

PERSISTENCE CAPACITY AND UNDERACHIEVING  
SENIOR MALE COLLEGE STUDENTS

By

DAVID MICHAEL SEIFERT

Bachelor of Arts  
Fort Hays Kansas State College  
Hays, Kansas  
1965

Master of Science  
Fort Hays Kansas State College  
Hays, Kansas  
1968

Submitted to the Faculty of the  
Graduate College of the  
Oklahoma State University  
in partial fulfillment of  
the requirements for  
the Degree of  
DOCTOR OF EDUCATION  
July, 1970

OKLAHOMA  
STATE UNIVERSITY  
LIBRARY  
NOV 4 1970

PERSISTENCE CAPACITY AND UNDERACHIEVING  
SENIOR MALE COLLEGE STUDENTS

Thesis Approved:

*John D. Hampton*  
Thesis Adviser

*Gladys H. Meador*

*Kenneth P. Sandberg*

*Bill Elsom*

*Neil R. Luebke*

*D. Durham*

Dean of the Graduate College

764205

## ACKNOWLEDGMENTS

Since this dissertation was not a product of my labor alone, I would like to express my gratitude to those who contributed to its accomplishment: to my major adviser, Dr. John Hampton, who gave generously of his time and created a climate conducive to success; to Dr. Bill Elsom whose patience and guidance saw me through frustrating procedural difficulties; and to my other advisory committee members, Drs. Gladys Means, Kenneth Sandvold and Neil Luebke, for their understanding and support.

In a very special way, I am deeply indebted to my family for their invaluable persistence and sacrifice on behalf of this project. I truly share a sizable part of this accomplishment with my wife, Shirl, whose labor and support are reflected herein. To my children, Cheree' and Michael, I shall always be grateful for their endurance through the demands that this investigation inadvertently placed upon them.

## TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION . . . . .	1
Purpose of the Study . . . . .	2
Problem . . . . .	3
Definition of Terms . . . . .	4
Value of the Study . . . . .	5
Hypotheses . . . . .	6
Limitations of the Study . . . . .	6
II. REVIEW OF LITERATURE . . . . .	8
Historical Background . . . . .	8
Persistence as a Trait . . . . .	9
Factor Analysis of Persistence . . . . .	10
Personality Dimensions and Persistence . . . . .	12
Persistence as a Concept of Motivation . . . . .	13
Summary . . . . .	14
III. METHOD . . . . .	16
Subjects . . . . .	16
Procedure . . . . .	18
Instruments . . . . .	19
Statistical Analysis . . . . .	21
IV. RESULTS . . . . .	23
V. DISCUSSION . . . . .	29
Review of Significant Findings . . . . .	29
Applications of the Study . . . . .	31
Suggested Research Possibilities . . . . .	32
Restrictions of the Findings . . . . .	32
BIBLIOGRAPHY . . . . .	36
APPENDIX . . . . .	41

## LIST OF TABLES

Table	Page
I. T-Test Results Between the Achiever and Under-Achiever Groups on Persistence Task Length . .	23
II. T-Test Results Between Achiever and Underachiever Groups on Persistence Accuracy . . . . .	25
III. Analysis of Proportions Results Between the Achiever and Underachiever Groups on Persistence Quality . . . . .	27

## LIST OF FIGURES

Figure	Page
1. Achiever and Underachiever Raw Score Positions and Group Means on Persistence Task Length . . . . .	24
2. Achiever and Underachiever Raw Score Positions and Group Means on Persistence Accuracy . . . . .	26
3. Persistence Quality Proportions of the Achiever and Underachiever Groups . . . . .	28
4. Achiever and Underachiever Persistence Task Length and Persistence Accuracy Means . . . . .	30

## CHAPTER I

### INTRODUCTION

The literature abounds with investigations into the etiology of underachievement. With the current interest in talent preservation, the student who performs academically below his capacity has become a focal point of research during the past decade.

Some authors have indicated that a poor self-concept is related to underachievement (Combs, 1964; Walsh, 1956; Nason, 1958). Others have suggested that male underachievers have particularly poor relationships with their fathers which has the consequence of inadvertently depressing their academic performance (Pierce, 1961). Shaw and Black (1960) found that the underachiever was apparently unable to persist in a frustrating situation, sought thrills and excitement in his recreation, and displayed elevated feelings of hostility.

Relative to classroom performance, the underachiever has also been found to spend more time working in other than academic areas with overt signs of withdrawal (Perkins, 1965). These students have been further characterized by impulsivity in their approach to cognitive tasks with manifestations of rigidity and intolerance of ambiguity (Davids,

1968). Haywood (1968) found the underachiever extrinsically task motivated (by ease, safety, and security aspects of the environment) in contrast to the overachiever who is more intrinsically task motivated. Still others (Davids, Sidman, and Silverman, 1968) have characterized the underachiever as suffering from high levels of manifest and test anxiety.

Few studies, however, have focused on the basic performance components of the underachiever's failure. Gilmore (1968) and Dedeck and Lester (1968) blame a short attention span for the underachiever's dilemma, indicating that there is a general deficit in the areas of attention and concentration. Gilmore states that attention is one of the variables differentiating high and low achievers.

As Moyer and Gilmer (1955) demonstrated, however, length of attention span is a function of how interesting and challenging a subject finds a task; that is, it is governed primarily by the stimulus pattern being dealt with. The concept of attention span, then, is illusive in that it is not only complex, but is of a necessarily differing magnitude for any two dissimilar tasks.

#### Purpose of the Study

It would seem that to enhance our understanding of the underachiever's capacity to approach learning, the more basic components of attention span must be considered. Such an attack is confounded by considerable disagreement and uncertainty as to just what are the basic elements of attention



span. There is general agreement, however, that persistence is fundamental in the approach to, and subsequent accomplishment of, any learning situation; "In school work, there is good reason to believe that persistence, or sticking to a task, is one of the main factors that helps to supplement or compensate for ability" (Symonds, 1931, 321-322). And if the underachiever's failure is a function of abortive learning attempts, it might well be that it is because of a basic failure to persist at a comparable level to the achiever through the completion of a task. Presumably, the successful student is able to carry himself through a learning situation.

To examine possible persistence differences between achievers and underachievers would seem crucial to understanding performance variations in the classroom. Since there is no recorded research directly bearing upon persistence differences between the two groups, there exists a gap in knowledge regarding persistence as a possible component of the dynamics of underachievement. It is the purpose of this study to discover if there are persistence capacity differences between achievers and underachievers.

### Problem

As indicated, short attention span length has often been considered and researched as a major component of the underachieving syndrome. However, Moyer and Gilmer (1955) shattered the illusion of that belief by demonstrating that

attention span exists in a state of flux depending on stimulus properties of an experience. The present study proposed to research a basic component of attention span length (continuance, persistence) in relation to task accomplishment. To date there is an informational lag with regard to differing persistence task lengths, persistence accuracy, and quality of persistence performance between achievers and underachievers; it was the intent of this study to play a role in demonstrating possible persistence capacity differences between these two groups.

- I. Do underachievers persist as long as achievers on a prescribed task?
- II. Does the accuracy of the underachiever's persistence performance equal that of the achiever's?
- III. Does the underachiever's persistence quality equal that of the achiever's?

#### Definition of Terms

1. Achievers (A)--senior male students at Oklahoma State University with composite American College Test standard scores of 25 (80 percentile) or higher whose current overall grade point averages are 3.5 or greater on a 4.0 scale.
2. Underachievers (UA)--senior male students at Oklahoma State University with composite American College Test standard scores of 25 (80 percentile) or higher whose current overall grade point averages are less than 2.5 on a 4.0 scale.

3. Persistence--sticking to, or continuance of, a task or line of behavior. Ryans (1938) meant approximately the same thing when he referred to the concept as a "continued release of energy."
4. Persistence task--performance on the Lafayette Pursuit Rotor (model number 2203).
5. Persistence task length (PTL)--time subject spends attempting to track the pursuit rotor target.
6. Persistence accuracy (PA)--total time on rotor target with the spring loaded stylus accompanying the Lafayette Pursuit Rotor.
7. Persistence quality (PQ)--total persistence accuracy for each group divided by total persistence task length for each group ( $PQ_A = \frac{PAA}{PTL_A}$ ,  $PQ_{UA} = \frac{PAUA}{PTL_{UA}}$  -- see above definitions for key to symbols).
8. Persistence capacity--the combination of persistence task length, persistence accuracy, and persistence quality.

#### Value of the Study

If persistence differences between achievers and under-achievers can be identified, understanding the dilemma of underachievement will be enhanced. And if persistence task variations are discovered, it would behoove educators to consider classroom approaches in light of the underachievers' capacity prior to proceeding with learning situations. Otherwise, underachieving students may be forced to "pass

over" many classroom undertakings because of possible limited ability to meet the persistence demands that teachers inadvertently place on lengthy learning assignments. This is not to say that learning cannot be lengthy, but that new research may suggest changes in academic procedures according to persistence limitations. Such fresh knowledge could conceivably improve the lot of the underachiever.

### Hypotheses

#### Total persistence task length:

Hypothesis I. There is no significant difference in persistence task length performance between achievers and underachievers as measured by the pursuit rotor.

#### Persistence accuracy:

Hypothesis II. There is no significant difference in persistence accuracy performance between achievers and underachievers as measured by the pursuit rotor.

#### Persistence quality:

Hypothesis III. There is no significant difference in persistence quality performance between the achieving group and the underachieving group as measured by the pursuit rotor.

### Limitations of the Study

This study attempted to treat underachievement as a function of persistence capacity. It did not delineate the kinds of learning most likely to be affected by persistence demands. Neither did it determine how to organize learning content according to the underachiever's capacity to persist. Certainly, it did not intend to identify all of the components of underachievement. Personality variables,

motivation differences, social dynamics in the classroom, and teacher characteristics were ignored though they are conceded to be of major importance in any formal learning attempt. Typical of much research, this study created more problems than it proposed to solve. More specifically, application of the results of this study relative to the underachiever's persistence capacity begs its own research demands. This study proposed, rather, to test persistence differences between achievers and underachievers with a design intended to identify the persistence capacity of both groups. If it has been successful, understanding the complexities of that student deemed to be functioning below his capacity may be enhanced.

## CHAPTER II

### REVIEW OF LITERATURE

#### Historical Background

The concept of persistence is a familiar one, having been dealt with in the psychological literature since the early 1900's. McDougall (1908) dealt with persistence as one of the objective variables of purposive behavior. Toleman (1932) also listed persistence as a basic requirement for purposive behavior when he wrote of persistence-until-ends-are-attained. As a personality phenomenon, Lewin (1935) discussed persistence within the context of maintaining tension within the regions of a person's life space. And both Hull (1943) and Dollard and Miller (1950) considered persistence as continuing action within the framework of drive theory. A bit more recently, persistence in behavior has been conceptualized by Peak (1955) and Atkinson (1957) as one of the important variables in a theory of motivation. In a similar theoretical vein, Bindra (1959), working within the general structure of Hebb's position (1949), handled persistence as one of the defining variables of goal directed action. Thus, there seems to be little lacking in the historical treatment of persistence though the theoretical frameworks are notably divergent.

## Persistence as a Trait

Research on persistence has been primarily of two types--trait and factor analytic. The first dealt with persistence as a behavioral trait. A 1929 study by Hartshorne, May and Maller provides a good illustration of the investigations of that period.

In this study eight individual and group administered tasks were used as indicators of persistence. The eight tasks were story resistance, puzzle mastery, fatigue and boredom in mental work, paper and pencil puzzle solutions, hunting for hidden objects, eating crackers and whistling, continual standing on one foot, and solving a toy puzzle. Reliability coefficients ranged from .40 to .85 while validity coefficients (obtained by comparing persistence tasks results with teachers ratings of persistence) were from zero to .33. These coefficients and the correlations between the various tasks were generally low. It is interesting to note, however, that a tendency for persistence to increase with age was found in this investigation.

The early trait studies seem to have in common an extensive variety of tasks which were proposed as measures of persistence. Their variety was excelled only by their inconclusive findings. With the coming popularity of factor analysis, however, attempts were made to look for order in the confusing variety of persistence task measures.

## Factor Analysis of Persistence

It was precisely factorial trait extraction which characterized the second main category of persistence task research. One of the earlier investigations was done by Webb (1915), in which he used the Spearman Analysis technique. He isolated a factor which, among other variables, was thought to include persistence of motives. In another study, Crutcher (1934) tested school children on persistence tasks which included card housebuilding, mechanical puzzle solutions, picture copying, addition, and cancelling A's in print. A correlation of only .30 was found between persistence and intelligence. Crutcher found some evidence for a G factor through intercorrelations between the times spent on each of the various persistence tasks. Alexander (1935) also found a factor which ran through school subjects involving persistence. His X factor was produced through correlational techniques between persistence measures and school subjects.

From articles dealing with persistence traits by Clark (1935), Howells (1928), Howells (1933), Morgan and Hull (1926), Porter (1933), and Wang (1932), Thornton (1939) undertook to determine if there was a factor common to a selection of other tests purporting to measure persistence; tests included (1) a shock test, (2) pressure tests, (3) handgrip, (4) handgrip maintained, (5) holding the breath, (6) motor inhibition, (7) aiming test, (8) perceptual ability test, (9) word building test, (10) verbal



recognition test, (11) Wang test (diagnostic questionnaire), (12) rating scale for persistence, (13) rating scale for self-confidence, (14) ascendance-submission test, and, (15) verbal ability test. He not only was unable to factor analyze a universal element of persistence measures, but suggested that many of the tests advanced as tests of persistence were not valid indicators. He further indicated that the more academically oriented tests of persistence were even more uncertain measures due to the complexity of the cognitive material they proposed to sample. The need for a basic measure of persistence is all the more indicated based on the revelations of Thornton's study.

Later factorial investigations were done by Ryans (1938), Rethlingschaffer (1942), Kremer (1942), and MacArthur (1955). MacArthur's study seems to be the most significant and methodically sound of these more recent factorial trait studies. He began by selecting a large number of traditional individual and group tests which had been used in the measurement of persistence. He further selected measures of intelligence, school grades, age, self ratings, and ratings by peers and teachers. A Thurstone intercorrelations analysis revealed five factors as follows: (a) general persistence; (b) a bipolar factor contrasting individuality with prestige suggestibility; (c) a bipolar factor contrasting measures of reputation for persistence with objective measures of time spent by subjects at the task; (d) a factor running through physical tests; and,

(e) a factor running through spatial and numerical tasks and interpreted as spatial-numerical persistence. MacArthur's study seems to have brought together many of the earlier uncertain findings of persistence. Again, however, inter-correlations between his variety of eight tests were generally low. Even so, one of his more notable findings is reflected in the fourth factor dealing with physical tests. Along with Thornton (1939), and Rethlingschaffer (1942), MacArthur's results support the presence of a basic motor component of persistence.

#### Personality Dimensions and Persistence

Though somewhat less relevant to the present study, Eysenck has discovered a number of personality dimensions which are related to persistence. He has indicated, for example, that persistence is negatively related to lack of neuroticism and positively related to introversion (Eysenck, 1947, 1952). More recently, Eysenck (1957) has given a theoretical explanation of the relationship between persistence and the development of inhibitory and excitatory potentials based on Pavlov's theoretical account of experimental neuroses (1927). Eysenck's findings have generally indicated that persistence differences between introverts and extroverts are related to variations in inhibitory potential. Stronger inhibitory potentials develop in extroverts which lead them to be relatively less persistent than introverts. The findings of his persistence

investigations have dealt largely with physical endurance tests.

### Persistence as a Concept of Motivation

Relatively recently, persistence has been conceived as a motivational phenomenon. The theories of Kurt Lewin and J. W. Atkinson are particularly relevant in this regard.

Lewin (1946) considers persistence in terms of barriers and goals when he says: "What is usually called persistence is an expression of how quickly goals change when the individual encounters obstacles" (p. 824). He discussed a study dealing with success, persistence and activity in youngsters and the effect of separating children from a goal at varying distances. Failure at a task decreased persistence when subjects were later confronted with a similar situation. By contrast, success led to subsequent increases in persistence. Similar findings relative to success and failure and their effect of persistence were noted by Wolf (1938). These results are relevant to the present study in that previous success, or failure as in the case of the underachiever, may be considered important determinants of future persistence performance.

The second motivational theory deals with achievement motivation and has made its influence felt primarily through the work of Atkinson (1957, 1960). Unlike the trait and factor analytic approaches, persistence as a motivational phenomenon takes both the person and situation

parameters into account. It has the potential of being able to account both for variations in persistence from situation to situation and for variations from person to person. It further allows for the study of person and situation in interaction. This theory is explicit in recognizing the interplay of personality variables and transitory influences in determining persistence. To put it differently, motives, expectations, and incentive values largely determine persistence capacity in any given situation. Atkinson generally believes that motivation is expressed in the direction, magnitude, and persistence of behavior.

#### Summary

Several conclusions can be drawn from the foregoing review. The early trait studies were in hopeless disagreement as to the nature of persistence. Then came the factor analytic studies, each proposing different G factors as the solutions to the hidden properties of persistence. As indicated above, however, occasional commonalities did exist, one of which was a physical variable rooted in motor tasks. More recently, investigators like Eysenck have linked personality variables to persistence performance. And finally, much research attention has been given to persistence as a motivational phenomenon.

As can be seen by the literature survey, underachievement in relation to persistence capacity has not directly

been investigated. It is precisely this research deficiency which the present study attempted to overcome.

## CHAPTER III

### METHOD

#### Subjects

Forty-eight achieving senior male students and forty-eight underachieving senior male students at Oklahoma State University were randomly selected as subjects by using a table of random numbers (Steel and Torrie, 1960, 9-10, Table A.1). Students with identified physical disabilities and international students (those born outside the continental limits of the United States) were eliminated as possible subjects by reason of probable environmental background differences. Only males were used in an attempt to control possible sex differences in persistence. In addition, "most of the studies of under-achievement have been made on boys rather than girls, because bright boys are underachievers in school much more frequently than girls are," (Havighurst, 1961, 428); this further necessitated a sex distinction. Seniors were used exclusively to control for possible age differences. Freshmen, sophomore, and junior populations were not used because it was felt that they might not have had sufficient time to establish a definite underachieving academic record.

Subjects were selected on the basis of composite American College Test Scores and overall grade point averages from the registrar's university-wide alphabetical listing of students. Subjects were drawn by identifying the total in-residence populations of achievers and underachievers from which a random selection of each was taken to fill sample quotas. The achieving and underachieving groups each consisted of 48 subjects. Subsequent to drawing samples, each subject received a telephone call from the experimenter one or two days in advance of his participation at which time the investigation was explained in brief and arrangements made for a convenient time to share in the project.

Only one student, an achiever, refused to participate. His refusal came in a third telephone conversation after two earlier appointments had been made and broken. During the final telephone contact, the student informed the experimenter that he was simply too busy with classwork and that, with apology, he hoped that the experiment would proceed without him. This student's cancellation required the selection of another subject from the achiever population (to which random numbers had already been assigned) to fill the sample quota.

Another subject, an underachiever, had to be dropped from the experiment due to a generalized body tremor which severely depressed his performance. He was eliminated from the sample with the justification that a noticeable physical disability existed. Again, selection of another subject

from the randomly numbered underachiever population was required to maintain the designated sample requirement.

The majority of both achievers and underachievers arrived and participated in the experiment after a single arrangement had been made. However, five achievers and eight underachievers required a second contact after the initial appointment had been broken; one underachiever was given a third telephone call. In each case demanding more than one contact, subjects gave excuses ranging from having forgotten the appointment to having deliberately broken it in the face of an unforeseen commitment. Only the above mentioned achiever, however, after breaking two appointments, refused to participate.

One half of the achievers and one half of the underachievers participated in the experiment in the morning hours from eight to twelve. The other half of both groups participated in the afternoon hours from one to five. This procedure was employed to control for possible performance differences in the time of day. All subjects were scheduled for appointment at least one hour prior to another commitment. This was but an additional safeguard against contamination of results by interference from other requirements.

#### Procedure

Each subject performed on the pursuit rotor on a 30 RPM setting; the work of Ammons and Ammons (1958) supports the 30 RPM setting for a variety of laboratory uses. The



following directions were given:

YOU REMEMBER OUR RECENT TELEPHONE CONVERSATION ABOUT MY PROJECT. ACTUALLY, I'M TRYING TO DETERMINE HOW WELL STUDENTS CAN OPERATE THIS MACHINE. THE ONLY DIRECTIONS NEEDED ARE THAT YOU TRY TO KEEP THE END OF THIS HANDLE ON THE METAL TARGET WHILE THE DISK ROTATES. HERE, I'LL SHOW YOU WHAT I MEAN: (the experimenter briefly demonstrates the required behavior). I'LL SEAT MYSELF BEHIND THIS PARTITION SO AS NOT TO DISTRACT YOU. THE MACHINE WILL REMAIN ON UNTIL YOU CHOOSE TO QUIT. DO YOU HAVE ANY QUESTIONS? FINE! SEAT YOURSELF COMFORTABLY. WITH THE HANDLE ON TARGET AND IN YOUR PREFERRED HAND, I WILL NOW START THE MACHINE.

Two scores were recorded for each subject based upon pursuit rotor performance: (a) persistence time spent on the task (as measured by a .1 second stop watch), and, (b) accuracy, or, persistence time on target (as measured by a digital .01 second timer). A proportion score was then computed for each group based upon total persistence time on target to total persistence time spent on the task which was operationally defined as persistence quality.

#### Instruments

The Lafayette Rotary Pursuit (model number 2203) was employed to measure persistence performance (Lafayette

Instrument Company, Catalog No. 867). The unit is 12 inches long by 12 inches wide by 6½ inches high. The machine was rewired to provide continuous 30 RPM motion rather than the standard 20 second on-20 second off mechanical procedure. Such an operational change was necessary for the evaluation of persistence as operationally defined; regulated resting periods would have been in direct contradiction to the measurement of continuous behavior. A constant-pressure loaded spring stylus accompanied the apparatus. A 69A-14-15D Digital .01 Second Marietta Timer provided the time on target measuring instrument (Marietta Apparatus Company, Catalog No. 69).

The pursuit rotor was chosen as the persistence measure because of the need for a basic evaluation of task continuance. As cited above, this need was created primarily by nonsupportive research regarding a variety of tools placing some claim on their capacity to measure persistence.

Such consideration of the pursuit rotor is not entirely new, however, as indicated by Fleishman's work (1960). He found significant intercorrelations between proficiency on the pursuit rotor and a battery of 17 reference ability measures. He further identified a common factor, which has been labeled control precision (persistence), between pursuit rotor performance and the reference ability tests. This evidence lends validating support to the instrument's use as a persistence measure. The findings of Loveless and

Holding (1959) and Pope (1962) with the use of tracking equipment also support its employment in this context.

### Statistical Analysis

A t-test for two independent means (Bruning and Kintz, 1968) was employed to determine a possible difference between achievers and underachievers on persistence task length. The .05 alpha level was required for rejection of the hypothesis in its null form. The model is as follows:

		Achievement	
		Achievers	Underachievers
Persistence Task Length		N = 48	N = 48

With regard to homogeneity of variance, it must be remembered that cells with equal N's bolster the strength of statistical analysis; equal N's encourage a robust statistical character and eliminates the need for homogeneity of variance (Snedecor and Cochran, 1967; McNemar, 1962; Edwards, 1957).

A second t-test for two independent means (Bruning and Kintz, 1968) was employed to determine a possible difference between achievers and underachievers on persistence accuracy. The .05 alpha level was again required for rejection of the

hypothesis in its null form. The paradigm is as follows:

		Achievement	
		Achievers	Underachievers
Persistence Accuracy		N = 48	N = 48

Again, both sample groups contained equal N's which eliminated the need for homogeneity of variance (Snedecor and Cochran, 1967; McNemar, 1962; Edwards, 1957).

The third statistical treatment employed an analysis of uncorrelated proportions with samples of equal size (Guilford, 1965) to determine a possible group difference between the achieving sample (A) and the underachieving sample (UA) on persistence quality (PQ),

$$\text{(between } PQ_A = \frac{PA_A}{PTL_A} \text{ and } PQ_{UA} = \frac{PA_{UA}}{PTL_{UA}} \text{)}.$$

The .05 alpha level was once again required for rejection of the hypothesis in its null form.

## CHAPTER IV

### RESULTS

Each of the two individual measures of persistence (persistence task length, persistence accuracy) was separately tested statistically with a t-test (Bruning and Kintz, 1968). The third variable, persistence quality, was treated with an analysis of uncorrelated proportions for samples of equal size (Guilford, 1965). Results, therefore, are given in three parts each of which follows its corresponding null hypothesis.

Hypothesis I. There is no significant difference in persistence task length performance between achievers and underachievers as measured by the pursuit rotor.

The t-test yielded a value of 2.678 (see Table I).

TABLE I

T-TEST RESULTS BETWEEN THE ACHIEVER AND UNDERACHIEVER GROUPS ON PERSISTENCE TASK LENGTH

	N	$\bar{X}$	df	t	p
A	48	7.33	94	2.678	<.01
UA	48	5.19			

This index was significant beyond the .01 level for non-directional (two-tailed) tests having exceeded the interpolated requirement of 2.636 for 94 degrees of freedom (Popham, Table F, 1967). These findings led to the rejection of the null hypothesis. There is, then, a significant difference between achievers and underachievers on persistence task length as defined by the parameters of this study. Figure 1 presents raw score positions and illustrates the significant difference between the means of the two groups. (See Appendix A for persistence task length raw data).

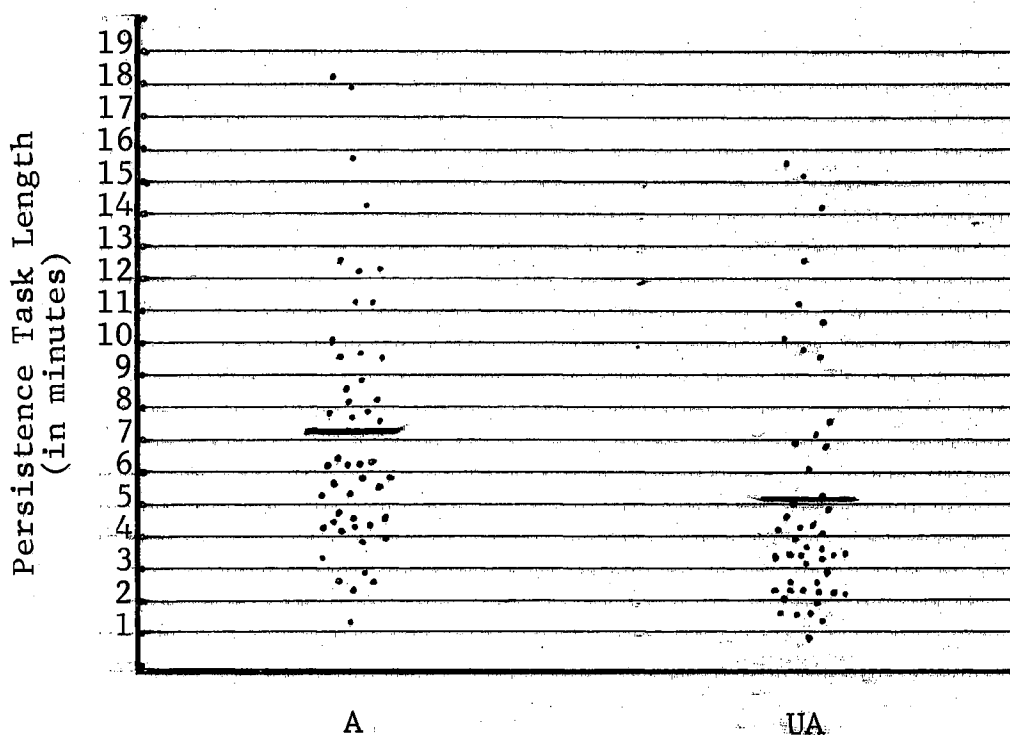


Figure 1. Achiever and Underachiever Raw Score Positions and Group Means on Persistence Task Length

Hypothesis II. There is no significant difference in persistence accuracy performance between achievers and under-achievers as measured by the pursuit rotor.

The t-test produced a value of 2.653 (see Table II).

TABLE II  
T-TEST RESULTS BETWEEN ACHIEVER AND UNDERACHIEVER  
GROUPS ON PERSISTENCE ACCURACY

	N	$\bar{X}$	df	t	p
A	48	5.98			
			94	2.653	<.01
UA	48	4.07			

This quantity was significant beyond the .01 level for nondirectional (two-tailed) tests having surpassed the interpolated requirement of 2.636 for 94 degrees of freedom (Popham, Table F, 1967). These findings led to the rejection of the null hypothesis. There is, then, a significant statistical difference between achievers and underachievers on persistence accuracy as defined by the parameters of this study. Figure 2 presents raw score positions and illustrates the significant difference between the means of the two groups. (See Appendix A for persistence accuracy raw data).

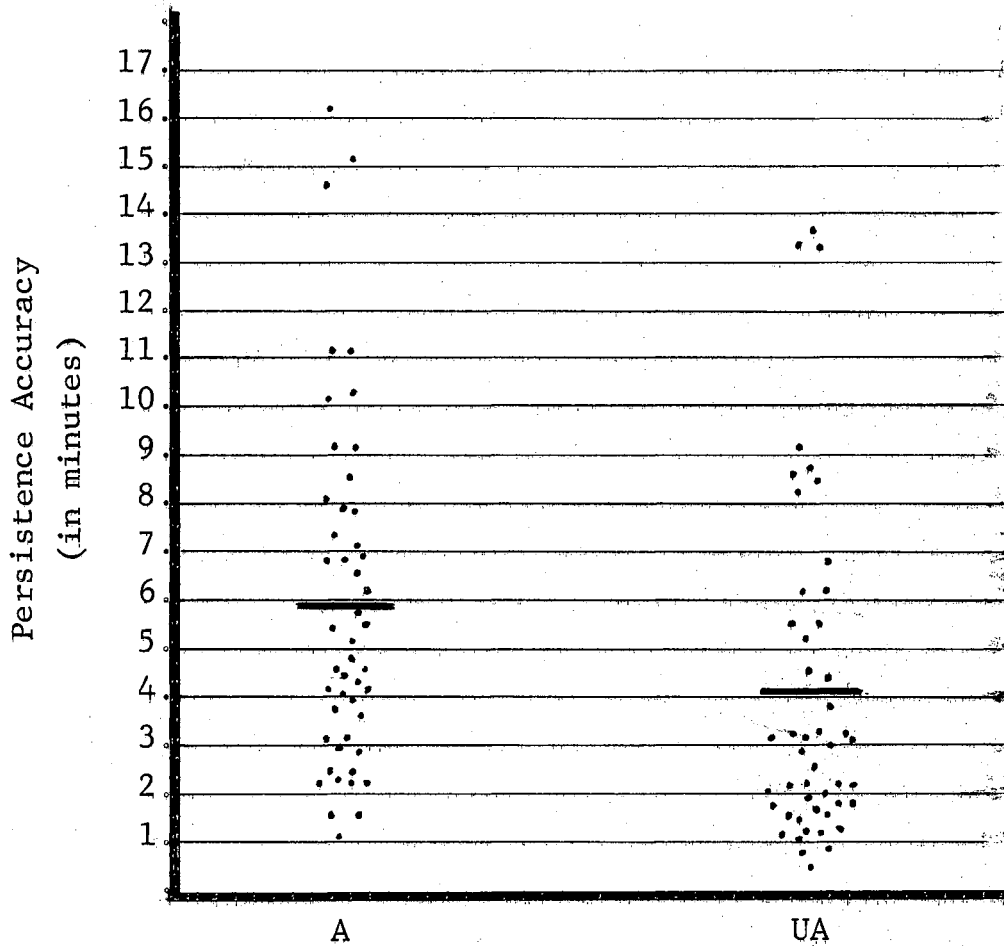


Figure 2. Achiever and Underachiever Raw Score Positions and Group Means on Persistence Accuracy



Hypothesis III. There is no significant difference in persistence quality performance between the achieving group and the underachieving group as measured by the pursuit rotor.

The analysis of proportions yielded a z value of .398 (see Table III).

TABLE III  
ANALYSIS OF PROPORTIONS RESULTS BETWEEN THE  
ACHIEVER AND UNDERACHIEVER GROUPS  
ON PERSISTENCE QUALITY

	N	$\sum$ PTL	$\sum$ PA	P*	z	p
A	48	351.75	287.21	.817		
					.398	.348
UA	48	249.02	195.24	.784		

\*proportion of persistence accuracy to persistence task length.

This quantity fell short of the 1.96 z index needed for rejection of the null hypothesis at the pre-set .05 level of significance for nondirectional (two-tailed) tests. The z value, rather, indicated a probability level of .348 (Guilford, Table B, 1965). Having failed to reject the null hypothesis, these results do not indicate a significant statistical difference between the achieving group and the underachieving group on persistence quality. Figure 3 illustrates the lack of significance between the persistence quality proportions of the two groups.

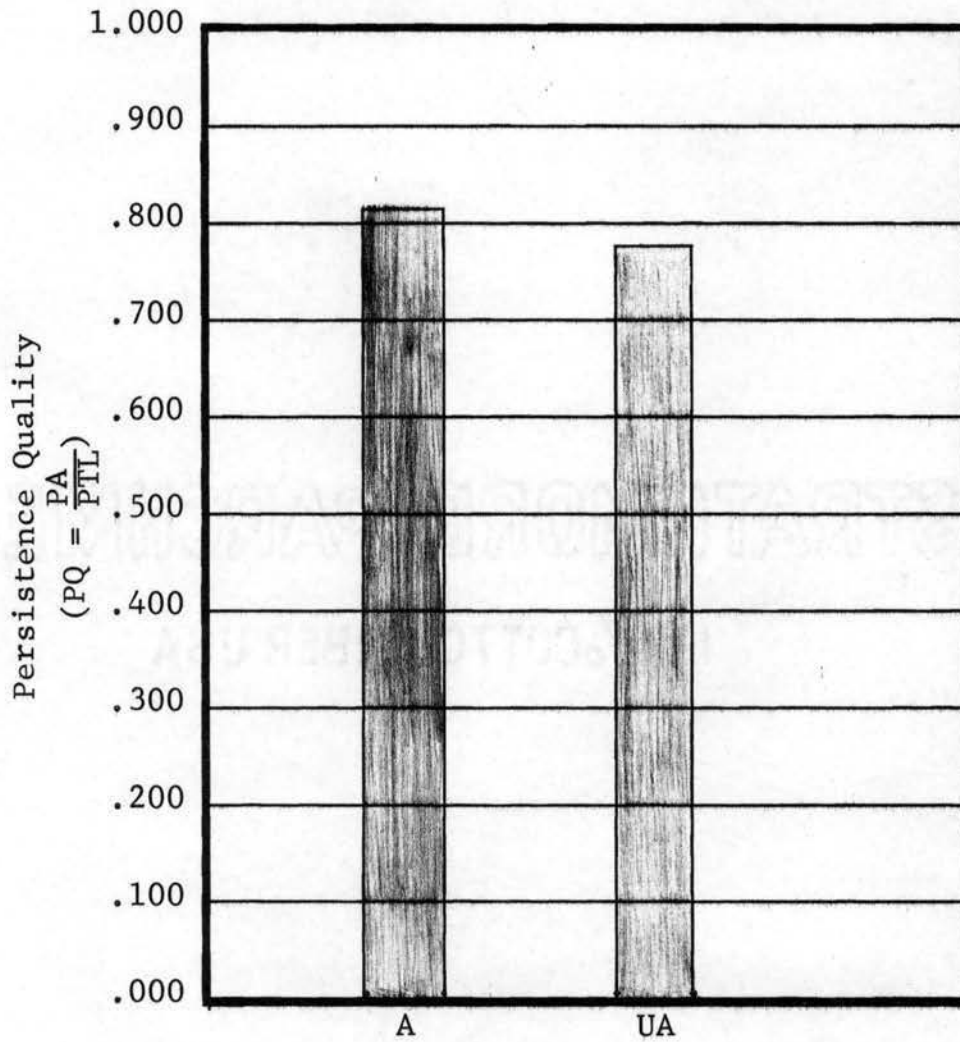


Figure 3. Persistence Quality Proportions of the Achiever and Underachiever Groups.

## CHAPTER V

### DISCUSSION

#### Review of Significant Findings

This investigation was undertaken to determine if persistence capacity differences existed between achievers and underachievers. Persistence capacity was divided into persistence task length, persistence accuracy, and persistence quality, each of which was separately analyzed. Results of the task length and accuracy treatments indicated that achievers were significantly more persistent than underachievers. There were, however, no statistically significant findings relative to persistence quality (see Figure 4). Achievers appear to continue longer and more accurately on a prescribed task though the proportion of their accuracy performance to their task length performance does not seem to differ noticeably from that of underachievers.

Results of this investigation have been revealing. Underachievers are at a disadvantage in their limited capacity to pursue a task as long and as accurately when compared to achievers. The relative equality of persistence capacity of the two groups is equally interesting. In effect, the proportion of persistence accuracy to persistence quality for either group is unaffected by the length of persistence

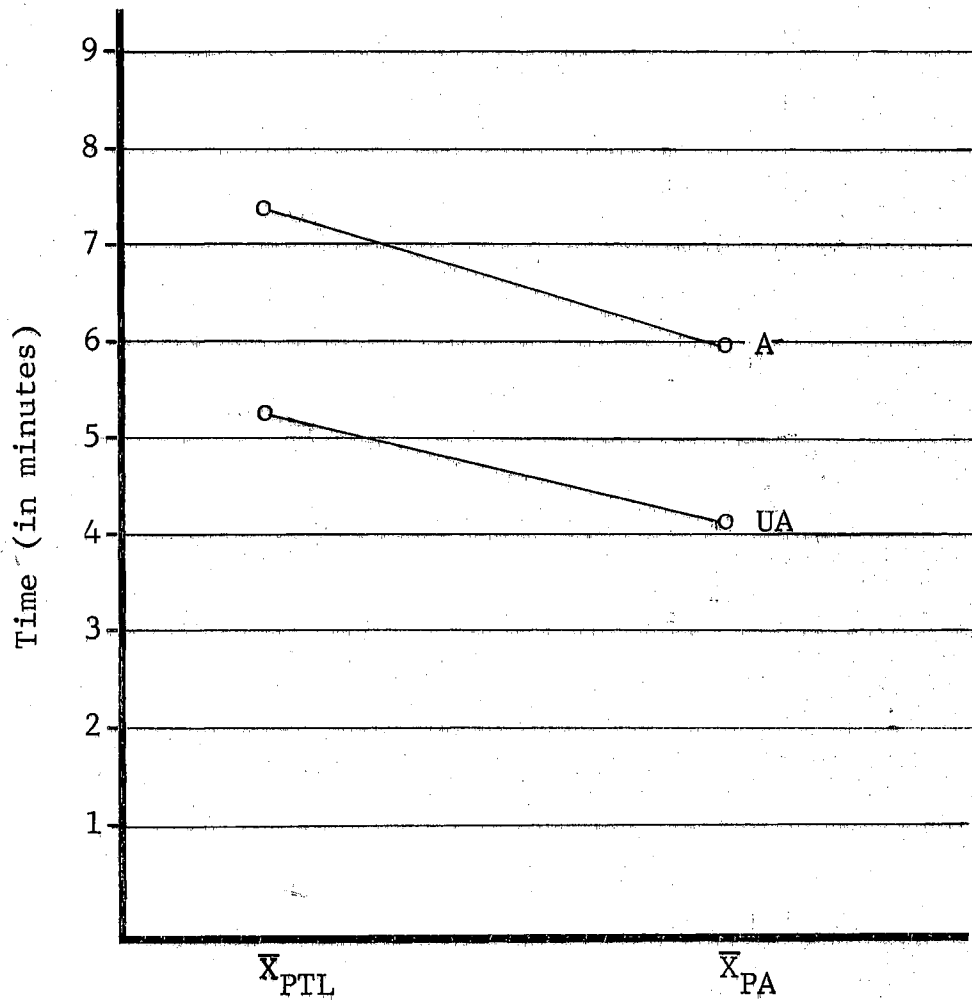


Figure 4. Achiever and Underachiever Persistence Task Length and Persistence Accuracy Means. Nearly parallel lines indicate similar persistence quality proportions between the two groups.

task performance. On the one hand, the underachiever appears unable to pursue lengthy tasks accurately. But he maintains a relatively accurate task length-accuracy ratio in comparison to his achiever counterpart. Educators would do well to consider the task length and accuracy limitations of the underachiever; using the achieving group as a standard of comparison, however, teachers need not be concerned about any supposed persistence quality deficiency of the underachiever.

#### Applications of the Study

The specific results of this study strongly tie academic achievement to the ability to accurately pursue ("stick-to") a task. It may well be that the dilemma of the underachiever is a function of learning tasks which demand persistence beyond his ability to cope. Educators would do well to cautiously observe the length of task-demands placed on the underachiever.

This study also implies that classroom behavior requiring precision over time discriminates against the underachiever's capacity for accuracy. It follows that the underachiever's performance may not be conducive to high-level accomplishment under usual classroom situations. For example, underachievers may not be able to produce sustained and accurate performance on such things as lengthy reading requirements, prolonged pencil and paper tasks, and physical and motor demands. Perhaps the most important suggestion

this study offers is that persistence limitations of the underachiever should be planned for in the classroom.

### Suggested Research Possibilities

Though results of this study can be linked to needed modifications in classroom approaches to the underachiever, it remains for further research to identify them. Optimal lengths of assignments in the various content areas must be determined in consideration of academic plans and schedules.

An equally compelling need is to identify performance decrements in persistence accuracy for various lengths of time. For example, there are probably temporal limitations beyond which one's index of persistence accuracy changes.

Although the pursuit rotor was emphasized in this investigation as a basic measure of persistence, it cannot be certain if persistence tasks of a more cognitive nature would produce similar findings. It remains, therefore, for further research to determine the effectiveness of using psychomotor measures on learning phenomena.

### Restrictions of the Findings

A number of limitations relative to the generalizations of the findings must be noted. Without identifying these restrictions, one may be dangerously tempted to relate the results beyond the population to which they apply.

It cannot be said, for example, that the persistence weaknesses noted among underachievers in this study are

typical of elementary and secondary school pupils. Perhaps these categories of students evidence different kinds and qualities of task continuance. To further complicate the situation concerning the persistence capacity of young children, it can be suspected that the very nature of early primary education does not demand long periods of involvement and commitment. How then, one wonders, can underachievement at an early age be accounted for if persistence as defined in this investigation is not required?

Another probable complicating variable influencing persistence and underachievement is sex. Though male underachievers are approximately four times as numerous as female underachievers, the latter group cannot be ignored. It is altogether possible that results derived from a sample of female students would not be similar to the ones found in this study. One must not, then, generalize these findings to females.

A third restriction of these findings involves intelligence. To some extent, persistence capacity of bright underachievers has been noted. But what of the persistence capacity of underachievers who are not so bright? They may exhibit much different abilities in task continuance. Such a possibility demands caution in characterizing all underachievers by the findings of this study.

Still another limitation of this investigation should necessarily involve the criterion on which underachievement was determined. This study identified underachievers

relative to an operationally defined population of achievers. That is, underachievement was assumed to exist if one's academic marks did not parallel the expected performance of an equally competent group of students who did achieve as expected. Rather than the underachiever's inability to persist, this investigation may have dealt with the achiever's unusual success at sticking to a task. In any event, the criteria and requirements for determining any level of achievement necessarily demands operational definition which may or may not meet the needs of the phenomena being measured. Underachievement as defined in this study may have been accurately treated. But it was only one of many ways in which it could have been defined. The results of this study, therefore, must be limited in their generalizability to underachievement identified in other ways.

Mention of a final limitation regarding the use of human subjects is in order. Since students were employed, the study is restricted by any number of variables typical of human behavior. It can never be certain that results were not in part artifact and a function of transitory motivational differences, sensory variations and peculiarities of instruments employed. At the same time, the particular manner in which subjects were selected for this study might have contaminated the findings. To some extent, they were "coerced volunteers." They were required to perform in artificial laboratory-type surroundings based on a scheduling procedure which provided systematic subject



participation. One is left to wonder how much the artificial nature of selection and participation affected results. It is these restrictions which demand caution in interpreting the findings of this investigation.

B I B L I O G R A P H Y

## SELECTED BIBLIOGRAPHY

- Alexander, W. P. "Intelligence, Concrete and Abstract," British Journal of Psychology. Monograph Supplements, 1935, No. 19.
- Atkinson, J. W. "Motivational Determinants of Risk-Taking Behavior." Psychological Review, LXIV (1957), 359-372.
- Atkinson, J. W. "Personality Dynamics." Annual Review of Psychology, XI (1960), 255-290.
- Bindra, D. Motivation: A Systematic Reinterpretation. New York: Ronald, 1959.
- Bruning, J. L., and Kintz, B. L. Computational Handbook of Statistics. Glenview: Scott-Foresman, 1968.
- Combs, C. F. "Perception of Self and Scholastic Underachievement in the Academically Capable." Personnel Guidance Journal, XLIII (1964), 47-51.
- Clark, W. H. "Two Tests for Perseverance." Journal of Educational Psychology, XXVI (1935), 604-610.
- Crutcher, R. "An Experimental Study of Persistence." Journal of Applied Psychology, XVIII (1934), 409-417.
- Davids, A. "Cognitive Styles in Potential Scientists and in Underachieving High School Students." Journal of Special Education, II (1968), 197-201.
- Davids, A., Sidman, J., and Silverman, M. "Tolerance of Cognitive Interference in Underachieving and High Achieving Secondary School Boys." Psychology in the Schools, V (1968), 222-229.
- Dedek, S. Z., and Lester, E. P. "The Good Child Facade in Chronic Underachievers." American Journal of Orthopsychiatry, XXXVIII (1968), 153-160.
- Dollard, J., and Miller, N. E. Personality and Psychotherapy: An Analysis in Terms of Learning, Thinking and Culture. New York: McGraw-Hill, 1950.

- Edwards, Allen L. Statistical Methods for the Behavioral Sciences. New York: Holt, Rinehart, and Winston, 1957.
- Eysenck, H. J. Dimensions of Personality. London: Kegan Paul, 1947.
- Eysenck, H. J. The Scientific Study of Personality. New York: Macmillan, 1952.
- Eysenck, H. J. The Dynamics of Anxiety and Hysteria. London: Kegan Paul, 1957.
- Fleishman, E. A. "Abilities at Different Stages of Practice in Rotary Pursuit Performance." Journal of Experimental Psychology, LX (1960), 162-171.
- Gilmore, W. "Attention and Underachievement." Journal of Education, CL (1968), 41-66.
- Hartshorne, M., May, M. A., and Maller, J. B. Studies in the Nature of Character: II. Studies in Service and Self-Control. New York: Macmillan, 1929.
- Havighurst, R. J. "Conditions Productive of Superior Children." Teachers College Record, LXII (1961), 524-531.
- Haywood, H. C. "Motivational Orientation of Overachieving and Underachieving Elementary School Children." American Journal of Mental Deficiency, LXXII (1968), 662-667.
- Hebb, D. O. The Organization of Behavior. New York: Wiley, 1949.
- Howells, T. H. "An Electrical Stimulus Apparatus." American Journal of Psychology, XLIII (1931), 122-123.
- Howells, T. H. "An Experimental Study of Persistence." Journal of Abnormal and Social Psychology, XXVIII (1933), 14-29.
- Hull, C. L. Principles of Behavior. New York: Appleton-Century, 1943.
- Kremer, A. H. "The Nature of Persistence." Studies in Psychiatry, Catholic University of America, V (1942), 1-40.
- Lafayette Instrument Company. A Catalog of Scientific and Laboratory Instruments. Lafayette, Indiana: Lafayette Instrument Company, Catalog No. 867.

- Lewin, K. Dynamic Theory of Personality. New York: McGraw-Hill, 1935.
- Lewin, K. "Behavior and Development as a Function of the Total Situation." In L. Carmichael (Ed.), Manual of Child Psychology. New York: Wiley, 1946, 791-844.
- Loveless, N. E., and Holding, D. H. "Reaction Time and Tracking Ability." Perceptual and Motor Skills, IX (1959), 134.
- MacArthur, R. S. "An Experimental Investigation of Persistence in Secondary School Boys." Canadian Journal of Psychology, IX (1955), 42-54.
- Marietta Apparatus Company. Catalog No. 69. Marietta, Ohio: Marietta Apparatus Company, 1969.
- McDougall, W. An Introduction to Social Psychology. London: Methuen, 1908.
- McNemar, Q. Psychological Statistics. New York: John Wiley and Sons, 1962.
- Morgan, J. B., and Hull, H. L. "The Measurement of Persistence." Journal of Applied Psychology, X (1926), 180-187.
- Moyer, K. E., and Gilmer, B. von H. "Attention Spans of Children for Experimentally Designed Toys." Journal of Genetic Psychology, LXXXVII (1955), 187-201.
- Nason, L. J. "Academic Underachievement of Gifted High School Students." University of Southern California Education Monograph Series, XVII (1958), No. 17.
- Pavlov, I. P. Conditioned Reflexes. London: Oxford University Press, 1927.
- Peak, H. "Attitude and Motivation." In M. R. Jones (Ed.), Nebraska Symposium on Motivation: 1955. Lincoln: Nebraska University Press, 1955, 149-188.
- Perkins, H. V. "Classroom Behavior and Underachievement." American Educational Research Journal, II (1965), 1-12.
- Pierce, J. V. "Personality and Achievement Among Able High School Boys." Journal of Individual Psychology, XVII (1961), 102-107.
- Pope, L. T. "Attention Level and Visual and Auditory Monitoring Performance." USAF AMRL Technical Document Reports, 1962, No. 62-97.

- Popham, W. J. Educational Statistics: Use and Interpretation. New York: Harper and Row, 1967.
- Porter, J. P. "A Comparative Study of Some Measures of Persistence." Psychological Bulletin, XXX (1933), 664.
- Rethlingschafer, D. "The Relationship of Tests of Persistence to Other Measures of Continuance of Activities," Journal of Abnormal and Social Psychology, XXXVII (1942), 71-82.
- Ryans, D. G. "The Meaning of Persistence." Journal of General Psychology, XIX (1938), 79-96.
- Shaw, M. C., and Black, D., "The Reaction to Frustration of Bright High School Underachievers." California Journal of Educational Research, XI (1960), 120-124.
- Snedecor, G. W., and Cochran, W. G. Statistical Methods. Ames, Iowa: Iowa University Press, 1967.
- Steel, R. G. D., and Torrie, J. H. Principles of Statistics. McGraw-Hill, 1960.
- Symonds, P. M. Diagnosing Personality and Conduct. New York: Century Company, 1931.
- Thornton, G. R. "A Factor Analysis of Tests Designed to Measure Persistence." Psychological Monographs, LI (1939), No. 3.
- Tolman, E. C. Purposive Behavior in Animals and Men. New York: Appleton-Century, 1932.
- Webb, E. "Character and Intelligence." British Journal of Psychology. Monograph Supplements, 1915, No. 3.
- Wolf, T. H. "The Effect of Praise and Competition on the Persistent Behavior of Kindergarten Children." Institute of Child Development and Welfare Monographs. University of Minnesota, 1939, No. 15.

A P P E N D I X

AMERICAN COLLEGE TEST SCORES, GRADE POINT  
AVERAGES, PERSISTENCE TASK LENGTH  
SCORES, AND PERSISTENCE ACCURACY  
SCORES FOR ACHIEVERS

Achievers	ACT	GPA	Persistence Task Length	Persistence Accuracy
1	25	3.721	2.68	2.47
2	26	3.666	3.82	3.05
3	30	3.756	15.82	15.05
4	27	3.653	8.18	6.89
5	26	3.877	12.41	11.18
6	25	3.634	10.01	9.27
7	25	3.600	9.73	7.97
8	29	3.560	1.39	1.04
9	27	3.515	17.93	14.76
10	25	3.532	4.06	3.66
11	29	3.700	9.55	8.03
12	27	3.677	3.30	2.18
13	25	3.506	18.12	16.21
14	26	3.578	4.56	4.01
15	29	4.000	4.65	2.47
16	26	3.515	5.36	3.09
17	32	3.877	8.49	7.40
18	29	3.762	5.65	5.19



Achievers	ACT	GPA	Persistence Task Length	Persistence Accuracy
19	30	3.824	6.13	4.43
20	26	3.525	4.23	2.92
21	31	3.679	5.22	4.08
22	27	3.565	4.37	2.35
23	28	3.773	11.27	10.11
24	28	3.762	12.23	9.24
25	25	3.571	2.91	2.28
26	28	3.580	4.34	2.99
27	27	3.659	5.48	4.54
28	27	3.647	7.80	6.69
29	30	3.586	7.75	7.07
30	28	3.875	2.65	2.26
31	25	3.600	2.17	1.74
32	25	3.892	5.84	5.38
33	30	3.659	3.90	1.63
34	28	3.620	6.27	4.50
35	25	3.525	5.81	4.14
36	27	3.556	12.21	10.32
37	26	3.530	6.24	4.64
38	27	3.519	4.71	3.98
39	29	3.540	7.46	5.90
40	30	3.608	9.78	7.94
41	27	3.613	14.36	11.13
42	26	3.578	4.28	3.88

Achievers	ACT	GPA	Persistence Task Length	Persistence Accuracy
43	26	3.622	6.27	4.81
44	27	3.904	11.25	8.60
45	30	3.652	7.73	6.36
46	29	3.556	8.79	6.93
47	27	3.549	6.38	5.67
48	26	3.551	8.12	6.78

AMERICAN COLLEGE TEST SCORES, GRADE POINT  
AVERAGES, PERSISTENCE TASK LENGTH  
SCORES, AND PERSISTENCE ACCURACY  
SCORES FOR UNDERACHIEVERS

Under- Achievers	ACT	GPA	Persistence Task Length	Persistence Accuracy
1	27	2.400	3.69	3.33
2	26	2.379	4.01	1.96
3	28	2.478	3.37	1.22
4	29	1.946	2.00	.91
5	27	2.137	1.98	1.27
6	27	1.804	2.24	1.78
7	28	1.862	1.56	1.02
8	29	2.489	4.27	3.79
9	26	2.170	6.03	5.59
10	27	2.128	2.39	1.99
11	26	2.195	9.79	8.30
12	25	2.159	3.44	2.99
13	25	2.010	9.65	8.73
14	25	2.347	15.09	13.41
15	25	2.076	7.12	6.27
16	27	2.385	3.42	2.67
17	25	1.857	3.08	2.22
18	26	2.123	4.35	3.26

Under-Achievers	ACT	GPA	Persistence Task Length	Persistence Accuracy
19	27	2.278	3.33	1.25
20	26	1.858	3.96	3.18
21	27	1.876	2.64	2.01
22	25	2.310	3.62	3.22
23	26	2.407	7.65	4.59
24	25	2.043	3.45	2.09
25	25	2.346	1.36	.51
26	27	2.146	2.20	1.57
27	29	1.991	14.21	13.36
28	26	1.831	10.78	8.54
29	27	2.431	1.67	1.19
30	26	1.945	2.59	2.25
31	27	2.069	2.33	1.77
32	25	2.122	4.29	2.94
33	25	2.346	6.96	5.59
34	27	1.659	5.04	4.33
35	25	2.485	2.39	1.88
36	25	2.479	2.24	1.84
37	25	1.892	5.18	3.23
38	26	2.414	11.25	8.66
39	26	2.154	10.06	6.81
40	25	2.468	4.63	3.10
41	25	1.968	15.51	13.68
42	26	2.061	.94	.86

Under-Achievers	ACT	GPA	Persistence Task Length	Persistence Accuracy
43	27	2.244	5.91	5.34
44	26	2.413	2.96	1.53
45	25	2.439	3.42	2.21
46	25	2.161	6.91	6.23
47	26	2.174	12.53	9.22
48	28	2.477	1.61	1.42

VITA

David Michael Seifert

Candidate for the Degree of  
Doctor of Education

Thesis: PERSISTENCE CAPACITY AND UNDERACHIEVING SENIOR MALE COLLEGE STUDENTS

Major Field: Educational Psychology

Biographical:

Personal Data: Born in Concordia, Kansas, August 24, 1943, the son of Mr. and Mrs. Andrew F. Seifert, Jr.

Education: Graduated from Clyde Rural High School, Clyde, Kansas, in May, 1961; attended Fort Hays Kansas State College from 1961 through 1966 and from 1967 through 1968; received the Bachelor of Arts degree in 1965 with a major in Psychology and the Master of Science degree in 1968 with majors in Counseling and Psychology from Fort Hays Kansas State College; attended Oklahoma State University from 1968 through 1970 and completed the requirements for the Doctor of Education degree in July, 1970.

Professional Experience: Psychologist, Larned Kansas State Security Hospital, 1966-1967; Graduate Assistant, Counseling Center, Fort Hays Kansas State College, 1967-1968; Psychologist, Walk-In and Out-Patient Psychiatric Units, Summer, 1968; Graduate Teaching Assistant, Department of Educational Psychology, Oklahoma State University, 1968-1969; NDEA Research Fellow, Summer, 1969; Instructor, Department of Educational Psychology, 1969-1970, Summer, 1970.