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EXTENT TO WHICH CERTAIN PSYCHOLOGICAL FACTORS  
AFFECT READING IN GRADE IV

**CENTRE FOR NEWFOUNDLAND STUDIES**

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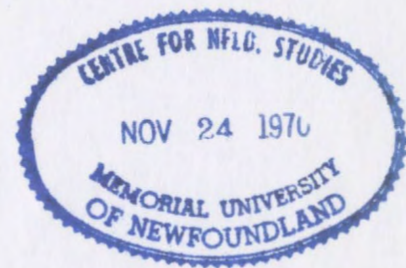
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MEMORIAL UNIVERSITY OF NEWFOUNDLAND

EXTENT TO WHICH CERTAIN PSYCHOLOGICAL FACTORS  
AFFECT READING IN GRADE IV

by

© SISTER MARGARET O'GORMAN, R.S.M.

A THESIS

SUBMITTED TO THE FACULTY OF EDUCATION  
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE  
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MEMORIAL UNIVERSITY OF NEWFOUNDLAND  
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The undersigned certify that they have read, and recommend to the Faculty of Education for acceptance, a thesis entitled "Extant to Which Certain Psychological Factors Affect Reading in Grade IV" submitted by Sister Margaret O'Gorman in partial fulfilment of the requirements for the Degree of Master of Education.

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## ABSTRACT

The present study examined the relationship between certain Psychological variables and the Reading Achievement of a sample of Elementary School pupils. More specifically, it investigated the extent to which certain perceptual, conceptual, and personality variables are related to Vocabulary scores and Paragraph Comprehension scores as measured by the Nelson Reading Test.

The sample used in the present study consists of 90 boys randomly selected from a group of 305 boys randomly selected by a previous investigator from the population of Grade IV boys of 1968 enrolled in schools conducted by the Roman Catholic School Board in St. John's.

Data for the present study include scores obtained by the previous investigator on Vocabulary, Paragraph Comprehension; the socio-economic factors of Father's Occupation, Mother's Education, Number of Siblings, Number of Newspapers received in the home, and Number of days absent from school in a given period; the educational input factors of Size of School, and Teacher Qualifications.

Added to these predictor variables by the present study are certain perceptual factors as measured by The Bender-Gestalt Test and The Uznadze Set Test; certain



conceptual factors as measured by the Kasanin-Hanfmann (Vigotsky) Concept Formation Test; certain personality factors as measured by The Taylor Manifest Anxiety Test and The McClelland n-Achievement Test; and the intellectual factors of Verbal and Nonverbal I.Q. from the Lorge Thorndike Intelligence Test.

The present study found n-Achievement, and Level of Verbalization of the Vigotsky Test to correlate significantly at the .01 level with both Vocabulary and Paragraph Comprehension. It found Time Required to Form a concept to correlate significantly at the .05 level with Paragraph Comprehension.

On the basis of the multiple correlation and F-ratios obtained, the present study revealed that in addition to socio-economic and educational factors, the psychological factors of n-Achievement, Time Required to Form a Concept, Total Score on the Concept Formation Test, and Level of Verbalization contribute significantly at the .01 level to the multiple correlation of predictor variables with Vocabulary and especially with Paragraph Comprehension taken as criteria.

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## CHAPTER I

### PROBLEM

This study attempts to determine the extent to which certain psychological factors contribute to reading discrepancies among elementary school pupils. More specifically, it investigates the relationship between certain perceptual, conceptual, and personality factors and the reading achievement of a sample of elementary school pupils in St. John's, Newfoundland

#### I. BACKGROUND OF THE STUDY

The large proportion of drop-outs from our Newfoundland schools--in 1962, it was more than double the national average in Canada<sup>1</sup>--and the high percentage of retardation of pupils are of major concern. Statistics indicate that these problems have been persistent and that they are still with us.

Within the past five years efforts have been made to determine the nature and extent of our educational problems. The Royal Commission on Education and Youth, under the

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<sup>1</sup>J. E. Cheal, Investment in Canadian Youth, (Toronto: The MacMillan Co., Ltd., 1963), pp. 39-41.

its chairman Dr. P. J. Warren, was a major effort to investigate underlying problems in the educational system in Newfoundland. The reports of that Commission point out serious weaknesses in many areas. In its study of pupil achievement at the Grade VIII level, it indicates that: "The most significant weaknesses are found in tests or reading comprehension and arithmetic problem solving."<sup>1</sup> Reporting on surveys of reading and mathematics made by the Newfoundland Department of Education, 1964-65, the Royal Commission states that 27 per cent of the students tested in Grades IX, X, and XI had reading levels below Grade VII. Similar studies were made at the Grade IV level with equally disconcerting results. Using the norms established for rural schools in Ontario, it was found that four out of f every five of our Grade IV students were below the Ontario standard.<sup>2</sup>

Since achievement in all subject areas is so dependent upon the reading ability of the student, and since it has been so clearly pointed out that many of our Newfoundland students are severely retarded in reading achievement, educators have been increasing their efforts to improve the

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<sup>1</sup>Province of Newfoundland and Labrador, Report of the Royal Commission on Education and Youth, I (St. John's; The Queen's Printer, 1967), p. 39.

<sup>2</sup>Ibid., pp. 43-44.

reading situation. Their efforts are, however, seriously impeded because of the lack of research into the nature of the reading problem. Until the roots of the difficulty have been determined, any attempt at improvement may well be missing the real problem.

II. NEED FOR THE PRESENT STUDY

Although educators in Newfoundland have been aware, for some time, of the existence of severe reading problems, only recently have they begun to investigate causes of reading difficulties. Of particular interest to the writer is a study presently being made by Roe.<sup>1</sup> In her study, Roe is investigating various socio-economic and educational factors with the hope of determining the extent to which these variables affect reading achievement in Grade IV. Although her study is not completed, sufficient has been done to indicate that some but not all of the discrepancies can be attributed to differences in socio-economic backgrounds. There is still much to be explored in the field of reading difficulties. Improving socio-economic conditions would undoubtedly help solve our reading problems in Newfoundland but cannot be expected to

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<sup>1</sup>Geraldine M. Roe, "The Relationship Between Certain Social, Economic, and Environmental Factors and Reading Achievement in Grade IV, "Unpublished Master's Thesis being conducted at Memorial University of Newfoundland. See also Hector Pollard, "Socioeconomic Versus Educational Input Variables and Reading Achievement in Rural Newfoundland, "Unpublished Master's Thesis, Memorial University of Newfoundland, 1970.



completely resolve the difficulties.

This statement, together with a statement made by French, Director of the Devereux Foundation, that: "The individual is a physical organism, functioning in a social environment, in a psychological manner,"<sup>1</sup> leads the writer to believe that an investigation of the relationship between certain psychological factors and the reading scores of the Roe study would be both interesting and profitable.

### III. SCOPE OF THE STUDY

Research findings discussed in Chapter II of this study indicate that reading difficulties are to some extent related to perceptual, conceptual, and personality variables. Other writers including Roe<sup>2</sup> have found a relationship to exist between certain socio-economic and educational input variables and reading achievement.

This study hypothesizes that certain psychological factors contribute to an explanation of variations in reading achievement, over and above the contribution made by certain socio-economic and educational factors. These psychological factors comprise perceptual, conceptual, and personality f

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<sup>1</sup>Edward L. French, "Psychological Factors in Cases of Reading Difficulty," J. F. Magary and J. R. Eichorn, editors, The Exceptional Child, (Toronto: Holt, Rinehart and Winston, 1966), p. 427.

<sup>2</sup>Geraldine M. Roe, op. cit..

factors. More specifically, it is hypothesized that there is a significant relationship between visual-motor perception, set fixation, set extinction, concept formation, ability to verbalize a concept, anxiety, need achievement and reading.

To investigate each of the psychological factors listed above, the writer used the Bender-Gestalt Test, The Uznadze Set Test, The Kasanin-Hanfmann (Vigotsky) Concept Formation Test, The Taylor form of The Manifest Anxiety Test, and the McClelland n-Achievement Test. These tests were administered to a sample of 90 boys from the Roe study. Principals of the eleven schools in which pupils were enrolled were contacted and arrangements were made for two interviews with the pupils selected. One interview involved the administration of the n-Achievement Test, The Bender-Gestalt Test, and the Anxiety Test. These tests were administered as group tests. During the other interview, the investigator administered the Set Test and the Concept Formation Test. These tests were administered as individual tests.

#### IV. RESEARCH INSTRUMENTS

The Bender-Gestalt Test was used to measure visual-motor perception. French reports that the Bender-Gestalt Test is the best known test for measuring "the organization of visually perceived Gestalten and translation of these into motor performance."<sup>1</sup> The test consists of a number of drawings which the child perceives and reproduces using pencil and paper.

The Uznadze spheres were used to measure set fixation and set extinction. This test, according to the theory of set proposed by Uznadze, measures a person's ability to establish and maintain a "set", which is defined as a state of readiness for a definite activity.<sup>2</sup> The test consists of presenting to a subject who is blindfolded two unequal sized spheres to determine his ability to perceive them as unequal, then of presenting him with equal spheres to determine whether he perceives them as unequal. When the equal spheres are perceived as unequal, a set is said to be fixed. When the subject is again able to perceive the equal spheres as equal a set is said to be extinguished.

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<sup>1</sup>E. L. French, op. cit., p. 431.

<sup>2</sup>D. M. Uznadze, The Psychology of Set, Translated by Basuk Haugh, (New York: Consultants Bureau, 1966), p. 90.

The Kasanin-Hanfmann Concept Formation Test was used to measure concept formation ability. This test makes use of the Vigotsky Blocks. These blocks were originally prepared by Ach and were adapted by Vigotsky to study the concept formation of children in their own right.<sup>1</sup>

To measure anxiety, the Children's Form of the Taylor-Manifest Anxiety Test was used. This test consists of fifty-three statements to which the child answers "Yes" or "No". By his answers one determines his level of anxiety. The test includes a Lie Scale which determines the extent to which a child tends to falsify his answers.

Need achievement was measured by means of the McClelland projective technique. The children are required to react to certain pictures, which are shown to them, by writing a story. Their need achievement level is determined by the number of times they express a need to do well, to succeed, etc. in their stories.

Further details about these tests will be given in Chapter III.

## V. RESEARCH SAMPLE

The sample to be used in this study consisted of 100 students selected randomly from the 305 students used in the

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<sup>1</sup>Jonas Langer, Theories of Development, (Toronto: Holt, Rinehart and Winston, Inc., 1969), p. 80.

Roe study mentioned earlier in this chapter. All subjects had been selected from the population of Grade IV boys of 1968 attending schools conducted by the Roman Catholic School Board in St. John's, Newfoundland.

## VI. ORGANIZATION OF THE REPORT

Before proceeding with an account of this present research, a review of the related literature together with the hypotheses formulated on the basis of past findings will be given in Chapter II. Chapter III will contain a detailed account of the research design, of the instruments used, and of procedures to be followed in this study. Chapter IV will present a description of the analysis of data and present the findings. Chapter V will present the summary, conclusion and recommendations reached as a result of this study.

## CHAPTER II

### RELATED LITERATURE AND STATEMENT OF HYPOTHESES

Robinson states that "research and reports of practices during the last two decades reemphasize the complexity of the reading task."<sup>1</sup> She states also that research findings point out the wide range of factors which affect success in learning to read.<sup>2</sup>

The purpose of this study is to show that certain psychological factors will contribute to the explanation of variations in reading achievement, over and above the contribution made by certain socio-economic and educational input factors. The review of the literature will be confined therefore, to the areas of particular interest here. Hence, this chapter will give a review of the literature related to tests being used in this study and to research findings in the following areas: (1) perceptual ability as it is related to reading, (2) concept formation ability and its relationship to reading, (3) certain personality characteristics and their effects on reading.

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<sup>1</sup>Helen M. Robinson, "Factors Which Affect Success in Reading," Elementary School Journal, LVIII (February, 1958), p. 263.

## I. PERCEPTUAL ABILITY AND READING

Two aspects of perception will be considered in the present study--visual-motor perception as measured by the Bender-Gestalt Test, and Set Fixation and Set Extinction as measured by the Uznadze Set Test.

### Visual-Motor Perception

The first aspect of perception to be investigated in this study is the visual-motor perceptual function. French states that:

In the psychological clinic there are many techniques for investigating the visual-motor perceptual function; that is, the organization of visually perceived Gestalten and the translation of these into motor performance. Best known of these is the Bender-Gestalt Test.<sup>1</sup>

Bender reports from her study that it appears

. . . that the visual motor gestalt function is a fundamental function associated with language ability and closely associated as visual perception, manual motor ability, memory, temporal and spatial concepts, and organization of representation.<sup>2</sup>

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<sup>1</sup>Edward L. French, "Psychological Factors in Cases of Reading Difficulties," J. R. Magary and J. R. Eichorn, editors, The Exceptional Child, (Toronto: Holt, Rinehart and Winston, 1966), p. 427.

<sup>2</sup>Lauretta Bender, A Visual Motor Gestalt Test and Its Clinical Use (Research Monographs No. 3. New York: The American Orthopsychiatric Association, 1938), p. 112.

Fabian, in 1945, found that the retarded readers tend to distort the figures on the Bender-Gestalt as they are copied.<sup>1</sup> French feels also that the tendency to alter horizontal perceptions to the vertical is possibly related to reversal of words and letters discussed as early as 1937 by Orton.<sup>2</sup>

A study made by Goins of visual perceptual ability in first grade children using non-verbal material indicated that good readers were able to hold in mind a total configuration while at the same time manipulating the parts.<sup>3</sup>

The theory of visual perception as applied to reading according to Goins, is that effective reading involves the ability to grasp the wholeness of words, phrases and sentences while at the same time being able to concentrate on the parts. The good reader, he contends, possesses or develops the ability to do both of these things simultaneously.<sup>4</sup>

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<sup>1</sup>A. A. Fabian, "Vertical Rotation in the Visual-Motor Perception--Its Relation to Reading Reversals," E. L. French, op. cit., p. 431.

<sup>2</sup>Ibid, p. 431, op. cit., p.

<sup>3</sup>J. T. Goins, "Visual Perception Abilities and Early Reading Progress," *The Reading Teacher*, XIII (October, 1959) p. 11.

<sup>4</sup>Ibid., p. 11.



Studies made in 1948 by Schonell<sup>1</sup> and in 1957 by Vernon<sup>2</sup> show that the perceptual level of older retarded readers is comparable to that of younger beginners.

Jutison, in her study of Visual Perception of Form and School Achievement, used six geometric forms from the Bender Gestalt Test, Ellis Visual Motor Test, and the Divided rectangle from the Stanford Binet. She found from her study of third grade pupils in the Public Schools of Montgomery County that there was a positive, significant correlation between copying ability as a measure of form perception and the separate tasks of achievement in reading and arithmetic. The author concluded that her findings give limited quantitative evidence of the critical role of visual form perception and its relationship to the reading task.<sup>3</sup>

Feldmann concentrated on Visual Perception Skills of Children and their Relation to Reading. She found, using the Bender-Gestalt Test, Reversal Test, and the Street

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<sup>1</sup>F. J. Schonell, Backwardness in Basic Subjects, J. T. Goins, (ed.), ibid., p. 13.

<sup>2</sup>M. D. Vernon, Backwardness in Reading, J. T. Goins (ed.), Ibid., p. 13.

<sup>3</sup>Gertrude G. Jutison, "Visual Perception of Form and School Achievement (An Exploratory Study of the Relationship Between Form Perception and School Achievement Among Third Grade Pupils in the Public Schools of Montgomery County, Maryland)," Journal of Developmental Reading, V-VI (1962-63), p. 157.

Gestalt Completion Test, that reading skills showed a positive relationship to the three visual perception tests and a high relationship to the age-experience factor.<sup>1</sup>

Marjorie J. McLean carried out an interesting study using only the Bender-Gestalt Test in relation to reading difficulties. This study found: (1) that the Bender-Gestalt test differentiated between the good and poor readers; significance at the .01 level, (2) correlations between reading and Bender-Gestalt scores for good readers were not significant, (3) correlations between reading and Bender-Gestalt scores for poor readers was significant at the .01 level.<sup>2</sup>

Robinson contends that visual discrimination, essential to perceiving the intricate details of our words can be increased through consistent attention to form, shape likenesses, and differences in pictures and drawings.<sup>3</sup>

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<sup>1</sup>S. C. Feldmann, "Visual Perception Skills of Children and Their Relation to Reading," Journal of Developmental Reading, V-VI (1962-63), p. 157.

<sup>2</sup>Marjorie J. McLean, "A Study of the Bender Visual-Motor Gestalt Test in Relation to Reading Difficulties," unpublished Master's Thesis, University of Manitoba, 1962, reported in The Canadian Education and Research Digest, II, (June, 1962), p. 143.

<sup>3</sup>H. M. Robinson, "Factors Which Affect Success in Reading," Elementary School Journal, LVIII (February, 1958), pp. 263-69.

This observation agrees with the finding of Leton that reading disability cases were more deficient in graphe-motor and oculomotor skills than were normal readers.<sup>1</sup>

To determine whether the Bender-Gestalt Test was simply measuring intelligence, Peek tested the hypothesis that intellectual level and degree of intellectual impairment could be subjectively established from B-G protocols. The B-G test was administered to 100 psychiatric in-patients. Three judges estimated from B-G protocols the two factors mentioned above. The hypothesis was not confirmed.<sup>2</sup>

In light of the literature just reviewed, this study sets forth the following hypothesis:

H<sub>1</sub> There is a negative correlation between visual-motor perception scores as measured by the Bender-Gestalt Test and reading achievement.

A negative correlation, in this case means a positive relationship since low scores on the Bender-Gestalt Test indicate better performance and would be expected to indicate higher reading scores.

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<sup>1</sup>D. A. Leton, "Visual-Motor and Ocular Efficiency in Reading," Percept and Motor Skills, XV (October, 1962), pp. 407-32. (PA 37:8253).

<sup>2</sup>R. Peek and L. H. Storms, "Judging Intellectual Status From the Bender-Gestalt Test," Journal of Clinical Psychology, XIV (July, 1958), pp. 296-99.

### Set Fixation and Set Extinction

The second aspect of perception to be investigated in the present study is that of "set". Uznadze defines "set" as the "integral, fundamental reaction to a situation where there is a problem to be considered and solved."<sup>1</sup>

According to the theory of set, the individual interacts with his environment and his activity is directed through the mediation of set. The specific level of human activity which interests us here is the intellectual level where man's behaviour is governed by reflection.<sup>2</sup> Reading requires man not only to perceive words and phrases but also to reflect in order to grasp their meaning.

Hritzuk et al. conclude that because language plays such an important part in reflection, man can imagine problem situations, arrive at possible solutions, and develop a definite set of activity without recourse to the real situation.<sup>3</sup> This, it would seem, is what we do when we read--we perceive letters which form words which in turn form

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<sup>1</sup>R. Peek and L. H. Storms, "Judging Intellectual Status From the Bender-Gestalt Test," Journal of Clinical Psychology, XIV (July, 1958), pp. 296-99.

<sup>2</sup>D. N. Uznadze, op. cit., p. 117.

<sup>3</sup>J. Hritzuk et al., "Some Soviet Approaches to the Study of Personality," The Canadian Psychologist, X (February, 1969), pp. 43-44.

sentences; we observe them, and through a process of reflection we recognize what they are.

Sodhi states in his thesis that the course of man's mental life seems to be changed from perception at the level of sets to entities of reflection.<sup>1</sup>

Although no research has used the Set Fixation or Set Extinction Test in relation to reading, it has been used with success in two studies relative to language. Hartzog on 1967 investigated set characteristics of linguistic codes,<sup>2</sup> and Sodhi in 1968 investigated rigidity and set in second language acquisition.<sup>3</sup> Although Sodhi did not find the number of trials needed for good and poor language learners to acquire set fixation to be significantly different, he did find a significant difference between the two groups on the number of trials required to extinguish a set.

For the present study, it has been hypothesized that pupils who readily fixate a set and those who with relative ease extinguish a set will have less difficulty in learning

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<sup>1</sup>S. Sodhi, "Rigidity and Set in Second Language Acquisition," unpublished Doctor's Thesis, Department of Educational Psychology, University of Alberta, 1968, pp. 51-53.

<sup>2</sup>J. Hritzuk et al., op. cit., pp. 43-44.

<sup>3</sup>S. S. Sodhi, op. cit., pp. 51-53.

to read their native language than will those who take longer to fixate or to extinguish a set. This means that a negative correlation in each of the hypotheses stated below will mean a positive relationship.

H<sub>2</sub> (a) There is a negative correlation between number of trials required to fixate a set as measured by the Uznadze Set Test and reading achievement.

(b) There is a negative correlation between number of trials required to extinguish a set as measured by the Uznadze Set Test and reading achievement.

## II. CONCEPTUAL ABILITY AND READING

Vigotsky believed that a study of the acquisition of thought in children requires more than simply a study of the child's ability to understand and communicate existing concepts. He contended that to study concepts in children, concepts as formed by children must be studied in their own right; hence, he adapted a test devised by Ach in 1921 to measure concept formation in children.

This test enables the researcher to discover the level of concept formation reached by each child. The first stage of concept formation ability is the primitive level where the child simply forms "heaps" of blocks with no other reason than that they are "linked by chance in the child's perception." The second level is known as the pseudo-conceptual

level at which stage the child is "thinking in complexes". His reasons are, at this stage, not based solely on subjective impressions but on actual similarities which he sees between the blocks. At this point his reasoning is said to be "concrete and factual rather than abstract and logical". The third level is the conceptual level which requires of the child the ability to synthesize and to analyze. This demands of the child a constant movement in thought from the general to the particular.<sup>1</sup>

According to Vigotsky, this is the ability required in reading which he considers to be an analytic-synthetic process whereby sentences are contracted into thoughts.<sup>2</sup>

Meece reports that "there is a scarcity of controlled, systematic studies using normal children as Ss."<sup>3</sup> The Vigotsky Test was, however, used by Thompson in 1941 to investigate performance and verbalization levels of children of average-intelligence in Grades I through IV. Although Thompson did not treat the data statistically, she

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<sup>1</sup>J. Langer, Theories of Development, (Toronto; Holt, Rinehart and Winston, Inc., 1969), pp. 80-81.

<sup>2</sup>D. Lissak, "Reading Difficulties--A Psycho-Educational Analysis of a Cognitive Dysfunction," Canadian Psychologist, IX (April, 1968), p. 126.

R. S. Meece and S. Rosenblum, "Conceptual Thinking of Sixth-Grade Children as Measured by the Vigotsky Block Test," Psychological Reports, XVII (1965), p. 195.

did find that the performance level of older subjects was higher.<sup>1</sup>

Meece and Rosenblum in 1965 conducted a study for the purpose of obtaining normative data from the Vigotsky Test. This study used sixth grade pupils from four Public Schools in Albuquerque, New Mexico as subjects. The Vigotsky Block Test was given over a four week period. The method of administration was basically the same as that used by Kasanin and Hanfmann in 1937 but with a slight modification in timing. Results show that subjects achieved a high level of success on: (1) verbalization of the principle involved in solving the task (Level of Verbalization), (2) performance without error once the correct principle had been elicited (Final Error). Highly significant correlations were found between mental age and Level of Verbalization (-.368). This correlation was negative because the highest level of verbalization was assigned a score of 11", while failure to verbalize the principle was assigned a score of "3". Level of Verbalization also correlated significantly with Total Time required for the test. (.510), Number of Clues given (,.474), and Time for First Grouping (.281). This indicated that students less able to verbalize the concept needed a longer time and greater number

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<sup>1</sup>Ibid, p. 195.



of clues to find the solution.<sup>1</sup>

To determine the extent to which Vigotsky Test is measuring the same thing as Intelligence Tests measure, Aldrich in 1944 compared scores for the various characteristics measured by Vigotsky with scores obtained on the Wechsler-Bellevue Tests. He found a close relationship to exist. Semeonoff and Laird in 1952 found a correlation of approximately .52 between Vigotsky and intelligence as measured by the Progressive Matrices.<sup>2</sup>

Although Semeonoff and Laird found this high correlation, they did not consider the Vigotsky test a suitable alternative to intelligence tests commonly used. They stated rather, that the test provides ". . . valuable or even indispensable supplementary material to the results of orthodox intelligence tests."<sup>3</sup>

Hence, the present study will use the Vigotsky Test in addition to the Lorge Thorndike Intelligence Test as a predictor variable in the investigation of causes of variations in reading. The following hypotheses have been

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<sup>1</sup>Ibid., pp. 195-202.

<sup>2</sup>B. Semeonoff and A. J. Laird, "The Vigotsky Test is A Measure of Intelligence," as reported in L. L. Stewin, "The Nature of Rigidity as Determined by the Vigotsky Test Performance," unpublished Master's Thesis, University of Alberta, Edmonton, 1968, p. 35.

<sup>3</sup>Ibid., ppp. 35.

set forth:

- H<sub>3</sub> (a) There is a negative correlation between Total Concept Formation Score as measured by the Kasanin-Hanfmann (Vigotsky) Test and reading achievement.
- (b) There is a negative correlation between Total Time required to form the concept in the Vigotsky Test and reading achievement.
- (c) There is a negative correlation between Number of Clues given to aid concept formation as measured by the Vigotsky Test and reading achievement.
- H<sub>4</sub> There is a positive correlation between Ability to Verbalize concepts on the Vigotsky Test and reading achievement.

The three predictions made in Hypothesis No. 3 are negative because high scores in each case indicate low levels of performance, while low scores indicate better performance,

In Hypothesis No. 4 the prediction is in the positive direction since a score of "1" was given to those who were unable to verbalize the concept, while a score of "3" was given to those who readily verbalized the concept.

### III. PERSONALITY FACTORS AND READING

Although all factors discussed thus far may be considered personality factors, for the purpose of categorization, personality factors when spoken of in this study will refer only to anxiety and need achievement.

Crandall et al. stated in 1962 that for over forty years the efforts of child psychologists to understand and to predict individual differences in children's intellectual achievement was confined to measuring intellectual ability by intelligence test and predicting academic success from these. Since that time, two other areas of the child's psychological make-up have been researched, namely the achievement motive and anxiety. Research in each of these areas has provided us with "many interesting, though often equivocal, research findings."<sup>1</sup>

#### Anxiety

The relationship between anxiety and achievement has been rather extensively researched since Allison Davis' essay in 1944. Davis associated 'anxiety' with 'striving behavior'. However, he did not specify the level of

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<sup>1</sup> V. J. Crandall et al., "Motivation and Ability Determinants of Young Children's Intellectual Achievement Behaviours," Child Development, XXXIII (1962), p. 643.

anxiety which motivates achievement.<sup>1</sup>

Since Davis' essay, a number of studies have reported a negative correlation between anxiety level and school performance. The same has been reported true of test scores. Hill and Sarason in 1966 investigated the relation of test anxiety and defensiveness to test and school performance over the elementary school years. In this study it was found that the highly anxious child experienced the "greatest difficulty in evaluative situations in which he is required to function independently." Hill and Sarason found the negative effect to be greater in reading than in mathematics. This they felt was due to the fact that reading tasks are less structured and require greater independence.

In an earlier study by the same researchers, a five-year longitudinal study of 1,100 children in a middle-class suburb was conducted. Hill and Sarason found that children, especially boys, who increased on anxiety scores during the five-year period following first and second grades, decreased in performance tests.<sup>2</sup>

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<sup>1</sup> E. F. Borgatta and W. W. Lambert, Handbook of Personality Theory and Research, (Chicago: Rand McNally & Co., 1968), p. 315.

<sup>2</sup> Ibid., pp. 315-316.

In another study by Sarason et al., high and low anxious children were observed in a classroom situation. Subjects were in grades one to four when tested and two to five when observed. Results on the 32 pairs of High Anxious and Low Anxious children matched on sex, grade, I.Q. showed: (1) of 16 Low Anxious boys, eight were explicitly labeled superior or adequate in academic ability, one as somewhat inadequate, in seven cases there was no mention of academic ability, (2) of the 16 High Anxious boys, three were judged as superior or adequate, five as having academic problems, and in eight cases no reference was made to academic performance.<sup>1</sup>

A study by Smock in 1958 showed that high manifest anxiety, as measured by the Children's Anxiety Scale, is associated with relatively more perceptual rigidity and, under certain conditions, increases the speed of closure.<sup>2</sup>

Dunford in 1966 made a similar study to the one carried out by Sarason et al. in 1960, and found that anxiety interferes with intellectual performance,

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<sup>1</sup>S. B. Sarason et al., "Classroom Observations of High and Low Anxious Children," Child Development, XXIX (June, 1958), pp. 287-95.

<sup>2</sup>C. D. Smock, "Perceptual Rigidity and Closure Phenomenon as a Function of Manifest Anxiety in Children," Child Development, XXIX (June, 1958), pp. 237-47.

particularly in boys.<sup>1</sup> This finding is similar also, to the findings of Wiener et al. who studied the correlates of anxiety in a group of 52 mildly retarded teenage boys. "It was found that poor academic achievement was significantly related to high test anxiety, and that a high level of anxiety prevented the mildly retarded child from achieving academic success at a level commensurate with his ability."<sup>2</sup>

A study by Feldhusen and Klausmeier in 1962 found that anxiety as measured by the Children's Manifest Anxiety Scale was significantly correlated with both intelligence as measured by the Wechsler Intelligence Scale for Children, (-.48) and with reading as measured by the California Achievement Battery, 1950, Form AA (-.48). Both correlations were significant at the .01 level. It was found also that anxiety was most negatively correlated with I.Q. , and Reading for students whose I.Q. range was 90-110, (-.35, -.31). Anxiety was positively but not significantly

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<sup>1</sup>M. J. Dunford, "Intellectual Performance and Classroom Behaviour of High and Low Test-Anxious Children," Ontario Journal of Educational Research, IX (Winter, 1966-67), p. 121.

<sup>2</sup>G. Wiener, E. Crawford, and R. Snyder, "Some Correlates of Overt Anxiety in Mildly Retarded Patients," American Journal of Mental Deficiency, LXIV, (1960), pp. 735-739.

related to reading for students in the I.Q. range 120-145 (.15). It was negatively but not significantly related to reading for students in the I.Q. range 56-81 (-.13).<sup>1</sup>

McCandless and Castaneda in their study of anxiety in children's school achievement and intelligence found a low negative correlation (-.08) between Children's Manifest Anxiety Scores and reading scores for grade five boys but found a significant negative correlation (-.33) on the same tests for grade six boys.<sup>2</sup> This suggests that boys of different age and grade level may be affected differently by anxiety.

Despite the fact that the majority of the boys tested in this study were at the grade five level when tested, the following hypothesis has been made:

H<sub>5</sub> There is a negative correlation between anxiety scores as measured by the Taylor Manifest Anxiety Test and reading achievement.

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<sup>1</sup>J. F. Feldhusen and H. J. Klausmeier, "Anxiety, Intelligence, and Achievement in Children of Low, Average, and High Intelligence," Child Development, XXXIII (1962), pp. 405-407.

<sup>2</sup>B. R. McCandless and A. Castaneda, "Anxiety in Children, School Achievement and Intelligence," Child Development, XXVII (1956), pp. 379-82.

In this hypothesis a negative correlation indicates a negative relationship since anxiety tends to militate against scholastic achievement.

### Need Achievement

Achievement motivation research had its beginning with McClelland. Regarding the unique characteristics of achievement motivation, McClelland has this to say:

Now what about achievement? What . . . expectation distinguish this motive from others? Clearly the expectations are built out of universal experiences with problem solving--with learning to walk, talk, hunt or read, write, sew, perform chores, and so forth. The expectations also involve standards of excellence with respect to such tasks . . . The child must begin to perceive performance in terms of standards of excellence so that discrepancies of various sorts from this perceptual frame of reference . . . can produce positive or negative affect.<sup>1</sup>

Crandall states that of the four projective techniques which may be used in studies of achievement motive the one most frequently used is the Thematic Apperception Test (TAT) originally devised by McClelland et al. The test consists of TAT-like stimuli which are presented to the subjects. The stories told by the subjects

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<sup>1</sup>D. McClelland et al., The Achievement of the Motive (in Child Psychology, Yearbook, National Society Study Education, ed. H. W. Stevenson. 1953. LXII, Part I), p. 417.



about the pictures are scored according to various empirically-validated indices of achievement motivation.<sup>1</sup>

Frost states that since the concept of 'achievement need' or 'achievement motive' was introduced in 1953, most of the studies relative to motivation of scholastic success has been done in the light of the McClelland-Atkinson thesis and that these studies either support or reject the thesis. He reports that Weiss et al. used the McClelland Picture Study Test, and the University of Colorado's Academic Aptitude Test in a study of college students and found a correlation of 0.63 between MCCPT and AAT.<sup>2</sup> Green reports "positive correlations (up to .50) have been found between scores on the n-Achievement measure and both grades and achievement test scores."<sup>3</sup>

Shaw, in his study, states that while Weiss et al. in 1960 reported significant correlations between the McClelland Achievement Motivation Test (MAMT) and grade

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<sup>1</sup>V. J. Crandall, Achievement (in Ibid., ed. H. W. Stevenson), p. 420.

<sup>2</sup>B. P. Frost, "Some Conditions of Scholastic Achievement, Part II," Canadian Education and Research Digest, VI (March, 1966), pp. 8-9.

<sup>3</sup>Donald R. Green, Educational Psychology, (Toronto: Prentice-Hall of Canada, Ltd., 1964), p. 19.

point averages of 60 college students, Atkinson in 1950 reported negative but insignificant relationships between MAMT results and grade point averages of college students.<sup>1</sup> In his own study, Shaw set out to determine whether or not need achievement scales, including the MAMT, would differentiate between groups of high school students matched for ability but differing in mean grade point average. On the basis of his study, he states:

It would not be reasonable to conclude on the basis of this single study that present need achievement scales are not predictive of achievement attainment, but the fact that other studies also have frequently failed to find any relationship between need achievement scales and academic performance signifies the need for a critical re-examination, not only of need achievement instruments, but of the concept of need achievement itself.<sup>2</sup>

Few studies of need achievement as related to academic success among children have been carried out. A recent study of significance here is that which was carried out by Crandall et al. The purpose of this study of forty early-grade-school-age children was to determine relations

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<sup>1</sup>M. C. Shaw, "Need Achievement Scales as Predictors of Academic Success," Journal of Educational Psychology, LII (1961), p. 282.

<sup>2</sup>Ibid., p. 284.

between a number of predictive variables--need achievement and anxiety were included--and children's intellectual achievement as measured by the California Achievement Tests. Crandall found that neither need achievement nor anxiety was predictive of reading achievement test performance. He states that the reason why this study failed to produce significant correlations while others have, could be due to two reasons: (1) other studies have generally studied 'extreme groups' while his study used a continuous distribution of children, (2) other studies have been made using older children. He concludes that: "It is possible that the variables themselves and/or their methods of measurement are not as applicable for young children as for older children."<sup>1</sup>

Although the pupils studied in the present investigation are fairly young (the majority were at grade V level when tested), the following hypothesis has been made:

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<sup>1</sup>V. J. Crandall et al., "Motivational and Ability Determinants of Young Children's Intellectual Achievement Behaviors," Child Development, XXXIII (1962), pp. 643-61.

H<sub>6</sub> There is a positive correlation between  
n-Achievement as measured by the McClelland  
Need Achievement Test and reading  
achievement.

## CHAPTER III

### DESIGN OF THE STUDY

Chapter I referred briefly to the instruments used in this study and to the sample chosen for the research. This chapter will describe: (1) the method used in choosing the sample, together with the reasons for the choice; (2) the instruments--method of administration, the validity and reliability of each; (3) the method of data collection; and (4) the method of analysis. A detailed account of the analysis will be given in Chapter IV.

#### I. METHOD OF SAMPLE SELECTION

In a study presently being conducted, Roe is investigating certain socio-economic factors to determine the extent to which they affect the reading achievement of elementary school children.<sup>1</sup> She is working with 305 grade four boys randomly selected from the population of grade four boys of 1968 enrolled in schools conducted by the Roman Catholic School Board in St. John's. Excluded from the sample were 15 fourth grade orphan boys enrolled in one of

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<sup>1</sup>Geraldine M. Roe, "The Relationship Between Certain Social, Economic, and Environmental Factors and Reading Achievement in Grade Iv," Unpublished Master's Thesis being conducted at Memorial University of Newfoundland.

the thirteen schools involved in the study.

For the purpose of the present study, the researcher selected a random sample of 100 subjects from the 305 used in the Roe study. It was necessary to reduce the number for the present study since testing time available and the nature of the tests made it impossible to include the whole 305.

To determine whether the random sample of 100 would give similar results to those obtained using 305 pupils, a Pearson product-moment correlation coefficient was calculated for scores obtained by Roe on the Vocabulary test and the Mother's Education index. On these two variables Roe found using an  $N=305$ , a correlation of .341. The researcher found, using an  $N=100$ , a correlation of .359. Both correlations were significant at the .01 level. A second correlation using the same two variables and an  $N=80$  was found to be .27 which was also significant at the .01 level.

The researcher felt justified, therefore, in reducing the  $N$  to 100, and in using this sample in a continuation of the Roe study. This number was further reduced to 96 when four of the sample failed to complete the testing satisfactorily and to 90 because an additional six subjects were absent during all or part of the test administration time. The final sample size was, therefore,  $N=90$ .

## II. DESCRIPTION OF THE INSTRUMENTS

Permission was obtained from Roe to use all test scores and other information relative to socio-economic and environmental background collected by her for each of the 90 subjects included in the present study. The testing for the Roe study was done in the spring of 1968. A brief review of the instruments used by Roe together with pertinent information found by the writer using an N=90 will be given here.

### Instruments Used in The Roe Study

Reading. As a measure of reading achievement, Roe used the Nelson-Woodland Reading Test (Grade 3-9). This test consists of two parts: (1) Vocabulary, and (2) Paragraph Comprehension. Roe reported reliability coefficients for the test as .86 for Vocabulary, .81 for Paragraph Comprehension, and .90 for the Total Test.

The present study, using N=90, found a correlation of .94 between Vocabulary and Total Reading and a correlation of .92 between Paragraph Comprehension and Total Reading. The correlation between Vocabulary and Paragraph Comprehension was found to be .73. Because of the high correlation between each of the subtests and the Total Test and because of the relatively low correlation between the

subtests, this study will use both Vocabulary and Reading Comprehension as criterion variables.

Measure of Intelligence. As a measure of intelligence Roe used the Lorge Thorndyke Intelligence Test, Verbal and Nonverbal Batteries, Level 3, designed for Grades IV-VI.

Roe reported reliability coefficients of .81 for the Verbal Battery, and of .91 for the Nonverbal Battery. The correlation between the two parts was reported as .65.

With an N=90, the present study found the correlation between Verbal I.Q. and Total I.Q. scores to be .85, and between Nonverbal I.Q. scores to be .91. The correlation between the two parts was found to be .61. The rather high correlations between each of the subtests and the Total I.Q. score, together with the comparatively low correlation between the parts of the test has lead the researcher to investigate Verbal I.Q. and Nonverbal I.Q. separately as predictor variables in this study.

Father's Occupation. Father's Occupation was classified using the Blishen scale which ranks and groups occupations according to standard scores for income and years of schooling. The mean score in the present study is 47.6 with a standard deviation of 10.4.

Mother's Education. Mother's Education was ranked on a twenty point scale according to the number of years of



formal education received. A year of elementary education was given the same weight as a year of high school or a year of university education.

The mean score found in this study is 8.7 with a standard deviation of 3.1.

Number of Siblings. Number of Siblings was obtained by counting the children under 18 who were living at home.

The mean for the present study was found to be 5.2 with a standard deviation of 2.4

Frequency of Receiving Newspapers in the Home. Frequency of Receiving Newspapers in the Home was scored on an interval of 1 to 3. "1" indicated no newspapers, "2" was given to those receiving a weekly paper, while "3" was given to those who received a daily paper in their homes.

The mean for the present study was found to be 2.4 with a standard deviation of .8.

Size of School. Size of School was classified according to the number of grade four classrooms in the school. The numbers ranged from 1 to 6, with a mean of 2.7 and a standard deviation of 1.8.

Teacher Qualifications. Teacher Qualifications were classified according to the present grading scale used at the Department of Education. An interval scale of 1 to 11 was used. "1" was assigned to teachers having no professional training or a maximum of a six week summer course; "2" was

assigned to teachers who received their training years ago; "4" was assigned to those who completed one full year at a teacher training institution but who failed one course. Numbers 5, 6, 7, 8, 9, 10, 11 were assigned to teachers having one, two, three, four, five, six or seven years of training respectively.

#### Instruments Used in The Present Study.

To investigate the hypotheses outlined in Chapter II, the researcher used the following instruments: (1) the Bender-Gestalt Test, (2) the Uznadze Set Test, (3) The Kasanin-Hanfmann (Vigotsky) Concept Formation Test, (4) The Children's Form of the Taylor Manifest Anxiety Test, (5) The McClelland n-Achievement Test.

The Bender-Gestalt Test. The Bender-Gestalt Test consists of nine simple designs which the subject is required to reproduce. The test was originally designed by Wertheimer in the "Studies in the Theory of Gestalt Psychology."<sup>1</sup> Bender, who was interested in using the test with children, made a careful study of its use with children three to eleven years of age.

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<sup>1</sup>Baldwant Singh, "The Bender-Gestalt Test as a Group Test," Ontario Journal of Educational Research, VIII (Autumn, 1965), p. 35.

This test has been standardized on eight hundred school and nursery children . . . Children three to eleven years, inclusive, were used, or children of preschool age and also those in the first to fifth grades, inclusive.<sup>2</sup>

The method of administration used in this study is that designed by Singh.<sup>2</sup> The nine designs were drawn on cardboard sheets, each 15" x 22". An opaque projector was used in reproducing the designs to ensure exact enlargements. Each design was displayed before the group of subjects for as long a time as was required for each of them to complete the drawing. Drawings were done with pencil on plain white paper provided. Pupils were permitted but not encouraged to use erasers.

Although the Bender-Gestalt was originally an individual test, Singh showed by his study that the test may be used as a group test without loss of any of its advantages.<sup>3</sup> Since testing time was a factor in the present research, the group method described above was used.

The scoring method used in this study was that of Pascal and Suttell. Validity of this method of scoring for children was worked out by Pascal and Suttell using twelve

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<sup>2</sup>Lauretta Bender, A Visual Motor Gestalt Test and Its Clinical Use, (Research Monograph No. 3. New York: The American Orthopsychiatric Association, 1938), p. 112.

<sup>2</sup>Baldwant Singh, op. cit., pp. 38-43.

normal children (mean age, 100 months; mean Stanford Binet I.Q., 117) and twelve patients (mean age, 100 months; mean Standard Binet I. Q., 114). The mean raw B-G Score for the normal children was 56.8, for the patients it was 90.8. (The mean score in the present study is 55.33).

It was found by Pascal and Suttell that for a mean difference of 34 a "T" of 4.29 which showed a significant difference between the groups, was obtained.

Although certainly not conclusive, our findings suggest that in addition to measuring maturation, our method of scoring the B-G records is measuring in children something similar to that which is measured for adults.<sup>1</sup>

Although Pascal and Suttell could not give norms for this age level, it was felt that for the present study which is interested in the best total score rather than in using results for analysis of individual students, this method of scoring has advantages over certain modified forms which generally measure only maturational level.

Buros reports that:

A system such as that developed by Pascal and Suttell, involving 105 details of performance over the various designs, has many features to commend it. With such a system moderately respectable correlations of around .70 are reported for test-retest performance.<sup>2</sup>

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<sup>1</sup>Gerald R. Pascal and B. B. Suttell, The Bender-Gestalt Test, (New York: Greene and Stratton, 1951), p. 42.

<sup>2</sup>Oscar K. Buros (ed.), The Sixth Mental Measurement Yearbook, (New Jersey: The Gryphon Press, 1951), p. 44.

The scoring of designs drawn by the subjects for this study was done by the researcher after a careful study of the scoring methods of Pascal and Suttell was made.

Uznadze Set Test. Set Fixation and Set Extinction were measured using the Uznadze spheres. There are three spheres with handles--one sphere is 100 mm in diameter, the other two are each 70 mm in diameter. Each sphere has a total weight of 300 gms.<sup>1</sup>

The student was seated with his hands--palm upward--resting on his knees. The following instruction was given: I have here two plain wooden balls which I will place in your hands. If they feel the same size, tell me they are the same; if they feel different (if one feels larger than the other), tell me they are different; if you are not sure, tell me you are not sure. The child was discouraged from grasping the spheres. This constituted a slight deviation from the Uznadze method of administration and may cast some doubt on the results. Since, however a retest at this time will be impossible, results of this test will be given as they are.

When this was understood, the student was asked to close his eyes and the test began. The two spheres of unequal size were placed in the pupil's hands--the larger one in his right hand and the smaller one in his left hand.

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<sup>1</sup>S.S. Sodhi, op. cit., p. 77.

They were then removed and replaced a second time. This constituted the "setting test". The "critical test" which involved presenting the two equal spheres was then given. If the subject perceived them as equal in size, the setting trials were continued. The maximum number of setting trials was placed at 20. Uznadze placed the optimal number of fixing exposures for persons up to eleven years of age at 15.<sup>1</sup> Of the 90 subjects in the present study, only three received scores of 20 on set fixation.

When the subject perceived the two equal spheres as unequal, a set was considered fixed and the examiner proceeded to extinguish the set. This was done by presenting the critical trials (presenting the equal spheres) until the child again perceived them as equal. The maximum number of trials to extinguish a set was placed at 100. In the majority of cases, the fixed set was extinguished and replaced by a set which explained the existing situation (reception of two equal balls) long before 100 trials. Only one student out of 90 obtained a score of 100.

Test-retest reliability correlations for both set fixation and set extinction scores have been found to be high. S. Sodhi found Spearman correlations of .98 for each of these

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<sup>1</sup>D.N. Uznadze, The Psychology of Set, (Translated from the Russian by Basil Haigh, New York: Consultants Bureau, 1966), p. 77.

<sup>2</sup>S. S. Sodhi, op. cit., p. 439.

sets of scores.<sup>1</sup>

Kasanin-Hanfmann (Vigotsky) Concept Formation Test.

The Kasanin-Hanfmann Concept Formation Test was developed by Vigotsky, a Soviet theorist, but was first used in the United States by Kasanin and Hanfmann. It is therefore known by both names.

The instrument consists of 22 wooden blocks of five different colors (red, green, yellow, white, and blue), six different shapes (circles, squares, trapezoids, triangles, hexagons, and half circles), two different heights (tall and short), and two different sizes (small and large).

To arrange these blocks in four groups so that each group can be distinguished from every other group and yet have the same common qualities, it is necessary to arrange them according to both height and size.

Besides having the characteristics mentioned above, each block has a name and all members of the same group have the same name, either LAG, BIK, MUR or CEV. All large, tall blocks are called LAG; all large, flat blocks are called BIK; all small, tall blocks are called MUR; and all small, flat blocks are called CEV.

This study made use of the Kasanin-Hanfmann method of administration and scoring. Since details regarding the administration of the test are quite lengthy, they are

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<sup>1</sup>S. S. Sodhi, op. cit., p. 49.

omitted here and are given in Appendix B. Very briefly, the method of administration may be summarized as follows: (1) the blocks--well mixed as to color, size and shape--and with names turned down were presented to the subject in an individual test situation; (2) the child was told that there were four different kinds of blocks and that each kind had a name; (3) one block was then turned over to reveal its name--the name of one kind of block; (4) the subject was instructed to try to find all the blocks he thought belonged with this one for some reason--the child was encouraged to give his reason; (5) after the subject had completed the first grouping and given his reason, the block most unlike the named block in height and/or size was turned to reveal its name--the name of a second kind of block; (6) the subject using the additional clue continued the task, with additional clues being given as required by each individual subject; (7) when the blocks had been placed in their four groups, the subject was asked for the principle of classification--his level of verbalization was judged on his ability to give the correct reasons for his classification; (8) the blocks were again placed, names down, as at the beginning of the test, and the subject was asked to place the blocks in the four groups again. This gave the examiner a chance to determine whether the subject had really conceived the principle of classification. If he could not



regroup them without clues, further clues were given and added to the number of clues given the subject. The additional time required was also added.

Buros reports no validity or reliability scores on this test.<sup>1</sup> The nature of the test makes it impossible to get a test-retest reliability on it since a subject who has once worked through the test and arrived at the underlying concept would not react in a similar way on a retest.

However, norms have been established for this test and conceptual thinking among children. Meece and Rosenblum used a quota sample of 50 girls from the sixth-grade population of four public schools in Albuquerque, New Mexico, in an attempt to derive normative data from the Vigotsky. Meece and Rosenblum reported a mean of 20.13 and a standard deviation of 9.35 for Total Time in Minutes (method of timing was a slightly modified form of the Kasanin-Hanfmann method), a mean of 12.44 and a standard deviation of 5.555 for Number of Clues, and a mean of 1.58 and standard deviation of .72 for Level of Verbalization.

Meece and Rosenblum concluded that those norms

. . . can be utilized for populations comparable to those from which the components of this sample were drawn. In general, these results closely resemble those of Semeonoff and Laird (1952) with a population of British adults. Using the measure of Total Time, Number of Clues, and Level of Verbalization with corrections to equate results,

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<sup>1</sup>Oscar K. Buros (ed.), op. cit.

the total average score for the present population of children was 87.39, which falls at the 50th percentile<sup>1</sup> of Semeonoff and Laird's population norm.

In the present study, Total Time, Number of Clues, Level of Verbalization, and Total Score were calculated according to the Kasanin-Hanfmann method of Scoring. Means and standard deviations compare favourably with norms set by Meece and Rosenblum. A mean of 34.86 and a standard deviation of 13.96 was found for Total Time. This is slightly higher than scores found by Meece and Rosenblum possibly due to the fact that this study did not use a modified form of time calculation. A mean of 12.03 with a standard deviation of 4.95 was found for Number of Clues and a mean of 2.47 with a standard deviation of 0.56 was found for Level of Verbalization. The average Total Score found was 95.1.

Total Time on the Vigotsky Test was computed in minutes from the time the subject started grouping the blocks until the task was completed and the principle was verbalized. For those who showed hesitation in the retest task, the extra time in minutes required to establish the principle was added to the time as defined above.

Number of Clues was found by summing the clues given after the initial clue given in the instruction.

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<sup>1</sup>R.S. Meece and S. Rosenblum, "Conceptual Thinking of Sixth-Grade Children as Measured by the Vigotsky Block Test," Psychological Reports, XVII (1965), pp. 195-201.

Level of Verbalization was measured on an interval of 1 to 3. Those unable to verbalize either concept of height or size were assigned a score of "1"; those who could verbalize at least one of the concepts and/or who needed a series of questions to prompt such verbalization received a score of "2"; those who, without prompting, verbalized both concepts and showed complete understanding were assigned a score of "3".

The Total Score was obtained by multiplying the number of clues by 5 and adding the product to the number of minutes required to finish the task. This method of obtaining a total score was given by Kasanin and Hanfmann.<sup>1</sup>

#### Taylor Manifest Anxiety Scale

The Taylor Manifest Anxiety Scale is an adapted form of the Taylor's adult form for use with fourth, fifth, and sixth-grade pupils.

The test consists of 42 anxiety items and 11 items which indicate the student's tendency to falsify responses. These items were selected from a previous scale which was administered to 60 subjects for the purpose of determining degrees of difference in instruction for administration and

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<sup>1</sup>Kasanin and Hanfmann, Examiner Manual for the Kasanin-Hanfmann Concept Formation Test--3611M, (Chicago: C. H. STOLTING Co.). See Appendix B.

for comprehensibility of items.

Castaneda et al. found an anxiety retest correlation of .91 for 68 fifth-grade boys; and a lie scale retest reliability of .69 and a correlation of .03 between anxiety scale and lie scale for the same group of boys.<sup>1</sup>

For this research study, the test was administered as a group test. The following instructions were given: "Read each question carefully. Put a circle around the word YES if you think the answer is true about you. Put a circle around the word NO if you think it is not true about you."

In two cases the test items were read by the examiner for students who showed particular difficulty in reading the items. For one of these students it was necessary to read all items.

The test was scored in the following way: An index of anxiety level was obtained by summing the number of anxiety items answered YES. Items 10 and 49 if answered NO contributed to the Lie scale as did the other nine items of the Lie scale if answered YES.

#### McClelland Need Achievement Test

This study used the four thematic cards used by McClelland et al. in 1953 and in many subsequent studies.

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<sup>1</sup>Alfred Castaneda, Boyd R. McCandless, and David S. Palermo, "The Children's Form of the Manifest Anxiety Test," Child Development, XXVII (September, 1956), pp. 317-23.

Jones, who made a detailed study of need for achievement and its relation to environmental factors, states that "it is felt that McClelland's four pictures represent a considerable extent of the range of achievement."<sup>1</sup>

One of the four pictures depicts a work situation (two men working at a machine); the second picture is one of a study situation (a boy with an open book before him); the third picture is of a father-son situation (TAT 7BM); and the fourth picture is one of a boy possibly dreaming of the future (TAT8BHE). The first two pictures were made especially for this test, while the last two were taken from the Murry Thematic Apperception Test.<sup>2</sup>

McClelland states that a subject's n-Achievement may be aroused and as a result his achievement-related associations in each picture may be aroused by three types of cues" "(1) cues in everyday environment and cues in relatively autonomous thought processes of the individual, (2) specific experimentally introduced cues, (3) controllable cues in a particular picture," The n-Achievement score is, then, the number of achievement associations in the imaginative story.<sup>3</sup>

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<sup>1</sup>Pauline Jones, "An Investigation of the Relationship of Integration Setting to Need for Achievement," unpublished ~~Manuscript~~ ~~Thesis~~ ~~Set~~ ~~in~~ ~~the~~ ~~Need~~ ~~Educ~~ ~~At~~ ~~tion~~ ~~in~~ ~~Psychology~~, Edmonton, Alberta, 1965, p. 34.

<sup>2</sup>Ibid., p. 31.

<sup>3</sup>D. McClelland, The Achievement Motive, (New York: Appleton-Century-Crofts, Inc., 1953), p. 196.

The method of administration used in this study was that devised by McClelland. Answer sheets containing questions designed to guide the subject in covering the elements of a plot in the time allotted, were given to each subject. The subjects were instructed that the test was a test of their creative imagination, that each picture would be shown for 20 seconds and that then they were to write a story about it. They were told that they would have about four minutes to write each story and that they should use the four questions given to guide them, spending about one minute on each question. The examiner kept time for them and told them when it was time to move on to the next question for each story. For complete details see Appendix D.

Because of a lack of a suitable place for showing slides, the researcher found difficulty in two schools in presenting clear pictures. However, the stories written by the twenty-two subjects involved were scored. Scores on their stories did not show any noticeable variation from scores on stories shown under more favorable conditions.

Test-retest reliabilities reported for the n-Achievement score are usually low. McClelland found a .22 correlation for two three picture measures. This was not significant with an N=40. However, there was a significant agreement ( 72.5% ) between the two measures in placing

persons above and below the mean on the two occasions mentioned above. A split-half reliability, however, for six or eight picture tests has been found to be about .70.<sup>1</sup>

Murstein reports, as a result of his study of several findings, that, "overall, there appears to be a very low but significant correlation between test and retest." He states that:

. . . findings suggest that a memory factor may account for much of the variance in the reliability co-efficients reported . . . these results (also) indicate that the content of the TAT is strongly influenced by situational factors. Yet another factor is the 'measurement error'. By this I mean that the act of giving a particular theme will to some degree lessen the likelihood of giving a very similar theme again.<sup>2</sup>

This undoubtedly helps to explain the low-test reliability correlations.

The reliability of scoring thematic stories by the same or different readers is, however, reported as quite high:

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<sup>1</sup>D. C. McClelland, (ed.), Studies in Motivation, quoted in Pauline Jones, op. cit., p. 35.

<sup>2</sup>Ibid, p. 34.

The correlation is .95 between n-Achievement scores obtained on two different occasions by two judges working together. One judge, after experience with the system for three days, has obtained a correlation of .92 between his scores and those obtained by another judge more experienced with the system.<sup>1</sup>

### III. METHOD OF DATA COLLECTION

All data was collected by the researcher during the months of April, May, and June, 1969. Principals of schools to be visited were contacted in March and an estimate of testing time was given. The estimated time for each pupil was two hours.

The pupils were visited on two separate occasions. On one of these occasions the group tests--The Bender-Gestalt Test, The Anxiety Scale and The n-Achievement Test--were given. Before visiting the schools for this testing, arrangements were made with the principals to have the pupils concerned free to meet in a room suitable for showing slides. In two schools it was difficult to find an ideal place for this testing. However, the researcher feels that these conditions were not such that tests should be cancelled.

The second time the researcher met the students, individual tests were administered. This testing required about an hour per student. At this time, The Kasanin-Hanfmann Concept Formation Test and the Uznadze Set Test were administered.

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<sup>1</sup>Ibid., p. 36.



#### IV. METHOD OF STATISTICAL ANALYSIS

The chief form of statistical analysis was correlation.

First, Pearson product moment correlation coefficients were calculated between each measure of reading achievement and each predictor variable. As shown in Table I, the predictor variables comprised six socio-economic factors, two educational input factors and two I.Q. factors from Roe's study, and, from the data of the present study three perceptual factors, from concept formation factors and two personality factors. Vocabulary and Paragraph Comprehension were the two measures of reading achievement.

Secondly, the correlation coefficients were tested for statistical significance at the .05 and .01 levels. Then multiple correlation coefficients were calculated, and, by means of F ratios, those predictor variables and groups of variables were identified which contributed significantly to the multiple correlation coefficients.

TABLE I  
CRITERION AND PREDICTOR VARIABLES

Criterion	Symbol	Description
$Y_1$	V	Vocabulary
$Y_2$	PC	Paragraph Comprehension
$Y_3$	TR	Total Reading Score
<b>Predictors (Socio-Economic Factors)</b>		
$X_1$	FO	Father's Occupation
$X_2$	ME	Mother's Education
$X_3$	Ne	Number of Newspapers in the Home
$X_4$	Sb	Number of Siblings
$X_5$	DA	Days Absent From School
<b>Predictors (Educational Input Factors)</b>		
$X_6$	Sc	Size of School
$X_7$	TQ	Teacher Qualifications
<b>Predictors (Perceptual Factors)</b>		
$X_8$	B-G	Bender-Gestalt
$X_9$	SF	Set Fixation
$X_{10}$	SE	Set Extinction
<b>Predictors (Concept Formation Factors)</b>		
$X_{11}$	CF	Total Concept Formation Score
$X_{12}$	CFT	Concept Formation Time
$X_{13}$	CCF	Clues Aiding Concept Formation
$X_{14}$	CV	Concept Verbalization
<b>Predictors (Personality Factors)</b>		
$X_{15}$	Anx.	Anxiety Score
$X_{16}$	n-Ach.	Need Achievement
<b>Predictors (Intelligence Factors)</b>		
$X_{17}$	VIQ	Verbal I.Q.
$X_{18}$	NVIQ	Nonverbal I.Q.
$X_{19}$	TIQ	Total I.Q.

## CHAPTER IV

### ANALYSIS OF DATA

This chapter is divided into three parts. The first part will be devoted to a review of pertinent findings based on the Roe study. The second part sets forth findings relative to the six minor hypotheses in the present study. The acceptance or rejection of each hypothesis will depend on the Pearson Product-Moment Correlation calculated for each criterion variable.

The third part of this chapter will be devoted to a presentation and discussion of findings derived by computing a multiple correlation coefficient and by determining the extent to which each predictor variable contributes to the Multiple Correlation.

#### I. PERTINENT FINDINGS FROM THE ROE STUDY

##### Criterion Variables

The Nelson Reading Test administered to the sample of students used for this study provided scores on Vocabulary, Paragraph Comprehension, and Total Reading. Table II shows the intercorrelation between Vocabulary, Paragraph Comprehension, and Total Reading as well as means

and standard deviations. Reliability coefficients taken from the Manual for the Nelson Reading Test are also given.

TABLE II  
INTERCORRELATIONS, MEANS AND STANDARD DEVIATIONS  
OF (N=90) CRITERION VARIABLES

	1	2	3	Mean	Stand. Dev.	Reliab. Coef.
1. Vocabulary	1.00	.73	.94	27.20	10.09	.86
2. Paragraph Comprehension		1.00	.92	20.91	8.58	.81
3. Total Reading			1.00	50.12	17.35	.90

These findings show a high correlation between Vocabulary and the Total Score (.94) and between Paragraph Comprehension and Total Reading (.92). There is, however, a comparatively low correlation (.73) between each of the subtests. Hence, the present study will include Vocabulary and Paragraph Comprehension as criterion variables and not Total Reading Scores. This decision will also make it possible to compare the possibly different effects of each predictor variable on two of the essentials of reading-- knowledge of vocabulary and paragraph comprehension.

### Socio-Economic and Educational Factors

Roe's study deals with relationships of socio-economic and educational input variables with reading achievement. Table III sets forth for the 90 subjects of the present study, from calculations based on her data, the correlations of Vocabulary and Paragraph Comprehension with each of Father's Occupation, Mother's Education, Number of Newspapers, Number of Siblings, and Days Absent From School. Table IV sets forth correlations for the two educational input variables; Number of Grade IV Sections in the School, and Teacher Qualifications.

Many of these correlation coefficients, especially those involving socio-economic variables are statistically and educationally significant. However, interpretation and discussion of these data form the substance of the Roe study rather than of the present investigation. The only purpose in reporting the data here is for use in the multiple correlation analysis developed later in this chapter.

TABLE III

CORRELATION MATRIX OF VOCABULARY AND COMPREHENSION  
WITH SOCIO-ECONOMIC VARIABLES  
(N=90)

	1	2	3	4	5	6	7
1. Vocabulary	1.00	.73 <sup>**</sup>	.31 <sup>**</sup>	.33 <sup>**</sup>	.14	-.24 <sup>**</sup>	.02
2. Comprehension		1.00	.22 <sup>**</sup>	.35 <sup>**</sup>	.21 <sup>*</sup>	-.34 <sup>**</sup>	.17
3. Father's Occupation			1.00	.47 <sup>**</sup>	.47 <sup>**</sup>	-.03	.12
4. Mother's Education				1.00	.46 <sup>**</sup>	-.19 <sup>*</sup>	.02
5. No. of Newspapers					1.00	-.17	.03
6. No. of Siblings						1.00	-.12
7. Days Absent							1.00

\*\* indicates statistical significance at the .01 level  
\* indicates statistical significance at the .05 level

TABLE IV

CORRELATION MATRIX OF VOCABULARY AND COMPREHENSION  
WITH EDUCATIONAL INPUT VARIABLES  
(N=90)

	1	2	3	4
1. Vocabulary	1.00	.73*	.04	.02
2. Comprehension		1.00	.03	.12
3. Size of School			1.00	-.04
4. Teacher Qualifications				1.00

\*\*indicates significance at the .01 level.

II. PSYCHOLOGICAL VARIABLES RESEARCHED  
IN THE PRESENT STUDY

Perceptual Factors

Table V presents correlations found between each of Bender-Gestalt, Set Fixation, and Set Extinction with both Vocabulary and Paragraph Comprehension.

TABLE V

CORRELATION MATRIX OF VOCABULARY AND COMPREHENSION  
WITH PERCEPTUAL FACTORS  
(N=90)

	1	2	3	4	5
1. Vocabulary	1.00	.73**	-.13	-.04	-.08
2. Comprehension		1.00	-.07	-.07	-.08
3. Bender-Gestalt			1.00	-.11	-.09
4. Set Fixation				1.00	-.06
5. Set Extinction					1.00

\*\* indicates significance at the .01 level.

Hypothesis I predicted a negative relationship between scores on the Bender-Gestalt Test and reading achievement. As shown in Table V, the correlation of  $-.13$  with Vocabulary and  $-.07$  with Reading Comprehension are in the predicted direction, although neither reaches the  $.17$  required for statistical significance.

The fact that neither of these correlations reached the level of significance can possibly be explained by the fact that the sample being studied consisted of good, average, and poor readers. McLean, in her study, found that the



correlation between reading and Bender-Gestalt scores for good readers was not significant, while correlations between reading and Bender-Gestalt scores for poor readers was significant at the .01 level.<sup>1</sup> It is possible, therefore, that the Bender-Gestalt test scores might have correlated significantly with the poor readers considered as a group, or that it might have been a successful instrument in differentiating between groups of good and poor readers.

For this study, however, there is insufficient evidence to accept Hypothesis 1.

Hypothesis 2 (a) stated that there is a negative relationship between Set Fixation and reading scores, while Hypothesis 2 (b) predicted a negative correlation between Set Extinction and reading scores. Table V shows low negative correlations of  $-.04$  and  $-.07$  between Set Fixation with Vocabulary and Reading Comprehension respectively. Correlations between Set Extinction and each of Vocabulary and Comprehension are also low negative, being only  $-.08$ .

Due to a scarcity of research using the Uznadze Test--there is no literature which discusses its relationship

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<sup>1</sup>Marjorie J. McLean, "A Study of the Bender-Gestalt Visual-Motor Gestalt Test in Relation to Reading Difficulties," unpublished Master's Thesis, University of Manitoba, 1962, reported in The Canadian Education and Research Digest, II (June, 1962), p. 143.

to reading as such--it is difficult to explain the low correlation found in the present research. A study of the Theory of Set proposed by Uznadze would lead one to suppose that a relationship between reading and both set fixation and set extinction might exist. On the evidence of the present findings, this does not seem to be so. However, this study is the first in the western world to use the Uznadze Set Test with children and the type of test was a new experience for both the children and the investigator. It is possible that higher correlations would have been found had set fixation and set extinction been investigated by using visual models rather than models which one perceives by touch. The writer would suggest, therefore, that further study be done using both methods of determining set fixation and set extinction. Such a study would, no doubt, shed more light on the Psychology of Set and its relationship to basic learning skills such as reading.

#### Concept Formation Factors

Hypothesis 3 has predicted negative relationships between various scores on the Vigotsky Test and reading achievement. The three factors involved are: Total Score, Time required to form a concept, and Number of Clues required to aid concept formation.

Hypothesis 4 predicted a positive relationship between Level of Verbalization and reading scores.

TABLE VI

CORRELATION MATRIX OF VOCABULARY AND COMPREHENSION  
WITH CONCEPT FORMATION FACTORS  
(N=90)

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	1	2	3	4	5	6
1. Vocabulary	1.00	.73**	-.10	-.11	-.07	.33**
2. Comprehension		1.00	-.17	-.18*	-.14	.32**
3. Total Score on Vigotsky			1.00	1.00	.95	-.02
4. Time on Vigotsky				1.00	.59**	-.41**
5. No. of Clues on Vigotsky					1.00	-.24**
6. Concept Verbalization						1.00

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\*\* indicates significance at the .01 level.

\* indicates significance at the .05 level.

As shown in Table VI, Total Score on Vigotsky, Time on the Vigotsky Test, and Number of Clues given to aid concept formation all have negative correlations with both Vocabulary and Reading Comprehension. The correlation -.17 between Reading Comprehension and Total Score on Vigotsky is almost significant at the .05 level, while the correlation -.10 shows that Total Score on Vigotsky is not significantly correlated with Vocabulary.

The correlations  $-.18$  and  $-.11$  indicate that there is a statistically significant relationship between Time required to form a concept on the Vigotsky Test and Reading Comprehension but not between Time on Vigotsky and Vocabulary.

Correlations  $-.07$  and  $-.14$  show that there is no statistically significant relationship between Number of Clues given to aid concept formation and either Reading Comprehension or Vocabulary.

Scores on the Vigotsky Concept Formation Test were not expected to correlate very highly with Vocabulary scores. The correlations with Reading Comprehension are consistently higher. Total Score which is calculated by multiplying the number of clues by 5 and adding the product to the time required to form the concept has a correlation with Reading Comprehension which is barely significant at the  $.05$  level. It is obvious from the other two correlations  $-.18$  and  $-.14$  that Time required to form a concept is more highly related to reading comprehension than is the Number of Clues given to aid concept formation. It would seem that the child who is slow in reasoning is also slow in getting the meaning conveyed by a paragraph.

In the light of these findings, Hypothesis 3 (b) may be accepted for the criterion Reading Comprehension but not for the criterion Vocabulary. Hypothesis 3 (a) and 3 (c)

are rejected in both cases.

Correlations .32 and .33 indicate that Concept Verbalization is highly related to both Vocabulary and Reading Comprehension. This is an understandable relationship since verbalizing a concept once formed requires both understanding and a certain degree of skill in the use of words.

Hypothesis 4 may, therefore, be accepted for both Vocabulary and Reading Comprehension.

### Personality Factors

Hypothesis 5 stated that there is a negative relationship between Anxiety and reading. Hypothesis 6 predicted a positive relationship between Need Achievement and reading achievement.

TABLE VII

CORRELATION MATRIX OF VOCABULARY AND COMPREHENSION  
WITH PERSONALITY FACTORS (N=90)

	1	2	3	4
1. Vocabulary	1.00	.73 <sup>**</sup>	-.05	.27 <sup>**</sup>
2. Comprehension		1.00	-.04	.40 <sup>**</sup>
3. Anxiety			1.00	.20 <sup>*</sup>
4. n-Achievement				1.00

<sup>\*\*</sup> indicates significance at the .01 level.

<sup>\*</sup> indicates significance at the .05 level.

Correlations  $-.05$  and  $-.04$  indicate low negative relationships between anxiety and both Vocabulary and Reading Comprehension.

A study of the literature on anxiety and its affect on students indicates that there is not a consistent pattern in the relationship between anxiety and achievement for all ranges of intelligence or for all grade levels. Feldhusen and Klausmeier found that anxiety was most negatively correlated with I.Q. and Reading for students whose I.Q. range was 90-110, while it correlated positively but not significantly with reading for students in the I.Q. range 90-100. Also, it was found that anxiety correlated negatively but not significantly with reading for students in the I.Q. range 56-81.<sup>1</sup>

Again, McCandless and Castaneda found a low negative correlation ( $-.08$ ) between Children's Manifest Anxiety scores and reading scores for grade five boys but found a significant negative correlation on the same tests for grade six boys.<sup>2</sup>

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<sup>1</sup>J. F. Feldhusen and H. J. Klausmeier, "Anxiety, Intelligence, and Achievement in Children of Low, Average, and High Intelligence," Child Development, XXXIII (1962), pp. 405-407.

<sup>2</sup>B. R. McCandless and A. Castaneda, "Anxiety in Children, School Achievement and Intelligence," Child Development, XXVII (1956), pp. 379-82

I.Q. range for the present sample of grade four boys, the majority of whom were in grade five when the anxiety test was given, is 60 to 127. This I.Q. range may possibly explain the low negative correlation between anxiety and reading in the present study. Another factor which, according to some research findings, may help explain the low correlation found here is the fact that the boys in the present sample were at a grade five level when the anxiety test was administered. It would seem that both I.Q. and grade level should be taken into consideration when discussing anxiety in relation to achievement. It is quite possible that the Manifest Anxiety Test might be an effective instrument if used to investigate reading difficulties of a particular I.Q. group or for some other grade level.

However, on the basis of findings in the present study no statistically significant evidence has been found to support Hypothesis 5.

Correlations of .27 and .40 show a highly significant relationship between n-Achievement and both Vocabulary and Reading Comprehension with the highest relationship between n-Achievement and Comprehension. With the exception of I.Q. variables, n-Achievement correlates more highly than any one of the other Socio-Economic, Educational input of Psychological variables investigated in this study.

According to the theory of "need achievement" or the desire for excellence which motivates behaviour, it is believed that this desire is fostered by parental attitudes. Hence, one might suppose that this variable would be highly correlated with certain socio-economic factors. This study found a correlation of .14 with both Mother's Education and Father's Occupation. This correlation is not statistically significant at the .05 level. Hence, it is reasonable to suppose that n-Achievement and its relationship with reading should be studied in greater detail.

Hypothesis 6 is, therefore, accepted at the .01 level.

#### Intelligence Factors

No hypotheses have been made regarding the relationship between I.Q. factors and reading achievement. Intelligence factors are being reported here because they will be added to predictors in calculating multiple correlations.



TABLE VIII

CORRELATION MATRIX OF VOCABULARY AND COMPREHENSION  
WITH I.Q. FACTORS  
(N=90)

	1	2	3	4	5
1. Vocabulary	1.00	.73**	.74**	.51**	.71**
2. Comprehension		1.00	.68**	.41**	.63**
3. Verbal I.Q.			1.00	.65**	.85**
4. Nonverbal I.Q.				1.00	.91**
5. Total I.Q.					1.00

\*\*indicates significance at the .01 level.

The statistically significant correlations presented in Table VIII, indicate that there is a high degree of relationships between intelligence factors and reading achievement. This observation does not need explanation. However, it is interesting to note that the correlation between Verbal I.Q. and reading (.74 with Vocabulary, and .68 with Comprehension) is considerably higher than the correlations Nonverbal I.Q. and reading (.51 with Vocabulary, and .41 with Comprehension). Correlations .71 and .63

indicate that Total I.Q. is not as highly related to reading achievement as is Verbal I.Q. considered by itself.

The correlations between I.Q. variables and reading just discussed together with .85 and .91 correlation between I.Q. subtests and Total I.Q. score, and a correlation of .65 between the I.Q. subtests has led the researcher to believe that each of the subtests, Verbal I.Q. and Nonverbal I.Q. should be considered separately as contributing factors when multiple correlations are calculated.

#### Summary of Findings

Table IX shows the correlations between each of the psychological variables with both Vocabulary and Reading Comprehension, together with the level of statistical significance.

On the basis of these findings, Hypotheses 1, 2(a), 2(b), 3(a), 3(c), and 5 have been rejected; Hypotheses 3(b), has been accepted at the .05 level with Reading Comprehension as criterion; and Hypotheses 4 and 6 have accepted at the .01 level for both Vocabulary and Reading Comprehension.

TABLE IX  
 PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENTS  
 FOR VOCABULARY AND COMPREHENSION  
 (N=90)

	$r_1$	Level Stat. Sig. $r_1$	$r_2$	Level of Stat. Sig. $r_2$
<b>Perceptual Factors</b>				
Bender-Gestalt	-.13	Not sig.	-.07	Not sig.
Set Fixation	-.14	Not sig.	-.07	Not sig.
Sense-Extinction	-.08	Not sig.	-.08	Not sig.
<b>Concept Formation Factors</b>				
Total Score on Vigotsky	-.10	Not sig.	-.17	Not sig.
Time on Vogot- sky	-.11	Not sig.	-.18	.05
Number of Clues	-.07	Not sig.	-.14	Not sig.
Level of Verbal- ization	.33	.01	.31	.01
<b>Personality Factors</b>				
Anxiety	-.05	Not sig.	-.04	Not sig.
n-Achievement	.27	.01	.40	.01

$r_1$  correlation between Vocabulary and each psychological factor  
 $r_2$  correlation between Comprehension and each psychological factor  
 .05 statistically significant at the .05 level  
 .01 statistically significant at the .01 level

### III. MULTIPLE CORRELATION ANALYSIS

Evidence was presented earlier in this chapter that scores on vocabulary and reading comprehension were related to certain socio-economic, educational input, and psychological variables. In this section an attempt will be made to determine which of these predictor variables are helpful in explaining discrepancies in reading scores.

Wert, Neidt and Ahmann state in their discussion of linear regressions that:

It should be noted, that when more than one variable is used to predict a criterion, the relative influence of each of the predictor variables with respect to any other cannot be inferred from a direct comparison of the size of the coefficient of the variable.<sup>1</sup>

For the purpose of determining factors which contribute at statistically significant levels to discrepancies found in reading, multiple correlation coefficients of predictor variables for each of the criterion variables together with F-ratios for each of the predictors have been calculated. Factors which make a statistically significant contribution to the multiple correlations will be determined by testing the F-ratio.

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<sup>1</sup>James E. Wert, Charles O. Neidt and J. Stanley Ahmann, Statistical Methods in Educational and Psychological Research, (New York: Appleton-Century-Crofts, Inc., 1954), p. 237.

### Procedure

Four multiple correlation coefficients were calculated. The first two used Vocabulary as the criterion variable, the other two used Reading Comprehension as criterion variable.

For each criterion, the first multiple correlation added Verbal I.Q., the second added Nonverbal I.Q. as the final predictor variable. Socio-economic variables and Educational Input variables were added in the order followed by Roe in her study. The psychological variables--n-Achievement, Level of Verbalization, Time on Vigotsky, and Time on Vigotsky--which correlated significantly with reading were then added. Next were added the other psychological variables which did not correlate significantly with reading.

### Presentation of Statistical Findings

Table X shows the Pearson Product-Moment Correlation of each of the predictor variables with Vocabulary as criterion, the F-ratios of each variable and the multiple correlations of groups of significantly contributing variables.

TABLE X

PEARSON PRODUCT-MOMENT CORRELATIONS, F-RATIOS AND  
MULTIPLE CORRELATIONS WITH VOCABULARY  
AS CRITERION (N=90)

Predictors	r	F-ratio	R
<b>Socio-ec., and Ed. Input</b>			
1. Father's Occupation	.31**	9.615**	
2. Mother's Education	.31**	6.548**	
3. No. of Newspapers	.14	4.490**	
4. No. of Siblings	-.24**	4.583**	
5. Days Absent from Sc.	.02	3.675**	
6. Grade IV Sections in Sc.	.04	3.027**	
7. Teacher's Qualifications	.02	2.735*	0.459
<b>Psychological Factors</b>			
8. n-Achievement	.27**	3.065**	0.482
9. Level of Verbalization	.33**	3.179**	0.499
10. Total TOME on Vigotsky	-.11	2.859**	
11. Total Score on Vigotsky	-.10	2.576**	0.516
12. No. of Clues on Vigotsky	-.07	1.667	
13. Bender-Gestalt	-.13	1.550	
14. Set Fixation	-.04	1.430	
15. Set Extinction	-.08	1.372	
16. Anxiety	-.05	1.270	
17. Lie on Anxiety	-.07	1.188	0.468
<b>Intelligence Factors</b>			
18. Verbal I.Q.	.74**	6.549**	0.790
19. Nonverbal I.Q.	.68**	2.366**	0.612

\*\*indicates statistical significance at the .01 level.  
\*indicates statistical significance at the .05 level.

TABLE XI  
 PEARSON PRODUCT-MOMENT CORRELATIONS, F-RATIOS AND  
 MULTIPLE CORRELATIONS WITH COMPREHENSION  
 AS CRITERION (N=90)

	r	F-ratio	R
<b>Socio-ec., and Ed. Input</b>			
1. Father's Occupation	.22**	4.391**	
2. Mother's Education	.35**	6.186**	
3. No. of Newspapers	.21*	4.117**	
4. No. of Siblings	-.34**	5.369**	
5. Days Absent from Sc.	.17	4.622**	
6. Grade IV Sections in Sc.	.03	3.806**	
7. Teacher Qualifications	.12	3.239**	0.461
<b>Psychological Factors</b>			
8. n-Achievement	.40**	5.116**	0.581
9. Level of Verbalization	.31**	5.136**	
10. Total Time on Vigotsky	-.18*	4.565**	
11. Total Score on "	-.17	4.197**	0.614
12. No. of Clues on "	-.14	1.374	
13. Bender-Gestalt	-.07	1.393	
14. Set Fixation	-.07	1.279	
15. Set Extinction	-.08	1.308	
16. Anxiety	-.04	1.274	
17. Lie on Anxiety	-.01	1.297	0.484
<b>Intellectual Factors</b>			
18. Verbal I.Q.	.68**	5.867**	0.773
19. Nonverbal I.Q.	.41**	2.185**	0.597

\*\*indicates statistical significance at the .01 level.  
 \* indicates statistical significance at the .05 level.

Table X indicates that each of the Socio-economic variables contribute significantly to the multiple correlations .790 and .612. Considered as a group, Socio-economic and Educational Input variables from a multiple correlation of .459 explaining approximately about 21 per cent of the discrepancies in Vocabulary.

Adding the four significantly contributing psychological variables increases the multiple correlation to .516 which implies that the four psychological factors, n-Achievement, Level of Verbalization, Total Time on Vigotsky, Total Score on Vigotsky explained an additional 6 per cent. This is a small contribution but is understandable since Pearson correlations between Vocabulary and most psychological variables were found to be much lower than between Reading Comprehension and the same predictor variables.

Table X shows that each of the Socio-economic and Educational Input variables again contribute significantly to the multiple correlations .773 and .597. These variables considered as a group have a multiple correlation of .461 which indicates that they explain approximately 21 per cent of the discrepancies found in Reading Comprehension scores.

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Four multiple correlations (.790, .612, .773, .597) were calculated by computer. Multiple correlations for groups of variables were calculated by hand using the formula:



Adding to these variables the significantly contributing psychological variables increases the multiple correlation explaining discrepancies in Reading Comprehension scores to .614. This indicates that the psychological factors: n-Achievement, Level of Verbalization, Time on Vigotsky, and Total Score on Vigotsky, explain approximately 16 per cent of the discrepancies found in Reading Comprehension scores.

Including the six psychological variables, which correlated very lowly with reading decreased the multiple correlation from .516 to .468 when Vocabulary was criterion and from .614 to .484 with Reading Comprehension as criterion.

Thus it may be concluded that certain psychological variables help to explain discrepancies in both vocabulary and reading comprehension scores but that an addition of many insignificant variables adds nothing. It remains to be seen whether the three major hypotheses set forth in this study have been justified.

The major hypotheses of this study stated: (1) That certain perceptual factors contribute significantly to an

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$$F_{m, N-m-1} = \frac{R^2 (N-m-1)}{m(1-R^2)}$$

where:  $F_{m, N-m-1}$  = the F-ratio with  $m$ , and  $N-m-1$  df.

$N$  = the number in the sample  
 $m$  = the number of variables

$R^2$  = the multiple correlation squared.

explanation of discrepancies in reading scores, (2) That certain conceptual factors contribute significantly to an explanation of discrepancies in reading scores, (3) That certain personality factors contribute significantly to an explanation of discrepancies in reading. To test these hypotheses, each group of psychological variables will be examined separately.

#### Findings Relative to Perceptual Factors

In Chapter I of this study it was stated that certain perceptual factors would contribute significantly to an explanation of discrepancies found in reading scores. Tables X and XI show, however, that neither of the perceptual variables investigated in this study makes a significant contribution.

Hence, on the basis of findings from the present study, neither Visual-Motor Perception, Set Fixation or Set Extinction contribute significantly to the multiple correlation. The first major hypothesis must, therefore, be rejected.

#### Findings Relative to Concept Formation Factors

The second major hypothesis of this study stated that certain concept formation factors contribute significantly to an explanation of discrepancies in reading. Tables X

and XI indicate that Ability to Verbalize a concept, Time required to form a concept, and Total Score on the Vigotsky Testm contribute significantly at the .01 level to the multiple correlation. Closer study shows that these variables increase the multiple correlation from .482 to .516 with Vocabulary as criterions--an addition of about 3 per cent--and from .581 to .614 with Reading Comprehension as criterion--a 4 per cent increase.

On the basis of these findings, the second major hypothesis stating that certain concept formation variables contribute significantly to an explanation of reading discrepancies may be accepted at the .01 level.

#### Findings Relative to Personality Factors

The third major hypothesis stated that certain personality factors contribute significantly to an explanation of reading discrepancies. Table X and XI indicate that Manifest Anxiety does not make a significant contribution to our study of reading. However, m-Achievement makes a contribution which is highly significant at the .01 level. This is particularly true for Reading Comprehension as criterion. In the case of Vocabulary, n-Achievement increases the multiple correlation from .459 to .482 which indicates a small increase of about 2 per cent. In the case of Reading Comprehension, however, n-Achievement increases

the multiple correlation from .461 to .581 which indicates an increase of approximately 13 per cent.

## CHAPTER V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### I. SUMMARY

The present study is a continuation of a study presently being made at Memorial University by Roe. In her study, Roe is investigating the relationship between certain Socio-economic and Environmental Factors and Reading Achievement at the Grade IV level. This study involves an investigation of certain Psychological Factors and their additional affect on Reading Achievement.

#### The Problem

A review of the literature related to reading difficulties indicates that an investigation of reading difficulties must involve research in more than one area. This study, therefore, adds certain psychological variables to those investigated in the Roe study mentioned above.

The three major purposes of this study were (1) to determine the extent to which certain perceptual variables affect reading, (2) to determine the extent to which certain conceptual factors affect reading, (3) to determine the extent to which certain personality factors affect reading.

In an attempt to explore these three areas, six minor hypotheses were set up.

Hypothesis 1 stated that there is a negative correlation between visual-motor perception and reading achievement. Hypothesis 2 was divided into two parts: (a) There is a negative correlation between set fixation and reading achievement, and (b) There is a negative correlation between set extinction and reading achievement. These two hypotheses relate to the perceptual variables being studied.

Hypothesis 3 has three parts: (a) There is a negative correlation between total score on the Concept Formation test and reading achievement, (b) There is a negative correlation between time required to form the concept in the Concept Formation test and reading achievement, (c) There is a negative correlation between number of clues given to aid concept formation and reading achievement. Hypothesis 4 stated that there is a positive correlation between ability to verbalize a concept when formed and reading achievement. These two hypotheses have been made about the conceptual variables being studied.

The final two hypotheses are related to personality variables. Hypotheses 5 and 6 stated that there is a negative correlation between anxiety and reading achievement.

Hypothesis 6 stated that there is a positive correlation between need to achieve and reading achievement.

### The Sample

The sample used in this study consists of 90 boys selected randomly from a sample of 305 students being examined in the Roe study. Roe selected her sample randomly from the total population of Grade IV boys enrolled in schools conducted by the Roman Catholic School Board in St. John's.

### The Instruments

In addition to results obtained from the Nelson-Woodland Reading Test and the Lorge Thorndike Intelligence Test--Level 3, Roe collected information relative to: (1) Father's occupation, (2) Mother's education, (3) Frequency of receiving newspapers in the home, (4) Number of siblings (5) Size of school attended, (6) Teacher qualifications.

This data for each of the 90 boys forming the sample of the present study is, with the permission of Roe, being used in this study,

Other tests used are: (1) The Bender-Gestalt Test, (2) The set Test, (3) The Kagan-Hanfmann (Vigotsky) Concept Formation Test, (5) Taylor Manifest Anxiety Scale, (6) McClelland n-Achievement Test.

### Data Collection

Except for the data reported from the Roe study which was collected during the spring of 1968, the data for this study was collected during the months of April, May and June, 1969. All data was collected by the researcher who personally administered each of the psychological measures mentioned above. All tests except the n-Achievement test were scored by the writer. The n-Achievement test was scored by a graduate student who is doing his work in the field of Educational Psychology.

### Statistical Treatment

Results of the psychological testing, Reading Scores I.Q. Scores, together with data on Socio-economic and Environmental factors were punched on cards for the computer.

Pearson Product-Moment Correlations were then calculated. The intercorrelations and correlations were then put in order for further statistical treatment.

The intercorrelations of all predictors in the order of Socio-economic, Educational inputs, Psychological variables, and I.Q. variables were given. The I.Q. variables of Verbal I.Q., Nonverbal I.Q. and Total I.Q. were added separately. Finally, correlations between each of the predictors with each of the Reading scores of Vocabulary, Reading Comprehension, and Total Reading Score, were given.



Means, standard deviations, F-ratios, and multiple correlation coefficients were calculated by computer.

### Findings

Taking Vocabulary as the criterion variable, two only of the Psychological predictor variables correlated significantly. Level of Verbalization on the Vigotsky Test had a correlation of .33 with Vocabulary. This correlation with an N=90 was significant at the .01 level. Need Achievement correlated .27 with Vocabulary. This, too, was significant at the .01 level.

The Bender-Gestalt Test; Set Test; Total score, Time, and Number of clues on the Vigotsky Test; and the Anxiety Test did not correlate significantly with Vocabulary.

Taking Reading Comprehension as the criterion variable, three of the Psychological predictor variables correlated significantly. Level of verbalization on the Vigotsky Test correlated .31 with Reading Comprehension. This correlation was found to be significant at the .01 level with N=90.

Need Achievement correlated .40 with Reading Comprehension. This correlation, too, was found to be significant at the .01 level, N=90.

Time required to complete the Concept Formation Test (Vigotsky) correlated  $-.18$  with Reading Comprehension.

This correlation is significant at the .05 level with  $N=90$ .

The other psychological variables investigated in this study did not correlate significantly with Reading Comprehension.

In the light of these findings, Hypotheses 1, 2(a), 2(b), 3(a), 3(c) and 5 were rejected. Hypothesis 3(b) was accepted at the .05 level for Reading Comprehension. Hypothesis 4 was accepted at the .01 level for both Vocabulary and Reading Comprehension. Hypothesis 6 was accepted at the .01 level for both Vocabulary and Reading Comprehension.

F-ratios indicated that four of the psychological variables--n-Achievement, Level of Verbalization, Time required to form a concept and Total Score on the Vigotsky Test made significant contributions at the .01 level to the multiple correlations. The contribution made when Vocabulary was the criterion was considerably less than when Reading Comprehension was the criterion. In the first case the multiple correlation is increased from .459 to .516, in the second case the multiple correlation is increased from .461 to .614 by adding the four psychological variables: n-Achievement, Level of verbalization on Vigotsky, Time required to form a concept on the Vigotsky test, and Total score on the Vigotsky test.

## II. CONCLUSIONS

Although this study has not revealed any variables which explain a great percentage of reading discrepancies, it has succeeded in revealing two areas which are deserving of further study,

Need Achievement has been found to be a factor which contributes significantly to an explanation of reading discrepancies,, particularly in reading comprehension. Adding five Socio-Economic and two Educational Input variables produced a multiple correlation of .461 with Reading Comprehension as criterion. Adding the single variable-- n-Achievement--increased the multiple correlation to .581. This means that n-Achievement explains approximately 13 per cent of the discrepancies found in reading comprehension. The writer feels, therefore, that a single variable, other than I.Q., which accounts for a reasonably high percentage of the difficulties found in reading should be studied further.

One should suppose from a study of the literature related to n-Achievement that this variable would be closely related to such socio-economic variables as mother's education and father's occupation. This study shows only a moderate correlation of .14 with mother's education and of .14 with father's occupation. Neither of these correlations

is significant at the .05 level. Hence, a study of n-Achievement would seem to involve more than a simple study of socio-economic factors.

Although Concept Formation variables together do not account for a very great percentage of reading discrepancies--only 4 per cent is explained in the case of both Vocabulary and Reading Comprehension--the writer feels that this group of variables which accounts for about 4 per cent of the discrepancies in reading should not be overlooked.

The perceptual factors investigated are not, according to the present study, contributing significantly to discrepancies in reading. The writer feels, however, that the Bender-Gestalt Test should not be disregarded in a study of reading difficulties, and that its use in differentiating good and poor readers as well as its use in determining readiness to read might be profitable.

### III. RECOMMENDATIONS

Concerning further research in the area of psychological factors as variables affecting reading, the writer would recommend:

1. That Need Achievement be studied in greater detail. In particular, the writer would suggest an investigation of ways to increase the child's need to aspire after a high degree of perfection

in his achievements. A comparison of reading achievement before and after attempts were made to increase his need to achieve might indicate steps which should be taken in an attempt to improve reading.

2. The writer would also recommend that further research be done to determine the extent to which improving a child's concept formation ability would improve his ability to read with greater comprehension.

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APPENDIX A  
CORRELATION MATRIX FOR ALL VARIABLES



	1	2	3	4	5	6
1. Vocabulary	1.000	.727	.941	.314	.305	.140
2. Reading Comprehension		1.000	.918	.218	.3077	.2093
3. Total Reading Score			1.000	.290	.347	.18
4. Father's Occupation				1.000	.465	.47
5. Mother's Education					1.000	.46
6. No. of Newspapers						1.000
7. No of Siblings,						
8. Days Absent						
9. Size of School						
10. Teacher Qualifications						
11. Bender-Gestalt						
12. Set Fixation						
13. Set Extinction						
14. Total Score on Vigotsky						
15. Time on Vigotsky						
16. No. of Clues on Vigotsky						
12. Concept Verbalization						
13. Anxiety						
19. Lie on Anxiety						
20. n-Achievement						
21. Verbal I.Q.						
22. Nonverbal I.Q.						
23. Total I.Q.						



17	18	19	20	21	22	23
.326	-.050	-.068	.266	.738	.507	.713
<del>.324</del>	-.039	.007	.397	.684	.413	.623
.345	-.247	-.037	.351	.768	.499	.752
.331	.097	-.140	.143	.311	.315	.358
.174	.012	-.093	.140	.292	.276	.357
.211	.014	-.146	.094	.291	.203	.268
-.116	.187	-.034	-.249	-.193	-.173	-.219
.055	-.178	.177	-.014	-.049	.040	.029
.034	-.005	-.241	-.101	.032	.185	.113
.003	.149	-.183	.084	.044	-.050	.009
-.179	.004	-.036	-.097	-.211	-.306	-.285
-.128	.163	.099	-.160	-.006	.104	.053
-.137	.138	-.048	-.047	-.084	-.052	-.066
-.340	.060	.071	-.054	-.165	-.253	-.238
.408	-.005	.162	-.082	-.236	-.295	-.304
.244	.095	.013	-.029	-.095	-.190	-.162
.000	-.062	-.254	.182	.343	.409	.412
	1.000	.090	.197	-.124	-.113	-.109
		1.000	.095	-.142	-.245	-.211
			1.000	.335	.042	.217
				1.000	.613	.853
					1.000	.905
						1.000

APPENDIX B

KASANIN-HANFMANN CONCEPT FORMATION TEST





APPENDIX B  
KASANIN-HANFMANN CONCEPT FORMATION TEST  
EXAMINER MANUAL -- 36118M

Spread the 22 blocks before the subject over the circular area of a board. (Use any flat-surfaced, neutral colored board on which to place the blocks) at about equal distance from each other one-half to one inch and well mixed as to color and size. Say, in effect, the following: "These are four different kinds of blocks. Each kind has a name. This kind of block, for instance turning up the triangular mur, is called mur. Your task is to find these four kinds and to put them in those, four spaces showing the four corner fields of the board. You might start by picking out all the blocks that you think might belong to this kind, mur, and putting them in this space." (If no board is used, it is well to stress again: "Remember that there are just four kinds of blocks.") If the subject asks about the number of blocks in each group, explain that it need not be the same in each group, ~~explain~~ ~~that~~ whether the classification is logical and consistent, answer in the affirmative, stressing the existence of a principle, and reassure him if he suspects the existence of "catches" or "fould play." The subject who asks about

timing should be reassured that there is no time limit on the test. If the subject at any time during the test chooses to organize the whole material simultaneously rather than to concentrate on one kind, he is given full freedom to do so, and encouraged to move the blocks about freely if he seems to have inhibitions about it. Through these measures we safeguard the freedom of procedure which is necessary for the display of the superior, well-planned approach which from the beginning aims at the total system.

When the subject has selected all blocks that might be mur, turn up the block which is more in error (e.g. of all triangles added to the sample, turn up bik which is different from mur both in height and size. Say: "I am showing you one mistake. The rest may be correct or may not." If the subject waits for further instructions, say: "Try again picking out all the murs. Or you can try the biks the kind turned up or any other kind that you like," thus again encouraging the free procedure. On further trial turn up, whenever possible, a block belonging to a kind different from the one turned up before, so as to give the subject - after three corrections - one sample of each kind. All blocks that had been turned up are left in this position, with their names visible. When all the blocks selected for one group are correct (not necessarily all blocks of this kind having been selected,) say, "Are

those all the murs?" If the group is as it was, or correctly completed, say, "Now pick out the biks," proceeding in the same way as before. If the group is incorrectly completed, turn up the blocks, as before. In general, discourage the purely blind trial and error, asking the subject to state the reasons for his choice wherever they are not self-evident, and if he admits having none, urge him to find the principle. Only if no new solution is produced in five minutes should the purely random group be accepted for correction, so as to avoid deadlock. For the same reason the subjects who refuse to act outwardly (i.e., to place the blocks) before they have satisfied themselves of the completeness and consistency of their solution, if and when they display signs of a prolonged blocking should be tacfully urged to try out some of their ideas, even though they do not seem quite satisfactory.

When the entire test is finished ask for the principle of classification, and if only one characteristic is given (height, or sizes: or volume,) call for specification, until the formulation in terms of the double dichotomy (height and size) is clearly arrived at, regardless of the terms used to express these ideas (height, depth, or third dimension; area or size.) If the subject shows all signs of complete and easy mastery of the system; repetition of the task may be foregone.

ADDITIONAL INSTRUCTIONS

With uneducated adults, children, and also with special groups of subjects, such as psychotic patients, one starts by presenting the standard instructions and the usual procedure. If, however, the subject does not understand the meaning of the task, as much explanation is given to him at different points as is necessary to make him attack the task and keep at it. Attached are given the most frequently occurring difficulties and questions of psychotic patients and uneducated normals and the answers that might be given them.

I. EXPLANATION OF THE NON-RANDOM NATURE OF THE TASK

1. The subjects who try to solve the problem by turning the blocks and reading the names have to be cautioned against doing so. If the subject's behavior makes us anticipate such a method, we enlarge on the instruction by saying, "The names are written on the bottom, but you must not turn the blocks and read them."

2. If to this the subject replies, "Then how can I tell?", or proceeds to pick blocks in a purely random manner, declaring to inquiry that he just thinks they are right, or that he is going "by names," he is told, in effect, the following: "Yes, but the names stand for

something. You cannot get it merely by guessing. There is some reason why the blocks have the same name and you have to find it out."

3. If the subject does not benefit by repeated explanation of that kind, he is finally told, "The blocks have the same name because they are alike in some way," and then more directly, "You must put together the blocks that are alike in some way." This explanation, however, is only given to put an end to a purely random procedure or inactivity; it is not given if the subject proceeds according to some reason, e.g., putting together blocks of different instead of similar shape or color.

## II. EXPLANATION OF THE MULTIPLE POSSIBILITIES OF THE CHOICE

1. If the subject responds to the instruction to pick out all murs by asking, "You mean the same color?" (or: the same shape, etc.), the examiner answers, "It is up to you to find out which blocks belong together - I am not supposed to tell you; it might be color or it might be something else."

2. If this is not sufficient to start the subject on a trial, the examiner explains that he may try out whatever idea he has, adding, "When you have picked out all blocks which you think might be mur, I shall turn one up, and you will see whether you are right or not."

3. Finally, if the subject consistently misinterprets these explanations, as meaning a rejection of his original idea, and not grasping the existence of other possibilities, does nothing at all, the examiner says simply, "You may try the color."

### III. EXPLANATION OF THE MEANING OF CORRECTIONS

1. In this last case, as in many others, it is useful to accompany at least the first correction with an explicit statement, "This one has a different name; it is a block of a different kind, a bik, we shall put it here."

2. In the same way with every correction the warning about the uncorrected blocks may be stressed by saying, "I can turn only one block at a time; the rest may be right or wrong; or some might be right and some wrong. You must decide for yourself if they should be left there or taken away." If the subject leaves the blocks where they were, he should be reminded now and then in the course of further trials, that he had no confirmation that this placement was correct.

3. In extreme cases when accumulations of wrongly placed blocks in all four groups confuse the picture and

thus interfere with any further insightful trials, it is advisable to suggest to the subject that he remove uncorrected blocks from all groups but one, and concentrate his further efforts on this one group.

4. At the time of the third correction, when the fourth block is turned, the examiner says, "Now you have a sample of each kind. All of those blocks (rest) belong to one of those four kinds; you must put each block where it belongs.

5. The subject who not understanding the function of the corrected blocks, turns them again so that the names are hidden from view, or unite in one group blocks with different (visible) names, are cautioned against doing so.

#### IV. FINDING OF THE PRINCIPLE

After me solution has been reached--sometimes without any insight on the part of the subject--the examiner places the four groups closer to each other in the center of the board in order to make the survey easier, and asks the subject the following questions in the designated order:

1. PRINCIPLE "What do they go by?" Or: "How do you tell the different kinds apart?" If the subject says, "By names," turn the blocks so that the names cannot be seen and say, "But if you cannot see the names?"

2. DEFINITION Whatever the answer to 1, the examiner then asks the subject to describe each kind of blocks, saying; "Describe the lag?" or, "How are they compared with the other kinds?" If a group is described as consisting of different shapes and colours by a subject who has previously named size as a basis of classification, the examiner may urge the subject who did not mention size before no such is given, the examiner proceeds to the next question which is:

3. COMMON CHARACTERISTIC "What do all the lag have in common? In which way are all the lag alike?" If the subject points out a similarity of color or shape between two blocks of one group say: "Yes, but in which way are all the lag alike? Why do they all have the same name?"

4. DIFFERENCE The examiner asks next: "In which way are the lag different from the cev?", repeating this question for each of the six possible combinations. If the subject points out differences (e.g., of color) between individual members of the two groups, repeat the question, all: "How are all the lag different from all the cev? Why do they have different names?"

5. Very frequently the subject who failed the first three questions will at this point discover the difference of size, especially if the two most contrasting groups cev



and lag are presented. If he does not however, the difference is pointed out by the examiner, who also helps the subject to find an adequate formulation, and then repeats the questions of the principle, common characteristic, and definition, if they were failed before. This time the subject, if he fails again, is helped to find the correct answer to each question and is made to repeat the definition of each group in terms of double dichotomy (lag - tall and large; bik - flat and large; mur - tall and small; cev - flat and small.) He is also shown that two groups have the same height but differ in size; and two have the same size but differ in height.

6. The subject is then told the following: "I am going to mix the blocks up again. Now that you know what the different kinds are (or: what they go by) it should be easy for you to put them back in four groups the way they are now." After noting the subjects reactions to that suggestion, the blocks are turned and mixed and the subject has to put them again in four groups. His procedure, errors and results are noted in detail.

RECORDING AND SCORING

Record all selections made by the subject and all corrections made by the examiner, numbering the latter in the order of their occurrence. For a brief written symbol of each block, its cross section containing the initial letter of its kind, thus:  $\pi$ , c, l, proved the best available. Encourage the subject to "think aloud" and record all his remarks as well as those of the examiner. Time is measured, to the nearest minute, from the last word of standard instructions to the moment of correct solution. Taking of time should be done inconspicuously, with no watch in sight. In scoring the performance each correction is considered to five minutes of trial. (The first block given as a sample is not counted as a correction.) Thus, to obtain the score, the number of corrections is multiplied by five and added to the number of minutes spent in arriving at the solution. Examples of scoring: (1) Solution reached within 5 minutes with 3 corrections; score 20. (2) Solution reached within 20 minutes with 2 corrections, score 30.

**APPENDIX C**  
**TAYLOR MANIFEST ANXIETY TEST**

APPENDIX C

MEMORIAL UNIVERSITY

ST. JOHN'S, NEWFOUNDLAND

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Taylor Manifest Anxiety Test

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Read each question carefully. Put a circle around the word YES if you think it is true about you. Put a circle around the word NO if you think it is not true about you.

1. It is hard for me to keep my mind on anything..YES NO
2. I get nervous when anyone watches me work.....YES NO
3. I feel I have to be best in everything.....YES NO
4. I blush easily.....YES NO
5. I like everyone I know.....YES NO
6. I notice my heart beats very fast sometimes....YES NO
7. At times I feel like shouting.....YES NO
8. I wish I could be very far from here.....YES NO
9. Others seem to do things easier than I can.....YES NO
10. I would rather win than lose in a game.....YES NO
11. I am secretly afraid of a lot of things.....YES NO
12. I feel that others do not like the way I do things.....YES NO
13. I feel alone even when there are people around me.....YES NO
14. I have trouble making up my mind.....YES NO
15. I get nervous when things do not go the right way for me.,.....YES NO
16. I worry most of the time.....YES NO
17. I am always kind.....YES NO
18. I worry about what my parents will say to me...YES NO
19. Often I have trouble getting my breath.....YES NO
20. I get angry easily.....YES NO
21. I ~~have~~ always good manners.....YES NO
22. My hands feel sweaty.....YES NO

- |   |      |    |
|---|------|----|
| 23. I have to go to the toilet more than<br>most people.....                          | YES  | NO |
| 24. Other children are happier than I.....  | YES  | NO |
| 25. I worry about what other people think<br>about me.....                            | YES  | NO |
| 26. I have trouble swallowing.....  | YES  | NO |
| 27. I have worried about things that did not<br>really make any difference later..... | YES  | NO |
| 28. My feelings get hurt easily.....  | YES  | NO |
| 29. I worry about doing the right things.....   | YES  | NO |
| 30. I am always good.....   | YES  | NO |
| 31. I worry about what is going to happen.....  | YES  | NO |
| 32. It is hard for me to go to sleep at night...                                      | YES  | NO |
| 33. I worry about how well I am doing in<br>school.....                               | YES  | NO |
| 34. I am always nice to everyone.....   | YES  | NO |
| 35. My feelings get hurt easily when I am<br>scolded.....                             | YES  | NO |
| 36. I tell the truth every single time.....   | YESQ | NO |
| 37. I often get lonesome when I am with<br>people.....                                | YES  | NO |
| 38. I feel someone will tell me I do things<br>the wrong way.....                     | YES  | NO |
| 39. I am afraid of the dark.....  | YES  | NO |
| 40. It is hard for me to keep my mind on my<br>school work.....                       | YES  | NO |
| 41. I never get angry.....  | YES  | NO |
| 42. Often I feel sick in my stomach.....  | YES  | NO |
| 43. I worry when I go to bed at night.....  | YES  | NO |
| 44. I often do things I wish I had never done...                                      | YES  | NO |
| 45. I get headaches.....  | YES  | NO |
| 46. I often worry about what could happen to<br>my parents.....                       | YES  | NO |
| 47. I never say things I shouldn't .....  | YES  | NO |
| 48. I get tired easily.....   | YES  | NO |
| 49. It is good to get high grades in school.....                                      | YES  | NO |
| 50. I have bad dreams.....  | YES  | NO |
| 51. I am nervous .....  | YES  | NO |
| 52. I never lie.....  | YES  | NO |
| 53. I often worry about something bad happening<br>to me.....                         | YES  | NO |

**APPENDIX D**  
**DESCRIPTION OF THE N-ACHIEVEMENT MEASURE**  
**AND PROCEDURE FOR ADMINISTRATION**

## APPENDIX D

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### THE N ACHIEVEMENT TEST

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The n-Achievement measure consists of four pictures (designated A, B, G, and H by McClelland). These pictures are used to elicit stories which are then scored for achievement content following the scoring procedure outlined by McClelland et al. (1953). A description of these pictures (in order of presentation) follows:

- B. Two men ("inventors") in a shop working at a machine
- H. Boy in checked shirt at a desk, an open book in front of him
- A. "Father-son". Card 7BM from the Murray Thematic Apperception Test
- G. Boy with vague operation scene in background (sometimes described as a boy possibly dreaming of the future). Card 8BM from the Murray Thematic Apperception Test

Procedure for administration (McClelland et al., 1953, pp. 98-99.

Four sheets of paper clipped together were handed to

each student. On each sheet four sets of questions were printed. The sets of questions were spaced on the sheet so that one quarter of the page was allowed for writing about each of them. The four questions were intended to insure complete coverage of a plot.

They were:

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

]

This is a test of your creative imagination. A number of pictures will be projected on the screen before you. You will have twenty seconds to look at the picture and then about four minutes to make up a story about it. Notice that there is one page for each picture. The same four questions are asked. They will guide your thinking and enable you to cover all the elements of a plot in the time allotted. Plan to spend about a minute on each question. I will keep time and tell you when it is time to go on to the next question for each story. You will have a little time to finish your story before the next picture is shown.



Obviously there are no right or wrong answers, so you may feel free to make up any kind of a story that you choose. Try to make the stories vivid and dramatic, for this is a test of creative imagination. Do not merely describe the picture you see. Tell a story about it. Work as fast as you can in order to finish in time. Make them interesting. Are there any questions? If you need more space for any question, use the reverse side.

The room was then darkened for 20 seconds while the first picture was projected on a screen before the subjects. After 20 seconds the picture was turned off, the lights were turned on, and the subjects began writing. The experimenter kept time, and after a minute had been allowed for each question, would say, "All right, it is about time to go on to the next question." When the subjects had been writing for 30 seconds on the last question the experimenter would say, "Try to finish up in 30 seconds." At the end of the final minute the experimenter would begin to prepare for the next picture, allowing no more than 15 seconds more than the required time to finish the stories. The lights would be dimmed and the next picture projected on the screen for 20 seconds, and so on without interruption until all four stories had been written.





