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Predicting Reading Readiness from Human Figure Drawings

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PREDICTING READING READINESS FROM HUMAN FIGURE DRAWINGS

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CHAPTER I

THE PROBLEM

This study was initiated to aid the Arlington Elementary School, Tacoma, Washington, in its search for a means to augment teacher judgments for the placement of kindergarten students in their subsequent first grade reading groups. The principal of Arlington expressed a need to find an inexpensive, reliable, and practical technique to predict reading readiness. (Practical was defined as a technique which would not require extensive training of teachers for administration, scoring, or interpretation.)

Dr. Glenn Easley had completed the initial research on a method of predicting reading readiness in kindergarten age children through their drawings of human figures. Koppitz, et. al., had demonstrated that human figure drawings have some established relationship to reading readiness. This study was an exploration of several possible methods of scoring human figure drawings for the prediction of reading readiness. Particular attention was paid to the Easley method of scoring drawings, as his work suggested high reliability, ease of scoring, and potential validity as a predictor of reading readiness.

Need for the Study

It is commonly agreed among educators that children need to reach a certain level of development before they can profit from formal school programs. The Gesell Institute's study of readiness (Ilg and Ames, 1964) estimated that from 9 to 21 per cent of children were clearly not ready for either kindergarten or first grade. An additional 23 to 36 per cent were "uncertains." Age attainment, by itself, has not proven to be a completely reliable index of readiness.

Reading has been called the most important subject taught to children (Gann, 1945). There is much concern that unless reading skills are acquired properly, future academic learning will be impaired. The National Committee on Reading recognized, as early as 1925, that not all children entering the first grade are equally ready to read (Rivlin, 1943).

The early identification and evaluation of children who may be prone to reading difficulties has been one major effort aimed toward reducing educational casualties. Rose and Stanley (1954) conclude:

> There is an abundance of evidence to show the value of educational diagnosis, and that science has confirmed the verdict of common sense. A real principle of educational learning is that one begins where the learner's present knowledge leaves off.

Tests of reading readiness have been developed as predictors of later reading achievement. However, validity

coefficients reported on twelve popular commercial tests range lower than would be ideal (Chall, 1958; Horrocks, 1964). Part of the dilemma of reading readiness measurement lies in the recognition of the complexity of the reading process itself.

Strong, et. al.(1955), make two valid points about the limitations of current reading readiness tests: they do not measure all of the factors involved in the process, and they report a total score which can be very misleading if taken without individual observation. Gray (1956) notes that there are at least twenty-six factors to consider in any child. He concludes that more is necessary than merely a score on a reading readiness test.

Smith (1958) also makes several salient remarks about the limitations of reading readiness tests. She comments that children in kindergarten and first grade often do not have the skills necessary for paper and pencil type tests. Most of the tests of reading readiness fail to clearly discern the middle child and his performance. She notes that there are few evaluation methods which measure social, emotional, and motivational characteristics of children at this young age. Smith makes a strong case for the elimination of the "one shot" evaluation of reading readiness in the spring. She appears to base her argument upon Gray's (1956) contention that during the year different maturation rates

for reading are occurring without notice.

In summary, current methods of reading readiness assessment are less than satisfactory as predictors, or as sensitive measures of child development. Easley's use of human figure drawings appeared worthy of investigation in this reading area, as the rationale he developed attempted a partial answer to Smith's criticism of current standardized methods.

Background Information

Easley (1964) designed a unique system for scoring human figure drawings of kindergarten age children. The purpose of the system was to provide the classroom teacher with a means to predict reading readiness for first grade work. Easley's review of the literature suggested that human figure drawings and art work were considered expressions of symbolic communication. He found that art work involves the experiences of the child, his perceptual motor development, his emotional and physical maturation, and his intellectual processes. Since it has been clearly established that reading is a complex process involving many factors of growth and development, it appeared logical to explore the use of the Draw-A-Man technique for predicting reading readiness.

Easley developed a quality scale consisting of twenty-one drawings which were converted into a Thurstone type scale of equal appearing intervals. The scale was based upon the assumption that the higher the quality of drawing, the greater the total integration of all factors in the child's development, including those associated with reading readiness.

A classroom teacher, using the method, would arrange the twenty-one sample drawing guides in their scaled order. She would then simply match the children's drawings with the scaled sample.

Easley formulated the rationale, selected the set of scaled drawings to be used in scoring, and provided the initial data on reliability and validity. Inter scorer reliability was based upon the evaluation of two judges with a reported correlation of .90. Validity was limited to simple correlation with the California Reading Test. This was reported at .64. No further work has been done on the Easley Scale.

Statement of the Problem

The purposes of this investigation were two-fold: First, to study the reliability and predictive validity of the Easley Scale in comparison with a number of other measurements; second, to select the best possible predictor of

reading achievement from the instruments used in this study. The criteria for reading achievement were: (1) scores from the Primary Reading Profiles administered at the end of the second grade, and (2) teacher placements in reading groups over an 18-month period.

In response to these purposes, answers were sought to the following questions:

1. To what extent does the Easley Scale, administered during the kindergarten year, predict second grade reading achievement as measured by the Primary Reading Profiles?

2. To what extent does the Easley Scale predict teacher placements in reading groups as a measure of reading achievement?

3. To what extent do the Rutgers Perceptual Drawing Test and the numerical, reading and total scores of the Metropolitan Readiness Test predict reading achievement as determined by teacher placements and scores from the Primary Reading Profiles?

4. To what extent does the Easley Scale, in combination with any one of the other selected measures of reading readiness, intelligence, or perception prove predictive of reading achievement as measured by the Primary Reading Profiles?

Certain other questions were raised concerning the Easley Scale itself. Answers were sought for the following:

1. Does the Easley Draw-A-Man technique duplicate other established drawing measures such as the Goodenough-Harris point scoring system, the Harris quality scale system, or the Visual Five point rating system used by the Metropolitan Reading Readiness Tests?

2. Are the other systems of scoring drawings more predictive of reading achievement?

3. What degree of relationship exists between the Easley Scale and the other measures of intelligence, perceptual processes, and reading readiness selected for the study?

4. Will scorer reliability estimates reported by Easley be upheld when independent scorings are obtained from three psychologists using the Easley method?

Other studies at much higher grade levels, notably those concerned with the Washington Pre-College Testing Program, suggest that teacher grades and placements may be the best overall predictors of future academic success. A final question was raised by this study:

1. How accurately do teacher placements in reading groups predict second grade reading achievement as measured by the Primary Reading Profiles?

Limitations of the Study

The population of kindergarten children used in this study was restricted to the Arlington Elementary School in Tacoma, Washington. Due to the transient character of the population in the Arlington district, many of the original children were lost to the study. The final sample was considerably reduced from the original population of kindergarten pupils. The remaining subjects, therefore, do not constitute a random selection of kindergarten pupils from the Arlington School. The foregoing facts suggest that generalizations to other populations would be inappropriate.

Definitions of Terms

Reading readiness is interpreted as that level of child development requisite for learning to read, usually understood to imply a chronological age of six years and an IQ of at least 100 (Good, 1959).

The Easley Scale is understood to mean that system of scoring human figure drawings developed by Glenn Easley specifically to predict reading readiness in children five and one-half to six years of age.

Other terminology used is common to psychometrics and educational psychology.

Organization of the Study

Chapter Two contains a review of the relevant literature concerned with reading readiness, human figure drawing technique as used in practice, and efforts to adapt the Draw-A-Man to educational measurement. Chapter Three presents the methodology. This includes the selection of the sample of pupils and statistical procedures. The results are presented in Chapter Four. A discussion of the results is found in Chapter Five. Chapter Six summarizes the study.

CHAPTER II

REVIEW OF LITERATURE

This chapter reviews and summarizes previous efforts to adapt human figure drawing techniques for academic prediction. Before examining studies specifically related to the Easley Scale, reading readiness and human figure drawings in general are briefly reviewed.

Factors in Reading Readiness

Much has been written on reading readiness and its role in the eventual scholastic achievement of children. Numerous studies have been performed in an attempt to describe what is involved in the reading process. Many authors focus on one variable as most influential in reading success, while others select combinations of variables. Still others make broad statements to include the total range of factors in child development as inseparable from successful reading performance.

Visual motor perception is one of the most often mentioned factors found common to reading readiness. Koppitz, Sullivan, Blith, and Shelton (1959) conclude:

> Studies have shown that achievement in first grade is closely related to visual motor coordination and perception . . . .

Smith and Keogh (1964) report on the importance of perceptual

processes in reading and suggest that a significant relationship exists between the processes. Horrocks (1964), Anastasi (1961a), Ilg and Ames (1964), Hildreth and Griffiths (1949), and Fennrich (1935) conclude that reading readiness tests should involve visual and motor perceptual tasks as a function necessary for assessing reading readiness.

Wheeler (1954) is one of the many who focus on the role of personality factors in reading readiness. Researchers emphasizing this factor point to the importance of personality in achievement and suggest that it makes diagnosis of reading readiness very difficult. Lamy (1962), using projective techniques for personality assessment and diagnosis, found that the child's self picture was more predictive of later achievement than intelligence. Moffett's (1961) findings support those of Lamy as he writes, "If a child has an unfavorable self concept, this will affect reading abilities."

Many studies are found which stress the role of intelligence in reading readiness. Cohen (1963) is typical of these and suggests that prediction of reading readiness can be accomplished through the use of IQ scores.

Other investigators seem to emphasize maturity and biological factors as vital prerequisites for reading achievement. Humes (1954) appears to provide a summary statement of such studies:

> Readiness is not a whim, biological growth must occur before a child can learn. Research shows a wide variation in individual differences in children. Often one tries to force a child into something he cannot do. He may not be able to read, but he can do other things.

There are many studies reporting specific environmental factors associated with being ready to read. Sutton (1956) found that occupation of parents, number of trips taken by the family, and amount of reading done by the child were all linked with readiness and successful reading in school. These factors suggest the importance of environmental stimulation. Reid (1958), in an extensive study of thirty children, found mental ability not simply related to reading achievement. Among the significant factors he reported were: history of handiness, speech development, preschool attitudes towards reading, and quality of mother-child relationships. Sheldon and Parrizzo (1956) found that size of family, position in the family, number of books in the home, educational level of the parents, and attitudes towards school were all related to reading achievement in the primary levels.

Many factors have been singled out for specific emphasis. The majority of present writers tend to agree that reading and reading readiness are complex, multivariable processes. White and Harris (1961) conclude that the cause of poor reading is usually associated with a number of factors, including poor teaching methods, heredity, brain

damage, mixed dominance, emotional disturbances, or environmental factors such as socio-economic status. Rivlin (1943) discusses reading inability as a function of slowness in mental development, being too young, having had narrow experiences, poor perceptions, language difficulty in general, defective vision and/or emotional factors. Blair (1951), in his review of studies in reading readiness, also emphasizes a multivariable approach. Such factors as general mental ability and physical functions of health, vision, hearing, and injuries are all involved in reading readiness. The role of the teacher in developing attitudes and skills is also stressed in Blair's summary. Anastasi (1961) perhaps best summarizes the current feeling about the nature of reading readiness and its diagnosis:

> The diagnosis of reading is a special clinical process and should include clinical case studies, sensory and motor development assessment, medical and health factors, educational and family background information . . . .

It seems clear that the usual paper and pencil tests of reading readiness and achievement have difficulty assessing all the variables involved. Such failures have led to the increasing exploration of measurement techniques proporting to cross the many lines of child development. Among these approaches are the human figure drawings.

Human Figure Drawings

Formal study of figure drawings occupies a great deal of the literature in psychology and education. A brief summary of the background of figure drawings is provided here for the reader's perspective.

Harris (1961) in his exhaustive review of the research on human figure drawings suggests that psychologists soon recognized that young children enjoyed drawing familiar objects such as people, houses, trees, boats, and animals. Gradually, it was recognized that, unlike perceptual motor tasks, drawings were a means of self expression. The subject's material demonstrated a clear evolution as the child matured. Early scribbles were more than random marks and included observations from the subject's visual field.

During the last fifty years, several established systems have evolved for the systematic assessment of children's drawings. These systems have generally been concerned with intellectual maturity and personality projection. Among the two most often examined are the Goodenough Draw-A-Man (Goodenough, 1926) for assessment of maturity (later revised by Harris), and the Machover Draw-A-Man system (Machover, 1949) for assessment of personality dynamics.

Concerning the widespread use of the human figure drawing as a testing procedure, Ross (1939), writing of the

Goodenough system, concludes that "no other widely used intelligence test so clearly demonstrates the close relationship between intelligence and emotional factors." Anderson and Anderson (1951) point out that "human figure drawings have been in constant use in a variety of approaches for over twenty years, partly because of the ease of administration, universality, and inexpensiveness of the method."

Much contradiction is evidenced concerning the validity and relative usefulness of drawings of human figures in personality assessment. There appears to be little doubt that it has become a useful technique in assessing intellectual process and perceptual motor skills.

Specific use of human figure drawings for prediction of academic achievement is not widespread. Several isolated variations were found in the research literature and conflicting results were reported.

Russell (1956) selected two hundred second graders and asked them to make drawings of the games they enjoyed playing outdoors, games they enjoyed playing indoors, and the most frightening thing that had happened to them. His scoring procedures were based on a subjective quality system. He concluded that there was a "significant relationship" between the drawing scores and reading achievement.

Hessell and Travers (1954) used drawings of human figures made by teacher training cadets to estimate success

in teacher training. Their findings did not support the hypothesis that drawings were predictive of later success. In an earlier study by Hessell, school children were asked to draw their teachers and were then given a rating of school attitudes. This use of figure drawings appeared to have potential in measuring feelings about school.

Lourenso, et. al., (1965) asked Negro fourth graders to draw their families and later, a child in school. He found useful results in describing underprivileged, underachieving children and suggested that such drawings may have value for the classroom teacher.

Lowenfield (1957) speaks of all art work by children by having potential value in identifying underachievers. He reports that it should be subjectively possible for a teacher to judge levels of integrated emotional, intellectual, and perceptual growth as signs of scholastic productivity. Hofmann (1957) also points out potential value in art work done by children, especially kindergarten age children. He concludes that all forms of art work should be used in measuring readiness for first grade work.

Since the formal development of the Goodenough scale for scoring human figure drawings and the Machover system for projective assessment, some effort has been made to relate the use of these techniques to academic prediction.

Hirsch (1958) reports that often striking immaturity in body image projected through drawings is seen in underachievers. Bruch and Bodman (1962) found correlations of .60 significantly relating immature self concept, as measured by drawings, and underachievement. Linder (1962), using the drawing approach with Negro children, also found a positive relationship with achievement in the primary grades, but not of significant size to be very useful.

Studies using combinations of measurement devices which include the drawing approach report various conclusions of the value of drawings as predictors of academic success. Balinsky (1964), preferring a profile analysis rather than a correlational procedure, reports using Goodenough drawing scores in combination with tests of intelligence, perception, and several facts from the child's environment. She found 78 per cent successful prediction of reading achievement using all factors in combination, including the drawing scores.

Nash (1963), using a battery of tests similar to those selected by Balinsky, found that drawing scores did not add sufficient weight to the prediction of reading ability. He chose tests of intelligence, reading readiness, and learning rate of new words.

Poppornic (1964), using tests of reading readiness, intelligence, and drawings of a man, found that the best

predictor of reading readiness were those tests preporting to measure readiness. He excluded IQ scores and drawings as non-predictors. Hadley (1964) found no correlations better than .41 with figure drawings and prediction of achievement in pre-schoolers. Kyle (1961), using drawing techniques in conjunction with mental age, perceptual tests, and achievement batteries, concluded that drawings were not adequate predictors of achievement.

Anastasi (1952), using the Draw-A-Man system with adult males, found no prediction of awareness, perceptual development, personality factors, or intellectual maturity as it related to the selection of student pilots.

It appears that efforts thus far to use drawings as a single predictor of academic success have not been highly productive.

Quality Drawing Scales

Due to the recency of its conception, as well as the uniqueness of the system itself, no reference is found on the Easley Scale of scoring drawings for prediction of achievement. In a personal communication with Easley, it was learned that, to date, no further studies have been made.

There have been a few isolated studies using a scoring quality scale somewhat related to the system designed by Easley. Wagner and Schubert (Buros, 1959, p. 129) chose a

seven point scoring guide from 1579 specimens for use in predicting college grades. Their results were significant and resulted in a published scale available commercially. Lawrence (1963) developed a five point pictorial scale with three categories in each point range for estimating personality adjustment. He found low but positive relationships between his scale, intelligence, estimates of personality adjustment, and artistic ability. His technique called for the use of color in arriving at a score, particularly in the personality adjustment estimate derived from the drawings.

Dunn (1954), in assessing mental maturity, selected twenty drawings for use as guides in evaluation of aged persons. Lark and Horowitz (Harris, p. 109, 1961), developed a scoring guide to assess art work, and Stone (Harris, p. 63, 1961) designed a figure drawing preference scale consisting of twenty-six sets of pictures where subjects were asked to select the most representative picture they might have drawn. The choices of the subject were reported to have diagnostic significance in personality assessment.

In summary, no specific drawing assessment techniques similar to that designed by Easley have been developed specifically for the prediction of reading readiness in kindergarten age children. The literature does support Easley's contention that human figure drawings assess many of the factors found common to the development of reading

abilities. Such factors as maturity, intelligence, perceptual processes, and personality appear common in the description of both drawing rationale and readiness for reading.

CHAPTER III

METHOD

The design of this study is similar to many seeking to establish validity and reliability of psychological and educational measuring techniques (Anastasi, 1961). Primarily, such studies are statistical in nature and seek to define the degree of relationship existing between two or more variables, usually designated as independent (predictor) and dependent (criterion) variables.

To assess the validity and reliability of the Easley Scale, adequate criteria were needed which would span a two-year period of reading achievement. Teacher ratings, based upon classroom performance of pupils in reading, were selected as one criterion. A standardized reading achievement test was used as a second criterion. Prediction of performance in reading over a two-year period, as measured by these major criteria, thus describes the goal of this study.

Selection of Variables

The following testing information was gathered on the sample of kindergarten pupils over a period of two years. This included a standardized reading readiness test and tests of intellectual and perceptual abilities (see Chapter 2).

The assessment of intelligence was made by the Lorge-Thorndike Group Intelligence Test. This test is reputed to be among the best of the primary level tests (Buros, p. 350, 1959). Lorge-Thorndike raw scores were therefore used as one of the independent variables.

Kindergarten age children in the Tacoma School System are routinely given the Metropolitan Readiness Test (Form R) as a means of assessing their ability for first grade work. Results from the Metropolitan series, including numerical, reading, and total subtest scores, were collected for use in comparison with the Easley Scale.

The Rutgers Perceptual Drawing Test was also available from the Tacoma testing program, and was selected to serve as an additional means to assess the Easley Scale as well as to provide a potentially useful predictor of reading readiness.

It was felt that since there are a number of established techniques available for the scoring of human figure drawings, it would be useful to see whether or not any one system would either duplicate the Easley scale or provide a more adequate estimate of reading readiness. Outstanding among the various drawing score techniques is the Goodenough-Harris scale. Two alternatives are available for arriving at a measure of maturity by using the Harris scale (Harris, 1961). The first involves an accumulative point system based upon the quality of the drawing and its inclusion of

detail. The second method is quite similar to the Easley Scale in that pictogram scoring guides are provided for comparison. Both means of scoring were used to assess the drawings obtained for the present study and the results were used as additional variables for prediction of reading readiness.

The drawings obtained from the pupils on the Metropolitan Readiness Test provided a fourth alternative to scoring human figure drawings. Space is provided for the completion of these drawings on the test booklet. The drawings are scored subjectively by the teacher using a rating from one (low) to five (high) as suggested by the manual of instructions (Hildrith and Griffiths, 1949). Thus, two different sets of drawings of human figures were obtained from the pupils in the sample.

The Primary Reading Profiles (level two) was selected for use as the major criterion to be administered two years after the original drawings were obtained from the subjects. The Primary Reading Profiles, according to reviews (Vickery, 1959), appears to be among the best of those tests preporting to measure reading achievement and ability at the primary level.

Teacher ratings of their students over a two-year period were assumed from their placement of these pupils in an ungraded reading program. A rating of one was equivalent

to level one, prereading. Reading groups covering the first two years of school were as follows:

Level 1 Prereading	Level 7 Hard First
Level 2 Chart Reading	Level 8 Easy Second
Level 3 Preprimer	Level 9 Hard Second
Level 4 Easy Primer	Level 10 Easy Third
Level 5 Hard Primer	Level 11 Hard Third
Level 6 Easy First	Level 12 Enrichment

Collection of Data

The data used in this study were, for the most part, taken directly from school files. The testing program is administered throughout the district by certified personnel of the Tacoma Public Schools. Available were raw scores from the Metropolitan Readiness Tests (administered December, 1964), the Lorge-Thorndike Intelligence Test (administered September, 1964), and Teacher Ratings (made during November, 1964, June, 1965, and February, 1966).

The human figure drawings were obtained by kindergarten teachers on Mary 26, 1964, using the following directions:

> Materials: 8-1/2 by 11 inch plain paper, a box of colored crayons. Say to each child, "Using the sheet of paper and the crayons on your desk, draw a picture of a large man. Make it the best you can." No other directions, hold the time to about 10 minutes.

The Primary Reading Profiles were administered during the spring of 1966 to those pupils still at Arlington. They were then in the second grade, approximately two years from the date of the Easley drawing collection.

Scoring Procedures

Scoring of the drawings according to the Easley Scale was done by the writer. Independent judges were used for estimating inter-scorer reliability. The drawings were first scored by the Easley Scale, then converted into Z scores according to procedures outlined by Easley.

Each of the drawings was then scored by the Harris-Goodenough technique; first by matching the drawings with the quality pictogram, which provides a standard score for maturity, and then by the more lengthy point scaling system. This procedure seemed defensible in that similar directions and materials are used in both techniques.

Statistical Treatment

One of the major difficulties in psychological measurement is the assignment of obtained scores to an appropriate numerical scale (Senders, 1958). Most psychological measures assume that even though the origins are arbitrary and the distances between the scores are less than constant as the numbers change, an interval scale is able to provide useful distinctions for decision making calculations (Edwards, 1957). Much of the data collected for this study did not meet the requirements for interval scale calculation. Appropriate non-parametric techniques were therefore selected for use with those scales.

The following data was assumed to be normally distributed:

Metropolitan Reading Readiness Scores
Rutgers Perceptual Drawing Scores
Primary Reading Profile Scores
Easley Scale Scores
Harris-Goodenough Quality Scale, Converted
Harris-Goodenough Point Scores
Lorge-Thorndike Intelligence Test Scores

Data based on ordinal scales were:

Teacher Ratings of November 1964, June 1965, and February 1966
Five Point Drawing Scale, Metropolitan Reading Tests
Non-Standardized Quality Scale of Harris-Goodenough

The relationship between two interval scores was examined by the Pearson Product Moment Correlation (r) and levels of confidence were established by the calculation of t (Edwards, 1955, ed.).

Relationships between two ordinal measurements or between one ordinal and one interval measurement were studied by the correlation ratio (E) (Senders, 1958; Edwards, 1957b). Confidence levels of E were established through the calculation of F (Edwards, 1955a).

Procedure

The first task was to derive descriptive statistics from the test data. Means, standard deviations, and ranges were compiled in table form (see Appendix A).

The Easley Scale scores were then compared with the criteria for statements of relationship derived from either

r or E. Next, the Easley scores were correlated with the other techniques of scoring figure drawings to determine duplicity of systems. Finally, Easley scores were correlated with each of the other independent variables to determine their relationship with the Easley Scale.

Using the other potential predictors of reading readiness, each of the independent variables were correlated with the criteria to find the best source of prediction possible in the battery selected for study.

Multiple Correlations

Multiple correlations (R) involving three interval scaled variables were computed. The intent was to combine the two best predictors of reading achievement. Multiple correlations (R) were calculated according to methods suggested by Guilford (1965b). Levels of significance were determined by t. Due to the small numbers involved in the final sample, a shrinkage factor was added (Guilford, 1965b).

Scorer Variability

As a means of rechecking the scoring of the drawings by the Easley method, as well as further examine reliability factors, the drawings were rescored one month later by the author and the Pearsonian correlation coefficient was calculated between the two sets of scores. Interscorer reliability was determined by using three psychologists. They were

asked to score the drawings using the Easley system. A two-way classification analysis of variance was then calculated according to Guilford (1956a).

Final Sample

The eighty-two kindergarten pupils enrolled in the Arlington School during 1964-65 originally comprised the sample for this study. After two years approximately 28 per cent of that group remained with complete data.

The study was aimed at providing the best predictors of reading readiness in the Arlington School; therefore no attempt was made to obtain a large, randomly drawn sample representative of the City of Tacoma. The final number of students available with complete testing data totaled 29 for the period under study.

Several procedures were followed to identify the remaining pupils more precisely. The intent was to ascertain to what degree they might have deviated from a more randomly and normally selected sample of kindergarten age children both from the city at large and the population of Arlington School.

The 82 drawings obtained from the Arlington population were first individually scored by the Easley method. Comparison was then made between the drawing scores of the sample universe and the resulting sample. Table 1 suggests that

there was no significant difference between the means of the parent and sample groups. An F value of 1.07, significant at the one per cent level, indicates that the variance of the two groups was homogeneous.

TABLE I

COMPARISON OF EASLEY DRAWING SCORES FOR SAMPLE AND PARENT GROUPS

	Mean	SD	Number	t	F
Parent Group	1.60	.44	82	.90	1.07
Sample	1.51	.47	29		

While no claims can be made for the randomness of the sample, it does appear that the final sample drawings do not constitute a unique and different distribution from the drawings of the original group.

Utilizing the Lorge-Thorndike intelligence test results, comparisons were made between the distributions of scores and the Lorge-Thorndike norms as provided by the manual standardization tables. Difference between means of the two distributions were determined by the use of the t test (Underwood, 1954) and variances using the F test (Edwards, 1946).

Examination of Table II indicates that the sample does not differ significantly from the abilities of the all city group. (Test scores from the sample and the comparable city population are higher than the national norms based upon reliability studies.)

TABLE II

COMPARISONS BETWEEN SAMPLE AND ALL CITY INTELLIGENCE TEST SCORES

	N	S.D.	Mean	t ratio
Sample	29	6.97	45.33	.49
All City	2659	4.12	45.99	
National Norms	760	10.35	45.82	

An F value of 1.01, significant at the two per cent level, indicates that the variance of the sample and the city population was homogeneous.

It appears that both the sample and the comparable city kindergarten population are distributed similarly in abilities as measured by the group intelligence test scores.

An examination was made of parental occupations of the sample compared with 1960 census figures obtained for the city of Tacoma at large. Table III summarizes a comparison of persons in each of twelve occupational groups in the city

TABLE III

PERCENTAGE COMPARISONS BETWEEN OCCUPATIONAL GROUPS FOR SAMPLE AND TACOMA CITY

	Occupational Group	Tacoma Per Cent	Sample Per Cent	P
1.	Profession, Technical and Kindred	10.4%	3.4%	n.s.
2.	Farmers and Farm Managers	1.4	--	n.s.
3.	Managers, Officials	11.4	20.7	s. 05
4.	Clerical and Kindred	6.5	11.1	s. 05
5.	Sales Workers	7.8	--	s. 05
6.	Craftsmen, Foremen, and Kindred	23.4	17.0	s. 05
7.	Operatives and Kindred	19.2	10.3	n.s.
8.	Private Household Workers	0.01	--	n.s.
9.	Service Workers	7.1	3.4	s. 05
10.	Farm Laborers, Foremen	1.1	--	n.s.
11.	Laborers, Except Farm	8.6	6.9	s. 05
12.	Occupations Not Reported	2.6	27.6	n.s.

and the parents of the children in the sample. The significance of the differences among proportions is reported at the five per cent level of confidence (Senders, 1958).

In the comparison between the parent sample and the Tacoma population noted in Table III, significant differences between proportions were found in 6 of the 12 occupational groups.

In summary, a number of unknown factors have operated to reduce the size of the population universe originally available for this study. On two of three comparisons made, it did not appear that the final sample was unique from what might have been expected from the population universe. In the distribution of abilities, the sample was not found significantly different from the comparable population of students in the city. In terms of drawing scores obtained by the Easley System, the remaining sample did not differ significantly from the distribution of scores from the original group as a whole. The differences in parent occupation does suggest, however, that no generalizations should be made to the city population, particularly in view of the literature noting the importance of cultural and familial backgrounds in reading.

CHAPTER IV

RESULTS

The statistical findings are presented in the following order:

(1) The prediction of reading achievement by the Easley Scale, the Rutgers drawing test, and the Metropolitan Readiness Test;

(2) Multiple correlations, combining the Easley Scale with other tests. (These combinations were restricted to those tests showing significant relationships with the Primary Reading Profile.);

(3) The relationships between the various human figure drawing methods and the Easley Scale;

(4) The prediction of reading achievement by other systems of scoring figure drawings;

(5) The relationships between the Easley Scale, intelligence as measured by the Lorge-Thorndike test, perception as measured by the Rutgers test, and reading readiness as measured by the Metropolitan test;

(6) Intra-scorer reliability and inter-scorer reliability;

(7) The accuracy of teacher ratings for prediction of reading achievement as measured by the Primary Reading Profiles concludes the presentation.

TABLE IV

RELATIONSHIPS AND SIGNIFICANCE LEVELS
BETWEEN CRITERION AND
POSSIBLE PREDICTORS

	Primary Reading Profiles		Teacher Ratings		
			11/64	6/65	2/66
	r	E	E	E	E
Easley	.21		.39	.52	.39
Metropolitan DAP	.14		.55	.58	.56
Metropolitan R.R.	.49**		.66	.69	.81*
Metropolitan Numerical	.63**		.69	.76*	.81*
Metropolitan Total	.55**		.75	.77*	.63*
Rutgers	.80**		.68	.74*	.59
Harris Quality Scale		.63	.28	.30	.45
Harris Quality, Standard	-.10		.01	.22	.27
Harris Point System	.18		.48	.69	.58

*Significant at .05 level
**Significant at .01 level

No significant relationships were found between the Easley Scale and the criteria for reading achievement (see Table IV). A correlation with the Primary Reading Profiles of .21, while positive, did not meet .05 confidence limits. Teacher ratings, initiated after six months of first grade, yielded an E of .39 with the drawings. This was not significant at the .05 level. Twelve months after the Easley drawings were collected, an E of .52 with teacher ratings again failed to reach significance at the .05 level. Final teacher ratings made in second grade, approximately 19 months after the drawings, yielded an E of .39 with the Easley Scale and was not significant at the .05 level.

Other Predictors of Reading Achievement

Other tests selected for study were found to be more predictive of reading achievement than the Easley Scale (see Table IV, page 32). The Rutgers Perceptual Drawing Test correlated .80 with the Primary Reading Profiles and was significant at the .01 level of confidence. The Rutgers test was positively correlated with Teacher Ratings of 6/65. An E of .74 was significant at the .05 level. Other teacher ratings were not predicted by the Rutgers test.

Each of the three sub-scores obtained from the Metropolitan Readiness Test was found to be predictive of reading achievement as measured by the Primary Reading Profiles.

The numerical subtest was the strongest predictor of the three subtests with an r of .63. This was significant at the .01 level. The total score obtained from the Metropolitan series was predictive with an r of .55, significant at the .01 level. The reading readiness sub-score of the Metropolitan test correlated .49 with the Primary Reading Profiles. This was significant at the .01 level of confidence. None of the Metropolitan sub scores were predictive of the first Teacher Rating of November 1964. For Teacher Ratings of June 1965, the numerical and total scores of the Metropolitan were each significantly related at the .05 level of confidence with E values of .76 and .77, respectively. The final Teacher Rating of February 1966 was also significantly correlated at the .05 level with the numerical, total, and reading readiness subscores of the Metropolitan test. Correlations (E) of .81, .63, and .81 respectively, were found.

Multiple Predictors

Table V shows multiple correlation values (R) with the Easley Scale and each of the measures found to have a significant relationship with the Primary Reading Profiles. To correct for the smallness of the sample, a shrinkage factor was employed and noted Rc (Guilford, 1956a).

TABLE V

MULTIPLE CORRELATION VALUES IN COMBINATIONS OF TWO PREDICTORS

Combinations of Tests		Correlation With Primary Reading Profiles	
		R	Rc
Easley Scale and:	(.21)		
Metro numerical	(.63)	.63**	.59**
Metro RR	(.49)	.50*	.45*
Metro total	(.55)	.54*	.49*
Rutgers	(.89)	.88**	.77**
Rutgers Perceptual Test and:	(.89)		
Metro numerical	(.63)	.81**	.79**
Metro RR	(.49)	.80**	.78**
Metro total	(.55)	.80**	.78**

*Significant at .05
**Significant at .01

It is apparent that combining the Easley Scale with any of the best four predictors did not increase prediction to any degree. Combining the best two predictors also did not significantly increase the accuracy of prediction.

Other Drawing Score Methods

The Harris point scoring method of evaluating figure drawings did show some positive overlap with the Easley Scale. An r of .73, significant at the .01 level, was reported. The raw scores obtained from the quality method of the Harris scale did not significantly correlate with the Easley scores. Converting those raw scores into standard scores as suggested by Harris did, however, result in a significant (.01) r of .64 with the Easley Scale. The Metropolitan Readiness Test drawing scores were not found significantly correlated with the Easley Scale.

None of the various human figure drawing scoring methods was found to be successful in predicting reading achievement.

Table VI summarizes the correlations obtained between each of the independent variables and the Easley Scale. The comparisons were made to ascertain what degree of overlap existed between each of the variables and the Easley Scale. An r of .34, not significant at the .05 level, was found between the Easley Scale and the Lorge-Thorndike Intelligence

TABLE VI

CORRELATIONS BETWEEN THE INDEPENDENT VARIABLES AND THE EASLEY SCORING SYSTEM

	Easley Scale	
	r	E
Harris point score	.73**	
Harris quality score		.69
Harris quality, standard	.64**	
Metropolitan RR	.63**	
Metropolitan Numerical	.27	
Metropolitan total	.35	
Lorge-Thorndike	.34	
Rutgers	.63**	
Metropolitan DAP		.52

**Significant at .01

Test. Of the three sub-scores of the Metropolitan test, only the reading readiness score was significantly related to the Easley Scale with an r of .63. This was significant at the .01 level.

Perceptual processes as measured by the Rutgers drawing test, do find some common factors with the Easley Scale. An r of .63 was found significant at the .01 level of confidence.

Scorer Reliability

The sample drawings were scored one month apart by the writer and correlated for a measure of intra-scorer variability. An r of .85, significant at the .01 level, was comparable to results reported by Easley (.90 or better).

Three judges, all trained at least to the master's level in psychology, were asked to score the drawings according to the Easley Scale. These ratings were then analyzed for variance among the raters and an rkk value of .85 was obtained. Easley reported inter-scorer reliability coefficients near the .80 range, which is similar to the findings of this study. (Easley, 1961)

Finally, Teacher Ratings were correlated with the Primary Reading Profiles for predicting second grade (2/66) reading achievement. Table VII suggests that teachers, after the first twelve months of their pupils' schooling,

were subjectively able to anticipate achievement with some accuracy.

TABLE VII

TEACHER RATINGS WITH PRIMARY READING PROFILE

	Primary Reading Profile E
Teacher Rating of 11/64	.71
Teacher Rating of 6/65	.84**
Teacher Rating of 2/66	.78*

*Significant at .05
**Significant at .01

CHAPTER V

DISCUSSION

Throughout this discussion, it is well to remember that a specific population with a specific problem was under study. From this non-random population, less than half of the sample universe remained at the end of the second year. The remaining proportion did not appear to deviate markedly from what would have been expected from the original universe. However, interpretation must be guarded as factors other than test data and parent occupation were not considered. It is entirely possible that the factor of pupil mobility is of significance. This in itself may have resulted in a study of a highly select sample of pupils. No provision was made to study the factor of mobility. Additional care is necessary where correlation ratios were used to describe relationships. This method, while appropriate to certain of the data gathered, does not indicate the direction of relationship by reporting values from .00 to 1.00 (Edwards, 1946).

The Easley Scale

Initial efforts by Easley to establish validity for his reading scale were limited to correlations between the drawings scored by his method and first grade reading achievement as measured by the California Reading Test.

An r of .64 suggested support for his scale as a measure of reading readiness. One of Easley's original hypotheses stated that drawings scored by his system should be more predictive of reading achievement than a group intelligence test. He found his scale correlated higher with the California Reading Test than did the Kuhlman Anderson Intelligence Test.

In an effort to further explore the predictive value of Easley's Scale, different criteria for a longer period were selected for this study. Teacher ratings of reading achievement obtained during the first and second grade were not forecast accurately by the Easley Scale.

The non-significant relationship established between the Easley Scale and the Primary Reading Profiles also failed to provide adequate evidence in support of Easley's method. In summary, the predictive value of the Easley Scale was not established by this study.

Successful Prediction of Criteria

Utilizing the Primary Reading Profile as a measure of reading achievement, several successful predictors were identified. Most successful was the Rutgers Perceptual Drawing Test, followed in order by the numerical, total, and reading subtests of the Metropolitan Readiness Test. Teacher ratings for achievement were not predicted by any

method during the first rating period. The Rutgers test, the numerical and total scores of the Metropolitan test were equally able to anticipate ratings made during 6/65, however. The final teacher rating was significantly related only to the three Metropolitan subtests with the numerical and reading readiness scores highest in accuracy.

The most successful predictor of all the criteria during the two-year period were the Metropolitan tests. The Rutgers test, while higher in correlations with the Primary Reading Profiles, did not predict teacher ratings as consistently over time. The relatively high correlation between reading achievement and numerical subscores appear to be a not uncommon finding and have been supported by the work of Abbot (1963) and Petrone (1963).

Multiple Prediction

The addition of the Easley Scale with other, more successful predictors of reading achievement generally failed to increase accuracy of prediction. Using the Primary Reading Profile as a criterion, the Easley Scale was paired one at a time with: the Rutgers drawing test, the numerical subtest of the Metropolitan, the reading readiness subtest of the Metropolitan, and the total score obtained from the Metropolitan test. In no case did a gain in prediction occur with enough value to suggest a

combination of any other single instrument with the Easley Scale. Essentially the same results occurred when combinations of any two successful predictors were correlated with the Primary Reading Profile.

The author was curious to learn if the Easley Scale would be found to be merely a duplication of other techniques to score human figure drawings, and if not, whether these other systems would be useful in predicting reading readiness. It was apparent, however, that none of the drawing techniques were successful in the prediction of reading achievement over a two-year period.

Although there appeared to be a common factor among each of the drawing scales and the Easley system, only the Harris Point Scoring Method (r of .73) seemed to indicate much measurement of common factors.

The relationship between the Easley Scale and intelligence as measured by the Lorge-Thorndike was low with a correlation of .34. Easley, using the Kulhmann Anderson Group Intelligence Tests, found similar results with an r of .278. Intelligence, as defined by these group measurements, does not appear to be strongly measured by the Easley Drawing Scale.

An r of .63 between the Rutgers Perceptual drawing test and the Easley Scale suggests that some common perceptual factors are to be found in responses to both tests.

These perceptual processes may account for some of the overlap found between the Easley system and the Metropolitan tests, as much of the material in the Metropolitan series clearly calls for perceptual discrimination (Hildreth and Griffiths, 1949).

Reliability

Easley's initial study reported that one of the apparent advantages of his system was the high scorer reliability (Easley, 1964). By using a simple pictogram approach, the scorer was not called upon to make a series of subjective judgments about each part of a drawing and thus consistency was enhanced. He reported that both inter- and intra-scorer reliabilities were quite high, and correlations between re-scorings were in the .90 range. Although reliability coefficients found in this study (.80-.85) were somewhat lower than those reported by Easley, it appears that his original estimates of scorer reliability were reasonable. Variance accounted for by separate scorings was within acceptable limits.

Comparing teacher ratings with reading achievement in the second grade also proved to be of predictive interest. It would appear that teachers subjectively rating students in their classrooms were able to anticipate reading achievement with nearly as much success as the formal readiness test selected by Arlington School.

Conclusions

In this study, the Easley method of scoring kindergarten children's drawings of human figure has not been found useful in predicting reading readiness over a two-year period. The other techniques of scoring human figure drawings selected for study here also failed to prove of predictive usefulness. These findings generally support the work of Kyle (1961), who concluded from his study that figure drawings were not prognostic of reading achievement.

The Rutgers Perceptual drawing test proved to be one of the most diagnostic of the various measurement devices selected for study. This lends weight to studies which suggest that visual-motor and perceptual development are important in the beginning acquisition of reading skill (Koppitz, et. al., 1959; Smith and Keogh, 1962; Hildrith and Griffiths, 1949; Fendrich, 1935; Gates, 1947; Russell, 1961).

Although more research is needed, there appeared to be several trends which may eventually prove helpful to the classroom teacher in assessing reading readiness. Of those Arlington students remaining throughout the two-year period, it seems clear that the combination of teacher judgments and the Metropolitan Reading Readiness Tests has been predictive of achievement in second grade. It has been supported here, as it has in previously cited studies, that more weight should be given to the numerical subtest. A teacher with a

borderline case might do well to examine this type of subtest score more carefully.

At the same time, it might prove to be more predictive to select the Rutgers Perceptual drawing test than to continue to request a figure drawing such as is found in the Metropolitan series. The addition of such a test seems practically sound in that little time, training, or subjective judgment is required to score it. Theoretically, such a substitution can be supported from the standpoint of previously cited studies relating perceptual development to reading readiness.

Need for Further Study

A point which has proven interesting is the correlation between the Harris-Goodenough point scoring method of assessing intellectual maturity from drawings and the Easley method of drawing assessment. Since the Harris-Goodenough method is quite elaborate and requires not only much training but also considerable time to apply, it is possible that the Easley method might accomplish somewhat the same thing with considerably less effort and time.

The relatively high correlation between the criteria and the Rutgers drawing test suggests that further investigation of its ability to predict reading readiness is in order. Such an investigation might very well point to a

ready and useful new tool for the classroom teacher as well as other professional workers. There is little doubt that many authorities stress the role of perception in reading readiness, and further evaluation of the Rutgers test might provide important new evidence for this view.

This study has not found human figure drawings to be useful in predicting reading readiness. However, the literature leaves little doubt that human figure drawings do reflect developmental levels. Precisely what this means in terms of reading readiness has not been firmly established by this or other studies using the usual correlational method with various criteria of reading achievement. This study established no new direction in this regard. However, in view of the final, and possibly select sample of pupils available for this study, no assumptions concerning the final validity of the Easley Scale can be made.

CHAPTER VI

SUMMARY

This study was undertaken specifically to aid the Arlington Elementary School in Tacoma, Washington. The expressed need of this school was to find a best predictor of the readiness of kindergarten age children to begin formal reading programs. It was hoped that an adequate yet easily administered and scored instrument could be found to place students in appropriate first grade ungraded reading groups.

One of the primary interests of this study was the independent investigation of the Easley Scale for use in predicting reading readiness from human figure drawings.

The investigation, to be meaningful in terms of other research, included other techniques used to predict reading readiness. Four methods of scoring human figure drawings, including the Easley method, were selected. Each of these were compared with the selected criteria to determine their value in predicting readiness for reading. In addition to figure drawings, measurements of intelligence, perceptual processes, teacher ratings for reading group placement, and reading readiness tests were also selected. These other measures allowed a more careful appraisal of the Easley Scale.

The criteria selected were teacher ratings obtained for a two-year period in an ungraded primary reading program; and scores derived from the administration of the Primary Reading Profile. The latter gave an achievement index at the second grade level.

Methods Used

The sample used in this study was obtained from the kindergarten classes at the Arlington Elementary School in Tacoma, Washington. Out of the 80 students available at the beginning of the study, only 29 remained after two years. This remaining group did not appear unique from that which might have been expected had all the original subjects been available.

The remaining sample was tested in several ways. In the distribution of abilities, as measured by the Lorge-Thorndike Intelligence Tests, the remaining students were not found to be significantly different from the comparable population of students throughout the city of Tacoma. In terms of drawing scores obtained by the Easley method, the remaining sample did not differ significantly from the population universe available at Arlington School at the beginning of the study. Examination of parental occupations of the sample as compared with the occupations of the city at large did show that there was a significant difference in

proportion in six out of the twelve groups studied. This latter finding, along with the size of the remaining sample, suggested that no generalization could be made from this study.

The study was correlational by design, and where applicable, Pearson Product Moment formulii were used. Where non-normally distributed, ordinal scaled measurements were obtained, correlation ratios provided the measure of relationship.

Each of the human figure drawing techniques as well as each of the formal tests selected was correlated with the criteria to find the best predictor of reading readiness over a two-year period. Multiple correlations were calculated to determine if two instruments would increase prediction of the criteria. The Easley Scale was then correlated with each of the various measurement techniques to examine construct validity. Finally, reliability coefficients were calculated for both inter- and intra-scorer reliability.

Results and Conclusions

It was apparent that none of the human figure drawing methods were able to predict reading readiness as measured by teacher ratings and the Primary Reading Profile. Validity coefficients were uniformly in the lower .20 and .30 range.

Outstanding as a predictor, however, was the Rutgers Perceptual Drawing Test, suggesting that the role of

perceptual processes in reading achievement has not been exaggerated. Further investigation of the usefulness of this device seems worthwhile, as well as the overall role of perceptual processes in readiness for reading.

Both teacher ratings and the subtest scores of the Metropolitan Readiness Tests were also predictive of later reading achievement, indicating that their current use by the Arlington School is supported here. The scorer reliability of the Easley system was found acceptable for this study, as it was in the work of Easley.

In conclusion, the use of teacher ratings and Metropolitan test scores for prediction of reading readiness seems to have been supported by this study in the Arlington School. The problem of finding a supplemental technique of predicting reading readiness in kindergarten age children remains substantially unrealized.

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APPENDIX A

BASIC DATA USED

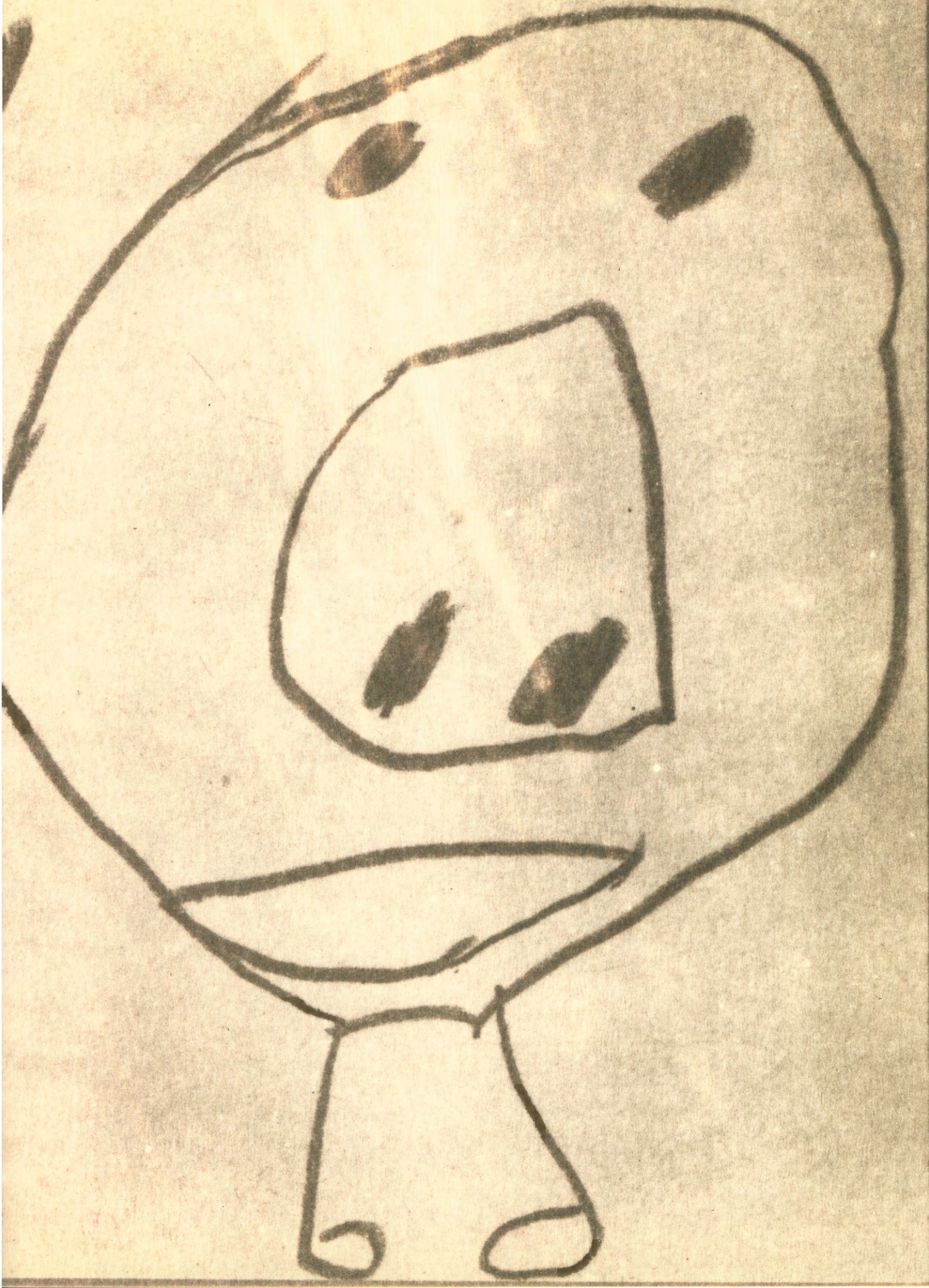
APPENDIX A

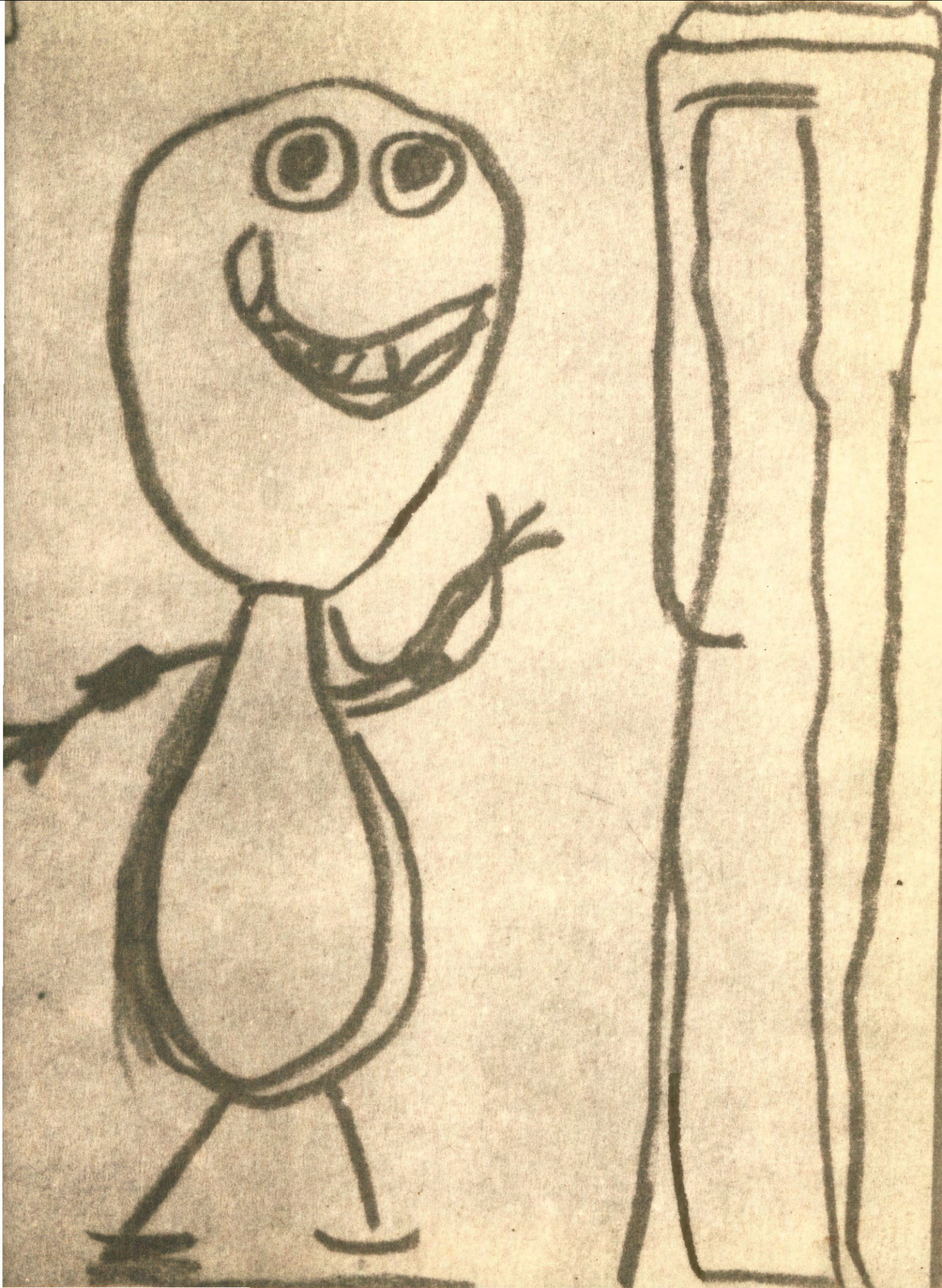
DESCRIPTIVE DATA

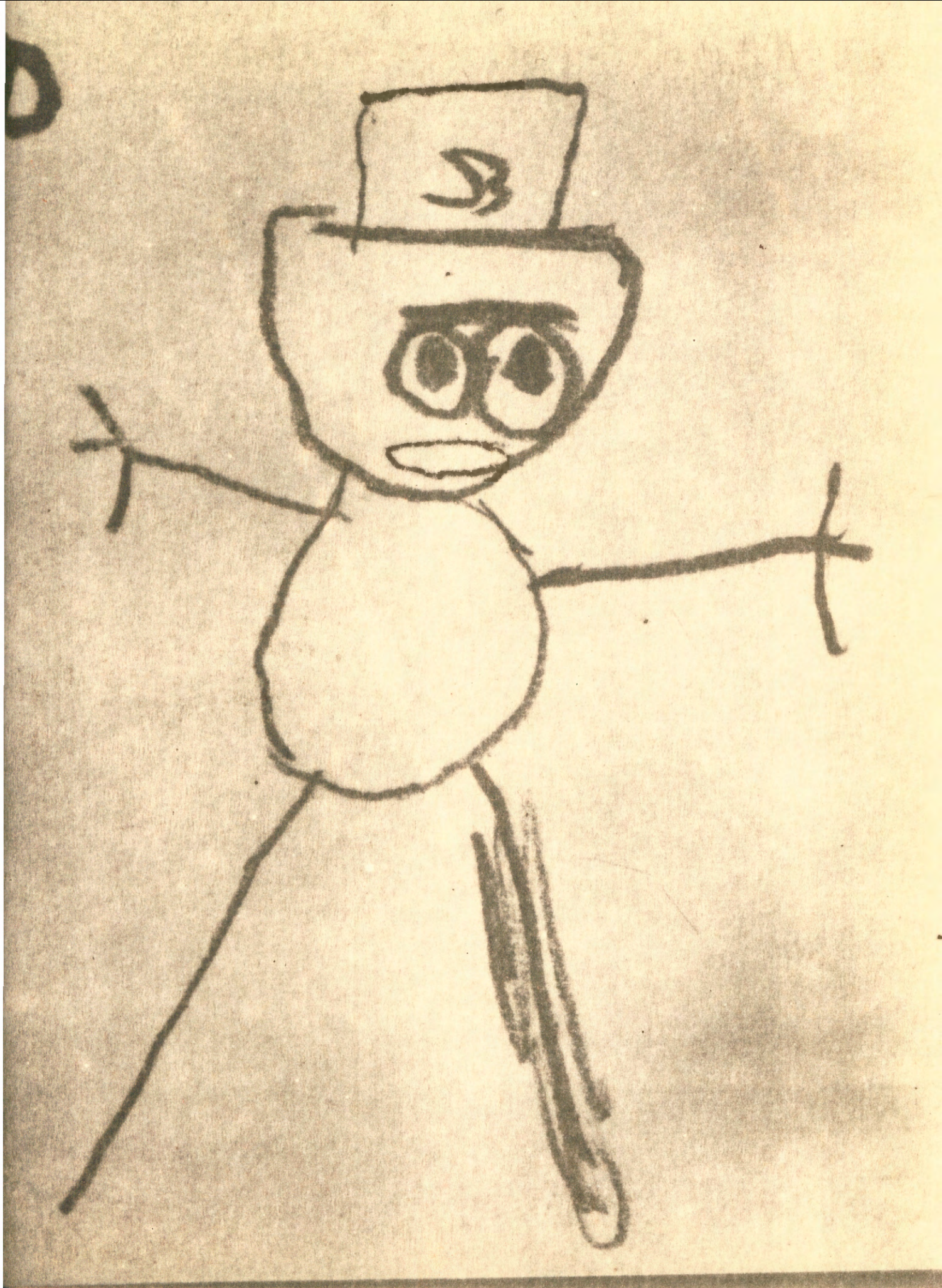
	Number	Mean	Standard Deviation
Lorge-Thorndike	27	45.33	6.97
Rutgers	27	17.96	6.20
Metropolitan RR	29	52.96	6.41
Primary Reading Profile	2929	76.58	21.57
Metropolitan DAP Scale	29	2.58	.98
All Tacoma Lorge-Thorndike	2659	45.99	41.12
Harris Quality Scale	29	2.65	.90
Harris Quality, Standard	29	94.48	12.67
Harris Point Score	29	1.51	.47
Teacher Rating 11/64	29	1.89	.90
Teacher Rating 6/65	28	4.92	2.04
Teacher Rating 2/66	29	16.44	4.30
Easley Scale	29	1.51	.47

APPENDIX B

EASLEY SCORING PLATES







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