipulating the environmental variable "probability of success" at a task. Some of these involve structuring the actual difficulty of the task in the game-like experiment so that different levels of difficulty are quite apparent to subjects. Many studies employ a ring-toss game requiring that rings be thrown over a peg. It is generally assumed that the farther one stands from the peg when playing this game, the lower the subjective expectancy of success will be. For example, Atkinson and Litwin³⁴ had subjects attempt to toss rings over a peg. The subjects were allowed to stand at varying distances from the peg, and could change positions following each toss. It was assumed by researchers that a position close to the target corresponds to a high P_s level,

32 J. W. Atkinson and D. C. McClelland, "The Projective Expression of Needs. II. The Effect of Different Intensities of the Hunger Drive on Thematic Apperception", Journal of Experimental Psychology, 1948, 38, 643-658.

33 J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 353-356.

34 J. W. Atkinson and G. H. Litwin, op. cit., 1966, p. 75-91.

and that P_s decreases as the distance from the peg increases.

Another procedure used to manipulate P_s is to have some subjects compete against varying numbers of other subjects. For example, Atkinson³⁵ offered female college students a modest monetary prize for good performance at two 20-minute tasks. The probability of success was varied by instructions which informed each subject of the number of persons with whom she was in competition for the monetary prize and how many of the persons in her group were paid for good performance. The reported probabilities of winning the monetary prize were 1/20, 1/3, 1/2, and 3/4. The numerator represented the number of monetary prizes to be awarded while the denominator represented the number of persons in competition for the prize. If a subject, for example, was in the condition of a probability of 3/4, she was told:

You are one of a group of 4 persons. The 3 persons in your group with the highest scores will win \$2.50. In other words, your chances of winning \$2.50 are 3 out of 4.

Another procedure used to manipulate P_s is to supply subjects with some normative information about the difficulty of the task, which involves reference to the performance of related groups. For example, Feather³⁶ created a situation in which subjects were given an achievement-related puzzle.

35 J. W. Atkinson, op. cit., 1958, p. 288-305.

36 N. T. Feather, op. cit., 1961, p. 552-561.

He introduced false norms to establish a P_s at the task. In one experimental condition the task was presented as quite difficult ($P_s = 0.05$). The subjects of this condition were told that "at your age level approximately 5 percent of college students are able to get the solution". In a second condition, the task was introduced as relatively easy ($P_s = 0.70$). The subjects were told that "at your age level approximately 70 percent of college students are able to get the solution". Feather then examined the number of trials attempted by each subject before he quit the task. Performance was predicted to be a function of the initial P_s at the task and of individual differences in the strength of achievement-related motives.

A series of puzzle-task experiments, similar to the one presented above, were also conducted by Feather in which reported false norms about the difficulty of the task were used as the procedure of manipulating the probability of success. As a result of these experiments, Feather³⁷ concluded that an artificially induced probability of success corresponds closely with a person's subjective probability of success at a specific task.

³⁷ N. T. Feather, "Valence of Outcome and Expectation of Success in Relation to Task Difficulty and Perceived Locus of Control", Journal of Personality and Social Psychology, 1967, 7, 372-386.

In addition, Weiner,³⁸ who has reviewed a number of early studies concerned with experimental manipulation of probability of success, made the following statement:

[...] The operations [...] to produce a desired P_s level generally are identical for all subjects within an experimental condition. The experimenter assumes that a high correspondence exists between an individual's subjective expectancy and the experimentally induced probability.

He also suggested that "any information or contrived stimulus situation that influences a subject's beliefs about winning or performing well apparently can be used to define operationally the magnitude of P_s ".³⁹

As discussed above, the empirical evidence supports the fact that high correspondence exists between an experimentally induced probability of success and an individual's subjective probability of success at a task within an experimental condition. However, the need for greater precision in manipulating P_s experimentally should be considered. Experimentally induced probability of succeeding at a task may be differentiated from an individual's subjective probability of success since a person's estimate of his chance of succeeding at a task may depart from the experimentally induced probability of success.

38 B. Weiner, Theories of Motivation, Chicago, Markham, 1972, p. 197.

39 Ibid., 1972, p. 196.

6. Early Studies Related to the Theory of Achievement Motivation

A number of early studies have examined the implications of the theory of achievement motivation. The hypothesis generally tested has been that achievement-oriented persons in whom $M_s > M_{af}$ will be more highly motivated toward tasks of intermediate difficulty, whereas failure-threatened persons in whom $M_{af} > M_s$ will be less inhibited at tasks which are either very difficult or very easy. Those studies which have investigated this general hypothesis in a variety of situations will be reviewed in this section and will be categorized into three groupings: (a) choice-preference, (b) persistence, and (c) level of performance.

Choice-Preference.- Several studies ^{40,41,42} involving game-like situations have provided experimental evidence that achievement-oriented persons in whom $M_s > M_{af}$ choose tasks of intermediate difficulty with greater frequency than failure-threatened persons in whom $M_{af} > M_s$.

40 J. W. Atkinson and G. H. Litwin, op. cit., 1966, p. 75-91.

41 J. O. Raynor and C. P. Smith, "Achievement-related Motives and Risk-Taking in Games of Skill and Chance", Journal of Personality, 1966, 34, 176-198.

42 B. Weiner, "The Effects of Unsatisfied Achievement Motivation on Persistence and Subsequent Performance", Journal of Personality, 1965, 33, 428-442.

For example, an experiment by Atkinson and Litwin⁴³ had male college students play a ring toss game. The subjects were classified according to the strength of M_s and M_{af} on the basis of their Achievement and Test Anxiety scores. Each subject was given an opportunity to take 10 shots from any distance he chose between 1 and 15 feet from the peg. Intermediate difficulty in this study was defined either as the intermediate distance from the peg or the median of the distribution of distance actually obtained. The two measures yielded comparable results.

The results of the study showed that significantly more shots are taken from an intermediate distance by subjects in whom $M_s > M_{af}$ than by subjects in whom $M_{af} > M_s$. The data also revealed that subjects in whom $M_{af} > M_s$ do not actually avoid intermediate risk. Instead, they exhibit only a relatively weak preference for intermediate risk, in comparison with subjects in whom $M_s > M_{af}$.

Weiner,⁴⁴ who has reviewed a large number of risk-preference experiments, concluded that failure-threatened subjects prefer tasks of intermediate difficulty less than achievement-oriented subjects, but they do not absolutely

43 Ibid., 1966, p. 75-91.

44 B. Weiner, op. cit., 1972, p. 203-215.

prefer easy or difficult tasks. Maehr and Sjogren⁴⁵ also pointed out that while there is strong support for the hypothesis that achievement-oriented subjects are more likely to prefer tasks of intermediate difficulty than failure-threatened subjects, it should not be concluded that the predicted patterns of motivational increase or decrease across all P_s levels has also received confirmation.

For many studies, the data indicated only that when the preference patterns of achievement-oriented and failure-threatened subjects are compared, achievement-oriented subjects do indeed exhibit a higher level of preference for tasks of intermediate difficulty. However, considering the preference pattern of failure-threatened subjects separately, their preference for tasks of intermediate difficulty is not consistently less than their preferences for either easy or difficult tasks. They too exhibit a preference for the intermediate difficulty level, though not perhaps to the same degree as achievement-oriented subjects.

The studies reviewed above pose some problems for the theory of achievement motivation. It may be misleading to conclude that failure-threatened subjects actually avoid the $P_s = 0.50$ level, as the theory asserts. What remains to

45 M. L. Maehr and D. D. Sjogren, "Atkinson's Theory of Achievement Motivation: First Step Toward a Theory of Academic Motivation?", Review of Educational Research, 1971, 41, 143-161.

be demonstrated is that failure-threatened subjects exhibit maximum avoidance for the tasks of intermediate difficulty, whereas they exhibit minimum avoidance for very easy or very difficult tasks, as the theory predicts.

Persistence.- The theory of achievement motivation has also been applied to the prediction of task persistence. In theory, achievement-oriented subjects ($M_s > M_{af}$) should be more highly motivated, or approach-oriented, to the task (and hence, persist longer) when $P_s = 0.50$; failure-threatened subjects ($M_{af} > M_s$) should be less motivated, in fact avoidance-oriented, toward the task (and hence, persist for a shorter period) under the same $P_s = 0.50$ condition.

In an experiment by Atkinson and Litwin,⁴⁶ the measure of persistence at an achievement task was the amount of time spent by college male students working on the final examination in a psychology course. The investigators noted the time of each subject's departure from the examination room; subjects were unaware that this was being done. The hypothesis was that persons in whom $M_s > M_{af}$ would work for a longer time on the final examination than persons in whom $M_{af} > M_s$. The reasons for this hypothesis are that persons in whom $M_s > M_{af}$ should wish to remain in the performance situation because it is potentially rewarding. On the other

46 J. W. Atkinson and G. H. Litwin, op. cit., 1966, p. 75-91.

hand, persons in whom $M_{af} > M_s$ should wish to leave an examination early because the consequences of performance are potentially painful.

Atkinson and Litwin employed the n Achievement scores as measures of the motive to approach success (M_s) and Test Anxiety scores as measures of the motive to avoid failure (M_{af}). Subjects were simultaneously classified high and low in n Achievement and in Test Anxiety (based on median splits). Subjects high in n Achievement and low in Test Anxiety were considered to have a stronger motive to approach success (M_s) than to avoid failure (M_{af}). Subjects low in n Achievement and high in Test Anxiety were considered to have a stronger motive to avoid failure (M_{af}) than to approach success (M_s). These two groups were compared by the Mann-Whitney U Test with respect to time spent by subjects in the final examination. Significant differences were found ($U = 40.5$, $N = 27$, $p < 0.01$); subjects in whom $M_s > M_{af}$ worked for a longer time on the final examination than subjects in whom $M_{af} > M_s$.

Smith,⁴⁷ in a study dealing with the same problem as Atkinson and Litwin, found the opposite relationship to hold true for his sample. That is, subjects in whom $M_s > M_{af}$

47 C. P. Smith, "Relationships Between Achievement-Related Motives and Intelligence, Performance Level, and Persistence", Journal of Abnormal and Social Psychology, 1964, 68, 523-532.

left the final examination earlier than subjects in whom $M_{af} > M_s$.

The contradictory results obtained by Atkinson and Litwin, and by Smith, as cited above, may be explained by reference to the results of an experiment by Feather,⁴⁸ who investigated the relationship of Need for Achievement and Test Anxiety to persistence at an insoluble task. Feather demonstrated that "the relationship between achievement-related motives and persistence can be positive or negative depending on the perceived difficulty of the task". In Feather's experiment, his results supported the hypothesis that subjects in whom $M_s > M_{af}$ persist longer than subjects in whom $M_{af} > M_s$ at a task (actually insoluble) which is initially perceived as easy ($P_s > 0.50$), but which is perceived as more and more difficult with repeated failure (presumably lowering P_s to, or in, the direction of 0.50). However, the opposite relationship was also predicted and obtained; that is, subjects in whom $M_{af} > M_s$ persist longer than subjects in whom $M_s > M_{af}$ when the task is initially perceived as very difficult ($P_s < 0.50$).

Feather's evidence may be used to explain the lack of agreement between Atkinson and Litwin's results and Smith's results. This lack of agreement might be accounted

48 N. T. Feather, op. cit., 1961, 552-561.

for by the fact that the perceived difficulty of the examinations was different in the two studies. It might have occurred that the subjects of Atkinson and Litwin's study perceived their final examination as intermediate in difficulty, while the subjects in Smith's study perceived their examination as either relatively easy or relatively difficult. The contradictory results of the two studies would then actually be in conformity with theory which holds that subjects in whom $M_s > M_{af}$ will persist longer at a task of intermediate difficulty than subjects in whom $M_{af} > M_s$ but will persist for a shorter time at a very easy or very difficult task.

No measures of the perceived difficulty of the final examinations were obtained in either study. Lack of agreement between these two studies relating achievement-related motives to the criterion variable is probably attributable to the failure to specify and control the perceived difficulty of the final examination. The perceived difficulty of a task is theoretically a variable which should influence the relationship between achievement-related motives and persistence, since the theory states that strength of resultant approach or avoidant tendency varies as a function of probability of success at a task.

Performance.- Weiner⁴⁹ indicated that neither magnitude nor intensity of performance has been used frequently as a dependent variable in studies relevant to the theory of achievement motivation. However, an experiment by Karabenick and Youssef⁵⁰ was designed to examine the relationships between two achievement-related motives, Need for Achievement and Test Anxiety, and the perceived difficulty level of a task on performance, using a verbal paired-associated (PA) learning task. They reported that 15 word pairs had been tested for equal difficulty, and that these 15 pairs were used and randomly placed into three groups to equate the mean and variance of the difficulty levels across groups as closely as possible. The groups were color-coded using red, yellow, and green transparent tapes. In order to influence a subject's perceived level of task difficulty before performing the task, he was told by means of printed instructions that the 15 word pairs were covered with three different colors and that each colour served as an indicator of the difficulty level of each word-pair, viz: easy (red),

49 B. Weiner, "New Conceptions in the Study of Achievement Motivation", in B. A. Maher (Ed.), Progress in Experimental Personality Research (Vol. 5), New York, Academic Press, 1970, p. 72.

50 S. A. Karabenick and Z. I. Youssef, "Performance as a Function of Achievement Motive Level and Perceived Difficulty", Journal of Personality and Social Psychology, 1968, 10, 414-419.

intermediate (yellow), and difficult (green).

The subjects were 76 male introductory psychology students. Persons above the median on the n Achievement scores and below the median on the Test Anxiety scores were classified as having $M_s > M_{af}$. Those below the median on the n Achievement scores and above the median on the Test Anxiety scores were classified as having $M_{af} > M_s$. It was hypothesized that persons in whom $M_s > M_{af}$ perform better on word pairs designated to be of an intermediate level of difficulty than on either easy or difficult pairs, whereas persons in whom $M_{af} > M_s$ perform better on either easy or difficult pairs than on intermediate pairs.

The results of this study showed a significant interaction between resultant achievement tendency and perceived levels of task difficulty in determining performance ($F = 3.59$; $d.f. = 2,52$; $p < 0.05$). Thus, subjects in whom $M_s > M_{af}$ performed better than those in whom $M_{af} > M_s$ at tasks designated to be of intermediate difficulty, but the performance of these two groups did not differ when the tasks were either easy or difficult.

Kight and Sassenrath⁵¹ have reported a study which was designed to test predictions derived from the theory of

51 H. R. Kight and J. M. Sassenrath, "Relation of Achievement Motivation and Test Anxiety to Performance in Programmed Instruction", Journal of Educational Psychology, 1966, 57, 14-17.

achievement motivation, using a programmed instruction task. These investigators employed a programmed learning task in which item difficulty was kept intentionally low (that is, an easy task); they tested for relationships among n Achievement, Test Anxiety, and three measures of performance including: (a) the length of time each subject took to complete the material, (b) the number of frames answered incorrectly, and (c) the subject's proficiency on an achievement test, administered at the conclusion of the programmed instruction.

They found that persons who scored high on both n Achievement and Test Anxiety worked faster and made fewer errors than persons who scored low on both measures. Also, persons having high n Achievement and low Test Anxiety ($M_s > M_{af}$) showed higher scores on a short-term retention test than persons having low n Achievement and high Test Anxiety ($M_{af} > M_s$).

In Kight and Sassenrath's experiment, there seems to be some ambiguity about the reported relationship between achievement-related motives and performance on an easy programmed instruction task. They intentionally kept item difficulty low (an easy task) in their particular programmed instruction task. However, the prediction of performance by the theory of achievement motivation on an easy task for persons who are high in resultant achievement motivation

($M_s > M_{af}$) is quite different from the results obtained by Kight and Sassenrath.

For the apparent contradiction between the theory of achievement motivation and the results of the above study in which item difficulty of a programmed instruction task is intentionally low, the value of P_s approaches 1.00. According to the theory, since the P_s is so high, the task will tend to arouse very little, if any, achievement motivation for persons high in resultant achievement motivation ($M_s > M_{af}$). Under this condition, motivation to perform the task will be minimized for such persons.⁵² On the other hand, since the P_s is so high there should be little motivation to avoid or inhibit performance on the task for persons low in resultant achievement motivation ($M_{af} > M_s$). Consequently, performance of persons low in resultant achievement motivation should be maximized under this condition.⁵³ In other words, programs which ensure a high success rate in the study of Kight and Sassenrath may be ideal for persons low in resultant achievement motivation ($M_{af} > M_s$); conversely, persons high in resultant achievement motivation ($M_s > M_{af}$) would not be motivated to perform well on such materials.

⁵² J. W. Atkinson, An Introduction to Motivation, 1964, p. 259.

⁵³ Ibid., 1964, p. 261.

One possible explanation for the findings in the study by Kight and Sassenrath, which showed a significant positive relationship between n Achievement and performance on the programmed instruction task, is that their subjects might have found the task to be closer to an intermediate difficulty rather than to an easy one. Another possible explanation is that the findings may be questionable since the measure of achievement motive employed in the study was obtained from the Iowa Picture Interpretation Test.⁵⁴ There is some evidence to support this explanation. McClelland⁵⁵ stated that different methods of assessing human motives do not yield comparable results. Moreover, Heckhausen⁵⁶ has pointed out that the Iowa Picture Interpretation Test has not had notable success and is a questionable substitute for a projective-type measure of n Achievement.

In contrast with the results of the above experiment by Kight and Sassenrath, a number of studies have produced a negative relationship between n Achievement and performance

54 J. R. Hurley, "The Iowa Picture Interpretation Test: A Multiple Choice Variation of the TAT", Journal of Consulting Psychology, 1955, 19, 372-376.

55 D. C. McClelland, "Methods of Measuring Human Motivation", in J. W. Atkinson (Ed.), Motives in Fantasy, Action, and Society, 1958, p. 7-42.

56 H. Heckhausen, The Anatomy of Achievement Motivation, New York, Academic Press, 1967, p. 15.

level on easy tasks. Atkinson,⁵⁷ for instance, found a difference between subjects high and low in n Achievement when their performance on an arithmetic and on a writing task was combined. The subjects low in n Achievement tended to perform better than subjects high in n Achievement on an easy task (probability of success was above 0.75). These performance differences were not statistically significant, but in the expected direction. Similarly, McClelland⁵⁸ concluded, from a cross-cultural replication of Atkinson's study, that persons low in n Achievement perform better than persons high in n Achievement when the task is seen as an easy one. In other words, a negative relationship exists between n Achievement and performance on easy tasks.

7. Summary, Assumptions, and the Problem

Summary.- The theoretical model of achievement motivation is similar in its general conceptual approach to Lewin's equation $B = f(P, E)$. The theory emphasizes the role of relatively general and stable individual differences in personality (motives), and of more specific and transient environmental determinants (expectancies and incentive

57 J. W. Atkinson (Ed.), op. cit., 1958, p. 288-305.

58 D. C. McClelland, "Longitudinal Trends in the Relation of Thought to Action", Journal of Consulting Psychology, 1966, 30, 479-483.

values), as well as the interaction of personality and immediate environment factors.

In an achievement situation, the theory assumes that only the tendency to approach success (T_s) and the tendency to avoid failure (T_f) are aroused. The tendency to approach success is postulated to be a multiplicative function of the motive to approach success (M_s), of the probability of success at a given task (P_s), and of the incentive value of success (I_s); that is, $T_s = M_s \times P_s \times I_s$. The tendency to avoid failure (T_f) is conceptually parallel to that of the tendency to approach success. It is postulated that the tendency to avoid failure (T_f) is a multiplicative function of the motive to avoid failure (M_{af}), of the probability of failure (P_f), and of the incentive value of failure (I_f); that is, $T_f = M_{af} \times P_f \times I_f$.

These two component tendencies, the achievement-approach and the failure-avoidance, combine additively to generate the resultant achievement-oriented tendency (T_A); that is, $T_A = T_s + T_f$. Within the context of the theory of achievement motivation, the probability of failure (P_f) and the incentive values of success (I_s) and failure (I_f) at a particular task are fixed by the probability of success (P_s) because it has been assumed that $P_f = 1 - P_s$, $I_s = 1 - P_s$, and $I_f = -P_s$. Hence, once the probability of success (P_s) is known, the other environmental determinants of behavior

(P_f , I_s , and I_f) are also known. The final equation of the theory is, therefore, algebraically represented as:

$$T_A = (M_s - M_{af}) [P_s \times (1 - P_s)].$$

It can be seen from the above equation that the strength of the resultant tendency (T_A) is in part determined by individual differences in the motive to approach success (M_s) and in the motive to avoid failure (M_{af}), and also in part by the properties of the environment. The equation indicates that the strength of M_s relative to M_{af} determines the approach or avoidance of the resultant tendency, and that these two motives interact with environmental determinants of behavior.

With respect to individual differences in personality dispositions (M_s and M_{af}), generally, Atkinson and other workers in the achievement motivation area employ a projective instrument, the n Achievement Test, to assess M_s , and an objective self-report instrument, the Test Anxiety Questionnaire, to assess M_{af} . Persons in whom $M_s > M_{af}$ are classified as high in resultant achievement tendency and are called achievement-oriented persons. Conversely, persons in whom $M_{af} > M_s$ are classified as low in resultant achievement tendency; they are called failure-threatened persons.

With respect to the environmental variable, expectancy of success at a given task, it is suggested that there

are a number of different procedures through which this variable may be manipulated experimentally. For example, P_s can be defined by presenting subjects with false norms, by having subjects compete against varying numbers of individuals, or by varying the actual or perceived difficulty of the tasks.

Given this general theoretical framework and these methodological considerations, a variety of specific predictions can be made. The major, over-riding prediction is that, in achievement situations, persons who are dominated by the motive to approach success ($M_s > M_{af}$) are more highly motivated by a task of intermediate difficulty (i.e., a task with a probability of success about 0.50), whereas persons who are dominated by the motive to avoid failure ($M_{af} > M_s$) are least inhibited by a task which is extremely easy or extremely difficult (i.e., a task involving nearly a one hundred percent or zero percent probability of success). That is to say, these persons feel more at ease with a very easy or a very hard task. They may rationalize expected failure at a difficult task in which few succeed. Also, at a very easy task they may rationalize that they are unlikely to fail.

Early studies dealing with the relationships between achievement-related motives (M_s and M_{af}) and various criterion variables in a variety of situations produced ambiguous results.

Empirical support has been found for the prediction that achievement-oriented persons ($M_s > M_{af}$) are more highly motivated to undertake tasks of intermediate difficulty than failure-threatened persons ($M_{af} > M_s$). The question of whether failure-threatened persons actually avoid undertaking tasks of intermediate difficulty and prefer equally to undertake either very easy or very difficult tasks as the theory asserts, still remains in the realm of speculation.

The perceived difficulty of a task (probability of success at a given task) is theoretically a variable which should influence the relationships between achievement-related motives and criterion variables since the theory states that strength of resultant achievement motivation varies as a function of probability of success at a task. Lack of agreement among different studies is probably attributable to failure to specify levels of task difficulty. It is an important variable in studies of achievement motivation which must be accounted for when predictions about criterion variables are made from the theory. The conjecture is made that, if the environmental variable and individual characteristics of motives were appropriately considered, a more precise resolution of the experimental problem might emerge.

Assumptions. According to the theory and in view of the previous studies, the need for greater precision in experimentally manipulating the environmental variable, probability of success at a task, will be considered in the present study. As indicated previously, the empirical evidence of Weiner⁵⁹ and Feather⁶⁰ supports the fact that a high correspondence exists between an experimentally induced probability of success and an individual's subjective probability of success at a task within an experimental condition. However, an experimentally induced probability of succeeding at a task may be differentiated from an individual's subjective probability of success since a person's estimate of his chance of succeeding at a task may depart from the experimentally induced probability of success.

The main concern of the present investigation is differences among treatment groups rather than among individuals. Individual differences in terms of subjective probability of success at a task can be equalized through the procedure of random assignment of subjects to treatment groups. In other words, an individual's subjective probability of success at a task is unknown, but it is assumed to be approximately equal for each group due to the use of

59 B. Weiner, op. cit., 1972, p. 197.

60 N. T. Feather, op. cit., 1967, p. 372-386.

randomization in the assignment of subjects.

Within each treatment, cell variance contains variance due to error and variance due to individual differences among the subjects. However, it can be assumed that, if the random assignment of subjects has been successful, there will be no inter-cell variation of individual differences in terms of subjective probability of success.

Applying the above empirical evidence and using the procedure of random assignment of subjects, the following assumptions are made:

(1) On a group rather than on an individual basis, it is assumed that a high correspondence exists between an experimentally induced probability of succeeding at a task and an individual's subjective probability of success under a particular experimental condition.

(2) It is assumed that if the random assignment of subjects to treatment groups has been successful, there will be no differences among various groups on subjective probability of success.

Given these two specific assumptions, one may now state the problem and the hypotheses for the present study.

The Problem.- The purpose of the present investigation is to examine Atkinson and Feather's theory of achievement motivation as applied to an educational situation by providing answers to the following questions:

(1) How is performance at a task affected by experimentally induced probability of succeeding at that task among achievement-oriented subjects in whom M_s is stronger than M_{af} ?

(2) How is performance at a task affected by experimentally induced probability of succeeding at that task among failure-threatened subjects in whom M_{af} is stronger than M_s ?

More specifically, the problem to be investigated concerns the interaction of resultant achievement motivation and experimentally induced probability of succeeding at the Word-Number Pair Test in a testing situation. Based on the theory and the literature reviewed, the following hypotheses are formulated:

(1) Achievement-oriented individuals, with $M_s > M_{af}$, will perform better when an intermediate level of success probability is experimentally induced than when a high or low level of success probability is induced.

(2) Failure-threatened individuals, with $M_{af} > M_s$, will perform better when a high or low level of success probability is experimentally induced than when an intermediate level of success probability is induced.

To test these hypotheses, each subject's motive to approach success (M_s) and motive to avoid failure (M_{af}) must be measured, and the experimentally induced probability of

succeeding at the Word-Number Pair Test must be manipulated. In addition, measures of the subject's performance on the Word-Number Pair Test should be made in terms of: (1) number of word-number pairs attempted, and (2) number of word-number pairs answered correctly.

In the next chapter, the experimental design will be discussed and it will be shown that all the conditions stated above have been met.

CHAPTER II

EXPERIMENTAL DESIGN

In order to examine the combined effect of the type of motivation and the probability of succeeding on performance, an experiment was conducted. The presentation of the design of this project will include a discussion of the sample and population, a discussion of the measuring instruments, an outline of the experimental procedures, and the statistical design together with the type of analysis used to test the hypotheses.

1. Population and the Sample

In the school year 1973-1974, 1113 pupils were enrolled in grade six, in 32 English-speaking elementary schools, under the jurisdiction of the Ottawa Roman Catholic Separate School Board. These schools are situated in the city of Ottawa, Canada. The pupils range in age from 10 years and 8 months to 11 years and 10 months, with a median age of 11 years and 4 months.

The subjects in this study consisted of 542 pupils enrolled in 19 grade-six classes randomly selected from all such classes of the 32 elementary schools. The class size generally ranged from 10 to 30 pupils.

To the extent that achievement-oriented and failure-threatened children of one area do not perform in a different manner from children in general, the results can be generalized, tentatively, to performance on a similar task by children of the same age level.

2. Measuring Instruments

To test adequately the research hypotheses, it was determined that McClelland's projective measure of n Achievement and the Sarason, et al., self-report measure of test anxiety would provide most appropriately a measure of the motive to approach success (M_s) and a measure of the motive to avoid failure (M_{af}), respectively. It was also decided that an adapted administration of Thurston's Word-Number Pairs Test would provide the criterion measures.

(a) McClelland's n Achievement Test

The n Achievement Test was developed by McClelland, Atkinson, Clark, and Lowell¹ through a modification of Murray's Thematic Apperception Test (TAT) procedures and protocol scoring systems for n Achievement. The authors initially focused on the measurement of a single need for

¹ D. C. McClelland, J. W. Atkinson, R. A. Clark, and E. L. Lowell, The Achievement Motive, New York, Appleton-Century-Crofts, 1953.

achievement (n Ach). A considerable number of exploratory studies was carried out to provide empirical support for the validities of the measuring procedures and protocol scoring systems for n Achievement, by relating the obtained scores to various behavioral indices in many situations.

McClelland and his co-workers realized that many of the principles of measurement had to be met so that the projective instrument would be useful in research settings. For example, the measure needed to have interscorer reliability, that is, judges must agree on the scoring of the fantasy content. Therefore, a quantitative scoring system measuring individual differences in the strength of n Achievement was established.

In summary, a number of changes were made by McClelland and his co-workers when adapting Murray's TAT as a research instrument. McClelland's procedure for measuring n Achievement is first discussed and then a review of the reliability and the validity of the instrument will follow.

McClelland used stimulus pictures and had the subjects respond by writing short imaginative stories about each picture. Leading stimulus questions on the answer sheets guide the subjects through the plot of a story. A process of content analysis is used to obtain n Achievement scores.

The stimulus materials used by McClelland and his co-workers for the measurement of n Achievement generally

consisted of four pictures, two of which were taken from Murray's TAT and two others were selected from ordinary magazines. The same four pictures were used in the present study for two main reasons. First, they had been repeatedly employed by McClelland and his group for the measurement of Achievement in a variety of exploratory studies. Secondly, they had been recommended by Atkinson² for use in the research of achievement motivation. The description of the four pictures used in the present study and the identifying letter assigned to each picture are shown in Appendix 1.

McClelland's procedure for administration of the test was followed. After the instructions were given, the first picture was projected on a screen for 30 seconds in a group situation, and then removed. The subjects were given four minutes to write a story about the picture. On each story sheet the four guiding questions were printed. They were equally spaced for response purposes. The instructions and four guiding questions on each answer sheet are shown in Appendix 2.

The timing of the response was controlled by the experimenter. As soon as the four minutes allotted for writing the stories were up, another picture was shown. This

² J. W. Atkinson (Ed.), Motives in Fantasy, Action, and Society: A Method of Assessment and Study, Princeton, Van Nostrand, 1958, p. 831-837.

procedure was repeated for each of the remaining pictures.

The n Achievement protocols were then scored according to a method of content analysis originated by McClelland and his group.^{3,4} In the scoring of the protocols for n Achievement, each story written about a picture receives from negative one to positive eleven points. An individual's total achievement score is the sum of scores on the four pictures. One score point is given for the presence of "achievement imagery", zero for "doubtful achievement imagery". Otherwise, the score received is a negative one for "unrelated imagery". If the criteria for achievement imagery are met, 10 achievement imagery subcategories may each add a score point resulting in the item score range of -1 to 11. Directions for scoring are found in Appendix 3.

Finally, each subject has a numerical score representing the strength of his n Achievement. Thus, the problem encountered by Murray's TAT, that is, the absence of quantitative values, is overcome by McClelland's method of content analysis. Murstein suggested that:

3 D. C. McClelland, et al., op. cit., 1953, p. 107-138 and p. 146-150.

4 J. W. Atkinson (Ed.), op. cit., 1958, p. 179-204.

McClelland's scoring system is a remarkable accomplishment for a projective instrument. It is attributed to the clarity of directions and numerous examples of scoring which have been published, as well as to the admonition to score only overt responses without inference beyond that which is written in the story.⁵

In the following pages, the reliability and the validity of McClelland's projective method of measuring n Achievement, as well as the sex differences in n Achievement, will be examined.

Reliability. The chief difficulties encountered with McClelland's projective method of measuring n Achievement were its low coefficients of reliability for internal consistency and stability over time.

Attempts to find internally consistent sets of pictures have met with some difficulty. Atkinson⁶ utilized an eight-picture set by combining the four original ones with four others in various orders of presentation. Scores on the two sets correlated 0.48, which becomes 0.65 when corrected by the Brown-Spearman formula. After elimination of the least reliable picture, the split-half reliability of the remaining pictures was found to be 0.78.

⁵ B. I. Murstein, Theory and Research in Projective Techniques, New York, Wiley, 1963, p. 35.

⁶ J. W. Atkinson, "Studies in Projective Measurement of Achievement Motivation", doctoral dissertation, University of Michigan, 1950. Cited in D. C. McClelland, et al., op. cit., 1953, p. 187-194.

According to Rosenzweig,⁷ it is inappropriate to determine the reliability of a projective technique by either the split-half or alternate-picture methods. Rosenzweig contended:

[...] the reliability of a projective technique can not be determined by either the split-half or alternate-item methods. [...] any attempt to divide the total series of cards into a first half and a second half or to equate odd and even items for the purpose of determining reliability would violate the essence of the procedure. Any two "halves" of the method are simply not intended to be equal and hence should not correlate with each other if the projective technique lives up to its configurational design.⁸

Anastasi⁹ and Kleinmuntz¹⁰ also pointed out that it is always questionable as to how similar a parallel set of pictures is to the primary set.

Reported test-retest reliability coefficients, using a set of pictures on the first occasion and a comparable set of pictures on the second, have ranged from 0.03 over an

7 S. Rosenzweig, "Idiodynamics in Personality Theory with Special Reference to Projective Methods", Psychological Review, 1951, 58, 213-223.

8 Ibid., 1951, p. 219.

9 A. Anastasi, Psychological Testing (3rd ed.), London, MacMillan, 1971, p. 493-519.

10 B. Kleinmuntz, Personality Measurement, Homewood, Ill., Dorsey Press, 1967, p. 314.

eighteen-month period¹¹ to 0.64 over a five-week period.¹² Using a three-week time period, Haber and Albert¹³ found test-retest coefficients of 0.36 for pictures which elicit few n Achievement stories and of 0.59 for pictures which elicit a relatively large number of n Achievement stories. Murstein¹⁴ summarized much of the reliability research. At best, the scores appeared to be only moderately stable over a fairly brief period of time.

Anastasi has launched a criticism of test-retest reliability in projective techniques. She pointed out that:

Retest reliability presents special problems. With long intervals, genuine personality changes may occur which the test should detect. With short intervals, a retest may show no more than recall of original responses.¹⁵

Similarly, Rosenzweig¹⁶ stated that test-retest reliability may be low because of a change in personality

11 R. C. Birney, "The Reliability of the Achievement Motive", Journal of Abnormal and Social Psychology, 1959, 58, 266-267.

12 H. H. Morgan, "Measuring Achievement Motivation with Picture Interpretations", Journal of Consulting Psychology, 1953, 17, 289-292.

13 R. N. Haber and R. Alpert, "The Role of Situation and Picture Cues in Projective Measurement of the Achievement Motive", in J. W. Atkinson (Ed.), op. cit., 1958, p. 644-663.

14 B. I. Murstein, op. cit., 1963, p. 141.

15 A. Anastasi, op. cit., 1971, p. 513.

16 S. Rosenzweig, op. cit., 1951, p. 213-223.

or mood during the interval between tests. McClelland and his group¹⁷ and Harrison¹⁸ also discussed the problem of test-retest reliability in the projective measures of n Achievement and came to similar conclusions.

Consequently, Anastasi,¹⁹ Birney,²⁰ Harrison,²¹ Murstein,²² and Rosenzweig²³ have suggested that, in work with projective techniques, standard test-retest or internal consistency reliability is of less importance than scoring reliability. Atkinson²⁴ has repeatedly maintained the necessity for experimenters to establish high reliability in scoring the manual materials and high interscorer reliability with test materials. Gulliksen²⁵ and Murstein²⁶

17 D. C. McClelland, et al., op. cit., 1953, p. 193.

18 R. Harrison, "Thematic Apperception Methods", in B. B. Wolman (Ed.), Handbook of Clinical Psychology, New York, McGraw-Hill, 1965, p. 562-620.

19 A. Anastasi, op. cit., 1971, p. 512.

20 R. C. Birney, "Research on the Achievement Motive", in E. F. Borgatta and W. W. Lambert (Eds.), Handbook of Personality Theory and Research, Chicago, Rand McNally, 1968, p. 857-889.

21 R. Harrison, op. cit., 1965, p. 562-620.

22 B. I. Murstein, op. cit., 1963, p. 7.

23 S. Rosenzweig, op. cit., 1951, p. 213-223.

24 J. W. Atkinson (Ed.), op. cit., 1958, p. 179-204.

25 H. Gulliksen, Theory of Mental Tests, New York, Wiley, 1950.

26 B. I. Murstein, op. cit., 1963, p. 125-126.

have recommended that interscorer reliability should be at least 0.90, and they doubted that a test could be of much value when the coefficient falls below 0.80.

In a review of several studies, there was sufficient evidence that interscorer reliability was reasonably high when McClelland's system of content analysis for scoring n Achievement was used. Feld and Smith,²⁷ who reviewed 14 studies employing McClelland's system, reported that interscorer reliabilities ranged from 0.66 to 0.96 with a median of 0.89 and that score-rescore reliabilities on two occasions with one month to six months apart ranged from 0.88 to 0.95 with a median of 0.94. Even with 12 "novice" scorers (12 hours' training), they reported a median interscorer reliability of 0.87. Rank-order correlations between scores of different scorers ranged from 0.72 to 0.91 in a study reported by Veroff, Atkinson, Feld, and Gurin.²⁸ High scoring reliability, either interscorer or score-rescore, may be a function of McClelland's scoring manual which employs precise language for describing his system, gives detailed

27 S. Feld and C. P. Smith, "An Evaluation of the Objectivity of the Method of Content Analysis", in J. W. Atkinson (Ed.), op. cit., 1958, p. 234-241.

28 J. Veroff, J. W. Atkinson, S. Feld, and G. Gurin, "The Use of Thematic Apperception to Assess Motivation in a Nationwide Interview Study", Psychological Monograph, 1960, 74 (12), p. 1-32.

instructions for scoring, provides training examples with practice protocols, and offers scoring reliability checks.

In conclusion, even though scoring reliability is of much importance with projective techniques, Murstein²⁹ suggested that one should concentrate on validity. Anastasi³⁰ also stated that "for any test, the most fundamental question is that of validity".

Validity.- Has it been demonstrated that McClelland's n Achievement test validly assesses individual differences in the strength of n Achievement?

To answer this question it is necessary to consider various types of validity. In the following pages, the content, criterion-related, and construct validities of McClelland's n Achievement test will be examined.

The "Technical Recommendations" of the American Psychological Association specify that:

If a test performance is to be interpreted as a sample of performance or a definition of performance in some universe of situations, the manual should indicate clearly what universe is represented and how adequate the sample is.³¹

In most research reviewed previously, this level of sophistication was not reached in the measurement of

29 B. I. Murstein, op. cit., 1963, p. 7.

30 A. Anastasi, op. cit., 1971, p. 513.

31 American Psychological Association, "Technical Recommendations for Psychological Tests and Diagnostic Techniques", Psychological Bulletin, 1954, 51, 201-238.

n Achievement. Indeed, it is doubtful that such intensity in the sampling of content is possible. Generally, the measurement procedure of n Achievement has involved the use of four or six pictures differing somewhat in their content; for example, two men working at a machine, or a father-son relationship. However, this was the extent of content "sampling". In no investigation was there evidence of specification of the sampling procedure, or of the rationale behind the choice of the particular pictures selected. Therefore, in the measurement of n Achievement, the possibility of inappropriate content sampling or relative lack of content validity exists. However, in the evaluation of proficiency of projective measures, Anastasi stated that "content validity is inappropriate and may, in fact, be misleading".³² Previously, Thorndike and Hagen wrote:

This type of validity (content validity) [...] has no application in the case of projective techniques. The essence of projective testing is that it deals with the inner, concealed aspects of personality dynamics, and that these are revealed only indirectly by the interpretation of subtle signs in the individual's interpretation of what he sees. Thus, we must exclude content validity as an approach to the evaluation of projective techniques. Their validity must be appraised in other ways.³³

32 A. Anastasi, op. cit., 1971, p. 102.

33 R. L. Thorndike and E. Hagen, Measurement and Evaluation in Psychology and Education (3rd ed.), New York, Wiley, 1969, p. 506.

Consequently, it may be reasonable to ask: How effective is McClelland's method of measuring n Achievement for predicting significant outcomes for individuals?

McClelland captured the essence of criterion-related validity in his description of good motive measures:

The measure of a motive should have relational fertility. It should correlate with many other variables or account for much of the variance in human behavior [...]. Validity, properly speaking, is an instance of relational fertility [...]. It is correct to assess the validity of the measure in terms of the number and extent of its connections to other theoretically-related variables.³⁴

Many early studies of achievement motivation, concerned with criterion-related validity, followed McClelland's dictum. They related individual differences in strength of achievement motive to a variety of behaviors for which achievement performance appeared to be a relevant outcome of motivation. For example, in one of the very early studies, Lowell³⁵ required subjects to solve arithmetic problems. In the analysis of the results, subjects were divided into high (above the median) and low (below the median) achievement motive groups in terms of scores obtained from McClelland's n Achievement Test. He found that persons

34 D. C. McClelland, "Methods of Measuring Human Motivation", in J. W. Atkinson (Ed.), op. cit., 1958, p. 20.

35 E. L. Lowell, "The Effect of Need for Achievement of Learning and Speed of Performance", Journal of Psychology, 1952, 33, 31-40.

having high n Achievement scores showed a significantly higher level of performance on an arithmetic task than persons having low n Achievement scores.

Another early study providing criterion-related validity for McClelland's method of measuring n Achievement was conducted by Atkinson.³⁶ He investigated the recall of incompleting and completing tasks after subjects received relaxed, neutral, or achievement-oriented instructions. It was believed that these three conditions influence the degree of aroused achievement motivation, and therefore were expected to affect task recall. The subjects were also classified as high or low in n Achievement scores. The results of the study revealed that the percentage recall of completed tasks did not significantly differ among the three experimental conditions for the two motive groups. However, the percentage recall of incompleting tasks was systematically influenced by the arousal instructions. Subjects having high n Achievement scores showed a significant increase in recall of incompleting tasks from the relaxed to achievement-oriented instruction conditions. Conversely, subjects having low n Achievement scores exhibited a decrease in recall of

³⁶ J. W. Atkinson, "The Achievement Motive and Recall of Interrupted and Completed Tasks", Journal of Experimental Psychology, 1953, 46, 381-390, cited in J. W. Atkinson, An Introduction to Motivation, Princeton, Van Nostrand, 1964, p. 232-234.

incompleted tasks as conditions became more closely associated with achievement concerns.

Atkinson interpreted his findings for subjects classified high in n Achievement:

There is a significant increase in recall of interrupted tasks (and the Zeigarnik effect) as the instructions and other situational cues increase the likelihood that subjects will perceive completion as evidence of personal success and incompleteness as evidence of personal failure. In other words, the strength of the tendency to achieve at these particular tasks was significantly greater among persons having comparable High n Achievement scores when cues in the instructions and other features of the situation led them to expect that performance would be evaluated in terms of a standard of excellence than when the situational cues made it patently clear that their performance would not be evaluated.³⁷

There have been many other validity studies.³⁸ The logic of these investigations was similar to that employed by Lowell and Atkinson. Individuals were classified into motive groups on the basis of their n Achievement scores. Then their performance was compared on one or more dependent

37 J. W. Atkinson, op. cit., 1964, p. 233.

38 Of the many other validity studies, three examples are:

J. W. Atkinson, "Explorations Using Imaginative Thought to Assess the Strength of Human Motives", in M. R. Jones (Ed.), Nebraska Symposium on Motivation, Vol. 2, Lincoln, University of Nebraska Press, 1954, p. 56-112.

J. W. Atkinson and W. R. Reitman, "Performance as a Function of Motive Strength and Expectancy of Goal-Attainment", in J. W. Atkinson (Ed.), op. cit., 1958, p. 278-287.

D. C. McClelland, The Achieving Society, Princeton, Van Nostrand, 1961.

variable which was sensitive to motivational influence. The results of these investigations have shown mixed success with respect to criterion-related validity for McClelland's method of measuring n Achievement through content analysis. A considerable number of studies has indicated support for the McClelland system, but several others have found little support, or have discovered complicating factors which indicate that the system is too simple to be more than a very rough measure of achievement motive.

In summarizing the research reports, one can conclude that McClelland's system has achieved some support as a research instrument to measure n Achievement for the purpose of group comparisons but has not proved as suitable for the purpose of making precise predictions about the standing of individuals on n Achievement. McClelland and his associates stated:

We conclude that the measure is, at present, unsuitable for purposes of precise prediction about the standing of individuals on n Achievement, but its stability for purposes of group comparisons is fairly well established.³⁹

In conclusion, it is appropriate to use McClelland's n Achievement Test for the measurement of achievement motive in the present research, since groups are being compared.

39 D. C. McClelland, et al., op. cit., 1953, p. 194.

To establish construct validity, Cronbach and Meehle⁴⁰ stated that a test must be embedded in a clearly stated theory or nomological network. Atkinson and Feather⁴¹ have formulated a comprehensive theory of achievement motivation which was reviewed in Chapter I. Validation of their theory⁴² provided construct validity for the measurement instruments employed in previous investigations. Generally, McClelland's method of measuring n Achievement was used.

One question still remains: Are there sex differences in the measurement of n Achievement? This will be discussed next.

Sex Differences in n Achievement Measurement.- A considerable number of original validation studies of achievement motivation conducted by McClelland and his associates

40 L. J. Cronbach and P. E. Meehle, "Construct Validity in Psychological Tests", Psychological Bulletin, 1955, 52, 281-302.

41 J. W. Atkinson and N. T. Feather (Eds.), A Theory of Achievement Motivation, New York, Wiley, 1966.

42 Of the many validity studies, three examples are: J. W. Atkinson and G. H. Litwin, "Achievement Motive and Test Anxiety Conceived as Motive to Approach Success and Motive to Avoid Failure", in J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 75-92.

N. T. Feather, "The Relationship of Persistence at a Task to Expectation of Success and Achievement-Related Motives", in J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 117-133.

P. O'Connor, J. W. Atkinson, and M. Horner, "Motivational Implications of Ability Grouping in Schools", in J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 231-248.

generally involved male subjects only. It was believed at first that there were sex differences in Achievement scores and that each sex might be most effectively studied through the use of a set of achievement-related pictures composed mainly of characters similar in sex and age to the subjects. According to the current literature, this assumption is largely unjustified.

The crucial question is: Do persons respond differently to a set of achievement-related pictures which contain the same or opposite sex characters in eliciting achievement imagery? To demonstrate whether or not sex differences exist with respect to stimulus pictures, it is necessary to review the empirical studies using the same pictures for males and females. Otherwise the difference may be attributed to differences in the stimulus impact of the pictures employed.

It seems advantageous to organize the sample of studies to be reviewed in an order commencing with young children and continuing into adulthood. In this manner, it can be seen whether any appearance of a sex difference is a function of psycho-sexual development.

Bruckman⁴³ studied 383 primary school children (204 boys, 179 girls) whose ages ranged from 9 to 11 years. The major concern of his study was the relationship of achievement motive to five social and psychological factors, namely, sex, age, social class, school stream and intelligence. His measurement of n Achievement was based on three pictures taken from McClelland's list.⁴⁴ The central character of the pictures used was male. These pictures were administered to children under the "achievement-oriented" condition in which the experimenter, as described by Bruckman,⁴⁵ made deliberate attempts to introduce achievement-related cues.

The mean n Achievement score obtained from stories written by boys about pictures containing male characters was 6.48 (N = 204) while the mean n Achievement score obtained from stories written by girls about the same pictures was 7.32 (N = 179). While there was a very slight superiority in the mean n Achievement score of girls, it was not a significant difference (F = 0.25). Bruckman thus indicated that boys and girls were equally achievement-oriented when

43 I. R. Bruckman, "The Relationship Between Achievement Motivation and Sex, Age, Social Class, School Stream and Intelligence", British Journal of Social and Clinical Psychology, 1966, 5, 211-220.

44 D. C. McClelland, et al., op. cit., 1953, p. 375.

45 I. R. Bruckman, op. cit., 1966, p. 212.

McClelland's method of measuring n Achievement was used and when the central character of the pictures was male.

Two other studies concerning sex differences in n Achievement were carried out by Veroff, Wilcox and Atkinson.⁴⁶ High school boys and girls were used as the subjects in the first experiment. College women were used as the subjects in the second experiment.

The first investigation was undertaken for the dual purpose of determining: (a) whether or not the McClelland's method of measuring n Achievement, which was originally developed on male college students, was applicable to a population of younger males, and (b) whether or not it was a valid method of obtaining a measure of n Achievement in female subjects.

Six pictures were administered to 92 high school students (aged 16-18) in a group situation which was either "relaxed" or "achievement-oriented". The subjects in the "relaxed" condition consisted of 18 boys and 22 girls while the subjects in the "achievement-oriented" condition consisted of 28 boys and 24 girls.

In the "relaxed" condition, the writing of stories in response to pictures was preceded by a period in which

⁴⁶ J. Veroff, S. Wilcox, and J. W. Atkinson, "The Achievement Motive in High School and College Age Women", The Journal of Abnormal and Social Psychology, 1953, 48, 108-119.

the experimenter attempted, through instructions, to minimize the number of achievement-related cues that might be present in the situation. In the "achievement-oriented" condition, the writing of stories was preceded by certain instructions and by the performance of an anagrams task designated to maximize the extent to which achievement cues would affect subjects before the writing of stories.

Of the six pictures used in the measurement of n Achievement, three containing male characters were selected from McClelland's list of pictures that had already been used in previous studies involving male college students. Three more pictures were specifically chosen for this study. They were comparable to the first three, but the central character of each was a female.

All of the stories written in response to the pictures were scored according to McClelland's scoring system.⁴⁷ Two n Achievement scores were obtained from the stories written by each subject--one from three stories written in response to male pictures, and another from three stories written in response to female pictures.

Under the "relaxed" condition, the girls obtained significantly higher n Achievement scores ($M = 5.76$) than the boys ($M = 1.94$) in response to pictures of male

47 D. C. McClelland, et al., op. cit., 1953, p. 107-138.

characters ($t = 3.23, p < 0.01$). Both groups however showed low n Achievement scores in response to pictures of female characters (for girls, $M = 1.77$; for boys, $M = 1.72$). In the "achievement-oriented" condition, both sexes showed high n Achievement scores in response to male pictures with no significant sex difference (for girls, $M = 5.21$; for boys, $M = 4.93$). Both sexes showed low n Achievement scores in response to the female pictures (for girls, $M = 1.92$; for boys, $M = 1.57$).

When results under the two conditions were compared, boys obtained significantly higher n Achievement scores with male pictures under the "achievement-oriented" condition than with male pictures under the "relaxed" condition ($t = 2.77, p < 0.01$). However, boys showed low n Achievement scores with female pictures under both conditions. From this finding, Veroff, Wilcox and Atkinson concluded that McClelland's method of measuring n Achievement, which was originally developed on a population of male college students, was sufficient to produce different motivational intensities when male pictures were used in a population of younger male subjects. In other words, for high-school boys, the male pictures produce a measure of achievement motive while female pictures do not. On the other hand, the girls exhibited significantly higher n Achievement scores in response to male pictures than their scores with female

pictures under both conditions (Relaxed, $t = 3.76$, $p < 0.01$; Achievement-oriented, $t = 3.36$, $p < 0.01$).

At this point, a question is raised. Why do the girls obtain significantly higher Achievement scores in response to male picture cues rather than to female picture cues regardless of the experimental condition?

Veroff, Wilcox, and Atkinson wrote concerning this question as follows:

(For girls) [...] the significantly greater Achievement response to pictures containing male characters may mean either that the male character in an achievement-related situation is a more powerful elicitor of achievement-related thoughts than the female character in a similar situation as a result of the cultural differentiation of sex role regarding achievement, [...] or that the attempt to select pictures containing female characters in achievement-related situations was not very successful.⁴⁸

This leads to another question. Is it possible that the female pictures used in the experiment were not sufficiently achievement-oriented? In order to find evidence for the question just raised, only college women were used as subjects in the second experiment.

The pictures selected contained female characters in situations that were somewhat more achievement-oriented than those employed in the first experiment. In addition, the college female subjects were tested under both "relaxed" and

⁴⁸ J. Veroff, S. Wilcox, and J. W. Atkinson, op. cit., 1953, p. 113.

"achievement-oriented" conditions. Since Veroff, Wilcox, and Atkinson contended that the "relaxed" condition of the first experiment did not reduce achievement cues for girls to the same extent than it did for boys because of the classroom situation (the presence of boys in the class, a male experimenter, and reference to the stories as a test of creative imagination), an attempt was made to reduce the number of achievement cues in the "relaxed" condition of the second experiment. The removal of some cues should effect the lowering of the n Achievement scores for females. Furthermore, to make the "relaxed" condition as relaxed as possible, 27 college female students were tested by only one female of the three experimenters in an informal way in the girl's dormitory room at night, using small groups of two to ten without men present. The measurement of n Achievement was preceded by a period in which the experimenter tried to be relaxed and friendly, she treated the experiment with no particular importance in order to minimize achievement related cues that might present themselves in the situation.

In the "achievement-oriented" condition, 26 college female students were tested by the same experimenter in their regular classroom with male students present. The measurement of n Achievement was preceded by the administration of an anagrams task which was meant to maximize the

effect of the achievement cues. It was assumed by the researchers that the number of anagrams produced by subjects during the 12-minute period allotted would be related to the n Achievement score obtained from the stories written immediately after this period. If the measure obtained from analysis of the stories was actually a measure of achievement motivation, then the higher the n Achievement score the greater should be the number of anagrams completed in the 12-minute period. If this type of relationship existed, they could conclude that the n Achievement score obtained from stories written by women is a valid measure of achievement motivation.

Six pictures were used for both conditions: three pictures containing male characters previously used in the first experiment; three new pictures containing female characters which were especially selected for the second experiment. Veroff, Wilcox, and Atkinson have written that "every effort was made to select the female pictures having achievement cues equivalent to those in the male pictures".⁴⁹

Despite efforts made to select pictures having female characters in situations clearly suggestive of achievement, and despite the attempt to remove achievement-related cues in the "relaxed" condition (in order to be able to show an

49 Ibid., 1953, p. 114.

increase in n Achievement score in the "achievement-oriented" condition), the results obtained were virtually identical with those of the first experiment.

Under both conditions, the mean n Achievement scores obtained by college women in response to pictures having male characters (relaxed, $M = 5.70$; achievement-oriented, $M = 5.77$) were greater than that in response to pictures having female characters (relaxed, $M = 0.26$; achievement-oriented, $M = 0.38$). An analysis of variance yielded no significant difference between experimental conditions but a significant difference between the two types of pictures ($F = 61.72$, $p < 0.01$).

A further analysis involved performance of the anagrams task in the "achievement-oriented" condition preparatory to the administration of six stimulus pictures. The results showed that subjects with high n Achievement completed significantly more anagrams than subjects with low n Achievement. In other words, a positive relationship existed between the imaginative measure of n Achievement and the anagrams performance measure. This positive result enabled Veroff, Wilcox, and Atkinson, to indicate that McClelland's method of measuring n Achievement is valid when applied to female subjects.

The studies reviewed may be summarized as follows:

(a) McClelland's method of measuring n Achievement which was originally developed on a population of male college students is applicable to primary school children, high school boys and girls, and college women, provided that pictures containing male characters are used.

(b) For primary school children, no significant sex difference was found in Bruckman's study in response to the pictures containing male characters.

(c) For high school boys and girls, and for college women, the result showed high n Achievement scores in response to the pictures containing male characters and low n Achievement scores in response to the pictures containing female characters regardless of experimental condition. This finding indicated that both sexes express their achievement motive primarily in response to pictures in which the central character is male.

(d) High school boys exhibited higher n Achievement scores on male pictures under the "achievement-oriented" condition than that under the "relaxed" condition.

(e) High school girls and college women showed equally high n Achievement scores in both "relaxed" and "achievement-oriented" conditions. Thus, there was little evidence demonstrating an increase in n Achievement scores of girls following achievement-arousal.

On the whole, McClelland's method of measuring n Achievement seems to be increasingly employed in the research of achievement motivation. The attraction of its methodology lies in the fact that it has been generally validated against behavior samples in many situations. Another attraction is due to the employment of precise language to describe his method and due to the simplicity of the scoring system when compared with that of other projective instruments.

(b) Test Anxiety Scale for Children

In discussing McClelland's n Achievement measures, Atkinson and Feather indicated that:

Although the projective procedure provides an n Achievement score that now seems likely to be a measure of $M_s - M_{af}$, this measure is only moderately reliable. [...] Hence prediction is improved by also employing a questionnaire measure of Test Anxiety, which, we assume, independently assesses M_{af} .⁵⁰

This leads one to believe that the n Achievement or the motive to approach success (M_s) should be measured by means of McClelland's projective method, subjects being asked to write imaginative stories in response to selected pictures. The preciseness of the measurement of M_s can be increased by supplementing the projective procedure with an independent

⁵⁰ J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 352.

measurement of test anxiety or the motive to avoid failure (M_{af}) by means of a self-report Test Anxiety Scale which is examined in the following pages.

Sarason and his co-workers^{51,52} have dealt with anxiety which is normally aroused in an individual in an achievement situation. They referred to it as "test anxiety". Their basic assumption was that examinations in elementary school arouse anxiety in children in sufficient strength and often enough that an intensive study of the matter would be useful both practically and theoretically.

In their theoretical consideration of anxiety they described it as a conscious experience which can be communicated to someone else and which is accompanied by a highly unpleasant or painful reaction with bodily concomitants of which the individual is aware. The occurrence of unpleasant or painful reaction in a specific situation can be determined by the method of direct questioning. Furthermore, if anxiety is attached to and aroused by specific situations, it should be more valid to measure anxiety by items pertinent to particular situations than by items which

51 S. B. Sarason, K. S. Davidson, F. F. Lighthall, and R. R. Waite, "A Test Anxiety Scale for Children", Child Development, 1958, 29, 105-113.

52 S. B. Sarason, K. S. Davidson, F. F. Lighthall, R. R. Waite, and B. K. Ruebush, Anxiety in Elementary School Children, New York, Wiley, 1960.

purport to measure anxiety in some general way.

In congruence with their theory, Sarason, Davidson, Lighthall, Waite, and Ruebush⁵³ developed the Test Anxiety Scale for Children (TASC) to measure a specific anxiety aroused in a testing situation.

This scale consists of 30 items, made up in the form of questions which each child answers by drawing a circle around either a "yes" or a "no" on an answer sheet. The items are concerned with attitudes toward, and experiences in, test and test-like situations. In utilizing the TASC in a group situation, the authors suggested that the directions for administration of the scale, as well as each item, should be read to the children. A child's score on the scale is the sum of the number of times he circled "yes" on the answer sheet. The score may range from a minimum of zero to a maximum of 30 points. A high score reflects anxious reactions in a variety of test-like situations, in which case, a child receiving a high score may be labelled as highly "test anxious". Conversely, a low score reflects that a child is not anxious in test and test-like situations and characteristically may be labelled as a low "test anxious" subject.

53 S. B. Sarason, et al., op. cit., 1960, p. 84-95.

Reliability. In the initial validity studies, Sarason and his co-workers⁵⁴ administered the TASC to 1697 children, in grades two to five. They found that test-retest coefficients of reliability, after a two-month interval, were 0.76, 0.44, 0.76 and 0.82, and that the split-half coefficients of reliability, corrected by the Spearman-Brown formula, were 0.82, 0.90, 0.89 and 0.88. They indicated that the Test Anxiety scores tended to increase linearly with grade, and that girls, as a group, consistently obtained higher scores than boys.

Validity.- The construct validity of the TASC was provided by the over-all pattern of generally confirmatory results of a number of studies. These studies were designed to test several psychoanalytic hypotheses derived from the specificity theory of anxiety concerning the role of test anxiety in intellectual and personality functionings. For example, several investigations^{55,56} of TASC construct validity were concerned with the relationship between TASC scores, and intelligence and achievement tests. Moderate but consistently significant negative relationships were

54 S. B. Sarason, et al., op. cit., 1958, p. 105-113.

55 S. B. Sarason, et al., op. cit., 1960, p. 125-158.

56 I. G. Sarason, "Test Anxiety and Intellectual Performance", Journal of Abnormal and Social Psychology, 1963, 66, 73-75.

obtained. The reported correlations varied from -0.186 to -0.294 (all significant at the one per cent level).

The criterion-related validity of the TASC also came from the results of a series of studies. For example, in the initial validity study conducted by Sarason and his co-workers,⁵⁷ which was reviewed above, each child was also rated by his teacher on 17 items of the Teachers' Rating Scale (TR).⁵⁸ The items of this scale were derived from the same a priori considerations as were those of the TASC. Sarason and his co-workers claimed that, if a significant relationship could be found between the TASC (a child's self-rating) and his teacher's independent rating, the validity of the former would be established. The reported correlation coefficients were 0.10, 0.09, 0.34, and 0.18. With regard to the small but positive relationship between the two scale results for each grade, Sarason and his co-workers concluded:

The task of rating each of some 30 pupils on 17 separate anxiety indicators was met with enthusiasm by some, seriousness by most, near rejection by others. In view of these widely differing uses of responses to the rating scale by the teachers, the degree of relationship between the TASC and the TR was viewed as being at least encouraging, if not somewhat remarkable.⁵⁹

57 S. B. Sarason, et al., op. cit., 1958, p. 105-113.

58 S. B. Sarason, et al., op. cit., 1960, p. 311-314.

59 Ibid., 1960, p. 127-128.

In fact, the small but positive relationship between the two scales may probably be due more to lack of reliability in the teacher ratings than to a lack of validity of the TASC.

Other evidence concerning the criterion-related validity of the TASC came from the results of the study conducted by Waite, Sarason, Lighthall and Davidson,⁶⁰ in which the focus was on differences between high test-anxious (HTA) and low test-anxious (LTA) children in an experimental learning situation. The children in their study came from a group of 747 pupils in grades two through five. Children whose TASC scores fell in the upper quartile of the distribution were termed HTA, and those whose TASC scores fell in the lower quartile were termed LTA. Twenty-four pairs of children were then selected by matching LTA subjects with HTA subjects in terms of grade, sex, and Otis Alpha scores. It was hypothesized that LTA children would do better in an experimental learning situation than HTA children.

The most important finding was that, as they expected, the LTA children learned more, and learned faster, than did the HTA children ($F = 5.52, p < 0.01$). Furthermore, the girls appeared to do better than the boys, but the result

⁶⁰ R. R. Waite, S. B. Sarason, F. F. Lighthall, and K. S. Davidson, "A Study of Anxiety and Learning in Children", Journal of Abnormal and Social Psychology, 1958, 57, 267-270.

was not statistically significant.

In summary, the TASC has been found to have high split-half coefficients of reliability and has satisfactory test-retest coefficients of reliability for a period of up to two months. The scale has been used with elementary-school children in a number of studies. The results of the validity studies cited above provide some evidence of the validity of the TASC as a measure of a specific anxiety in test and test-like situations. Thus, one can conclude that the TASC is a sufficiently valid measure of test anxiety in the population for which it was designed.

(c) Word-Number Pairs Test

The Word-Number Pairs Test was originally constructed by Thurstone and Thurstone⁶¹ as one of six subtests of the Chicago Test of Primary Mental Abilities for ages 11 to 17. This appeared in 1941 and was subsequently revised by the Educational Testing Service in 1962.⁶² The subtest in question was designed to provide a measure of the ability to learn combinations of words and numbers.

61 L. L. Thurstone and T. G. Thurstone, The Chicago Tests of Primary Mental Abilities, Chicago, Science Research Associates, 1941.

62 A. Anastasi, op. cit., 1971, p. 328-331.

The design of the subtest provided for a practice list as well as the two main parts of the test itself. The practice list shows five word-number pairs. The testee is given one minute to study them. After studying, the testee is asked to turn to the next page (practice test) which shows the words, without numbers, placed in a different order. He is then asked to write down the number that goes with each word.

Similarly each part of the test consists of two pages using 15 word-number pairs. After three minutes of study, the testee is given two minutes to respond, as in the practice test. The score is the number of times a word is correctly matched with the appropriate numeral for both parts of the test.

The test instructions were adapted for use in the present study. The test provides a criterion measure based on the following technical and theoretical considerations.

Technical Consideration.- A pilot study⁶³ was conducted to determine: (a) the appropriate method of manipulating the environmental variable (individual's expectancy of success at this test), (b) the appropriate number of

63 L. Fu, "A Pilot Study: The Interaction Between Resultant Achievement Motivation and Experimentally Induced Probability of Succeeding at a Task in the Testing Situation", Faculty of Education, University of Ottawa, 1974.

word-number pairs used in the test, and (c) the difficulty of the words for grade-six children. On the basis of the pilot study, it was decided that the test should consist of three parts.

Part 1 is identical to Thurstone's test containing five original word-number pairs for practice.

Part 2 allows for the manipulation of the individual's probability level of succeeding at this test. This environmental variable will be discussed later.

Part 3, consisting of two pages, is the main test. The first of these pages shows 20 word-number pairs selected from 30 word-number pairs of Thurstone's original test. The subjects are allowed to study these 20 pairs for five minutes. The second test page shows 20 words, without numbers, placed in a different order. The subjects are asked to write down the number corresponding to each word and are told to complete the test within a time limit of three minutes.

Theoretical Consideration.- The majority of the past studies in the area of achievement motivation generally employed two types of skilled performance as dependent variables: (a) athletic performance (for example, a ring toss game, or throwing a basketball from different distances), and (b) problem-solving (for example, connect the dots, or puzzle tracing). Theoretically, these types of skills are not the only ones to which the theory of achievement

motivation should apply. Any task perceived as involving the evaluation of performance in which the probability levels of succeeding at that task are manipulated should provide a criterion measure for the theory.

As reviewed in Chapter I, the theory of achievement motivation states that the strength of the resultant achievement motivation has been viewed as a function of both the strength of achievement-related motives and of the expectancy of success at a task aroused by situation cues. The situation cues can be experimentally manipulated, for example, by giving specific instructions to the subject regarding his chance of succeeding at that task. Accordingly, the variation of specific instructions for probability levels of succeeding at a task should produce differences in strength of resultant achievement motivation, and consequently differences in persistence and performance on that task.

With such considerations, Thurstone's test can be adapted to provide two dependent variables: (1) the number of word-number pairs attempted, and (2) the number of word-number pairs answered correctly. On the basis of the theory, scores computed from the number of word-number pairs attempted may be viewed as a measure of the trait of persistence at the task, while scores computed from the number of word-number pairs answered correctly may be viewed as a

measure of level of accomplishment. Therefore, the Word-Number Pairs Test provides measures not only of a personality characteristic, but also measures relating to a learning ability factor as well. Furthermore, the environmental variable (expectancy of success at a task) can be manipulated by means of the printed instructions for this test.

3. Experimental Procedures

As discussed previously, the materials used in this study consisted of three measuring instruments, namely, McClelland's n Achievement Test, Sarason's Test Anxiety Scale for Children, and an adaptation of Thurstone's Word-Number Pairs Test. The first two instruments provided measures of achievement-related motives, namely, the motive to approach success or n Achievement, and the motive to avoid failure or fear of failure in an achievement situation, respectively. The third test provided the criterion measures.

Both, McClelland's n Achievement Test and Sarason's Test Anxiety Scale for Children, were first administered to the subjects in each of 19 participating grade-six classes. In each class, these two tests were given at one sitting of approximately an hour. One week after the first testing session, the Word-Number Pairs Test was administered to the same subjects.

The Motive to Approach Success.- This motive was measured by McClelland's n Achievement Test. The subjects were asked to write stories in response to stimulus pictures. As indicated previously, McClelland's four original pictures A, B, G, and H were used in the present study. The standard instructions⁶⁴ for the administration of the pictures were pre-recorded on audio tape. The story booklet was prepared containing a cover sheet with printed instructions as well as a separate page for each story. On each of the separate pages, four leading stimulus questions were printed. (See Appendix 2.)

In each class, the story booklet was handed out after the pupils had entered the classroom in groups of 10 to 30. The subjects were subsequently asked to write above the instructions on the first page their names and sex. The pupils were directed to read and to follow the printed instructions. Simultaneously, the same instructions were being played on a tape recorder.

Following the instructions, the first picture was projected on a screen for 30 seconds, and then removed. The subjects were given four minutes in which to write stories about the picture guided by the four stimulus questions on the answer sheet. Only one minute was allowed per question.

64 D. C. McClelland, et al., op. cit., 1953, p. 98. Also found in J. W. Atkinson, (Ed.), op. cit., 1958, p. 837.

At the end of each minute, the subjects were informed that it was time to proceed to the next question. Thirty seconds before the end of the fourth minute, the subjects were requested to attempt to complete their stories. After four minutes had expired the subjects were asked to turn to the next page and prepare to study the following picture. The three remaining pictures were shown in sequence, and the same procedure was followed in each case.

The administration of the pictures was, thus, carried out under the "neutral" condition. A neutral condition, as described by McClelland and his associates,⁶⁵ and by Atkinson,⁶⁶ is one in which no attempt is made either to weaken or to strengthen achievement motive. The objective is to elicit the normal motivation level of the subject in an everyday school setting.

The stories written in response to the four pictures were scored for n Achievement using content analysis. The procedure as outlined in Atkinson's scoring manual is presented in Appendix 3. Scoring was done by an experienced scorer. Her scoring reliability, with the training materials scored by experts, had been previously established at above the 0.90 level. The interscorer reliability between the

65 D. C. McClelland, et al., op. cit., 1953, p. 101 104.

66 J. W. Atkinson (Ed.), op. cit., 1958, p. 834-837.

experienced scorer and the present experimenter, who had acquired the requisite level of skill through work with the practice materials presented by Atkinson,⁶⁷ was 0.89. This was determined on the basis of stories written by 30 subjects who were randomly selected from the same 542 subjects used in the present study. The basic principle of scoring was "to score only what the manual covered and not to score a particular category if there was any doubt".⁶⁸

The Motive to Avoid Failure.- This motive was measured by the Test Anxiety Scale for Children (TASC). It was introduced to the same subjects immediately following the administration of the McClelland n Achievement Test.

As suggested by Sarason and his co-workers, the instructions for the administration of the TASC and its 30 questions were pre-recorded on audio tape. The time interval between each pair of questions on the tape was five seconds. This provided time for the subjects to circle either "yes" or "no" on the answer sheets. The TASC together with the instructions can be found in Appendix 4.

As in the previous test, the subjects were directed to write their names and sex in the space provided. They were also requested to read and to follow the printed

67 J. W. Atkinson (Ed.), op. cit., 1958, p. 685-735.

68 D. C. McClelland, et al., op. cit., 1953, p. 187.

instructions, while the same instructions were being played on a tape recorder.

A subject's score on the TASC was the sum of the number of times he circled "yes" on his answer sheet. Scoring was done by the experimenter.

The Criterion Measures.- One week after the measurement of achievement-related motives, the Word-Number Pairs Test was administered to the same subjects. As indicated previously, the individual's probability level of succeeding at this test was manipulated by means of printed instructions.

According to the theory of achievement motivation, it was decided that three probability levels should be included, namely, low ($P_s < 0.25$), intermediate ($P_s = 0.50$), and high ($P_s > 0.75$). Therefore, three sets of specific instructions were used for each of three levels, respectively, in the following manner.

The set of specific instructions for the low probability level presents the test material as being very difficult. An example is given as follows:

Before you start, we would like to tell you something. Last week you wrote two tests. We are using your answers to these tests to tell you how well we think you will be able to learn the numbers that go with each of the words. We believe that you will be able to match about 25 per cent of the words and numbers correctly. This test will therefore be very hard for you.

The set of specific instructions for the intermediate probability level differs from the above instructions in that the test is presented as being of average difficulty, while the instructions for the high probability level presents the test as being very easy. A copy of the instructions is to be found in Appendix 5.

It should be noted that each subject received only one of the three sets of specific instructions regarding his chance of success at this test. The subjects were randomly assigned to the respective probability levels. For the purpose of randomness 570 booklets of the Word-Number Pairs Test were prepared: 190 booklets had the specific instructions for the low probability level, an equal number had the instructions for the intermediate probability level, and the remainder had the instructions for the high probability level. All 570 booklets were thoroughly mixed. Each subject's name was then written on the test by the experimenter. The writing of the subject's name on the test was an attempt to influence his belief that his chance of succeeding at this test was really based on the scores of the previous two tests which he had written a week previously.

After the tests were distributed, the subjects were asked to read and follow the instructions. The timing was controlled by the experimenter.

There were two scores recorded for this test. The first score was the number of word-number pairs attempted by the subject. The second score was the number of word-number pairs answered correctly by the subject. The scoring was done by the experimenter.

4. Statistical Design and Planned Analysis of the Data

Since the theory of achievement motivation focuses on the combined effects of achievement-related motives and probability of succeeding at a given task on performance, these two factors must be taken into consideration as far as a statistical design is concerned.

With respect to achievement-related motives, the theory deals with a competitive achievement situation in which only the motive to approach success (M_s) and the motive to avoid failure (M_{af}) are aroused. The strength of M_s was determined by the score on McClelland's n Achievement Test, whereas the strength of M_{af} was determined by the score on Sarason's Test Anxiety Scale for Children.

As discussed in Chapter I, Atkinson and other researchers in the area of achievement motivation generally classified the subjects simultaneously on the basis of the median split in the obtained distributions of both M_s and M_{af} scores. Individuals who had scores in the upper half (above the median) on M_s and also in the lower half (below the

median) on M_{af} were classified as high in resultant achievement motivation. These individuals are called achievement-oriented persons. Conversely, individuals who had scores in the upper half on M_{af} and also in the lower half on M_s were classified as low in resultant achievement motivation.

These individuals are called failure-threatened persons.

Individuals who had scores in the upper half on both measures, and those, who had scores in the lower half on both measures, were grouped into a common "intermediate" classification.

According to Atkinson and Litwin,⁶⁹ these two "intermediate" groups, high M_s and high M_{af} , low M_s and low M_{af} , showed more conflict in personality characteristics; therefore, a vast majority of previous studies usually excluded these two "intermediate" groups from the experiments. The present study adhered to previous practice. Only two extreme groups, achievement-oriented persons ($M_s > M_{af}$) and failure-threatened persons ($M_{af} > M_s$), were included in the study.

With respect to the relationship of resultant achievement motivation to the probability levels of succeeding at a given task, the theory states that achievement-oriented persons are more highly motivated toward tasks of intermediate difficulty, whereas failure-threatened persons are less inhibited at tasks which are either very difficult or very

⁶⁹ J. W. Atkinson and G. H. Litwin, op. cit., 1966, p. 75-91.

easy. Therefore, a 2 by 3 factorial design was used. The independent variables were the resultant achievement motivation and the experimentally induced probability levels of succeeding at the Word-Number Pairs Test. The resultant achievement motivation has two levels. Level one represents achievement-oriented subjects while level two represents failure-threatened subjects. The experimentally induced probability of succeeding at the Word-Number Pairs Test has three levels, namely, low, intermediate, and high.

With respect to the above design, the postulation of four sub-hypotheses, being restatements in more precise terms of the experimental hypotheses, was possible. These sub-hypotheses were as follows:

Hypotheses 1 and 2 concern performance of achievement-oriented individuals under experimentally induced probability levels.

Hypothesis 1:

Achievement-oriented individuals attempt and answer correctly more word-number pairs at the Word-Number Pairs Test when an intermediate probability level of succeeding at that test is experimentally induced than when a low probability level is induced.

Hypothesis 2:

Achievement-oriented individuals attempt and answer correctly more word-number pairs at the Word-Number Pairs Test

when an intermediate probability level of succeeding at that test is experimentally induced than when a high probability level is induced.

Hypotheses 3 and 4 concern performance of failure-threatened individuals under experimentally induced probability levels.

Hypothesis 3:

Failure-threatened individuals attempt and answer correctly more word-number pairs at the Word-Number Pairs Test when a low probability level of succeeding at that test is experimentally induced than when an intermediate probability level is induced.

Hypothesis 4:

Failure-threatened individuals attempt and answer correctly more word-number pairs at the Word-Number Pairs Test when a high probability level of succeeding at that test is experimentally induced than when an intermediate probability level is induced.

Since this study was designed to investigate simultaneously the effects of two independent variables on two dependent variables, a two-factor multivariate analysis of variance was proposed to examine the experimental hypotheses. A multivariate approach was justified, since it was found that the two dependent variables are sufficiently correlated. The obtained correlation was 0.54 (N = 265).

Post-hoc procedures were employed to locate significant differences within levels of the motivational variable.

Details of these analyses, together with the results, are reported in the next chapter.

CHAPTER III

PRESENTATION AND DISCUSSION OF THE RESULTS

In this chapter, the results of testing the interaction hypotheses are presented and discussed under the following headings: (1) classification of two extreme motivational groups, (2) results of multivariate analysis of variance, (3) results of post-hoc analysis, and (4) discussion of the results.

1. Classification of Two Extreme Motivational Groups

In the statistical analysis of the data, not all scores of the 542 subjects were used. To form the motivational groups, only those subjects were chosen who (a) scored above the median on the n Achievement Test (n Achievement) and below the median on the Test Anxiety Scale for Children (TASC), and who (b) scored below the median on the n Achievement Test and above the median on the TASC. Those who scored either above the median or below the median on both measures were excluded.

Two separate score distributions were formed: one for the n Achievement Test, and the other for the Test Anxiety Scale for Children. The median for the distribution of the n Achievement Test was 2.50, while the median for the distribution of the Test Anxiety Scale for Children was

15.50.

On the basis of the median split suggested by previous research, 137 subjects who scored above the median on the n Achievement and below the median on the TASC constituted the achievement-oriented group; 128 subjects who scored below the median on the n Achievement and above the median on the TASC constituted the failure-threatened group. The assignment of each of the motivational groups to three sub-groups, according to probability of success level, creates the two-factor statistical design which determines the type of data analysis.

The subjects' raw scores on the n Achievement Test, the Test Anxiety Scale for Children, and the Word-Number Pairs Test are given, according to motivational group and induced probability of success level, in Appendix 6.

The means and standard deviations of the two dependent variables, (a) the number of word-number pairs attempted and (b) the number of word-number pairs answered correctly, which were obtained from the Word-Number Pairs Test, are presented in Table 3. The means of the two dependent variables are also displayed in Figures 1 and 2 for achievement-oriented subjects and for failure-threatened subjects, respectively. The purpose of presenting these two figures is to promote discussion later.

Table III
Means, Standard Deviations, and Sample Sizes of Dependent Variable Scores
According to Independent Variable Classification

Classification of Independent Variables	N	Dependent Variables Word-Number Pairs			
		Attempted		Answered Correctly	
		M	SD	M	SD
<u>Achievement-oriented Subjects</u>					
Low Probability Level	45	8.20	4.02	4.51	3.04
Intermediate Prob. Level	51	12.12	4.69	6.88	4.37
High Probability Level	41	9.34	4.82	4.56	3.15
<u>Failure-threatened Subjects</u>					
Low Probability Level	46	11.48	4.97	6.78	4.59
Intermediate Prob. Level	42	8.00	4.32	4.05	3.65
High Probability Level	40	9.45	4.89	4.15	3.79

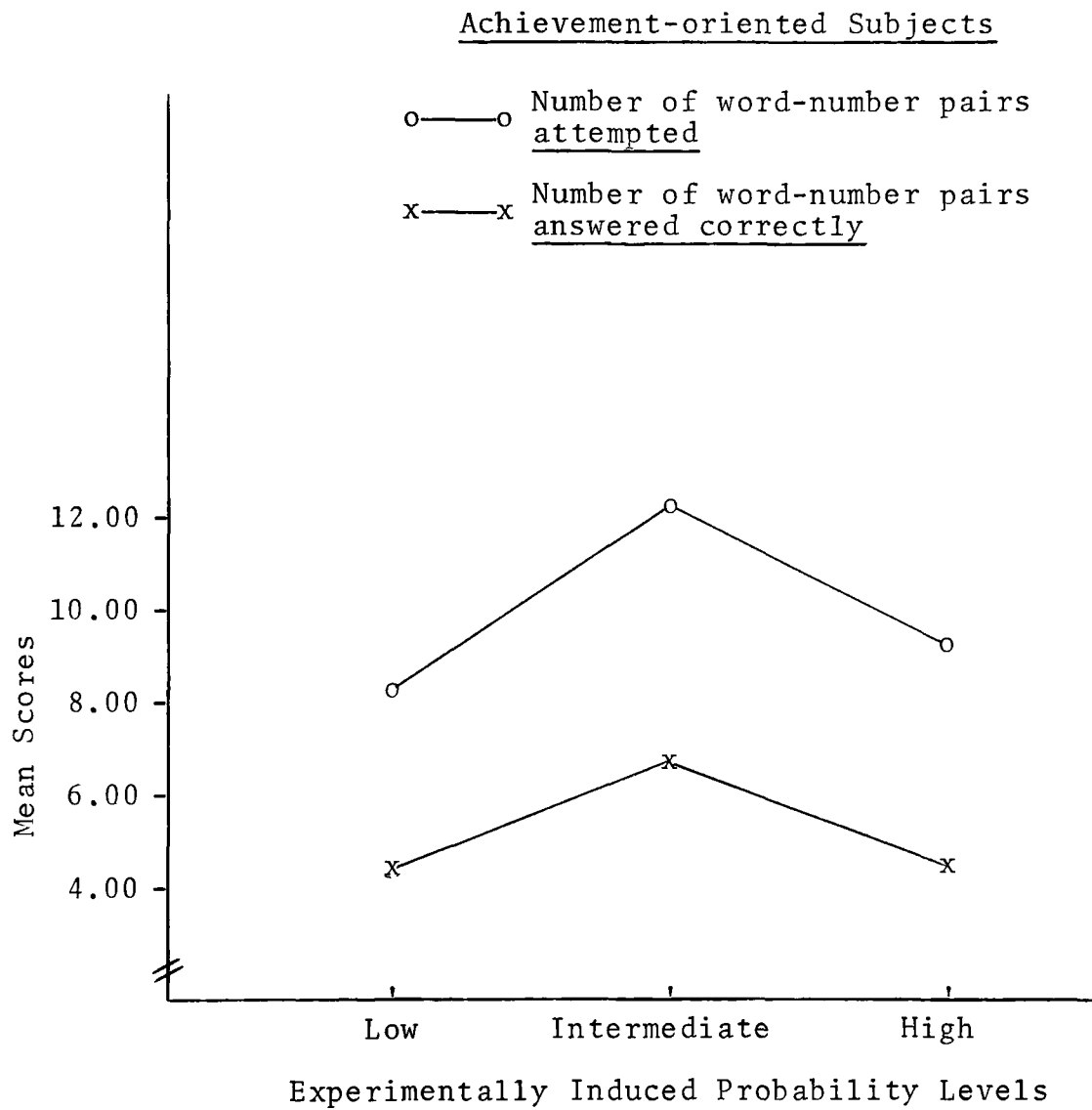


Figure 1. Graphic representation of the means of two dependent variables for achievement-oriented subjects at the experimentally induced probability levels.

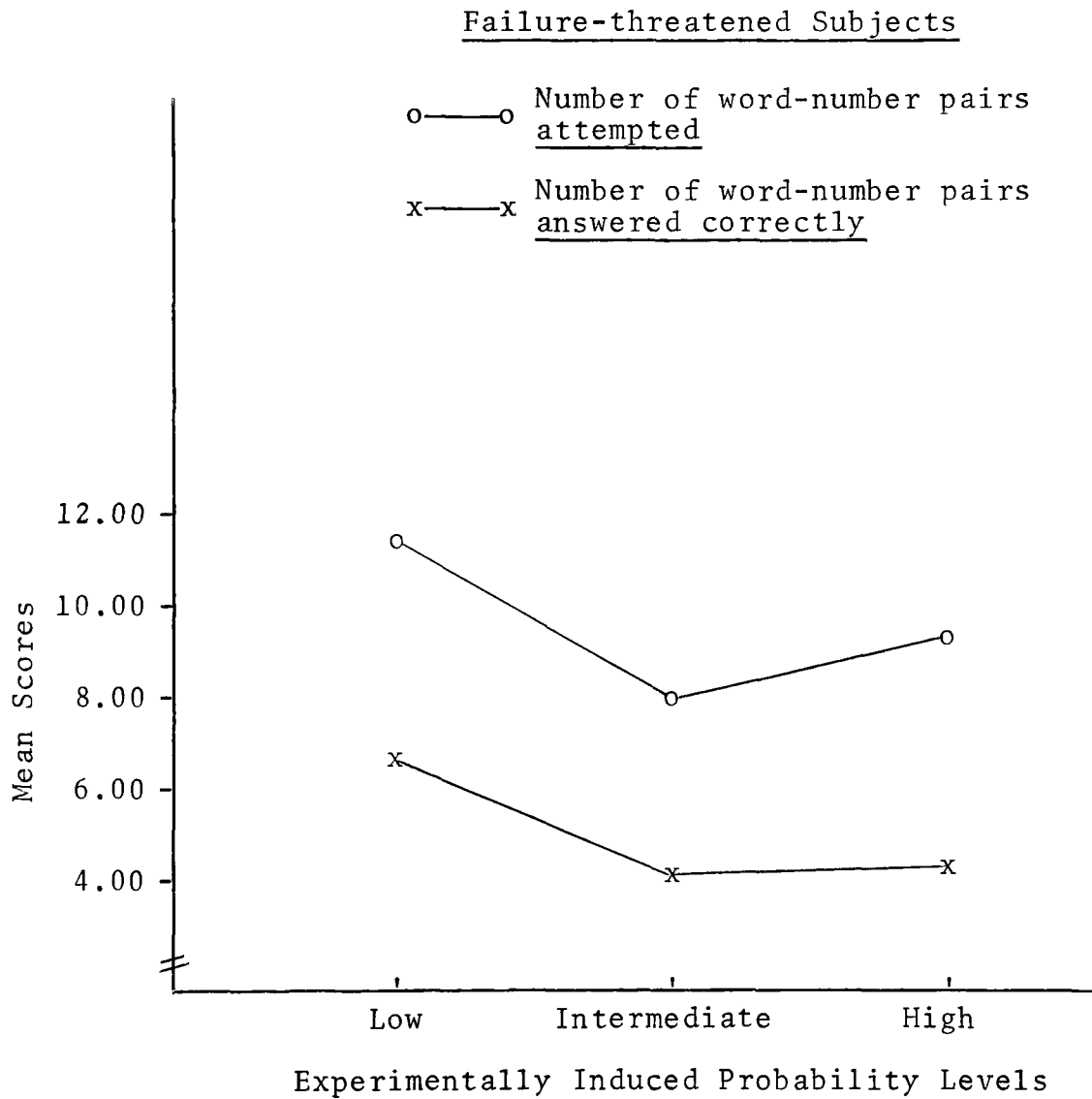


Figure 2. Graphic representation of the means of two dependent variables for failure-threatened subjects at the experimentally induced probability levels.

2. Results of Multivariate Analysis of Variance

A two-factor multivariate analysis of variance of dependent variable scores was done by means of the NYBMUL program.¹ The first factor was the motivation factor; the other was the probability of success factor. Thus, data in a 2 by 3 design were analyzed to test for interaction. The results of the multivariate analysis are summarized in Table IV.

There were no significant mean differences between the resultant motivational groups ($F = 0.25$, n.s.), or among the experimentally induced probability levels ($F = 1.70$, n.s.). However, as predicted by the theory, the interaction between the resultant motivational groups and the experimentally induced probability levels was statistically significant ($F = 8.01$, $ndf = 4$ and 516 , $p < 0.05$). It was necessary, therefore, to examine the effects of this significant interaction.

Figure 3 illustrates the interaction effect between motivational groups and probability levels on the mean scores of the number of word-number pairs attempted, while Figure 4 illustrates the interaction effect on the mean

¹ J. D. Finn, "Multivariate-Univariate and Multivariate Analysis of Variance and Covariance: A FORTRAN IV Program", (Version 4), State University of New York at Buffalo, 1967.

Table IV
Multivariate Analysis of Variance Results for the
Motivation--Probability Level Design with
Two Dependent Variables

Source of Variance	ndf	F
Resultant Motivational Groups	2 and 258	0.25
Probability Levels	4 and 516	1.70
Interaction	4 and 516	8.01*

* Significant at the 0.05 level.

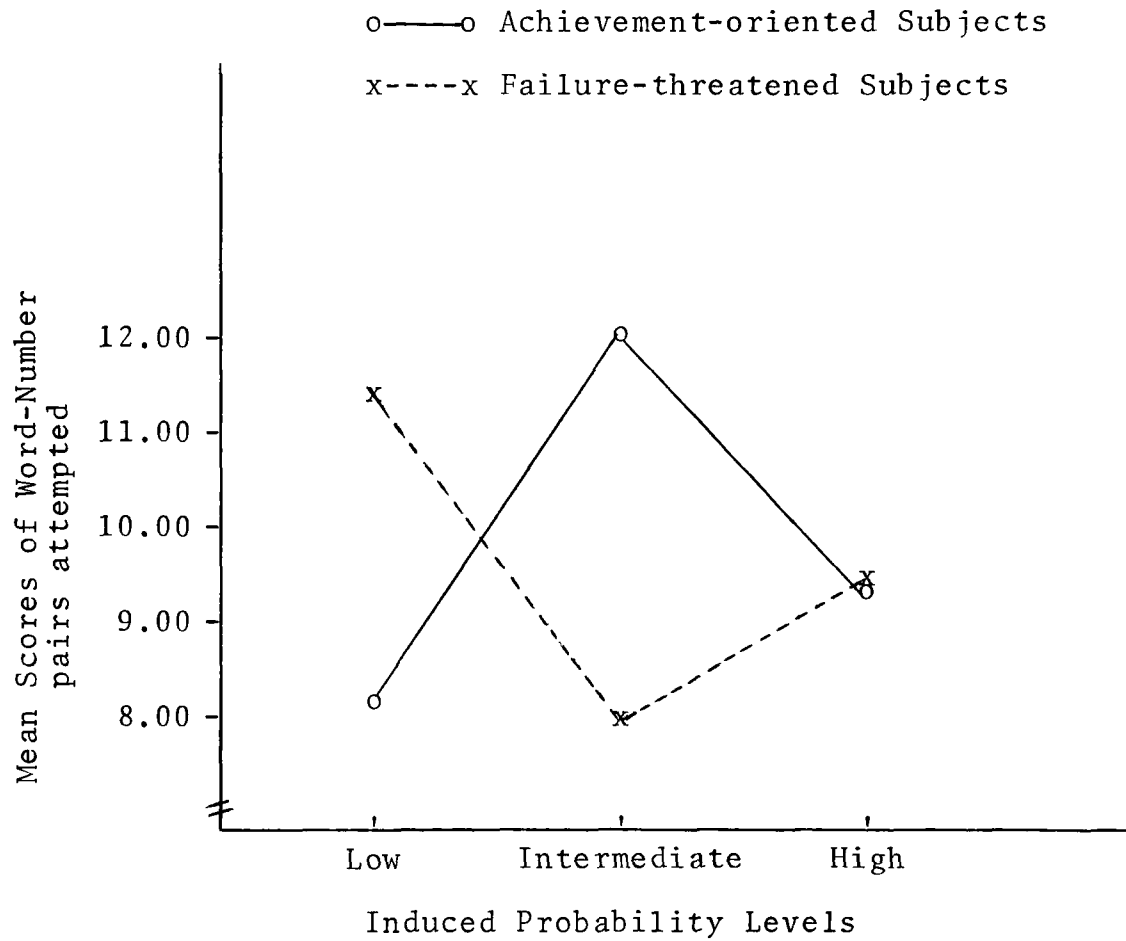


Figure 3. Graphic representation of the motivation--probability interaction effect on the mean scores of the number of word-number pairs attempted.

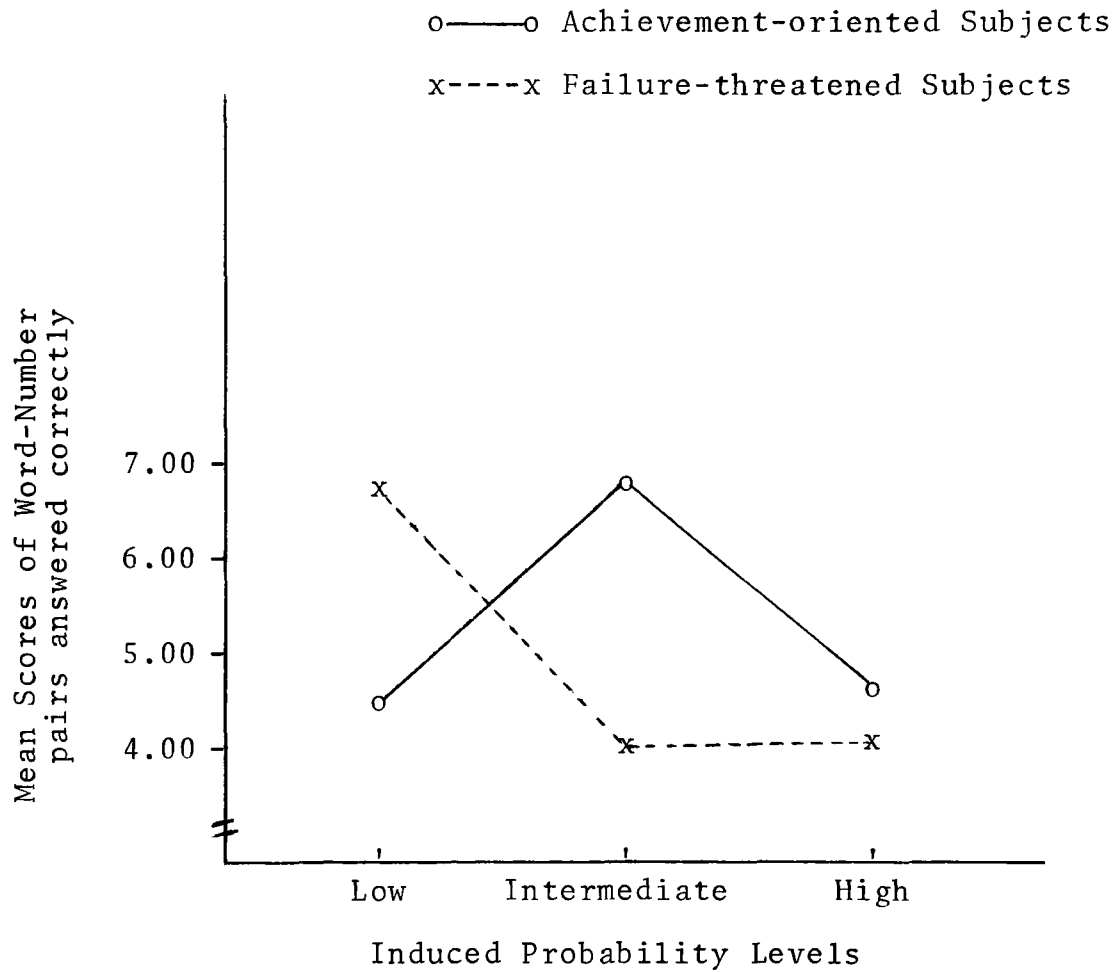


Figure 4. Graphic representation of the motivation--probability interaction effect on the mean scores of the number of word-number pairs answered correctly.

scores of the number of word-number pairs answered correctly.

3. Results of Post-hoc Analysis

According to the theory of achievement motivation, achievement-oriented individuals are more highly motivated toward a task which is perceived as being of intermediate difficulty, whereas failure-threatened individuals are less inhibited at a task which is perceived as being either very difficult or very easy. In order to determine the effect of experimentally induced probability level on achievement-oriented individuals and on failure-threatened individuals, mean contrasts within motivational groups were formed. Within each motivational group, low and high probability level means are each compared with intermediate level means. The formula² used for the contrasts is as follows:

$$\hat{\psi} \pm \hat{\sigma}_{\hat{\psi}} \sqrt{\frac{(N_1 + N_2 - 2)p}{N_1 + N_2 - p - 1} \cdot F_{(p, N_1 + N_2 - p - 1)}(1 - \alpha)}$$

where: $\hat{\psi}$ is an estimate of $(\mu_1 - \mu_2)$, and
 μ_1 and μ_2 are estimated by the group means;

$$\hat{\sigma}_{\hat{\psi}} \text{ is estimated by } \sqrt{\frac{N_1 + N_2}{N_1 N_2} s^2}$$

² N. H. Timm, "Lectures Notes on Multivariate Analysis in Educational and Psychological Research", Berkeley, University of California, 1973, p. II 54-56.

N_1 and N_2 are the sample sizes for groups 1 and 2;

p is the number of dependent variables;

s^2 is the sample variance.

The results of the mean difference contrasts are presented in Table V.

With respect to the achievement-oriented subjects, the two dependent variable means of those in the low induced probability level were significantly less than the means of those in the intermediate induced probability level. When the subjects in the intermediate induced probability level were compared with the subjects in the high induced probability level, it was also found that the two dependent variable means of the former were significantly higher than those of the latter. Therefore, the predictions of the experimental hypotheses one and two are confirmed by the evidence of the results.

With respect to the failure-threatened subjects, when the two dependent variable means of those in the low induced probability level were compared with the means of those in the intermediate induced probability level, it was found that the former were significantly greater than the latter. When the subjects in the intermediate induced probability level were compared with the subjects in the high induced probability level, it was found that the high

Table V

Estimates of Contrasts of Means Among the Probability Levels Within Each of the Resultant Motivational Groups on Two Dependent Variables

Contrast	$\hat{\psi}$	$\hat{\sigma}_{\psi} \sqrt{\frac{(N_1+N_2-2)p}{N_1+N_2-p-1} \frac{(1-\alpha)}{(p, N_1+N_2-p-1)}}$	Confidence Interval	
			Lower Limit	Upper Limit
<u>Achievement-oriented Subjects</u>				
Low vs. Intermediate Prob. Level				
1. Attempted	-3.92	2.356	-6.276	-1.564
2. Answered Correctly	-2.37	1.953	-4.323	-0.417
Intermediate vs. High Prob. Level				
1. Attempted	2.78	2.416	0.364	5.196
2. Answered Correctly	2.32	2.002	0.318	4.322
<u>Failure-threatened Subjects</u>				
Low vs. Intermediate Prob. Level				
1. Attempted	3.48	2.461	1.019	5.941
2. Answered Correctly	2.73	2.039	0.691	4.769
Intermediate vs. High Prob. Level				
1. Attempted	-1.45	2.549	-3.999	1.099
2. Answered Correctly	-0.10	2.113	-2.213	2.013

- Note: 1. For the first dependent variable, the number of word-number pairs attempted, $s^2 = 21.425$
 For the second dependent variable, the number of word-number pairs answered correctly, $s^2 = 14.716$
 2. For all contrasts, $\alpha = 0.05$.
 3. The means and the sample sizes used are from Table III.

probability level means on both dependent variables were slightly greater than those in the intermediate probability level. But the differences were not statistically significant. Therefore, while the third experimental hypothesis is confirmed by the results, the fourth hypothesis is only confirmed to the extent that the difference is in the hypothesized direction.

4. Discussion of the Results

The four experimental hypotheses to be investigated in the present study stemmed directly from Atkinson and Feather's theory of achievement motivation. The theoretical rationale led to the following predictions: (a) persons in whom the motive to approach success (M_s) is relatively stronger than the motive to avoid failure (M_{af}) should prefer and hence perform better at the intermediate tasks ($P_s = 0.50$) than at either very difficult (low P_s) or very easy tasks (high P_s), and (b) persons with the opposite motive pattern ($M_{af} > M_s$) should, if constrained, prefer and perform maximally at either very difficult or very easy tasks, avoiding and performing more poorly at the intermediate tasks.

More specifically, it was predicted that achievement-oriented individuals, in whom $M_s > M_{af}$, would attempt and answer correctly more word-number pairs from the Word-Number

Pairs Test when the task was perceived as being of intermediate difficulty than when it was perceived as being either very difficult or very easy. Failure-threatened individuals, in whom $M_{af} > M_s$, would attempt and answer correctly more word-number pairs from the Word-Number Pairs Test when the task was perceived as being either very difficult or very easy than when it was perceived as being of intermediate difficulty.

In other words, the present study was to investigate an interaction effect between perceived difficulty level, or probability of success, and extreme motivational groups on persistence (as measured by the number of word-number pairs attempted) and on performance level (as measured by the number of word-number pairs answered correctly).

The results of two-factor multivariate analysis of variance provide clear evidence for the interaction between achievement motivational groups and induced probability levels of success in determining persistence and performance. Specifically, with respect to achievement oriented individuals, the results of post-hoc analysis revealed that those in the intermediate probability level achieved significantly better on both criterion variables than those in the low probability level or those in the high probability level. These results of the present study are precisely as predicted by the theory of achievement motivation and thus

provide further evidence to support the theory.

With respect to failure-threatened individuals, according to the theory, a failure-dominated person should be much less inhibited at a task which he perceives to be either the most difficult one (low P_s) or the least difficult one (high P_s), than one he perceives to be of intermediate difficulty ($P_s = 0.50$). The reason is that he prefers the most difficult task in which the failing is not as painful because many other people will also fail; on the other hand, he also prefers the least difficult task where the chance of failure is remote.

The results of post-hoc analysis showed that failure-threatened individuals in the low probability level (very difficult one) achieved significantly better on both criterion variables than those in the intermediate probability level. On the other hand, those in the high probability level (very easy one) achieved slightly, but not significantly, better on both criterion variables than those in the intermediate probability level. Closer examination of Table V, however, reveals that mean differences between the intermediate probability level and the high probability level within the failure-threatened group are consistent with the direction of the experimental hypothesis, on both criterion variables.

The lack of statistical significance between failure-threatened individuals in the high probability level and those in the intermediate probability level raises the following questions:

(a) How does a failure-dominated person behave when offered only an easy task (high P_s) to perform?

(b) How hard will he work at it when he is constrained to remain in the competitive achievement situation as he was in the present study?

Some suggestive statements are provided by Atkinson and Feather, where they wrote:

In the case of achievement-oriented activity, anxiety about failure is associated with the tendency to inhibit a particular activity. What the individual in whom $M_{af} > M_s$ does in an achievement-oriented context may be construed as avoidant behavior or defensive behavior. [...] The individual is viewed as acting merely to comply with an authority or to gain approval for doing what is expected. In a very real sense, he is not achievement-oriented at all, but is merely going through the motions of what for others is achievement-oriented activity.³

The above demonstration leads to a possible explanation for the non-significant results. The task difficulty level was experimentally induced and presented to the subject as relatively easy (high P_s). Thus it was less threatening, and consequently aroused few debilitating

³ J. W. Atkinson and N. T. Feather (Eds.), A Theory of Achievement Motivation, New York, Wiley, 1966, p. 335-336.

responses. He was constrained, as he must be, to remain in the classroom where the experiment was carried out. He remained in the situation in order to please the experimenter, but presumably, thought of not working hard or thought of not working at all should produce even stronger avoidant motivation than that aroused by the task itself.

Another possible explanation is that he perceived the task as relatively easy to begin with, having a P_s of above 0.75. He then began to try to match a few word-number pairs and presumably proceeded to fail. The immediate result should be an increase in the avoidant motivation as the P_s drops toward 0.50. Consequently, there is a reduction in the total strength of the motivation to perform the task and he would give up the task after his initial failure even if it seemed easy to begin with.

Arguing in a similar vein for failure-threatened individuals in the low probability level, he began the task, perceived it as very difficult, having a P_s of below 0.25, and then worked at it. He was uncertain whether or not his matching of numbers with words was correct, because of the nature of the task used in the present study. The effect of uncertainty is, paradoxically, to reduce the strength of his avoidant motivation. The final strength of the motivation to undertake the task became stronger and stronger as the inhibition was reduced, and consequently the

performance was increased. The above argument has been confirmed in the results of Feather's studies.^{4,5}

An important finding in the present study is that the performance of failure-threatened individuals showed relatively higher mean scores on both dependent variables at each of the low and high probability levels than at the intermediate probability level. In the previous studies, persons classified as having $M_{af} > M_s$ did not exhibit lower motivation level at tasks of intermediate difficulty than at either very easy or at very difficult tasks, failing to demonstrate the predicted avoidance pattern for persons with $M_{af} > M_s$. For example, Atkinson and Litwin⁶ had male college students play a ring toss game. When persons in whom $M_{af} > M_s$ were compared with persons in whom $M_s > M_{af}$, they found that those in whom $M_{af} > M_s$ exhibited a much smaller percentage of shots from the intermediate region. However, considering the failure-threatened subjects only, they found that persons in whom $M_{af} > M_s$ did not show a

4 N. T. Feather, "The Relationship of Persistence at a Task to Expectation of Success and Achievement Related Motives", Journal of Abnormal and Social Psychology, 1961, 63, 552-561.

5 N. T. Feather, "The Study of Persistence", in J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 49-71.

6. J. W. Atkinson and G. H. Litwin, "Achievement Motive and Test Anxiety Conceived as Motive to Approach Success and Motive to Avoid Failure", in J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 75-91.

smaller percentage of shots from the intermediate region than from either the easy region or from the difficult region. They argued that the absence of avoidance of intermediate tasks by those classified as $M_{af} > M_s$ was due to the college students participating in the experiment; few of them were absolutely high in test anxiety relative to their need for achievement.⁷ If this were the case, then the resultant motivation among all the subjects would be positive but differ in magnitude, and the behavior observed in their study would be expected.

Turning attention to the relationship between n Achievement and Test Anxiety scores, one factor that may have contributed to the findings of the present study was the negative correlation between n Achievement and Test Anxiety scores. Using scores from only two groups, high n Achievement-low Test Anxiety (achievement-oriented group) and low n Achievement-high Test Anxiety (failure-threatened group), a Pearson correlation of -0.69 between the two measures was obtained (N = 265), an uncommon finding since most correlations between these measures have ranged from low negative to low positive (see Chapter I, Section 4). If one uses scores from all subjects (N = 498), including both high and low on both measures, a Pearson correlation

⁷ J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 22 and 342.

of -0.09 between the two measures was obtained which is consistent with Atkinson and Litwin's study ($r = -0.15$, $N = 47$),⁸ with Litwin's study ($r = -0.005$, $N = 78$),⁹ and with Atkinson and O'Connor's study ($r = -0.12$, $N = 35$).¹⁰ In the present study, it can be seen that persons having high n Achievement scores were as likely as not also to have high Test Anxiety scores.

There may be some question as to the appropriateness of the use of the Word-Number Pairs Test for the criterion measures which provide a measure of persistence (as measured by the number of word-number attempted) and a measure of performance level (as measured by the number of word-number pairs answered correctly). Persistence studies, within the context of the theory of achievement motivation, as Feather¹¹ pointed out, typically have utilized some difficult, in fact insoluble, task from which subjects could turn, after

8 J. W. Atkinson and G. H. Litwin, op. cit., 1966, p. 75-91.

9 G. H. Litwin, "Achievement Motivation, Expectancy of Success, and Risk-Taking Behavior", in J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 103-115.

10 J. W. Atkinson and P. O'Connor, "Neglected Factors in Studies of Achievement-Oriented Performance: Social Approval as an Incentive and Performance Decrement", in J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 299-325.

11 N. T. Feather, "The Study of Persistence", in J. W. Atkinson and N. T. Feather (Eds.), op. cit., 1966, p. 49-71.

repeated failure, to an alternative activity. The disadvantage of his procedure is that in assuring that the subject can not solve the task, it limits the study of persistence, within the context of achievement motivation, to the insoluble tasks; whereas the question of more general interest to the study of achievement motivation presumably is: how hard and how well do different persons work at tasks of differing levels of difficulty before giving up or turning to some other activity? Feather¹² circumvented this problem to some extent by creating an initial expectation for some trials that the task, in fact insoluble, would be easy and for others that the task would be hard. No subject had the experience of completing the task, however, and it presumably seemed progressively harder as they continued to work at it without success.

In contrast to an insoluble task, a number of word-number pairs can be completed by some of the subjects. The objection might be raised that it is not possible to study persistence and performance level, within the context of the theory of achievement motivation, on a task which some of the subjects are expected to complete. One answer to this objection is that, in the present study, there is substantial variation in the number of word-number pairs

12 N. T. Feather, op. cit., 1961, p. 552-561.

attempted and in the number of word-number pairs answered correctly, and that this variability reflects individual differences in persistence and performance level (see Table III). The results of the present study suggest that it is possible to use a soluble learning task to measure persistence and performance level reflecting individual differences in the strength of achievement motivation.

One question still remains concerning whether or not attempts to arouse achievement motivation were successful. No attempt was made to obtain an independent measure of achievement arousal. However, one argument is that a similar arousal procedure has been used by McClelland and his associates,¹³ Atkinson,¹⁴ and Feather.^{15,16} The second is that, according to the theory, motivation intensity is a function of two factors: personality disposition and a situational variable. In the present study, achievement

13 D. C. McClelland, et al., The Achievement Motive, New York, Appleton-Century-Crofts, 1953.

14 J. W. Atkinson, "Toward Experimental Analysis of Human Motivation in Terms of Motives, Expectancies, and Incentives", in J. W. Atkinson (Ed.), Motives in Fantasy, Action, and Society, Princeton, Van Nostrand, 1958, p. 288-305.

15 N. T. Feather, op. cit., 1961, p. 552-561.

16 N. T. Feather, "Valence of Outcome and Expectation of Success in Relation to Task Difficulty and Perceived Locus of Control", Journal of Personality and Social Psychology, 1967, 7, 372-386.

motivation was aroused by the experimental manipulation of probability levels of succeeding at the task. The results showed a significant interaction effect between levels of resultant achievement motivation and probability levels of success on two criterion variables, as predicted by the theory. Hence, one may conclude that the experimental manipulation of the situational variable, as in the present study, makes a strong case for the successful arousal of achievement motivation.

SUMMARY AND CONCLUSIONS

The problem to be investigated was the interaction of resultant achievement motivation and experimentally induced probability of succeeding at a task.

Atkinson and Feather's theory of achievement motivation was applied to an educational situation to ascertain: (1) how performance at a task was affected by experimentally induced probability of succeeding at that task among achievement-oriented individuals in whom the motive to approach success (M_s) is stronger than the motive to avoid failure (M_{af}), (2) how performance at a task was affected by experimentally induced probability of succeeding at that task among failure-threatened individuals in whom M_{af} is stronger than M_s .

The sample consisted of 542 pupils, from 19 grade-six classes. Three measuring instruments were used: McClelland's n Achievement Test to measure the strength of M_s ; Sarason's Test Anxiety Scale for Children to measure the strength of M_{af} ; and an adaptation of Thurstone's Word-Number Pairs Test to measure the criterion variables.

On the basis of the median split of two separate score distributions (one for the n Achievement Test, and the other for the Test Anxiety Scale for Children), subjects were divided into two extreme groups, achievement-oriented

persons ($M_s > M_{af}$) and failure-threatened persons ($M_{af} > M_s$).

Concerning the performance of achievement-oriented individuals under experimentally induced probability levels, it was hypothesized that achievement-oriented individuals attempt and answer correctly more word-number pairs at the Word-Number Pairs Test when an intermediate probability level of succeeding at that test is experimentally induced than when either a low or a high probability level is induced.

This prediction was confirmed by the findings: the two dependent variable means of achievement-oriented individuals in the low induced probability level were significantly less than the means of those in the intermediate induced probability level; when the individuals in the intermediate induced probability level were compared with those in the high induced probability level, the two dependent variable means of the former were significantly higher than those of the latter.

Concerning the performance of failure-threatened individuals under experimentally induced probability levels, it was hypothesized that failure-threatened individuals attempt and answer correctly more word-number pairs at the Word-Number Pairs Test when either a low or a high probability level of succeeding at that test is experimentally induced than when an intermediate probability level is induced.

This prediction was partially confirmed by the findings: the two dependent variable means of failure-threatened individuals in the low induced probability level were significantly higher than the means of those in the intermediate induced probability level; however, when those in the intermediate induced probability level were compared with those in the high induced level, the two dependent variable means in the high induced level were slightly, but not significantly, higher than those in the intermediate induced level.

The degree of motivation of achievement-oriented persons showed the unique effects predicted by the theory of achievement motivation and was found to interact with the perceived level of difficulty at a task. The motivation to approach success was strongest when an intermediate probability level of success was experimentally induced.

The degree of motivation of failure-threatened persons showed only one, of two, unique effects and offers only partial support for the theory of achievement motivation. It was found that the motivation of failure-threatened persons interacts with the perceived level of difficulty at a task in one case only; the motivation to avoid failure was weakest when a low probability level of success was experimentally induced, but not when a high probability level of success was induced.

A possible explanation for the non-conformity with theory of failure-threatened persons at a task of high probability level of success could lie in the conceptualization-determinants of the strength of the avoidant motivation or could be due to other intervening variables.

A major possible contribution of this research is that it could provide information which would allow for further interpretation of achievement motivation theory and its application to education.

Another possible contribution of this research is that it could provide information which would assist classroom teachers in understanding students' behavior and which could, therefore, be useful in daily teacher-student interaction. The underlying assumption is that teachers have a two-fold function to perform in relation to students' achievement. First, they must know and understand the motives which activate and direct student behavior so that they can draw valid inferences from what they observe. Secondly, teachers must strive to increase the impact of the learning experience so as to stimulate and sustain student motivation. In terms of the achievement motivation model, the present findings provide considerable evidence that, at the grade-six level, a learning task, introduced by the teacher to the achievement-oriented students, should be presented as being of intermediate difficulty. The same

task, when introduced to the failure-threatened students, should be presented as being either most difficult or very easy. In this way, the teacher would create an atmosphere which stimulated students and helped to carry them through the learning episode.

Another possible contribution is that the results of the theoretical analysis of achievement motivation undertaken in the present study could be further applied to programmed instruction. The degree of task difficulty of programmed instruction has motivational consequences. Most such programs appear to have been written based on certain over-simplified assumptions concerning motivation. A typical assumption is that a high success ratio will elicit maximum motivation in all students. In light of the achievement motivation model and of the findings of the present study, this is obviously a misleading assumption. Maximum motivation will occur at quite different success levels for different kinds of students. For example, when a success level of a programmed learning task is at least 75 per cent, P_s approaches unity ($P_s \rightarrow 1$), and theoretically, motivation is minimized among achievement-oriented students. These students might become "bored" given this type of program. To maximize motivation, the achievement-oriented students should be given a program in which they can initially answer only half the questions correctly. Conversely,

failure-threatened students will be motivated to a greater extent under low, or possibly high, success levels but motivated to a lesser extent at the intermediate success level. Therefore, learning programs with high success ratios least enhance motivation for achievement-oriented students and least inhibit motivation for failure-threatened students. The general intention of this interpretation is to indicate that individual differences interact with environmental situations. More specifically, strength of achievement-related motives interacts with the degree of difficulty of the program.

A number of ideas for further research have emerged in the process of conducting this study. Since the publication in 1953 by McClelland et al. of The Achievement Motive, there has been a number of studies to investigate the contemporaneous determinants of achievement-oriented behavior for male adults. Relatively few studies, however, have examined the sex differences that were identified almost at the outset of the research on achievement motivation. In this respect, further research might well address itself to the following questions:

(a) Does level of resultant achievement motivation interact with expectancy of success at a given task for female adults?

(b) Does level of resultant achievement motivation predict level of performance differently for females than it does for males?

(c) In addition to the achievement-related motives (the motive to approach success and the motive to avoid failure) and the environmental cues (expectancy of success of a task), what are the other determinants of the strength of achievement motivation for females who engage in a particular achievement-oriented activity?

Another possible research area constitutes a logical follow-up to the present study. It would be fruitful to examine the possibility of differences between experimentally induced expectancy of succeeding at a task and the individual's subjective expectancy of succeeding at that task within such treatment groups as used in the study. According to the empirical evidence provided by Feather and Weiner, it has been suggested that artificially induced probability of success corresponds closely to a person's subjective probability of success at a specific task within an experimental condition. However, a person's estimate of his chances of succeeding at a task might depart from the experimentally induced probability of success. It would be of interest to study the possible differences between experimental manipulation of expectancy of success and a person's subjective expectancy of success within each treatment group. A possible

method of achieving this goal might be to ask subjects to rate their own chances of succeeding at a particular task prior to performing it. If Feather and Weiner are correct, one would expect to find a positive relationship between experimentally induced probability of success and self-estimate of chances of success within each of the treatment groups.

From an educational point of view, the findings of the recommended studies could be used to improve understanding, prediction, and control of classroom behavior with respect to different types of motivation and to sex differences. For example, the research results might well indicate ways for optimizing types and strength of motivation in order to promote achievement. Also a better understanding of motivated behavior would better enable teachers to equip their students to deal with problems not only in the school context but also in their larger social and work environment.

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Atkinson, J. W., (Ed.), Motives in Fantasy, Action, and Society: A Method of Assessment and Study, Princeton, Van Nostrand, 1958, xv-873 p.

A research handbook examining the projective method for assessment of human motives through the analysis of the content of thematic apperception stories. A collection of 46 articles is organized into six parts: (1) the effect of arousal of motivation on the content of imaginative thought, (2) nature or assessment of this influence, (3) individual differences in motivation and behavior, (4) social origins of human motives, (5) motivation and society, and (6) means of improving the thematic apperception measuring instrument. Also included are manuals describing the method of analysis, pretested practice materials for achievement, affiliation and power motives and a survey representing various empirical investigations validating this particular method.

Atkinson, J. W., An Introduction to Motivation, Princeton, N. J., Van Nostrand, 1964, xiii-335 p.

This book presents both a historical and an integrative explanation of motivation. It is an attempt to integrate the two main theoretical views: the Hull-Spence "drive \times habit" formula and the Tolman-Lewin "expectancy \times value" notation in the endeavor to make the use of the study of motivation.

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A research summary report concerned with the basic conceptual framework of the theory of achievement motivation. It deals with (1) the individual's selection of one path of action among a set of possible alternatives and (2) the amplitude or vigor of the action tendency once it is initiated and its tendency to persist for a time in a given direction. It represents an attempt to state explicitly how situational cues affect individual differences in the strength of the achievement-related motives in competitive achievement situations.

Atkinson, J. W. and Feather, N. T., (Eds.), A Theory of Achievement Motivation, New York, Wiley, 1966, x-392 p.

A summary of researches and the theory of achievement motivation are organized into four parts: (1) basic concepts, (2) aspiration and persistence, (3) applications and social implications, and (4) critical problems involved in the development of the theory.

Atkinson, J. W. and Litwin, G. H., "Achievement Motive and Test Anxiety Conceived as Motive to Approach Success and Motive to Avoid Failure", in J. W. Atkinson and N. T. Feather (Eds.), A Theory of Achievement Motivation, New York, Wiley, 1966, p. 75-91.

This study was to test two assumptions: (a) measures of n Achievement obtained from thematic apperception or a similar instrument indicate the strength of a motive to achieve success, and (b) measures of test anxiety obtained from Test Anxiety Questionnaire indicate the strength of a motive to avoid failure. It was essentially an investigation of the construct validity of three contemporary measures of achievement related motives.

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Feather, N. T., "The Relationship of Persistence at a Task to Expectation of Success and Achievement-Related Motives", in J. W. Atkinson and N. T. Feather (Eds.), A Theory of Achievement Motivation, New York, Wiley, 1966, p. 117-133.

An experimental study concerned with how perceived task difficulty interacts with the individual's relative strength of motive to achieve success and of motive to avoid failure at an insoluble puzzle which was presented to the subject as either easy or very difficult.

Feld, S. and Smith, C. P., "An Evaluation of the Objectivity of the Method of Content Analysis", in J. W. Atkinson (Ed.), Motives in Fantasy, Action and Society, Princeton, Van Nostrand, 1958, p. 234-241.

A study aimed at the evaluation of a method in which trained persons score stories written in response to stimulus pictures, scoring being for the need for achievement, the need for affiliation, and the need for power. This was essentially a study of scoring reliability of projective techniques by means of the method of content analysis.

Karabenick, S. A. and Youssef, Z. I., "Performance as a Function of Achievement Motive Level and Perceived Difficulty", Journal of Personality and Social Psychology, 1968, 10, p. 414-419.

This study was designed to investigate the relationship between the achievement motive level and perceived task difficulty at a paired-associate learning task. Fifteen word pairs were divided into three groups on the basis of equal mean and variance. The groups were color-coded using red, yellow, and green transparent tapes which represented difficulty levels.

McClelland, D. C., Atkinson, J. W., Clark, R. A., and Lowell, E. L., The Achievement Motive, New York, Appleton-Century-Crofts, 1953, xxii-384 p.

Presentation of a method for assessing achievement motive through the use of a modified Murray's TAT procedure and a report of its use in collecting data aimed at the development of a theory of motivation.

Maehr, M. L. and Sjogren, D. D., "Atkinson's Theory of Achievement Motivation: First Step Toward a Theory of Academic Motivation?", Review of Educational Research, 1971, 41, p. 143-161.

A survey of literature undertaken with the purpose of examining whether Atkinson's theory of achievement motivation could be useful for classroom teachers and whether it had value in the development of a theory of academic motivation.

Murstein, B. I., Theory and Research in Projective Techniques (Emphasizing the TAT), New York, Wiley, 1963, xiii-385 p.

A comprehensive survey of the theoretical, empirical, and clinical approaches to projective techniques mainly emphasizing the appraisal of the thematic apperception method. Different scoring systems, stimulus modifications and situational influences are reported and validation studies are also included. Finally, the relevance of the TAT in the light of future trends in projective techniques and clinical psychology is discussed.

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Sarason, S. B., Davidson, K. S., Lighthall, F. F., Waite, R. R., and Ruebush, B. K., Anxiety in Elementary School Children, New York, Wiley, 1960, vii-351 p.

The findings of a long-term research project on the measurement of "test-anxiety" and "general anxiety" with elementary school children were reported in detail. The characteristics of high and low anxious children are considered along with their particular implications for educational testing.

Veroff, J., Wilcox, S., and Atkinson, J. W., "The Achievement Motive in High School and College Age Women", Journal of Abnormal and Social Psychology, 1953, 48, p. 108-119.

Two experiments were conducted, with high school males and females in the first experiment, and with college females in the second, to test the validity of McClelland's projective method of measuring Achievement, which had already successfully been used with college males.

Waite, R. R., Sarason, S. B., Lighthall, F. F., and Davidson, K. S., "A Study of Anxiety and Learning in Children", Journal of Abnormal and Social Psychology, 1958, 57, p. 267-270.

This study attempted to validate the test anxiety and the general anxiety scales by using elementary school children as the subjects. Twenty-four pairs of children were selected by matching low-anxiety with high-anxiety

subjects in terms of grade, sex, and IQ scores. They were then given two modified paired-associate learning tasks, separated by neutral, failure, and success instructions.

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This book is a review and discussion of four theories of motivation: drive theory, field theory, achievement theory, and attribution theory. Each theory is examined from a historical viewpoint, with the presentation of conceptual developments as new empirical facts and theoretical ideas emerge.

APPENDIX 1

IDENTIFICATION OF THE FOUR PICTURES
USED IN THE STUDY

The four pictures used in the study and the respective identifying letters assigned by McClelland are identified below:*

- A. "Father-son". Card 7BM from Murray's TAT.
- B. Two men ("inventors") in a shop working at a machine.
- G. Boy with vague operation scene in background.
Card 8BM from Murray's TAT.
- H. Boy in checked shirt at a desk, an open book in front of him.

* D. C. McClelland, J. W. Atkinson, R. A. Clark, and E. L. Lowell, The Achievement Motive, New York, Appleton-Century-Crofts, 1953, p. 375.

APPENDIX 2

ANSWER BOOKLET FOR THE n ACHIEVEMENT TEST

Name: _____

Sex: _____

1. Write your name at the top of this page, both your first and your last names.
2. Write a "B" if you are a boy or a "G" if you are a girl.

INSTRUCTIONS

What I have for you today is a sort of game. I'm interested in storytelling and I'd like you to tell some stories.

You are going to see four pictures, and your task is to tell a story that is suggested to you by each picture. Try to imagine what is going on in each picture. Then tell what the situation is, what led up to the situation, what the people are thinking and feeling, and what they will do. In other words, write as complete a story as you can -- a story with plot and characters.

You will have 30 seconds to look at a picture and then 4 minutes to write your story about it. Write your first impressions and work rapidly. I will keep time and tell you when it is time to finish your story and to get ready for the next picture.

There are no right or wrong answers, so you may feel free to write whatever story is suggested to you when you look at a picture. Spelling, punctuation and grammar are not important. What is important is to write out as fully and as quickly as possible the story that comes into your mind as you imagine what is going on in each picture.

Picture 2: A boy in checked shirt at a desk,
an open book in front of him.

1. What is happening? Who are the persons?
2. What has led up to this situation? That is, what happened in the past?
3. What is being thought? What is wanted? By whom?
4. What will happen? What will be done?

APPENDIX 3
DIRECTIONS FOR SCORING OF n ACHIEVEMENT

The initial step in the scoring procedure is to decide whether or not the story written meets the criteria necessary to be considered "achievement imagery". A story written is considered to have achievement imagery if it contains some reference to competition with a standard of excellence. Competition with a standard of excellence means that one of the characters in the story is engaged in some competitive activity where winning or doing as well as or better than others is of paramount concern. Typical examples are an individual desiring to win an essay contest, or an apprentice wanting to show the master that he, too, can fix a machine.

On the other hand, achievement imagery may also receive a score point if a story includes a unique accomplishment, for example, an invention or an artistic act; a long-term achievement goal, for example, becoming a doctor, or being a success in life.

If a story written meets these criteria, it receives a score of one for "achievement imagery" and then the scorer proceeds to examine ten achievement-related subcategories. It is possible to add additional points for each of the subcategories. These are:

- stated need for achievement;
- instrumental activity;
- successful anticipatory goal state;

unsuccessful anticipatory goal state;
personal obstacle;
environmental obstacle;
positive affective state;
negative affective state;
nurturant press;
achievement thema.

Each of the ten subcategories receives a score of one point. The maximum achievement score possible for any story is eleven points.

If a story does not contain achievement imagery, none of the subcategories are scored and then the scorer proceeds to examine "doubtful achievement imagery" and "unrelated imagery". Doubtful achievement imagery refers to a story which contains some reference to achievement but fails to meet one of the criteria for achievement imagery and a score of zero is given. Unrelated imagery refers to a story which contains no reference to an achievement goal and a score of minus one is given. Therefore the minimum score possible for any story is a score of minus one.

APPENDIX 4

TEST ANXIETY SCALE FOR CHILDREN

Name: _____

Sex: _____

1. Write your name at the top of this page, both your first and your last names.
2. Write a "B" if you are a boy or a "G" if you are a girl.

INSTRUCTIONS

I'm going to be asking you some questions--questions different from the usual school questions for these are about how you feel and so have no right or wrong answers.

No one but myself will see your answers to these questions, neither your teacher nor your principal nor your parents. These questions are different from other questions that you are asked in school. These questions are different because there are no right or wrong answers. You are to listen to each question and then put a circle around either "yes" or "no". These questions are about how you think and feel and, therefore, they have no right or wrong answers.

People think and feel differently. For example, if I asked you this question: "Do you like to play ball?" Some of you would put a circle around "yes" and some of you would put a circle around "no". Your answer depends on how you think and feel. These questions are about how you think and feel about a lot of things. Remember, listen carefully to each question and answer it "yes" or "no" by deciding how you think and feel.

1. Do you worry when the teacher says that he is going to ask you questions to find out how much you know?
Yes No
2. Do you worry about being promoted, that is, passing from the 6th to the 7th grade at the end of the year?
Yes No
3. When the teacher asks you to get up in front of the class and read aloud, are you afraid that you are going to make some bad mistakes?
Yes No
4. When the teacher says that he is going to call upon some boys and girls in the class to do arithmetic problems, do you hope that he will call upon someone else and not on you?
Yes No
5. Do you sometimes dream at night that you are in school and cannot answer the teacher's questions?
Yes No
6. When the teacher says that he is going to find out how much you have learned, does your heart begin to beat faster?
Yes No
7. When the teacher is teaching you about arithmetic, do you feel that other children in the class understand him better than you do?
Yes No
8. When you are in bed at night, do you sometimes worry about how you are going to do in class the next day?
Yes No
9. When the teacher asks you to write on the blackboard in front of the class, does the hand you write with sometimes shake a little?
Yes No

10. When the teacher is teaching you about reading, do you feel that other children in class understand him better than you do?
- Yes No
11. Do you think you worry more about school than other children?
- Yes No
12. When you are at home and you are thinking about your arithmetic lesson for the next day, do you become afraid that you will get the answers wrong when the teacher calls upon you?
- Yes No
13. If you are sick and miss school, do you worry that you will do more poorly in your schoolwork than other children when you return to school?
- Yes No
14. Do you sometimes dream at night that other boys and girls in your class can do things you cannot do?
- Yes No
15. When you are home and you are thinking about your reading lesson for the next day, do you worry that you will do poorly on the lesson?
- Yes No
16. When the teacher says that he is going to find out how much you have learned, do you get a funny feeling in your stomach?
- Yes No
17. If you did very poorly when the teacher called on you, would you probably feel like crying even though you would try not to cry?
- Yes No

18. Do you sometimes dream at night that the teacher is angry because you do not know your lessons?

Yes No

In the following questions the word "test" is used. What I mean by "test" is any time the teacher asks you to do something to find out how much you know or how much you have learned. It could be by your writing on paper, or by your speaking aloud, or by your writing on the blackboard. Do you understand what I mean by "test"--it is any time the teacher asks you to do something in order to find out how much you know.

19. Are you afraid of school tests?

Yes No

20. Do you worry a lot BEFORE you take a test?

Yes No

21. Do you worry a lot WHILE you are taking a test?

Yes No

22. After you have taken a test do you worry about how well you did on the test?

Yes No

23. Do you sometimes dream at night that you did poorly on a test you had in school that day?

Yes No

24. When you are taking a test, does the hand you write with shake a little?

Yes No

25. When the teacher says that he is going to give the class a test, do you become afraid that you will do poorly?

Yes No

26. When you are taking a hard test, do you forget some things you knew very well before you started taking the test?

Yes No

27. Do you wish a lot of times that you didn't worry so much about tests?

Yes No

28. When the teacher says that he is going to give the class a test, do you get a nervous or funny feeling?

Yes No

29. While you are taking a test do you usually think you are doing poorly?

Yes No

30. While you are on your way to school, do you sometimes worry that the teacher may give the class a test?

Yes No

APPENDIX 5

THE WORD-NUMBER PAIRS TEST WITH THREE SETS OF SPECIFIC
INSTRUCTIONS FOR LOW, INTERMEDIATE, AND HIGH
PROBABILITY LEVELS

Name: _____

Sex: _____

Your name is shown at the top of this page. Please check it.

This is a test of your ability to match words with numbers. In order that you may understand, you will have a chance to practise. Below you will find 5 words, each with a number beside it. You are to learn which number goes with each word.

You will have one minute to study the words and numbers. After studying you will turn to a page showing the words in a different order. You will be asked to write down the number that goes with each word.

PRACTICE LIST

Here is a practice list. Study it for one minute until you are asked to turn to the next page (one minute).

<u>Word</u>	<u>Number</u>
door	84
carpet	19
window	73
desk	41
glass	90

DO NOT TURN THIS PAGE UNTIL YOU ARE ASKED TO DO SO.

STOP

PRACTICE TEST

For the first word below, the number that matches has been written. In the blank beside each of the other words, write the number that goes with the word.

Your score will be the number of correct matches.

<u>Word</u>	<u>Number</u>
desk	<u>41</u>
glass	_____
window	_____
door	_____
carpet	_____

DO NOT TURN THIS PAGE UNTIL YOU ARE ASKED TO DO SO.

STOP

INSTRUCTIONS

You have had a chance to practise. We shall now do the same thing only using more words and numbers.

As in the previous practice example there are two parts:

In the first part you will see 20 words matched with numbers. You will be allowed 5 minutes to study these words and the numbers that go with them.

In the second part you will be shown the 20 words in a different order. You will have 3 minutes to write the number that goes with each word.

* * * *

Before you start, we would like to tell you something. Last week you wrote two tests. We are using your answers to these tests to tell you how well we think you will be able to learn the numbers that go with each of the words. We believe that you will be able to match about 25 per cent of the words and numbers correctly. This test will therefore be very hard for you.

DO NOT TURN THIS PAGE UNTIL YOU ARE ASKED TO DO SO.

STOP

INSTRUCTIONS

You have had a chance to practise. We shall now do the same thing only using more words and numbers.

As in the previous practice example there are two parts:

In the first part you will see 20 words matched with numbers. You will be allowed 5 minutes to study these words and the numbers that go with them.

In the second part you will be shown the 20 words in a different order. You will have 3 minutes to write the number that goes with each word.

* * * *

Before you start, we would like to tell you something. Last week you wrote two tests. We are using your answers to these tests to tell you how well we think you will be able to learn the numbers that go with each of the words. We believe that you will be able to match about 50 per cent of the words and numbers correctly. This test will therefore be of average difficulty (not very easy nor very hard) for you.

DO NOT TURN THIS PAGE UNTIL YOU ARE ASKED TO DO SO.

STOP

INSTRUCTIONS

You have had a chance to practise. We shall now do the same thing only using more words and numbers.

As in the previous practice example there are two parts:

In the first part you will see 20 words matched with numbers. You will be allowed 5 minutes to study these words and the numbers that go with them.

In the second part you will be shown the 20 words in a different order. You will have 3 minutes to write the number that goes with each word.

* * * *

Before you start, we would like to tell you something. Last week you wrote two tests. We are using your answers to these tests to tell you how well we think you will be able to learn the numbers that go with each of the words. We believe that you will be able to match about 75 per cent of the words and numbers correctly. This test will therefore be very easy for you.

DO NOT TURN THIS PAGE UNTIL YOU ARE ASKED TO DO SO.

STOP

STUDYING PART

Study this list. You will have 5 minutes.

<u>Word</u>	<u>Number</u>
tree	58
floor	29
chair	33
wall	56
shoe	17
table	78
coat	49
dish	36
roof	22
pillow	43
rock	62
plate	26
shade	40
jacket	18
cup	77
book	54
spoon	63
piano	28
ball	31
bed	59

DO NOT TURN THIS PAGE UNTIL YOU ARE ASKED TO DO SO.

STOP

TEST PART

Write the number that goes with each of the words.
You will have 3 minutes. You should write the answer if you know it, but not if you do not know it.

<u>Word</u>	<u>Number</u>
table	_____
pillow	_____
rock	_____
book	_____
bed	_____
tree	_____
shoe	_____
plate	_____
chair	_____
spoon	_____
wall	_____
dish	_____
floor	_____
piano	_____
jacket	_____
cup	_____
ball	_____
shade	_____
coat	_____
roof	_____

DO NOT GO BACK TO ANY OTHER PAGES.

STOP

APPENDIX 6
PERSONALITY AND CRITERION SCORES

PERSONALITY AND CRITERION SCORES

Note: 1 Sex: 1 = boys, 2 = girls.

2 Induced Probability Level: 1 = low ($P_s \leq 0.25$)

2 = intermediate ($P_s = 0.50$)

3 = high ($P_s \geq 0.75$)

Achievement-oriented Subjects Randomly Assigned in Low
Probability Level (N = 45)

Subject Number	Sex ¹	Probability Level ²	Personality Scores		Criterion Scores	
			n Ach	TASC	Word-Number Pairs Attempted	Answered correctly
25	1	1	4	6	7	4
28	2	1	7	14	7	0
37	2	1	5	10	8	1
42	1	1	6	5	6	4
84	1	1	7	12	20	15
85	1	1	4	3	12	5
90	1	1	6	13	12	6
91	1	1	5	7	8	4
94	1	1	7	7	7	3
127	1	1	4	13	5	2
141	2	1	6	10	11	9
159	1	1	5	6	11	3
163	2	1	3	14	8	3
166	1	1	3	15	5	4
168	1	1	7	0	10	8
188	1	1	5	15	7	7
207	1	1	9	6	7	5
208	1	1	6	11	6	5
218	1	1	6	10	9	2
219	1	1	5	9	8	4
227	1	1	6	11	8	6
232	1	1	5	7	11	0
239	1	1	8	10	6	3
247	1	1	7	10	9	5
267	1	1	13	7	12	2
281	1	1	6	11	5	3
293	1	1	5	12	3	2
298	1	1	5	4	6	5
301	1	1	11	3	7	7
308	2	1	5	11	3	3

Achievement-oriented Subjects Randomly Assigned in Low
Probability Level - Continued

Subject Number	Sex ¹	Probability Level ²	Personality Scores		Criterion Scores	
			n Ach	TASC	Word-Number Pairs Attempted	Answered correctly
309	1	1	9	11	20	10
322	2	1	5	11	8	4
344	1	1	3	11	10	0
345	1	1	11	15	4	4
375	2	1	13	14	7	3
380	2	1	5	15	9	8
386	1	1	6	12	7	4
401	1	1	11	13	4	1
417	1	1	4	13	9	9
422	1	1	5	12	20	11
430	1	1	9	5	6	5
436	1	1	5	14	2	2
453	2	1	6	9	6	5
459	2	1	7	1	9	5
482	1	1	7	7	4	2

Achievement-oriented Subjects Randomly Assigned in Intermediate
Probability Level (N = 51)

Subject Number	Sex ¹	Probability Level ²	Personality Scores		Criterion Scores	
			n Ach	TASC	Word-Number Pairs Attempted	Answered correctly
5	2	2	11	5	12	5
10	1	2	8	13	6	5
18	2	2	10	13	6	2
32	1	2	7	9	20	1
38	2	2	7	8	16	11
44	1	2	5	3	20	2
74	1	2	5	13	20	15
76	1	2	3	11	20	9
79	1	2	4	9	20	11
92	2	2	4	9	14	10
101	2	2	10	14	10	7
132	1	2	7	11	9	1
135	1	2	12	4	13	4
144	1	2	4	15	13	6
145	2	2	8	3	14	14
152	1	2	5	14	8	1
167	1	2	6	15	12	3
170	2	2	6	14	10	7
176	1	2	16	14	19	1
194	1	2	3	9	6	1
201	2	2	4	7	5	4
211	1	2	6	2	7	5
214	1	2	14	8	20	12
215	2	2	12	9	11	10
222	1	2	8	2	10	1
230	1	2	4	8	10	10
260	1	2	7	10	15	13
266	1	2	4	13	17	16
289	1	2	10	15	9	5
291	1	2	3	12	7	5
317	2	2	4	6	9	1
328	1	2	4	14	11	10
338	1	2	4	13	10	4
341	1	2	6	15	13	7
348	1	2	7	15	8	6
369	2	2	6	14	7	6
370	1	2	7	12	19	17
379	2	2	5	12	6	6
384	1	2	5	10	20	5
390	1	2	8	1	12	9

Achievement-oriented Subjects Randomly Assigned in Intermediate
Probability Level Continued

Subject Number	Sex ¹	Probability Level ²	Personality Scores		Criterion Scores	
			n Ach	TASC	Word-Number Pairs Attempted	Answered correctly
392	1	2	8	2	11	11
400	1	2	5	12	12	7
418	2	2	8	1	7	6
420	1	2	3	4	7	1
424	1	2	5	5	10	10
426	1	2	8	8	10	4
428	1	2	7	4	8	5
447	1	2	4	13	20	10
458	1	2	12	0	14	3
465	2	2	5	12	12	12
480	2	2	10	4	13	12

Achievement-oriented Subjects Randomly Assigned in High
Probability Level (N = 41)

Subject Number	Sex ¹	Probability Level ²	Personality Scores		Criterion Scores	
			n Ach	TASC	Word-Number Pairs Attempted	Answered correctly
7	1	3	6	1	7	3
12	1	3	11	0	20	3
15	1	3	6	0	9	7
21	1	3	3	10	20	6
31	1	3	6	9	20	4
34	1	3	7	12	20	10
48	1	3	11	12	13	0
69	2	3	3	11	13	13
70	2	3	5	15	10	8
109	2	3	6	11	15	4
112	1	3	7	13	6	1
123	2	3	13	3	10	3
164	1	3	14	5	5	4
165	2	3	7	7	11	5
199	2	3	7	10	8	1
205	2	3	7	15	7	4
217	2	3	5	14	9	6
244	1	3	8	7	7	5
252	2	3	10	12	7	4
258	1	3	5	12	5	1
270	1	3	3	12	5	2
274	2	3	5	14	9	3
275	1	3	8	13	9	1
277	2	3	13	15	17	12
290	1	3	6	10	3	0
292	2	3	10	6	10	7
302	1	3	5	8	8	3
305	2	3	20	10	9	8
306	1	3	16	4	10	5
310	1	3	5	9	3	2
335	1	3	4	11	8	8
376	2	3	6	11	6	2
378	2	3	7	13	14	8
395	1	3	7	7	6	5
407	2	3	5	10	6	2
415	1	3	5	14	1	0
419	1	3	15	13	7	6
421	1	3	4	3	8	5
427	2	3	7	8	5	3
429	2	3	7	11	5	4
479	2	3	6	0	12	9

Failure-threatened Subjects Randomly Assigned in Low
Probability Level (N = 46)

Subject Number	Sex ¹	Probability Level ²	Personality Scores		Criterion Scores	
			n Ach	TASC	Word-Number Pairs Attempted	Answered correctly
8	2	1	-2	16	20	9
11	2	1	0	18	10	9
14	1	1	1	21	4	11
20	1	1	1	23	5	3
40	1	1	1	16	8	3
41	1	1	1	16	12	12
47	1	1	0	20	20	16
55	1	1	2	23	12	1
60	1	1	1	25	10	2
63	1	1	-2	30	20	10
64	1	1	0	21	9	4
78	1	1	1	21	11	11
80	1	1	1	22	9	7
113	2	1	1	20	17	5
117	2	1	0	18	9	3
146	1	1	0	22	5	4
151	2	1	0	17	9	2
156	1	1	0	20	9	3
160	2	1	-2	20	5	1
172	2	1	1	21	20	14
186	1	1	0	20	6	1
195	2	1	1	17	12	11
200	2	1	1	24	12	7
231	1	1	0	22	10	1
235	2	1	1	21	18	12
241	1	1	-1	20	13	11
253	1	1	2	20	10	2
256	1	1	1	24	8	7
259	2	1	-1	19	8	2
262	2	1	-1	19	7	6
287	1	1	1	19	10	4
315	1	1	0	19	20	9
325	2	1	0	24	5	3
336	1	1	1	23	6	4
347	2	1	2	21	9	9
354	1	1	2	17	11	10
372	1	1	1	20	10	8
383	1	1	-4	21	20	0
408	1	1	0	17	16	11
423	2	1	1	17	17	5
440	2	1	2	18	20	18
443	2	1	-1	23	16	14
444	1	1	-4	24	18	10
468	1	1	0	22	13	10
490	1	1	-1	26	6	5
494	2	1	2	26	13	12

Failure-threatened Subjects Randomly Assigned in
Intermediate Probability Level (N = 42)

Subject Number	Sex ¹	Probability Level ²	Personality Scores		Criterion Scores	
			n Ach	TASC	Word-Number Pairs Attempted	Answered correctly
4	2	2	-2	19	14	5
6	2	2	-3	16	9	6
22	1	2	-2	17	0	0
23	1	2	1	17	8	0
24	1	2	1	20	5	3
33	2	2	1	30	8	3
61	1	2	2	30	20	16
81	1	2	0	24	4	4
104	2	2	2	16	8	3
105	2	2	2	17	10	7
126	1	2	3	18	7	4
130	1	2	2	18	6	1
131	1	2	1	19	10	3
133	1	2	2	25	14	1
147	2	2	2	25	8	7
154	2	2	2	20	3	1
185	1	2	2	19	3	0
197	2	2	1	22	9	7
203	2	2	0	17	7	5
204	2	2	0	19	16	10
238	1	2	1	21	13	1
251	1	2	1	23	2	1
254	1	2	2	16	6	5
263	2	2	1	21	7	4
271	2	2	2	22	13	3
280	2	2	0	16	16	14
285	2	2	-1	22	9	8
286	2	2	2	19	9	6
295	1	2	-2	16	2	1
304	2	2	-4	17	9	0
312	2	2	0	16	6	2
339	1	2	1	17	9	6
366	1	2	0	16	1	0
367	1	2	1	18	11	8
374	1	2	1	17	5	2
410	2	2	0	19	8	5
416	2	2	0	20	9	0
435	2	2	2	16	10	6
437	2	2	0	19	6	6
441	2	2	2	25	3	0
446	2	2	-4	23	3	2
469	2	2	-2	23	10	4

Failure-threatened Subjects Randomly Assigned in High
Probability Level (N = 40)

Subject Number	Sex ¹	Probability Level ²	Personality Scores		Criterion Scores	
			n Ach	TASC	Word-Number Pairs Attempted	Answered correctly
2	2	3	2	29	5	1
3	2	3	-3	21	8	8
13	2	3	2	17	8	2
26	1	3	-2	18	7	2
54	1	3	1	18	4	4
66	2	3	2	18	13	13
86	1	3	0	19	6	3
95	2	3	0	17	6	1
97	2	3	-4	20	6	3
111	1	3	0	17	11	0
115	2	3	1	17	13	6
122	1	3	1	17	1	1
138	1	3	0	18	4	2
142	1	3	1	20	6	1
171	2	3	2	18	5	2
179	1	3	1	18	20	18
180	2	3	0	25	6	5
213	1	3	2	18	14	4
221	2	3	0	16	13	11
226	2	3	1	25	18	1
243	2	3	-3	24	9	3
245	2	3	0	25	15	11
272	1	3	1	17	3	1
300	2	3	1	16	5	2
324	1	3	1	23	11	5
329	2	3	1	17	9	6
342	2	3	-2	19	13	2
377	2	3	2	18	6	3
387	2	3	0	19	7	6
399	1	3	2	20	20	6
411	1	3	-3	23	11	1
432	2	3	1	20	15	4
445	2	3	-3	16	11	3
454	2	3	-4	22	8	5
457	2	3	1	19	4	1
466	1	3	2	17	20	0
486	2	3	0	25	8	6
487	2	3	1	26	7	2
495	2	3	0	28	14	4
496	2	3	0	18	8	7

APPENDIX 7

ABSTRACT OF

An Experimental Investigation of the Interaction Between
Resultant Achievement Motivation and Experimentally
Induced Probability of Succeeding at a Task

APPENDIX 7

ABSTRACT OF

An Experimental Investigation of the Interaction Between Resultant Achievement Motivation and Experimentally Induced Probability of Succeeding at a Task¹

The purpose of the present study was to apply Atkinson and Feather's theory of achievement motivation to persistence at and performance on one specific educational task. More specifically, the problem to be investigated was the interaction effect between resultant achievement motivation and experimentally induced probability of succeeding at the Word-Number Pairs Test with respect to persistence and level of performance.

According to the theory, the strength of the resultant motivation to approach or avoid an achievement-oriented task is in part determined by individual differences in personality determinants of behavior, that is, by the relative strength of the motive to approach success (M_s) and of the motive to avoid failure (M_{af}). These two achievement-related motives (M_s and M_{af}) are linked with an affective state aroused by certain stimuli. Different states of arousal are expected to arouse different intensities of motivation. The strength of the resultant motivation is, therefore, also determined by environmental determinants of

¹ Lewis Fu, doctoral thesis presented to the School of Graduate Studies of the University of Ottawa, Canada, 1975, x-168 p.

behavior, one of which is the expectancy of success at a given task.

The theory, therefore, holds that persons in whom the motive to approach success is stronger than the motive to avoid failure are more highly motivated toward tasks which are perceived as being of intermediate difficulty, whereas persons with the opposite motive pattern ($M_{af} > M_s$) are, if constrained, less inhibited at tasks which are perceived as being either very difficult or very easy.

It was hypothesized that: (a) achievement-oriented individuals, with $M_s > M_{af}$, attempt and answer correctly more word-number pairs in the Word-Number Pairs Test when an intermediate probability level of succeeding at that test is experimentally induced than when a high or low level of success probability is induced; and (b) failure-threatened individuals, with $M_{af} > M_s$, attempt and answer correctly more word-number pairs in the Word-Number Pairs Test when a high or low probability level of succeeding at that test is experimentally induced than when an intermediate level of success probability is induced.

The sample in the study consisted of 542 pupils enrolled in 19 grade-six classes randomly selected from all such classes of the 32 elementary schools situated in the city of Ottawa, Canada.

Three measuring instruments were used: McClelland's n Achievement Test, Sarason's Test Anxiety Scale for Children, and an adaptation of Thurstone's Word-Number Pairs Test. The first two tests provided measures of the strength of the motive to approach success and of the motive to avoid failure, respectively. The third test provided the criterion measures from which two dependent variables were produced: (a) number of word-number pairs attempted, and (b) number of word-number pairs answered correctly.

Two extreme motivational groups, achievement-oriented ($M_s > M_{af}$) and failure-threatened ($M_{af} > M_s$), were formed on the basis of the median split of two separate score distributions, one for the n Achievement Test, and the other for the Test Anxiety Scale for Children.

The environmental variable, expectance of success at a task, was manipulated in the Word-Number Pairs Test by means of printed instructions. Three sets of printed instructions were prepared, one for each level of induced probability of succeeding at the test. The levels were: low ($P_s < 0.25$), intermediate ($P_s = 0.50$), and high ($P_s > 0.75$). Each individual received only one set of these instructions.

Multivariate analysis of variance was carried out on the scores of two dependent variables in a 2 by 3 crossed design with resultant motivational group and experimentally

induced probability of succeeding at the task as independent variables. A significant interaction was found between motivational group and induced probability level. In order to determine the effect of induced probability level on achievement-oriented and failure-threatened individuals, contrasts of means within motivation level were estimated and tested for significance.

Concerning the performance of achievement-oriented individuals under experimentally induced probability levels, the results showed that those in the intermediate probability level performed significantly better on both dependent variables than those in the low probability level or those in the high probability level. The predictions for the achievement-oriented individuals were confirmed.

Concerning the performance of failure-threatened individuals under experimentally induced probability levels, the results showed that those in the low probability level performed significantly better on both dependent variables than those in the intermediate probability level. On the other hand, those in the high probability level performed slightly, but not significantly, better on both dependent variables than those in the intermediate probability level. The predictions for failure-threatened individuals were partially confirmed by the results, that is, the degree of motivation of failure-threatened persons showed only one,

of two, unique effects and offered only partial support for the theory of achievement motivation.

A possible explanation of the non-conformity with theory for failure-threatened persons performing a task having a high probability of success could lie in the conceptualization-determinants of the strength of avoidant motivation or could be due to intervening variables which were not controlled for.

A major possible contribution of this research is that it could provide information which would allow for further interpretation of achievement-motivation theory and its application to education. Another possible contribution of this research is that the information provided could assist classroom teachers in better understanding students' behavior.