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PROFILE TYPES OF THE URBAN JUNIOR HIGH SCHOOL STUDENT: UTILIZING MEASURES OF COGNITIVE FACTORS, ACHIEVEMENT, APTITUDE, AND BACKGROUND INFORMATION

by

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CHAPTER I

STATEMENT OF THE PROBLEM

Cognitive factors, which might be called tools for learning, have been examined closely in tightly structured experimental studies. The strengths and effects of cognitive factors in the school performance of an educationally disadvantaged group of students have not been analyzed in depth. This study will attempt such an analysis. Although during recent years there have been many studies and much written on the educationally disadvantaged child, most of the current emphasis has been of a descriptive nature with a major stress on weaknesses resulting from educational, economic, and cultural deprivation. In this study profile types based upon measures of selected cognitive factors and profile types based upon measures of cognitive factors, aptitude, achievement, and background will be defined. A new technique called "shape-type criteria of profile analysis" will be used. It is the intent of the study to provide more information on the educationally disadvantaged child, and to apply a newly developed research technique. Utilization of the new technique of profile

analysis and additional multivariate techniques will stress learner success rather than failure, and individual strengths rather than disabilities.

Background and Importance of the Problem

One of the major crises in education today is the low level of achievement, as measured by standardized tests, of the majority of children attending the public schools in the big cities. Millions of dollars of supplementary funds from federal, state, and local educational agencies are allocated to the "inner city" schools annually for the purpose of improving the achievement of the children. Most of this money is used to provide more professional and paraprofessional staff, materials and equipment, and other supplementary services, all of which may improve the immediate education of the child and provide a measure of compensatory education, but it has not yet given the educators and the community the needed insight into solving the problem of the low level of achievement which has precipitated this crisis in big-city school systems.

Educators, sociologists, psychologists, and many others have studied and subsequently presented descriptive as well as empirical assessments of the educationally disadvantaged child. Almost every aspect of the child has been treated analytically. The major emphasis

has been on description of the economic status, family structure and life, subculture values, and educational experiences which result from historic deprivation and discrimination and which have placed the child in the position of becoming educationally disadvantaged.

As a result of the many empirical investigations and as a result of the equally numerous descriptive type of studies of the child in the urban area, a model has been defined. The school has undertaken the task of developing programs to compensate for the weaknesses this model of a child brings with him as he enters the educational setting. The emphasis is on the weaknesses of the model. There has been little effort to diagnose or define strengths of the model and to change traditional teaching-learning patterns to take advantage of the child's strengths.

The school structures the learning experiences of the child on the basis of information available concerning the child's level of achievement and aptitude as measured by standardized tests. In recent years, the schools in the large urban areas have been faced with low levels of performance on achievement and aptitude tests. Programs and classroom approaches have been geared for remediation and compensation. Teachers' expectancies of the children's success have been lowered. The educational experiences of the urban child have been geared down to allow him to function in the

framework of his weaknesses. This general approach of remediation and compensation has developed because few studies have been made that can provide evidence of a diagnostic type upon which school programs can be developed based upon a child's strengths. Strengths in this context means the "best" or "highest" measures of specific achievement and aptitude factors for the child or group of children in question. In this context, the child, or group of children, will be compared to themselves and not to a norms group drawn from any external population.

The measures of achievement and aptitude used in urban school systems are very general in nature. Test scores obtained by the children fall into two broad categories--verbal and nonverbal. The test scores do not provide for isolation of measures of the more finite factors of aptitude and achievement. These factors, termed cognitive factors, have been isolated, measured, and defined in studies of human intelligence over the last sixty years.

These cognitive factors as independent, identifiable variables account for a certain portion of the variance in the measures obtained on standardized achievement and aptitude tests. Definition of the relationships between selected cognitive factors and measures of achievement and aptitude as well as definition of profile types based upon measures of the selected cognitive factors could provide

more specific information needed for structuring teaching-learning models. There is need to consider the possibility that strengths in the selected cognitive factors will be most meaningful in the curriculum and methodology developed for the educationally disadvantaged child. There is need to discover how the school can capitalize on strengths rather than compensate for weaknesses.

Finally, it also might be possible that the child's background, such as size of family, position in family, economic status, educational level of parents, and stability of residence have effect on measures of achievement and aptitude as well as on measures of the cognitive factors being considered in this study.

Definition of Terms

Profile analysis:[1] Statistical procedure utilized to objectively describe and classify profiles; and to assign subjects to groups on the basis of their profiles.

Shape-type criteria of profile analysis:[2] Technique of profile analysis that provides an objective description of profile shape

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[1] J. R. Lindsey, "Shape Type Criteria of Profiles" (unpublished Doctoral dissertation, Wayne State University, 1969), p. 90.

[2] Ibid., p. 82.

whereby an isolated profile may be described in terms of its own characteristics.

Multiple regression:[1] Technique used to examine the relationship between a dependent variable and two or more predictors or independent variables.

Factor analysis:[2] Statistical method that will produce a representation or explanation of observed covariational relations among many experimental variables in terms of linear dependencies on, and relations among, a much reduced number of "ideal," "intervening," or "abstract" conceptual variables.

Communality (h^2):[3] The proportion of the total variance of a variable which is correlated with other variables.

Cognitive factor:[4] A factor is an independent, identifiable variable (for purposes of this study to be within the cognitive

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[1]William W. Cooley and Paul R. Lohnes, Multivariate Procedures for the Behavioral Sciences (New York: John Wiley and Sons, 1962), p. 5.

[2]Raymond B. Cattell, "The Meaning and Strategic Use of Factor Analysis," in Handbook of Multivariate Experimental Psychology, ed. by Raymond B. Cattell (Chicago: Rand McNally and Co., 1966), pp. 174-75.

[3]Benjamin Fruchter, Introduction to Factor Analysis (Princeton, N.J.: D. Van Nostrand Co., Inc., 1954), p. 51.

[4]J. P. Guilford, "Three Faces of the Intellect," American Psychologist, 1959, p. 470.

domain) that accounts for a certain portion of the total test variance in a correlation matrix. The amount of variance it accounts for in any given test is called the test's factor loading.

Cognitive structure:[1] Substantive content of an individual's structure of knowledge and its major organizational properties in a particular subject-matter field at any given time.

Cognitive factors:[2]

Flexibility of closure: Ability to keep one or more definite configurations in mind so as to make identifications in spite of perceptual distractions.

Speed of closure: Ability to unify all of an apparently disparate perceptual field into a single percept.

Word fluency: Facility in producing isolated words that contain one or more structural, essentially phonetic, restrictions, without reference to the meaning of words.

Length estimation: Ability to judge and compare visually perceived distances on paper.

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[1]David AuSubel, Educational Psychology: A Cognitive View (New York: Holt, Rinehart, and Winston, Inc., 1968), p. 127.

[2]J. W. French, Ruth Ekstrom, and L. A. Price, Manual for Kit of Reference Tests for Cognitive Factors (Princeton, N.J.: Educational Testing Service, 1963), pp. 9-51.

Associative (rote) memory: Ability to remember bits of unrelated material.

Memory span: Ability to recall perfectly for immediate reproduction a series of items after only one presentation of the series.

Number facility: Ability to manipulate numbers in arithmetic operations rapidly.

Perceptual speed: Speed on finding figures, making comparisons, and carrying out other very simple tasks, involving visual perception.

General reasoning: Ability to solve a broad range of reasoning problems, including those of a mathematical nature.

Spatial scanning: Speed in visually exploring a wide or complicated spatial field.

Semantic spontaneous flexibility: Ability to produce a diversity of verbally expressed ideas in a situation that is relatively unrestricted.

Educationally disadvantaged: The children enrolled in urban public schools in which federal and state funds are being used to provide compensatory and remedial educational programs.

Underachievement: Denotes attainment of grade-equivalent scores on standardized achievement tests of one year or more below actual grade placement in school at the time of testing.

Limitations and Assumptions

Any conclusions resulting from the analysis of data in this study will be applicable only to the sample of pupils involved in the study. It is not the intent to draw conclusions that would be of a "universal" nature in reference to the educationally disadvantaged or to the urban underachiever.

This study has limited itself to a presentation of cognitive profiles and description of cognitive profile types based upon eleven selected cognitive factors. The number of cognitive factors included in the study as experimental variables was limited because of restrictions placed upon the time that the subjects were available for test administration.

As the experimental variables are measures obtained on tests of cognitive factors structured for experimental purposes, there are no data available on the reliability and validity of the tests used.

The data collected on measures of cognitive factors, student background, and student reactions to school were collected by the

investigator in group test situations and from student interviews. The remainder of the data were obtained from cumulative records and from counselor ratings of the students in the sample. It will be assumed that the data collected from student records and counselor ratings is accurate even though it was not under the direct control of the investigator.

It will be assumed that the educationally disadvantaged child will perform more satisfactorily on some measures of selected cognitive factors than on others. It will be assumed that utilization of the technique of shape type criteria of profile analysis will produce distinctive profile types which can be described in terms of cognitive strengths and terms of relationships between cognitive factors and data from other measures collected for this study.

It is not the intent of this study to enter into the broad discussion of intelligence and intelligent behavior. References to the term "intelligence" will be made because the sources of background material for the study use the term. It is the intent of the study to limit itself to a discussion of selected cognitive factors with recognition of the fact that they are part of cognition which in turn is part of intelligence or part of the intellect depending upon semantic orientation.

Review of Related Literature

As the major intent of this study is to analyze the cognitive factors or abilities of a sample of urban youth who are educationally disadvantaged, the review of related literature will discuss materials from research as well as from theoretical and philosophical writings in the areas of cognition; cognitive factors; the educationally disadvantaged; the learning process and the educationally disadvantaged; standardized achievement and aptitude tests and the educationally disadvantaged; and underachievement. Also included in this section is a summary of the works cited. The purpose of this section of the study is to present some of the information most pertinent to the development of the objectives and stated hypotheses of the study. In no measure can the review of related literature be considered a summary of all materials related directly or indirectly to the subjects under consideration.

In the process of bringing together information from many sources and articulating it into a meaningful presentation, problems of semantics develop. The portion of this review on the subjects of cognition and cognitive factors is an example of the semantic difficulties one finds in summarizing the writings of many people. Cognition is defined several ways; cognitive factors are sometimes

referred to as abilities, and the term "intelligence" becomes enmeshed in the semantic war. Even though several definitions are presented herein, for purposes of this study the meanings that will be used are those made operational in the compilation of the Kit of Reference Tests for Cognitive Factors by Educational Testing Service.

Aspects of cognition

Cognition, as defined by Guilford,[1] is one of the five groups of intellectual abilities and is an ability of discovery, rediscovery, and recognition. George[2] defines cognition as the way humans perceive and learn. According to Bloom,[3] the cognitive domain includes objectives which deal with recall or recognition of knowledge and development of intellectual abilities and skills. AuSubel[4] discusses cognitive structure as a set of learning variables or a factor within the learner. He defines the existing cognitive structure (both

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[1]Guilford, "Three Faces of Intellect," p. 469.

[2]F. H. George, Cognition (London: Matheun and Co., Ltd., 1962), p. 2.

[3]Benjamin S. Bloom (ed.), Taxonomy of Educational Objectives. Handbook I: Cognitive Domain (New York: David McKay Co., Inc., 1956).

[4]AuSubel, Educational Psychology, p. 127.

substantive content of an individual's structure of knowledge and its major organizational properties in a particular subject-matter field at any given time) as the principal factor influencing meaningful learning and retention in this same field. AuSubel expands upon this definition by stating that, if cognitive structure is clear, stable, and suitably organized, accurate and unambiguous meanings emerge and tend to retain their dissociability strength or availability. If cognitive structure is unstable, ambiguous, disorganized, or chaotically organized, it tends to inhibit meaningful learning and retention. This viewpoint places great emphasis on the effect of past experiences and the impact of the existing cognitive structure in new learning.

Piaget[1] has presented to the world his theory of cognitive development. The major premise of this monumental contribution to the broad field of learning theory is that there are four periods of development. In order from infancy to age fifteen, these periods are: sensorimotor period, preconceptual period (including the phase of intuitive thought), concrete operations, and formal operations. There is constant interaction between the environment and the child as part

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[1]Joe L. Frost and Glenn R. Hawkes, The Disadvantaged Child (Boston: Houghton Mifflin Co., 1966), p. 19.

of the developmental process. The child passes through the periods by the mechanisms of assimilation and accommodation.

N. L. Gage[1] states that cognitive structure refers to the organization of facts, concepts, and principals which are partly determined by how man's mind works and partly by the nature of the subject.

Cognitive factors

Cognitive factors, as defined for purposes of this study, are independent and identifiable variables in the cognitive domain. The selected cognitive factors used in this study may be viewed as abilities or factors of aptitude and achievement. As independent and identifiable variables cognitive factors may be part of Spearman's general factor, "g," of intelligence; but more important they have been identified through factor analysis treatment in many studies and are classified in one or more of the three major factor analytic classifications of mental operations: Thurstone's "primary mental abilities," Cattell's "universal index," or Guilford's "structure of the intellect."

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[1]N. L. Gage, "Paradigms for Research on Teaching," in Handbook of Research on Teaching, ed. by N. L. Gage (Chicago: Rand McNally and Co., 1963), p. 138.

AuSubel[1] states that research in the field of intelligence supports the hypothesis that both a general or unitary ability and a constellation of discrete and separately measurable abilities or aptitudes exist in human intelligence. The discrete abilities he makes reference to are essentially the same as cognitive factors. In general, AuSubel views the developmental process for these sub-abilities as a function of age and sex. It is also stated that available evidence indicates that bright, dull, and average children grow intellectually at different rates and that cognitive abilities vary in organization and qualitative pattern.

Klausmeier has stated a somewhat eclectic definition of cognitive abilities:

> Cognitive abilities are combinations of such mental processes as perceiving, integrating, and generalizing, with such contents as figural, symbolic, and semantic. The outcomes of learning associated with these abilities are facts, concepts, and intellectual skills.[2]

In his "structure of the intellect," J. P. Guilford[3] has hypothesized a three-dimensional model with intellectual abilities

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[1]AuSubel, Educational Psychology, p. 229.

[2]Herbert Klausmeier, Learning and Human Abilities (New York: Harper and Row, 1961), p. 33.

[3]J. P. Guilford, "New Frontiers of Testing in the Discovery and Development of Human Talent" (paper presented at the Seventh

classified in three ways: operations, product, and content. The model has five operations: cognition, memory, divergent production, convergent production, and evaluation. There are six classifications of products: units, classes, relations, systems, transformations, and implications. Content may be figural, symbolic, semantic, or behavioral. The $4 \times 5 \times 6$ model represents the possibility of existence of 120 factors with each factor at the intersection of three variables. Guilford hypothesizes that the intercorrelations among factors will depend upon the population concerned and that the factors cannot be classified as universal to the degree that they will not be common to all ages, to all races, and to all sexes in the same degree of development. The foundations for the factors are inherent in all people, though it is possible that variance in potential factor development exists. Guilford hypothesizes that the development of the potential is dependent upon both formal and informal learning. It is further stated by Guilford that the multiple-ability concept of intelligence implies that an individual may have strengths and weaknesses which are not measurable in the application of the more traditional types of devices and instruments. Knowledge of the

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Annual Western Regional Conference on Testing Problems of Educational Testing Service, Los Angeles, Calif., 1959).

factors and their properties would allow for individual diagnostic planning as well as for improved curriculum construction and teaching procedures.

AuSubel[1] is somewhat critical of Guilford's multifactor model. He states that Guilford's factors are derived from a purely hypothetical three-dimensional model comparable to the periodic table of chemical elements. It was pointed out that many of the factors have never been verified by empirical study and that those factors supported by experimental evidence have not been shown to have any predictive significance for academic achievement. The low intercorrelations among Guilford's tests which are supposed to measure the same factor-pure ability indicate that scores on these tests are reflective of highly specific situation-bound abilities rather than of true intellectual subabilities that manifest generality of function and have psychological reality and significance.

One of the most far-reaching pioneer studies of intelligence was presented by Thurstone[2] in 1938 after several years of intensive work. In this first Thurstone study he found nine psychologically

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[1]AuSubel, Educational Psychology, p. 230.

[2]L. L. Thurstone, Primary Mental Abilities, Psychometric Monograph, No. 1 (Chicago: University of Chicago Press, 1938).

interpretable factors which he named primary mental abilities because they were the first found, not because they were the "ultimate." On the basis of this and other research he constructed a battery of commercially available tests which measured seven independent factors: verbal, reasoning, number, word fluency, memory, perceptual, and space. In subsequent studies, Thurstone expanded and refined his initial and most significant factor analytic study of abilities.

Cattell[1] advanced his theory of fluid and crystallized intelligence as a theory of integrating principles that demonstrated how with developmental influences basic abilities become organized at two distinct levels. The main premise is that the area semantically called "intelligence" has two major dimensions which have been labeled "fluid intelligence" and "crystallized intelligence." Within each dimension the "g" or general ability is at work. Fluid intelligence reflects anlage functions (reflecting perceptual limits of an individual) and the use of aids in the immediate environmental situation. (Aids are "tricks," procedures, learning sets, operations, or strategies employed to cope with an anlage function). Crystallized

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[1]R. B. Cattell, "Theory of Fluid and Crystallized Intelligence: A Critical Experiment," Journal of Educational Psychology, 1963, pp. 54-122.

intelligence involves recall of concepts previously acquired through previous anlage function and use of aids. The major difference between fluid and crystallized intelligence is that the concepts and aids involved in fluid intelligence are common experiences one might acquire anywhere in the physical world, whereas those involved in crystallized intelligence most probably represent what is acquired in a particular culture. This theory has been somewhat ignored, particularly because confirmation is an experiment of very large scope and particularly because the theory has not been pushed. Currently, it is beginning to attract attention.

A summary and review of studies in cognitive development was compiled by some staff members at the Center for Cognitive Studies at Harvard University.[1] In the introductory remarks the following points were made concerning the factor analytic approach to the study of cognitive abilities: some factors result from the process of formal education; abilities are not performed but differentiate out of more primitive structure which varies between individuals; and domains of the structure have a developmental order. The latter was expanded by referring to Guilford and Piaget. It

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[1]Mortimer Garrison (ed.), Cognitive Models and Development in Mental Retardation, Monograph Supplement to American Journal of Mental Deficiency, January, 1966, pp. 1-9.

was stated that a general factor will appear when factor extraction produces only one factor of significance, where the orthogonal relation saturates most variables heavily with one of the primary variables; or when, after rotation to a structure of correlated factors, the correlations are high and yield a second-order factor which saturates all the first-order factors. Finding a predominant factor on first extraction rarely happens. Guilford holds to orthogonal relation of factors, whereas other theorists follow Thurstone in permitting a hierarchical arrangement, starting with the simplest level of obliquely related factors, to second-order clusters of them, and possibly, as in Cattell's case, to two major domains of cognitive factors. In summary, statements were made to the effect that factor analytic research in cognitive development will encourage the search for attributes of human ability, lead to progress in comparative assessment of differentials among diagnostic groups, could lead to steps of intervention in and prevention of less than normal cognitive development, and will lead to hypothesizing or testing of hypotheses in cognitive development.

There is in existence a deficit in application of the findings from factor analytic study of mental abilities or cognitive factors. Sixty years after Spearman's methodological contribution, fifty years after Burt's refinements of statement, and thirty years after

Thurstone's general structuring of the ability field, the tests used are still of what is called the "omnibus" type and rest on a priori subtests factored after construction. The use of tests measuring one defined factor has been left to the research worker, and from these efforts in the experimental field many reference or marker tests have evolved.

The use of reference or marker variables in factor analysis has been to locate given concepts within specific populations. This approach not only confirms the factor content of the marker variable in a sample but allows for observation of relationships of other reference variables to the marker variables.[1]

The investigation of independent and identifiable variables that function within the cognitive domain gained momentum as a result of the importance placed upon measurement of abilities and aptitudes during World War II. By 1950, there were quantities of factor analyses data being reported and these data were hypothesizing the existence of many factors within human mental development. In 1951, the Educational Testing Service called a conference to initiate

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[1] B. Fruchter, "Manipulative and Hypothesis-Testing Factor-Analytic Experimental Designs," in Handbook of Multivariate Experimental Psychology, ed. by R. B. Cattell (Chicago: Rand McNally and Co., 1966), p. 333.

a project which would select tests to represent each of the better established factors in the cognitive area. The tests to represent each factor were chosen on the following basis: (1) three tests for each factor; (2) tests covering as much of the range from sixth grade through college as possible; (3) tests to be as factorially pure as possible for the intended factor; (4) tests to be as different as possible to balance out uniqueness; and (5) tests to be reasonably easy to administer by paper-and-pencil methods. The work was completed in 1954. The kit provided for sixteen factors. A second conference was held in 1958. This conference adopted a kit that tested twenty-four factors. Most of these tests were newly adopted for the kit. Preparation of the Kit of Reference Tests for Cognitive Tests was accomplished for the purpose of factorial research. It is expected that the named factors will appear unless conditions of the study or analysis prevents factors from separating as expected. A detailed description of the selected cognitive factors in this study and description of the test used can be found in Appendix A.

The educationally disadvantaged

For the purposes of this paper, educationally disadvantaged children have been defined as those children attending public schools that qualify to receive funds under federal or state programs for compensatory education. This definition allowed for the inclusion in the sample of economically disadvantaged children who are successful in school--particularly in a school in which success is the exception rather than the rule. Frost and Hawkes[1] define the educationally disadvantaged as children with a particular set of educationally associated problems arising from and residing extensively within the culture of the poor.

Passow et al.[2] describe the child within the culture of the poor as "motoric," "concrete," "thing-oriented," and nonverbal as compared to a description of a middle-class child as "conceptual," "abstract symbolic," "idea-oriented," and verbal. Passow et al.[3] further describe the child as less marked by an individualistic competitive orientation and as not being apt to use competition

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[1]Frost and Hawkes, The Disadvantaged Child, p. 4.

[2]A. Harry Passow, Miriam Goldberg, and Abraham T. Tannenbaum (eds.), Education of the Disadvantaged (New York: Holt, Rinehart, and Winston, Inc., 1967), p. 44.

[3]Ibid., p. 60.

in the classroom, less flexible in mental sets, and having a life style that is physical and visual. It is also stated in this reference that this child is less self-confident, has a low educational motivation, and is less knowledgeable about the world outside his immediate neighborhood.

In the 1967 yearbook of the National Society for the Study of Education[1] it was stated that the disadvantaged child suffers from a family environment that inhibits mental development during the preschool years; that intelligence grows out of experience with objects and people and each person inherits a potential which cannot be reached without environmental help; and research has shown the existence of a growing or cumulative "cognitive deficit" between the first and fifth grades in school. The demands of survival in the economically poor home do not leave parental time or energy for the exercise of middle-class values in education or environmental stimulation. "Be good" means be physically in active, verbally nonparticipative, and nonobservant.

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[1]National Society for the Study of Education, The Educationally Retarded and Disadvantaged, Sixty-sixth Yearbook of the National Society for the Study of Education, Part I (Chicago: University of Chicago Press, 1967), p. 67.

Deutsch[1] states that the disadvantaged child is restricted in his variety of stimulation. He is restricted to only a segment of the spectrum of stimulation potentially available. The segments have poorer and less systematic ordering of stimulation sequences; therefore, are less useful to growth and activation of cognitive potential.

Some general statistics cited by Passow et al.[2] state that about 15 percent of all children and about 25 to 30 percent of the disadvantaged children fail to take advantage of school opportunities. It is further stated that studies show that near the seventh year of school many of the disadvantaged children develop hostility or apathy toward the school which is demonstrated by aggressive acts.

In general, research has shown that extreme deprived environments may affect the development of the IQ in the first four years of life by approximately 2.5 IQ points per year and that between the ages of eight and seventeen by 0.4 point per year. This becomes a significant deficit for the first seventeen years of a child's life.[3]

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[1]Martin Deutsch, The Disadvantaged Child (New York: Basic Books, Inc., 1967), p. 45.

[2]Passow, Goldberg, and Tannenbaum, Education of the Disadvantaged, p. 39.

[3]National Society for the Study of Education, The Educationally Retarded and Disadvantaged, p. 106.

The Sixty-sixth Yearbook of the National Society for the Study of Education[1] presents a summary of characteristics of the disadvantaged: (1) Disadvantaged children display language inadequacies, including limited vocabulary and limited syntactical structure, inability to handle abstract symbols and complex language forms, and inability to interpret and communicate, difficulties in developing and maintaining thought sequence verbally, and restricted verbal comprehension. (2) Disadvantaged children display perceptual deficiencies, including problems of visual and auditory discrimination and spatial organization. (3) Disadvantaged children have a mode of expression which is more motoric and concrete than conceptual and idea-symbol focused. (4) Disadvantaged children have an orientation of life which seeks gratification in the here and now rather than in delaying for future advantage. (5) Disadvantaged children have low self-images, denigrating their potential as individuals and as learners. (6) Disadvantaged children have too modest aspirations and motivation to achieve academic goals. (7) Disadvantaged children display apathy and detachment from formal educational goals and processes. (8) Disadvantaged children have limited role behavior skills.

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[1] Ibid.

Yet, though these eight points listed above appear to be so strongly negative, there are strengths of the disadvantaged that are significant and could be capitalized on in educational planning. The NSSE Sixty-sixth Yearbook[1] continues its summary by emphasizing these strengths: high degree of cooperativeness and mutual aid; collective group values; more genuine egalitarian values; superior physical skill and grace; more visual and physical than auditory environmental orientation; concrete, not abstract, thought; and a cognitive style that tends to be slow, careful, and patient as opposed to clever and facile.

In the last several years, the topic of the "disadvantaged child" has been the subject receiving much attention from educators, sociologists, and psychologists in research and in books summarizing research and other writings. The major emphasis has been weaknesses and differences between the disadvantaged and the middle-class child who succeeds in school. This emphasis has led too many educators to continue to look for these differences and to attempt to analyze these differences as weaknesses that lead to compensation. Passow et al.[2] make a statement that can serve

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[1] Ibid., p. 28.

[2] Passow, Goldberg, and Tannenbaum, Education of the Disadvantaged, p. 80.

to put these descriptive statements concerning the disadvantaged into a more realistic perspective. It was stated that, despite the differences demonstrated in intellectual and academic abilities, attitudes, motivation, and behavior patterns in lower- and middle-class children, there is overlapping between groups. Some in one group resemble the other group. It also might be implied that these likenesses exist in the broad category of school success. What causes this to occur?

The learning process and the educationally disadvantaged

Passow et al.[1] have taken the viewpoint that the educationally disadvantaged need an educational experience that teaches them how to learn, that gives them intellectual discipline, and a depth of understanding. There is a need for special techniques.

Bruner states:

> By virtue of his distinctive degree of cognitive sophistication at every age level, the child has a very characteristic way of approaching learning material and "viewing the world." The pedagogic problem in readiness is to manipulate the learning situation in such a way that one takes account of and optimal advantage of existing cognitive capacities and modes of assimilating ideas and information. For example, the learner's objectivity-subjectivity, level of generality or particularity, and the abstractness and precision of his conceptualizations.

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[1] Ibid., p. 28.

> The task of teaching a subject to a child at any particular age is one of representing the structure of that subject in terms of the child's way of viewing things. The task can be thought of as one of translation.[1]

The research of great depth that has been completed by Martin Deutsch[2] and his associates has produced strong evidence that the disadvantaged child comes to school with a qualitatively different preparation for the demands of the learning process and the behavioral requirements of the classroom. There is evidence that little difference is found in the first grade between the poor child and the more affluent child, but that a difference develops and increases as the children progress through the grades. There is implication that lack of variety in the environment causes a detrimental effect from which the concept of stimulus deprivation has developed. It is assumed that this deprivation has effects on both formal and contentual aspects of cognition. Formal aspects of cognition are operations by which stimuli are perceived, encouraged, and responded to. Contentual aspects of cognition refer to the

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[1]Jerome S. Bruner, Process of Education (Cambridge, Mass.: Harvard University Press, 1960), pp. 33-34.

[2]Martin Deutsch, "The Disadvantaged Child and the Learning Process," in Education in Depressed Areas, ed. by A. Harry Passow (New York: Bureau of Publcations, Teachers College, Columbia University, 1963), p. 163.

actual content of the child's knowledge and comprehension. It is most probable that with less experience the educationally disadvantaged child takes longer to achieve a level of achievement than it would take a more advantaged child to reach the same level.

Riessman[1] describes the educationally disadvantaged child as relatively slow in performing intellectual tasks. He states that this child may be slow because he is extremely carefree, meticulous, or cautious and refuses to generalize easily. He cannot understand a concept unless he does something physically, e.g., with his hands, in connection with the idea he is trying to grasp. The educationally disadvantaged learns in one track and persists in one line of thought and is not flexible and broad.

In an unpublished research study Metfessel[2] gives five factors of learning patterns of the educationally disadvantaged: (1) The educationally disadvantaged learn more readily by the inductive than by deductive approaches (their low self-esteem causes them to distrust their own judgment or conclusions; the discovery technique

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[1]Frank Riessman, Helping the Disadvantaged Pupil to Learn More Easily (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1966), p. 18.

[2]Newton S. Metfessel, Unpublished research, Center for Study of Education of Disadvantaged Youth, University of Southern California, 1964, p. 31.

does not work with these children). (2) The educationally disadvantaged are symbolically deprived. (3) The educationally disadvantaged are unaccustomed to "insight building." (4) The educationally disadvantaged need to see concrete application of what is learned for immediate sensory and topical satisfaction. (5) The educationally disadvantaged display a poor attention span and experience difficulties in following directions.

Metfessel continues by stating that background of the child prevents success in traditional curriculum. These children experience frequent changes of residence and school. They have little success in receiving approval for success in a task.

Frost and Hawkes[1] firmly state that weaknesses which cause the disadvantaged child to have difficulties in the classroom revolve around problems of know-how or ineffective habits of perception, particularly skills of auditory and visual discrimination. The authors continue by stating that certain language factors affect the child's adjustment to the traditional learning process. The disadvantaged child does not use a broad vocabulary: he understands more words than he uses; the words he uses are not representative

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[1]Frost and Hawkes, The Disadvantaged Child, p. 46.

of the school culture; and he uses significantly fewer words with less variety to express himself.

Success in the learning process depends to a great degree upon the compatibility of the child's own learning system with the system to which he is exposed. Beilen[1] describes, in general terms, the child's system. The child develops a system of perceiving and responding to reality that represents increased control of received stimulation and increased control of response. The control is achieved through the development of monitoring, transforming, and activating system. This process is identified in different ways--cognitive structure, strategies, plans, schemata--all of which are included in the term "cognition." Control has some genetic determination, but the questions of how much, what kinds, and whether change is possible are yet to be answered. Control is also achieved through individual changes that are exclusively the consequences of experience or external events acting upon the organism. If the learner's system of control which reflects the cognitive resources of the learner has not matured along the lines

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[1]Harry Beilen, "A Cognitive Strategy for Curriculum Development," in Developing Programs for the Educationally Disadvantaged, ed. by A. Harry Passow (New York: Teachers College Press, 1968), pp. 133-53.

expected by the teacher, then the learner will not be active in the learning process. What happens in the classroom is affected by at least three categories of influence: values and goals of curriculum; state of educational technology; and, most important, state of knowledge of the child as a learner and of the disciplines from which knowledge is derived. If the teacher is not knowledgeable about the child's system of learning, then the learning process established cannot be appropriate. Either the child's system is changed or the learning process is changed. In recent years emphasis seems to have been placed upon changing the child's system. This occurred because knowledge of the traditional learning process and the successful child's system existed, but the system of the unsuccessful child was not known.

Standardized achievement and aptitude measures and the educationally disadvantaged

At one period of time in the last decade a segment of the educational world rejected standardized tests as measures of achievement and aptitude for the child who was not part of the middle class. The answer was a "culture-free" or "culture-fair" test which would reduce the premium of school experience on test content and reduce the importance of speed of response. The

results were not too successful. The tests failed to have predictive value and failed to indicate what a child has learned. It is now the opinion that standardized tests can be used to make objective assessments of the educationally disadvantaged child. In many cases use of these tests will bring to light unrecognized strengths of the child who otherwise would be described as an underachiever. It is probable that standardized tests cannot be used with the educationally disadvantaged without some reservations, but with proper interpretation the standardized tests are proper tools to use.

Fishman et al.[1] take the viewpoint reflected by the old adage, "Don't throw out the baby with the bath water." The standardized tests are valuable evaluative and prognostic tools when used properly. There are three major difficulties encountered in their use: (1) The tests may not provide reliable differentiation in the range of minority groups' scores. (2) The predictive validity of the tests for minority groups may be quite different from that for standardization and validation groups. (3) The validity of test interpretation is strongly dependent upon an adequate understanding of the social and cultural background of the group in question.

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[1]Joshua A. Fishman et al., "Guidelines for Testing Minority Group Children," Journal of Social Issues, 1964, pp. 20, 129-45.

The tasks of the educator are to select tests that will discriminate between achievers and nonachievers and that will enable the educator to diagnose potential in the educationally disadvantaged population and to interpret test scores on the basis of knowledge of the child. The tests may be used to indicate the magnitude of educational deprivation as compared to a "norms" group, to compare the child to other disadvantaged, or as a means to evaluate the child's progress by comparing the child to himself.

Summary of Related Research

Cognition, cognitive structure, and cognitive factors or skills have been clearly delineated in research. The developmental aspects of cognition have received much attention in research, and the process of cognition has been described and defined empirically. The disadvantaged child has been studied and described. Weaknesses of the disadvantaged child that bring about low school achievement have been documented for children of all ages. An overview of the research related to this study indicates that a need exists to establish a comprehensive framework for research which stresses learner success rather than failure and individual strengths rather than disabilities.

Sections of a framework for viewing human intellectual development and for relating it to instruction and to other kinds of experience have already emerged from research work. Five underlying assumptions can be stated that could form the groundwork for building theories of success:

> 1. Intellectual functioning is not genetically fixed at birth and does not develop in a predetermined manner, regardless of the environment. The development of intellectual potential requires stimulation and nurture.
> 2. Intellectual development takes place in the "whole" child, yet there are distinct dimensions of growth and development which can be identified, described, and explained. An individual may exhibit differing profiles of strengths. Each dimension is susceptible to types of instruction. The dimensions to be considered are perception, oral language, syntax, concept formation ability, and learning set.
> 3. Development is hierarchical; there are distinct stages of growth.
> 4. Intellectual development is influenced by certain affective or motivational factors, such as student's self-concept, attitude toward himself as a learner, attitude toward school, and influence of peers.
> 5. Adequate cognitive development rests on stimulation and channeling of good instruction.[1]

Within the framework of the five assumptions made from completed research, it should be possible to diagnose strengths of the educationally disadvantaged child and to apply this diagnosis

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[1]National Society for the Study of Education, The Educationally Retarded and Disadvantaged, p. 33.

to the task of creating a meaningful educational experience for the urban underachiever.

Statement of Objectives and Hypothesis

The major objectives of this study are to determine if there is any direct relationship between strengths in cognitive factors and data on achievement, aptitude, and background; and to determine what are the cognitive profile types of the educationally disadvantaged junior high school student. Hypothetical questions this study will attempt to answer are:

1. Will measures in specific areas of school achievement vary with measures of cognitive factors?

2. How will items of background data be related to cognitive factors?

3. What are the differences in measures of cognitive factors between educationally disadvantaged children who achieve normally and those who do not?

4. Is it possible to group educationally disadvantaged children into a few well-defined clusters by techniques of profile analysis?

5. Will the study of strengths in cognitive factors have strong implication for curriculum and methods in urban area schools?

6. Can the newly developed technique called "shape-type criteria of profile analysis" be considered a significant contribution to the study of differences between individuals and groups?

Methodology

Population and sample

A random sample of students in an urban junior high school was selected. The sample selected was 20 percent of the students in each of three grades: seventh, eighth, and ninth. The random number table was used to determine an entry point in an alphabetical listing of the students in each grade, and thereafter every sixth student was chosen. The original sample totaled 240 students. As the data collection included several group sessions with each of a number of small groups of twenty or fewer students and at least one individual session with each student, the total time for data collection was two months in the late 1967-68 school year and three months in the early 1968-69 school year, with a summer vacation intervening. Additional factors contributing to the length of data collection were the lack of space in the school for holding group sessions and the investigator's obligation to the school administration not to interfere with certain

segments of each student's daily schedule. Only one small room was available, and this was not available every day nor every period of the days it was available. As a result of the length of data collection, there was an attrition rate in the sample of over 50 percent, mostly ninth-grade students. Complete data were obtained on 112 students. This high rate of turnover is not unusual in this particular school, as it is located in the center of a large urban renewal area. A parental permission form was obtained for each student to participate in the data collection.

The school from which the sample comes is a school characterized by low achievement levels, many students from poor homes, a teacher turnover of nearly 50 percent in each of the last two years, and a constant state of overcrowded classes. The achievement level as measured by the Iowa Tests of Basic Skills of entering 7B students is generally two and one-half years below grade level. Because of a concentrated program funded by the state in the feeder elementary schools over the last three years, the achievement level of entering 7B's has improved somewhat. Also there have been more new students with average or above-average achievement levels entering as their families move into the area rebuilt after

urban renewal. The majority of the students in the sample are underachievers but there are some, not just ones new to the area, who are not underachievers but who classify as economically disadvantaged.

The teacher turnover, large as it may be, has not affected a cadre of staff members who have been assigned to the school for several years. The turnover has been among new, young teachers.

General design

The data collected for each student in the random sample can be classified according to the following types: data from cumulative records such as attendance data, standardized test data, and elementary school arithmetic and language grades; counselor ratings of students; data from individual and small group interviews such as student and parent participation in school-related activities, student reaction to school, and background data; and scores on tests of selected cognitive factors administered to small groups of students by the investigator. The following outline describes each type of data in detail. Where a complete description is very lengthy, the reader will be referred to Appendix A.

Cumulative records.--Attendance data: average number of absences per term since entering the sixth grade.

Standardized test data.--Iowa Tests of Basic Skills: Raw scores were obtained for each student on measures in vocabulary, reading, work-study total, language total, and arithmetic total. The test was Form 3 and administered where the students were in the 6B grade.

Stanford Achievement Tests: Raw scores were obtained for each student in measures in word meaning, paragraph meaning, spelling, language usage, and arithmetic computation. The test was Form W of the Advanced Level administered to the students during the period of data collection. Spelling was from Form W of the Intermediate II Level.

California Test of Mental Maturity: Raw scores were obtained for each student in measures of verbal aptitude and nonverbal aptitude as well as the raw score total for the test. The test was Level 3 of the CTMM administered when the students were in the 7B grade.

Elementary school grades.--Using a 5.0 scale, averages were computed for the end-of-semester grades of each student in language arts and arithmetic for grades four, five, and six.

Counselor ratings of students.--Each student was rated on a one-to-five scale on twelve school-related characteristics. This

rating scale can be found in Appendix A. The rating on each characteristic is treated as a unique variable.

Student and parent participation in school-related activities.--In a personal interview the students were asked to list for themselves and parents the specific school-related activities in which they had participated in the two terms prior to the data collection. The total number for the student is recorded as a unique variable, as is the total number for the parents.

Student reaction to school.--Each student was asked to write twenty sentences using one of twenty school-related terms in each sentence. The sentences were judged to be positive, negative, or neutral by the investigator. This yielded three variables: total number of responses for each of three possible categories. The listing of terms used in this instrument is found in Appendix A.

Background data.--Each student was asked to fill out a brief questionnaire that would supply the following data: employment status of each parent, general estimate of economic level of the family, position of the student in the birth order in his family, number of years student has lived in the attendance area of the junior high school, years of school attendance for each parent, and the number

of elementary schools the student attended. The data collected on parent employment status, economic level, position in family birth order, and parents' education were coded in a numeric continuum from low to high. The system for numeric coding of data is found in Appendix A.

Measures of performance on tests of selected cognitive factors.--In groups of not less than ten students nor more than twenty students, the students were given tests selected from the Kit of Reference Tests of Cognitive Factors provided for research purposes by Educational Testing Service. Fourteen separate tests were given to the students, with each test having two parts. The tests were given in two sessions of approximately 75 minutes each. Scores on the two parts of each test were combined for a total score in order to control for the practice effect that was apparent on Part II. The cognitive factors measured have been identified by Cattell's "universal index," Guilford's "structure of intellect model," or by Thurstone's letter symbol. The factors measured and related tests are:

Flexibility of Closure--Hidden Patterns test

Speed of Closure--Concealed Words test

Word Fluency--Word Beginnings and Endings test

Length Estimation--Shortest Road test

Associative (Rote) Memory--First and Last Names test

Memory Span--Auditory Letter Span test

Number Facility--Addition, Division, Subtraction, and Multiplication tests

Perceptual Speed--Identical Pictures test

General Reasoning--Necessary Arithmetic Operations test

Spatial Scanning--Map Planning test

Semantic Spontaneous Flexibility 1--Utility test

Semantic Spontaneous Flexibility 2--Object Naming test

Included in Appendix A is a brief description of each test and an interpretation of the factor measured.

Analysis

The data analysis was accomplished through utilization of the computer facilities at Wayne State University. The procedures and statistical treatment are described in detail in this section.

1. Stepwise multiple regression analysis was applied. It was expected that this analysis would provide information that would allow the selection of certain of the selected cognitive measures as "best" predictors of performance on standardized tests of achievement and would also provide statistical results that could be utilized in the diagnosis of cognitive strengths and weaknesses as they appear

in a sample of educationally disadvantaged students. In the analysis the fourteen experimental variables were treated as the independent variables and the remainder of the data were treated as dependent variables.

The first step in the analysis was computation of sums of squares and cross products for the specified variables. From the sums of squares and products a Pearson product-moment correlation matrix was computed. Next the formation of the regression equation for the first dependent variable was begun. On each cycle an independent variable was added to the partial regression equation. The independent variables were added in the order of amount of contribution to the equation. A partial regression equation was obtained at the completion of each cycle.

The following values were obtained for each partial regression equation and for the final regression equation: multiple correlation coefficient, standard error of estimate, F value (significance of the regression equation), partial regression coefficient, standard error of Beta, normalized Beta, regression coefficient, standard error of the regression coefficient, and the F value giving the significance of adding variables.

2. The Hotelling method of factor analysis which is called "principal components" was used. Also utilized was the rotation

option based upon Kaiser's varimax criteria. All variables were used in the major analysis. For both the major analysis and the supporting analysis the computations were done for the total sample, for the sixty girls only, and for the fifty-two boys only. The results of this analysis have been examined to determine the number of significant factors extracted, to determine the sources of variance, and to identify the interrelationships among variables.

In this technique of factor analysis each factor extracts the maximum amount of variance (i.e., the sum of squares of factor loadings is maximized on each factor) and gives the smallest possible residual. The correlation matrix is condensed into the smallest number of orthogonal factors by this method. The method gives mathematically unique (least squares) solution for a given table of correlations. A preanalysis was done in which no maximum number of factors was specified and there was no rotation option programmed. In this preanalysis factoring continued until the factor variance was less than 1.0. Based upon the preanalysis, fifteen was specified as the maximum number of factors to be extracted with the addition of the option of varimax rotation. The diagonal loadings inserted were +1.0. The angle of tolerance used in the rotation was 0.0116. This angle is most practical: if larger, it would not be too precise; if smaller, little would be accomplished during each rotation.

3. Means and standard deviations were computed for each variable for each grade level and for total sample. The results of these computations were used to compute the Z scores needed in the shape-type criteria technique of profile analysis. Utilizing the formula $Z = 50 + 10(\frac{X-\overline{X}}{S})$,[1] a program was written for an Olivetti that generated Z scores for the values of each variable from one to the maximum value obtained for each variable.

4. The shape-type criteria technique of profile analysis[2] produces an objective measure of profile shape which compares to the more traditional measures of elevation and shape used to describe profiles. It allows the user to describe individual profiles without reference to other profiles. The technique provides the means for clustering profiles according to shape. Profile shape is based upon the gamma measures of skewness and kurtosis from Pearson's β_1 and β_2 curve-type criteria. To describe general profile types the four shape-type criteria of profile elements were computed utilizing the Z value for each variable or profile element for each student. The resultant values for the mean, standard

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[1]Wilfred J. Dixon and Frank J. Massey, Introduction to Statistical Analysis (New York: McGraw-Hill Book Co., 1957), p. 23.

[2]Lindsey, "Shape Type Criteria of Profile Analysis."

deviation, skewness, and kurtosis of the elements for each student's profiles became the criteria for clustering profiles and describing profile types. To describe cognitive profile types the same procedures were followed but applied only to the fourteen profile elements representing the measures of cognitive factors. Classifications of profile types under the two conditions were made for each student. A comparison and analysis of classifications of profile types was made for individual students and an analysis of profile clusters that evolved under the two conditions was made.

CHAPTER II

GENERAL FINDINGS

The major objective of this study was to determine if there is any direct relationship between strengths in cognitive factors and data on achievement, aptitude, and background. The analysis of data was accomplished in four phases: descriptive statistics, regression analysis, factor analysis, and profile analysis.

It was determined that the sample was typical of the educationally disadvantaged student population. In regression analysis it was determined that the cognitive factors accounted for one-fourth of the variance in eight of ten measures from standardized achievement tests and for one-third of variance on standardized aptitude tests. The factor analytic phase of the analysis produced factor structures that described the total sample and also isolated differences that can be attributed to sex differences.

The cognitive factors displayed relationships of varied strength to all other data. Semantic Spontaneous Flexibility and the Number Facility measures were consistently identified as cognitive strengths related to achievement within the sample.

The final phase of analysis which was the application of shape type criteria of profile analysis to complete data records and to data records of cognitive factors only clustered the students into distinct groups that can be described on the basis of similar data records. Clusters of similar profiles could be described on the basis of relationships of cognitive factors to other data.

The data upon which the analysis was performed represent 112 junior high school students. Each student had a complete data record, thus enabling the analysis to proceed without making any provisions for treatment of data records with missing data. As the data analysis was completed in several separate and independent phases, this chapter is organized on the basis of the separate phases of the analysis. Each phase will be presented with its related tables; summaries and conclusions will be included where appropriate. The final section of the chapter will present findings and conclusions which will draw these separate phases together and will respond to the hypothetical questions asked in Chapter I.

Descriptive Statistics

The means and standard deviations for the total sample, for boys only, and for girls only on all fifty-six variables are presented in Table 1. Also when applicable the range of scores for the

TABLE 1

MEANS AND STANDARD DEVIATIONS FOR TOTAL SAMPLE, FOR BOYS, AND FOR GIRLS, AND RANGES OF SCORES FOR THE VARIABLES[a]

Variable	Group	Mean	G.E.[b]	S.D.	Range
A. Means, Grade Equivalents, and Standard Deviations of Raw Scores on Standardized Tests					
Iowa Tests of Basic Skills: 6B					
Vocabulary	Total	16.03	5.4	8.23	47-2
	Boys	17.21	5.6	8.81	
	Girls	15.00	5.2	7.62	
Reading	Total	24.46	5.1	9.80	59-5
	Boys	25.81	5.3	10.53	
	Girls	23.30	4.9	9.06	
Language Total	Total	12.38	4.4	5.40	46-4
	Boys	12.67	4.5	6.41	
	Girls	12.12	4.4	4.39	
Work Study Total	Total	21.23	4.9	7.99	49-1
	Boys	21.67	4.9	8.42	
	Girls	20.85	4.9	7.64	
Arithmetic Total	Total	9.52	4.5	3.54	21-2
	Boys	10.40	4.5	3.73	
	Girls	8.74	4.4	3.20	

[a]Total, N=112; Boys, N=52; Girls, N=60.

[b]These figures are derived scores in the form of grade equivalents.

TABLE 1 (Continued)

Variable	Group	Mean	G.E.	S.D.	Range
Stanford Achievement Tests					
Word Meaning (INT. II)	Total	20.30	5.2	8.30	46-4
	Boys	21.44	5.4	9.51	
	Girls	19.32	5.1	7.01	
Paragraph Meaning (ADV)	Total	22.46	6.1	9.96	59-7
	Boys	21.73	6.0	11.31	
	Girls	23.10	6.2	8.67	
Spelling (ADV)	Total	23.45	6.7	9.83	50-3
	Boys	22.15	6.6	10.17	
	Girls	24.57	7.0	9.47	
Language (ADV)	Total	51.56	3.6	23.41	122-7
	Boys	52.92	3.7	22.83	
	Girls	50.38	3.5	24.02	
Arithmetic (ADV) Computation	Total	9.88	5.4	9.16	44-1
	Boys	9.08	5.1	5.02	
	Girls	10.57	5.6	11.62	
California Test of Mental Maturity--Level 2					
Language	Total	20.91		8.47	54-6
	Boys	20.88		9.44	
	Girls	20.93		7.62	
Non-language	Total	25.80		8.29	52-12
	Boys	27.62		9.26	
	Girls	24.23		7.06	
Total	Total	46.71		15.30	106-25
	Boys	48.50		17.44	
	Girls	45.16		13.11	

TABLE 1 (Continued)

Variable	Group	Mean	S.D.	Range
B. Means and Standard Deviations of Rankings of Background Data				
Pupil participation in school activities	Total	1.41	1.67	9-0
	Boys	1.27	1.62	
	Girls	1.53	1.71	
Parent participation in school activities	Total	1.04	1.35	8-0
	Boys	0.81	1.10	
	Girls	1.25	1.51	
Average number of absences per term	Total	3.96	3.21	23-0
	Boys	4.13	2.66	
	Girls	3.80	3.64	
Pupil reaction to school: Positive	Total	10.10	4.93	20-0
	Boys	9.46	4.60	
	Girls	10.65	5.17	
Neutral	Total	7.42	5.00	20-0
	Boys	7.94	4.18	
	Girls	6.97	5.61	
Negative	Total	2.48	2.22	8-0
	Boys	2.60	2.39	
	Girls	2.38	2.08	
Elementary school language arts grades	Total	3.13	0.66	5-2
	Boys	3.08	0.68	
	Girls	3.18	0.65	
Elementary school mathematics grades	Total	2.90	0.71	4-1
	Boys	2.85	0.70	
	Girls	2.95	0.72	
Employment of father	Total	3.29	1.90	7-1
	Boys	3.42	1.86	
	Girls	3.18	1.94	
Employment status of mother	Total	3.29	1.22	7-1
	Boys	3.37	1.14	
	Girls	3.22	1.30	

TABLE 1 (Continued)

Variable	Group	Mean	S.D.	Range
Economic status of family	Total	2.96	1.57	6-1
	Boys	3.06	1.46	
	Girls	2.88	1.67	
Size of family	Total	7.07	2.85	14-2
	Boys	7.42	3.08	
	Girls	6.77	2.63	
Position among siblings	Total	3.06	1.36	5-1
	Boys	3.00	1.48	
	Girls	3.12	1.25	
Number of years in neighborhood	Total	5.61	3.45	13-1
	Boys	5.69	3.46	
	Girls	5.53	3.47	
Educational level of father	Total	3.03	0.57	5-2
	Boys	3.19	0.56	
	Girls	2.88	0.55	
Educational level of mother . . .	Total	2.91	0.51	5-1
	Boys	2.88	0.58	
	Girls	2.93	0.45	
Number of elementary schools attended	Total	2.47	1.36	7-1
	Boys	2.44	1.38	
	Girls	2.50	1.36	
C. Means and Standard Deviations of Counselor Ratings of Subjects				
Classroom behavior	Total	3.19	1.20	c
	Boys	3.15	1.21	
	Girls	2.22	1.19	
Neatness of work	Total	3.01	1.04	
	Boys	2.81	1.03	
	Girls	3.18	1.02	

[c]All attributes received within the 1-5 scale.

TABLE 1 (Continued)

Variable	Group	Mean	S.D.	Range
Ability to read	Total	2.63	1.00	
	Boys	2.65	1.06	
	Girls	2.62	0.94	
Ability to write	Total	2.71	0.97	
	Boys	2.65	0.91	
	Girls	2.75	1.03	
Ability to do arithmetic	Total	2.33	0.98	
	Boys	2.36	0.95	
	Girls	2.30	1.01	
Attitude toward school	Total	3.24	1.11	
	Boys	3.23	1.13	
	Girls	3.25	1.10	
Parent interest in child's school work	Total	3.19	1.15	
	Boys	3.21	1.21	
	Girls	3.17	1.11	
Personal neatness	Total	3.38	1.10	
	Boys	3.23	1.11	
	Girls	3.50	1.08	
Ability to verbalize	Total	2.85	0.94	
	Boys	2.87	0.97	
	Girls	2.83	0.92	
Self-confidence	Total	2.84	0.94	
	Boys	2.90	0.93	
	Girls	2.78	0.96	
Peer relations	Total	3.05	0.88	
	Boys	3.15	0.94	
	Girls	2.97	0.82	
Cooperation with school	Total	3.21	1.11	
	Boys	3.25	1.20	
	Girls	3.18	1.03	

TABLE 1 (Continued)

Variable	Group	Mean	S.D.	Range
D. Means and Standard Deviations of Raw Scores of Cognitive Factors				
Flexibility of closure	Total	30.56	13.96	68-5
	Boys	35.58	14.71	
	Girls	28.82	13.15	
Speed of closure	Total	6.19	4.11	22-1
	Boys	6.56	4.33	
	Girls	5.87	3.42	
Word fluency	Total	12.20	6.29	48-2
	Boys	11.58	4.98	
	Girls	12.73	7.23	
Length estimation	Total	22.14	8.76	41-2
	Boys	23.90	9.49	
	Girls	20.62	7.84	
Associative (rote) memory	Total	10.96	5.65	26-2
	Boys	10.35	6.04	
	Girls	11.50	5.29	
Memory span: auditory	Total	6.36	2.47	16-2
	Boys	6.13	2.42	
	Girls	6.57	2.52	
Number facility: addition	Total	17.63	9.02	50-2
	Boys	19.40	9.61	
	Girls	16.10	8.25	
Number facility: division	Total	7.41	6.24	31-2
	Boys	8.83	7.43	
	Girls	6.18	4.72	
Number facility: subtraction/ multiplication	Total	20.19	10.44	56-4
	Boys	22.19	11.71	
	Girls	18.45	8.93	

TABLE 1 (Continued)

Variable	Group	Mean	S.D.	Range
Perceptual speed	Total	46.59	12.30	89-5
	Boys	47.81	13.20	
	Girls	45.53	11.46	
General reasoning	Total	6.54	3.46	43-2
	Boys	6.79	3.60	
	Girls	6.32	3.36	
Spatial scanning	Total	8.56	3.91	20-2
	Boys	8.79	3.87	
	Girls	8.37	3.96	
Semantic spontaneous flexibility 1	Total	6.64	2.68	14-1
	Boys	6.56	2.65	
	Girls	6.72	2.73	
Semantic spontaneous flexibility 2	Total	7.24	4.12	20-2
	Boys	6.98	3.71	
	Girls	7.47	4.47	

variables is included in the table. Data on all the variables for each grade have a similar wide range from high to low. On each variable there are only a few students whose data records create the upper section of the range. This may be observed by examining the original data in Appendix B.

Standardized tests

Table 1, Section A, summarizes the data on the selected standardized achievement and aptitude measures: the Iowa Tests of Basic Skills, the Stanford Achievement Tests, and the California Test of Mental Maturity.

The data present a description of the urban underachieving junior high school student. There is a wide range of scores with a few very high scores. The means of the achievement test scores were similar for the three grades as the tests were taken at a common grade level. The means indicate that the group is two to three years below grade level on the selected subtests except in the case of Spelling on the Stanford Achievement Tests where the group approaches grade level. The writer's experience in the area of testing in the school system from which the sample was drawn accepts the Spelling mean as typical though it is atypical when compared to the other subtest means.

The achievement test means show the boys to be very slightly higher than the girls on the subtests of the Iowa Tests of Basic Skills and slightly higher than the girls on the Word Meaning and Language subtests of the Stanford Achievement Tests. The girls are slightly higher than the boys on the Paragraph Meaning, Spelling, and Arithmetic subtests of the Stanford Achievement Tests. The discrepancies between Iowa and Stanford mean scores on subtests that are supposedly measuring the same skills--e.g., Iowa Vocabulary and Stanford Word Meaning--exist for several reasons. If a Stanford subtest mean is higher, an assumption can be made that this occurred because the Stanford was taken by the students a year or more after they took the Iowa and the score was affected by the additional educational experience. If a Stanford subtest mean is lower, no assumption can be made without a detailed analysis of the subtests content and the relationships between content and the educational experiences of the students in the sample. In either instance cited above vocabulary familiar to the students will be likely to bring about a higher score. It is also possible that the climate for testing can bring about some variations in scores that are difficult to account for. It is not the purpose of this paper to analyze such differences in performance on standardized tests, but it is necessary

to recognize that such unexplained differences exist in the data records utilized in this study.

The aptitude measures included in the data records of this study are the scores obtained on the California Test of Mental Maturity. Examination of Table 1, Section A, shows that the sample demonstrated a higher nonlanguage aptitude than language aptitude. Yet this higher nonlanguage aptitude is not apparent in a comparison of language and nonlanguage performance on achievement measures. The boys in the sample demonstrate a higher nonlanguage aptitude than do the girls, but this difference is not reflected in performance on achievement tests. In summary, the descriptive statistics on standardized test data reflect the low achievement of the urban school population and supports the assumption that the sample selected for this study is representative of the urban school population.

Background data

As on the standardized tests, the reported background data in Table 1, Section B, shows a wide range. As a completely random sample was selected to be representative of the total school population; there are a few children in the sample from the section of the school attendance area which includes middle and upper income housing. These children and a few from the remainder of the school

attendance area account for the data records at the upper limits of the range for employment, education, and economic status.

The extracurricular involvement of the students and the parental involvement in school activities is very low. The students had a mean participation in extracurricular activities of 1.41 with boys slightly less and girls slightly more. Parent contact with the school for two terms has a mean of 1.04 with parents of boys having a mean of .81 or less than one contact and parents of girls having a mean of 1.25 or slightly more than one contact in two terms. The original data records of the students show that some parents and students were very involved and others not at all.

School attendance figures in Table 1, Section B, indicate that the average number of absences for the students in the sample could be considered low for urban junior high school students. The good attendance record is somewhat reflected in the students' reactions to school. The mean of positive reactions to school is 10.10 for twenty possible responses. The mean of positive reactions for the boys is slightly less at 9.46 and slightly more for the girls at 10.65. Means for neutral reactions to school were 7.94 for the boys and 6.97 for the girls with a group mean of 7.42. The negative reactions have means of 2.60 for the boys, 2.38 for the girls, and 2.48 for the total group. If one considers neutral responses to be not

negative, the general attitude of the sample toward school can be assumed to be good. The average elementary school language arts and mathematics grades for the students in the sample fall in the "C" or average range with the language grades very slightly above 3.00 or "C" and the mathematics grades fall slightly below 3.00.

The items of background data pertaining to what has been classified in current writings as socioeconomic factors are parental employment, educational, and economic status; family size and position among siblings, and family mobility. Examination of the means for these items of background data in Table 1, Section B, points out that the majority of students in the sample are typical of the educationally disadvantaged students. The occupational level mean of the father for the total group was 3.29, for the boys was 3.42, and for the girls was 3.18. The means for mother's employment status reflected only minor differences from the figures for father's employment status. The mean for the total group is identical at 3.29; for boys only it is 3.37; and for girls only it is 3.22. These means are in the range of "3" which is the coded value for seasonal or irregular employment status. It is important to note here that these means for employment status are depressed somewhat due to the inclusion of the coded value "1" for a parent not in the home or for a deceased parent. Exclusion of these cases from the

analysis would raise the means for father's and mother's employment status closer to the coded value of "4" which would represent a status of regularly employed unskilled worker such as day laborers or domestics. The level of employment is supported by the figures for mean economic status. The mean for the total group is 2.96; for the boys only is 3.06; and for the girls only is 2.88. A coded value of "2" represented an income of less than $5,000 and value of "3" represented an income of $5,000 to $7,000. In general terms all income of around $5,000 can be accepted for the sample in this study. Related very closely to employment status and economic level is educational level reached by the parents. The data obtained for the level of education of the father produced a mean of 3.03 for the total group; 3.19 for boys only, and 2.88 for girls only. The same data for the mother's education produced means of 2.91, 2.88, and 2.93. A coded value of "2" is equivalent to completion of junior high school, and a coded value of "3" is equivalent to completion of senior high school.

The students in the sample have families averaging seven members including the student himself. This figure may represent six children and one parent or five children and two parents, one of whom is sometimes a stepparent. The mean for position among siblings of the students in the sample is 3.06 which is interpreted

as the student being neither among the oldest nor among the youngest in the family. The means for number of years in the neighborhood and number of elementary schools attended, which are approximately 5.5 years in the neighborhood and approximately 2.5 elementary schools attended, do not support other studies that characterize the educationally disadvantaged as having a high rate of mobility. A high rate of mobility is reflected in a few students in the final sample and by the part of the sample which changed schools during the data collection. High rates of mobility may be a result of analyzing large group data which could include repeated residence and school changes by a very small number of families. The small sample included in this study seems to have an element of residential and school stability. In several instances an elementary school change for students in this sample did not involve moving out of the attendance area of the junior high school and was caused by urban renewal, not by a family mobility factor. The fact that these families stayed within the community reflects a certain amount of stability.

The overall picture of the background data obtained from the students in the sample supports the assumption that the sample is representative of the educationally disadvantaged population. There are a few exceptions as previously pointed out and the process of profile analysis will assess these differences.

Counselor ratings of students

The scale upon which the counselors rated the students was a one-to-five scale representing ratings ranging from poor to excellent. The means for the ratings on twelve characteristics are found in Table 1, Section C. The means range from 2.30 to 3.50, which is essentially around the value of "3" or "good." The lowest means represent the ratings for student's ability to read, write, and do arithmetic. The differences between the means of ratings for boys and girls were very minor except in the characteristics of neatness of school work and personal neatness, in which cases the girls were rated .37 and .27 higher than were the boys. These differences would be expected for the age group in question. The clustering of means about the midpoint of the scale may infer that the counselors perceive these students as average and do not have negative feelings toward the student population with which they work. Examination of the individual data records in Appendix B shows that many students were rated above average in several characteristics as well as many students receiving a range of ratings. This supports a statement to the effect that mean ratings close to the average on the one-to-five scale do not mean that the person rating just "took the middle road" as so frequently happens on similar rating scales.

Cognitive factors

Table 1, Section D, presents the means for the measures of cognitive factors. As these measures are the results of several experimental tests, there are no standards or norms to which the means can be compared. The only possible comparison of this type is the mean score as compared to the total items on a test. As each test is short and carefully timed, time would also be a factor in making comparisons. The descriptions of each of these experimental measures of cognitive factors which are found in Appendix A include the number of items and the time for each test. The means will establish points of reference in profile analysis for determination of inner group strengths and weaknesses of the students on cognitive factors. Means and score ranges were not affected by variation in grade levels of the students.

It is well to note some differences between the boys and girls on raw score means in certain measures of cognitive factors. The means of raw scores for the boys show a significant difference from the means of the girls on the nonverbal measures of Flexibility of Closure, Length Estimation, and the three tests of Number Facility. The mean scores of the girls are slightly greater than for the boys on the verbal type measures of Word Fluency and Semantic Spontaneous Flexibility. These differences are similar to the

differences exhibited by the sample on verbal and nonverbal sections of the California Test of Mental Maturity.

Regression Analysis

The analysis of the cognitive factors as contributors of variance to measures obtained from standardized aptitude and achievement tests was accomplished by application of a stepwise multiple regression. Each of the thirteen variables representing the aptitude and achievement measures was treated in turn as the dependent variable in an analysis, and the fourteen measures of cognitive factors were treated as the independent variables for each of the thirteen analyses. In each of these analyses the order of accretion of the independent variables was based upon the amount of variance accounted for by the independent variable, with the order being from the greatest to the least. This was an operation internal to the computer program.

Figures 1, 2, 3, and 4 schematically present the results of the thirteen analyses: five with measures from the Iowa Tests of Basic Skills as criterion variables, five with measures from the Stanford Achievement Tests as criterion variables, and three with measures from the California Test of Mental Maturity as criterion variables. Figures 1, 2, and 3 give the percentage of variance

within the dependent or criterion variable explained by the stepwise regression analysis at the completion of each step or after the accretion of each independent variable. The percentages indicated by the vertical scale in the figures are a cumulative result as accretion proceeds step by step. When the increase in percentage of variance accounted for became less than .01 by addition of another variable, it was considered not meaningful. Table 18 in Appendix D presents the final multiple regression coefficients. The percentage of variance is based upon the square of the multiple regression coefficient (R) obtained at the completion of each step of the regression analysis.[1]

Before an effort is made to discuss Figures 1, 2, and 3, it is necessary to indicate that there are limitations to consider when interpreting multiple regression analysis in this manner. If the number of data records is large and the number of independent variables is also large, the R may be too small or too large. Since R is always positive, variable errors of sampling tend to accumulate and R can become too large. The value of R may be high when intercorrelations among predictors are low. As variables are added, the increase in R tends to become smaller.

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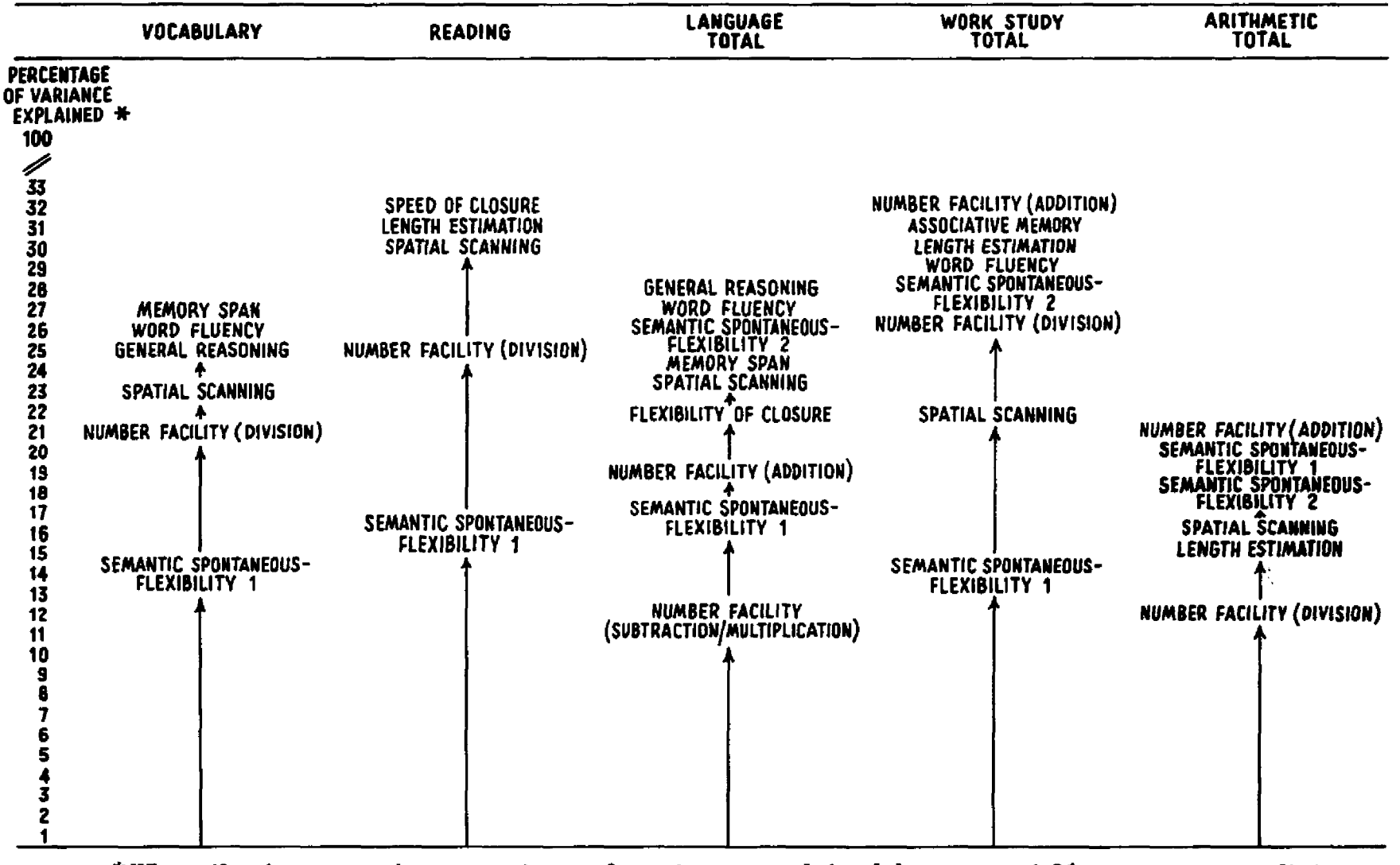
[1]Cooley and Lohnes, Multivariate Procedures for the Behavioral Sciences, p. 41.

Iowa Tests of Basic Skills

Figure 1 presents the percentage of variance in the five measures from the Iowa Tests of Basic Skills as explained by the fourteen cognitive factors. The cognitive factor measure termed Semantic Spontaneous Flexibility 1 in this study accounted for a greater percentage of variance than did the other independent variables: Reading Comprehension, Vocabulary, and Work Study Skills Total. In combination with Number Facility: Subtration-Multiplication, it also was a large contributor of variance to the Language Total. The reference test used was the Utility Test: a test in which uses are listed for a given object and the score is the number of times the class of uses is changed. It is measuring the ability to produce a lot of verbally expressed ideas in a relatively unrestricted situation. In some respects it is measuring a certain aspect of verbal creativity. This relationship between measures of Semantic Spontaneous Flexibility and the standardized test measures given above has implications for classroom methodology. Questions that seem pertinent are: (1) What types of learning activities encourage the development of ability to express ideas freely? (2) How does the teacher successfully broaden the experiential background of the child within the confines of the classroom? It also seems necessary to ask how achievement measures that have been

FIGURE 1

STEPWISE MULTIPLE REGRESSION PREDICTION OF SCORES ON IOWA TESTS OF BASIC SKILLS--PREDICTORS: MEASURES ON TESTS OF COGNITIVE FACTORS (N=112)



*When the increase in percentage of variance explained becomes <.01, no more predictors are listed.

constructed and standardized by most rigid control processes can have such a relationship to a cognitive factor that implies such freedom of expression as does Semantic Spontaneous Flexibility. The students responded on this test in terms of their generally disadvantaged background, and the ITBS tests are not constructed to be relevant to such a background.

A second cognitive factor appears to be strongly related to measures from the ITBS battery. This factor is Number Facility: Division. It is a speed test in dividing two- and three-digit numbers by single-digit numbers. This factor made the greater contribution of variance to the ITBS, Arithmetic Total; made a contribution in combination with Semantic Spontaneous Flexibility and Spatial Scanning to the Work Study Skills Total. The contribution to the Arithmetic is self-explanatory, but its contribution in the combinations given to Verbal Measures and to Work Study Skills which is a measure of ability to handle learning skills can not be explained with any accuracy in this study. The writer will make an assumption that a mental operation is present within the ability to do or to learn to do division that is also found in language arts skills. Here, also, an assumption is made that reading comprehension is a factor in Work Study Skills. The identification of the common denominator

or common mental operation within the skills of division and language arts could become another research effort.

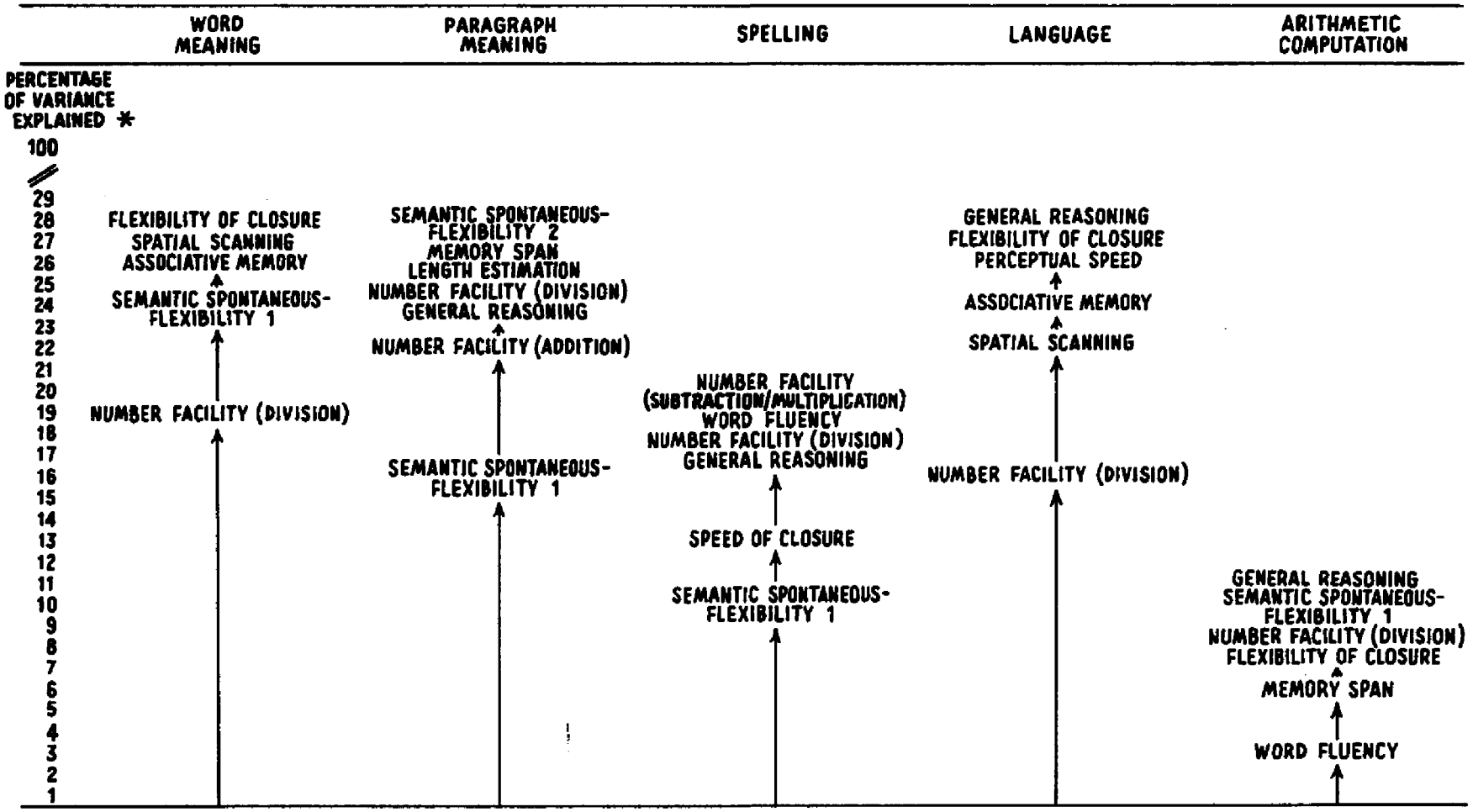
Although the cognitive factor of Spatial Scanning does not appear as a high-ranked contributor of variance to ITBS measures, it is important to note that it does make a contribution in combination with other factors to all five measures. It is defined as speed in visually exploring a wide or complicated spatial field. It also implies ability to plan or to reject false leads. It is also somewhat related to ability to scan verbal material for comprehension. In this context, it is obvious that the format of a standardized test may or may not demand a high degree of this ability. The Iowa Tests of Basic Skills seem to have a format that does call for some degree of ability in Spatial Scanning. It is probable that such a factor should be considered in teacher-prepared and presented materials as well as in preparation of commercial learning materials.

Stanford Achievement Tests

An explanation of variance on the selected subtests of the Stanford Achievement Tests as summarized in Figure 2 has some elements in common with the preceding section concerning the ITBS measures. The two cognitive factors--Semantic Spontaneous Flexibility 1 and Number Facility: Division--that were so evident in the

FIGURE 2

STEPWISE MULTIPLE REGRESSION PREDICTION OF SCORES ON STANFORD ACHIEVEMENT TESTS--PREDICTORS: MEASURES ON TESTS OF COGNITIVE FACTORS (N=112)



*When the increase in percentage of variance explained becomes <.01, no more predictors are listed.

regression analysis of cognitive factors and ITBS measure are also very evident separately and together in the regression analysis of the Stanford Achievement Tests. Number Facility: Division accounted for more variance than any other cognitive factors in the SAT measures of Word Meaning and Language and a significant amount in measures of Paragraph Meaning, Spelling, and Arithmetic Computation. Semantic Spontaneous Flexibility 1 accounted for more variance than any other cognitive factors in the SAT measures of Paragraph Meaning and Spelling and explained a significant amount in Word Meaning in combination with Division and in Arithmetic Computation in combination with four factors. The same general pattern is found here that was found in the analysis of ITBS measures. The statements regarding Semantic Spontaneous Flexibility previously made are also appropriate at this point. It is also noteworthy to state that the similarity between the two regression analyses of achievement measures and Semantic Spontaneous Flexibility reinforces a reservation the writer has in drawing conclusions from these statistics. It is very much within the realm of probability that performances on the Utility Test which measured this cognitive factor are too dependent upon a broad vocabulary which in turn is a factor in performance upon achievement measures.

The unexplained relationship between ability to do division and skills within the field of language arts exists in SAT measures as it did in ITBS measures. The degree of relationship is somewhat different but such differences could not become too significant until the reason or reasons for the general pattern of relationship are diagnosed.

Even though the percentage of variance explained by Flexibility of Closure and Speed of Closure is small as they are combined with other factors, it seems unusual that the two factors do appear in all the SAT measures but Paragraph Meaning. As both factors are part of the general skill of visual perception and more particularly concerned here with a defined perceptual field, the lack of involvement in Paragraph Meaning implies that more lengthy verbal passages have not become a defined perceptual field to these students. The two factors do appear in the analysis of ITBS Reading Comprehension in a minor way. The selections in this reading test are shorter than are those in the SAT Paragraph Meaning Test. The size of the passage to be read may be the critical point at which further analysis should begin to discover more about Flexibility of Closure and Speed of Closure.

The SAT Arithmetic Computation test includes addition, subtraction, multiplication, or division. Yet, the only Number Facility

factor to appear as a significant contributor of variance is Division. The factor of Word Fluency explains the most variance, but the total amount of variance explained in Arithmetic Computation by the experimental measures of cognitive factors is only 12 percent. This is not too readily explained as the SAT test has the problems presented in a format identical to that in the Number Facility tests. It seems logical that the performance on the criterion variable should have been explained more significantly by the three similar independent variables. The question here is whether there is great error of measurement in both dependent and independent variables because of students' lack of motivation during the administration of one of the tests or whether there is no transfer from classroom drill in basic arithmetic to tests in similar format but with different problems. Explanation of variance by Word Fluency in Arithmetic Computation is reasonable in that the problem gives limitations within which the student looks for his most reasonable solution just as the Word Fluency measure gave the student a first and last letter with which he was to structure a list of words. In this case, it is the process involved and not necessarily the content that is important.

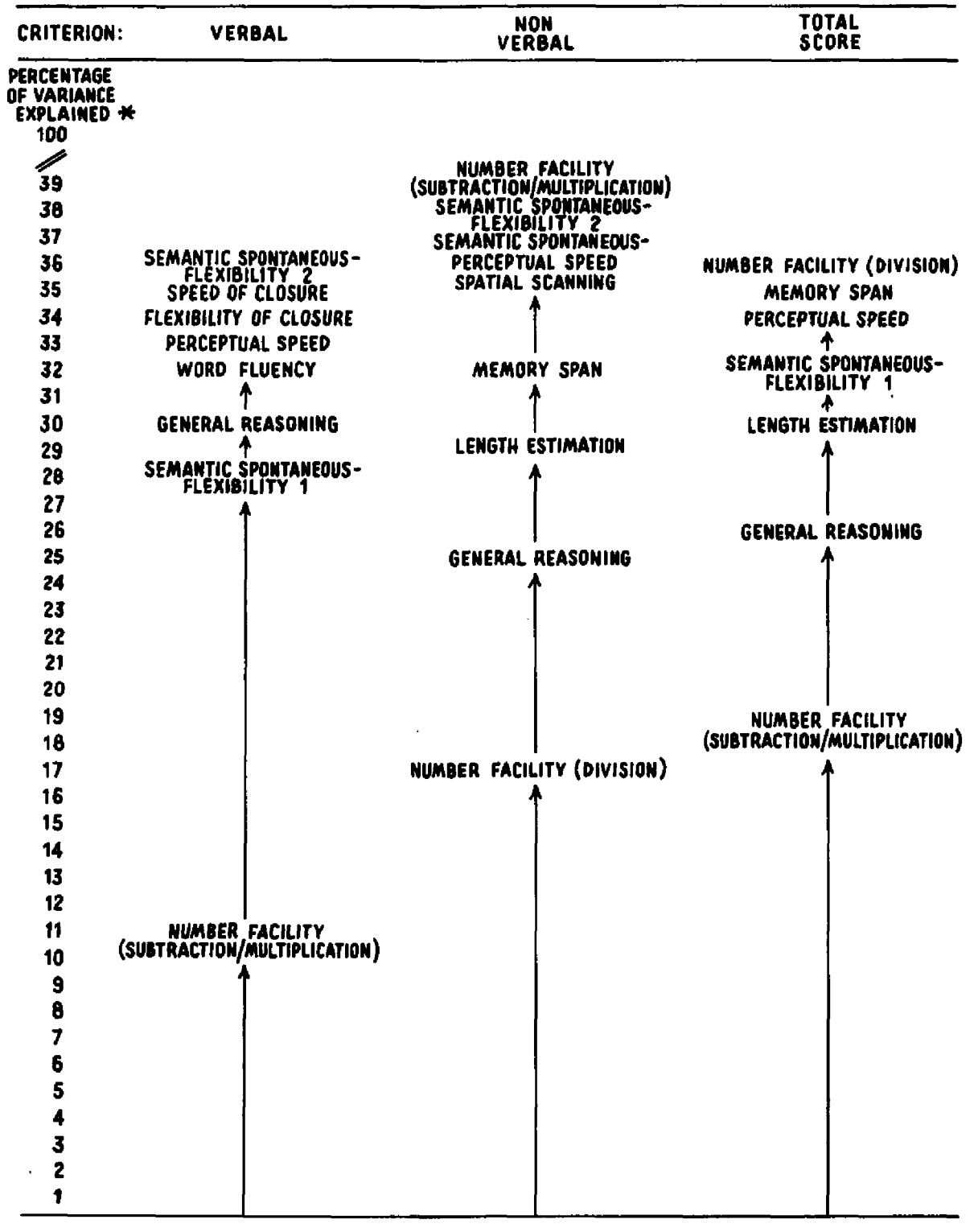
California Test of Mental Maturity

The California Test of Mental Maturity is structured to be an aptitude test: one that measures verbal or language aptitude and nonverbal aptitude. There has been much said about the experiential factor of the child as it relates to performance on aptitude tests of this kind. As the child progresses through school the importance of school experience and achievement is said to become more of a factor on such tests as the CTMM. In the regression analysis (see Figure 3) in which the three scores from the CTMM, Verbal, Nonverbal, and Total, were dependent variables and the fourteen experimental cognitive measures were independent variables it seems that the verbal and nonverbal sections of the CTMM have many factors involved. Eight cognitive factors are involved in the explanation of variance for the verbal section and nine in the explanation of variance for the nonverbal section.

The cognitive factor, Number Facility: Subtraction and Multiplication, explained more variance in verbal aptitude than did any other factor. This factor and the factor of Semantic Spontaneous Flexibility 1 in combination explained more than one-fourth of the variance. The other six factors that added to the amount of variance explained are General Reasoning, Word Fluency, Perceptual Speed, Flexibility of Closure, Speed of Closure, and Semantic Spontaneous Flexibility 2.

FIGURE 3

STEPWISE MULTIPLE REGRESSION PREDICTION OF SCORES ON CALIFORNIA TEST OF MENTAL MATURITY--PREDICTORS: MEASURES OF COGNITIVE FACTORS (N=112)



*When the increase in percentage of variance explained becomes <.01, no more predictors are listed.

All of these factors are unique factors, with only Word Fluency and Semantic Spontaneous Flexibility reflecting a great amount of verbal learning.

The explanation of variance for the nonverbal section of the CTMM appears to be very logical. Number Facility: Division is the greater contributor of variance. In combination with General Reasoning one-fourth of the variance in the nonverbal scores is explained. Thereafter, the combination becomes the two previously mentioned factors with Length Estimation; the addition of which can be understood as one visualizes the types of items in the nonverbal section of the test. Many of the items are the type in which the student selects answers based upon relationships of similarities or opposites among figures. It is a type of skill involving recognition of common factors in a picture.

The factors added in order to the combination of three already listed are Memory Span, Spatial Scanning, Perceptual Speed, Semantic Spontaneous Flexibility 1 and 2, and Number Facility: Subtraction and Multiplication. All of these factors fit a pattern to be expected in nonverbal aptitude except for the two measures of Semantic Spontaneous Flexibility which are verbally oriented. Yet, there is reason for this since comprehension of the relationships in

three-fourths of the CTMM nonverbal test would demand a certain amount of language-oriented experience.

The factors that explain variance in the total score on the CTMM, which is derived by adding the verbal and nonverbal scores, seem to be a reasonable combination. Again, Number Facility: Subtraction and Multiplication made the greater contribution. In combination with General Reasoning more than one-fourth of the variance is explained. Nearly one-third of the variance is explained by the addition of the factors of Length Estimation and Semantic Spontaneous Flexibility 1. Thereafter, the addition of Perceptual Speed, Memory Span, and Number Facility: Division explained 4 percent more of the variance.

Summary of regression analysis

Figure 4 summarizes the regression analysis by presenting the order of accretion of significant independent variables to each of the thirteen criterion variables and by giving the total percentage of variance explained by the significant cognitive factors for each of the standardized test measures. Considering the complexities of learning and the many efforts made to help the disadvantaged child learn more effectively, explaining more than one-fourth of the variance in eight out of ten achievement measures obtained from

FIGURE 4

ORDER OF ACRETION OF COGNITIVE FACTORS AND PERCENTAGE OF VARIANCE BY COMBINATION OF COGNITIVE FACTORS IN REGRESSION ANALYSIS WITH STANDARDIZED TEST MEASURES AS CRITERION VARIABLES[a]

Cognitive Factors	Standardized Tests[b]												
	ITBS					SAT					CTMM		
	V	R	L	W	A	W	P	S	L	A	V	N	T
Flexibility of closure			4			5			5	3	6		
Speed of closure		5						2			7		
Word fluency	5		8	5				5		1	4		
Length estimation		4		6	2		5					3	3
Associative memory				7		3			3				
Auditory memory span	6		6				6			2		4	6
Number facility: addition			3	8	6		2						
Number facility: division	2	2		3	1	1	4	4	1	4		1	7
Number facility: subraction/multiplication			1					6			1	9	1
Perceptual speed									4		5	6	5
General reasoning	4		9				3	3	6	6	3	2	2
Spatial scanning	3	3	5	2	3	4			2			5	
Semantic spontaneous flexibility 1	1	1	2	1	5	2	1	1		5	2	7	4
Semantic spontaneous flexibility 2			7	4	4		7				8	8	
Percent of variance explained by ranked factors	27	32	28	32	21	28	28	20	28	12	36	39	36

[a]When the increase in percentage of variance explained becomes < .01, no more cognitive factors are ranked.

[b]Key to tests: ITBS--V = Vocabulary, R = Reading, L = Language Total, W = Work Study Total, A = Arithmetic Total; SAT --W = Word Meaning, P = Paragraph Meaning, S = Spelling, L = Language, A = Arithmetic Computation; CTMM--V = Verbal; N = Non-verbal, T = Total.

educationally disadvantaged youth by performance on certain experimental cognitive factor tests is sufficient reason to continue the next phases of the analysis which are factor analysis and profile analysis. From these analyses should come information that will aid in diagnosis of strengths in cognitive measures.

It is also significant to note that the cognitive measures explained more than one-third of the variance in each aptitude score. From these beginnings more regression analysis should be undertaken at another time to attempt to explain more of the variance in the standardized test measures. The items of background data included in this study should be added to the regression analysis as independent variables.

Figure 4 shows that even though some of the selected cognitive factors are involved in nearly all standardized test measures and others in only a few, all of the experimental measures of cognitive factors explained some variance in combination with other cognitive factors. It appears that even though the cognitive measures are factor-pure tests, relationships between these measures and measures on standardized tests cannot be clearly explained. The common processes involved in performance on a standardized test measure and performance on a cognitive measure that accounts for variance within the standardized test measure have not been explained.

The fact that the relationship exists within the sample selected for this study is apparent, but further analysis to determine common thought processes is not within the scope of this study.

Factor Analysis

The third phase of data analysis is the process of identification and description of the factor structure operational in the data obtained from the sample of junior high pupils. All data for all fifty-six variables for the 112 subjects were factor-analyzed using the Hotelling method termed "principal components" with a varimax rotation as an option. The analysis was repeated for only the boys in the sample and for only the girls in the sample. The results of the three factor analyses will be presented separately and the differences between the factor structures for boys and girls is discussed in the summary of this phase of the analysis. Tables 13 through 17, which present the correlation and rotated factor matrices, are found in Appendix C.

Factor analysis of data for total sample

Tables 13 and 14 present the correlation matrix and the rotated factor matrix produced in the factor analysis for the total sample. Factors were extracted in the order of descending percentage of variance explained. The fifteen factors have been identified for this sample as given in the listing that follows.

Factor

I. Achievement and aptitude.

II. Counselor concept of student and parent values related to school.

III. Economic status.

IV. Positive school attitudes.

V. School involvement.

VI. Counselor concept of school performances and student image.

VII. Mobility.

VIII. Family structure.

IX. Verbal skill and elementary school grades.

X. Parental education.

XI. Nonverbal perception and performance.

XII. Creativity.

XIII. School attendance.

XIV. Negative school attitudes.

XV. Auditory memory span.

Factor I has been identified as a factor of achievement and aptitude with the significant loading being found on the five measures from the Iowa Tests of Basic Skills and the three measures from the California Test of Mental Maturity. The fact that the measures from the Stanford Achievement Tests did not load highly

on the same factor as did the Iowa Tests of Basic Skills and California Test of Mental Maturity prevents Factor I from being a general achievement and aptitude factor. It is most likely an achievement and aptitude factor representing traits measured by the annual tests given in the local school system. The scores from the Iowa Tests of Basic Skills used are from the second set of scores the students have obtained on the battery, and scores from the California Test of Mental Maturity are the third set of scores obtained. The students had only taken the Stanford tests once.

Factor II has high loadings from certain items on the Counselor Concept of Student rating scale. The items are classroom behavior, neatness of work, attitude toward school, parent interest in child's school work, personal appearance, and cooperation with school. This factor has been named Counselor Concept of Student and Parent Values Related to School, as the variables reflect traits that are based upon what can be defined as intrinsic values of a family. It is noteworthy that these items were significantly loaded on one factor without high loadings from the items on the rating scale that deal with school performance and self-confidence. Ratings of school performance and self-confidence are loaded on Factor VI, which is discussed later. The students are viewed as social beings without influence from their school performance and their

self-confidence. Of course, it must be kept in mind that these are measures based upon the counselors' opinions and most probably reflect some of their unconscious relating of measures as they rated the students. Factor III represents the variables that explain family economic level and is named Economic Status. Three variables loaded on this factor are: employment of father, employment of mother, and family income. Factor IV is Positive School Attitudes, with significant loadings from the positive and neutral components of the student's reaction to school. Factor V is the School Involvement factor, with high loadings of .81 and .59 from pupil participation and parent participation, respectively. Even though both variables have high loadings, the pupil participation variable is obviously the stronger part of the factor.

Ratings on the Counselor Concept of Student Rating Scale that pertain to academic performance and the self-confidence of the student are loaded on Factor VI. The variables loading highly on this factor are ability to read, ability to write, ability to do arithmetic, ability to verbalize, self-confidence, and peer relations. The most appropriate name for this factor seems to be Counselor Concept of Student Academic Ability and Self-confidence. This particular pattern of loadings shows that the counselors unconsciously linked self-confidence to academic performance and peer relations. This

is a relationship which is partially supported by other research. Academic ability and self-confidence have been found to be correlated in an educationally disadvantaged student population as would be self-confidence and peer relations, but there is a question regarding correlation of academic ability and peer relations. The achieving student in an educationally disadvantaged population is sometimes not acceptable to his peers. The data in this study seem to indicate that such is not true in the sample. School achievement does not carry negative values as far as the counselors are concerned in their ratings of student peer relations.

Factor VII is a bipolar factor called Mobility. The number of years in the neighborhood and the number of elementary schools attended are loaded heavily on this factor. The inverse relationship between these two variables is obvious. A small number of elementary schools attended means a large number of years in a neighborhood.

Factor VIII is a factor of Family Structure, with size of family and position among siblings loading on the factor. It is reasonable for size of family to be a factor, but the loading of family position on this factor is not understandable and needs to be examined in a separate and more specific analysis. Factor IX is a factor of verbal skill as measured by the Stanford Paragraph

Meaning and Spelling tests and a factor of Elementary School Language Arts and Mathematics Grades. There are some low loadings on the factor from two Iowa Tests of Basic Skills language tests; the Stanford Word Meaning and Arithmetic tests; the California Test of Mental Maturity Language test; and counselor ratings of ability in reading, writing, and arithmetic, and neatness of work. This factor comes closest to being a general factor of school performance with loadings from several classifications of school performance data.

Parental Education is Factor X. The variables representing level of father's education and level of mother's education have high loadings on this factor. The loadings are .70 and .69, respectively. Employment of mother has a moderate loading on this factor, but employment of father has a zero loading for all practical purposes. Some variables from the group of standardized achievement test scores have low loadings on this factor, which implies that amount of parental education and measures of achievement are slightly related in the factor structure of the sample.

Factor XI is a factor of Nonverbal Perception and Performance. The variables with high or very high loadings on this factor are the cognitive Measures of Flexibility of Closure, Number Facility: Addition, Number Facility: Division, and Perceptual Speed. The factor has moderate loadings for the following variables: three

measures from the California Test of Mental Maturity, Word Fluency, Length Estimation, Number Facility: Subtraction and Multiplication, and General Reasoning. There are low loadings from Elementary School Arithmetic Grades and Spatial Scanning. It is important to observe that this factor demonstrates a factor structure that contains standardized aptitude test measures, one type of school performance, and measures of cognitive factors.

The two measures of Semantic Spontaneous Flexibility have high loadings on Factor XII. These are considered to be measures of creativity, and the factor is labeled as such. Factor XIII is clearly a factor of school attendance. Factor XIV is a factor of negative school reactions. Factor XV is a factor of Auditory Memory Span.

Examination of the rotated factor matrix indicates that one or more of the measures of cognitive factors have loadings with other data on all factors. These loadings are within the low and moderate range, except on Factors XI, XII, and XV, which has some high loadings. This point can be summarized as demonstrated in Figure 5. The rating of loadings in Figure 5 are arbitrary according to Fruchter.[1] Loadings below .2 are insignificant, loadings of

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[1]Fruchter, Introduction to Factor Analysis, p. 151.

FIGURE 5

LOADINGS OF COGNITIVE FACTORS FOR TOTAL SAMPLE[a]

Cognitive Factor	Factor							
	I	II	III	IV	V	VI	VII	VIII
Flexibility of closure								
Speed of closure	L			L			L	
Word fluency								L
Length estimation	L	L			L		L	
Associative memory					M	L		
Memory span: auditory								
Number facility: addition						L		
Number facility: division	M					L		
Number facility: subtraction/ multiplication	M						L	
Perceptual speed							L	
General reasoning	M							
Spatial scanning	M						L	
Semantic spontaneous flexibility 1	M	L	L					
Semantic spontaneous flexibility 2								

[a]Fruchter, Introduction to Factor Analysis, p. 151: .2 to .3 = Low (L); .3 to .5 = Moderate (M); .5 to .7 = High (H); > .7 = Very High (VH).

FIGURE 5 (Continued)

Cognitive Factor	Factor						
	IX	X	XI	XII	XIII	XIV	XV
Flexibility of closure			H				
Speed of closure		L		M	L		L
Word fluency			M	M			
Length estimation					L		
Associative memory				M			
Memory span: auditory							VH
Number facility: addition		L	H		M		M
Number facility: division			H		L		
Number facility: subtraction/ multiplication			M		M		
Perceptual speed		L	H		L		M
General reasoning			M				
Spatial scanning	L		L	L	L	L	
Semantic spontaneous flexibility 1				H			
Semantic spontaneous flexibility 2				VH		L	

.2 to .3 are low (L), .3 to .5 are moderate (M), .5 to .7 as high (H), and above .7 as very high (VH). It would vary somewhat depending upon the N, the range of variables, and the type of correlation used, but for general discussions in this paper these arbitrary classifications will be used.

Figure 5 supports the assumption that was made when the measures of cognitive factors were selected for the experimental variables in the study. The selected cognitive factors were expected to be correlated with the other data obtained and were expected to be scattered throughout the total factor structure of the sample. It was not expected that any of the fourteen cognitive measures would evolve as well-defined factors in the final factor matrix.

An unexpected occurrence in the factor analytic phase was that the measures from the Stanford Achievement Tests did not load on a general aptitude, and achievement factor with Iowa Tests of Basic Skills measures and California Test of Mental Maturity measures. One or more of the Stanford Achievement Tests measures having loadings on nine factors either to a low degree, moderate degree, or high degree. It might be said that for this sample the Stanford Achievement Test measures are general measures of achievement and are more directly or inversely related to the

measures of background data; counselor concept and cognitive factors then are measures from the Iowa Tests of Basic Skills.

In the values in Table 15 the communalities of the fifty-six variables are generally high. Large amounts of the total variance of the variables are correlated with the other variables. The range of communalities for all variables is from .4427 for General Reasoning to .9452 for Positive Attitudes toward School. It might be said that the variance within the items of data for the sample of educationally disadvantaged students has been accounted for to a significant degree. Yet, there is still variance to account for if the learning patterns of educationally disadvantaged students are going to be more completely understood by the educator. In an unpublished study by Dent and Holland,[1] data on seven measures of creativity for sixty-two of the subjects in this sample were added to a factor analysis procedure and subsequent analysis accounted for more of the variance. Yet, there is still a portion unaccounted for. It is a hypothesis of the writer that objective measures of classroom process over several years would increase the amount of variance accounted for in a similar sample with similar data.

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[1]Paula A. Dent and Lois J. Holland, "Cognitive-Creative Profiles of Educationally Disadvantaged Junior High School Students" (unpublished paper, Wayne State University, 1969).

Factor analysis of data for boys in the sample

The second part of the factor analytic phase of data analysis was completed on all variables for the fifty-two boys in the sample. Tables 15 and 16 present the correlation matrix and the rotated factor matrix for this analysis. The fifteen factors have been identified for this sample as given in the listing below.

Factor

I. Education of father: standardized tests.

II. Counselor concept of student and parent values related to school.

III. School involvement.

IV. Positive school attitudes.

V. Economic status.

VI. Mobility.

VII. Arithmetic skills.

VIII. Perceptual speed.

IX. Flexibility of closure.

X. Perceptual-associative reasoning.

XI. Family size.

XII. Reasoning skills.

XIII. Counselor concept of school performance and student images.

XIV. California aptitude.

XV. Reading and arithmetic.

Factor I has high or very high loadings from all five measures of the Iowa Tests of Basic Skills, Stanford Spelling, and Education of the Father. The factor illustrates the influence of the father on the educationally disadvantaged boy. The fact that the variable of father's education loads on the factor with high loadings from six standardized measures of achievement supports this assumption. Examination of Table 16 also illustrates that other standardized measures of achievement and aptitude and the two measures reflecting elementary school grades have moderate or low loadings on Factor I.

Six items from the Counselor Concept of Student Scale have high or very high loadings on Factor II. These measures are ratings of classroom behavior, neatness of work, attitude toward school, parent interest in child's school work, personal appearance, and cooperation with school. Factor II is called Counselor Concept of Parent and Student Values Related to School. It is identical to Factor II previously described for the total sample.

Factor III has very high loadings from Pupil Participation and Parent Participation and is named School Involvement. There is also a high loading of .56 on this factor from the Stanford Language test.

This loading implies that a relationship exists between measured language skill and participation in extra activities of the school on the part of both parents and students. If parents have a degree of skill in language usage their children will be more apt to possess comparable skill. Therefore, the relationship that exists between child and parent language skill could be represented by the child's score on the Stanford Language test. A relationship between participation and language skill can be explained by making an assumption that adults and children will be more apt to participate in group or individual school activities if language usage skill is possessed.

Measures of Positive and Neutral Reactions to school load heavily on Factor IV. This factor is named Positive School Attitudes. Factor V is Economic Status, with very high loadings from employment status of father and income level. Factor VI is a bipolar factor of mobility, with high loadings from measures reflecting years in the neighborhood and the number of elementary schools attended. Factors IV, V, and VI are similar to factors found in the analysis for the total sample.

Factor VII is clearly a factor of Arithmetic Skill, with high or very high loadings from the Stanford Arithmetic Computation test and from cognitive measures of Number Facility: Addition, Number Facility: Division, and Number Facility: Subtraction and Multiplication.

Logically, the arithmetic measure from the Iowa Tests of Basic Skills should also load on this factor, but its loading is near zero. An explanation for this seemingly incongruent development in the factor analysis is not within the scope of this study, but several possibilities exist which might be explored in additional research. One reason might be that the Iowa Tests of Basic Skills were not taken too seriously by the students or the teachers at the time they were given, whereas the arithmetic measures loading on this factor were obtained in testing situations in which the students were trying harder and were more conscious of the reasons for the test. It is also a possibility that the Iowa measure of arithmetic is not a pure arithmetic measure and is more verbally oriented. A third possibility is that the Iowa measures an entirely different type of arithmetic skill than do the variables that load heavily on this factor.

Factor VIII is Perceptual Speed, with a very high loading from the cognitive test of this skill. Factor IX is Flexibility of Closure, with a loading of .799 or .80 from the cognitive measure of this skill. One can also observe from Table 16 that Factor IX has a loading of .557 or .56 from employment status of mother. To completely diagnose this relationship one would have to know what factors operated in the work experience of the mother and how these

factors could have brought about a mother-child transmission that would foster development of closure in the child.

The cognitive measures of Speed of Closure and Associative Memory load heavily on Factor X. This is a logical union of cognitive factors, as Speed of Closure is the ability to unify an apparently disparate perceptual field into a single percept and Associative Memory is the ability to remember bits of unrelated material. A combination of the two skills might be termed Perceptual-Associative Reasoning. Factor XI is a factor of family size, with high loadings from size of family and position of subject in sibling structure. Factor XII has high loading from the cognitive measure of General Reasoning and low and moderate loadings from the variables measuring Stanford Spelling and Arithmetic, Negative School Reactions, Parent Interest in Child's School Work, Length Estimation, and Semantic Spontaneous Flexibility 1. This factor is reflecting general reasoning in several areas.

The traits of ability to verbalize, self-confidence, and peer relations as rated by the counselor on the Counselor Concept of Student Rating Scale load high or very high on Factor XIII. This factor is termed Counselor Concept of School Performance and Student Image. The implied dependence of self-confidence and peer

relations upon ability to verbalize as conceived by the counselors would be an interesting subject to pursue in depth.

The three measures from the California Test of Mental Maturity load heavily on Factor XIV. This factor is to be called California Aptitude. It is significant that these measures load together and that the loading occurs on the next to last factor extracted. It might be expected that the aptitude measures upon which many educational judgments are made would evolve as a more important factor and that other variables might load significantly on the same factor. The final factor extracted is a general factor of Reading and Arithmetic, with high loadings from the Stanford tests on Word Meaning and Paragraph Meaning; measures from the Counselor Concept of Student representing ratings in ability to read, write, and do arithmetic; and a measure representing elementary school arithmetic grades.

As was pointed out for the total sample, examination of the rotated factor matrix shows that one or more of the measures of cognitive factors loaded to some extent on all fifteen factors. This is summarized in Figure 6, in which the loadings of the measures of cognitive factors are presented separately. In combination with other variables these "factor pure" measures become spread throughout the factor structure of the data from the sample. The cognitive

FIGURE 6

LOADINGS OF COGNITIVE FACTORS FOR BOYS IN SAMPLE[a]

Cognitive Factor	Factor							
	I	II	III	IV	V	VI	VII	VIII
Flexibility of closure					L			
Speed of closure				L				
Word fluency				L	M			
Length estimation	L	L	L				L	M
Associative memory				L				
Memory span: auditory	L			L	M		L	L
Number facility: addition	L						H	M
Number facility: division	L						VH	
Number facility: subtraction/ multiplication							VH	L
Perceptual speed								VH
General reasoning		L				L	L	
Spatial scanning		L			L	L		M
Semantic spontaneous flexibility 1	L	L						
Semantic spontaneous flexibility 2	L			L		L	L	M

[a]See Figure 5, page 90, for interpretation of loadings.

FIGURE 6 (Continued)

Cognitive Factor	Factor						
	IX	X	XI	XII	XIII	XIV	XV
Flexibility of closure	VH						
Speed of closure		VH					
Word fluency	M	M			L	M	
Length estimation	M			L			
Associative memory		VH					
Memory span: auditory		M			L	L	
Number facility: addition							
Number facility: division							
Number facility: subtraction/ multiplication							
Perceptual speed							
General reasoning				H			
Spatial scanning			M			L	M
Semantic spontaneous flexibility 1	M		M				L
Semantic spontaneous flexibility 2	M	M					

measures do not operate alone but influence or are influenced by other variables except for Factors VIII, IX, and X, which appear as cognitive factors.

As in the rotated factor matrix for the total sample, the Stanford Achievement Tests did not load with the Iowa Tests of Basic Skills to form a general standardized achievement test factor but combined with other variables to create separate factors. Theoretically, the five Stanford measures should load significantly on a single factor, but for this sample they vary according to other variables more rather than according to each other. The Stanford measures have fairly high correlations with each other according to technical material distributed by the publisher.[1] It is also pertinent to note that the aptitude measures from the California Test of Mental Maturity are not combined with measures of achievement even though they are sometimes considered more achievement than aptitude for the educationally disadvantaged student. Examination of Table 16 shows that only two of the thirty possible intercorrelations between measures from the California Test of Mental Maturity and standardized achievement measures are significant at the .05 level.[2]

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[1]T. L. Kelly et al., Stanford Achievement Tests: Technical Supplement (New York: Harcourt, Brace, and World, 1966), p. 18.

[2]J. P. Guilford, Fundamental Statistics in Psychology and Education (4th ed.; New York: McGraw-Hill Co., 1965), pp. 580-81.

These are the correlations between the Iowa Tests of Basic Skills Vocabulary Test and the California Language score and California Total Score.

The communalities for the variables for the boys in the sample range from a low of .5616 for parent interest in child's school work to a high of .9547 for the total score on the California Test of Mental Maturity. Not all the variance within each of the fifty-six variables is correlated with other variables in the data collection, but comparison of the communalities for the sample of boys to the total sample shows that more of the total variance of the variables for the boys is correlated with other variables than is for the total sample. This is discussed in more detail in the summary of the factor analytic phase of data analysis.

Factor analysis for girls in the sample

The final phase of the factor analytic treatment of the data was completed upon the data from all variables for the sixty girls in the sample. Tables 15 and 17 present the correlation matrix and rotated factor matrix for this phase of data treatment. The fifteen factors have been identified for this sample as given in the listing that follows.

Factor

I. Counselor concept of student and parent values related to school.

II. General academic ability and related performance.

III. Educational level of parents.

IV. Mobility.

V. Positive school attitudes.

VI. Language skill and school attendance.

VII. Verbal and arithmetic speed and accuracy of response.

VIII. Counselor concept of school performance and student image.

IX. Unifications and/or production of verbal percepts.

X. Economic status.

XI. Reading skill.

XII. Auditory memory.

XIII. Position in sibling structure.

XIV. Arithmetic and extracurricular activities.

XV. Family size.

Factor I has high or very high loadings from five measures of the Counselor Concept of Student Rating scale. The measures are classroom behavior, attitude toward school, parent interest in school work, personal appearance, and cooperation with school.

These measures viewed as a single unit reflect student and parent values toward the school and the educational process. Comments made regarding similar factors in the two previous factor analyses apply to this analysis as well.

The California Test of Mental Maturity have very high loadings on Factor II. These are loadings of .808, .856, and .899. But there are other variables which load significantly on this factor with the three standardized aptitude measures. They are the Iowa Tests of Basic Skills Reading Comprehension, Language Total, and Work Study Total and the cognitive measures of Number Facility: Subtraction and Multiplication and General Reasoning. These measures of school performance have traits in common with the California aptitude measures within the factor structure of the sixty girls in the sample.

Factor III is loaded heavily with the variables reflecting the amount of father's and mother's education. The loadings are .880 and .906, respectively. Factor IV received very high loadings from the two variables reflecting family mobility: number of years in the neighborhood and number of elementary schools attended. These two factors are identified as Parent Education and Mobility. Factor V is identified as Positive School Attitudes with very high loadings from the measures of positive and neutral reactions to school.

The loadings on Factor VI present a bipolar factor that is somewhat different but a factor that can be explained and would not be considered to be unusual. The Stanford measures of Word Meaning and Language have very high loadings and school attendance has a high loading on the factor. This is supporting either the assumption that good school attendance is reflected in performance on language-oriented performance or the assumption that students with language skill have good school attendance. Application of either of the two assumptions would depend upon a more detailed assessment of the three variables as well as a more detailed collection of background data on the subjects. Both assumptions probably are valid but for different populations within a larger population.

Factor VII is a factor of verbal fluency and skill in addition as measured by the tests of cognitive factors: Word Fluency and Number Facility: Addition. The nature of these two tests implies that the factor is one of speed and accuracy in verbal and arithmetic responses. These common traits found in the instruments themselves explain the factor. Factor VIII represents School Performance and Student Image. Loaded on this factor are the measures from the Counselor Concept of Student Rating Scale which rated ability to read, to write, to do arithmetic, and to verbalize and self confidence and peer relations.

The cognitive measure, Speed of Closure--which is the ability to unify unrelated bits in a perceptual field into one percept--and the cognitive measures, Semantic Spontaneous Flexibility 1 as represented by the Utility Test--which is the ability to produce a lot of verbal ideas--load on Factor IX. The Semantic Spontaneous Flexibility measure is a test of a type of verbal creativity, and the skill involved in Speed of Closure may have a degree of verbal creativity within it as the student tries to make a single percept from apparently unrelated bits. This factor has been named Unification and/or Production of Verbal Percepts. Measures of employment status of father and mother and income level are loaded on Factor X. This factor is defined as Economic Status. Factor XI is labeled Reading Skill with loadings from Stanford tests of Paragraph Meaning and Spelling and from Elementary School Language Grades which are generally a reflection of reading skill.

Factor XII is clearly a factor of Auditory Memory with a loading of .850 from the measure of the cognitive factor by this name. Factor XIII is a factor with a very high loading of .806 from the measure, Position in Sibling Structure. Factor XIV is a bipolar factor with loadings from the Iowa Arithmetic Measure and from the measure of Pupil Participation. Factor XV is a factor of Family

Size with a high loading from the variable which gives the number of people in a subject's family.

As with the two previous factor analytic segments of data analysis, the loadings for the measures of cognitive factors are scattered throughout the rotated factor matrix and do not appear as separate factors except on Factor VII, Factor IX, and Factor XII; and Factor VII and Factor IX represent two measures of cognitive factors. The saturation of the cognitive factors throughout the matrix is demonstrated in Figure 7.

Summary of factor analysis

The presentation of the three segments of the factor analysis --for the total sample, for the boys in the sample, and for the girls in the sample--reflect differences which can best be described as sex differences. The factor analysis for the total sample presents the factor structure that might be found in any randomly selected classroom in the selected junior high school. The factor structures for the boys and for the girls would be structures that could help explain special learning problems that develop for boys or for girls.

The total group, the boys, and the girls have, in the factor structures for each analyses, the following common factors:

FIGURE 7

LOADINGS OF COGNITIVE FACTORS FOR GIRLS IN SAMPLE[a]

Cognitive Factor	Factor							
	I	II	III	IV	V	VI	VII	VIII
Flexibility of closure		M		L			M	
Speed of closure	L			L				
Word fluency						L	VH	
Length estimation		L						
Associative memory	M							L
Memory span: auditory								
Number facility: addition							H	L
Number facility: division		M	L			M	M	L
Number facility: subtraction/ multiplication		H		L			M	
Perceptual speed		M	M					
General reasoning		H				L		
Spatial scanning		M	L	L			L	
Semantic spontaneous flexibility 1	L	L		L				L
Semantic spontaneous flexibility 2		L					M	

[a]See Figure 5, page 90, for interpretation of loadings.

FIGURE 7 (Continued)

Cognitive Factor	Factor						
	IX	X	XI	XII	XIII	XIV	XV
Flexibility of closure			M				
Speed of closure	VH						
Word fluency							
Length estimation	M			M			
Associative memory		L	L	M			
Memory span: auditory				VH			
Number facility: addition				L			
Number facility: division							L
Number facility: subtraction/ multiplication							
Perceptual speed		L		L		L	
General reasoning					L	L	
Spatial scanning	L	L	L	L			
Semantic spontaneous flexibility 1	H	L					
Semantic spontaneous flexibility 2	M				M	M	L

Counselor concept of student and parent values related to school.

Economic status.

Positive school attitudes.

Counselor concept of school performance and student image.

Mobility.

The rank of these factors in the factor structures or the amount of variance extracted by the factor is not comparable for the three analyses, but similar factors exist for boys and for girls. It should be noted that the mobility factor is not necessarily a factor that reflects a high degree of transiency in the selected sample, but is more of a factor of stability in a neighborhood where much substandard housing has been torn down and replaced by moderate- and upper-income housing. Three of the common factors are based upon data from somewhat subjective measures and could have evolved because of their nature. The three factors in this category are the two Counselor Concept factors and the Positive Attitude factor. There is an element of consistency in the data for these three factors as the counselors did all the rating, and the Positive Attitude factor is from data obtained on the Student Reaction to School instrument administered by the writer with consistent directions.

The existence of Economic Status and Mobility factors is consistent with other research and with descriptive studies of the educationally disadvantaged population. But it might be asked at this point why measures of school performance did not load with these variables to form a general factor if poverty and transiency are so closely related to school performance.

The emergence of counselor ratings of students and student attitudes as factors implies that the school must begin to consider such measures if they are to solve any of the learning problems they face. Positive feelings emerged alone without any strong correlations with other measures, particularly those of school performance. Positive feelings toward school seem to exist without affecting performance. Why does this structure exist? It is also apparent that staff ratings of students are not reflected with any other measures. Could they not be utilized in a positive manner by all the staff as motivational devices?

Certain factors are held in common by the girls and the total group and by the boys and the total group. These similarities exist because the intercorrelations within a factor for the subgroup, either boys or girls, were strong enough to influence the factor analytic process for the total sample and cause a similar factor to be extracted.

The analysis for the girls in the sample produced three factors which are also found in the factor structure for the total sample. These factors are Achievement and Aptitude, Educational Level of Parents, and Auditory Memory Span. These factors would be expected to appear if one predicted factors before analysis, but it might be true that they would be expected to be in combination with other variables. Auditory Memory Span could be expected to be related to some types of measures of school performance. Its appearance as a single factor could be interpreted as a reflection upon the type of classroom procedures the students have been exposed to in their school life. It could be said that girls are probably better listeners or that they may have been motivated more to perform well. Maybe girls are influenced by school experiences more than boys are. A tentative conclusion might also be that the most recent experiences they have had in the classroom have not involved listening and remembering. Whether this means they have had action-oriented learning experiences or passive "paper and pencil busy work" learning experiences is not known by the writer. It also might be that this factor emerged as a unity without other correlated measures because of the "be quiet and listen" type of home discipline, because of home confusion and the necessity for being able to sort out auditory cues, or as a result of their practice

at listening to the music of their generation and being able to sort out and remember the words and the melody they hear.

The factor of Educational Level of Parents should have been loaded with some measures of language arts performance if the theories advanced regarding language in the home and its effects on the child's development in language skills are always valid. The contradiction of theory in this analysis could be a result of the fact that two-thirds of the sample had an upper elementary school experience that had heavy emphasis upon language arts skills. Again it could be said here that it is possible that girls are less affected in their school performance by parent education than are boys. The emergence of a general achievement and aptitude factor without high loadings from the Stanford Achievement Tests for the girls only would support the assumption that girls are less affected by the other variables that enter into the analysis.

The analysis for the boys in the sample produced two factors which are also found in the factor structure for the total sample. These factors are School Involvement and Family Structure. The School Involvement factor has loadings from measures of pupil participation and parent participation which was very low for the boys. Obviously the strength of the low level of participation for the boys and their parents was sufficient to counteract the higher level found

among the girls and bring about the emergence of the factor for the total sample. It can be said that lack of interest in and low motivation for participation in school activities on the part of the boys is characteristic of the boy who has been alienated from the educational system. The boy's attitudes have been transmitted to the parents. This statement is supported by a correlation of .75 between pupil and parent participation for the boys in the sample. The correlation between these two variables for the girls is only .19, which indicates that the girls operate independently of their parents and vice versa.

The factor of Family Structure, which has high loadings from measures of size of family and position of subject in sibling structure, is found in the total sample factor matrix and in the boys only factor matrix. Its extraction as a unity for the boys and as two separate factors for the girls can be explained as a peculiarity of the random sample. There is a correlation of .357 between the two variables loaded on the Family Structure factor for the boys in the sample and a near zero correlation between the variables for the girls in the sample. It was assumed that these two variables, size of family and position in sibling structure, might be related in some manner to measures of school performance. Examination of the

correlation matrix found in Table 15 shows that this assumption is not supported by the data for this sample.

The factor analysis produced unique factors for the two subgroups of the total sample, as well as some unique factors for the total sample. This, in itself, presents to school personnel areas of concern that would be directly related to instruction. As most of the unique factors that were extracted in the three analyses have loadings from measures of standardized tests, school performance, and/or cognitive factors, the relationship to instruction becomes even more important.

The first factor extracted for the subgroup of boys only is heavily loaded with measures of scores on standardized tests and the measure reflecting father's level of education. This supports the recent strong emphasis placed upon providing more strong male leadership in the elementary schools. It defines a unity within the factor structure of the educationally disadvantaged junior high school boy. It is significant that this was the first factor extracted and thus, by definition, the strongest factor within the structure.

The second unique factor extracted for the boys only is one of pure computation skill or arithmetic skill with loadings from the Stanford Arithmetic Computation test and from the three cognitive measures of Number Facility. These measures are free of

dependence upon verbal skills and as such present a pure nonlanguage or number skill factor. That such a factor exists in the factor structure of the boys in the sample is not unexpected, but that it was extracted from sample data representing subjects with learning problems is encouraging.

Factors VIII, IX, and X in the factor structure for the boys are basically cognitive factors as the high loadings are from the measures of cognitive factors. Factor VIII is Perceptual Speed, the ability to find figures, make comparisons, and carry out simple tasks involving visual perception. The fact that the skill exists in the sample of boys and does not have traits in common with measures of school performance is critical to instruction and curriculum. It is a factor that could be capitalized on in presenting material and structuring learning experiences. It is a factor that is most probably involved in many job skills that may never be introduced to the educationally disadvantaged boy. The extraction of Factors IX and X further supports the assumption that skills exist that are not involved in common school learnings as far as the boys in the sample are concerned. Factor IX is loaded heavily with the variable, Flexibility of Closure, and Factor X is loaded heavily with the two variables, Associative Memory and Speed of Closure. It is the opinion here that the combination of Factors VII, VIII, IX, and X

present a meaningful combination of skills that could be capitalized on in curriculum design for the junior high school boy who is marked as a nonachieving or low-achieving student according to currently used measures of aptitude and achievement. If viewed as a unity, the measures in these four factors are Arithmetic Computation; Number Facility in Addition, Division, Subtraction and Multiplication; Perceptual Speed; Flexibility of Closure; Speed of Closure; and Associative Memory. The unity implies that there is potential for development over a wide range of technical skills; for example, those that would deal with computer technology at any level of operations. Examination of skills such as listed would lead to examination of the vocational education program in the high school and to examination of the career guidance programs in operation in both junior and senior high school.

Factor XII has been defined as a factor of General Reasoning since it has a high loading from the cognitive measure of this name. It also has loadings from measures of arithmetic, spelling, negative school attitudes, Length Estimation, and Semantic Spontaneous Flexibility 1. There is an implication that reasoning was only brought into play by the boys when dealing with the other variables loaded upon the factor. There is an implication that the ability displayed in the cognitive factor test of General Reasoning

is a trait necessary for performance on the other measures. These statements do not necessarily apply to the measure of Negative Reactions to School. In this case, it is probable that the students made judgments in making negative statements similar in nature to those made in responding to the other instruments. This factor implies a thought process.

For the subgroup of boys only, the three measures from the California Test of Mental Maturity loaded heavily on a single factor. In theory, the Language score should have loaded with language-oriented achievement and cognitive measures, and the Nonlanguage score should have loaded with nonlanguage achievement and cognitive measures. This pattern is an assumption that can be made if tests are measuring common traits. Obviously, there is little to support this assumption in the factor structure for the boys in the sample. Factor XIV which is called California Aptitude has some low loadings from some achievement measures, from the measure of Educational Level of Mother, and from three measures of cognitive factors. But the aptitude loadings are so strong that it is clearly an aptitude factor. It is a concern here that the students are being measured on an aptitude battery and on an achievement battery that do not measure common traits to any great degree. Comparisons made between the performances on the aptitude and achievement batteries

in question would be invalid. Does either have any relationship to what is being taught? The ideal educational experience would have tests to measure potential, curriculum to capitalize on potential, and tests to measure performance with all three phases being correlated on the basis of common traits. It is obvious that in the learning situation to which the boys in the sample are exposed, there is a need to study the standardized instruments being used to structure curriculum.

Factor XV in the structure for the subgroup of boys only is a general reading and arithmetic factor. Actually, it is more a reading factor in that the objective measures with high loadings are the Word Meaning and Paragraph Meaning subtests of the Stanford Achievement Tests. The other variables loading on the factor are counselor ratings of reading, writing, and arithmetic ability, and elementary school arithmetic grades. All of these are dependent upon another person's judgment which may be influenced by the person unconsciously relating reading skill to other skills. It is also probable that reading skill is an important component of other skill development. If reading skill or measures of reading skill exist rather independently in the factor structure for the boys, then reading might be a skill that has not been integrated into the total process of education for these students.

Seven factors in the factor structure for the subgroup of girls only are unique for this subgroup. The first such factor is one defined as a Language Arts Skills—School Attendance. As previously stated, the question here is which part of the factor is the cause and which part is the result. If one assumes the skill is developed because of good attendance, then one assumes that something is happening in the classroom. If one assumes the attendance is good because they have language skill, then one assumes that poor language skill means poor attendance. Either assumption is eliminating many factors from consideration. It is the opinion here that the common trait is a home structure that encourages attendance and encourages the child to learn successfully. It is the opinion here that girls are less alienated from the school and more susceptible to encouragement from the home.

Factor VII is a factor loaded with Word Fluency and Number Facility: Addition. The combination can be interpreted as a factor of speed and accuracy in vocabulary and arithmetic. The lack of traits in common with standardized test measures would indicate that the girls do not use such skills in similar type achievement and aptitude measures. Is it not possible that these two factors describe a learning skill that the school should consider in curriculum development. Such skills seem most likely to be useful in

a business education curriculum and courses that would be of a nature to demand speed and accuracy.

The combination of loadings from Speed of Closure and Semantic Spontaneous Flexibility produced a factor that implies an ability to create unified percepts in a somewhat unrestricted situation. A girl, given some cues, should be able to produce new and creative material whether it be in creative writing, journalism, sewing, art, or whether it be the creation of learning materials within a class. It seems that freedom to create within a loosely defined field would capitalize on this factor in the structure of the educationally disadvantaged junior high school girl.

Reading appeared as Factor XI for girls only and is different from a similar factor in the analysis for the boys in only one respect. There are no loadings from any measures of arithmetic skill. The factor for the girls is all reading test scores and elementary school language grades. Again, the question is asked as to why other reading-oriented measures did not load on this factor. The most pertinent point is why did not the Iowa Reading Comprehension measure load with the Stanford Paragraph Meaning on a common factor? In this situation it seems that the critical point for school personnel to consider is which reading skill test is

measuring the skill these girls possess? It is also pertinent to note that according to test descriptions they are identical tests.

For the girls only Sibling Structure and Family Size were extracted as two separate factors, which was probably due to sampling as for boys only they loaded on the same factor. The purpose for including these variables was to see if they had any relationship to performance measures of the students. It is sufficient to say that there are no apparent significant correlations for size of family and position in sibling structure with performance measures.

The final factor extracted for girls only that can be described as being a factor defined as one of sex differences is the factor with loadings from student participation in extracurricular activities and the Iowa Arithmetic Measure. This is another example of which comes first. Does arithmetic performance depend on participation, or does participation depend on arithmetic performance, or is there an underlying trait common to the two variables? The possible answer to this would be the existence of what could be called "an action-oriented" characteristic for the girls. Arithmetic skill development most probably involves actually doing something such as problems at the board or even just the paper-and-pencil tasks necessary. Such a characteristic is

obviously necessary for participation in activities. It could also be that if a girl performs well in arithmetic she is usually a very good student and has more motivation to participate in extracurricular activities. If the first possibility is accepted, it seems that "action-oriented" classes and related extracurricular activities may be needed to motivate for learning.

Cognitive factors in the factor structure

As previously stated, and as previously demonstrated in Figures 5, 6, and 7, the measures of cognitive factors are loaded on all fifteen factors in each of the three analyses. These loadings range from low to very high, and the pattern of loadings in Figures 6 and 7 demonstrate sex differences. These sex differences can best be summarized by reference to the correlation matrices in Table 15. The sex differences are most apparent in the correlations of the measures of cognitive factors with the ten standardized achievement measures. These correlations are summarized in Figure 8, which presents the comparisons. If the correlation for the boys is highest, a "B" has been inserted in the cell; if the correlation for the girls is highest, a "G" is in the cell; and if the correlations are approximately equal, the cell is blank.

FIGURE 8

COMPARISON OF CORRELATIONS: COGNITIVE FACTORS AND MEASURES FROM STANDARDIZED TESTS

Cognitive Factor	Standardized Tests[a]									
	Iowa Tests of Basic Skills					Stanford Achievement Tests				
	V	R	L	W	A	W	P	S	L	A
Flexibility of closure	B	G		G	B	B	B	G	B	B
Speed of closure	G	G	G	G	G	G	G	G		G
Word fluency	B	B	G	G	B	G	G	B	G	
Length estimation	B		G	B	B	B	B	B	B	B
Associative memory	B	G	G	G	G	G	G	G	B	
Memory span: auditory	G	B			B		G			G
Number facility: addition	B	B	B	B	G	B	B	B	B	B
Number facility: division	B	G	G	G	B	B	B	B		B
Number facility: subtraction/ multiplication	B	G	G	G	G	B	G	G	B	B
Perceptual speed	B		G	B	B	B	B	B	B	B
General reasoning	B	B	G	B	B	B	B	B	G	B
Spatial scanning	B	G	G	G	G	B	B	B	B	G
Semantic spontaneous flexibility 1	B	G	G	G	B	B	G	B	B	B
Semantic spontaneous flexibility 2	B	B		B	B	B	B	B	B	B

[a]Key to tests: ITBS--V = Vocabulary, R = Reading, L = Language Total, W = Work Study Total, A = Arithmetic Total; SAT --W = Word Meaning, P = Paragraph Meaning, S = Spelling, L = Language, A = Arithmetic Computation.

Figure 8 shows that out of 140 cells, the boys have higher correlations between cognitive factors and standardized achievement tests in 78 cells. Examination of the columns shows that:

1. The cognitive factor and Iowa Vocabulary column has twelve higher correlations for the boys.
2. The cognitive factor and Iowa Language column has ten higher correlations for the girls.
3. The cognitive factor and Stanford Word Meaning column has ten higher correlations for the boys.
4. The cognitive factor and Stanford Language column has nine higher correlations for the boys.
5. The cognitive factor and both arithmetic columns have nine higher correlations for the boys.

Examination of the rows show that:

1. Speed of Closure and achievement measure correlations are higher for girls in nine cells.
2. Length Estimation and achievement measure correlations are higher for boys in eight cells.
3. Associative Memory and achievement measure correlations are higher for girls in nine cells.
4. Number Facility: Addition and achievement measure correlations are higher for boys in eight cells.

5. Perceptual Speed and achievement measure correlations are higher for boys in eight cells.
6. General Reasoning and achievement measure correlations are higher for boys in eight cells.
7. Semantic Spontaneous Flexibility 2 and achievement measure correlations are higher for boys in nine cells.

It is apparent that sex differences exist in the relationships between cognitive factors and measures of school performance. It is apparent that there is reason to consider the more finite elements of human performance such as cognitive factors when trying to diagnose learning problems and when trying to provide for an improved learning process.

For example, if in teaching vocabulary to boys the various abilities defined by the cognitive factors were called into play for instructional approaches, it is possible that the learning would be more profitable. This may be further expanded by suggesting that the idea of unrestricted expression of words and ideas as implied by Word Fluency and Semantic Spontaneous Flexibility combined with a problem-solving goal as implied by General Reasoning would bring cognitive factors into play in learning vocabulary. This approach is further supported if one observes that the boys are not necessarily strong in memory work.

Another example could be found in teaching language to girls. If the instructional plan was centered around utilization of the cognitive factors of Spatial Scanning, Associative Memory, and Perceptual Speed as the performance skills, a group would be actively learning with skills they possess to some degree. A correctly stated and structured sentence could be presented followed by two, three, or four sentences like the correct one but containing errors. The task would be to make corrections with the correct one as the standard in the student's memory. This process could be reversed somewhat with an incorrect sentence presented and several possible ways to correct it were presented.

Figure 8, if examined for row characteristics, shows that the cognitive factors of Speed of Closure and Associative Memory are stronger for girls in the sample than for the boys. If these abilities are viewed as performance skills, an instructional technique could include unification of an apparently disparate perceptual field into a single percept with the ability to remember unrelated bits as an adjunct to provide cues for building a single percept. Figure 8 shows that the boys are stronger than the girls in the cognitive factors of Perceptual Speed and General Reasoning. This combination implies speed in making comparisons and carrying out tasks calling for visual perception and the ability to solve

reasoning problems. Visual material with alternatives based upon some type of previously learned material would take advantage of this combination of cognitive factors.

To answer the question "Will measures in specific areas of school achievement vary directly or inversely with measures of cognitive factors?" it is necessary to examine the part of the correlation matrix in Table 15 that displays the correlations between the ten measures from standardized tests and the fourteen measures from cognitive factors. The following conclusions can be drawn from this examination:

1. None of the intercorrelations are statistically significant at the .01 or .05 level of significance.
2. Standardized tests correlate consistently with a few exceptions between .20 and .50 with the cognitive factors of Number Facility, General Reasoning, Spatial Scanning, and Semantic Spontaneous Flexibility 1.
3. Semantic Spontaneous Flexibility 1 and Number Facility: Division correlate the highest with eight of ten standardized tests.
4. Auditory Memory Span: has a zero or near zero correlation with six out of ten standardized tests.

In summary, standardized tests do vary directly with measures in cognitive factors, but not in a statistically significant manner.

Relationships between items of background data and cognitive factors can be described by studying the correlation matrix in Table 13. There are no intercorrelations between cognitive factors and items of background data which are significant at either the .01 or .05 level of significance. There are several correlations of .20 to .50 between cognitive factors and elementary school performance, and there are correlations of .32, .25, and .34 between Semantic Spontaneous Flexibility 1 and father's employment, mother's employment, and economic level. It can be concluded that items of background data have no strong effect on strengths in cognitive factors.

In an examination of the correlations between standardized test measures and measures of cognitive factors for students in the sample who achieve at a near average level on the standardized tests, certain conclusions can be drawn. These data are presented in Table 2.

1. The correlations are somewhat higher for the students achieving in the average range.
2. Three of the correlations are statistically significant at the .05 level of significance. These are Number Facility:

TABLE 2

CORRELATION MATRIX FOR STANDARDIZED TEST MEASURES AND MEASURES OF COGNITIVE FACTORS FOR CHILDREN ACHIEVING AT A NEAR AVERAGE LEVEL (N=37)

Cognitive Factor	Iowa Tests of Basic Skills[a]				
	V	R	L	W	A
Flexibility of closure	.32	.01	-.09	.13	.08
Speed of closure	.46	.33	.26	.20	.11
Word fluency	.30	.19	.31	.28	.15
Length estimation	.38	.20	.17	.29	.29
Associative memory	.44	.32	.21	.11	.24
Memory span: auditory	.18	.31	.09	.15	.19
Number facility: addition	.30	.01	.26	.11	-.01
Number facility: division	.25	.29	.42	.32	.13
Number facility: subtraction/ multiplication	.26	.26	.40	.36	.13
Perceptual speed	.13	-.15	-.02	.03	.08
General reasoning	.39	.18	.22	.27	.23
Spatial scanning	.39	.35	.41	.38	.45
Semantic spontaneous flexibility 1	.49	.36	.38	.45	.33
Semantic spontaneous flexibility 2	.21	.18	.11	.08	-.13

[a]Key to tests: V = Vocabulary, R = Reading, L = Language Total, W = Work Study Total, A = Arithmetic Total.

TABLE 2 (Continued)

Cognitive Factor	Stanford Achievement Tests[b]				
	W	P	S	L	A
Flexibility of closure	.11	.17	.03	.20	.24
Speed of closure	.05	.17	.30	.08	.25
Word fluency	.26	.21	.37	.23	.43
Length estimation	.25	.22	.17	.31	.58
Associative memory	.27	.07	.20	.28	.14
Memory span: auditory	.05	-.10	.15	.03	.18
Number facility: addition	.40	.29	.07	.33	.40
Number facility: division	.59	.30	.11	.50	.45
Number facility: subtraction/ multiplication	.38	.20	.11	.34	.40
Perceptual speed	-.09	.03	-.19	-.24	.08
General reasoning	.20	.33	.04	.23	.31
Spatial scanning	.46	.33	.21	.59	.34
Semantic spontaneous flexibility 1	.30	.33	.33	.22	.30
Semantic spontaneous flexibility 2	.22	.19	.15	.31	.15

[a]Key to tests: W = Word Meaning, P = Paragraph Meaning, S = Spelling, L = Language, A = Arithmetic Computation.

Division and Stanford Word Meaning; Spatial Scanning and Stanford Language; and Length Estimation and Stanford Arithmetic Computation.

3. It is not possible to state conclusively that a strength in cognitive factors would bring about higher performance on standardized test measures, but the data presented in Table 2 show a more positive relationship between the two types of performance measures than do the data in Table 2.

The study of relationships between cognitive factors and standardized test measures was carried one step further. Table 8 presents the correlation matrix between the two types of performance measures for the eighteen students in the sample who achieve at an above-average level. The pattern of correlations changes again for this group. For example, comparison of the correlations on Stanford Arithmetic Computation and the cognitive factors in Table 3 with the same ones in Table 2 shows an entirely different picture. The tentative conclusion that can be made here is that the types of cognitive factors utilized by students vary in accordance with achievement level. It is possible that higher achievement is based upon a more productive utilization of certain cognitive factors. The low achievers are not utilizing cognitive

TABLE 3

CORRELATION MATRIX FOR STANDARDIZED TEST MEASURES AND MEASURES OF COGNITIVE FACTORS FOR CHILDREN ACHIEVING AT AN ABOVE AVERAGE LEVEL (N=18)

Cognitive Factor	Iowa Tests of Basic Skills[a]				
	V	R	L	W	A
Flexibility of closure	.01	.21	-.09	.13	.32
Speed of closure	.17	.33	.45	.17	.20
Word fluency	.36	.48	.42	.49	.47
Length estimation	.42	.51	.31	.43	.38
Associative memory	-.03	.08	.13	-.09	.09
Memory span: auditory	-.20	-.14	-.05	-.30	-.38
Number facility: addition	.54	.58	.41	.56	.46
Number facility: division	.55	.58	.38	.47	.67
Number facility: subtraction/ multiplication	.50	.50	.64	.23	.49
Perceptual speed	.31	.57	.16	.45	.40
General reasoning	.25	.26	.10	.29	.16
Spatial scanning	.16	.35	.20	.28	.08
Semantic spontaneous flexibility 1	.23	.35	.36	.21	.06
Semantic spontaneous flexibility 2	-.05	.18	.07	-.12	.04

[a]Key to tests: V = Vocabulary, R = Reading, L = Language Total, W = Work Study Total, A = Arithmetic Total.

TABLE 3 (Continued)

Cognitive Factor	Stanford Achievement Tests[b]				
	W	P	S	L	A
Flexibility of closure	.28	.10	.15	.14	.23
Speed of closure	.29	.47	.51	.05	.03
Word fluency	.24	.27	.31	.16	.27
Length estimation	.23	.57	.20	-.07	.04
Associative memory	.09	-.04	.20	.02	-.19
Memory span: auditory	-.10	.18	.02	.26	.17
Number facility: addition	.23	.48	.17	.11	.10
Number facility: division	.69	.48	.57	.44	.07
Number facility: subtraction/ multiplication	.30	.48	.55	.18	.07
Perceptual speed	.40	.39	.11	.30	.21
General reasoning	.30	.06	.15	.46	.25
Spatial scanning	-.12	.13	-.07	-.04	.04
Semantic spontaneous flexibility 1	.28	.45	.16	-.09	-.30
Semantic spontaneous flexibility 2	.01	.27	.23	.03	.08

[b]Key to tests: W = Word Meaning, P = Paragraph Meaning, S = Spelling, L = Language, A = Arithmetic Computation.

factors in a productive pattern or they have not been guided in learning to do so.

The factor analysis has indicated that the total group for the sample and the two subgroups based upon sex have factor structures with rather clear-cut characteristics. It has also indicated that performance on measures of selected cognitive factors is intercorrelated with variables reflecting standardized test scores, student ratings, and background information. Some statements have been made which point out how the relationships between cognitive factors and school performance can be utilized in instruction. The next and final phase of the data analysis will present groups of students as profile types and will describe the types based upon strengths in cognitive factors. The factor analysis summarized group characteristics and the profile analysis will summarize individual characteristics.

Shape-Type Criteria of Profile Analysis

The final phase of data analysis was to apply the technique of shape-type criteria of profile analysis to the data. To accomplish this several steps were necessary. Because this is an innovative technique of profile analysis, the presentation of data

analysis will be accomplished in a step-by-step description of the process.

Step 1:

All data records were converted to standard scores with a mean of 50 and a standard deviation of 10. By use of an IBM 360 program written specifically for this technique,[1] the four criterion measures were computed for each subject. These measures are mean, standard deviation, skewness, and kurtosis.

Step 2:

Quartiles for the distribution of each of the criterion measures were computed. As a result of this, each data record became four single-digit numbers representing the quartiles into which each of the four criterion measures had fallen.

Step 3:

The individual data records were sorted into groups with similar pattern of measures based upon the quartiles. An example of a pattern of measures would be:

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[1] A Fortran program to compute means, standard deviations, skewness, and kurtosis was written by Mr. Jerry Henderson for use by J. R. Lindsey. The program was adapted by this writer for use on the IBM 360 at Wayne State University. The use and adaptations were made with the permission of Dr. Lindsey.

Mean	Standard Deviation	Skewness	Kurtosis
3	4	3	4

This could be read as high average—high—high average—high. It would be interpreted as above average or high average elevation (mean), high scatter (standard deviation), almost no skewness, and cap-shaped kurtosis.

Skewness in the fourth quartile would have been read as skewed right, as a first quartile would have meant skewed left. Cap-shaped kurtosis means scores above the mean for the data record, and cup-shaped denotes below the mean of the data record. There is a slight linear relationship between the criterion measures of mean and kurtosis.

To group students into clusters of similar profiles the pattern of measures was allowed to vary one quartile for all measures.

Step 4:

Each group of similar profiles was given a type number. These steps were completed for two sets of profiles for the

subjects. They were clustered on the basis of total data records and on the basis of cognitive factors only. Table 4 contains the listing of each profile with the four criterion measures and profile type for all subjects. The subjects clustered into twenty-one clusters based upon the complete data records. Descriptions of these profile shapes are listed below.

Type	Elevation	Scatter	Skewness	Kurtosis
I	Low	High	None-Right	Flat
II	Low	High—High Avg.	None-Left	Cup
III	Low—Low Avg.	Low—Low Avg.	None-Left	Cup-Flat
IV	Low—Low Avg.	High—High Avg.	None-Left	Cup
V	Low—Low Avg.	Low—Low Avg.	None-Right	Flat
VI	Low—Low Avg.	Low—Low Avg.	None-Right	Cap
VII	Low—Low Avg.	Low—Low Avg.	None	Cap
VIII	Low Avg.	High	None-Right	Cap
IX	Avg.	Avg.	None-Left	Cup
X	Avg.	Low—Low Avg.	None-Left	Cup
XI	Avg.	Low—Low Avg.	None-Left	Cup-Flat
XII	Avg.	High—High Avg.	None-Left	Cap
XIII	High—High Avg.	Low—Low Avg.	None-Left	Cap
XIV	Avg.	Avg.	None	Cap

TABLE 4

PROFILE DIMENSIONS AND CLASSIFICATION OF PROFILES FOR ALL DATA AND COGNITIVE FACTORS ONLY

Profile	Measure[a]	Mean	Standard Deviation	Skewness	Kurtosis	Type
1	AD	48.33928	7.89540	5.00387	3.82560	VI
	CF	46.38461	9.34111	5.09543	3.78211	XI
2	AD	46.41071	10.69541	5.01844	3.83106	I
	CF	44,38461	10.95094	5.12457	3.83381	VIII
3	AD	45.01785	9.09244	5.01023	3.82842	VI
	CF	43.46153	6.59059	4.96922	3.74675	II
4	AD	49.32143	9.26598	4.99371	3.83091	XI
	CF	49.23076	6.17999	4.97871	3.84774	IV
5	AD	50.16071	8.88467	5.02314	3.83006	XIX
	CF	51.53845	7.68782	4.89227	3.75320	XIII
6	AD	51.33928	9.69775	4.92175	3.78733	XVII
	CF	57.53845	13.51922	4.89766	3.86188	XVI
7	AD	52.14285	9.82840	5.11084	3.80993	XXI
	CF	47.30768	7.79299	4.93841	3.75338	II
8	AD	50.07143	9.92166	4.81641	3.93991	XV
	CF	44.30768	5.54353	4.97404	3.83749	IV
9	AD	44.50000	7.98180	5.07227	3.79422	V
	CF	41.23076	5.81884	4.91753	3.81934	III
10	AD	53.10713	9.10280	5.03554	3.88083	XIX
	CF	49.61537	7.29770	4.97993	3.74976	XIII

[a]AD = All Data; CF = Cognitive Factors.

TABLE 4 (Continued)

Profile	Measure	Mean	Standard Deviation	Skewness	Kurtosis	Type
11	AD	48.16071	9.22403	4.94134	3.83444	XII
	CF	48.15384	9.42378	5.12927	3.78265	XI
12	AD	40.60713	10.13846	4.92136	3.77081	II
	CF	42.92307	8.97646	5.11227	3.75837	VII
13	AD	49.50000	10.85943	5.04780	3.79181	XX
	CF	46.00000	7.07107	4.99004	3.76396	II
14	AD	62.76785	13.66215	5.08980	3.81989	XXI
	CF	55.76923	14.92288	4.97221	3.79408	XVI
15	AD	47.07143	7.57953	4.91482	3.79051	III
	CF	49.15384	6.12163	5.05709	3.77021	IX
16	AD	46.83928	8.09059	4.99135	3.88741	VII
	CF	44.00000	10.72381	4.91116	3.87457	V
17	AD	47.92856	9.98154	4.86131	3.78460	IV
	CF	53.38461	6.70247	5.03860	3.77192	XIV
18	AD	49.37500	10.37227	4.98052	3.82532	XVII
	CF	45.46153	5.39468	4.95035	3.81063	III
19	AD	45.89285	9.76762	4.93312	3.73053	IV
	CF	48.15384	10.09823	5.08984	3.93210	VIII
20	AD	49.10713	7.29802	5.00330	3.81629	VI
	CF	47.00000	8.21584	4.88000	3.68452	I
21	AD	46.00000	7.63247	4.96181	3.74008	III
	CF	50.38461	7.39976	5.03471	3.78245	XI
22	AD	41.80356	10.28047	4.93575	3.78211	IV
	CF	43.84615	4.81051	5.00229	3.75968	II

TABLE 4 (Continued)

Profile	Measure	Mean	Standard Deviation	Skewness	Kurtosis	Type
23	AD	49.42856	8.52346	5.02149	3.84696	XIV
	CF	45.76923	5.58501	5.03589	3.80285	IV
24	AD	49.42856	8.77985	5.01074	3.80780	XIX
	CF	49.53845	9.61436	5.04592	3.68781	XVIII
25	AD	47.55356	6.56414	5.02046	3.82572	VI
	CF	46.76923	5.87583	4.91353	3.72198	I
26	AD	48.98213	9.69253	5.01208	3.87514	XIV
	CF	44.76923	9.42650	5.15800	3.75598	VII
27	AD	50.33928	11.90611	4.90781	3.83381	XV
	CF	55.38461	14.68865	5.04430	3.95451	XVII
28	AD	48.92856	7.06813	5.04028	3.81951	VI
	CF	46.84615	3.46040	4.98431	3.82184	IV
29	AD	49.14285	10.79971	4.95556	3.68793	IV
	CF	55.30768	13.20596	4.95398	3.73534	XV
30	AD	46.69643	9.49434	4.91687	3.73856	IV
	CF	50.76923	9.39108	5.15597	3.86594	XVII
31	AD	49.21428	8.43739	5.00220	3.83007	VI
	CF	48.76923	10.00961	5.16087	3.83022	VIII
32	AD	47.94643	9.61518	5.00333	3.74148	IX
	CF	51.00000	7.46101	5.10035	3.85159	X
33	AD	45.96428	8.22847	4.99583	3.80658	VI
	CF	46.00000	8.24621	5.07779	3.71285	VII
34	AD	50.39285	6.79753	4.94316	3.83592	XIII
	CF	51.84615	5.71323	5.08630	3.86438	X

TABLE 4 (Continued)

Profile	Measure	Mean	Standard Deviation	Skewness	Kurtosis	Type
35	AD	46.44643	7.29363	5.00524	3.86296	VII
	CF	42.46153	6.60322	4.98634	3.78957	IV
36	AD	50.17856	9.70493	4.99291	3.93881	XII
	CF	44.07692	9.46451	5.07154	3.75122	VII
37	AD	45.60713	11.47912	4.99249	3.82977	I
	CF	43.61537	5.42430	4.98961	3.81328	IV
38	AD	44.53571	8.87686	4.92744	3.78980	III
	CF	46.00000	8.45577	4.89044	3.83327	V
39	AD	50.03571	11.54275	5.05658	3.84844	XXI
	CF	46.76923	6.91802	4.93617	3.74699	I
40	AD	41.28571	10.63906	4.97684	3.79732	II
	CF	36.23076	11.56974	5.10760	3.86022	VIII
41	AD	46.25000	8.70580	4.97577	3.80882	VII
	CF	46.07692	8.02560	5.02660	3.70322	II
42	AD	49.41071	8.49123	4.97805	3.79819	XI
	CF	48.46153	7.70947	5.01461	3.81498	IV
43	AD	48.98213	7.54499	4.96979	3.79423	XI
	CF	50.30768	7.05200	5.03695	3.74298	XIV
44	AD	46.67856	7.54166	5.07124	3.83285	VI
	CF	42.46153	7.52347	4.93363	3.74936	I
45	AD	50.32143	8.29700	5.00789	3.80393	XIX
	CF	48.38461	10.02113	5.01184	3.78489	XI
46	AD	50.89285	8.23668	4.99604	3.83284	XIV
	CF	48.23076	6.97799	4.96557	3.78588	II

TABLE 4 (Continued)

Pro-file	Meas-ure	Mean	Standard Deviation	Skewness	Kurtosis	Type
47	AD	44.19643	9.10428	4.97729	3.73803	III
	CF	44.61537	11.60846	5.05694	3.88336	XVII
48	AD	53.21428	8.40933	4.97474	3.83616	XIII
	CF	53.92307	5.48424	4.95508	3.84066	XIII
49	AD	54.25000	9.47772	4.92778	3.72973	XVI
	CF	60.53845	12.37346	4.95517	3.96580	XVI
50	AD	46.10713	10.49100	4.99707	3.78223	I
	CF	47.38461	6.48766	5.01751	3.73924	II
51	AD	58.32143	8.75548	5.02882	3.80292	XVIII
	CF	55.15384	7.22087	4.97996	3.76277	XII
52	AD	44.28571	9.58922	4.97798	3.71331	II
	CF	46.61537	8.57845	4.99739	3.85413	VIII
53	AD	49.71428	6.73853	4.95677	3.76120	X
	CF	52.23076	7.61746	5.03234	3.86657	X
54	AD	48.55356	12.26365	5.04408	3.72925	S
	CF	46.38461	8.71338	4.82575	3.87989	V
55	AD	50.96428	9.88104	4.89988	3.79839	XVII
	CF	57.76923	9.87551	5.03917	3.64000	XVIII
56	AD	43.30356	10.06148	4.98192	3.78534	II
	CF	39.84615	9.22719	4.98010	3.71335	VI
57	AD	46.69643	8.33594	4.89899	3.79765	III
	CF	52.00000	11.35048	5.08097	3.82858	XVII
58	AD	50.39285	7.84550	4.95094	3.91671	XIII
	CF	48.76923	6.01600	4.95014	3.80932	III

TABLE 4 (Continued)

Profile	Measure	Mean	Standard Deviation	Skewness	Kurtosis	Type
59	AD	50.25000	8.72457	5.00489	3.84590	XIV
	CF	50.07692	8.49962	4.94016	3.78388	XIII
60	AD	59.87500	10.19815	5.03330	3.79944	XX
	CF	55.46153	7.91218	5.08290	3.78773	XIV
61	AD	51.85713	8.78724	5.01704	3.82735	XIX
	CF	50.92307	10.07026	5.00176	3.65540	XVIII
62	AD	48.30356	10.37991	5.06586	3.85235	VIII
	CF	43.53845	4.13552	5.04545	3.77452	II
63	AD	47.17856	7.17092	5.00586	3.77627	XI
	CF	47.53845	10.74411	4.96873	3.84776	V
64	AD	51.19643	8.14732	4.98925	3.77430	XI
	CF	53.76923	6.37905	4.95154	3.82924	XIII
65	AD	46.83928	8.97628	5.05840	3.82345	VI
	CF	45.46153	10.78282	5.10686	3.88754	VIII
66	AD	52.53571	8.87686	5.06322	3.86355	XIX
	CF	50.46153	7.72027	4.84207	3.84771	XII
67	AD	53.14285	11.62353	4.95770	3.76234	XVI
	CF	57.61537	7.96386	4.91756	3.76625	XIII
68	AD	60.25000	12.26266	5.08885	3.85604	XXI
	CF	54.23076	8.05351	4.91913	3.76957	XIII
69	AD	51.42856	8.97240	5.00317	3.77756	IX
	CF	53.61537	7.17099	4.93747	3.81043	XIII
70	AD	49.10713	8.92938	5.04014	3.79351	V
	CF	47.84615	7.31262	4.96918	3.69015	II

TABLE 4 (Continued)

Profile	Measure	Mean	Standard Deviation	Skewness	Kurtosis	Type
71	AD	50.26785	10.72209	4.95640	3.80098	XVII
	CF	54.53845	9.76060	5.10326	3.75161	XVIII
72	AD	46.39285	7.73582	4.96627	3.82181	VII
	CF	45.00000	7.16473	4.97406	3.82651	IV
73	AD	52.82143	10.68917	4.94643	3.84828	XV
	CF	55.00000	13.19091	5.10833	3.73170	XVIII
74	AD	48.35713	7.32475	4.98394	3.81518	VII
	CF	48.76923	6.05742	5.03587	3.78651	IX
75	AD	43.08928	9.83366	4.95420	3.73605	IV
	CF	45.46153	7.49016	5.05479	3.71783	II
76	AD	45.16071	10.20299	4.94009	3.73372	IV
	CF	49.69231	8.89180	4.96828	3.80019	XVI
77	AD	56.32143	10.35744	4.95688	3.78984	XVII
	CF	58.07692	9.63900	5.03953	3.80287	XVII
78	AD	44.21428	6.21059	4.99548	3.76473	V
	CF	44.84615	6.05318	5.02278	3.83703	IV
79	AD	45.53571	6.40444	4.99711	3.81458	VI
	CF	45.07692	3.52282	4.93955	3.76845	II
80	AD	48.30356	9.35156	4.94027	3.71668	IV
	CF	51.69231	11.89106	5.05701	3.81955	XVII
81	AD	55.82143	12.19256	4.99896	3.94475	XXI
	CF	53.15384	9.27223	4.97804	3.82726	XVI
82	AD	52.53571	10.13897	5.03764	3.86035	XXI
	CF	48.69231	8.45956	5.07414	3.75281	XI

TABLE 4 (Continued)

Profile	Measure	Mean	Standard Deviation	Skewness	Kurtosis	Type
83	AD	49.85713	10.04432	5.01815	3.75446	IX
	CF	50.69231	9.14134	5.03086	3.76076	XVIII
84	AD	52.03571	7.89698	5.02399	3.83355	XIX
	CF	51.23076	10.05115	5.09728	3.75983	XVIII
85	AD	61.21428	11.08761	4.99218	3.72106	XVI
	CF	67.61537	8.22130	4.96574	3.85469	XVI
86	AD	54.82143	11.92721	5.03128	3.79521	XX
	CF	58.61537	13.02906	4.99289	3.60992	XVIII
87	AD	47.12500	10.38191	4.99168	3.90084	XII
	CF	43.38461	11.07955	5.13889	3.83726	VIII
88	AD	51.39285	9.78994	4.92416	3.68740	XVI
	CF	59.53845	11.40625	4.97144	3.94539	XVI
89	AD	46.37500	10.16154	4.87514	3.76546	IV
	CF	51.92307	10.61808	5.07025	3.78092	XVIII
90	AD	54.57143	8.68406	4.99516	3.76284	XVIII
	CF	55.38461	9.55282	4.95336	3.70753	XV
91	AD	52.08928	10.06935	4.94654	3.79686	XVII
	CF	58.07692	11.34652	5.09893	3.71939	XVIII
92	AD	50.80356	10.79633	4.88084	3.81471	XVII
	CF	57.38461	15.91403	4.88118	3.92647	XVI
93	AD	49.35713	7.45515	4.98805	3.86785	VII
	CF	47.00000	4.81318	4.90617	3.79671	III
94	AD	45.83928	8.47837	4.95535	3.82343	S
	CF	45.46153	8.79029	4.96745	3.76870	VI

TABLE 4 (Continued)

Pro-file	Meas-ure	Mean	Standard Deviation	Skewness	Kurtosis	Type
95	AD	47.69643	8.38162	4.99100	3.75935	X
	CF	52.00000	11.71182	5.04754	3.99353	XVII
96	AD	51.60713	8.07168	5.00257	3.71492	XI
	CF	54.15384	6.81721	4.94094	3.77585	XIII
97	AD	45.21428	6.54416	4.98377	3.74811	III
	CF	46.46153	6.05000	5.02209	3.73003	II
98	AD	52.33928	10.27668	5.05098	3.86502	XXI
	CF	50.07692	8.19005	4.86118	3.83987	XIII
99	AD	58.73213	10.09679	5.05636	3.77608	XX
	CF	59.23076	16.03720	4.74772	3.95894	XVI
100	AD	55.94643	10.82828	4.94461	3.70883	XVI
	CF	66.46153	12.23121	4.90881	3.80492	XVI
101	AD	51.14285	6.61858	4.90400	3.41522	X
	CF	53.07690	6.77240	4.87826	3.74985	XIII
102	AD	47.71428	11.16767	5.02339	3.84191	VIII
	CF	44.15384	7.94613	5.01920	3.89183	IV
103	AD	48.62500	8.30238	5.02953	3.75234	V
	CF	47.53845	8.79029	4.98096	3.82145	V
104	AD	59.92856	11.25871	5.02578	3.76409	XX
	CF	63.69231	16.21924	5.17805	3.73265	XVIII
105	AD	52.28571	10.01946	5.05610	3.78496	XX
	CF	51.23076	6.33974	4.97922	3.75796	XIII
106	AD	52.19643	8.38271	5.04627	3.81071	XIX
	CF	51.23076	7.14322	5.06141	3.82844	

TABLE 4 (Continued)

Profile	Measure	Mean	Standard Deviation	Skewness	Kurtosis	Type
107	AD	49.75000	7.86765	5.00335	3.82056	XIX
	CF	50.30768	3.96620	4.94024	3.83737	XIII
108	AD	49.75000	8.48796	5.03104	3.82997	XIX
	CF	46.38461	8.46107	4.98855	3.83068	V
109	AD	53.16071	10.06484	5.05363	3.77255	XX
	CF	52.30768	11.49916	4.93521	3.70711	XV
110	AD	48.23213	9.58027	4.96348	3.72150	IX
	CF	51.07692	5.80892	4.99196	3.75044	XIV
111	AD	48.41071	6.03859	5.00570	3.81743	VI
	CF	47.38461	5.47020	5.02621	3.81593	IV
112	AD	49.35713	7.90725	4.96455	3.85245	VII
	CF	49.84615	8.62019	5.07322	3.79731	XVII

Type	Elevation	Scatter	Skewness	Kurtosis
XV	High—High Avg.	High—High Avg.	Left	Cap
XVI	High—High Avg.	High—High Avg.	None-Left	Cup
XVII	High—High Avg.	High—High Avg.	None-Left	Flat
XVIII	High	Low Avg.	None-Left	Cup-Flat
XIX	High—High Avg.	Low—Low Avg.	None-Right	Cap
XX	High—High Avg.	High—High Avg.	Right	Cup-Flat
XXI	High—High Avg.	High—High Avg.	None-Right	Cap

To ascertain whether the shape-type criteria of profile analysis technique clustered like students, the data records of the students falling into each cluster were compared. Three of these comparisons are presented here.

Type I:

1. All students are below average on standardized tests.
2. Students are similar in background except for variations in size of family and number of elementary schools attended.
3. A slight variation in counselor ratings exists.
4. A few cases of large variation in measures of cognitive factors exist.

Type XI:

1. All students are one to three raw score points above or below means on standardized tests.
2. Similar background data and counselor ratings exist for students in this cluster.
3. Slight isolated variations are found in cognitive measures.

Type XXI:

1. All students are above average on standardized test scores and have similar counselor ratings.
2. There are variations in background data on educational levels and employment status of parents.
3. Slight variations exist in cognitive factors which are mainly attributable to sex differences.

Two profiles did not conform to any of the clusters or each other and according to the procedures followed in the development of the technique, singles are not thrust into any group just to avoid having such profiles not classified. The singles are indicated in the table as "S."

The students clustered into eighteen clusters based on measures of cognitive factors. Descriptions of these profile shapes are listed below.

Type	Elevation	Scatter	Skewness	Kurtosis
I	Low—Low Avg.	Low—Low Avg.	None-Left	Cup
II	Low—Low Avg.	Low—Low Avg.	None-Right	Cup-Flat
III	Low—Low Avg.	Low—Low Avg.	None-Left	Cap
IV	Low—Low Avg.	Low—Low Avg.	None-Right	Cap
V	Low—Low Avg.	High—High Avg.	None-Left	Cap
VI	Low	High Avg.	None	Cup
VII	Low	High Avg.	Right	Cup-Flat
VIII	Low—Low Avg.	High—High Avg.	None-Right	Cap
IX	Low Avg.—High Avg.	Low—Low Avg.	None-Right	Flat
X	High Avg.	Low—Low Avg.	None-Right	Cap-Flat
XI	Low Avg.—High Avg.	Low Avg.—High Avg.	None-Right	Flat
XII	High—High Avg.	Low—Low Avg.	None-Left	Cap
XIII	High—High Avg.	Low Avg.—High Avg.	None-Left	Cup-Flat
XIV	High—High Avg.	Low—Low Avg.	None	Flat
XV	High—High Avg.	High—High Avg.	None-Left	Cup
XVI	High—High Avg.	High—High Avg.	None-Left	Cap
XVII	High—High Avg.	High—High Avg.	None-Right	Cap
XVIII	High—High Avg.	High—High Avg.	None-Right	Cup

Again, the data records of the students in each cluster were compared on the basis of measures of cognitive factors to determine

the effectiveness of the shape-type criteria of profile analysis in grouping similar students. Three of these comparisons are summarized below.

Type I:

Students in this cluster are generally below the means cited in Table 1, Section D, with the exception of the scores on General Reasoning and Spatial Scanning, which are above the means and can be defined as cognitive strengths for this cluster of profiles. The three Number Facility measures appear to be the weakest among the cognitive factors.

Type VIII:

Scores of the students in this cluster on measures of cognitive factors are generally grouped around the means. With a few exceptions, most of the scores are only slightly above or slightly below the means or at the mean for the cognitive measures. The students in this cluster show the most strength in cognitive factors on measures of Length Estimation and Associative (Rote) Memory. The most significant group weaknesses for this cluster are on measures of Word Fluency, Number Facility: Division, and Perceptual Speed.

Type XVIII:

The students in this cluster have scores on the cognitive tests which are, for the most part, above the means. An examination of the standard scores for the cognitive measures for this cluster of profiles shows that even though the group is above the means it is possible to recognize strengths and weaknesses for this group. The measures of Speed of Closure, Length Estimation, and Semantic Spontaneous Flexibility reflect the cognitive strengths of the students in this cluster. The three measures of Number Facility and of Auditory Memory Span are the cognitive weaknesses displayed by the group.

Within each of these three profile clusters, individual students may differ slightly on one or two measures from the pattern of the group, but these deviations are slight. Strengths and weaknesses in the context of this study are defined on the basis of intragroup comparisons, either total sample, boys, or girls; and most particularly in this section, intragroup comparisons with a profile cluster as the reference group.

To answer the question concerning the relationships between cognitive strengths and weaknesses and performance on standardized measures of performance, the following procedure was followed. The standardized test records of the profiles in each cognitive profile

cluster were grouped and examined for (1) strengths and weaknesses in measured performance and (2) classification into profile types on the basis of the total data record.

Three of the four students in the cognitive Type I cluster are in total data Type VI cluster and one in Type XXI. Yet, all four standardized test records exhibit strong deficiencies in Reading, Word Meaning, and Arithmetic Computation. The group exhibits the most competence in Work Study Skills. For this cluster of individual profiles, strength in General Reasoning and Spatial Scanning is reflected in strength in Work Study Skills. Less competence in Reading, Word Meaning, and Arithmetic Computation could have some relationship to the weaknesses in the Number Facility Skills. It is also important to note that three of the four profiles in the lowest cognitive cluster group together on the basis of total data. This does not occur as the level of the cognitive cluster increases. The lower the level of cognitive factor skill, the more likely will the students be similar on total data records.

The seven students in the cognitive Type VIII cluster represent five total data clusters. One student is in total Type I, two in total Type II, one in total Type IV, two in total Type VI, and one is in total Type XII. An examination of the standardized test records of the students in this cognitive profile cluster shows two areas

displaying weaknesses for all students in the cluster. The two areas are Vocabulary and Language Usage. The most competence in standardized test measures is found in the area of arithmetic.

The cognitive profile Type XVIII has eleven students in the cluster. The eleven individual profiles fall into six profile clusters based upon total data records. Three students are Type XIX and Type XVII. Two students are Type XX, and one each is found in Types IV, IX, and XV. The standardized test data records for these students display one area as being weaker than others. This is the Work Study Skills measure. The intragroup strengths are in the measures of Vocabulary, Reading skills, and Language Usage. The other measures of performance on standardized tests generally reflect average performance with slight variations above and below average performance.

In summary, the cognitive Type I shows strengths in General Reasoning and Spatial Scanning and weaknesses in Number Facility: Addition, Division, and Subtraction and Multiplication. The individual standardized test records of the students in this cluster show strength in Work Study Skills and weaknesses in Reading, Vocabulary, and Arithmetic. It would seem that the processes involved in General Reasoning and Spatial Scanning are reflected in Work Study Skills for this cluster. If such is the case, it logically follows that the

skills of General Reasoning and Spatial Scanning could be capitalized on in preparation of learning materials in subject-matter areas other than Work Study Skills and that this same assumption could be made for instructional technique. Such materials and techniques could be applicable for students who are similar to those in the cognitive Type I cluster.

The students in cognitive Type VIII show intragroup strength in Length Estimation and Associative (Rote) Memory and weaknesses in Word Fluency, Number Facility: Division, and Perceptual Speed. The individuals in the group show strength in standardized test measures of Arithmetic Skill and weaknesses in Vocabulary and Language Usage measures. It would seem that the relationship of cognitive and standardized test strengths for this group is based upon types of skills that can be learned by repetitive drill process. This is a profile cluster characterized by strengths in rote learning and weaknesses in application and/or concept development. Students similar to those in this cluster should be encouraged to use other skills than those of rote learning. It is possible that as a group, their school achievement in all areas is completely based upon rote work.

Cognitive Type XVIII shows intragroup strengths in the cognitive factors of Speed of Closure, Length Estimation, and Semantic

Spontaneous Flexibility and in standardized test measures of Vocabulary, Reading, and Language Usage. Intragroup weaknesses are found in the cognitive factors of Number Facility: Addition, Division, and Subtraction and Multiplication, and in Auditory Memory Span with a corresponding weakness in standardized test performance on Work Study Skills. Students in this cluster display strength in skills of visual discrimination and in skills of verbal creativity and corresponding higher achievement in language arts with less auditory memory skills. The weaknesses in Number Facility and Work Study Skills do not mean low achievement for this cluster, but do mean that the students have less skills in these somewhat nonverbal skills than they do in the verbal types of performance. Such a combination could lead to educational planning for students similar to this cognitive cluster that would be more visually oriented with provisions for the development of student ideas.

The application of shape-type criteria of profile analysis produced cognitive clusters that can be described in terms of strengths in both cognitive factors and in standardized test performance. It is possible that educational planning could be based upon such descriptions of profile clusters and could be based upon the strengths of the cluster. The comparisons between cognitive clusters and the related standardized test measures show that students with similar

cognitive profiles have selected similar strengths and weaknesses in standardized test performance.

The technique of shape-type criteria of profile analysis can be utilized to cluster students into similar groups. It is a practical technique to use in grouping educationally disadvantaged children, and could be utilized to group on the basis of many types or combinations of types of data. Profiles of the data utilized in this study, if based upon elevation and scatter only, would have provided only gross descriptions of profiles and would not have isolated the more unique characteristics of the sample. It seems that the technique would be particularly useful in grouping children who are homogeneous before grouping because of their educationally disadvantaged status. The additional dimensions of skewness and kurtosis isolate and describe the subtle characteristics in a far more adequate manner.

The technique could also be utilized to group children on the basis of results of a diagnostic instrument. A hypothetical application would be as follows.

1. A diagnostic reading test of fifty items is given. Five skills are tested by ten items each. Each item has four possible responses which are weighted from a high value

for the correct answer to a low value for the least correct response.

2. The fifty responses with their weighted value become a data record.
3. Shape-type criteria of profile analysis is applied.
4. The resulting clusters of students will be based upon common patterns of reading skill and strengths and deficiencies and will provide the description of reading skill a teacher could translate into an instructional plan.

Further exploration and experimentation in application of this technique to learning problems in the urban school could provide a wealth of descriptive material needed to plan and improve the educational process.

CHAPTER III

SYNOPSIS OF PROBLEM AND METHODOLOGY

This study was designed with the intent of providing insight into the relationships between cognitive factors as measured by tests of cognitive factors and measures from standardized tests, items of background data, and counselor ratings of students. Such insight into these relationships should provide input into instructional planning and techniques and into curriculum design that would help improve the educational experience of the educationally disadvantaged student.

A random sample composing 20 percent of the student body of an urban junior high school was chosen. At the end of the data collection there were 112 complete data records for the analysis. The statistical analysis of the data was divided into four segments. All of the data analysis was completed at the Wayne State University Computer Center. Phase one was computation of means and standard deviations on each of the fifty-six variables. Phase two was stepwise multiple regression with the thirteen measures from

standardized tests as criterion variables and the measures of fourteen cognitive factors as independent variables. Phase three was factor analysis using the Hotelling principal components technique with a varimax rotation. Phase four was application of the innovative techniques of profile analysis called shape-type criteria of profile analysis.

General Findings

1. The sample is typical of the educationally disadvantaged student population displaying characteristics of below-average achievement, generally low or low middle economic level which is based upon employment status of parents, generally less than a completed high school education for level of parental education, some degree of transiency in residence within the city, and a degree of student and parent alienation from school involvement.

2. The fourteen cognitive factors accounted for one-fourth of the variance in the standardized achievement tests and one-third of the variance in the standardized aptitude tests.

3. The factor structure for the total sample presents fifteen distinct factors with no apparent general factor as is frequently found. The subanalyses for boys only and girls only have factors that are unique and that display sex differences.

4. One or more of the cognitive factors load in some pattern on all factors extracted in all three analyses. Some cognitive factors were extracted as intact factors within the matrices.

5. There is a pattern of direct relationship between cognitive factors and standardized measures of performance.

6. The students in the sample can be clustered into distinct and different profile types based upon both complete data records and data records of cognitive factors only. Even though they appear homogeneous, the students have displayed varied patterns or profiles for both types of data records.

Specific Findings

1. Even though there are distinct relationships statistically explained between cognitive factors and performance measures, there are common processes involved in the two types of performance that cannot be defined in this study.

2. Throughout all phases of the analysis Semantic Spontaneous Flexibility or ability to freely express ideas exhibits itself as a cognitive strength.

3. Four other cognitive factors that are correlated with some strength with other data are the three Number Facility measures and General Reasoning.

4. If the standardized tests are the tool of measurement for achievement, then the lack of strong correlation between these measures and cognitive factors should lead to an examination of the process for learning being developed in the disadvantaged child's educational experience.

5. Strengths displayed in cognitive factors such as mentioned in points 2 and 3 above should be capitalized on in teaching techniques and classroom methods.

6. Strengths displayed in patterns of cognitive factors should be capitalized on in planning curriculum at the junior high level.

7. An analysis of strengths in individual cognitive factors and in patterns of cognitive factors should be utilized in planning curriculum for the elementary school and in structuring instructional techniques. For example, children who are achieving successfully according to standardized test measures display strength in Speed of Closure, Perceptual Speed, and General Reasoning as well as varied degrees of strengths in Associative Memory; whereas, for the total sample these factors are not correlated to any degree with measures of school performance. A combination of Fluency and Perceptual Speed in learning process could enhance learning as could a combination of Spatial Scanning and Flexibility of Closure.

8. All phases of the analysis show Auditory Memory Span to be nonrelated or inversely related to performance measures, yet not only do instructional methods depend a great deal upon "listen and learn" approaches, but the new media approach to curriculum packages depends upon such hardware as dual-track tape recorders and listening posts. The data in this study might question the value of these tools except when the tools provide visual stimulation as well as auditory cues.

9. The students, though considered homogeneous, proved to be heterogeneous when shape-type criteria of profile analysis were applied. It seems that teaching techniques and curriculum have been generalized for the educationally disadvantaged because the children are assumed to be homogeneous in their achievement deficits. The fact that the sample could be classified into twenty-one clusters on total data records and eighteen clusters on cognitive data records indicates that heterogeneity exists to a great degree in a group supposedly homogeneous if a conclusion was based upon means and standard deviation only. Interpretation and description of profile types could provide the basis for methodology and curriculum.

10. Shape-type criteria of profile analysis comprise a tool that can be used for not only distinguishing between individuals and groups in an educationally disadvantaged population, but could be

used as a tool in the development of instructional groups and as a tool for interpretation of aptitude, achievement, and diagnostic tests.

Weaknesses of the Study

The study could have been improved by extending the regression analysis to include the remainder of the variables as criterion measures to provide data for the future prediction of performance based upon total data. The final sample was not as large as was planned. If the data collection had not been extended previously, it would have been wise to add some students to the sample. The long period of time needed to collect data was poor procedural technique even though it was caused by circumstances beyond the control of the investigator. The study would have been stronger if the sample had been given measures of additional cognitive factors.

Possibilities for Further Research

The data analysis in this study points out that the field of education has a challenge to meet if it expects to solve the learning problems of the educationally disadvantaged. Even though the analysis in this study was fairly comprehensive, it did little more than hint at what there is to know and to point out how much is left to learn about learning, particularly learning in the urban school. As

the analysis was summarized, it became apparent at each step that many questions were unanswered. One area is to identify common processes of thinking that are involved in certain measures of school performance. A second question is: What would a similar study produce if completed on a sample of suburban children who generally achieve? Are different cognitive factors utilized in school performance in such a setting? Next comes a question as to why is the ability to express ideas in an unrestricted format such a strong factor in performance on highly structured performance measures? What are the relations between Number Facility factors and verbal performance? Are the public schools actually measuring learning with the standardized achievement instruments at any socioeconomic level? What are the school or home environmental factors that foster the development of strengths in cognitive factors? Why do average and above-average achievers display different patterns of cognitive factor-performance measure relations than does the total sample?

It can be summarized by stating that the investigator in this study believes that the analysis presented has posed a multiple variety of investigations to be undertaken. The questions listed above seem to be only the beginning of an investigation into what affects learning for the educationally disadvantaged.

APPENDIXES

APPENDIX A

DESCRIPTION OF INSTRUMENTS USED

COUNSELOR CONCEPT OF STUDENT
(Experimental Form)

Directions: Each counselor is requested to fill out one of these forms for those of his students who are included in the random sample.

Please indicate your rating of the pupil for whom this form is filled out by circling the number in the appropriate column after each behavioral category.

Student's Name _____ Teacher _____

School _____ Homeroom No. _____

Grade _____ Sex _____ Date of rating _____

	Behavioral Rating				
Behavioral Category	Poor	Fair	Aver-age	Good	Excel-lent
1. Classroom behavior	1	2	3	4	5
2. Neatness of work	1	2	3	4	5
3. Ability to read	1	2	3	4	5
4. Ability to write	1	2	3	4	5
5. Ability to do arithmetic	1	2	3	4	5
6. Attitude toward school	1	2	3	4	5
7. Parents' interest in child performance in school	1	2	3	4	5
8. Personal neatness	1	2	3	4	5
9. Ability to verbalize	1	2	3	4	5
10. Self-confidence	1	2	3	4	5
11. Peer relations	1	2	3	4	5
12. Cooperation with school	1	2	3	4	5

STUDENT REACTIONS TO SCHOOL

Please fill in these blanks:

SCHOOL:_____ NAME:_____

GRADE:_____

Students

Each one of you have ideas and thoughts about going to school. You think both good and bad things when you are in school about what you are doing. Below are 20 words or phrases that have something to do with school. After each word or phrase, write a sentence telling what you think about that word or phrase.

EXAMPLE:
Music Class is a lot of fun.

Art Class bugs me.

1. My school_____
2. My teacher_____
3. School trips_____
4. The principal_____
5. Arithmetic_____
6. Reading_____
7. Summer classes_____
8. Going to school_____
9. Books_____
10. I am_____
11. Good grades_____
12. Taking tests_____
13. Spelling_____
14. Friends_____
15. Classroom_____
16. Writing_____
17. Gym class_____
18. Learn_____
19. Homework_____
20. My school building_____

CODING FORMAT FOR NONNUMERIC BACKGROUND DATA

Employment Status	Status	Numeric Value
	Not in home (dec. or divorced)	1
	Unemployed	2
	Housewife or seasonal employment	3
	Laborer/unskilled work	4
	Semiskilled job	5
	Skilled job	6
	Professional employment	7

Economic Status	Income Description	Numeric Value
	Welfare, ADC, unemployment compensation	1
	Less than $5,000	2
	$5,000-$7,000	3
	$7,000-$10,000	4
	$10,000-$15,000	5
	Above $15,000	6

Sibling Structure	Description	Numeric Value
	Oldest child	5
	Between middle and oldest	4
	Middle child	3
	Between middle and youngest	2
	Youngest child	1

Parental Education	Amount of Schooling	Numeric Value
	Attended elementary school	1
	Attended junior high school	2
	Attended senior high school	3
	Attended college	4
	Attended professional school	5

DESCRIPTION OF MEASURES OF COGNITIVE FACTORS[1]

Flexibility of Closure

Name of Test: Hidden Patterns.
Task: Given a geometrical pattern in some of which a single given configuration is embedded. The task is to mark each pattern in which the configuration occurs.
Length and time for each part: 200 items, 2 minutes.
Score: Number of correct responses.

Speed of Closure

Name of Test: Concealed Words Test.
Task: Words are presented with parts of each letter missing. Subject is to write out complete word in space provided.
Length and time for each part: 25 words, 3 minutes.
Score: Number of correct responses.

Word Fluency

Name of Test: Word Beginnings and Endings Test.
Task: To write as many words as possible beginning with one given letter and ending with another.
Length and time for each part: One pair of letters, three minutes.
Score: Number of words written.

Length Estimation

Name of Test: Shortest Road Test.
Task: Each item has two points. Three curved or angular lines are drawn between these two points. Task is to select the shortest.
Length and time for each part: 28 items, 2 minutes.
Score: Number of correct responses.

Associative (Rote) Memory

Name of Test: First and Last Names Test.
Task: Subject examines twenty names, including both first and last names. Later, when the last names are presented in a different order, he writes the appropriate first name with each last name.

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[1]French et al., Manual for Kit of Reference Tests for Cognitive Profiles.

Length and time for each part: 15 items, 3 minutes for memorizing and 2 minutes for writing.
Score: Number of correct matches.

Memory Span

Name of Test: Letter Span: Auditory.
Task: Letters in series of varying length are read at a speed of one digit per second. When a series is completely read, the subject writes down the series as it is remembered.
Length and time for each part: Only one part with 24 series, about 10 minutes.
Score: Number of series correctly reproduced.

Number Facility

Name of Tests: 1. Addition.
2. Division.
3. Subtraction/Multiplication.
Tasks: 1. Speed test of adding sets of three 1- or 2-digit numbers.
2. Speed test of dividing 2- or 3-digit numbers by single digit.
3. Speed test alternating ten items of subtraction of 2-digit numbers from 2-digit numbers and ten items of multiplying 2-digit numbers by single digit numbers.
Length and time of each part: 60 items, 2 minutes.
Score: Number of correct responses.

Perceptual Speed

Name of Test: Identical Pictures Test
Task: For each item the subject is to check which of five numbered geometrical figures or pictures in a row is identical to a given figure at the left of each row.
Length and time of each part: 48 rows, 1-1/2 minutes.
Score: Number of correct responses.

General Reasoning

Name of Test: Necessary Arithmetic Operations
Task: To determine what numerical operations are required to solve problems without actually doing the problem. All four choice items.

Length and time of each part: 15 items, 5 minutes.
Score: Number of correct responses.

Spatial Scanning

Name of Test: Map Planning.
Task: Subject is given diagrammatic sections representing city maps. The streets are blocked at various points by barriers represented by circles. The examinee must plan routes between given points in such a way that no road blocks need to be crossed. The task is to find the shortest available route as quickly as possible.
Length and time of each part: 2 maps each with 10 routes, 3 minutes.
Score: Number of correct choices.

Semantic Spontaneous Flexibility 1

Name of Test: Utility Test.
Task: Subject is given the name of an object and asked to list as many uses for the object as he can think of.
Length and time of each part: One object, 5 minutes.
Score: Number of times the class of uses is changed as subject lists uses.

Semantic Spontaneous Flexibility 2

Name of Test: Object Naming.
Task: To name as many objects as possible that belong to a certain class.
Length and time of each part: One class, 2 minutes.
Score: Number of types of objects named.

APPENDIX B

PRIMARY DATA AND STANDARD SCORES OF PROFILE DATA

TABLE 5

PRIMARY DATA OF SUBJECTS: BACKGROUND DATA

Variable	Pupil Number							
	1	2	3	4	5	6	7	8
Pupil participation in school activities . .	2	6	4	3	4	1	0	0
Parent participation in school activities	0	4	3	4	3	0	0	0
Average number of absences per term.	7	2	10	4	2	0	2	4
Pupil reaction to school: positive . .	0	11	8	11	13	15	10	15
Pupil reaction to school: neutral . . .	20	7	9	6	6	5	7	5
Pupil reaction to school: negative . .	0	2	3	3	1	0	3	0
Elementary grades in language arts	4	2	2	3	3	4	4	2
Elementary grades in mathematics	3	2	2	2	3	3	4	2
Employment status: father	3	1	3	3	3	3	4	3
Employment status: mother	3	2	3	3	3	3	1	3
Economic status	2	1	3	3	3	2	2	1
Size of family	7	11	5	14	4	11	4	3
Position in relation to siblings	2	2	3	2	1	3	2	1
Number of years in neighborhood	5	8	5	3	9	5	3	10
Educational level: father	3	3	3	3	3	3	3	3
Educational level: mother	3	3	3	3	3	3	3	3
Number of elementary schools attended . .	2	1	2	2	1	3	4	1

TABLE 5 (Continued)

Variable	Pupil Number							
	9	10	11	12	13	14	15	16
Pupil participation in school activities . .	4	1	4	0	7	2	2	0
Parent participation in school activities	0	3	2	0	0	2	1	0
Average number of absences per term	1	3	6	6	4	8	1	0
Pupil reaction to school: positive . .	12	12	17	0	0	4	15	12
Pupil reaction to school: neutral . . .	4	7	3	20	20	9	5	7
Pupil reaction to school: negative . .	4	1	0	0	0	7	0	1
Elementary grades in language arts	3	4	3	2	3	5	3	2
Elementary grades in mathematics	2	4	2	2	3	4	2	2
Employment status: father	1	5	3	1	4	7	3	5
Employment status: mother	2	3	3	4	3	7	3	3
Economic status	5	4	3	4	6	3	4	5
Size of family	6	4	3	6	9	4	11	8
Position in relation to siblings	1	1	5	1	3	1	5	4
Number of years in neighborhood	11	5	13	5	4	7	4	5
Educational level: father	3	3	3	3	3	5	3	3
Educational level: mother	3	3	3	3	3	5	3	1
Number of elementary schools attended . .	1	3	1	2	3	1	4	2

TABLE 5 (Continued)

Variable	Pupil Number							
	17	18	19	20	21	22	23	24
Pupil participation in school activities . .	0	2	1	3	1	1	3	0
Parent participation in school activities	0	0	2	1	2	1	4	1
Average number of absences per term	0	3	4	3	5	5	9	3
Pupil reaction to school: positive . .	17	5	16	9	12	9	12	0
Pupil reaction to school: neutral . . .	3	7	4	9	7	9	4	20
Pupil reaction to school: negative . .	0	8	0	2	1	2	4	0
Elementary grades in language arts	3	3	3	3	2	3	3	3
Elementary grades in mathematics	3	3	3	3	2	3	3	3
Employment status: father	5	5	1	5	1	5	5	4
Employment status: mother	5	5	2	3	2	3	3	4
Economic status	5	1	4	1	1	2	3	4
Size of family	12	8	9	9	8	8	9	5
Position in relation to siblings	2	5	5	5	3	3	4	1
Number of years in neighborhood	13	5	4	4	2	2	3	5
Educational level: father	3	3	3	3	3	3	3	3
Educational level: mother	3	3	3	3	3	3	3	3
Number of elementary schools attended . .	1	3	3	3	4	4	4	2

TABLE 5 (Continued)

Variable	Pupil Number							
	25	26	27	28	29	30	31	32
Pupil participation in school activities . .	1	1	3	2	1	2	2	1
Parent participation in school activities	4	1	1	3	0	0	0	0
Average number of absences per term	6	10	2	3	5	7	5	23
Pupil reaction to school: positive . .	11	17	18	16	10	9	14	11
Pupil reaction to school: neutral . . .	5	3	1	3	6	11	6	4
Pupil reaction to school: negative . .	4	0	1	1	4	0	0	5
Elementary grades in language arts	3	4	3	3	4	3	4	3
Elementary grades in mathematics	2	2	4	3	3	3	3	3
Employment status: father	3	5	1	1	1	1	1	1
Employment status: mother	3	3	2	4	2	2	1	2
Economic status	4	4	1	1	1	1	1	1
Size of family	4	11	12	7	12	8	9	6
Position in relation to siblings	1	3	4	3	3	4	3	3
Number of years in neighborhood	4	9	1	5	10	7	1	4
Educational level: father	3	2	3	3	3	3	3	3
Educational level: mother	3	3	3	3	3	3	3	3
Number of elementary schools attended . .	3	1	5	2	1	3	6	3

TABLE 5 (Continued)

Variable	Pupil Number							
	33	34	35	36	37	38	39	40
Pupil participation in school activities . .	3	2	2	1	9	4	5	2
Parent participation in school activities	1	0	1	0	1	0	8	1
Average number of absences per term	5	3	6	6	0	0	3	7
Pupil reaction to school: positive . .	20	8	14	15	8	16	20	12
Pupil reaction to school: neutral . . .	0	7	4	5	1	11	3	0
Pupil reaction to school: negative . .	0	5	2	0	4	1	1	0
Elementary grades in language arts	4	4	2	2	3	3	3	3
Elementary grades in mathematics	2	3	3	4	2	2	4	2
Employment status: father	1	5	3	5	5	3	1	5
Employment status: mother	3	3	3	5	3	4	4	3
Economic status	4	3	4	5	3	3	4	3
Size of family	4	12	7	5	7	4	5	5
Position in relation to siblings	1	3	3	3	3	5	2	3
Number of years in neighborhood	3	12	12	5	2	3	4	3
Educational level: father	3	3	2	3	3	3	3	3
Educational level: mother	3	3	3	3	3	3	3	3
Number of elementary schools attended . .	4	1	1	2	4	3	2	3

TABLE 5 (Continued)

Variable	Pupil Number							
	41	42	43	44	45	46	47	48
Pupil participation in school activities . .	4	1	1	1	1	2	0	0
Parent participation in school activities	2	3	2	0	1	0	0	0
Average number of absences per term	0	2	2	3	10	3	2	4
Pupil reaction to school: positive . .	0	0	11	13	14	15	9	16
Pupil reaction to school: neutral . . .	5	20	20	9	2	5	2	10
Pupil reaction to school: negative . .	3	0	0	0	5	1	3	1
Elementary grades in language arts	4	3	3	3	3	3	3	3
Elementary grades in mathematics	2	3	4	2	4	4	2	3
Employment status: father	3	3	4	3	1	5	5	1
Employment status: mother	3	3	3	5	4	3	4	5
Economic status	2	4	4	3	3	5	2	4
Size of family	11	12	7	3	7	4	6	4
Position in relation to siblings	3	3	3	3	3	3	3	4
Number of years in neighborhood	3	12	5	10	10	12	3	2
Educational level: father	3	3	3	3	3	3	3	4
Educational level: mother	3	3	3	3	2	3	3	3
Number of elementary schools attended . .	4	1	2	1	1	1	3	4

TABLE 5 (Continued)

Variable	Pupil Number							
	49	50	51	52	53	54	55	56
Pupil participation in school activities . .	1	2	2	1	0	1	0	3
Parent participation in school activities	1	2	1	1	0	1	0	2
Average number of absences per term	4	13	4	2	2	0	4	1
Pupil reaction to school: positive . .	14	3	8	14	10	7	8	13
Pupil reaction to school: neutral . . .	3	14	9	5	6	10	7	5
Pupil reaction to school: negative . .	1	3	3	1	4	3	5	2
Elementary grades in language arts	3	3	4	3	3	3	3	3
Elementary grades in mathematics	3	3	4	2	3	3	3	2
Employment status: father	5	4	5	1	5	1	6	4
Employment status: mother	3	3	5	2	3	2	3	3
Economic status	2	4	5	1	4	1	4	2
Size of family	13	7	8	4	10	8	10	10
Position in relation to siblings	4	3	4	1	3	4	5	5
Number of years in neighborhood	4	4	3	2	5	2	6	12
Educational level: father	4	3	4	3	3	4	4	4
Educational level: mother	3	1	4	2	3	3	2	3
Number of elementary schools attended . .	3	2	3	5	2	4	2	1

TABLE 5 (Continued)

Variable	Pupil Number							
	57	58	59	60	61	62	63	64
Pupil participation in school activities . .	0	1	1	0	2	0	0	0
Parent participation in school activities	0	0	1	1	2	0	1	0
Average number of absences per term	3	0	5	0	10	5	5	0
Pupil reaction to school: positive . .	4	16	3	6	11	7	14	14
Pupil reaction to school: neutral . . .	15	3	13	6	6	9	6	2
Pupil reaction to school: negative . .	1	1	4	8	3	4	0	4
Elementary grades in language arts	3	3	3	4	3	3	2	4
Elementary grades in mathematics	3	3	2	4	3	3	3	2
Employment status: father	1	5	1	7	5	1	1	5
Employment status: mother	2	3	4	5	3	3	3	3
Economic status	1	4	1	6	4	1	1	3
Size of family	8	11	5	6	7	2	8	4
Position in relation to siblings	2	4	2	5	5	3	2	2
Number of years in neighborhood	5	6	9	12	2	5	6	9
Educational level: father	4	4	4	5	3	3	3	3
Educational level: mother	3	3	3	3	3	3	3	3
Number of elementary schools attended . .	3	2	1	1	4	2	2	1

TABLE 5 (Continued)

Variable	Pupil Number							
	65	66	67	68	69	70	71	72
Pupil participation in school activities . .	0	3	2	0	0	3	2	0
Parent participation in school activities	2	2	2	0	2	4	4	1
Average number of absences per term	1	5	5	3	5	5	5	1
Pupil reaction to school: positive . .	2	15	9	9	7	0	0	16
Pupil reaction to school: neutral . . .	18	4	8	10	11	20	20	3
Pupil reaction to school: negative . .	0	1	3	1	2	0	0	1
Elementary grades in language arts	3	3	3	4	4	3	4	3
Elementary grades in mathematics	3	3	3	4	3	2	4	2
Employment status: father	1	1	5	6	1	1	1	2
Employment status: mother	2	2	6	3	4	2	2	4
Economic status	1	1	6	5	2	1	1	1
Size of family	6	5	6	4	6	5	3	8
Position in relation to siblings	1	2	3	5	4	5	5	5
Number of years in neighborhood	2	6	4	12	4	3	5	13
Educational level: father	2	3	4	3	3	3	3	3
Educational level: mother	2	3	3	3	3	3	3	3
Number of elementary schools attended . .	3	2	3	1	3	3	2	1

TABLE 5 (Continued)

Variable	Pupil Number							
	73	74	75	76	77	78	79	80
Pupil participation in school activities . .	3	0	2	7	0	1	0	1
Parent participation in school activities	1	1	0	0	1	1	0	0
Average number of absences per term	2	3	8	4	1	2	2	2
Pupil reaction to school: positive . .	15	16	11	10	11	10	8	5
Pupil reaction to school: neutral . . .	3	1	4	5	4	9	7	10
Pupil reaction to school: negative . .	2	3	5	5	5	1	5	5
Elementary grades in language arts	4	4	2	3	5	2	2	3
Elementary grades in mathematics	3	3	1	2	6	2	2	3
Employment status: father	5	1	1	1	7	1	3	5
Employment status: mother	3	2	2	2	6	2	3	3
Economic status	5	1	1	1	3	1	2	4
Size of family	9	5	7	5	1	8	3	9
Position in relation to siblings	4	2	2	3	3	2	5	4
Number of years in neighborhood	5	10	2	5	4	2	9	2
Educational level: father	2	3	3	3	4	3	3	3
Educational level: mother	3	3	3	3	4	3	3	3
Number of elementary schools attended . .	2	1	5	3	5	4	1	4

TABLE 5 (Continued)

Variable	Pupil Number							
	81	82	83	84	85	86	87	88
Pupil participation in school activities . .	1	0	0	0	0	0	0	2
Parent participation in school activities	1	0	0	0	0	0	0	1
Average number of absences per term	2	6	6	6	6	6	6	6
Pupil reaction to school: positive . .	11	8	13	11	11	7	14	15
Pupil reaction to school: neutral . . .	6	5	5	5	3	6	6	4
Pupil reaction to school: negative . .	3	7	2	4	6	7	0	1
Elementary grades in language arts	4	3	3	3	5	3	3	4
Elementary grades in mathematics	4	3	3	3	5	3	2	3
Employment status: father	6	4	1	5	1	1	4	5
Employment status: mother	7	4	4	5	6	5	4	3
Economic status	6	3	2	4	5	3	2	4
Size of family	5	5	6	9	3	4	7	7
Position in relation to siblings	1	3	3	3	3	1	2	3
Number of years in neighborhood	13	13	10	6	3	1	4	5
Educational level: father	3	3	3	3	3	2	3	3
Educational level: mother	3	3	3	2	3	3	3	3
Number of elementary schools attended . .	1	1	1	2	4	4	3	2

TABLE 5 (Continued)

Variable	Pupil Number							
	89	90	91	92	93	94	95	96
Pupil participation in school activities . .	0	1	0	0	1	1	0	0
Parent participation in school activities	0	1	0	0	0	0	0	0
Average number of absences per term	2	4	6	6	6	6	5	6
Pupil reaction to school: positive . .	10	12	6	3	4	9	3	9
Pupil reaction to school: neutral . . .	7	8	11	13	9	8	11	8
Pupil reaction to school: negative . .	3	0	3	4	7	3	6	3
Elementary grades in language arts	2	3	3	3	3	3	3	3
Elementary grades in mathematics	2	3	2	3	3	3	3	3
Employment status: father	5	5	1	4	5	6	1	1
Employment status: mother	3	4	3	4	3	3	3	3
Economic status	4	4	2	3	3	5	1	1
Size of family	14	6	4	12	13	7	5	9
Position in relation to siblings	4	5	4	4	3	3	3	3
Number of years in neighborhood	5	2	4	12	9	4	1	3
Educational level: father	3	3	1	3	3	3	3	3
Educational level: mother	3	2	3	3	3	3	2	3
Number of elementary schools attended . .	2	7	3	1	1	2	1	5

TABLE 5 (Continued)

Variable	Pupil Number							
	97	98	99	100	101	102	103	104
Pupil participation in school activities . .	1	0	1	1	2	1	0	2
Parent participation in school activities	0	1	1	0	2	4	0	2
Average number of absences per term	3	6	6	0	0	0	1	1
Pupil reaction to school: positive . .	10	8	8	14	7	7	12	11
Pupil reaction to school: neutral . . .	9	12	7	6	6	9	3	1
Pupil reaction to school: negative . .	1	0	5	0	7	4	5	8
Elementary grades in language arts	3	3	4	3	3	3	3	3
Elementary grades in mathematics	2	3	4	3	4	3	3	3
Employment status: father	1	4	5	4	7	5	3	3
Employment status: mother	2	4	3	3	7	5	3	3
Economic status	1	3	4	2	6	5	5	3
Size of family	6	4	5	12	4	6	10	8
Position in relation to siblings	2	2	3	4	5	5	2	3
Number of years in neighborhood	2	4	9	4	4	5	7	4
Educational level: father	3	3	3	2	5	2	3	3
Educational level: mother	3	3	3	2	5	2	3	3
Number of elementary schools attended . .	5	2	1	2	2	2	2	3

TABLE 5 (Continued)

Variable	Pupil Number							
	105	106	107	108	109	110	111	112
Pupil participation in school activities . .	0	1	2	0	1	0	0	0
Parent participation in school activities	1	1	2	3	0	0	0	0
Average number of absences per term	3	1	5	2	3	3	3	0
Pupil reaction to school: positive . .	13	12	0	17	13	1	12	11
Pupil reaction to school: neutral . . .	4	6	20	2	4	16	3	6
Pupil reaction to school: negative . .	3	2	0	1	3	3	5	3
Elementary grades in language arts	4	4	4	3	3	3	3	3
Elementary grades in mathematics	4	3	4	3	3	3	3	3
Employment status: father	6	1	1	2	6	4	6	5
Employment status: mother	4	2	2	1	3	3	3	3
Economic status	5	1	1	1	5	3	5	3
Size of family	6	5	8	10	4	9	8	8
Position in relation to siblings	4	3	5	2	3	4	2	3
Number of years in neighborhood	1	4	7	2	8	6	7	1
Educational level: father	2	3	2	3	3	3	2	1
Educational level: mother	2	3	3	3	3	3	2	2
Number of elementary schools attended . .	2	3	2	5	1	2	2	5

TABLE 6

PRIMARY DATA OF SUBJECTS: COUNSELOR RATINGS

Variable	Pupil Number							
	1	2	3	4	5	6	7	8
Classroom behavior . .	3	3	3	4	3	4	4	3
Neatness of work . . .	3	3	2	3	4	3	4	3
Ability to read	3	1	1	1	3	3	4	2
Ability to write	3	2	2	3	3	3	3	2
Ability to do arithmetic	2	3	1	1	5	3	4	2
Attitude toward school	3	3	3	4	4	4	4	3
Parent interest in child's school performance	3	3	4	4	5	3	2	2
Personal neatness . . .	4	4	2	2	4	3	3	3
Ability to verbalize . .	3	3	3	4	2	3	4	3
Self-confidence	3	3	3	4	3	3	3	3
Peer relations	3	3	3	4	3	3	3	3
Cooperation with school	3	3	3	4	4	3	4	3

TABLE 6 (Continued)

Variable	Pupil Number							
	9	10	11	12	13	14	15	16
Classroom behavior . .	3	4	2	3	2	4	4	1
Neatness of work . . .	3	4	3	1	1	3	2	2
Ability to read	1	4	2	1	3	5	1	2
Ability to write	2	4	2	1	3	3	2	2
Ability to do arithmetic	1	4	3	1	4	4	1	2
Attitude toward school	3	5	2	2	3	4	3	2
Parent interest in child's school performance	3	5	3	1	2	5	2	2
Personal neatness . . .	3	5	3	2	2	5	3	1
Ability to verbalize . .	2	4	3	1	3	5	2	2
Self-confidence	2	3	4	1	3	5	3	2
Peer relations	2	3	4	1	3	5	3	3
Cooperation with school	3	5	4	3	2	5	3	2

TABLE 6 (Continued)

Variable	Pupil Number							
	17	18	19	20	21	22	23	24
Classroom behavior . .	1	2	1	4	1	2	5	3
Neatness of work . . .	1	2	2	3	2	1	3	3
Ability to read	2	2	2	3	3	2	1	3
Ability to write	2	2	2	2	3	1	4	3
Ability to do arithmetic	2	2	2	2	2	1	1	2
Attitude toward school	1	2	1	3	2	2	4	3
Parent interest in child's school performance	4	4	1	2	2	1	4	3
Personal neatness . . .	3	2	2	3	2	2	4	4
Ability to verbalize . .	2	2	2	3	3	1	3	3
Self-confidence	2	2	2	3	2	1	2	3
Peer relations	2	4	3	3	2	1	3	3
Cooperation with school	2	4	1	3	2	2	5	3

TABLE 6 (Continued)

Variable	Pupil Number							
	25	26	27	28	29	30	31	32
Classroom behavior . .	3	4	4	3	1	1	4	3
Neatness of work . . .	4	4	4	4	2	2	4	3
Ability to read	3	4	2	2	3	2	4	3
Ability to write	3	4	3	4	2	2	3	2
Ability to do arithmetic	1	1	5	4	2	2	3	3
Attitude toward school	3	4	3	3	1	1	4	2
Parent interest in child's school performance	3	4	3	2	2	2	4	2
Personal neatness . . .	4	3	4	3	1	2	4	2
Ability to verbalize . .	3	3	3	3	2	2	3	2
Self-confidence	3	3	3	3	2	2	3	2
Peer relations	3	3	3	3	2	2	3	2
Cooperation with school	3	4	4	3	2	2	3	2

TABLE 6 (Continued)

Variable	Pupil Number							
	33	34	35	36	37	38	39	40
Classroom behavior . .	3	3	2	2	4	2	1	2
Neatness of work . . .	3	3	2	3	2	2	3	2
Ability to read	2	3	3	3	1	1	4	1
Ability to write	3	3	3	4	1	1	3	1
Ability to do arithmetic	2	4	2	3	1	1	3	1
Attitude toward school	3	3	3	5	5	4	3	2
Parent interest in child's school performance	3	3	3	4	2	2	3	1
Personal neatness . . .	3	3	3	4	2	3	3	3
Ability to verbalize . .	3	3	3	4	3	2	4	1
Self-confidence	3	4	3	4	3	2	3	1
Peer relations	3	3	3	3	4	3	3	3
Cooperation with school	2	3	2	4	4	4	3	2

TABLE 6 (Continued)

Variable	Pupil Number							
	41	42	43	44	45	46	47	48
Classroom behavior . .	5	3	3	3	3	4	1	5
Neatness of work . . .	4	3	3	4	3	5	2	4
Ability to read	1	2	2	3	2	3	2	3
Ability to write	2	2	2	3	2	3	2	2
Ability to do arithmetic	1	2	2	2	2	2	2	2
Attitude toward school	3	3	3	4	3	4	1	5
Parent interest in child's school performance	3	3	3	4	4	3	1	5
Personal neatness . . .	3	4	4	4	3	5	4	5
Ability to verbalize . .	2	2	2	3	3	2	2	4
Self-confidence	2	2	2	2	3	2	2	4
Peer relations	2	3	3	2	3	3	2	4
Cooperation with school	3	3	3	3	3	4	1	5

TABLE 6 (Continued)

Variable	Pupil Number							
	49	50	51	52	53	54	55	56
Classroom behavior . .	3	1	5	1	4	3	4	2
Neatness of work . . .	3	1	4	2	3	2	4	1
Ability to read	3	3	4	1	3	3	1	1
Ability to write	3	2	4	1	2	3	4	1
Ability to do arithmetic	2	2	2	2	2	2	2	1
Attitude toward school	3	1	5	3	3	2	4	3
Parent interest in child's school performance	3	1	3	3	3	3	3	1
Personal neatness . . .	4	1	5	3	3	2	2	1
Ability to verbalize . .	3	3	4	1	2	3	2	2
Self-confidence	3	4	4	2	2	2	2	2
Peer relations	3	4	4	2	2	2	3	2
Cooperation with school	3	1	5	1	3	2	3	2

TABLE 6 (Continued)

Variable	Pupil Number							
	57	58	59	60	61	62	63	64
Classroom behavior . .	3	4	4	4	5	5	2	3
Neatness of work . . .	3	4	3	4	4	4	3	3
Ability to read	2	4	3	4	3	3	3	3
Ability to write	2	4	3	5	4	3	3	3
Ability to do arithmetic	2	3	3	4	2	2	2	3
Attitude toward school	3	5	5	5	5	3	3	2
Parent interest in child's school performance	3	4	3	3	4	3	3	3
Personal neatness . . .	4	4	4	3	4	5	2	4
Ability to verbalize . .	2	3	4	4	3	3	3	3
Self-confidence	2	4	4	4	2	3	3	3
Peer relations	3	4	4	4	3	3	3	3
Cooperation with school	3	4	5	5	3	4	3	3

TABLE 6 (Continued)

Variable	Pupil Number							
	65	66	67	68	69	70	71	72
Classroom behavior . .	5	5	1	5	4	3	3	4
Neatness of work . . .	4	5	3	5	3	3	3	3
Ability to read	3	4	3	5	4	3	3	2
Ability to write	3	5	3	5	3	3	3	2
Ability to do arithmetic	2	4	2	5	2	2	2	2
Attitude toward school	4	4	1	5	4	3	3	3
Parent interest in child's school performance	3	4	3	5	4	3	3	3
Personal neatness . . .	4	5	1	5	4	4	4	3
Ability to verbalize . .	3	4	4	5	2	3	3	2
Self-confidence	4	5	5	1	3	3	2	4
Peer relations	3	4	5	5	4	3	3	3
Cooperation with school	4	5	1	5	4	3	3	3

TABLE 6 (Continued)

Variable	Pupil Number							
	73	74	75	76	77	78	79	80
Classroom behavior . .	5	3	2	2	4	3	3	2
Neatness of work . . .	2	2	2	1	5	2	3	2
Ability to read	2	3	1	1	3	2	2	2
Ability to write	2	2	1	1	4	1	2	2
Ability to do arithmetic	2	2	1	1	2	2	2	2
Attitude toward school	5	4	2	3	3	3	3	2
Parent interest in child's school performance	5	3	1	2	4	3	3	1
Personal neatness . . .	4	3	4	3	5	3	4	1
Ability to verbalize . .	4	4	2	2	3	2	2	2
Self-confidence	4	4	1	2	3	2	2	2
Peer relations	4	3	1	2	3	3	3	2
Cooperation with school	5	3	3	2	3	3	3	2

TABLE 6 (Continued)

Variable	Pupil Number							
	81	82	83	84	85	86	87	88
Classroom behavior . .	5	5	4	4	4	5	4	2
Neatness of work . . .	5	3	3	4	4	5	5	2
Ability to read	5	3	2	4	4	4	4	2
Ability to write	5	3	2	4	4	3	4	2
Ability to do arithmetic	5	2	2	2	3	2	2	2
Attitude toward school	5	4	4	4	4	4	4	2
Parent interest in child's school performance	5	5	5	4	4	3	1	2
Personal neatness . . .	5	5	4	4	4	5	4	2
Ability to verbalize . .	5	4	1	4	3	4	4	2
Self-confidence	5	3	1	3	4	4	2	2
Peer relations	5	4	1	3	4	4	4	3
Cooperation with school	5	5	5	3	4	4	4	2

TABLE 6 (Continued)

Variable	Pupil Number							
	89	90	91	92	93	94	95	96
Classroom behavior . .	2	4	2	2	2	2	4	3
Neatness of work . . .	2	3	2	3	3	1	2	3
Ability to read	1	4	3	3	3	2	2	3
Ability to write	1	3	3	3	3	3	2	3
Ability to do arithmetic	1	3	4	3	2	2	2	2
Attitude toward school	2	3	4	4	3	1	3	3
Parent interest in child's school performance	4	3	4	2	5	2	4	4
Personal neatness . . .	3	4	4	3	4	3	3	3
Ability to verbalize . .	1	3	4	3	3	3	2	2
Self-confidence	2	3	4	3	3	3	3	2
Peer relations	2	4	4	3	4	4	4	2
Cooperation with school	2	3	4	3	3	1	4	2

TABLE 6 (Continued)

Variable	Pupil Number							
	97	98	99	100	101	102	103	104
Classroom behavior . .	3	5	5	3	5	3	3	5
Neatness of work . . .	2	3	4	3	4	5	3	5
Ability to read	2	3	4	3	3	3	2	4
Ability to write	2	2	4	3	3	4	3	4
Ability to do arithmetic	2	3	4	3	3	2	3	4
Attitude toward school	2	5	4	3	5	2	3	5
Parent interest in child's school performance	4	5	5	4	5	1	3	5
Personal neatness . . .	2	5	4	4	5	2	2	5
Ability to verbalize . .	2	4	4	3	4	5	2	4
Self-confidence	2	5	4	3	3	3	2	4
Peer relations	2	5	4	3	3	2	2	4
Cooperation with school	2	5	5	4	5	1	2	5

TABLE 6 (Continued)

Variable	Pupil Number							
	105	106	107	108	109	110	111	112
Classroom behavior . .	4	4	4	3	4	2	4	3
Neatness of work . . .	4	4	4	3	3	2	3	3
Ability to read	2	3	3	3	3	1	3	5
Ability to write	2	3	3	3	4	1	3	3
Ability to do arithmetic	2	3	2	3	2	2	2	4
Attitude toward school	4	4	3	4	4	1	3	3
Parent interest in child's school performance	5	4	4	4	5	4	3	3
Personal neatness . . .	5	5	4	4	2	4	3	4
Ability to verbalize . .	2	4	3	3	3	1	2	3
Self-confidence	2	4	3	4	3	2	3	4
Peer relations	2	3	4	4	3	2	3	4
Cooperation with school	4	4	3	4	4	2	3	3

TABLE 7

PRIMARY DATA OF SUBJECTS: MEASURES OF COGNITIVE FACTORS

Variable	Pupil Number							
	1	2	3	4	5	6	7	8
Flexibility of closure	37	39	24	14	31	47	9	24
Speed of closure . . .	14	3	2	2	4	4	4	6
Word fluency	4	12	12	8	14	18	16	8
Length estimation . . .	21	14	16	28	26	34	26	8
Associative (rote) memory	12	16	2	14	6	4	2	4
Memory span: auditory	4	4	6	6	4	8	4	6
Number facility: addition	14	17	4	22	16	22	16	18
Number facility: division	8	5	2	5	5	26	6	7
Number facility: subtraction/ multiplication	14	21	12	17	20	17	28	20
Perceptual speed . . .	37	5	57	48	68	76	41	42
General reasoning . . .	6	2	2	8	12	6	6	2
Spatial scanning	4	10	5	4	8	6	12	4
Semantic spontaneous flexibility 1	2	4	5	4	8	6	6	6
Semantic spontaneous flexibility 2	6	11	5	3	4	6	7	8

TABLE 7 (Continued)

Variable	Pupil Number							
	9	10	11	12	13	14	15	16
Flexibility of closure	15	27	36	42	22	63	20	20
Speed of closure . . .	2	6	12	4	6	4	7	4
Word fluency	6	10	14	8	18	18	20	8
Length estimation . . .	6	20	10	26	6	40	26	5
Associative (rote) memory	2	14	18	2	6	2	8	4
Memory span: auditory	6	6	6	6	6	4	6	4
Number facility: addition	10	14	12	4	12	28	18	12
Number facility: division	7	2	2	4	7	14	4	2
Number facility: subtraction/ multiplication	6	22	26	12	20	17	22	21
Perceptual speed . . .	44	42	25	43	41	86	52	36
General reasoning . . .	2	8	4	5	2	6	4	6
Spatial scanning	6	6	6	4	10	6	9	8
Semantic spontaneous flexibility 1	6	12	6	6	6	7	4	2
Semantic spontaneous flexibility 2	6	5	7	9	11	7	8	2

TABLE 7 (Continued)

Variable	Pupil Number							
	17	18	19	20	21	22	23	24
Flexibility of closure	36	24	21	19	18	35	26	40
Speed of closure . . .	5	2	4	6	8	3	2	8
Word fluency	18	6	10	10	8	8	14	20
Length estimation . . .	23	19	28	21	36	17	24	20
Associative (rote) memory	20	12	12	4	13	4	4	8
Memory span: auditory	8	6	10	4	6	6	8	4
Number facility: addition	20	18	24	22	6	10	10	10
Number facility: division	2	7	4	3	6	4	4	2
Number facility: subtraction/ multiplication	14	20	14	14	10	17	17	20
Perceptual speed . . .	59	52	43	48	47	29	42	53
General reasoning . . .	8	6	2	12	10	5	5	4
Spatial scanning	10	10	10	10	8	6	6	4
Semantic spontaneous flexibility 1	8	4	1	8	6	6	4	12
Semantic spontaneous flexibility 2	8	4	16	4	2	7	5	4

TABLE 7 (Continued)

Variable	Pupil Number							
	25	26	27	28	29	30	31	32
Flexibility of closure	23	14	32	31	66	52	40	27
Speed of closure . . .	6	8	4	3	4	2	8	6
Word fluency	6	20	22	12	16	18	8	10
Length estimation . . .	24	20	14	17	22	30	32	34
Associative (rote) memory	6	12	15	9	20	14	22	16
Memory span: auditory	4	4	12	6	6	10	4	10
Number facility: addition	10	2	50	17	14	14	20	16
Number facility: division	4	7	10	5	4	7	2	4
Number facility: subtraction/ multiplication	16	6	11	24	17	17	8	17
Perceptual speed . .	44	39	72	46	89	29	45	48
General reasoning . .	10	2	2	5	12	5	2	4
Spatial scanning . . .	10	2	9	6	6	6	4	6
Semantic spontaneous flexibility 1	6	8	6	5	6	6	8	8
Semantic spontaneous flexibility 2	7	11	7	11	6	7	4	11

TABLE 7 (Continued)

Variable	Pupil Number							
	33	34	35	36	37	38	39	40
Flexibility of closure	48	31	16	57	18	16	44	30
Speed of closure . . .	6	6	4	6	6	2	4	4
Word fluency	18	16	14	8	4	12	6	18
Length estimation . . .	20	26	2	12	10	18	8	14
Associative (rote) memory	4	8	6	10	6	10	6	6
Memory span: auditory	2	10	6	2	6	8	4	6
Number facility: addition	14	18	8	14	14	8	20	2
Number facility: division	4	10	4	7	7	2	2	5
Number facility: subtraction/ multiplication	17	22	14	12	6	17	20	17
Perceptual speed . . .	40	44	39	28	47	67	49	43
General reasoning . . .	2	4	5	2	5	8	4	6
Spatial scanning	6	8	2	4	2	6	10	6
Semantic spontaneous flexibility 1	6	6	6	7	6	4	6	2
Semantic spontaneous flexibility 2	5	6	4	11	10	9	6	5

TABLE 7 (Continued)

Variable	Pupil Number							
	41	42	43	44	45	46	47	48
Flexibility of closure	33	29	42	5	24	42	15	40
Speed of closure . . .	4	4	10	1	7	2	6	6
Word fluency	12	16	6	4	8	4	12	8
Length estimation . . .	18	20	14	21	13	29	14	21
Associative (rote) memory	11	8	11	8	22	6	26	16
Memory span: auditory	2	8	4	4	8	4	6	6
Number facility: addition	14	24	22	6	4	24	4	30
Number facility: division	4	4	6	4	6	2	6	12
Number facility: subtraction/ multiplication	10	22	20	10	22	36	21	28
Perceptual speed . . .	33	21	49	28	32	47	39	54
General reasoning . . .	10	10	2	8	6	6	6	10
Spatial scanning	8	8	10	12	8	8	2	8
Semantic spontaneous flexibility 1	4	6	8	4	10	6	2	6
Semantic spontaneous flexibility 2	8	10	8	2	14	8	2	8

TABLE 7 (Continued)

Variable	Pupil Number							
	49	50	51	52	53	54	55	56
Flexibility of closure	26	35	30	10	22	15	55	23
Speed of closure . . .	8	10	6	4	8	4	14	7
Word fluency	6	6	20	4	12	8	20	6
Length estimation . . .	30	25	36	29	32	22	36	4
Associative (rote) memory	15	6	10	6	12	4	12	2
Memory span: auditory	16	6	4	10	6	4	6	2
Number facility: addition	36	16	28	14	24	30	10	10
Number facility: division	24	2	12	7	14	8	4	10
Number facility: subtraction/ multiplication	30	12	28	12	38	22	16	4
Perceptual speed . . .	58	50	51	39	41	51	66	12
General reasoning . . .	12	8	10	8	6	8	12	43
Spatial scanning	10	6	12	8	4	8	12	2
Semantic spontaneous flexibility 1	8	4	8	4	8	6	10	6
Semantic spontaneous flexibility 2	12	6	6	12	6	2	4	2

TABLE 7 (Continued)

Variable	Pupil Number							
	57	58	59	60	61	62	63	64
Flexibility of closure	25	36	28	25	22	19	16	20
Speed of closure . . .	16	2	6	14	18	6	2	6
Word fluency	10	12	4	20	10	10	2	12
Length estimation . . .	20	23	24	25	26	17	32	23
Associative (rote) memory	13	14	10	18	8	6	14	18
Memory span: auditory	10	4	8	6	4	6	8	6
Number facility: addition	28	22	20	22	12	6	18	24
Number facility: division	2	10	4	12	4	7	2	12
Number facility: subtraction/ multiplication	12	28	16	34	14	8	8	34
Perceptual speed . . .	62	44	49	42	54	36	67	50
General reasoning . . .	8	4	4	6	8	4	8	6
Spatial scanning	2	10	18	8	12	4	8	14
Semantic spontaneous flexibility 1	6	6	6	10	8	6	2	8
Semantic spontaneous flexibility 2	2	8	2	16	2	5	2	2

TABLE 7 (Continued)

Variable	Pupil Number							
	65	66	67	68	69	70	71	72
Flexibility of closure	29	31	39	41	34	27	37	8
Speed of closure . . .	2	2	4	10	2	8	12	1
Word fluency	2	8	16	10	12	10	22	14
Length estimation . . .	31	16	27	17	35	26	30	8
Associative (rote) memory	16	10	18	16	11	8	11	11
Memory span: auditory	10	4	8	4	8	2	8	6
Number facility: addition	8	28	22	16	16	16	26	18
Number facility: division	2	6	10	16	8	4	4	4
Number facility: subtraction/ multiplication	6	28	24	36	38	10	10	20
Perceptual speed . . .	45	63	55	46	50	46	45	32
General reasoning . . .	2	8	12	10	10	10	14	4
Spatial scanning	8	10	20	10	12	8	4	8
Semantic spontaneous flexibility 1	2	8	8	10	6	8	8	8
Semantic spontaneous flexibility 2	2	10	2	2	4	12	12	11

TABLE 7 (Continued)

Variable	Pupil Number							
	73	74	75	76	77	78	79	80
Flexibility of closure	15	19	11	25	27	16	21	24
Speed of closure . . .	16	3	7	2	12	6	4	6
Word fluency	10	20	16	16	14	8	8	16
Length estimation . . .	36	18	22	28	15	17	22	27
Associative (rote) memory	18	16	10	12	16	10	4	20
Memory span: auditory	10	6	4	8	12	8	6	10
Number facility: addition	16	14	8	6	28	18	12	18
Number facility: division	2	4	4	2	6	2	2	2
Number facility: subtraction/ multiplication	14	20	8	22	32	12	18	8
Perceptual speed . . .	45	47	48	46	46	43	42	48
General reasoning . . .	4	6	2	7	4	6	6	2
Spatial scanning	12	8	12	8	16	6	8	12
Semantic spontaneous flexibility 1	14	6	4	6	12	2	7	4
Semantic spontaneous flexibility 2	20	14	12	12	14	2	6	4

TABLE 7 (Continued)

Variable	Pupil Number							
	81	82	83	84	85	86	87	88
Flexibility of closure	12	46	52	50	68	63	14	31
Speed of closure . . .	8	1	4	4	10	16	4	9
Word fluency	14	16	12	16	16	14	10	14
Length estimation . . .	31	37	40	41	27	12	18	24
Associative (rote) memory	8	8	12	12	22	19	24	20
Memory span: auditory	10	8	4	4	10	4	6	10
Number facility: addition	22	4	18	20	32	15	8	34
Number facility: division	4	4	8	8	31	4	2	23
Number facility: subtraction/ multiplication	36	13	20	8	39	12	12	51
Perceptual speed . . .	26	44	36	44	78	52	45	53
General reasoning . . .	10	4	10	4	12	16	2	6
Spatial scanning	4	8	10	8	12	16	10	6
Semantic spontaneous flexibility 1	10	8	4	12	10	12	4	12
Semantic spontaneous flexibility 2	6	6	10	6	12	12	6	12

TABLE 7 (Continued)

Variable	Pupil Number							
	89	90	91	92	93	94	95	96
Flexibility of closure	54	56	30	42	27	61	25	30
Speed of closure . . .	10	6	22	8	5	2	4	8
Word fluency	16	20	14	10	8	4	6	16
Length estimation . . .	32	31	32	17	16	28	19	21
Associative (rote) memory	11	9	22	10	4	6	14	12
Memory span: auditory	4	6	7	4	4	4	10	7
Number facility: addition	21	16	16	48	16	18	44	22
Number facility: division	7	14	10	24	11	4	6	10
Number facility: subtraction/ multiplication	48	30	18	56	24	14	24	32
Perceptual speed . . .	28	43	56	60	46	51	54	49
General reasoning . . .	4	12	6	6	6	4	2	6
Spatial scanning	4	12	6	6	6	4	2	6
Semantic spontaneous flexibility 1	6	10	10	2	7	4	8	7
Semantic spontaneous flexibility 2	8	14	8	6	2	4	4	12

TABLE 7 (Continued)

Variable	Pupil Number							
	97	98	99	100	101	102	103	104
Flexibility of closure	30	22	35	68	21	25	30	39
Speed of closure . . .	8	4	2	3	4	1	4	19
Word fluency	10	10	2	30	14	12	12	48
Length estimation . . .	16	36	28	28	24	7	8	38
Associative (rote) memory	2	8	8	20	10	13	18	15
Memory span: auditory	7	6	6	6	8	4	8	6
Number facility: addition	14	12	28	30	21	24	10	27
Number facility: division	2	20	28	30	4	12	12	15
Number facility: subtraction/ multiplication	14	28	56	45	20	10	18	38
Perceptual speed . . .	36	40	49	65	61	32	41	45
General reasoning . . .	4	10	16	16	10	4	10	6
Spatial scanning	11	12	18	14	18	4	2	14
Semantic spontaneous flexibility 1	6	6	8	12	10	4	6	8
Semantic spontaneous flexibility 2	6	2	8	10	18	18	2	14

TABLE 7 (Continued)

Variable	Pupil Number							
	105	106	107	108	109	110	111	112
Flexibility of closure	44	30	30	14	15	26	30	30
Speed of closure . . .	6	6	4	8	12	8	4	10
Word fluency	16	16	8	10	6	18	14	4
Length estimation . . .	21	18	22	7	17	25	14	31
Associative (rote) memory	6	16	10	6	6	8	8	15
Memory span: auditory	8	10	7	10	6	4	8	8
Number facility: addition	20	14	21	12	16	20	24	10
Number facility: division	4	6	11	11	10	10	2	11
Number facility: subtraction/ multiplication	22	24	24	10	16	26	12	10
Perceptual speed . . .	51	47	47	43	38	40	43	47
General reasoning . . .	10	2	6	4	10	10	6	2
Spatial scanning	10	10	11	8	12	12	6	12
Semantic spontaneous flexibility 1	4	8	7	6	14	7	6	6
Semantic spontaneous flexibility 2	8	2	5	6	4	6	6	6

TABLE 8

STANDARD SCORES OF PROFILE DATA OF SUBJECTS: STANDARDIZED TESTS

Variable	Profile Number							
	1	2	3	4	5	6	7	8
Iowa Tests of Basic Skills:								
Vocabulary	47	47	38	50	47	47	56	43
Reading	46	45	37	46	38	44	56	46
Language total . . .	52	44	44	52	46	42	64	44
Work study total . .	56	48	47	46	51	46	52	47
Arithmetic total . .	56	49	52	46	43	57	46	43
Stanford Achievement Test:								
Word meaning	59	35	35	36	43	36	50	36
Paragraph meaning	54	41	40	49	49	43	68	43
Spelling	53	31	38	37	44	41	69	34
Language	46	35	31	33	36	42	42	40
Arithmetic computation	33	55	40	57	55	68	61	33
California Test of Mental Maturity:								
Language	43	36	27	39	39	38	68	42
Non-language	51	41	47	50	53	65	73	52
Total	46	35	35	44	46	54	77	47

TABLE 8 (Continued)

Variable	Profile Number							
	9	10	11	12	13	14	15	16
Iowa Tests of Basic Skills:								
Vocabulary	44	61	48	42	49	80	41	48
Reading	40	51	49	33	50	80	43	48
Language total . . .	46	54	44	44	62	69	44	44
Work study total . .	47	46	49	37	49	84	47	38
Arithmetic total . .	49	46	52	37	43	75	49	43
Stanford Achievement Test:								
Word meaning	42	68	40	33	48	68	39	54
Paragraph meaning	41	60	52	38	56	87	39	49
Spelling	51	50	50	34	59	55	37	44
Language	38	39	39	37	41	49	49	51
Arithmetic computation	48	40	38	38	40	70	38	48
California Test of Mental Maturity								
Language	38	39	32	28	51	79	48	37
Non-language	51	53	50	29	54	74	52	46
Total	44	46	40	37	53	84	50	40

TABLE 8 (Continued)

Variable	Profile Number							
	17	18	19	20	21	22	23	24
Iowa Tests of Basic Skills:								
Vocabulary	45	64	44	51	45	33	45	48
Reading	54	44	43	46	54	31	42	46
Language total . . .	52	52	40	50	41	34	38	52
Work study total . .	59	46	43	60	58	26	36	56
Arithmetic total . .	43	49	52	66	52	29	43	60
Stanford Achievement Test:								
Word meaning	39	43	55	43	43	46	49	49
Paragraph meaning	37	40	46	38	40	38	48	54
Spelling	41	45	28	40	45	41	66	53
Language	52	45	54	45	45	29	41	40
Arithmetic computation	38	40	40	44	40	31	55	48
California Test of Mental Maturity:								
Language	42	44	40	41	33	37	42	41
Non-language	52	57	56	54	52	44	49	49
Total	47	49	49	48	42	38	45	42

TABLE 8 (Continued)

Variable	Profile Number							
	25	26	27	28	29	30	31	32
Iowa Tests of Basic Skills:								
Vocabulary	50	51	37	50	49	44	41	39
Reading	47	48	43	47	50	48	50	48
Language total . . .	48	50	48	40	56	50	44	40
Work study total . .	46	41	45	42	48	46	42	54
Arithmetic total . .	43	37	37	54	52	40	43	46
Stanford Achievement Test:								
Word meaning	35	49	34	42	59	44	44	35
Paragraph meaning	58	48	51	42	58	41	57	45
Spelling	39	50	37	50	57	42	45	46
Language	41	41	33	35	42	42	41	42
Arithmetic computation	42	46	59	51	48	44	46	44
California Test of Mental Maturity:								
Language	34	42	39	49	53	53	42	46
Non-language	58	46	39	60	57	47	56	59
Total	47	43	36	56	57	56	50	54

TABLE 8 (Continued)

Variable	Profile Number							
	33	34	35	36	37	38	39	40
Iowa Tests of Basic Skills:								
Vocabulary	45	49	45	42	39	44	47	41
Reading	39	48	50	46	44	47	47	48
Language total . . .	46	46	46	44	46	42	50	48
Work study total . .	56	56	47	47	42	46	56	46
Arithmetic total . .	37	49	40	52	29	49	43	43
Stanford Achievement Test:								
Word meaning	44	42	42	50	36	35	40	30
Paragraph meaning	50	47	52	54	46	37	47	36
Spelling	36	46	51	54	38	38	43	40
Language	40	40	40	39	39	40	37	28
Arithmetic computation	42	53	33	48	38	40	40	33
California Test of Mental Maturity:								
Language	36	34	38	34	37	31	50	48
Non-language	48	50	46	48	45	46	50	53
Total	40	41	40	40	39	37	50	51

TABLE 8 (Continued)

Variable	Profile Number							
	41	42	43	44	45	46	47	48
Iowa Tests of Basic Skills:								
Vocabulary	45	49	49	47	51	64	42	60
Reading	39	47	47	47	56	56	38	47
Language total . . .	44	54	54	56	54	56	38	46
Work study total . .	45	53	53	53	70	57	41	48
Arithmetic total . .	43	52	52	57	52	46	40	66
Stanford Achievement Test:								
Word meaning	34	49	46	45	46	42	54	41
Paragraph meaning	39	46	42	45	35	49	49	55
Spelling	42	47	47	51	57	57	50	46
Language	50	50	50	56	50	52	56	37
Arithmetic computation	40	48	48	44	48	42	59	46
California Test of Mental Maturity:								
Language	33	44	42	40	39	42	38	34
Non-language	48	50	52	48	52	50	49	50
Total	39	46	47	43	45	46	42	41

TABLE 8 (Continued)

Variable	Profile Number							
	49	50	51	52	53	54	55	56
Iowa Tests of Basic Skills:								
Vocabulary	45	43	75	47	53	60	50	50
Reading	49	47	63	56	56	60	47	48
Language total . . .	48	40	66	42	54	117	50	40
Work study total . .	59	47	83	49	58	54	59	41
Arithmetic total . .	49	40	75	72	52	57	66	46
Stanford Achievement Test:								
Word meaning	36	41	60	39	51	46	36	36
Paragraph meaning	38	46	64	39	43	66	35	40
Spelling	45	54	66	48	54	45	45	47
Language	37	39	42	37	37	37	38	42
Arithmetic computation	53	42	44	48	64	44	55	46
California Test of Mental Maturity:								
Language	44	39	60	32	44	43	38	39
Non-language	58	52	65	48	48	52	51	49
Total	53	45	70	38	45	48	44	43

TABLE 8 (Continued)

Variable	Profile Number							
	57	58	59	60	61	62	63	64
Iowa Tests of Basic Skills:								
Vocabulary	42	43	45	77	53	87	45	43
Reading	44	50	54	74	46	38	47	47
Language total . . .	54	46	50	81	50	46	54	67
Work study total . .	43	47	65	67	47	49	49	53
Arithmetic total . .	52	40	52	75	72	52	54	66
Stanford Achievement Test:								
Word meaning	43	44	54	67	44	46	45	46
Paragraph meaning	33	41	48	62	56	52	47	53
Spelling	37	38	39	74	52	38	41	57
Language	45	45	51	58	46	39	39	40
Arithmetic computation	38	33	42	64	42	89	51	46
California Test of Mental Maturity:								
Language	33	44	31	61	39	31	44	44
Non-language	50	48	48	65	50	51	55	58
Total	40	45	38	67	44	40	50	76

TABLE 8 (Continued)

Variable	Profile Number							
	65	66	67	68	69	70	71	72
Iowa Tests of Basic Skills:								
Vocabulary	48	50	53	67	45	48	48	51
Reading	46	45	56	75	43	46	55	45
Language total . . .	48	54	54	81	58	56	39	42
Work study total . .	51	52	64	74	54	57	17	51
Arithmetic total . .	52	49	49	75	57	46	46	52
Stanford Achievement Test:								
Word meaning	46	46	48	57	37	46	46	40
Paragraph meaning	53	52	41	65	50	52	52	47
Spelling	57	57	40	71	41	57	57	31
Language	40	40	40	48	42	40	40	39
Arithmetic computation	46	46	53	51	42	46	46	38
California Test of Mental Maturity:								
Language	40	40	54	79	56	42	41	42
Non-language	48	54	61	75	60	46	50	48
Total	43	47	87	84	87	43	45	44

TABLE 8 (Continued)

Variable	Profile Number							
	73	74	75	76	77	78	79	80
Iowa Tests of Basic Skills:								
Vocabulary	39	49	47	51	63	35	49	57
Reading	44	48	47	44	63	41	33	46
Language total . . .	46	52	48	50	75	48	34	46
Work study total . .	45	58	45	36	54	40	42	48
Arithmetic total . .	40	37	40	32	52	40	43	63
Stanford Achievement Test:								
Word meaning	48	50	30	39	51	46	46	54
Paragraph meaning	67	38	36	43	72	46	40	49
Spelling	56	43	36	44	64	58	34	50
Language	38	38	37	40	46	50	50	56
Arithmetic computation	51	48	55	42	53	33	46	59
California Test of Mental Maturity:								
Language	38	42	31	38	53	40	50	39
Non-language	51	55	42	43	48	49	51	50
Total	44	49	38	38	50	43	51	44

TABLE 8 (Continued)

Variable	Profile Number							
	81	82	83	84	85	86	87	88
Iowa Tests of Basic Skills:								
Vocabulary	49	48	55	51	69	63	45	60
Reading	43	50	48	42	69	49	43	59
Language total . . .	56	46	52	44	56	46	40	60
Work study total . .	42	60	48	45	60	41	37	56
Arithmetic total . .	32	83	59	49	63	46	57	54
Stanford Achievement Test:								
Word meaning	46	54	54	54	75	54	54	54
Paragraph meaning	49	39	47	47	78	60	39	49
Spelling	47	45	49	49	73	46	41	44
Language	50	57	56	56	75	56	51	51
Arithmetic computation	48	40	51	51	81	44	31	48
California Test of Mental Maturity:								
Language	53	46	48	48	50	61	27	56
Non-language	39	56	54	54	55	65	44	49
Total	48	76	83	83	78	96	33	53

TABLE 8 (Continued)

Variable	Profile Number							
	89	90	91	92	93	94	95	96
Iowa Tests of Basic Skills:								
Vocabulary	45	58	48	47	44	37	41	75
Reading	48	67	43	34	47	38	46	64
Language total . . .	42	48	48	42	44	42	46	64
Work study total . .	41	54	40	43	47	36	48	59
Arithmetic total . .	49	63	40	40	57	43	46	52
Stanford Achievement Test:								
Word meaning	33	57	54	54	54	54	54	54
Paragraph meaning	35	64	39	41	37	49	37	47
Spelling	43	59	52	38	49	44	39	49
Language	51	59	56	51	51	51	57	56
Arithmetic computation	48	72	40	51	48	48	51	51
California Test of Mental Maturity:								
Language	41	43	49	38	36	31	45	52
Non-language	53	54	69	51	48	47	55	60
Total	47	49	63	44	40	37	51	58

TABLE 8 (Continued)

Variable	Profile Number							
	97	98	99	100	101	102	103	104
Iowa Tests of Basic Skills:								
Vocabulary	48	42	55	63	56	36	51	61
Reading	48	50	51	59	64	31	41	60
Language total . . .	50	50	64	50	52	40	46	69
Work study total . .	54	56	68	63	53	40	43	71
Arithmetic total . .	43	57	63	52	52	57	49	57
Stanford Achievement Test:								
Word meaning	54	54	73	56	54	54	64	63
Paragraph meaning	52	37	77	69	56	48	60	60
Spelling	43	37	51	51	48	44	65	65
Language	51	56	72	66	61	56	66	66
Arithmetic computation	38	48	61	48	59	44	59	77
California Test of Mental Maturity:								
Language	39	44	58	66	42	33	50	49
Non-language	40	66	65	65	52	44	49	56
Total	37	85	66	64	47	37	49	78

TABLE 8 (Continued)

Variable	Profile Number							
	105	106	107	108	109	110	111	112
Iowa Tests of Basic Skills:								
Vocabulary	44	47	39	56	70	45	51	49
Reading	48	47	42	51	63	58	44	68
Language total . . .	48	60	44	46	60	54	50	48
Work study total . .	47	59	40	63	74	53	58	48
Arithmetic total . .	46	52	49	63	46	52	40	46
Stanford Achievement Test:								
Word meaning	54	54	48	54	63	47	48	45
Paragraph meaning	50	49	45	43	57	45	43	42
Spelling	70	47	51	45	55	51	50	47
Language	66	66	56	56	66	56	57	50
Arithmetic computation	85	85	40	44	48	44	53	48
California Test of Mental Maturity:								
Language	50	43	46	42	45	42	40	38
Non-language	55	54	50	47	60	60	51	41
Total	78	49	48	43	80	76	45	41

TABLE 9

STANDARD SCORES OF PROFILE DATA OF SUBJECTS: BACKGROUND DATA

Variable	Profile Number							
	1	2	3	4	5	6	7	8
Pupil participation in school activities . .	56	83	70	63	70	50	43	43
Parent participation in school activities . .	42	77	68	77	68	42	42	42
Average number of absences per term .	61	44	72	51	44	37	44	51
Pupil reaction to school: positive . .	28	53	46	53	57	61	51	61
Pupil reaction to school: neutral . . .	76	49	53	47	47	45	49	45
Pupil reaction to school: negative . .	37	46	51	51	42	38	51	38
Elementary grades in language arts	60	34	34	48	48	60	60	34
Elementary grades in mathematics	50	38	38	38	50	50	62	38
Employment status: father	48	39	48	48	48	48	53	48
Employment status: mother	48	41	48	48	48	48	33	48
Economic status	45	39	51	51	51	45	45	45
Size of family	50	65	43	76	39	65	39	36
Position in relation to siblings	42	42	50	42	34	50	42	34
Number of years in neighborhood	48	56	48	43	59	48	43	61
Educational level: father	51	51	51	51	51	51	51	51
Educational level: mother	52	52	52	52	52	52	52	52
Number of elementary schools attended . .	46	39	46	46	39	52	59	39

TABLE 9 (Continued)

Variable	Profile Number							
	9	10	11	12	13	14	15	16
Pupil participation in school activities . .	70	50	70	43	90	56	56	43
Parent participation in school activities	68	60	42	42	60	51	42	42
Average number of absences per term	41	48	42	58	51	65	41	37
Pupil reaction to school: positive . .	55	55	65	28	28	65	61	55
Pupil reaction to school: neutral . . .	43	49	41	76	76	53	45	49
Pupil reaction to school: negative . .	55	42	37	38	38	68	38	42
Elementary grades in language arts	48	60	48	34	48	72	48	34
Elementary grades in mathematics	38	62	38	38	50	62	38	38
Employment status: father	39	58	48	39	53	67	48	58
Employment status: mother	41	48	48	56	48	78	48	48
Economic status	39	64	58	51	58	70	51	58
Size of family	47	39	36	47	58	39	65	54
Position in relation to siblings	34	34	66	34	50	34	66	58
Number of years in neighborhood	64	48	69	48	45	53	45	48
Educational level: father	51	51	51	51	50	68	52	51
Educational level: mother	52	52	56	52	53	78	53	24
Number of elementary schools attended . .	39	46	37	46	50	39	59	46

TABLE 9 (Continued)

Variable	Profile Number							
	17	18	19	20	21	22	23	24
Pupil participation in school activities . .	44	56	50	63	50	50	63	43
Parent participation in school activities	40	60	51	60	51	77	51	77
Average number of absences per term	36	48	51	48	55	55	69	48
Pupil reaction to school: positive . .	65	40	63	48	55	48	54	28
Pupil reaction to school: neutral . . .	41	49	43	48	49	53	42	76
Pupil reaction to school: negative . .	37	72	37	46	42	46	53	36
Elementary grades in language arts	48	47	48	48	34	48	48	47
Elementary grades in mathematics	50	48	50	50	38	50	49	48
Employment status: father	58	56	39	58	39	57	56	53
Employment status: mother	63	61	41	48	42	46	47	55
Economic status	64	65	45	58	39	45	50	56
Size of family	69	54	48	56	54	53	54	42
Position in relation to siblings	42	90	66	64	50	48	56	33
Number of years in neighborhood	69	48	45	43	40	40	42	47
Educational level: father	51	50	48	48	50	51	49	50
Educational level: mother	52	53	54	51	52	49	50	47
Number of elementary schools attended . .	39	49	51	53	59	50	59	46

TABLE 9 (Continued)

Variable	Profile Number							
	25	26	27	28	29	30	31	32
Pupil participation in school activities . .	50	50	63	56	50	56	56	50
Parent participation in school activities	51	51	51	68	42	42	42	42
Average number of absences per term	57	73	44	48	55	61	55	95
Pupil reaction to school: positive . .	53	65	68	63	51	48	59	53
Pupil reaction to school: neutral . . .	45	41	37	41	47	57	47	43
Pupil reaction to school: negative . .	55	37	42	42	55	37	37	59
Elementary grades in language arts	46	60	48	48	60	48	48	48
Elementary grades in mathematics	38	38	62	50	50	50	50	50
Employment status: father	48	58	39	39	39	39	39	39
Employment status: mother	48	48	41	56	41	41	33	41
Economic status	58	58	39	39	39	39	39	39
Size of family	38	65	69	50	69	54	58	47
Position in relation to siblings	35	50	58	50	50	58	50	50
Number of years in neighborhood	48	59	37	48	61	82	37	45
Educational level: father	53	43	51	51	51	43	51	51
Educational level: mother	51	52	52	52	52	51	52	52
Number of elementary schools attended . .	54	39	66	46	39	52	73	52

TABLE 9 (Continued)

Variable	Profile Number							
	33	34	35	36	37	38	39	40
Pupil participation in school activities . .	63	56	56	50	103	70	76	56
Parent participation in school activities	51	42	51	42	51	42	111	51
Average number of absences per term	55	48	58	58	38	38	48	61
Pupil reaction to school: positive . .	72	46	59	61	61	46	68	72
Pupil reaction to school: neutral . . .	35	49	43	45	37	57	41	35
Pupil reaction to school: negative . .	37	59	46	37	55	42	42	37
Elementary grades in language arts	34	48	60	72	34	34	48	48
Elementary grades in mathematics	38	50	50	74	38	38	62	38
Employment status: father	58	48	58	58	48	39	58	48
Employment status: mother	48	48	48	63	48	56	56	48
Economic status	58	51	58	64	51	51	58	51
Size of family	39	69	50	43	50	39	43	43
Position in relation to siblings	34	50	43	50	50	66	42	50
Number of years in neighborhood	43	67	67	48	40	43	45	43
Educational level: father	51	51	43	51	51	51	51	51
Educational level: mother	52	52	52	52	52	52	52	52
Number of elementary schools attended . .	59	39	39	46	59	52	46	52

TABLE 9 (Continued)

Variable	Profile Number							
	41	42	43	44	45	46	47	48
Pupil participation in school activities . .	70	50	50	50	50	56	43	43
Parent participation in school activities	60	68	60	42	51	42	42	42
Average number of absences per term	38	44	44	48	72	48	44	51
Pupil reaction to school: positive . .	55	28	28	53	57	59	61	48
Pupil reaction to school: neutral . . .	55	76	76	53	39	45	39	55
Pupil reaction to school: negative . .	51	37	37	37	59	42	51	42
Elementary grades in language arts	48	48	60	48	48	48	48	48
Elementary grades in mathematics	38	50	62	38	62	62	38	50
Employment status: father	48	53	48	39	58	58	39	58
Employment status: mother	48	48	48	58	56	48	56	63
Economic status	45	58	58	51	51	64	45	58
Size of family	65	69	50	36	50	39	47	39
Position in relation to siblings	50	50	42	34	50	66	58	34
Number of years in neighborhood	43	67	48	61	61	67	43	40
Educational level: father	51	51	51	51	51	51	51	59
Educational level: mother	52	52	52	52	52	52	52	52
Number of elementary schools attended . .	59	39	46	39	39	39	52	59

TABLE 9 (Continued)

Variable	Profile Number							
	49	50	51	52	53	54	55	56
Pupil participation in school activities . .	50	56	56	50	43	50	43	63
Parent participation in school activities	51	60	51	51	42	51	42	60
Average number of absences per term	51	82	51	44	44	38	51	41
Pupil reaction to school: positive . .	63	36	46	59	51	44	46	57
Pupil reaction to school: neutral . . .	41	59	53	45	47	55	49	45
Pupil reaction to school: negative . .	42	51	51	42	55	51	59	46
Elementary grades in language arts	48	48	60	48	48	48	57	48
Elementary grades in mathematics	53	58	58	39	58	39	31	53
Employment status: father	53	58	58	39	58	39	31	53
Employment status: mother	48	48	63	41	48	41	63	48
Economic status	45	58	64	39	58	39	45	45
Size of family	72	50	54	39	61	54	56	61
Position in relation to siblings	58	42	58	34	50	58	57	66
Number of years in neighborhood	45	45	43	40	48	40	36	67
Educational level: father	59	51	59	51	51	59	37	59
Educational level: mother	52	24	65	39	52	52	40	52
Number of elementary schools attended . .	52	46	52	66	46	59	48	39

TABLE 9 (Continued)

Variable	Profile Number							
	57	58	59	60	61	62	63	64
Pupil participation in school activities . .	43	50	50	43	56	43	43	43
Parent participation in school activities	42	42	51	51	60	42	51	42
Average number of absences per term	48	38	55	38	72	55	55	38
Pupil reaction to school: positive . .	38	63	36	42	53	44	59	59
Pupil reaction to school: neutral . . .	61	41	62	47	42	53	47	39
Pupil reaction to school: negative . .	42	42	55	72	51	55	37	55
Elementary grades in language arts	48	48	48	60	48	48	34	60
Elementary grades in mathematics	50	50	38	62	50	50	50	62
Employment status: father	39	58	39	27	58	39	39	58
Employment status: mother	41	48	56	63	48	48	48	48
Economic status	39	58	39	70	58	39	39	51
Size of family	54	65	43	47	50	32	54	39
Position in relation to siblings	42	58	42	66	66	50	42	42
Number of years in neighborhood	48	51	59	67	40	48	51	61
Educational level: father	59	59	59	68	51	51	51	51
Educational level: mother	52	52	52	52	52	52	52	52
Number of elementary schools attended . .	52	46	39	39	59	46	46	39

TABLE 9 (Continued)

Variable	Profile Number							
	65	66	67	68	69	70	71	72
Pupil participation in school activities . .	43	63	56	43	43	63	56	43
Parent participation in school activities	60	60	60	43	60	77	77	51
Average number of absences per term	41	55	55	48	55	55	55	41
Pupil reaction to school: positive . .	33	61	48	48	44	28	28	63
Pupil reaction to school: neutral . . .	72	43	51	55	57	76	76	41
Pupil reaction to school: negative . .	37	42	51	42	46	37	37	42
Elementary grades in language arts	48	48	48	60	60	48	60	48
Elementary grades in mathematics	50	50	50	62	50	38	62	38
Employment status: father	39	39	58	63	39	39	39	44
Employment status: mother	39	39	70	64	45	39	39	39
Economic status	47	43	47	39	47	43	36	54
Size of family	47	43	47	39	47	43	36	54
Position in relation to siblings	34	42	50	66	58	66	66	66
Number of years in neighborhood	40	51	45	67	45	43	48	69
Educational level: father	32	51	59	51	51	51	51	51
Educational level: mother	39	52	52	52	52	52	52	42
Number of elementary schools attended . .	52	52	52	39	52	52	46	39

TABLE 9 (Continued)

Variable	Profile Number							
	73	74	75	76	77	78	79	80
Pupil participation in school activities . .	63	43	56	50	43	50	43	50
Parent participation in school activities	51	51	42	42	51	51	42	42
Average number of absences per term	44	48	65	55	41	42	44	44
Pupil reaction to school: positive . .	61	63	53	63	53	51	46	40
Pupil reaction to school: neutral . . .	41	37	43	39	43	53	49	55
Pupil reaction to school: negative . .	46	51	59	46	59	42	59	59
Elementary grades in language arts	60	60	34	48	72	34	34	48
Elementary grades in mathematics	50	50	26	50	62	38	38	50
Employment status: father	58	39	39	48	63	39	48	58
Employment status: mother	48	41	41	48	78	41	48	48
Economic status	64	39	39	45	70	39	45	58
Size of family	58	43	50	47	36	54	36	58
Position in relation to siblings	58	42	42	50	34	42	66	58
Number of years in neighborhood	48	61	40	48	43	40	59	40
Educational level: father	43	51	51	51	59	51	51	51
Educational level: mother	52	52	52	52	65	52	52	52
Number of elementary schools attended . .	46	39	66	52	66	52	39	59

TABLE 9 (Continued)

Variable	Profile Number							
	81	82	83	84	85	86	87	88
Pupil participation in school activities . .	50	43	43	43	43	43	43	56
Parent participation in school activities	51	42	42	42	42	42	42	51
Average number of absences per term	44	58	58	58	58	58	58	58
Pupil reaction to school: positive . .	53	46	57	53	53	44	59	61
Pupil reaction to school: neutral . . .	47	45	45	45	41	47	47	43
Pupil reaction to school: negative . .	51	68	46	55	64	68	37	42
Elementary grades in language arts	60	48	48	48	72	48	48	60
Elementary grades in mathematics	62	50	50	50	74	50	38	50
Employment status: father	62	53	39	58	39	39	53	58
Employment status: mother	78	56	56	63	71	63	56	48
Economic status	70	51	45	58	64	51	58	58
Size of family	43	43	47	58	36	39	50	50
Position in relation to siblings	34	50	50	50	50	34	42	50
Number of years in neighborhood	69	69	51	51	43	37	45	48
Educational level: father	51	51	51	51	51	43	51	51
Educational level: mother	52	52	52	52	52	52	52	52
Number of elementary schools attended . .	39	39	39	46	59	59	52	46

TABLE 9 (Continued)

Variable	Profile Number							
	89	90	91	92	93	94	95	96
Pupil participation in school activities . .	43	50	43	43	50	50	43	43
Parent participation in school activities	42	51	42	42	42	42	42	42
Average number of absences per term	44	51	58	58	58	58	55	58
Pupil reaction to school: positive . .	51	55	42	36	38	48	36	48
Pupil reaction to school: neutral . . .	49	51	57	62	53	51	57	51
Pupil reaction to school: negative . .	34	48	34	48	48	48	48	48
Elementary grades in language arts	34	48	34	48	48	48	48	48
Elementary grades in mathematics	38	50	50	50	50	50	50	50
Employment status: father	58	58	39	53	58	63	39	39
Employment status: mother	48	56	48	56	48	48	48	48
Economic status	58	58	45	51	51	64	39	39
Size of family	76	47	39	69	72	50	43	58
Position in relation to siblings	58	66	58	58	50	50	50	50
Number of years in neighborhood	48	40	37	67	59	45	37	43
Educational level: father	51	51	51	51	51	51	51	51
Educational level: mother	52	39	52	52	52	52	39	52
Number of elementary schools attended . .	46	80	66	39	39	46	39	66

TABLE 9 (Continued)

Variable	Profile Number							
	97	98	99	100	101	102	103	104
Pupil participation in school activities . .	50	43	50	50	56	50	43	56
Parent participation in school activities	42	51	51	42	60	77	42	60
Average number of absences per term	48	58	58	38	38	38	41	41
Pupil reaction to school: positive . .	51	46	46	59	44	44	55	53
Pupil reaction to school: neutral . . .	53	60	49	47	47	53	41	37
Pupil reaction to school: negative . .	42	37	59	37	68	55	59	72
Elementary grades in language arts	48	48	60	48	48	48	48	48
Elementary grades in mathematics	38	50	62	50	62	50	50	50
Employment status: father	39	53	58	53	67	58	48	48
Employment status: mother	41	56	48	48	78	63	48	48
Economic status	39	51	58	45	70	58	64	51
Size of family	47	39	43	69	39	47	61	54
Position in relation to siblings	42	42	50	58	66	66	42	50
Number of years in neighborhood	40	45	59	45	45	48	53	45
Educational level: father	51	51	51	43	68	43	51	51
Educational level: mother	52	51	52	39	78	39	53	52
Number of elementary schools attended . .	66	46	46	46	46	46	46	52

TABLE 9 (Continued)

Variable	Profile Number							
	105	106	107	108	109	110	111	112
Pupil participation in school activities . .	43	50	56	43	50	43	43	43
Parent participation in school activities	51	51	60	68	43	42	42	42
Average number of absences per term	48	41	55	44	48	48	48	38
Pupil reaction to school: positive . .	57	55	28	65	57	31	55	53
Pupil reaction to school: neutral . . .	43	47	76	39	43	66	41	47
Pupil reaction to school: negative . .	51	46	37	42	51	51	59	51
Elementary grades in language arts	60	60	60	48	48	48	48	48
Elementary grades in mathematics	62	50	62	50	50	50	50	50
Employment status: father	63	39	39	44	63	53	63	58
Employment status: mother	56	41	41	33	48	48	48	48
Economic status	64	39	39	39	64	51	64	51
Size of family	47	43	54	61	39	58	54	54
Position in relation to siblings	58	50	66	42	50	58	42	50
Number of years in neighborhood	37	45	53	40	56	51	53	37
Educational level: father	43	51	43	51	51	51	43	34
Educational level: mother	39	52	52	52	52	52	39	39
Number of elementary schools attended . .	46	52	46	66	39	46	46	66

TABLE 10

STANDARD SCORES OF PROFILE DATA OF SUBJECTS: COUNSELOR RATINGS

Variable	Profile Number							
	1	2	3	4	5	6	7	8
Classroom behavior . .	48	48	48	57	48	57	57	48
Neatness of work . . .	51	51	39	51	60	51	60	51
Ability to read	52	31	31	31	52	52	62	42
Ability to write	52	41	41	52	52	52	52	41
Ability to do arithmetic	45	56	34	34	78	56	67	45
Attitude toward school	47	47	47	56	56	56	56	47
Parent interest in child's school performance	47	47	56	56	65	47	38	38
Personal neatness . . .	56	56	36	36	56	46	46	46
Ability to verbalize . .	51	51	51	62	37	51	62	51
Self-confidence	51	51	51	62	51	51	51	51
Peer relations	48	48	48	60	48	48	48	48
Cooperation with school	47	47	47	56	56	47	56	47

TABLE 10 (Continued)

Variable	Profile Number							
	9	10	11	12	13	14	15	16
Classroom behavior . .	48	57	40	48	40	57	57	31
Neatness of work . . .	51	60	51	28	28	51	39	39
Ability to read	31	62	42	31	52	73	31	42
Ability to write	41	63	41	29	52	52	41	41
Ability to do arithmetic	34	67	56	34	67	67	34	45
Attitude toward school	47	65	37	37	47	56	47	37
Parent interest in child's school performance	47	65	47	28	38	65	38	38
Personal neatness . . .	46	66	46	36	36	66	46	26
Ability to verbalize . .	37	62	51	22	51	73	37	37
Self-confidence	40	51	62	28	51	74	51	40
Peer relations	37	48	60	26	48	70	48	48
Cooperation with school	47	65	56	47	37	65	47	37

TABLE 10 (Continued)

Variable	Profile Number							
	17	18	19	20	21	22	23	24
Classroom behavior . .	31	40	31	57	31	40	66	48
Neatness of work . . .	28	39	39	51	39	28	51	51
Ability to read	42	42	42	52	52	52	31	52
Ability to write	41	41	41	42	52	29	63	52
Ability to do arithmetic	45	45	45	41	45	34	34	45
Attitude toward school	28	37	28	47	37	37	56	47
Parent interest in child's school performance	56	56	28	38	47	28	56	47
Personal neatness . . .	46	36	36	46	36	26	56	56
Ability to verbalize . .	37	37	37	51	51	22	51	51
Self-confidence	40	40	40	51	40	28	40	51
Peer relations	37	60	48	48	37	26	48	48
Cooperation with school	37	56	28	47	37	37	65	47

TABLE 10 (Continued)

Variable	Profile Number							
	25	26	27	28	29	30	31	32
Classroom behavior . .	48	57	57	48	31	31	57	48
Neatness of work . . .	60	60	60	60	39	39	60	51
Ability to read	52	62	42	42	52	42	62	52
Ability to write	52	63	52	63	41	41	52	41
Ability to do arithmetic	34	34	78	67	45	45	56	56
Attitude toward school	47	28	47	47	28	28	56	37
Parent interest in child's school performance	47	56	47	38	38	38	56	38
Personal neatness . . .	56	46	56	46	26	36	56	36
Ability to verbalize . .	51	51	51	51	37	37	51	37
Self-confidence	51	51	48	51	40	40	51	40
Peer relations	48	60	48	48	37	37	48	37
Cooperation with school	47	56	56	47	37	37	47	37

TABLE 10 (Continued)

Variable	Profile Number							
	33	34	35	36	37	38	39	40
Classroom behavior . .	48	48	40	40	57	40	31	40
Neatness of work . . .	51	51	39	51	39	39	51	39
Ability to read	42	52	52	52	31	31	62	31
Ability to write	52	52	52	63	29	29	52	29
Ability to do arithmetic	45	67	45	56	34	34	56	34
Attitude toward school	37	56	47	65	65	56	47	37
Parent interest in child's school performance	47	47	47	56	38	38	47	28
Personal neatness . . .	46	46	46	56	36	46	46	46
Ability to verbalize . .	51	51	51	62	51	37	62	22
Self-confidence	51	62	51	62	51	40	51	28
Peer relations	48	48	48	48	60	48	48	48
Cooperation with school	37	47	37	56	51	56	47	37

TABLE 10 (Continued)

Variable	Profile Number							
	41	42	43	44	45	46	47	48
Classroom behavior . .	66	48	48	48	48	57	31	40
Neatness of work . . .	60	51	51	60	51	70	39	51
Ability to read	31	42	42	52	42	52	42	62
Ability to write	52	52	52	63	29	29	52	29
Ability to do arithmetic	34	45	45	45	45	45	45	56
Attitude toward school	47	56	47	56	47	56	28	47
Parent interest in child's school performance	47	47	47	56	47	47	28	65
Personal neatness . . .	46	56	56	56	46	66	56	56
Ability to verbalize . .	37	37	37	51	51	37	37	62
Self-confidence	40	40	40	40	51	40	40	62
Peer relations	37	48	48	37	48	48	37	60
Cooperation with school	47	47	47	47	47	56	28	65

TABLE 10 (Continued)

Variable	Profile Number							
	49	50	51	52	53	54	55	56
Classroom behavior . .	31	31	66	31	57	48	57	40
Neatness of work . . .	39	28	60	39	51	39	60	28
Ability to read	52	52	62	31	52	52	31	31
Ability to write	52	41	63	29	41	52	63	29
Ability to do arithmetic	45	45	45	45	45	45	45	34
Attitude toward school	47	28	65	47	47	37	56	47
Parent interest in child's school performance	47	28	47	47	47	47	47	28
Personal neatness . . .	36	26	66	46	46	36	36	26
Ability to verbalize . .	51	51	62	22	37	51	37	37
Self-confidence	51	62	62	40	40	40	40	40
Peer relations	48	60	60	37	37	37	48	37
Cooperation with school	37	28	65	28	47	37	47	37

TABLE 10 (Continued)

Variable	Profile Number							
	57	58	59	60	61	62	63	64
Classroom behavior . .	48	57	57	57	66	66	40	48
Neatness of work . . .	51	60	51	60	60	60	51	51
Ability to read	42	62	52	62	52	52	52	52
Ability to write	41	63	52	74	63	52	52	52
Ability to do arithmetic	45	56	56	67	45	45	45	45
Attitude toward school	47	65	65	65	65	47	47	47
Parent interest in child's school performance	47	56	47	47	56	47	47	47
Personal neatness . . .	56	56	56	46	56	66	36	56
Ability to verbalize . .	37	51	62	62	51	51	51	51
Self-confidence	40	62	62	62	40	51	51	51
Peer relations	48	60	60	60	48	48	48	48
Cooperation with school	47	56	65	65	47	56	47	47

TABLE 10 (Continued)

Variable	Profile Number							
	65	66	67	68	69	70	71	72
Classroom behavior . .	66	66	31	66	57	48	48	57
Neatness of work . . .	60	70	51	70	51	51	51	51
Ability to read	52	62	52	73	52	52	52	42
Ability to write	52	74	52	74	52	52	52	41
Ability to do arithmetic	45	67	45	78	45	45	45	45
Attitude toward school	56	56	28	65	56	47	47	47
Parent interest in child's school performance	46	56	47	65	56	47	47	47
Personal neatness . . .	46	66	26	66	56	56	56	46
Ability to verbalize . .	51	62	62	73	37	51	51	37
Self-confidence	51	62	74	74	28	51	51	40
Peer relations	48	60	70	70	60	48	48	48
Cooperation with school	56	65	28	65	56	47	47	47

TABLE 10 (Continued)

Variable	Profile Number							
	73	74	75	76	77	78	79	80
Classroom behavior . .	66	48	40	40	57	48	48	40
Neatness of work . . .	39	39	39	28	70	39	51	39
Ability to read	42	52	31	31	52	42	42	42
Ability to write	41	41	29	29	63	29	41	41
Ability to do arithmetic	45	45	34	34	45	45	45	45
Attitude toward school	65	56	37	47	47	47	47	37
Parent interest in child's school performance	65	47	28	38	56	47	47	28
Personal neatness . . .	56	46	56	46	66	46	56	26
Ability to verbalize . .	62	62	37	37	51	37	37	37
Self-confidence	62	62	28	40	51	40	40	40
Peer relations	60	48	26	37	48	48	48	37
Cooperation with school	65	47	47	37	47	47	47	37

TABLE 10 (Continued)

Variable	Profile Number							
	81	82	83	84	85	86	87	88
Classroom behavior . .	66	66	57	47	57	66	57	40
Neatness of work . . .	70	51	51	60	60	70	70	39
Ability to read	73	52	42	62	62	62	62	42
Ability to write	74	52	41	63	63	52	63	41
Ability to do arithmetic	78	45	45	45	56	45	45	45
Attitude toward school	65	56	56	56	56	56	56	37
Parent interest in child's school performance	65	65	65	56	56	47	28	38
Personal neatness . . .	66	73	56	56	56	66	56	36
Ability to verbalize . .	73	62	22	62	51	62	62	37
Self-confidence	74	48	28	51	62	62	40	40
Peer relations	70	56	26	48	60	60	60	37
Cooperation with school	65	72	65	47	56	56	56	37

TABLE 10 (Continued)

Variable	Profile Number							
	89	90	91	92	93	94	95	96
Classroom behavior . .	40	57	40	40	40	40	57	48
Neatness of work . . .	39	51	39	51	51	28	39	51
Ability to read	31	62	52	52	52	42	42	52
Ability to write	29	52	52	52	52	52	41	52
Ability to do arithmetic	34	56	67	56	45	45	45	45
Attitude toward school	37	47	56	56	47	28	47	47
Parent interest in child's school performance	56	47	56	38	65	38	56	56
Personal neatness . . .	46	56	56	46	56	46	46	46
Ability to verbalize . .	22	51	62	51	51	51	37	37
Self-confidence	40	51	62	51	51	51	51	40
Peer relations	37	60	60	48	60	60	48	37
Cooperation with school	37	47	56	47	56	28	47	37

TABLE 10 (Continued)

Variable	Profile Number							
	97	98	99	100	101	102	103	104
Classroom behavior . .	48	66	66	48	66	48	48	66
Neatness of work . . .	39	51	60	51	60	70	51	70
Ability to read	42	52	62	52	52	52	42	62
Ability to write	41	41	63	52	52	63	52	63
Ability to do arithmetic	45	56	67	56	56	45	56	67
Attitude toward school	37	65	56	47	65	37	47	65
Parent interest in child's school performance	56	65	65	56	65	38	47	65
Personal neatness . . .	36	66	56	56	66	36	36	66
Ability to verbalize . .	37	62	62	51	62	73	37	62
Self-confidence	40	74	62	51	51	51	40	62
Peer relations	37	70	60	48	48	37	37	60
Cooperation with school	37	65	65	56	65	28	37	56

TABLE 10 (Continued)

Variable	Profile Number							
	105	106	107	108	109	110	111	112
Classroom behavior . .	57	57	57	48	40	40	57	48
Neatness of work . . .	60	60	60	51	51	39	51	51
Ability to read	42	52	52	52	52	31	52	52
Ability to write	41	52	52	52	63	29	52	52
Ability to do arithmetic	45	56	45	56	45	45	45	67
Attitude toward school	56	56	47	56	56	28	47	56
Parent interest in child's school performance	65	56	56	56	66	56	47	47
Personal neatness . . .	66	66	56	56	36	56	46	56
Ability to verbalize . .	37	62	51	51	51	22	37	51
Self-confidence	40	62	51	62	51	40	51	62
Peer relations	37	60	48	60	48	37	48	60
Cooperation with school	56	47	56	47	56	37	47	47

TABLE 11

STANDARD SCORES OF PROFILE DATA OF SUBJECTS: MEASURES OF COGNITIVE FACTORS

Variable	Profile Number							
	1	2	3	4	5	6	7	8
Flexilibity of closure	54	56	45	38	50	61	35	45
Speed of closure . . .	69	40	40	40	44	44	44	49
Word fluency	37	50	50	43	53	59	56	43
Length estimation . . .	49	41	43	57	54	63	54	34
Associative (rote) memory	52	49	34	56	41	38	34	38
Memory span: auditory	40	40	48	48	48	57	40	48
Number facility: addition	46	49	35	55	48	55	48	50
Number facility: division	41	46	41	48	46	79	48	49
Number facility: subtraction/ multiplication	44	50	42	47	50	47	57	50
Perceptual speed . . .	42	16	58	51	67	74	45	46
General reasoning . . .	48	37	37	54	66	48	48	37
Spatial scanning	39	53	44	39	48	44	58	39
Semantic spontaneous flexibility 1	32	40	48	40	55	48	48	48
Semantic spontaneous flexibility 2	47	58	47	41	43	47	49	51

TABLE 11 (Continued)

Variable	Profile Number							
	9	10	11	12	13	14	15	16
Flexibility of closure	39	47	54	58	44	73	43	43
Speed of closure . . .	40	49	64	44	49	44	52	44
Word fluency	40	46	53	43	59	59	63	43
Length estimation . . .	31	47	36	54	31	70	54	30
Associative (rote) memory	34	56	63	34	41	34	45	38
Memory span: auditory	48	48	48	48	48	40	48	40
Number facility: addition	41	46	44	35	44	73	50	74
Number facility: division	49	41	41	45	49	60	45	41
Number facility: subtraction/ multiplication	37	51	55	42	50	47	51	50
Perceptual speed . . .	48	46	33	23	45	82	54	41
General reasoning . . .	37	54	43	45	37	48	43	48
Spatial scanning	44	44	44	39	53	44	51	48
Semantic spontaneous flexibility 1	48	70	48	48	48	51	40	32
Semantic spontaneous flexibility 2	47	45	49	54	58	49	51	38

TABLE 11 (Continued)

Variable	Profile Number							
	17	18	19	20	21	22	23	24
Flexibility of closure	54	45	43	42	41	53	47	56
Speed of closure . . .	47	40	44	49	54	42	40	54
Word fluency	59	40	46	46	43	43	53	63
Length estimation . . .	51	45	57	49	66	44	52	47
Associative (rote) memory	66	52	52	38	54	38	38	45
Memory span: auditory	57	37	66	40	48	48	57	40
Number facility: addition	53	50	53	35	55	37	41	41
Number facility: division	41	49	45	43	48	45	45	41
Number facility: subtraction/ multiplication	44	50	44	44	40	47	47	50
Perceptual speed . . .	60	38	47	51	50	36	46	55
General reasoning . . .	54	48	37	66	60	45	45	43
Spatial scanning	53	53	53	53	48	44	44	39
Semantic spontaneous flexibility 1	55	44	29	55	48	48	40	70
Semantic spontaneous flexibility 2	51	45	69	43	38	49	45	43

TABLE 11 (Continued)

Variable	Profile Number							
	25	26	27	28	29	30	31	32
Flexibility of closure	45	38	51	50	75	65	56	47
Speed of closure . . .	49	54	44	40	44	40	54	49
Word fluency	40	63	66	50	56	59	43	46
Length estimation . . .	52	47	41	44	50	59	61	63
Associative (rote) memory	41	52	57	47	66	56	70	59
Memory span: auditory	40	40	74	48	48	66	40	66
Number facility: addition	41	32	86	49	46	46	53	48
Number facility: division	45	49	54	46	45	49	41	45
Number facility: subtraction/ multiplication	46	37	41	53	47	47	39	47
Perceptual speed . . .	48	44	70	49	84	36	49	51
General reasoning . . .	60	37	37	45	66	45	37	43
Spatial scanning	53	34	51	44	44	44	39	44
Semantic spontaneous flexibility 1	48	55	48	44	48	48	55	55
Semantic spontaneous flexibility 2	49	58	49	58	45	49	43	58

TABLE 11 (Continued)

Variable	Profile Number							
	33	34	35	36	37	38	39	40
Flexibility of closure	62	50	40	68	41	40	59	49
Speed of closure . . .	49	49	44	49	49	40	44	44
Word fluency	59	56	53	40	43	37	50	40
Length estimation . . .	47	54	27	38	36	45	34	41
Associative (rote) memory	38	57	41	48	41	48	41	41
Memory span: auditory	31	66	48	31	48	57	40	48
Number facility: addition	46	50	39	46	46	39	53	32
Number facility: division	45	54	45	49	49	41	41	46
Number facility: subtraction/ multiplication	47	51	44	42	37	47	50	65
Perceptual speed . . .	45	48	44	35	50	66	52	47
General reasoning . . .	37	43	45	37	45	54	43	48
Spatial scanning	44	48	34	39	34	44	53	44
Semantic spontaneous flexibility 1	48	48	48	51	48	40	48	32
Semantic spontaneous flexibility 2	45	47	43	58	56	54	47	45

TABLE 11 (Continued)

Variable	Profile Number							
	41	42	43	44	45	46	47	48
Flexibility of closure	52	49	48	32	45	58	39	56
Speed of closure . . .	44	44	59	37	52	40	49	49
Word fluency	59	50	56	40	37	43	37	50
Length estimation . . .	45	47	41	49	41	58	39	49
Associative (rote) memory	50	45	50	45	70	41	77	59
Memory span: auditory	31	57	40	40	53	40	48	48
Number facility: addition	46	57	55	37	35	57	35	64
Number facility: division	45	45	48	45	48	41	48	57
Number facility: subtraction/ multiplication	40	51	50	40	51	55	50	57
Perceptual speed . . .	39	29	52	35	38	50	44	56
General reasoning . . .	60	60	37	54	48	48	48	60
Spatial scanning	48	48	53	58	48	48	34	48
Semantic spontaneous flexilibity 1	40	48	55	40	63	48	32	48
Semantic spontaneous flexibility 2	51	56	51	38	64	51	38	51

TABLE 11 (Continued)

Variable	Profile Number							
	49	50	51	52	53	54	55	56
Flexibility of closure	47	53	49	36	44	39	67	45
Speed of closure . . .	54	49	49	44	54	44	69	52
Word fluency	43	40	63	37	50	43	63	40
Length estimation . . .	59	53	66	58	61	30	66	29
Associative (rote) memory	57	41	48	41	52	38	53	34
Memory span: auditory	90	48	40	66	48	40	48	31
Number facility: addition	70	48	62	47	57	64	41	41
Number facility: division	75	41	57	49	60	51	45	45
Number facility: subtraction/ multiplication	59	42	57	42	66	51	46	42
Perceptual speed . . .	59	53	53	44	45	53	66	23
General reasoning . . .	66	54	60	54	48	54	66	54
Spatial scanning	53	44	58	48	39	48	58	34
Semantic spontaneous flexibility 1	55	40	55	40	55	48	63	48
Semantic spontaneous flexibility 2	60	47	47	60	47	38	43	38

TABLE 11 (Continued)

Variable	Profile Number							
	57	58	59	60	61	62	63	64
Flexibility of closure	46	54	48	46	43	42	40	43
Speed of closure . . .	74	40	49	69	78	49	40	49
Word fluency	46	50	37	63	46	46	34	50
Length estimation . . .	47	51	52	53	54	44	61	51
Associative (rote) memory	54	41	48	63	45	41	56	63
Memory span: auditory	66	40	57	48	40	48	57	48
Number facility: addition	62	55	53	55	44	37	50	57
Number facility: division	41	54	45	57	45	49	41	57
Number facility: subtraction/ multiplication	42	57	46	62	44	39	39	62
Perceptual speed . . .	62	48	52	46	56	41	66	53
General reasoning . . .	54	43	43	48	54	43	54	48
Spatial scanning	34	53	73	48	58	39	48	63
Semantic spontaneous flexibility 1	48	48	48	63	55	48	32	55
Semantic spontaneous flexibility 2	38	51	38	69	38	45	38	38

TABLE 11 (Continued)

Variable	Profile Number							
	65	66	67	68	69	70	71	72
Flexibility of closure	49	50	56	57	52	47	54	34
Speed of closure . . .	40	40	44	59	40	54	64	37
Word fluency	34	43	56	46	50	46	66	53
Length estimation . . .	60	43	55	44	64	54	59	34
Associative (rote) memory	59	48	63	59	50	45	50	50
Memory span: auditory	66	40	57	40	57	31	57	48
Number facility: addition	39	62	55	48	48	48	60	50
Number facility: division	41	48	54	63	51	45	45	45
Number facility: subtraction/ multiplication	37	57	53	64	66	40	40	50
Perceptual speed . . .	49	62	57	49	53	49	49	38
General reasoning . . .	37	54	66	60	60	60	71	43
Spatial scanning	48	53	78	53	58	48	39	48
Semantic spontaneous flexibility 1	32	55	55	63	48	55	55	55
Semantic spontaneous flexibility 2	38	56	38	38	45	60	60	58

TABLE 11 (Continued)

Variable	Profile Number							
	73	74	75	76	77	78	79	80
Flexibility of closure	39	42	36	46	47	40	43	45
Speed of closure . . .	74	42	52	40	64	49	44	49
Word fluency	46	63	56	56	53	43	43	56
Length estimation . . .	66	45	50	49	57	42	44	50
Associative (rote) memory	63	59	48	52	59	48	38	66
Memory span: auditory	66	48	50	57	74	57	48	66
Number facility: addition	48	46	39	37	62	50	44	50
Number facility: division	41	45	45	41	48	41	41	41
Number facility: subtraction/ multiplication	44	50	39	72	61	42	48	39
Perceptual speed . . .	49	50	51	49	49	47	46	75
General reasoning . . .	43	48	37	51	43	48	48	37
Spatial scanning	58	48	58	48	68	44	48	58
Semantic spontaneous flexibility 1	78	48	40	48	70	32	51	40
Semantic spontaneous flexibility 2	77	64	60	60	64	38	47	43

TABLE 11 (Continued)

Variable	Profile Number							
	81	82	83	84	85	86	87	88
Flexibility of closure	37	61	65	56	76	73	38	50
Speed of closure . . .	54	37	40	44	59	74	44	57
Word fluency	53	56	50	56	56	53	46	53
Length estimation . . .	55	60	67	70	71	55	38	45
Associative (rote) memory	45	45	52	52	70	64	73	66
Memory span: auditory	66	57	40	40	66	40	48	66
Number facility: addition	55	35	50	53	66	47	39	68
Number facility: division	45	45	51	51	86	45	41	74
Number facility: subtraction/ multiplication	64	43	50	39	67	42	42	78
Perceptual speed . . .	55	48	41	48	75	54	25	55
General reasoning . . .	60	43	60	43	66	77	37	48
Spatial scanning	39	48	53	44	58	68	53	44
Semantic spontaneous flexibility 1	63	55	40	70	63	70	40	70
Semantic spontaneous flexibility 2	47	47	56	47	60	60	47	60

TABLE 11 (Continued)

Variable	Profile Number							
	89	90	91	92	93	94	95	96
Flexibility of closure	66	68	49	58	47	71	46	49
Speed of closure . . .	59	49	88	54	47	40	44	54
Word fluency	56	63	53	46	43	37	40	56
Length estimation . . .	52	61	60	61	44	43	57	46
Associative (rote) memory	50	35	70	48	48	41	56	52
Memory span: auditory	40	48	53	38	40	40	66	53
Number facility: addition	54	48	48	84	48	50	79	55
Number facility: division	49	60	54	75	55	45	48	54
Number facility: subtraction/ multiplication	75	59	48	83	53	44	53	61
Perceptual speed . . .	35	47	58	61	49	53	56	52
General reasoning . . .	43	66	48	48	48	43	37	48
Spatial scanning	48	63	63	58	48	44	39	73
Semantic spontaneous flexibility 1	48	53	63	32	51	40	55	51
Semantic spontaneous flexibility 2	51	64	51	47	38	43	43	60

TABLE 11 (Continued)

Variable	Profile Number							
	97	98	99	100	101	102	103	104
Flexibility of closure	49	44	53	76	43	46	49	56
Speed of closure . . .	54	44	40	42	44	37	44	81
Word fluency	46	46	34	79	53	50	50	107
Length estimation . . .	49	43	66	57	52	33	34	68
Associative (rote) memory	34	45	45	66	48	54	63	57
Memory span: auditory	53	48	48	48	57	40	45	48
Number facility: addition	46	44	62	64	54	57	41	60
Number facility: division	41	69	82	85	45	57	57	62
Number facility: subtraction/ multiplication	44	57	83	72	50	40	48	66
Perceptual speed . . .	41	45	52	65	61	38	45	49
General reasoning . . .	43	60	77	77	60	43	60	48
Spatial scanning	56	58	73	63	73	39	34	71
Semantic spontaneous flexibility 1	48	48	55	70	63	40	48	55
Semantic spontaneous flexibility 2	47	38	51	56	73	73	38	64

TABLE 11 (Continued)

Variable	Profile Number							
	105	106	107	108	109	110	111	112
Flexibility of closure	59	49	49	38	39	47	49	49
Speed of closure . . .	49	49	44	54	64	54	44	59
Word fluency	56	56	43	46	40	59	53	37
Length estimation . . .	49	45	50	33	61	53	41	60
Associative (rote) memory	41	59	48	41	41	45	45	57
Memory span: auditory	57	66	53	66	48	40	57	57
Number facility: addition	53	46	54	44	48	53	57	41
Number facility: division	45	48	55	55	54	54	41	55
Number facility: subtraction/ multiplication	51	53	53	40	46	55	42	40
Perceptual speed . . .	53	50	50	47	43	45	47	50
General reasoning . . .	60	37	48	43	60	60	48	37
Spatial scanning	53	53	56	48	58	48	44	58
Semantic spontaneous flexibility 1	40	55	51	48	78	51	48	48
Semantic spontaneous flexibility 2	51	38	45	47	43	47	47	47

TABLE 12

PRIMARY DATA OF SUBJECTS: STANDARDIZED TESTS

Variable	Pupil Number							
	1	2	3	4	5	6	7	8
Sex	B	B	B	B	B	B	B	B
Iowa Tests of Basic Skills:								
Vocabulary	13	13	6	16	13	13	21	10
Reading	21	20	11	21	13	19	33	21
Language total . . .	13	9	9	13	10	8	19	9
Work study total . .	25	19	18	17	21	17	22	18
Arithmetic total . .	8	9	10	8	7	12	8	7
Stanford Achievement Test:								
Word meaning	22	9	9	10	16	10	23	10
Paragraph meaning	27	15	14	22	22	17	40	17
Spelling	29	6	13	12	19	16	45	9
Language	50	22	12	18	25	41	41	35
Arithmetic computation	17	12	5	13	12	18	15	2
California Test of Mental Maturity:								
Language	20	14	6	17	17		16	44
Non-language	24	12	19	22	26	40	50	25
Total	44	26	25	40	43	56	94	45

TABLE 12 (Continued)

Variable	Pupil Number							
	9	10	11	12	13	14	15	16
Sex	B	B	B	B	B	B	B	B
Iowa Tests of Basic Skills:								
Vocabulary	11	25	14	9	15	41	8	14
Reading	15	27	25	7	26	59	19	24
Language total . . .	10	14	9	9	18	22	9	9
Work study total . .	18	17	20	10	19	49	18	11
Arithmetic total . .	9	8	10	5	7	18	9	7
Stanford Achievement Test:								
Word meaning	15	39	13	7	21	40	12	26
Paragraph meaning	15	32	25	12	29	59	13	22
Spelling	24	26	26	9	35	31	12	19
Language	30	32	32	29	37	57	58	36
Arithmetic computation	9	7	4	4	5	19	4	9
California Test of Mental Maturity:								
Language	20	16	17	11	7	28	54	25
Non-language	24	26	22	21	27	51	25	18
Total	40	43	33	28	55	105	50	33

TABLE 12 (Continued)

Variable	Pupil Number							
	17	18	19	20	21	22	23	24
Sex	B	B	B	B	B	G	G	G
Iowa Tests of Basic Skills:								
Vocabulary	12	28	11	17	12	2	12	14
Reading	30	19	18	21	30	5	17	21
Language total . . .	13	13	7	12	8	4	6	13
Work study total . .	28	17	15	29	27	1	9	25
Arithmetic total . .	7	9	10	15	10	2	7	13
Stanford Achievement Test:								
Word meaning	12	16	27	16	16	19	22	22
Paragraph meaning	11	14	19	12	14	12	21	27
Spelling	16	20	3	15	26	16	42	29
Language	65	48	69	48	48	11	37	36
Arithmetic computation	4	5	5	7	5	1	13	9
California Test of Mental Maturity:								
Language	4	5	5	7	5	1	13	9
Non-language	25	31	30	27	25	16	21	21
Total	45	53	48	46	37	31	41	38

TABLE 12 (Continued)

Variable	Pupil Number							
	25	26	27	28	29	30	31	32
Sex	G	G	G	G	G	G	G	G
Iowa Tests of Basic Skills:								
Vocabulary	16	17	5	16	15	11	8	7
Reading	23	24	18	23	26	24	26	24
Language total . . .	11	12	11	7	15	12	9	7
Work study total . .	18	13	16	14	19	17	14	24
Arithmetic total . .	7	5	5	11	10	6	7	8
Stanford Achievement Test:								
Word meaning	9	22	8	15	31	17	17	9
Paragraph meaning	31	21	24	16	31	15	30	18
Spelling	14	26	12	26	33	17	20	21
Language	37	37	19	23	39	39	37	39
Arithmetic computation	6	8	14	10	9	7	8	7
California Test of Mental Maturity:								
Language	13	20	17	26	30	30	20	24
Non-language	32	18	10	34	31	19	30	33
Total	45	38	27	60	61	59	50	57

TABLE 12 (Continued)

Variable	Pupil Number							
	33	34	35	36	37	38	39	40
Sex	G	G	G	G	G	G	G	G
Iowa Tests of Basic Skills:								
Vocabulary	12	15	12	9	7	11	13	8
Reading	14	24	26	21	19	22	22	24
Language total . . .	10	10	10	9	10	8	12	11
Work study total . .	25	25	18	18	14	17	25	17
Arithmetic total . .	5	9	6	10	2	9	7	7
Stanford Achievement Test:								
Word meaning	17	15	15	23	10	9	13	4
Paragraph meaning	23	20	25	27	19	11	20	10
Spelling	11	21	27	30	13	13	18	15
Language	35	35	35	32	32	35	28	7
Arithmetic computation	6	11	2	9	4	5	5	2
California Test of Mental Maturity:								
Language	14	13	16	13	15	10	27	25
Non-language	20	22	18	20	17	18	23	26
Total	34	35	34	33	32	28	50	51

TABLE 12 (Continued)

Variable	Pupil Number							
	41	42	43	44	45	46	47	48
Sex	G	G	G	G	G	G	G	B
Iowa Tests of Basic Skills:								
Vocabulary	12	15	15	13	17	28	9	32
Reading	14	22	22	22	32	33	13	25
Language total . . .	9	14	14	15	14	15	6	13
Work study total . .	16	23	23	23	37	26	13	19
Arithmetic total . .	7	10	10	12	10	8	6	12
Stanford Achievement Test:								
Word meaning	8	22	19	18	19	16	26	19
Paragraph meaning	13	16	16	18	9	22	22	29
Spelling	17	22	22	27	33	33	26	27
Language	59	59	60	74	60	65	75	38
Arithmetic computation	5	9	9	7	9	6	14	9
California Test of Mental Maturity:								
Language	12	22	20	18	17	20	16	17
Non-language	20	22	25	20	25	23	21	43
Total	32	44	45	38	42	43	37	60

TABLE 12 (Continued)

Variable	Pupil Number							
	49	50	51	52	53	54	55	56
Sex	B	B	B	B	B	B	B	B
Iowa Tests of Basic Skills:								
Vocabulary	24	10	37	13	19	24	16	16
Reading	40	22	40	32	32	37	23	24
Language total . . .	16	8	20	8	14	46	12	7
Work study total . .	33	18	47	20	27	24	28	13
Arithmetic total . .	17	6	18	17	10	12	15	8
Stanford Achievement Test:								
Word meaning	18	14	33	12	24	19	10	10
Paragraph meaning	27	19	36	13	17	38	9	14
Spelling	30	30	42	24	30	20	20	22
Language	29	32	39	29	29	29	30	41
Arithmetic computation	13	6	7	9	16	7	12	8
California Test of Mental Maturity:								
Language	22	17	36	11	22	21	16	17
Non-language	28	25	46	20	20	25	24	21
Total	50	42	82	31	42	46	40	38

TABLE 12 (Continued)

Variable	Pupil Number							
	57	58	59	60	61	62	63	64
Sex	B	B	B	B	G	G	G	G
Iowa Tests of Basic Skills:								
Vocabulary	9	10	12	39	19	47	12	10
Reading	19	26	30	52	21	13	23	22
Language total . . .	14	10	12	28	12	10	14	21
Work study total . .	15	18	33	34	18	20	20	23
Arithmetic total . .	10	6	10	18	17	10	11	15
Stanford Achievement Test:								
Word meaning	16	17	26	38	17	19	18	19
Paragraph meaning	7	15	21	34	29	25	20	26
Spelling	12	13	14	50	28	13	16	33
Language	48	48	63	80	34	33	33	35
Arithmetic computation	4	2	6	16	6	28	10	8
California Test of Mental Maturity:								
Language	12	22	10	37	17	10	22	22
Non-language	22	20	20	40	23	24	28	32
Total	34	42	30	77	40	34	50	54

TABLE 12 (Continued)

Variable	Pupil Number							
	65	66	67	68	69	70	71	72
Sex	G	G	G	G	G	G	G	G
Iowa Tests of Basic Skills:								
Vocabulary	14	16	19	30	12	14	14	14
Reading	21	20	32	54	18	21	20	20
Language total . . .	11	14	14	28	16	15	14	8
Work study total . .	21	22	32	40	24	26	26	21
Arithmetic total . .	10	9	9	18	12	8	8	10
Stanford Achievement Test:								
Word meaning . . .	19	19	21	29	11	19	19	13
Paragraph meaning	26	25	15	37	23	25	25	20
Spelling	33	33	15	47	16	33	33	6
Language	35	34	35	57	39	35	35	32
Arithmetic computation	8	8	11	10	6	8	8	4
California Test of Mental Maturity:								
Language	18	18	31	54	33	20	19	20
Non-language	20	27	36	52	34	18	22	20
Total	38	45	67	106	67	38	41	40

TABLE 12 (Continued)

Variable	Pupil Number							
	73	74	75	76	77	78	79	80
Sex	G	G	G	G	G	G	G	G
Iowa Tests of Basic Skills:								
Vocabulary	7	15	13	17	27	3	15	22
Reading	19	24	23	19	40	16	7	21
Language total . . .	10	13	11	12	25	11	4	10
Work study total . .	16	27	16	9	24	12	14	10
Arithmetic total . .	6	5	6	3	10	6	7	14
Stanford Achievement Test:								
Word meaning	21	23	4	12	24	19	19	26
Paragraph meaning	39	42	10	17	44	19	14	22
Spelling	32	18	11	19	40	34	9	26
Language	31	31	28	35	50	59	59	75
Arithmetic computation	10	9	12	6	11	2	8	14
California Test of Mental Maturity:								
Language	16	20	10	16	30	18	27	17
Non-language	24	28	20	14	20	21	24	23
Total	40	48	30	30	50	39	51	40

TABLE 12 (Continued)

Variable	Pupil Number							
	81	82	83	84	85	86	87	88
Sex	G	B	B	B	B	B	B	B
Iowa Tests of Basic Skills:								
Vocabulary	15	14	20	17	32	27	12	24
Reading	18	26	24	17	47	25	18	36
Language total . . .	15	10	13	9	15	10	7	17
Work study total . .	14	29	19	16	29	13	10	25
Arithmetic total . .	6	21	9	9	14	8	12	11
Stanford Achievement Test:								
Word meaning	19	26	26	26	46	26	26	26
Paragraph meaning	50	13	20	30	49	32	13	22
Spelling	22	20	25	29	49	21	16	19
Language	59	76	74	76	122	74	63	63
Arithmetic computation	9	5	10	10	24	7	1	9
California Test of Mental Maturity:								
Language	30	24	25	24	27	37	6	33
Non-language	17	30	27	29	29	41	16	21
Total	47	54	42	53	56	78	22	54

TABLE 12 (Continued)

Variable	Pupil Number							
	89	90	91	92	93	94	95	96
Sex	B	B	B	B	B	B	B	B
Iowa Tests of Basic Skills:								
Vocabulary	12	23	14	13	11	5	8	37
Reading	24	45	18	8	22	13	21	41
Language total . . .	8	11	11	8	9	8	10	19
Work study total . .	13	24	12	15	18	9	19	28
Arithmetic total . .	9	14	6	6	12	7	8	10
Stanford Achievement Test:								
Word meaning	7	29	26	26	26	26	26	26
Paragraph meaning	9	36	13	15	11	22	11	20
Spelling	18	35	28	13	25	19	14	25
Language	63	82	75	63	63	63	76	74
Arithmetic computation	9	20	5	10	9	9	10	10
California Test of Mental Maturity:								
Language	19	21	26	16	14	10	23	29
Non-language	26	27	45	24	20	19	29	34
Total	45	48	71	40	34	29	52	63

TABLE 12 (Continued)

Variable	Pupil Number							
	97	98	99	100	101	102	103	104
Sex	B	B	B	G	G	G	G	G
Iowa Tests of Basic Skills:								
Vocabulary	14	9	20	27	21	4	17	25
Reading	24	26	27	36	41	5	16	37
Language total . . .	12	12	19	12	13	7	10	22
Work study total . .	24	25	35	31	23	12	15	38
Arithmetic total . .	7	12	14	10	10	12	9	12
Stanford Achievement Test:								
Word meaning	26	26	44	28	26	26	36	35
Paragraph meaning	25	11	48	41	29	21	32	32
Spelling	18	12	27	27	24	19	41	41
Language	63	74	113	100	87	74	99	99
Arithmetic computation	4	9	15	9	14	7	14	22
California Test of Mental Maturity:								
Language	17	22	35	42	20	12	27	26
Non-language	11	42	41	30	25	16	21	30
Total	28	64	76	72	45	28	48	56

TABLE 12 (Continued)

Variable	Pupil Number							
	105	106	107	108	109	110	111	112
Sex	G	G	G	G	G	G	G	G
Iowa Tests of Basic Skills:								
Vocabulary	11	13	7	21	33	12	17	15
Reading	24	22	17	27	40	35	19	46
Language total . . .	11	17	9	10	17	14	12	11
Work study total . .	18	28	12	31	40	23	27	19
Arithmetic total . .	8	10	9	14	8	10	6	8
Stanford Achievement Test:								
Word meaning	26	26	21	26	35	20	21	18
Paragraph meaning	23	22	18	17	30	18	17	16
Spelling	46	22	27	20	31	27	26	22
Language	99	99	74	74	99	74	76	60
Arithmetic computation	35	44	5	7	9	7	11	9
California Test of Mental Maturity:								
Language	27	21	24	20	23	20	18	16
Non-language	29	27	23	19	35	34	24	19
Total	56	48	47	39	58	54	42	35

APPENDIX C

CORRELATION MATRICES AND ROTATED FACTOR MATRICES

TABLE 13

CORRELATION MATRIX OF ALL VARIABLES FOR ALL SUBJECTS (N=112)

Variable	Variable						
	1	2	3	4	5	6	7
ITBS:							
1. Vocabulary		.64	.53	.58	.45	.48	.51
2. Reading			.61	.70	.50	.43	.47
3. Language total				.56	.38	.34	.51
4. Work study total					.58	.40	.38
5. Arithmetic total						.36	.22
SAT:							
6. Word meaning							.58
7. Paragraph meaning							
8. Spelling							
9. Language							
10. Arithmetic computation							
CTMM:							
11. Verbal							
12. Non-verbal							
13. Total							
14. Pupil participation							
15. Parent participation							
16. Absences per term							
17. Positive reaction to school							
18. Neutral reaction to school							

TABLE 13 (Continued)

Variable	Variable						
	8	9	10	11	12	13	14
ITBS:							
1. Vocabulary	.40	.27	.20	.49	.49	.53	-.18
2. Reading	.50	.29	.16	.57	.48	.56	-.16
3. Language total	.42	.12	.12	.51	.38	.49	-.09
4. Work study total	.35	.26	.16	.49	.48	.52	-.12
5. Arithmetic total	.32	.23	.12	.32	.42	.40	-.29
SAT:							
6. Word meaning	.55	.67	.28	.47	.38	.46	-.36
7. Paragraph meaning	.54	.23	.22	.55	.38	.49	-.07
8. Spelling		.32	.35	.46	.35	.44	-.13
9. Language			.36	.31	.26	.30	-.39
10. Arithmetic computation				.17	.16	.18	-.15
CTMM:							
11. Verbal					.69	.92	-.17
12. Non-verbal						.91	-.29
13. Total							-.25
14. Pupil participation							
15. Parent participation							
16. Absences per term							
17. Positive reaction to school							
18. Neutral reaction to school							

TABLE 13 (Continued)

Variable	Variable						
	15	16	17	18	19	20	21
ITBS:							
1. Vocabulary	-.13	-.07	-.07	-.07	.33	.29	.35
2. Reading	-.18	-.06	.03	-.12	.19	.13	.19
3. Language total	-.02	-.17	-.16	.09	.17	.21	.22
4. Work study total	.01	.01	-.07	-.02	.18	.21	.25
5. Arithmetic total	-.02	-.04	-.13	.05	.18	.27	.32
SAT:							
6. Word meaning	-.14	-.05	-.17	.03	.31	.22	.28
7. Paragraph meaning	-.03	-.06	.01	-.09	.17	.36	.36
8. Spelling	-.05	.01	-.13	.03	.21	.24	.31
9. Language	-.30	-.16	-.12	-.02	.31	.17	.23
10. Arithmetic computation	-.06	-.08	.01	-.10	.19	.21	.25
CTMM:							
11. Verbal	-.06	-.01	-.06	-.03	.19	.21	.26
12. Non-verbal	-.19	.10	-.11	.02	.20	.23	.22
13. Total	-.14	.07	-.09	-.01	.21	.23	.25
14. Pupil participation	.40	-.01	.09	-.06	-.08	-.09	-.20
15. Parent participation		-.07	-.11	.18	-.15	-.04	.06
16. Absences per term			-.10	.07	.08	-.06	-.08
17. Positive reaction to school				-.90	-.19	-.04	.08
18. Neutral reaction to school					-.25	-.04	-.13

TABLE 13 (Continued)

Variable	Variable						
	22	23	24	25	26	27	28
ITBS:							
1. Vocabulary	.44	.38	.23	.27	.30	.26	.26
2. Reading	.43	.29	.34	.23	.33	.21	.26
3. Language total	.40	.35	.27	.18	.29	.16	.28
4. Work study total	.42	.33	.31	.24	.39	.24	.34
5. Arithmetic total	.32	.35	.20	.24	.25	.26	.28
SAT:							
6. Word meaning	.56	.48	.39	.26	.35	.25	.49
7. Paragraph meaning	.61	.50	.44	.33	.34	.31	.53
8. Spelling	.42	.44	.29	.28	.30	.26	.25
9. Language	.28	.22	.20	.13	.32	.23	.12
10. Arithmetic computation	.10	.11	.16	.16	.25	.28	.08
CTMM:							
11. Verbal	.49	.33	.40	.18	.28	.20	.29
12. Non-verbal	.45	.25	.33	.24	.31	.23	.35
13. Total	.51	.31	.40	.22	.31	.22	.34
14. Pupil participation	-.30	-.19	-.06	.01	-.15	-.18	.03
15. Parent participation	-.01	.07	.02	-.01	-.02	-.05	.17
16. Absences per term	.09	.01	-.10	-.14	-.04	-.08	.02
17. Positive reaction to school	-.07	.04	.03	.04	-.01	-.05	-.02
18. Neutral reaction to school	.03	-.09	-.05	-.09	-.07	.03	-.05

TABLE 13 (Continued)

Variable	Variable						
	29	30	31	32	33	34	35
ITBS:							
1. Vocabulary	.26	.22	.35	.33	.38	.24	.33
2. Reading	.34	.29	.25	.39	.41	.29	.25
3. Language total	.22	.17	.23	.40	.41	.14	.13
4. Work study total	.41	.33	.31	.33	.38	.22	.19
5. Arithmetic total	.21	.28	.24	.28	.33	.20	.22
SAT:							
6. Word meaning	.36	.30	.31	.47	.54	.26	.27
7. Paragraph meaning	.46	.32	.35	.61	.51	.22	.30
8. Spelling	.23	.13	.27	.51	.56	.30	.15
9. Language	.14	.14	.17	.18	.31	.16	.24
10. Arithmetic computation	.11	.02	.19	.30	.30	.12	.10
CTMM:							
11. Verbal	.30	.31	.27	.47	.50	.22	.25
12. Non-verbal	.38	.38	.34	.31	.40	.17	.19
13. Total	.36	.37	.33	.43	.49	.20	.24
14. Pupil participation	.03	.01	-.03	-.17	-.26	-.09	-.15
15. Parent participation	.07	.04	-.02	-.01	.01	-.02	.03
16. Absences per term	-.01	.02	-.07	.02	-.01	-.09	-.05
17. Positive reaction to school	-.01	-.06	-.02	-.05	-.17	.05	-.08
18. Neutral reaction to school	-.04	-.01	-.06	.01	.08	-.15	-.06

TABLE 13 (Continued)

Variable	Variable						
	36	37	38	39	40	41	42
ITBS:							
1. Vocabulary	.31	-.19	.06	.07	.30	.25	-.02
2. Reading	.30	-.08	.05	.03	.31	.20	.06
3. Language total	.19	-.14	-.02	.06	.35	.25	-.03
4. Work study total	.22	-.14	-.02	.18	.28	.21	-.17
5. Arithmetic total	.18	-.06	.13	.10	.31	.13	-.03
SAT:							
6. Word meaning	.32	-.17	.01	.04	.08	.11	-.09
7. Paragraph meaning	.33	-.26	-.13	.02	.12	.26	.03
8. Spelling	.34	-.15	.06	.01	.01	.01	.03
9. Language	.24	-.05	.14	.04	-.08	-.07	-.03
10. Arithmetic computation	.12	-.06	.04	-.15	-.04	.09	.01
CTMM:							
11. Verbal	.23	-.09	.08	.09	.14	.24	-.12
12. Non-verbal	.17	-.19	.02	-.01	.21	.19	-.04
13. Total	.22	-.16	.06	.05	.20	.24	-.10
14. Pupil participation	-.06	.05	.08	-.06	.02	.16	.05
15. Parent participation	-.04	-.02	-.03	-.10	.01	.06	-.03
16. Absences per term	-.07	-.13	-.08	-.05	-.04	-.02	-.03
17. Positive reaction to school	-.01	.07	-.05	.04	-.11	-.03	.11
18. Neutral reaction to school	-.11	-.05	.01	-.07	.01	-.03	-.07

TABLE 13 (Continued)

Variable	Variable						
	43	44	45	46	47	48	49
ITBS:							
1. Vocabulary	.15	.20	.24	.23	.10	-.03	.22
2. Reading	.17	.25	.22	.32	.19	.12	.28
3. Language total	-.02	.19	.20	.19	.07	.00	.32
4. Work study total	.14	.16	.26	.30	.07	.06	.28
5. Arithmetic total	.11	.10	.10	.28	.08	.09	.15
SAT:							
6. Word meaning	.24	.17	.16	.23	.24	.05	.27
7. Paragraph meaning	.20	.14	.23	.29	.11	.01	.31
8. Spelling	.17	.30	.22	.21	.17	.02	.10
9. Language	.22	.15	.19	.17	.24	.10	.21
10. Arithmetic computation	.18	.07	.21	.15	.03	.15	.14
CTMM:							
11. Verbal	.30	.09	.31	.28	.14	.02	.32
12. Non-verbal	.25	.17	.18	.37	.11	-.10	.23
13. Total	.29	.14	.26	.36	.13	-.03	.29
14. Pupil participation	-.10	-.14	.04	-.25	-.21	-.14	-.12
15. Parent participation	-.10	-.13	.02	-.23	-.21	-.12	-.03
16. Absences per term	.14	.09	-.14	.19	-.01	-.02	-.14
17. Positive reaction to school	-.10	-.15	.05	-.18	.14	.07	-.08
18. Neutral reaction to school	.08	.09	-.11	.08	-.17	-.10	.03

TABLE 13 (Continued)

Variable	Variable						
	50	51	52	53	54	55	56
ITBS:							
1. Vocabulary	.35	.31	.14	.31	.29	.39	.14
2. Reading	.39	.34	.22	.27	.39	.40	.18
3. Language total	.25	.35	.16	.23	.28	.31	.01
4. Work study total	.37	.30	.21	.30	.37	.38	.04
5. Arithmetic total	.36	.23	.20	.24	.27	.20	-.04
SAT:							
6. Word meaning	.43	.34	.15	.25	.27	.34	.08
7. Paragraph meaning	.32	.30	.23	.24	.18	.40	.20
8. Spelling	.24	.24	.09	.26	.13	.32	.12
9. Language	.40	.33	.04	.25	.36	.21	.08
10. Arithmetic computation	.18	.15	.14	.12	.10	.03	.05
CTMM:							
11. Verbal	.40	.47	.23	.35	.29	.36	.07
12. Non-verbal	.42	.35	.33	.40	.36	.29	-.01
13. Total	.43	.43	.29	.39	.34	.34	.02
14. Pupil participation	-.18	-.18	-.06	-.12	-.14	-.11	.15
15. Parent participation	-.17	-.12	-.11	.01	-.06	-.02	.10
16. Absences per term	-.06	-.09	.04	-.04	-.09	.01	.01
17. Positive reaction to school	.02	-.02	-.02	-.12	-.09	-.02	.11
18. Neutral reaction to school	-.07	-.05	-.04	.08	-.01	-.07	-.15

TABLE 13 (Continued)

Variable	Variable						
	15	16	17	18	19	20	21
19. Negative reaction to school						.19	.12
20. Classroom behavior							.67
21. Neatness of work							
22. Ability to read							
23. Ability to write							
24. Ability to do arithmetic							
25. Attitude toward school							
26. Parent interest in school work							
27. Personal neatness							
28. Ability to verbalize							
29. Self-confidence							
30. Peer relations							
31. Cooperation with school							
32. Elementary school language grades							
33. Elementary school mathematics grades							
34. Employment: father							
35. Employment: mother							
36. Economic status							
37. Size of family							
38. Position among siblings							

TABLE 13 (Continued)

Variable	Variable						
	22	23	24	25	26	27	28
19. Negative reaction to school	.09	.12	.05	.12	.17	.04	.15
20. Classroom behavior	.35	.44	.22	.72	.48	.62	.43
21. Neatness of work	.57	.71	.41	.57	.41	.61	.52
22. Ability to read		.72	.60	.42	.37	.42	.67
23. Ability to write			.55	.49	.40	.37	.68
24. Ability to do arithmetic				.37	.34	.34	.49
25. Attitude toward school					.55	.58	.54
26. Parent interest in school work						.56	.35
27. Personal neatness							.38
28. Ability to verbalize							
29. Self-confidence							
30. Peer relations							
31. Cooperation with school							
32. Elementary school language grades							
33. Elementary school mathematics grades							
34. Employment: father							
35. Employment: mother							
36. Economic status							
37. Size of family							
38. Position among siblings							

TABLE 13 (Continued)

Variable	Variable						
	29	30	31	32	33	34	35
19. Negative reaction to school	.13	.14	.18	.10	.20	.23	.31
20. Classroom behavior	.34	.38	.74	.30	.31	.14	.17
21. Neatness of work	.38	.36	.54	.34	.41	.15	.26
22. Ability to read	.58	.50	.39	.50	.55	.25	.29
23. Ability to write	.53	.47	.43	.42	.51	.30	.28
24. Ability to do arithmetic	.55	.44	.38	.29	.51	.11	.12
25. Attitude toward school	.47	.47	.81	.27	.31	.18	.21
26. Parent interest in school work	.41	.39	.62	.30	.39	.21	.24
27. Personal neatness	.34	.37	.65	.33	.36	.06	.23
28. Ability to verbalize	.81	.67	.50	.32	.37	.27	.34
29. Self-confidence		.79	.45	.32	.38	.26	.27
30. Peer relations			.52	.25	.31	.28	.30
31. Cooperation with school				.25	.34	.15	.25
32. Elementary school language grades					.68	.24	.25
33. Elementary school mathematics grades						.36	.31
34. Employment: father							.47
35. Employment: mother							
36. Economic status							
37. Size of family							
38. Position among siblings							

TABLE 13 (Continued)

Variable	Variable						
	36	37	38	39	40	41	42
19. Negative reaction to school	.24	-.05	.10	.07	.23	.13	-.08
20. Classroom behavior	.13	-.14	-.05	-.04	.02	.19	.06
21. Neatness of work	.21	-.22	-.08	.07	.02	.12	-.04
22. Ability to read	.29	-.21	-.11	.10	.06	.15	-.05
23. Ability to write	.34	-.11	-.01	.12	.08	.09	-.08
24. Ability to do arithmetic	.14	-.13	-.06	.14	.10	.10	-.04
25. Attitude toward school	.21	-.19	-.08	.07	.10	.20	-.05
26. Parent interest in school work	.25	-.11	-.09	.14	.05	.20	-.16
27. Personal neatness	.11	-.31	-.15	.00	.01	.30	.03
28. Ability to verbalize	.29	-.25	-.12	.07	.13	.20	-.07
29. Self-confidence	.29	-.18	-.14	.09	.09	.10	-.09
30. Peer relations	.33	-.19	.03	.05	.14	.07	-.03
31. Cooperation with school	.20	-.24	-.03	.12	.13	.29	-.15
32. Elementary school language grades	.29	-.13	-.03	.13	.06	.25	-.10
33. Elementary school mathematics grades	.39	-.14	.09	.07	.12	.15	-.10
34. Employment: father	.84	.08	.14	.19	.17	.02	-.17
35. Employment: mother	.67	-.25	-.03	.15	.32	.29	-.16
36. Economic status		-.10	.06	.17	.17	.13	-.16
37. Size of family			.22	.03	-.08	-.12	.00
38. Position among siblings				.04	.04	-.04	.01

TABLE 13 (Continued)

Variable	Variable						
	43	44	45	46	47	48	49
19. Negative reaction to school	.05	.12	.14	.21	.08	.06	.12
20. Classroom behavior	.03	.08	.18	.27	-.01	-.01	.13
21. Neatness of work	.08	.11	.18	.19	.18	-.08	.21
22. Ability to read	.20	.17	.16	.30	.17	-.08	.27
23. Ability to write	.14	.17	.18	.22	.15	-.07	.23
24. Ability to do arithmetic	.16	.16	.21	.14	.16	.10	.35
25. Attitude toward school	-.06	.19	.08	.19	-.01	-.05	.08
26. Parent interest in school work	.14	.15	.15	.29	.03	.02	.21
27. Personal neatness	.13	.16	.15	.23	.09	-.02	.15
28. Ability to verbalize	.04	.13	.12	.11	.15	-.09	.18
29. Self-confidence	.13	.21	.13	.15	.15	.02	.25
30. Peer relations	.10	.16	.04	.12	.10	.06	.20
31. Cooperation with school	.05	.11	.14	.24	.04	.01	.16
32. Elementary school language grades	.21	.13	.19	.23	.20	.12	.26
33. Elementary school mathematics grades	.33	.15	.17	.30	.19	.20	.44
34. Employment: father	.13	.10	.13	-.01	-.11	-.16	.07
35. Employment: mother	.22	.01	.09	.14	.10	-.02	.16
36. Economic status	.20	.15	.13	.05	.02	-.13	.06
37. Size of family	.06	-.05	.18	.03	.11	.07	.18
38. Position among siblings	.01	.06	.10	.03	.08	-.02	.07

TABLE 13 (Continued)

Variable	Variable						
	50	51	52	53	54	55	56
19. Negative reaction to school	.11	.15	.13	.08	.21	.19	.11
20. Classroom behavior	.15	.13	.07	.12	.16	.32	.11
21. Neatness of work	.18	.18	.05	.17	.24	.29	.09
22. Ability to read	.32	.27	.20	.21	.23	.40	.01
23. Ability to write	.27	.20	.15	.13	.20	.38	.01
24. Ability to do arithmetic	.33	.32	.18	.08	.23	.28	.04
25. Attitude toward school	.18	.13	.10	.10	.17	.32	.09
26. Parent interest in school work	.22	.25	.08	.25	.27	.46	-.03
27. Personal neatness	.16	.20	.04	.12	.24	.29	.12
28. Ability to verbalize	.21	.09	.13	.06	.20	.33	.08
29. Self-confidence	.31	.19	.16	.10	.19	.33	.05
30. Peer relations	.21	.21	.18	.11	.22	.24	-.09
31. Cooperation with school	.18	.20	.14	.14	.20	.33	.07
32. Elementary school language grades	.31	.27	.22	.15	.09	.36	.14
33. Elementary school mathematics grades	.36	.35	.27	.25	.23	.42	.14
34. Employment: father	.15	.25	-.04	.09	.09	.32	.04
35. Employment: mother	.15	.21	.12	.19	.22	.25	.18
36. Economic status	.11	.25	.01	.16	.13	.34	.08
37. Size of family	.15	.05	.02	-.05	-.09	-.17	-.05
38. Position among siblings	.10	.14	.04	.11	.10	.01	.15

TABLE 13 (Continued)

Variable	Variable						
	36	37	38	39	40	41	42
39. Years in neighborhood					.11	.10	-.79
40. Education: father						.47	-.09
41. Education: mother							-.04
42. Number of elementary schools attended							
43. Flexibility of closure							
44. Speed of closure							
45. Word fluency							
46. Length estimation							
47. Associative memory							
48. Memory span: auditory							
49. Number facility: addition							
50. Number facility: division							
51. Number facility: subtraction/ multiplication							
52. Perceptual speed							
53. General reasoning							
54. Spatial scanning							
55. Semantic spontaneous flexibility 1							
56. Semantic spontaneous flexibility 2							

TABLE 13 (Continued)

Variable	Variable						
	43	44	45	46	47	48	49
39. Years in neighborhood	-.01	-.15	.01	-.16	-.06	-.13	-.05
40. Education: father	.02	.05	.05	.10	-.04	.01	.25
41. Education: mother	-.03	.01	.12	.09	-.04	-.02	.14
42. Number of elementary schools attended	-.04	.21	.05	.15	.07	.15	-.01
43. Flexibility of closure		.08	.32	.34	.15	-.16	.25
44. Speed of closure			.25	.23	.28	.04	.09
45. Word fluency				.22	.15	.01	.22
46. Length estimation					.19	.18	.33
47. Associative memory						.30	.18
48. Memory span: auditory							.24
49. Number facility: addition							
50. Number facility: division							
51. Number facility: subtraction/ multiplication							
52. Perceptual speed							
53. General reasoning							
54. Spatial scanning							
55. Semantic spontaneous flexibility 1							
56. Semantic spontaneous flexibility 2							

TABLE 13 (Continued)

Variable	Variable						
	50	51	52	53	54	55	56
39. Years in neighborhood	.01	.19	-.17	.03	-.13	.10	-.03
40. Education: father	.05	.15	.23	.12	.10	.09	.01
41. Education: mother	.04	.09	.18	-.01	.12	.13	.10
42. Number of elementary schools attended	-.01	.18	.11	.05	.19	.07	.07
43. Flexibility of closure	.31	.24	.29	.23	.11	.21	.08
44. Speed of closure	.08	.09	.07	.11	.17	.42	.15
45. Word fluency	.21	.24	.16	.09	.19	.31	.31
46. Length estimation	.29	.22	.36	.31	.33	.26	.13
47. Associative memory	.17	.18	.10	.07	.17	.22	.18
48. Memory span: auditory	.14	.06	.20	.04	.09	.08	.14
49. Number facility: addition	.49	.49	.39	.16	.21	.17	.14
50. Number facility: division		.63	.28	.33	.27	.25	.13
51. Number facility: subtraction/ multiplication			.08	.31	.36	.27	.13
52. Perceptual speed				.29	.15	.16	.08
53. General reasoning					.30	.28	-.01
54. Spatial scanning						.26	.17
55. Semantic spontaneous flexibility 1							.27
56. Semantic spontaneous flexibility 2							

TABLE 14

ROTATED FACTOR MATRIX, ALL VARIABLES FOR ALL SUBJECTS (N=112)

Variable	Factor			
	I	II	III	IV
ITBS:				
1. Vocabulary	.66	.20	.16	-.03
2. Reading	.78	.05	.18	-.10
3. Language total	.71	.08	.02	.12
4. Work study total	.74	.17	.09	.04
5. Arithmetic total	.53	.21	.10	.12
SAT:				
6. Word meaning	.35	.09	.16	.13
7. Paragraph meaning	.39	.17	.11	-.09
8. Spelling	.45	.17	.20	.08
9. Language	.19	.13	.14	.09
10. Arithmetic computation	.08	.28	.04	-.07
CTMM:				
11. Verbal	.65	.02	-.04	-.06
12. Non-verbal	.67	.13	-.05	-.01
13. Total	.71	.07	-.05	-.03
14. Pupil participation	-.13	-.06	-.05	-.09
15. Parent participation	-.14	-.03	-.01	.23
16. Absences per term	-.06	-.11	-.09	.08
17. Positive reaction to school	-.06	-.01	-.01	-.95
18. Neutral reaction to school	-.01	-.05	-.10	.94
19. Negative reaction to school	.17	.12	.24	-.02
20. Classroom behavior	.07	.84	-.01	-.01
21. Neatness of work	.05	.64	.02	-.09
22. Ability to read	.30	.24	.08	.04
23. Ability to write	.18	.37	.17	-.04
24. Ability to do arithmetic	.21	.20	-.09	-.04
25. Attitude toward school	.13	.80	.09	-.06
26. Parent interest in school work	.27	.66	.18	.02
27. Personal neatness	.06	.76	-.03	.07
28. Ability to verbalize	.14	.32	.14	-.01

TABLE 14 (Continued)

Variable	Factor			
	V	VI	VII	VIII
ITBS:				
1. Vocabulary	-.13	.05	.03	.01
2. Reading	-.10	.14	.07	.01
3. Language total	.02	.08	-.01	.05
4. Work study total	-.02	.20	-.13	.02
5. Arithmetic total	-.28	.13	.04	.28
SAT:				
6. Word meaning	-.32	.30	-.03	-.10
7. Paragraph meaning	.39	.17	.11	-.09
8. Spelling	-.04	.05	.06	.04
9. Language	-.44	.07	-.02	-.03
10. Arithmetic computation	.04	-.15	.13	.01
CTMM:				
11. Verbal	.02	.21	.12	-.06
12. Non-verbal	-.10	.25	.01	-.09
13. Total	-.04	.25	.07	-.08
14. Pupil participation	.81	.04	.04	.06
15. Parent participation	.59	.17	.07	.03
16. Absences per term	-.08	.07	-.04	-.10
17. Positive reaction to school	-.01	.01	.02	-.02
18. Neutral reaction to school	.05	-.02	-.01	-.04
19. Negative reaction to school	-.09	.01	-.03	.13
20. Classroom behavior	-.02	.14	.08	.08
21. Neatness of work	-.23	.33	.05	.06
22. Ability to read	-.24	.60	-.01	-.09
23. Ability to write	-.21	.58	.01	.16
24. Ability to do arithmetic	-.01	.61	-.09	-.03
25. Attitude toward school	.06	.30	-.01	-.01
26. Parent interest in school work	-.03	.13	-.17	-.14
27. Personal neatness	.13	.14	.02	-.23
28. Ability to verbalize	.08	.79	.02	-.08

TABLE 14 (Continued)

Variable	Factor			
	IX	X	XI	XII
ITBS:				
1. Vocabulary	-.20	.20	.01	.13
2. Reading	-.15	.09	.06	.16
3. Language total	-.29	.21	-.07	.05
4. Work study total	.07	.10	.07	.04
5. Arithmetic total	-.09	.22	-.03	-.15
SAT:				
6. Word meaning	.44	-.09	.12	.09
7. Paragraph meaning	.55	.10	.16	.15
8. Spelling	-.61	-.23	-.03	.13
9. Language	-.13	-.27	.19	.13
10. Arithmetic computation	-.45	-.25	.16	-.13
CTMM:				
11. Verbal	-.31	.02	.38	.07
12. Non-verbal	-.02	.01	.39	-.09
13. Total	-.19	.03	.40	-.02
14. Pupil participation	.14	.07	-.10	.13
15. Parent participation	-.11	.10	-.10	.04
16. Absences per term	-.01	.01	.09	.04
17. Positive reaction to school	.05	-.06	-.04	.04
18. Neutral reaction to school	-.02	-.03	.05	-.08
19. Negative reaction to school	-.05	.20	-.03	.10
20. Classroom behavior	-.15	.08	.03	.02
21. Neatness of work	-.30	.11	.01	.08
22. Ability to read	.38	.05	.13	.05
23. Ability to write	-.39	-.07	-.01	.05
24. Ability to do arithmetic	.25	-.05	.17	.08
25. Attitude toward school	-.05	.03	-.06	.01
26. Parent interest in school work	-.04	-.12	.17	.03
27. Personal neatness	-.15	.06	.10	.13
28. Ability to verbalize	-.16	.11	-.05	.05

TABLE 14 (Continued)

Variable	Factor			
	XIII	XIV	XV	h^2
ITBS:				
1. Vocabulary	-.04	.14	.10	.6534
2. Reading	-.06	-.01	-.17	.7707
3. Language total	-.18	-.14	-.08	.7290
4. Work study total	-.04	-.03	-.14	.6756
5. Arithmetic total	-.03	.03	.01	.6119
SAT:				
6. Word meaning	-.14	.32	.02	.7165
7. Paragraph meaning	-.04	.01	.03	.7199
8. Spelling	.07	.10	.01	.7393
9. Language	-.31	.49	-.04	.7586
10. Arithmetic computation	-.11	.38	-.22	.6459
CTMM:				
11. Verbal	.02	.17	.15	.7789
12. Non-verbal	.20	.21	.16	.8134
13. Total	.14	.21	.16	.8761
14. Pupil participation	.02	.01	-.01	.7469
15. Parent participation	-.19	-.13	.18	.5787
16. Absences per term	.74	.07	.06	.6134
17. Positive reaction to school	-.09	-.15	.01	.9452
18. Neutral reaction to school	-.01	-.13	.06	.9389
19. Negative reaction to school	.21	.63	-.15	.6486
20. Classroom behavior	.02	.08	.08	.7922
21. Neatness of work	-.12	-.05	.27	.7951
22. Ability to read	.04	-.12	.20	.8146
23. Ability to write	-.02	-.14	.19	.8108
24. Ability to do arithmetic	-.16	-.05	-.09	.6117
25. Attitude toward school	-.02	.02	.03	.7791
26. Parent interest in school work	-.06	-.01	-.19	.6970
27. Personal neatness	-.12	.01	.05	.7456
28. Ability to verbalize	.05	.04	.09	.8422

TABLE 14 (Continued)

Variable	Factor			
	I	II	III	IV
29. Self-confidence	.20	.26	.17	-.01
30. Peer relations	.18	.31	.20	.04
31. Cooperation with school	.18	.82	.02	-.02
32. Elementary school language grades	.25	.16	.10	.01
33. Elementary school mathematics grades	.25	.19	.19	.15
34. Employment: father	.16	.05	.85	-.09
35. Employment: mother	.02	.11	.62	.02
36. Economic status	.13	.06	.88	.04
37. Size of family	-.14	-.17	-.01	-.09
38. Position among siblings	.80	-.09	.03	.08
39. Years in neighborhood	.07	.04	.10	-.06
40. Education: father	.32	-.01	.19	.07
41. Education: mother	.19	.21	-.02	-.03
42. Number of elementary schools attended	-.01	-.03	-.09	-.09
43. Flexibility of closure	.00	-.01	.19	.08
44. Speed of closure	.26	.13	.18	.21
45. Word fluency	.19	.16	.05	-.11
46. Length estimation	.23	.27	-.03	.14
47. Associative memory	.01	-.09	-.11	-.14
48. Memory span: auditory	-.04	-.06	-.18	-.07
49. Number facility: addition	.12	.03	-.07	.07
50. Number facility: division	.32	.04	-.03	-.07
51. Number facility: subtraction/ multiplication	.33	.04	.06	-.02
52. Perceptual speed	.16	.04	-.01	-.06
53. General reasoning	.41	.11	.13	.13
54. Spatial scanning	.38	.15	.04	.10
55. Semantic spontaneous flexibility 1	.35	.29	.31	.02
56. Semantic spontaneous flexibility 2	-.03	.03	-.02	-.11

TABLE 14 (Continued)

Variable	Factor			
	V	VI	VII	VIII
29. Self-confidence	.12	.18	-.05	-.11
30. Peer relations	.06	.76	.01	-.02
31. Cooperation with school	.06	.26	-.12	-.06
32. Elementary school language grades	-.05	.16	-.11	.07
33. Elementary school mathematics grades	-.11	.28	-.06	.02
34. Employment: father	.03	.14	-.12	.17
35. Employment: mother	-.13	.17	-.06	-.23
36. Economic status	.02	.16	-.08	-.04
37. Size of family	.02	-.12	-.07	.69
38. Position among siblings	.04	-.05	-.01	.65
39. Years in neighborhood	-.08	.04	-.90	.06
40. Education: father	.04	.02	-.05	.07
41. Education: mother	.18	-.02	-.09	-.17
42. Number of elementary schools attended	-.01	-.03	.91	-.01
43. Flexibility of closure	-.07	.02	-.00	.02
44. Speed of closure	-.14	.09	.22	.08
45. Word fluency	.17	-.05	.03	.27
46. Length estimation	-.27	-.01	.22	.10
47. Associative memory	-.45	.24	.05	.09
48. Memory span: auditory	-.18	.04	.10	.01
49. Number facility: addition	-.06	.25	.01	.20
50. Number facility: division	.17	.24	-.04	.17
51. Number facility: subtraction/ multiplication	-.13	.13	-.25	.09
52. Perceptual speed	-.01	.12	.24	.04
53. General reasoning	-.06	-.06	.05	.05
54. Spatial scanning	-.18	.16	.25	-.06
55. Semantic spontaneous flexibility 1	-.05	.14	-.09	-.10
56. Semantic spontaneous flexibility 2	.15	-.04	.04	-.01

TABLE 14 (Continued)

Variable	Factor			
	IX	X	XI	XII
29. Self-confidence	-.04	-.06	.09	.04
30. Peer relations	.12	-.01	.08	-.10
31. Cooperation with school	-.03	.08	.06	.02
32. Elementary school language grades	-.70	.10	.15	.11
33. Elementary school mathematics grades	-.61	.07	.27	.09
34. Employment: father	-.13	-.03	.04	-.04
35. Employment: mother	-.07	.42	.18	.11
36. Economic status	-.16	.06	.07	.07
37. Size of family	.09	-.10	.21	-.02
38. Position among siblings	.06	-.02	-.01	.15
39. Years in neighborhood	.01	.07	-.08	.01
40. Education: father	.09	.70	-.01	-.07
41. Education: mother	-.06	.69	.04	.12
42. Number of elementary schools attended	.04	-.04	-.03	.09
43. Flexibility of closure	-.17	-.06	.71	.13
44. Speed of closure	.04	-.21	-.07	.49
45. Word fluency	-.16	.03	.32	.47
46. Length estimation	.05	.12	.46	.15
47. Associative memory	-.09	-.01	.07	.47
48. Memory span: auditory	-.12	.08	-.02	.12
49. Number facility: addition	-.19	.27	.50	.08
50. Number facility: division	-.10	-.04	.52	.05
51. Number facility: subtraction/ multiplication	-.05	.02	.46	.19
52. Perceptual speed	-.11	.28	.51	-.19
53. General reasoning	.04	-.07	.44	-.01
54. Spatial scanning	.24	.06	.21	.26
55. Semantic spontaneous flexibility 1	-.09	-.06	.13	.50
56. Semantic spontaneous flexibility 2	-.13	.14	.03	.74

TABLE 14 (Continued)

Variable	Factor			
	XIII	XIV	XV	h^2
29. Self-confidence	.05	.03	-.15	.8533
30. Peer relations	.07	.12	-.11	.8140
31. Cooperation with school	.02	.13	-.05	.8235
32. Elementary school language grades	.05	-.03	-.10	.6951
33. Elementary school mathematics grades	-.04	.07	-.14	.7349
34. Employment: father	-.04	.05	.08	.8423
35. Employment: mother	-.09	.24	.10	.7979
36. Economic status	-.04	.09	.07	.8888
37. Size of family	-.10	-.18	-.16	.6795
38. Position among siblings	-.06	.34	.13	.6071
39. Years in neighborhood	-.02	-.05	.06	.8624
40. Education: father	.01	.02	-.14	.6763
41. Education: mother	.01	.03	.02	.6416
42. Number of elementary schools attended	-.03	-.06	-.03	.8648
43. Flexibility of closure	.17	-.02	.13	.6503
44. Speed of closure	.24	-.16	-.21	.6614
45. Word fluency	-.03	-.02	.03	.5343
46. Length estimation	.29	.01	-.17	.6379
47. Associative memory	.02	.02	-.19	.5887
48. Memory span: auditory	-.09	.12	-.75	.6984
49. Number facility: addition	-.31	-.02	-.33	.7000
50. Number facility: division	-.28	.12	-.11	.6180
51. Number facility: subtraction/ multiplication	-.38	.12	-.02	.6319
52. Perceptual speed	.20	-.06	-.33	.6427
53. General reasoning	-.09	.01	.10	.4427
54. Spatial scanning	-.28	.23	.03	.6064
55. Semantic spontaneous flexibility 1	.10	-.17	-.12	.6769
56. Semantic spontaneous flexibility 2	-.07	.21	.02	.6791

TABLE 15

CORRELATION MATRICES OF ALL VARIABLES FOR BOYS AND GIRLS IN THE SAMPLE
(Boys, N=52, upper; Girls, N=60, lower)

Variable	Variable						
	1	2	3	4	5	6	7
				Boys			
ITBS:							
1. Vocabulary		.77	.59	.60	.50	.55	.69
2. Reading	.49		.59	.74	.61	.52	.64
3. Language total	.44	.66		.50	.33	.34	.56
4. Work study total	.55	.66	.66		.68	.44	.52
5. Arithmetic total	.37	.35	.45	.48		.34	.31
SAT:							
6. Word meaning	.38	.28	.33	.35	.35		.68
7. Paragraph meaning	.32	.28	.45	.22	.16	.47	
8. Spelling	.19	.39	.47	.27	.35	.62	.40
9. Language	.30	.29	.22	.36	.27	.67	.18
10. Arithmetic computation	.14	.07	.10	.10	.08	.31	.09
CTMM:							
11. Verbal	.27	.49	.53	.40	.34	.37	.39
12. Non-verbal	.36	.54	.45	.56	.46	.29	.26
13. Total	.32	.56	.55	.51	.43	.35	.32
14. Pupil participation	-.22	-.15	-.16	-.24	-.45	-.42	-.20
15. Parent participation	-.19	-.22	-.05	.01	.05	-.05	-.09
16. Absences per term	-.11	-.05	-.18	-.04	-.09	-.29	-.20
17. Positive reaction to school	-.05	.03	-.11	-.04	-.26	-.14	.08
18. Neutral reaction to school	-.03	-.06	.08	.01	.24	.06	-.11
				Girls			

TABLE 15 (Continued)

Variable	Variable						
	8	9	10	11	12	13	14
				Boys			
ITBS:							
1. Vocabulary	.65	.22	.45	.68	.57	.67	-.13
2. Reading	.64	.29	.50	.64	.40	.56	-.15
3. Language total	.41	.03	.24	.50	.34	.45	-.03
4. Work study total	.45	.15	.39	.57	.42	.53	.02
5. Arithmetic total	.38	.18	.36	.32	.34	.35	-.11
SAT:							
6. Word meaning	.54	.69	.40	.55	.41	.51	-.30
7. Paragraph meaning	.65	.29	.56	.66	.50	.62	.30
8. Spelling		.25	.54	.56	.47	.55	-.06
9. Language	.40		.26	.37	.29	.35	-.49
10. Arithmetic computation	.31	.43		.41	.34	.40	-.06
CTMM:							
11. Verbal	.36	.24	.09		.74	.93	-.10
12. Non-verbal	.29	.23	.14	.66		.93	-.24
13. Total	.35	.23	.13	.92	.89		-.18
14. Pupil participation	-.22	-.30	-.20	-.25	-.32	-.31	
15. Parent participation	-.04	-.20	-.10	-.02	-.17	-.11	.19
16. Absences per term	-.02	-.35	-.10	-.02	.11	.07	-.01
17. Positive reaction to school	-.15	-.15	.03	-.01	-.01	-.02	.16
18. Neutral reaction to school	.10	.03	-.10	.04	-.01	.03	-.15
				Girls			

TABLE 15 (Continued)

Variable	Variable						
	15	16	17	18	19	20	21
				Boys			
ITBS:							
1. Vocabulary	-.01	-.03	-.06	-.16	.41	.36	.41
2. Reading	-.09	-.08	.07	-.23	.26	.21	.21
3. Language total	.04	-.20	-.21	.10	.24	.23	.11
4. Work study total	.05	.06	-.09	-.07	.29	.37	.25
5. Arithmetic total	-.02	.01	.96	-.26	.34	.39	.35
SAT:							
6. Word meaning	-.22	.21	-.18	-.03	.40	.36	.40
7. Paragraph meaning	.01	.12	-.08	-.05	.25	.35	.35
8. Spelling	-.12	.07	-.15	-.03	.34	.20	.29
9. Language	-.48	.15	-.06	-.12	.33	.20	.18
10. Arithmetic computation	.05	-.01	-.07	-.09	.29	.30	.30
CTMM:							
11. Verbal	-.12	.01	-.11	-.12	.42	.37	.28
12. Non-verbal	-.16	.09	-.17	.01	.31	.43	.34
13. Total	.15	.05	-.15	-.06	.39	.43	.33
14. Pupil participation	.75	-.01	-.01	.12	-.17	-.19	-.23
15. Parent participation		-.02	.01	-.02	.01	-.08	-.10
16. Absences per term	-.08		-.42	.35	.18	.01	-.03
17. Positive reaction to school	-.22	.08		-.86	-.43	-.09	.13
18. Neutral reaction to school	.30	-.08	-.93		-.10	-.05	-.29
				Girls			

TABLE 15 (Continued)

Variable	Variable						
	22	23	24	25	26	27	28
				Boys			
ITBS:							
1. Vocabulary	.54	.41	.29	.36	.26	.30	.34
2. Reading	.52	.35	.31	.21	.21	.24	.29
3. Language total	.35	.35	.26	.13	.17	.04	.25
4. Work study total	.43	.37	.30	.30	.32	.33	.35
5. Arithmetic total	.30	.32	.09	.33	.24	.38	.30
SAT:							
6. Word meaning	.71	.60	.51	.38	.31	.46	.48
7. Paragraph meaning	.65	.49	.49	.27	.20	.30	.53
8. Spelling	.57	.48	.39	.29	.14	.21	.32
9. Language	.43	.32	.21	.13	.23	.29	.15
10. Arithmetic computation	.32	.30	.33	.26	.24	.20	.17
CTMM:							
11. Verbal	.56	.35	.41	.31	.23	.31	.39
12. Non-verbal	.56	.31	.42	.45	.29	.43	.52
13. Total	.60	.35	.45	.41	.28	.40	.49
14. Pupil participation	-.27	-.15	.10	-.14	-.12	-.21	-.01
15. Parent participation	-.26	-.09	.05	.01	.02	-.19	.09
16. Absences per term	.16	.04	-.04	-.06	-.05	.11	.27
17. Positive reaction to school	-.15	-.07	-.10	-.10	-.03	-.03	-.18
18. Neutral reaction to school	.02	-.11	.06	-.03	-.16	-.06	.04

TABLE 15 (Continued)

Variable	Variable						
	29	30	31	32	33	34	35
				Boys			
ITBS:							
1. Vocabulary	.26	.18	.39	.59	.62	.26	.55
2. Reading	.30	.20	.21	.57	.52	.24	.37
3. Language total	.10	-.01	.18	.40	.46	.08	.09
4. Work study total	.38	.23	.38	.56	.49	.26	.37
5. Arithmetic total	.23	.29	.32	.43	.36	.28	.31
SAT:							
6. Word meaning	.38	.42	.43	.64	.73	.19	.43
7. Paragraph meaning	.46	.31	.33	.69	.64	.21	.39
8. Spelling	.29	.19	.26	.58	.65	.32	.32
9. Language	.18	.28	.21	.33	.44	.02	.40
10. Arithmetic computation	.26	.16	.19	.59	.54	.29	.25
CTMM:							
11. Verbal	.40	.26	.37	.60	.66	.29	.38
12. Non-verbal	.52	.42	.50	.46	.62	.21	.40
13. Total	.49	.36	.46	.57	.69	.27	.42
14. Pupil participation	.11	-.01	-.14	-.06	-.24	-.04	-.22
15. Parent participation	.12	.03	-.01	-.08	-.17	-.04	-.18
16. Absences per term	.29	.31	.07	.05	.11	-.01	.25
17. Positive reaction to school	-.17	-.21	-.15	-.05	-.19	-.01	-.19
18. Neutral reaction to school	.04	.03	-.04	-.11	-.02	-.11	-.03

TABLE 15 (Continued)

Variable	Variable						
	36	37	38	39	40	41	42
				Boys			
ITBS:							
1. Vocabulary	.40	-.18	.11	-.11	.36	.37	.15
2. Reading	.29	-.15	.07	-.09	.46	.27	.19
3. Language total	.10	-.09	.09	-.10	.44	.29	.09
4. Work study total	.23	-.12	.02	.11	.40	.44	.09
5. Arithmetic total	.22	-.10	.16	.06	.40	.25	.08
SAT:							
6. Word meaning	.35	-.39	-.02	-.06	.09	.21	.06
7. Paragraph meaning	.36	-.38	-.12	-.12	.22	.31	.16
8. Spelling	.42	-.27	.08	-.06	.20	.06	.22
9. Language	.19	-.19	.17	.01	-.10	-.02	.10
10. Arithmetic computation	.29	-.03	-.02	-.06	-.20	.06	.06
CTMM:							
11. Verbal	.32	-.18	.03	-.06	.21	.39	.03
12. Non-verbal	.24	-.31	-.01	-.16	.21	.36	.13
13. Total	.30	-.26	.01	-.12	.23	.40	.09
14. Pupil participation	-.03	.10	.03	.14	-.06	.16	-.16
15. Parent participation	-.05	.08	-.06	.07	.03	.06	-.18
16. Absences per term	.10	.31	-.20	-.11	-.18	-.03	-.08
17. Positive reaction to school	-.03	.12	.09	.13	-.12	-.04	.09
18. Neutral reaction to school	-.12	-.09	-.20	-.23	.01	-.03	.04

TABLE 15 (Continued)

Variable	Variable						
	43	44	45	46	47	48	49
				Boys			
ITBS:							
1. Vocabulary	.22	.15	.39	.31	.23	-.01	.36
2. Reading	.14	.13	.38	.31	.18	.20	.36
3. Language total	-.13	.05	.16	.13	-.02	-.02	.33
4. Work study total	.09	-.01	.28	.44	-.01	.15	.32
5. Arithmetic total	.10	-.06	.28	.38	.04	.29	.10
SAT:							
6. Word meaning	.25	.06	.10	.35	.23	.05	.36
7. Paragraph meaning	.30	-.03	.20	.34	-.01	-.09	.34
8. Spelling	.16	.27	.35	.28	.12	-.03	.14
9. Language	.40	.15	.12	.34	.32	.10	.25
10. Arithmetic computation	.38	.04	.21	.46	.01	.04	.35
CTMM:							
11. Verbal	.20	.13	.45	.37	.06	-.09	.37
12. Non-verbal	.17	.15	.37	.41	.05	-.04	.26
13. Total	.20	.15	.44	.42	.06	-.07	.34
14. Pupil participation	-.21	-.21	-.02	-.41	-.22	-.18	-.25
15. Parent participation	-.32	-.32	-.19	-.25	-.18	-.10	-.19
16. Absences per term	.31	.13	-.16	.19	.06	.05	.01
17. Positive reaction to school	-.11	-.21	.17	-.06	.21	.20	-.07
18. Neutral reaction to school	-.04	.21	-.21	-.11	-.25	-.15	-.05

TABLE 15 (Continued)

Variable	Variable						
	50	51	52	53	54	55	56
	Boys						
ITBS:							
1. Vocabulary	.37	.33	.22	.40	.30	.42	.38
2. Reading	.37	.30	.21	.30	.26	.39	.37
3. Language total	.22	.25	.16	.20	.14	.23	.07
4. Work study total	.36	.24	.31	.33	.30	.30	.11
5. Arithmetic total	.34	.13	.23	.31	.16	.28	.20
SAT:							
6. Word meaning	.44	.38	.24	.25	.40	.36	.22
7. Paragraph meaning	.40	.28	.27	.34	.25	.29	.29
8. Spelling	.33	.25	.15	.31	.18	.41	.29
9. Language	.41	.37	.16	.22	.49	.26	.28
10. Arithmetic computation	.61	.37	.31	.38	.08	.22	.24
CTMM:							
11. Verbal	.37	.35	.25	.26	.30	.40	.36
12. Non-verbal	.38	.19	.37	.36	.32	.31	.19
13. Total	.40	.29	.33	.33	.33	.38	.29
14. Pupil participation	-.19	-.18	-.23	-.21	-.17	-.19	-.02
15. Parent participation	-.15	-.18	-.17	.04	-.14	-.10	-.08
16. Absences per term	.06	-.03	.16	.04	.06	.01	.00
17. Positive reaction to school	.04	.02	-.08	.03	-.03	.05	.21
18. Neutral reaction to school	-.13	-.11	-.02	-.10	-.06	-.23	-.22

TABLE 15 (Continued)

Variable	Variable						
	1	2	3	4	5	6	7
				Girls			
19. Negative reaction to school	.23	.10	.06	.06	-.01	.19	.09
20. Classroom behavior	.23	.05	.19	.06	.18	.06	.37
21. Neatness of work	.35	.23	.39	.28	.41	.21	.37
22. Ability to read	.32	.33	.48	.41	.35	.38	.57
23. Ability to write	.38	.26	.39	.31	.42	.40	.53
24. Ability to do arithmetic	.17	.36	.29	.33	.30	.26	.40
25. Attitude toward school	.19	.25	.24	.17	.17	.13	.40
26. Parent interest in school work	.33	.46	.47	.45	.28	.41	.51
27. Personal neatness	.26	.22	.34	.16	.21	.04	.33
28. Ability to verbalize	.18	.23	.34	.32	.26	.31	.54
29. Self-confidence	.25	.38	.36	.44	.18	.34	.49
30. Peer relations	.25	.37	.42	.44	.23	.12	.36
31. Cooperation with school	.31	.29	.31	.24	.14	.13	.39
32. Elementary school language grades	.09	.24	.43	.12	.19	.30	.52
33. Elementary school mathematics grades	.18	.33	.38	.28	.35	.38	.37
34. Employment: father	.21	.34	.21	.18	.12	.33	.24
35. Employment: mother	.13	.15	.16	.05	.14	.11	.22
36. Economic status	.22	.32	.29	.21	.13	.30	.31
37. Size of family	-.24	-.04	-.24	-.17	-.08	.09	-.10
38. Position among siblings	.02	.05	-.16	-.06	.13	.05	-.15

TABLE 15 (Continued)

Variable	Variable						
	8	9	10	11	12	13	14
				Girls			
19. Negative reaction to school	.10	.29	.19	-.10	.05	-.03	.02
20. Classroom behavior	.27	.14	.20	.04	.03	.02	-.01
21. Neatness of work	.30	.29	.24	.24	.19	.22	-.20
22. Ability to read	.28	.13	.01	.42	.33	.40	-.32
23. Ability to write	.40	.15	.04	.32	.22	.29	-.22
24. Ability to do arithmetic	.22	.19	.12	.40	.24	.35	-.18
25. Attitude toward school	.28	.13	.14	.03	.01	.01	.14
26. Parent interest in school work	.47	.40	.29	.35	.33	.36	-.17
27. Personal neatness	.30	.20	.32	.09	.07	.06	-.17
28. Ability to verbalize	.20	.08	.06	.18	.15	.17	.06
29. Self-confidence	.19	.10	.07	.21	.22	.22	-.03
30. Peer relations	.09	.01	-.03	.37	.30	.36	.04
31. Cooperation with school	.30	.13	.22	.16	.14	.14	.08
32. Elementary school language grades	.43	.07	.22	.34	.20	.31	-.29
33. Elementary school mathematics grades	.47	.21	.24	.34	.22	.32	-.28
34. Employment: father	.31	.26	.11	.16	.11	.13	-.12
35. Employment: mother	.04	.12	.06	.14	-.02	.06	-.08
36. Economic status	.31	.28	.11	.16	.10	.14	-.07
37. Size of family	.00	.08	-.07	.02	-.10	-.06	.02
38. Position among siblings	.03	.11	.07	.13	.09	.13	.11

TABLE 15 (Continued)

Variable	Variable						
	15	16	17	18	19	20	21
				Boys			
19. Negative reaction to school	-.25	.01	.02	-.39		.26	.25
20. Classroom behavior	-.02	-.11	-.01	-.03	.12		.70
21. Neatness of work	.11	-.10	.01	-.01	.01	.65	
22. Ability to read	.18	.04	.01	.03	-.10	.27	.61
23. Ability to write	.14	-.01	.10	-.07	-.06	.44	.77
24. Ability to do arithmetic	.01	-.14	.12	-.11	.01	.27	.49
25. Attitude toward school	-.01	-.20	.14	-.14	.02	.68	.43
26. Parent interest in school work	-.05	-.11	.03	-.02	-.01	.58	.51
27. Personal neatness	.01	-.20	-.09	.11	-.06	.61	.55
28. Ability to verbalize	.24	-.16	.12	-.12	.03	.36	.56
29. Self-confidence	.06	-.20	.12	-.11	.00	.26	.42
30. Peer relations	.08	-.20	.11	-.05	-.12	.40	.39
31. Cooperation with school	-.03	-.18	.10	-.08	-.03	.71	.45
32. Elementary school language grades	.02	.01	-.07	.10	-.08	.21	.28
33. Elementary school mathematics grades	.09	-.06	-.17	.16	.01	.25	.41
34. Employment: father	.01	-.12	.09	-.19	.27	.16	.19
35. Employment: mother	.15	-.22	.01	-.09	.22	.02	.29
36. Economic status	-.02	-.17	.03	-.11	.23	.10	.25
37. Size of family	-.06	-.02	.06	-.05	-.04	-.03	-.20
38. Position among siblings	-.03	.01	-.20	.18	.02	.07	-.02
				Girls			

TABLE 15 (Continued)

Variable	Variable						
	22	23	24	25	26	27	28
				Boys			
19. Negative reaction to school	.25	.33	.08	.23	.34	.15	.27
20. Classroom behavior	.42	.44	.17	.76	.39	.64	.50
21. Neatness of work	.56	.64	.35	.75	.33	.66	.50
22. Ability to read		.69	.61	.48	.26	.57	.68
23. Ability to write	.75		.52	.56	.23	.39	.64
24. Ability to do arithmetic	.59	.57		.43	.29	.38	.46
25. Attitude toward school	.37	.44	.33		.44	.66	.57
26. Parent interest in school work	.49	.54	.39	.66		.57	.23
27. Personal neatness	.29	.36	.33	.52	.57		.52
28. Ability to verbalize	.67	.72	.53	.51	.48	.27	
29. Self-confidence	.64	.61	.61	.42	.50	.22	.84
30. Peer relations	.51	.51	.48	.53	.55	.32	.62
31. Cooperation with school	.32	.42	.35	.83	.70	.68	.42
32. Elementary school language grades	.45	.37	.20	.20	.40	.30	.28
33. Elementary school mathematics grades	.42	.44	.48	.25	.46	.29	.34
34. Employment: father	.17	.30	.05	.22	.35	.07	.23
35. Employment: mother	.17	.28	.10	.12	.20	.10	.33
36. Economic status	.20	.32	.06	.26	.35	.08	.27
37. Size of family	-.18	-.16	.10	-.14	-.06	-.32	-.24
38. Position among siblings	-.15	-.08	-.02	.03	-.01	.03	-.07
				Girls			

TABLE 15 (Continued)

Variable	Variable						
	29	30	31	32	33	34	35
				Boys			
19. Negative reaction to school	.25	.36	.35	.28	.41	.19	.41
20. Classroom behavior	.43	.38	.77	.39	.38	.12	.36
21. Neatness of work	.37	.38	.66	.39	.40	.13	.26
22. Ability to read	.52	.49	.45	.55	.69	.34	.45
23. Ability to write	.42	.46	.44	.49	.60	.31	.30
24. Ability to do arithmetic	.49	.40	.42	.41	.56	.19	.13
25. Attitude toward school	.52	.41	.81	.36	.37	.13	.35
26. Parent interest in school work	.31	.25	.56	.19	.32	.06	.30
27. Personal neatness	.49	.45	.69	.34	.43	.07	.43
28. Ability to verbalize	.79	.74	.57	.37	.40	.31	.37
29. Self-confidence		.85	.53	.38	.40	.28	.40
30. Peer relations	.74		.51	.32	.37	.37	.42
31. Cooperation with school	.37	.53		.36	.40	.15	.49
32. Elementary school language grades	.28	.20	.15		.77	.30	.39
33. Elementary school mathematics grades	.38	.28	.29	.60		.34	.42
34. Employment: father	.23	.18	.14	.20	.38		.37
35. Employment: mother	.17	.18	.05	.15	.25	.54	
36. Economic status	.25	.26	.12	.22	.33	.86	.68
37. Size of family	-.09	-.15	-.07	-.03	-.05	-.05	-.34
38. Position among siblings	-.16	-.03	.05	-.01	.12	.03	-.07
				Girls			

TABLE 15 (Continued)

Variable	Variable						
	36	37	38	39	40	41	42
				Boys			
19. Negative reaction to school	.26	-.08	.18	.15	.21	.12	-.24
20. Classroom behavior	.10	-.25	-.16	-.08	.13	.30	-.01
21. Neatness of work	.18	-.22	-.17	.02	.10	.19	-.02
22. Ability to read	.40	-.25	-.08	-.13	.18	.25	.15
23. Ability to write	.37	-.05	.07	.01	.25	.15	.02
24. Ability to do arithmetic	.24	-.38	-.10	.11	.20	.18	-.02
25. Attitude toward school	.15	-.23	-.19	.06	.30	.28	-.09
26. Parent interest in school work	.13	-.17	-.18	.08	.05	.26	-.14
27. Personal neatness	.16	-.29	-.33	.03	.08	.44	-.01
28. Ability to verbalize	.31	-.26	-.16	-.03	.23	.32	.01
29. Self-confidence	.35	-.28	-.11	-.03	.22	.23	-.06
30. Peer relations	.41	-.25	.09	-.07	.20	.11	-.01
31. Cooperation with school	.28	-.38	-.10	.20	.25	.41	-.25
32. Elementary school language grades	.39	-.21	-.06	.03	.27	.37	-.02
33. Elementary school mathematics grades	.47	-.23	.06	-.08	.23	.25	.05
34. Employment: father	.81	.20	.26	.23	.35	.03	-.22
35. Employment: mother	.66	-.17	.02	.15	.26	.30	-.13
36. Economic status		-.02	.21	.15	.20	.12	-.13
37. Size of family	-.18		.36	.07	.05	-.04	-.12
38. Position among siblings	-.08	.07		.05	.14	-.11	.13
				Girls			

TABLE 15 (Continued)

Variable	Variable						
	43	44	45	46	47	48	49
	Boys						
19. Negative reaction to school	.27	.05	.04	.31	.04	-.11	.23
20. Classroom behavior	.23	.10	.28	.34	.08	-.09	.06
21. Neatness of work	.16	.10	.25	.29	.35	-.10	.10
22. Ability to read	.25	.10	.27	.39	.20	-.11	.29
23. Ability to write	.20	.11	.31	.38	.33	-.06	.19
24. Ability to do arithmetic	.11	.12	.24	.19	.12	-.06	.18
25. Attitude toward school	.08	.04	.25	.29	.17	-.13	.11
26. Parent interest in school work	.25	-.12	.13	.32	.12	-.01	.16
27. Personal neatness	.35	.05	.22	.33	.31	.02	.17
28. Ability to verbalize	.09	.02	.13	.17	.16	-.15	.11
29. Self-confidence	.20	.12	.14	.18	.14	-.07	.22
30. Peer relations	.19	.03	.07	.09	.21	-.02	.15
31. Cooperation with school	.14	-.02	.19	.27	.24	-.10	.11
32. Elementary school language grades	.24	.01	.23	.37	.10	.10	.38
33. Elementary school mathematics grades	.33	.13	.32	.50	.20	.07	.41
34. Employment: father	.18	-.11	.27	.01	-.05	-.27	.04
35. Employment: mother	.57	.03	.35	.35	.29	-.08	.23
36. Economic status	.39	-.01	.39	.12	.20	-.24	.03
37. Size of family	-.08	-.09	.09	.01	.02	-.03	.15
38. Position among siblings	-.03	.10	.19	.03	.10	-.02	.03

TABLE 15 (Continued)

Variable	Variable						
	50	51	52	53	54	55	56
				Boys			
19. Negative reaction to school	.15	.15	.19	.12	.17	.31	-.05
20. Classroom behavior	.26	.14	.18	.30	.24	.40	.01
21. Neatness of work	.25	.20	.13	.35	.33	.37	.11
22. Ability to read	.39	.27	.30	.32	.38	.41	.14
23. Ability to write	.30	.17	.31	.23	.37	.41	.09
24. Ability to do arithmetic	.30	.28	.18	.20	.36	.28	.17
25. Attitude toward school	.31	.18	.21	.25	.29	.34	-.02
26. Parent interest in school work	.22	.16	.14	.26	.18	.33	-.13
27. Personal neatness	.27	.12	.15	.26	.29	.36	.12
28. Ability to verbalize	.19	.02	.21	.13	.24	.27	-.09
29. Self-confidence	.31	.17	.25	.20	.23	.21	.01
30. Peer relations	.18	.07	.21	.10	.22	.11	-.09
31. Cooperation with school	.22	.18	.12	.23	.23	.32	-.07
32. Elementary school language grades	.50	.27	.47	.29	.09	.29	.18
33. Elementary school mathematics grades	.52	.38	.45	.43	.26	.45	.24
34. Employment: father	.15	.29	.11	.11	-.10	.20	.08
35. Employment: mother	.28	.11	.38	.23	.15	.32	.16
36. Economic status	.16	.28	.19	.19	-.02	.32	.10
37. Size of family	.04	.12	-.09	-.10	-.10	-.23	-.09
38. Position among siblings	.08	.23	-.14	.01	.15	-.06	.05

TABLE 15 (Continued)

Variable	Variable						
	1	2	3	4	5	6	7
				Girls			
39. Years in neighborhood	.23	.14	.27	.25	.13	.16	.18
40. Education: father	.19	.12	.24	.17	.12	-.01	.06
41. Education: mother	.12	.14	.19	-.06	.01	-.02	.18
42. Number of elementary schools attended	-.20	-.06	-.18	-.25	.14	-.26	-.12
43. Flexibility of closure	.03	.17	.13	.18	.06	.21	.11
44. Speed of closure	.24	.35	.39	.33	.24	.29	.36
45. Word fluency	.18	.15	.27	.26	.03	.26	.26
46. Length estimation	.10	.31	.27	.13	.08	.02	.27
47. Associative memory	-.02	.23	.21	.16	.20	.30	.25
48. Memory span: auditory	-.02	.07	.03	-.03	-.06	.07	.10
49. Number facility: addition	.01	.15	.30	.23	.12	.12	.31
50. Number facility: division	.28	.39	.29	.38	.31	.39	.25
51. Number facility: subtraction/multiplication	.25	.36	.51	.37	.28	.25	.39
52. Perceptual speed	.03	.22	.16	.09	.14	.01	.19
53. General reasoning	.21	.22	.27	.26	.14	.23	.25
54. Spatial scanning	.28	.51	.46	.43	.37	.12	.12
55. Semantic spontaneous flexibility 1	.37	.43	.42	.46	.16	.35	.53
56. Semantic spontaneous flexibility 2	-.03	.06	-.05	-.01	-.21	-.03	.12

TABLE 15 (Continued)

Variable	Variable						
	8	9	10	11	12	13	14
	Girls						
39. Years in neighborhood	.09	.06	-.19	.25	.16	.24	-.23
40. Education: father	-.10	-.09	-.10	.09	.11	.14	.12
41. Education: mother	-.08	-.12	-.19	.02	-.03	.02	.16
42. Number of elementary schools attended	-.16	-.14	-.02	-.28	-.24	-.31	.23
43. Flexibility of closure	.21	.05	.14	.41	-.31	.39	.02
44. Speed of closure	.36	.15	.11	.05	.15	.11	-.06
45. Word fluency	.13	.24	.20	.23	.10	.16	.06
46. Length estimation	.19	-.01	.07	.17	.25	.24	-.07
47. Associative memory	.21	.18	.03	.24	.25	.26	-.21
48. Memory span: auditory	.04	.10	.20	.14	-.15	.02	-.11
49. Number facility: addition	.11	.17	.10	.26	.12	.19	.02
50. Number facility: division	.19	.41	.03	.48	.41	.44	-.16
51. Number facility: subtraction/ multiplication	.29	.28	.10	.65	.53	.62	-.17
52. Perceptual speed	.05	-.08	.10	.21	.24	.21	.12
53. General reasoning	.24	.28	.04	.45	.45	.46	-.03
54. Spatial scanning	.10	.25	.12	.28	.40	.36	-.10
55. Semantic spontaneous flexibility 1	.24	.18	-.04	.33	.30	.32	-.05
56. Semantic spontaneous flexibility 2	-.01	-.04	-.02	-.18	-.18	-.21	.25

TABLE 15 (Continued)

Variable	Variable						
	15	16	17	18	19	20	21
	Girls						
39. Years in neighborhood	-.19	-.01	-.03	.03	-.02	.00	.13
40. Education: father	.08	.02	-.04	-.05	.25	-.06	.04
41. Education: mother	.05	-.01	-.03	-.03	.16	.06	.03
42. Number of elementary schools attended	.06	.01	.13	-.15	.08	.11	-.06
43. Flexibility of closure	.10	.01	-.07	-.14	-.21	-.17	.06
44. Speed of closure	.03	.05	-.08	.01	.20	.26	.17
45. Word fluency	.09	-.12	-.04	-.05	.24	.13	.12
46. Length estimation	-.18	.19	-.25	.20	.08	.22	.17
47. Associative memory	-.28	-.04	.05	-.10	.13	-.11	-.02
48. Memory span: auditory	-.17	-.05	-.04	-.05	.23	.07	-.09
49. Number facility: addition	.14	-.28	-.05	.06	-.02	.22	.40
50. Number facility: division	-.14	-.21	.06	-.07	.04	.04	.20
51. Number facility: subtraction/ multiplication	-.04	-.16	-.01	-.04	.14	.13	.26
52. Perceptual speed	-.06	-.05	.06	-.08	.05	-.04	.01
53. General reasoning	.03	-.10	-.22	.19	.04	-.05	.03
54. Spatial scanning	.01	-.19	-.13	.02	.25	.09	.19
55. Semantic spontaneous flexibility 1	.02	.01	-.07	.04	.08	.25	.22
56. Semantic spontaneous flexibility 2	.19	.01	.02	-.11	.24	.18	.06

TABLE 15 (Continued)

Variable	Variable						
	22	23	24	25	26	27	28
	Girls						
39. Years in neighborhood	.31	.21	.16	.08	.20	-.01	.15
40. Education: father	-.06	-.02	.01	-.06	.03	.01	.03
41. Education: mother	.02	.04	.01	.10	.13	.14	.05
42. Number of elementary schools attended	-.25	-.15	-.06	-.01	-.18	.05	-.14
43. Flexibility of closure	.14	.10	.20	-.19	.02	-.05	-.01
44. Speed of closure	.25	.23	.19	.34	.42	.29	.23
45. Word fluency	.10	.11	.20	-.02	.18	.10	.12
46. Length estimation	.20	.10	.09	.11	.25	.20	.05
47. Associative memory	.15	-.01	.21	-.19	-.06	-.16	.14
48. Memory span: auditory	-.06	-.08	.22	.02	.04	-.06	-.03
49. Number facility: addition	.25	.30	.51	.06	.26	.20	.26
50. Number facility: division	.22	.29	.38	.03	.24	.10	.24
51. Number facility: subtraction/ multiplication	.28	.27	.37	.09	.37	.36	.17
52. Perceptual speed	.10	.02	.18	-.01	.01	-.05	.05
53. General reasoning	.09	.06	-.02	-.05	.25	-.01	-.02
54. Spatial scanning	.10	.09	.12	.07	.36	.20	.16
55. Semantic spontaneous flexibility 1	.39	.36	.27	.30	.58	.23	.39
56. Semantic spontaneous flexibility 2	-.10	-.06	-.04	.17	.05	.11	.22

TABLE 15 (Continued)

Variable	Variable						
	29	30	31	32	33	34	35
	Girls						
39. Years in neighborhood	.19	.16	.05	.23	.19	.15	.14
40. Education: father	-.05	.03	.01	-.08	.07	-.01	.36
41. Education: mother	-.03	.04	.14	.10	.04	.01	.29
42. Number of elementary schools attended	-.12	-.05	-.04	-.18	-.23	-.13	-.19
43. Flexibility of closure	.05	-.02	-.07	.21	.35	.08	-.08
44. Speed of closure	.30	.29	.25	.26	.18	.28	-.03
45. Word fluency	.14	.03	.11	.16	.09	.06	-.04
46. Length estimation	.11	.12	.20	.11	.14	-.05	-.06
47. Associative memory	.18	.02	-.19	.29	.18	-.16	-.06
48. Memory span: auditory	.11	.16	.10	.13	.30	-.06	.03
49. Number facility: addition	.28	.24	.22	.18	.51	.08	.08
50. Number facility: division	.31	.22	.12	.12	.23	.14	-.01
51. Number facility: subtraction/multiplication	.19	.34	.22	.32	.37	.21	.31
52. Perceptual speed	.07	.13	.15	-.02	.13	-.20	-.12
53. General reasoning	-.01	.10	.04	.04	.09	.06	.16
54. Spatial scanning	.16	.21	.17	.10	.21	.24	.27
55. Semantic spontaneous flexibility 1	.43	.38	.35	.41	.39	.41	.21
56. Semantic spontaneous flexibility 2	.09	-.07	.19	.10	.06	.12	.19

TABLE 15 (Continued)

Variable	Variable						
	36	37	38	39	40	41	42
				Boys			
39. Years in neighborhood	.18	-.01	.03		.24	.16	-.76
40. Education: father	.13	-.29	-.03	-.01		.25	-.24
41. Education: mother	.15	-.22	.05	-.03	.79		-.13
42. Number of elementary schools attended	-.18	.13	-.13	-.82	.06	.06	
43. Flexibility of closure	.04	.19	.07	-.12	-.05	-.19	-.05
44. Speed of closure	.28	-.03	.01	-.17	-.02	.10	.20
45. Word fluency	.01	.29	.04	.01	.06	.06	-.03
46. Length estimation	-.04	.01	.04	-.14	.02	.06	.11
47. Associative memory	-.13	.25	.04	-.05	-.03	-.13	.06
48. Memory span: auditory	-.04	.20	-.02	-.07	.04	.05	.11
49. Number facility: addition	.08	.19	.14	-.02	.12	.07	.05
50. Number facility: division	.04	.27	.16	.04	-.19	-.23	-.08
51. Number facility: subtraction/ multiplication	.21	-.09	.05	.30	.18	.08	-.29
52. Perceptual speed	-.15	.12	.09	-.23	.11	.12	.15
53. General reasoning	.13	-.02	.23	.20	.19	.04	-.32
54. Spatial scanning	.23	-.09	.06	-.13	.29	.23	.10
55. Semantic spontaneous flexibility 1	.37	-.10	.06	.24	.14	.21	-.21
56. Semantic spontaneous flexibility 2	.07	-.01	.23	-.01	.06	.14	-.07
				Girls			

TABLE 15 (Continued)

Variable	Variable						
	43	44	45	46	47	48	49
				Boys			
39. Years in neighborhood	.08	-.14	.02	-.20	-.08	-.19	-.10
40. Education: father	.01	.08	.11	.09	.01	.05	.30
41. Education: mother	.10	-.05	.21	.12	.02	-.10	.21
42. Number of elementary schools attended	-.02	.23	.18	.20	.07	.19	-.05
43. Flexibility of closure		.18	.35	.44	.17	-.13	.16
44. Speed of closure	-.05		.23	.11	.45	.12	.08
45. Word fluency	.35	.29		.31	.22	-.06	.02
46. Length estimation	.17	.35	.22		.18	.18	.42
47. Associative memory	.16	.11	.10	.26		.32	.27
48. Memory span: auditory	-.16	-.01	.03	.23	.26		.30
49. Number facility: addition	.30	.08	.41	.17	.13	.23	
50. Number facility: division	.33	.13	.39	.02	.28	-.01	.31
51. Number facility: subtraction/ multiplication	.32	.07	.38	.19	.16	.08	.34
52. Perceptual speed	.28	-.02	.13	.21	.25	.16	.34
53. General reasoning	.19	-.04	.13	.16	.01	-.08	.16
54. Spatial scanning	.05	.22	.20	.40	.15	.15	.36
55. Semantic spontaneous flexibility 1	.12	.51	.25	.22	.13	.03	.27
56. Semantic spontaneous flexibility 2	-.04	.14	.27	.10	.04	-.01	.18
				Girls			

TABLE 15 (Continued)

Variable	Variable						
	50	51	52	53	54	55	56
				Boys			
39. Years in neighborhood	-.02	.08	-.11	-.17	-.14	-.06	-.06
40. Education: father	.12	.05	.31	.02	-.15	.06	-.02
41. Education: mother	.21	.11	.23	-.03	.04	.07	.05
42. Number of elementary schools attended	.05	-.09	.07	.25	.29	.09	.25
43. Flexibility of closure	.27	.14	.29	.26	.16	.31	.24
44. Speed of closure	.02	.08	.13	.24	.10	.32	.17
45. Word fluency	.11	.15	.25	.05	.19	.43	.38
46. Length estimation	.41	.19	.47	.44	.26	.31	.20
47. Associative memory	.15	.23	-.01	.13	.22	.32	.35
48. Memory span: auditory	.30	.07	.26	.02	.04	.14	.34
49. Number facility: addition	.58	.57	.41	.13	.05	.08	.12
50. Number facility: division		.69	.39	.36	.26	.24	.28
51. Number facility: subtraction/ multiplication	.50		.02	.21	.31	.17	.28
52. Perceptual speed	.10	.14		.33	.02	.28	-.09
53. General reasoning	.30	.41	.23		.37	.40	.03
54. Spatial scanning	.28	.41	.27	.24		.18	.29
55. Semantic spontaneous flexibility 1	.31	.41	.05	.18	.33		.18
56. Semantic spontaneous flexibility 2	-.01	.03	-.07	-.03	.09	.33	
				Girls			

TABLE 16

ROTATED FACTOR MATRIX, ALL VARIABLES FOR BOYS IN THE SAMPLE (N=52)

	Variable	Factor I	Factor II	Factor III	Factor IV
	ITBS:				
1.	Vocabulary	.70	-.22	.01	-.01
2.	Reading	.81	-.05	.06	.14
3.	Language total	.63	-.05	-.02	-.23
4.	Work study total	.73	-.24	-.10	.00
5.	Arithmetic total	.76	-.30	.05	.20
	SAT:				
6.	Word meaning	.35	-.20	.31	-.05
7.	Paragraph meaning	.48	-.13	-.09	-.04
8.	Spelling	.51	-.04	.02	-.08
9.	Language	.06	-.04	.56	.08
10.	Arithmetic computation	.34	-.13	-.13	-.01
	CTMM:				
11.	Verbal	.42	-.13	.06	.01
12.	Non-verbal	.24	-.41	.13	-.06
13.	Total	.36	-.23	.10	-.03
14.	Pupil participation	-.03	.16	-.90	-.03
15.	Parent participation	.07	.02	-.87	.02
16.	Absences per term	-.04	.07	.01	-.40
17.	Positive reaction to school	-.07	.02	-.02	.94
18.	Neutral reaction to school	-.12	.06	-.05	-.91
19.	Negative reaction to school	.34	-.13	.13	-.23
20.	Classroom behavior	.21	-.84	.08	-.04
21.	Neatness of work	.09	-.79	.07	.18
22.	Ability to read	.23	-.37	.21	-.06
23.	Ability to write	.20	-.43	.03	.02
24.	Ability to do arithmetic	-.01	-.24	-.18	.01
25.	Attitude toward school	.10	-.87	-.01	-.05
26.	Parent interest in school work	.11	-.53	.01	.06
27.	Personal neatness	.10	-.78	.13	.05
28.	Ability to verbalize	.15	-.50	-.10	-.10

TABLE 16 (Continued)

Variable	Factor			
	V	VI	VII	VIII
ITBS:				
1. Vocabulary	.14	-.07	.14	-.06
2. Reading	.09	-.10	.18	-.01
3. Language total	-.05	-.02	.09	.06
4. Work study total	-.03	.08	.15	.14
5. Arithmetic total	.07	-.06	.04	.07
SAT:				
6. Word meaning	-.04	.05	.23	-.10
7. Paragraph meaning	.12	-.14	.20	.01
8. Spelling	.29	-.11	.09	-.10
9. Language	-.14	.05	.25	-.19
10. Arithmetic computation	.15	-.08	.51	.16
CTMM:				
11. Verbal	.08	.02	.18	.01
12. Non-verbal	.08	-.14	.12	.14
13. Total	.08	-.06	.16	.08
14. Pupil participation	.02	.08	-.08	-.14
15. Parent participation	-.09	.11	-.07	-.05
16. Absences per term	-.08	-.02	-.02	.02
17. Positive reaction to school	.04	-.07	.04	-.02
18. Neutral reaction to school	-.01	.16	.00	.01
19. Negative reaction to school	-.06	.40	-.07	.07
20. Classroom behavior	.06	-.09	.03	.02
21. Neatness of work	.06	-.04	.05	-.01
22. Ability to read	.20	.16	.12	.07
23. Ability to write	.14	-.03	.01	.19
24. Ability to do arithmetic	.05	.09	.22	.01
25. Attitude toward school	.08	.04	.10	.06
26. Parent interest in school work	-.17	.28	.09	.09
27. Personal neatness	-.05	.01	.09	.01
28. Ability to verbalize	.17	-.07	-.09	.11

TABLE 16 (Continued)

Variable	Factor			
	IX	X	XI	XII
ITBS:				
1. Vocabulary	-.15	.15	.05	.06
2. Reading	-.03	.13	-.04	.02
3. Language total	.28	-.01	.11	-.04
4. Work study total	-.09	-.07	.05	.01
5. Arithmetic total	-.08	-.06	.10	.12
SAT:				
6. Word meaning	-.19	-.03	-.08	.07
7. Paragraph meaning	-.17	-.14	-.23	.02
8. Spelling	-.07	.19	-.13	.29
9. Language	-.36	.05	.13	.12
10. Arithmetic computation	-.24	-.09	-.10	.33
CTMM:				
11. Verbal	-.12	.02	.02	.01
12. Non-verbal	-.01	.03	-.05	.08
13. Total	-.07	.03	-.02	.05
14. Pupil participation	.02	-.07	-.01	-.14
15. Parent participation	.12	-.16	.04	.12
16. Absences per term	-.47	.03	-.22	.07
17. Positive reaction to school	.09	.01	-.05	-.06
18. Neutral reaction to school	.03	.02	-.15	-.13
19. Negative reaction to school	-.24	-.05	.35	.34
20. Classroom behavior	-.11	-.12	-.03	.06
21. Neatness of work	-.02	.13	-.01	.09
22. Ability to read	-.08	.04	-.04	-.04
23. Ability to write	-.04	.17	.25	.02
24. Ability to do arithmetic	.12	.19	-.17	.05
25. Attitude toward school	.10	.09	-.03	.04
26. Parent interest in school work	-.19	-.08	-.01	.26
27. Personal neatness	-.23	.10	-.20	-.11
28. Ability to verbalize	.05	-.01	-.02	-.13

TABLE 16 (Continued)

Variable	Factor			
	XIII	XIV	XV	h^2
ITBS:				
1. Vocabulary	.07	.34	-.25	.8156
2. Reading	-.03	.22	-.25	.8507
3. Language total	.22	.24	-.32	.7680
4. Work study total	-.11	.21	-.13	.7396
5. Arithmetic total	-.20	-.04	.08	.8049
SAT:				
6. Word meaning	-.25	.11	-.66	.8839
7. Paragraph meaning	-.06	.29	-.59	.8590
8. Spelling	.03	.23	-.45	.7731
9. Language	-.23	.14	-.36	.8193
10. Arithmetic computation	.11	.06	-.25	.7280
CTMM:				
11. Verbal	-.02	.73	-.31	.8793
12. Non-verbal	-.23	.76	-.12	.8954
13. Total	-.13	.80	-.23	.9547
14. Pupil participation	-.04	-.01	-.01	.9020
15. Parent participation	-.11	-.09	.04	.8570
16. Absences per term	-.52	-.08	-.03	.7150
17. Positive reaction to school	.13	-.07	.07	.9451
18. Neutral reaction to school	-.02	-.03	.03	.9104
19. Negative reaction to school	-.21	.17	-.18	.7790
20. Classroom behavior	-.03	.12	-.06	.8110
21. Neatness of work	-.01	-.03	-.34	.8185
22. Ability to read	-.19	.22	-.64	.8330
23. Ability to write	-.12	-.07	-.72	.9054
24. Ability to do arithmetic	-.14	.32	-.63	.7450
25. Attitude toward school	-.07	.11	-.17	.8484
26. Parent interest in school work	-.08	.17	-.03	.5616
27. Personal neatness	-.18	.11	-.13	.8185
28. Ability to verbalize	-.53	.17	-.43	.8541

TABLE 16 (Continued)

Variable	Factor			
	I	II	III	IV
29. Self-confidence	.06	-.40	-.21	-.09
30. Peer relations	.04	-.34	-.02	-.07
31. Cooperation with school	.17	-.81	.05	-.06
32. Elementary school language grades	.48	-.16	.02	.06
33. Elementary school mathematics grades	.36	-.19	.14	-.06
34. Employment: father	.16	-.04	.03	.06
35. Employment: mother	.32	-.28	.20	-.07
36. Economic status	.18	-.06	.03	.05
37. Size of family	-.13	.16	-.14	.06
38. Position among siblings	.13	.26	.07	.11
39. Years in neighborhood	-.01	-.04	-.07	.17
40. Education: father	.54	-.12	.01	-.13
41. Education: mother	.29	-.33	-.16	-.03
42. Number of elementary schools attended	.08	.08	.11	.07
43. Flexibility of closure	-.03	-.13	.15	-.06
44. Speed of closure	-.01	.05	.15	.27
45. Word fluency	.17	-.19	-.05	.25
46. Length estimation	.22	-.25	.20	.03
47. Associative memory	.02	-.20	.15	.22
48. Memory span: auditory	.30	.17	.13	.29
49. Number facility: addition	.22	.01	.18	-.06
50. Number facility: division	.21	-.16	.08	.09
51. Number facility: subtraction/ multiplication	.09	-.08	.13	.01
52. Perceptual speed	.16	-.05	.12	.01
53. General reasoning	.18	-.28	-.01	.03
54. Spatial scanning	.04	-.27	.10	.05
55. Semantic spontaneous flexibility 1	.23	-.29	.06	.16
56. Semantic spontaneous flexibility 2	.28	.12	-.03	.30

TABLE 16 (Continued)

Variable	Factor			
	V	VI	VII	VIII
29. Self-confidence	.20	-.02	.16	.10
30. Peer relations	.24	-.02	.03	.06
31. Cooperation with school	.04	.26	.04	-.05
32. Elementary school language grades	.17	.03	.29	.25
33. Elementary school mathematics grades	.16	.01	.29	.20
34. Employment: father	.85	.16	.09	.04
35. Employment: mother	.34	.17	.02	.09
36. Economic status	.77	.14	.03	-.02
37. Size of family	.16	-.01	.22	.20
38. Position among siblings	.22	-.01	.07	-.17
39. Years in neighborhood	.16	.83	-.01	-.10
40. Education: father	.28	.27	.06	.33
41. Education: mother	-.09	.17	.06	.16
42. Number of elementary schools attended	-.10	.89	-.07	-.05
43. Flexibility of closure	.21	.05	.13	.14
44. Speed of closure	-.01	-.13	-.01	.07
45. Word fluency	.32	-.15	-.08	.09
46. Length estimation	-.15	-.19	.23	.43
47. Associative memory	-.07	.01	.15	-.07
48. Memory span: auditory	-.40	-.14	.27	.22
49. Number facility: addition	.14	.08	.68	.38
50. Number facility: division	.01	-.06	.91	.14
51. Number facility: subtraction/ multiplication	.13	.11	.82	.23
52. Perceptual speed	.03	-.06	.12	.81
53. General reasoning	.04	-.25	.22	.14
54. Spatial scanning	-.31	-.25	.14	-.32
55. Semantic spontaneous flexibility 1	.08	.03	-.08	.13
56. Semantic spontaneous flexibility 2	-.08	-.21	.27	-.34

TABLE 16 (Continued)

Variable	Factor			
	IX	X	XI	XII
29. Self-confidence	-.02	.08	-.07	-.01
30. Peer relations	-.02	.03	.09	-.01
31. Cooperation with school	-.02	.05	-.07	.04
32. Elementary school language grades	-.14	-.08	-.19	.01
33. Elementary school mathematics grades	-.16	.08	-.04	.19
34. Employment: father	-.01	-.10	.17	.06
35. Employment: mother	-.56	.09	.01	-.08
36. Economic status	-.31	.07	.07	.05
37. Size of family	.02	-.04	.66	-.19
38. Position among siblings	.08	.10	.73	.09
39. Years in neighborhood	-.04	-.02	.00	.09
40. Education: father	.30	.14	.07	-.17
41. Education: mother	-.15	-.08	-.02	-.52
42. Number of elementary schools attended	-.01	.11	.03	.10
43. Flexibility of closure	-.80	.12	-.03	.08
44. Speed of closure	.01	.81	-.01	.16
45. Word fluency	-.31	.36	.19	-.14
46. Length estimation	-.43	.02	.16	.22
47. Associative memory	-.15	.72	.13	-.09
48. Memory span: auditory	.06	.33	-.15	.00
49. Number facility: addition	.01	.09	.11	.16
50. Number facility: division	-.14	-.01	.01	.10
51. Number facility: subtraction/ multiplication	.01	.11	.17	.06
52. Perceptual speed	-.18	.04	-.09	.08
53. General reasoning	-.12	.07	.02	.62
54. Spatial scanning	-.16	.09	.35	.11
55. Semantic spontaneous flexibility 1	-.19	.42	-.07	.39
56. Semantic spontaneous flexibility 2	-.34	.39	-.11	-.18

TABLE 16 (Continued)

Variable	Factor			
	XIII	XIV	XV	h^2
29. Self-confidence	-.66	-.28	-.22	.8643
30. Peer relations	-.81	.11	.23	.9105
31. Cooperation with school	-.22	.21	-.10	.8748
32. Elementary school language grades	-.06	.17	-.47	.7474
33. Elementary school mathematics grades	-.08	.32	-.54	.8097
34. Employment: father	-.16	.08	-.11	.8753
35. Employment: mother	-.25	.16	-.05	.7861
36. Economic status	-.19	.10	-.22	.8556
37. Size of family	-.28	-.21	.20	.8128
38. Position among siblings	-.08	.06	.06	.7467
39. Years in neighborhood	.08	-.05	.01	.7770
40. Education: father	-.04	-.01	.03	.7369
41. Education: mother	.05	.36	-.02	.7198
42. Number of elementary schools attended	.02	.08	-.06	.8644
43. Flexibility of closure	.03	.07	-.09	.7996
44. Speed of closure	.03	.14	-.02	.8167
45. Word fluency	.23	.41	-.07	.7794
46. Length estimation	.03	.14	-.13	.7374
47. Associative memory	-.17	-.16	-.13	.7861
48. Memory span: auditory	-.26	-.23	.19	.8092
49. Number facility: addition	-.07	.12	-.14	.7883
50. Number facility: division	-.10	.10	-.14	.8290
51. Number facility: subtraction/ multiplication	.04	.14	-.13	.8641
52. Perceptual speed	-.12	.16	-.13	.8231
53. General reasoning	.03	.13	-.06	.6679
54. Spatial scanning	-.15	.23	-.31	.7040
55. Semantic spontaneous flexibility 1	.07	.19	-.23	.6668
56. Semantic spontaneous flexibility 2	.08	.17	-.09	.7675

TABLE 17

ROTATED FACTOR MATRIX, ALL VARIABLES FOR GIRLS IN THE SAMPLE (N=60)

	Variable	Factor I	Factor II	Factor III	Factor IV
	ITBS:				
1.	Vocabulary	.23	-.34	.19	.09
2.	Reading	.15	-.62	.03	-.03
3.	Language total	.21	-.55	.20	.08
4.	Work study total	.06	-.57	-.03	.13
5.	Arithmetic total	.09	-.39	.10	-.06
	SAT:				
6.	Word meaning	-.03	-.20	-.02	.09
7.	Paragraph meaning	.27	-.19	.20	.11
8.	Spelling	.25	-.27	-.10	-.05
9.	Language	.15	-.19	-.15	.05
10.	Arithmetic computation	.27	-.09	-.27	-.21
	CTMM:				
11.	Verbal	.03	-.81	.02	.13
12.	Non-verbal	-.01	-.86	-.03	.04
13.	Total	-.01	-.90	.01	.11
14.	Pupil participation	.06	.18	.14	-.21
15.	Parent participation	-.09	.17	.07	-.20
16.	Absences per term	-.17	-.03	-.03	.03
17.	Positive reaction to school	.04	-.01	-.06	-.06
18.	Neutral reaction to school	-.01	-.03	-.04	.06
19.	Negative reaction to school	-.08	.10	.27	-.02
20.	Classroom behavior	.82	.10	.02	-.04
21.	Neatness of work	.50	-.09	.05	-.03
22.	Ability to read	.17	-.25	.01	.15
23.	Ability to write	.33	-.14	.05	.05
24.	Ability to do arithmetic	.24	-.23	-.02	-.01
25.	Attitude toward school	.79	.04	.00	.01
26.	Parent interest in school work	.68	-.31	-.01	.09
27.	Personal neatness	.78	-.06	.03	-.02
28.	Ability to verbalize	.21	-.03	.02	.04

TABLE 17 (Continued)

Variable	Factor			
	V	VI	VII	VIII
ITBS:				
1. Vocabulary	-.07	.33	-.01	.14
2. Reading	-.05	.08	-.01	.17
3. Language total	.13	.13	.12	.25
4. Work study total	.06	.19	.10	.32
5. Arithmetic total	.27	.21	-.10	.27
SAT:				
6. Word meaning	.05	.73	.02	.25
7. Paragraph meaning	-.11	.23	.12	.43
8. Spelling	.09	.36	-.07	.06
9. Language	.02	.77	.13	-.05
10. Arithmetic computation	-.12	.36	.12	-.12
CTMM:				
11. Verbal	.01	.04	.13	.15
12. Non-verbal	-.07	.04	-.06	.10
13. Total	-.03	.01	.02	.13
14. Pupil participation	-.11	-.19	.08	.01
15. Parent participation	.45	-.15	.24	.30
16. Absences per term	-.20	-.58	-.18	-.14
17. Positive reaction to school	-.88	-.14	-.01	.12
18. Neutral reaction to school	.96	-.01	-.03	-.08
19. Negative reaction to school	-.39	.35	.11	-.11
20. Classroom behavior	-.04	.03	.09	.19
21. Neatness of work	-.01	.05	.22	.49
22. Ability to read	.04	-.02	.02	.72
23. Ability to write	-.06	.04	.06	.70
24. Ability to do arithmetic	-.11	.03	.29	.61
25. Attitude toward school	-.09	.08	-.17	.34
26. Parent interest in school work	.02	.16	.03	.27
27. Personal neatness	.13	.02	.18	.07
28. Ability to verbalize	-.05	.08	.05	.89

TABLE 17 (Continued)

Variable	Factor			
	IX	X	XI	XII
ITBS:				
1. Vocabulary	.32	-.03	-.15	.14
2. Reading	.44	-.22	-.07	-.15
3. Language total	.32	-.10	.11	-.07
4. Work study total	.40	-.06	-.23	.06
5. Arithmetic total	.08	-.05	-.05	.04
SAT:				
6. Word meaning	.15	-.14	.39	.01
7. Paragraph meaning	.18	-.04	.51	-.10
8. Spelling	.17	-.16	.58	.03
9. Language	.06	-.17	.01	-.09
10. Arithmetic computation	-.11	-.05	.25	-.16
CTMM:				
11. Verbal	-.11	-.06	.25	-.06
12. Non-verbal	.14	.04	.07	.07
13. Total	.01	-.01	.19	-.02
14. Pupil participation	-.01	.03	-.21	.18
15. Parent participation	-.16	-.14	.01	.38
16. Absences per term	.28	.16	.23	.16
17. Positive reaction to school	-.14	-.05	-.04	.06
18. Neutral reaction to school	.01	.11	.06	.03
19. Negative reaction to school	.33	-.17	-.08	-.23
20. Classroom behavior	.10	.02	.09	-.03
21. Neatness of work	-.07	-.10	.08	.12
22. Ability to read	.09	.01	.29	.09
23. Ability to write	-.01	-.15	.24	.19
24. Ability to do arithmetic	-.10	.03	.05	-.24
25. Attitude toward school	.12	-.13	.04	.01
26. Parent interest in school work	.22	-.22	.20	-.03
27. Personal neatness	.04	.01	.08	.02
28. Ability to verbalize	.09	-.13	-.06	.04

TABLE 17 (Continued)

Variable	Factor			
	XIII	XIV	XV	h^2
ITBS:				
1. Vocabulary	-.05	-.26	-.12	.5971
2. Reading	-.05	-.08	.08	.7297
3. Language total	-.32	-.09	-.09	.7514
4. Work study total	-.14	-.16	-.08	.7694
5. Arithmetic total	.12	-.58	.05	.7331
SAT:				
6. Word meaning	.03	-.15	.10	.8786
7. Paragraph meaning	-.15	.12	-.01	.7645
8. Spelling	.06	-.13	.01	.7114
9. Language	.07	-.21	-.05	.7865
10. Arithmetic computation	.04	-.11	-.49	.7251
CTMM:				
11. Verbal	.01	-.05	.10	.8080
12. Non-verbal	.09	-.16	-.09	.8282
13. Total	.05	-.13	-.01	.8933
14. Pupil participation	.18	.67	.07	.7208
15. Parent participation	.02	.14	-.06	.6677
16. Absences per term	.24	-.24	-.08	.7597
17. Positive reaction to school	-.14	.11	.08	.8817
18. Neutral reaction to school	.04	-.07	.02	.9483
19. Negative reaction to school	.23	-.10	-.26	.7112
20. Classroom behavior	.15	-.15	-.02	.7921
21. Neatness of work	.07	-.44	-.20	.8267
22. Ability to read	-.12	-.25	-.04	.8166
23. Ability to write	.01	-.34	.03	.8573
24. Ability to do arithmetic	-.01	-.25	.18	.7344
25. Attitude toward school	.06	.14	.05	.8503
26. Parent interest in school work	-.04	-.01	.03	.7987
27. Personal neatness	-.15	-.18	-.27	.7979
28. Ability to verbalize	.05	.08	-.15	.9122

TABLE 17 (Continued)

Variable	Factor			
	I	II	III	IV
29. Self-confidence	.17	-.13	-.12	.07
30. Peer relations	.42	.35	-.03	.02
31. Cooperation with school	.86	-.13	.04	-.01
32. Elementary school language grades	.15	-.14	-.02	.18
33. Elementary school mathematics grades	.20	.22	-.02	.05
34. Employment: father	.10	-.09	-.06	.05
35. Employment: mother	-.02	-.02	.33	.11
36. Economic status	.09	-.10	.09	.06
37. Size of family	-.12	.07	-.24	-.08
38. Position among siblings	.09	-.13	-.02	.05
39. Years in neighborhood	.03	-.16	.05	.91
40. Education: father	-.06	-.15	.88	-.05
41. Education: mother	.13	.01	.91	.01
42. Number of elementary schools attended	.05	.23	.07	-.83
43. Flexibility of closure	-.19	.44	-.22	-.21
44. Speed of closure	.24	-.04	.01	-.23
45. Word fluency	.04	-.12	.05	.01
46. Length estimation	.17	-.26	.01	-.19
47. Associative memory	-.37	-.20	-.06	-.09
48. Memory span: auditory	.04	.04	.04	-.05
49. Number facility: addition	.16	-.17	.10	-.15
50. Number facility: division	-.01	-.46	-.24	.03
51. Number facility: subtraction/ multiplication	.17	-.63	.11	.24
52. Perceptual speed	-.04	-.38	.20	-.41
53. General reasoning	-.01	-.58	.15	.17
54. Spatial scanning	.10	-.47	.21	-.25
55. Semantic spontaneous flexibility 1	.20	-.26	.13	.23
56. Semantic spontaneous flexibility 2	.08	.28	.07	.15

TABLE 17 (Continued)

Variable	Factor			
	V	VI	VII	VIII
29. Self-confidence	-.05	.09	.04	.84
30. Peer relations	.02	-.08	-.09	.62
31. Cooperation with school	-.06	.05	.01	.23
32. Elementary school language grades	.11	-.08	.15	.20
33. Elementary school mathematics grades	.22	-.02	.22	.31
34. Employment: father	.12	.12	.02	.06
35. Employment: mother	-.01	.06	.06	.21
36. Economic status	-.06	.16	-.07	.12
37. Size of family	-.10	.11	.29	-.15
38. Position among siblings	.17	.04	.04	-.12
39. Years in neighborhood	-.01	.01	-.03	.13
40. Education: father	-.01	-.03	.05	-.02
41. Education: mother	.01	-.08	-.01	-.03
42. Number of elementary schools attended	-.11	-.09	.02	-.09
43. Flexibility of closure	.10	-.06	.44	.02
44. Speed of closure	.06	.10	.02	.15
45. Word fluency	-.07	.24	.77	.01
46. Length estimation	.18	-.19	.09	-.02
47. Associative memory	-.12	.19	.04	.23
48. Memory span: auditory	-.02	.05	.04	.01
49. Number facility: addition	.14	.01	.66	.29
50. Number facility: division	-.11	.32	.40	.21
51. Number facility: subtraction/ multiplication	-.03	.06	.43	.05
52. Perceptual speed	-.06	.03	.06	.15
53. General reasoning	.20	.28	.03	-.08
54. Spatial scanning	.13	.07	.22	.02
55. Semantic spontaneous flexibility 1	.07	.00	.20	.29
56. Semantic spontaneous flexibility 2	-.05	-.08	.41	.08

TABLE 17 (Continued)

Variable	Factor			
	IX	X	XI	XII
29. Self-confidence	.19	-.11	.01	-.13
30. Peer relations	.06	-.13	-.16	-.14
31. Cooperation with school	.08	.01	.03	-.05
32. Elementary school language grades	.13	-.16	.68	-.18
33. Elementary school mathematics grades	-.05	-.35	.42	-.31
34. Employment: father	.18	-.89	.11	.08
35. Employment: mother	-.15	-.71	-.02	-.07
36. Economic status	.11	-.88	.12	.04
37. Size of family	-.01	.13	.07	-.19
38. Position among siblings	-.03	.01	-.06	-.02
39. Years in neighborhood	-.04	-.07	.03	-.01
40. Education: father	-.01	-.09	-.09	-.01
41. Education: mother	.08	-.08	.06	-.03
42. Number of elementary schools attended	.11	.08	-.11	-.07
43. Flexibility of closure	-.12	-.02	.35	.19
44. Speed of closure	.73	-.14	.19	.06
45. Word fluency	.29	.10	.10	.09
46. Length estimation	.46	.16	.19	-.31
47. Associative memory	.22	.24	.26	-.47
48. Memory span: auditory	-.02	-.01	.06	-.85
49. Number facility: addition	-.13	-.07	.02	-.28
50. Number facility: division	.08	-.01	-.11	.01
51. Number facility: subtraction/ multiplication	-.05	-.15	.10	-.11
52. Perceptual speed	-.11	.27	.08	-.24
53. General reasoning	-.10	-.01	.07	.10
54. Spatial scanning	.28	-.26	-.28	-.28
55. Semantic spontaneous flexibility 1	.52	-.28	.18	-.02
56. Semantic spontaneous flexibility 2	.37	-.12	-.01	-.02

TABLE 17 (Continued)

Variable	Factor			
	XIII	XIV	XV	h^2
29. Self-confidence	-.12	.10	-.01	.8694
30. Peer relations	-.14	.16	.09	.8102
31. Cooperation with school	-.06	.13	.02	.8545
32. Elementary school language grades	-.13	-.10	-.05	.7072
33. Elementary school mathematics grades	.12	-.24	.02	.7545
34. Employment: father	.06	-.05	.07	.9098
35. Employment: mother	.00	-.01	-.32	.8020
36. Economic status	-.05	.01	-.03	.8785
37. Size of family	.15	.01	.70	.7732
38. Position among siblings	.81	.03	.09	.7374
39. Years in neighborhood	-.01	-.09	.10	.8952
40. Education: father	-.01	-.01	-.14	.8449
41. Education: mother	-.01	.06	.05	.8676
42. Number of elementary schools attended	-.13	-.02	.13	.8508
43. Flexibility of closure	.04	.07	.07	.7127
44. Speed of closure	-.07	-.04	.11	.7557
45. Word fluency	-.03	.08	.05	.7815
46. Length estimation	.09	-.01	-.17	.6222
47. Associative memory	.08	-.08	.04	.6948
48. Memory span: auditory	-.01	-.01	.05	.7393
49. Number facility: addition	.11	-.03	.13	.7468
50. Number facility: division	.09	-.10	.27	.7063
51. Number facility: subtraction/ multiplication	-.07	-.01	-.11	.7490
52. Perceptual speed	.17	.22	.03	.6007
53. General reasoning	.22	.27	-.07	.6583
54. Spatial scanning	.01	-.08	-.18	.7460
55. Semantic spontaneous flexibility 1	.04	.14	.09	.7167
56. Semantic spontaneous flexibility 2	.41	.31	-.23	.7585

APPENDIX D

MULTIPLE REGRESSION ANALYSIS

TABLE 18

MULTIPLE REGRESSION COEFFICIENTS: STANDARDIZED TESTS AS CRITERION VARIABLES AND COGNITIVE FACTORS AS INDEPENDENT VARIABLES

Criterion Variable	Multiple Regression Coefficient[a]	F Value[b]
Iowa Tests of Basic Skills:		
Vocabulary	.5151	6.3189*
Reading comprehension	.5676	10.0784**
Language total	.5318	4.47**
Work study total	.5621	5.9464**
Arithmetic total	.4537	4.5354*
Stanford Achievement Test:		
Word meaning	.5269	8.1478*
Paragraph meaning	.5238	5.6179*
Spelling	.4402	4.2068
Language	.5275	6.7465*
Arithmetic computation	.3270	2.0955
California Test of Mental Maturity:		
Verbal	.5933	6.9942**
Non-verbal	.6208	7.1083**
Total	.6010	8.4002**

[a]This figure is the multiple regression coefficient at the point in the stepwise analysis when addition of variables does not increase the coefficient by .01 or > .01. The complete computer printout may be obtained upon request directed to the author.

[b]If significant at the .05 level, the F value is marked by an asterisk. If significant at the .01 level, the F value is marked by a double asterisk.

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