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AN ANALYSIS OF REALITY CONTENT AND FUNCTIONAL EFFICIENCY AS RELATED TO MATURATION IN HUMAN FIGURE DRAWINGS

Jack E. Dye
Kansas State College of Pittsburg

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by

Jack E. Dye

KANSAS STATE COLLEGE OF PITTSBURG

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ABSTRACT

This study evaluates maturation in terms of Reality Content and Functional Efficiency components within the Goodenough scale for human figure drawings as modified at the Parsons State Hospital and Training Center. Reality Content is defined as the items which must be present to score as contrasted to Functional Efficiency, or an improvement upon an item, which is awarded an increase in score. Reality Content in drawings of young children contrasted to Functional Efficiency content in drawings of adults, provide a continuum for examination, in evaluating the hypothesis, "Functional Efficiency is the major contributing factor in the drawings of children before the thirteenth year of age."

The subjects were divided by IQ into three diagnostic groups and within these groups by age, sex, and grade in school. Scores were evaluated on a basis of the percentage of Reality Content and Functional Efficiency within the achieved Goodenough score. These two aspects of the score were evaluated to ascertain if there were significant differences in Reality Content and Functional Efficiency scores and if there were significant differences in male-female scoring on both aspects of the total score.

The hypothesis is accepted for normal IQ females, age 12, grade 7. Females begin to draw functionally at an

earlier age than the males; therefore, they are considered to mature emotionally or intellectually at a more rapid rate, when the IQ's are normal. The hypothesis is rejected for both sexes in ages six through eleven and for males, age twelve.

CHAPTER I

ANALYSIS OF THE PROBLEM

Description of the Problem

During the latter part of the nineteenth century an avid interest in the drawings of children began to develop. Research studies were carried out in several countries and many of these studies held the promise of glowing results.

Unfortunately, an almost complete lack of continuity produced such a mixture of hypotheses that standardization of technique, communicability, and comparability were practically non-existent. These studies were not in vain for each new hypothesis and resultant controversy was quite heuristic in nature and produced some new idea.

F. C. Ayer, in 1916, concluded that there was no question that a proper utilization of drawings could reveal certain mental characteristics of the individual which would be valuable for comparative purposes.[1] He did not, however, suggest any specific techniques for standardization which would allow comparability. Ayer deftly summarized the results of many research studies in his reference to the

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[1]Ayer, F. C. The Psychology of Drawing. Baltimore: Warwick and York, Inc., 1916. p. 33.

differences in drawings evidenced by maturation, as being reflections of stages of development from individual and concrete to the conventional and abstract.[2]

In the years from 1916 to 1926, Florence Goodenough developed a measure of intelligence utilizing many of the ideas from previous research efforts. The test she developed is commonly called, "The Draw-A-Man Test," (DAM).[3] This measure is well standardized in technique, communicability, and comparability.[4]

The DAM was designed after the fashion in which Goodenough found that children draw. She found that stages of development do exist beginning with what the child knows rather than sees, and development progresses gradually and continuously from the concrete to the abstract. Concepts concerning relative proportions, spatial relationships, and numbers are much later in developing than the earliest developmental stage.[5]

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[2] Idem., p. 81.

[3] Goodenough, Florence. Measurement of Intelligence by Drawings. New York: Harcourt, Brace, and World, Inc., 1954. p. 1 & passim.

[4] Idem., pp. 17, 48, 49.

[5] Idem., p. 12.

Specific Aspects of the Current Problem

The DAM is well validated and reliable as cited in Buros.[6] If one could modify the work of Goodenough toward a fuller projective technique, retaining the validity and reliability, a valuable instrument for rapid screening and general indications of psychopathology might evolve. These indications for psychopathology in the drawings of human figures do exist as evidenced by the work of Machover[7] and Goodenough.[8]

The Goodenough scoring system consists of fifty-one items which are related in some manner or form to the way in which she found children usually draw human figures.[9] A basic concept of her test design deals with the developmental stages of drawing; or the greater the immaturity the less the abstraction and conversely, the greater the maturity the greater the abstraction. This pertains to the normal child; therefore, we may safely assume that a reverse of this concept may be an indication of psychopathology.

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[6]Buros, O. K. The Fourth Mental Measurements Yearbook. New Jersey: The Gryphon Press, 1953. p. 292.

[7]Machover, Karen. Personality Projection in the Drawing of the Human Figure. Springfield, Illinois: Charles C. Thomas, 1961. passim.

[8]Goodenough, op. cit., p. 62.

[9]Idem., p. 17.

The Goodenough scoring system has continuity and homogeneity and it seems to contain a distinct basis for differentiation of concreteness and abstraction. It is this basis for differentiation of concreteness and abstraction that is the focal point of this study.

Reality and Functional Aspects in Drawing

We shall call these aspects of differentiation "Reality Content" and "Functional Efficiency."[10] The Reality Content is that score which is based upon the presence of the parts of the body or clothing related to the usual drawings of human figures. Functional Efficiency is that score which is related to how well the parts are drawn. This represents a simple differentiation of the inclusion of parts on the one hand and how well those parts are included on the other. This establishes a dichotomic situation which permits a certain amount of objective observation of the drawing protocols and it is this dichotomic division which we wish to analyze statistically.

Goodenough points out that children draw what they know rather than what they see. This consists of merely

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[10]Leland, H. Procedures for Use with the DAP Test, Part II, Method and Interpretation. Mimeographed, Parsons State Hospital and Training Center, 1962. p. 2 & passim.

an enumeration of parts at the very early developmental stages with transition to successive stages illustrating increasingly more abstraction.[11] Thus, drawing begins with the reality the child knows and progresses through varying stages of development in which functional aspects of design are added.

The key items to the child would be those major parts of the figure to be represented in the drawing such as the head, eyes, nose, mouth, trunk, legs, and arms. These would represent the reality to which the child would be oriented.

When the drawing "looks right" to the child we must remember the limits of perception in the child, for it is within these limits that the items are produced. "Being all there," is of greater concern to the child than "being correctly there." This illustrates an aspect of differentiation in that "being all there" represents Reality Content, whereas, "being correctly there" represents Functional Efficiency. Following the concept of "developmental stages of drawing," "being correctly there," indicates a more mature drawing since it occurs at a later developmental stage than "being all there."

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[11] Goodenough, op. cit., p. 12.

Reality Items and Functional Efficiency Items in the Goodenough Scale

In dividing the Goodenough scoring scale to illustrate this point we must consider two things. The first is the fact that in the Goodenough (DAM) itself, there is a built-in quality of a single item earning more than one point if it is drawn at a higher level (if it is correctly there), or "more functionally perfect."[12]

Therefore, the scoring gives one point for reality, and an additional point for functional efficiency; the additional point is based upon the original reality. Thus, a point is earned for a head being present which would be a reality point, but two points are earned at the functional level, one for head proportion and one for head coordination. Therefore, it is possible to earn two functional points to one reality point on the head. However, the head must be there first. The reality point must be earned before points for functional efficiency may be earned. Thus, the functional efficiency score indicates a higher level of performance than does the reality score.

Lower levels of performance are indicated by those

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[12]Leland, op. cit., p. 4.

items which exist in their own right and are not dependent upon other items for their value or are measured merely upon presence or absence. These are the items representing Reality Content. Higher levels of performance are indicated by attempts to functionally perfect those items which are dependent upon the presence of other items. For example, an eye receives credit in terms of its presence; however, neither pupil, shape, or glance can exist without first having credited an eye. If the dot that would normally be considered the pupil exists by itself, it would only receive an "eye" score, and if a circle that was normally considered an eye exists without the dot, of course, there is no pupil, so that for the pupil to be scored at all there must exist both the circle and the dot; thus the pupil is dependent upon the presence of the eye.

With this concept of Reality Content and Functional Efficiency in mind, the Goodenough scoring scale was divided by Leland[13] as found in Table I.

Table I indicates that there are twenty-one reality items and thirty functional efficiency items. Obviously the "perfect drawing" has more functional efficiency items than reality items. This is due both to the fact that the functional efficiency items are totally dependent upon the reality

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[13]Leland, op. cit., p. 6.

TABLE I

LELAND'S DIVISION OF THE GOODENOUGH SCORING SCALE

Reality Items*		Functional Efficiency Items*	
1.	Head present	4b.	Trunk proportions
2.	Legs present	5a.	Attachment of limbs (A)
3.	Arms present	5b.	Attachment of limbs (B)
4a.	Trunk present	6b.	Neck outline
4c.	Shoulders present	7d.	Features in two dimensions
6a.	Neck present	7e.	Nostrils shown
7a.	Eyes present	8b.	Hair detail
7b.	Nose present	9b.	Two articles non-transparent
7c.	Mouth present	9c.	Entirely non-transparent
8a.	Hair present	9e.	Complete costume
9a.	Clothing present	10b.	Number correct
9d.	Four articles shown	10c.	Detail correct
10a.	Fingers present	12a.	Proportion-head
10d.	Thumb shown	12b.	Proportion-arms
10e.	Hand shown	12c.	Proportion-legs
11a.	Arm joints	12d.	Proportion-feet
11b.	Leg joints	12e.	Two dimensions
13.	Heel	14a.	Coordination lines A
15a.	Ear present	14b.	Coordination lines B
16a.	Eye-brow	14c.	Coordination-head
17a.	Chin and forehead	14d.	Coordination-trunk
		14e.	Coordination-arms and legs
		14f.	Coordination-features
		15b.	Ear detail
		16b.	Eye detail pupil
		16c.	Eye detail shape
		16d.	Eye detail glance
		17b.	Chin and forehead detail
		18a.	Profile A
		18b.	Profile B

*Numbers preceding the scoring items refer to the numbers in the Goodenough text.[14]

[14]Goodenough, op. cit.,pp. 21-23.

items and to the fact that there are more areas of measurement in functional efficiency.

Description of the Theoretical Protocol

In order to statistically analyze the relationship of reality and functional efficiency scoring we shall consider three groups of children. The children shall all be under thirteen years of age[15] and for the purposes of this study, the "normal" intelligence quotient shall be 86 or greater.[16] This study is primarily concerned with the child who achieves the "normal" intelligence quotient, although three types of protocols will be discussed.

Group I: Group I, as indicated above, includes children under the age of thirteen, who in terms of Goodenough scoring have achieved an IQ normal for their stated chronological age. In terms of the developmental stages in drawing, the normal drawing habits of younger children should be in terms of inclusion of parts, rather than quality of drawing; therefore, in the normal IQ child, when the reality scoring tends to be greater than the functional efficiency scoring, we have what seems to be a

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[15] Idem., p. 40.

[16] Leland, op. cit., pp. 8; 13.

normal protocol. This factor seems to support a contention that high reality adult protocols are immature drawings, because we would say in effect that adults who draw in this manner are thus drawing immaturely, or drawing as children draw, and therefore while a child has a perfect right to be immature, an adult would have to be considered disturbed or organically damaged to perform in that manner. Thus, this type of drawing in a child would be considered normal protocol. Conversely, if the functional efficiency scoring is greater than or equal to the reality scoring, we are faced with a situation where we porbably have a precocious child who, as indicated by his preoccupation with the quality of drawing, is more sensitive to the world around him and probably able to do better work; and if in spite of this he only achieves what would be considered a normal IQ, recognizing that the range of IQ's for children is much broader than for adults, we would have to assume that we have an artificial lowering of ability. This would be considered some sort of psychogenic process at varying levels from mild neurosis to full blown psychosis depending on the type of drawing and the later subjective observations.

Group II: Group II, as indicated above, includes those children under the age of thirteen who achieve subnormal IQ's based on the Goodenough scoring. Here, the process is similar to that described in Group I, except that

it is more pronounced, still with an emphasis on the fact that the young child tends to draw reality elements. Thus, if we have a child with a reality scoring that is greater than the functional efficiency scoring, but this child has not been able to include enough parts to earn an IQ normal for his age, we would again presume some sort of interruption with perception, but of a nature that was due to organic or congenital causes, rather than to functional causes, and this would be described then as a mentally retarded child. If, conversely, we find a drawing of such a child with functional efficiency superior or equal to the reality dimensions but the total IQ is still subnormal we would have to again presume that the child could do better and that his failure to do so is artificial, that therefore the lowering of the IQ tends to be primarily functional, and that we are dealing with some sort of psychogenic process, in this instance, of course, much more serious than indicated in Group I. This second group of psychogenic problems may also be organic even though this is not specifically reflected in a study of the most obvious elements of reality or functional efficiency.

Group III: Group III, consists of children under the age of thirteen, who by Goodenough's scoring achieved an extra-normal IQ which would for our purposes be considered anything over 110.[17] Here, the indication is

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[17]Leland, op. cit., p. 13.

essentially that the child is drawing in a pattern similar to an adult, and the normal adult ratios are utilized in consideration of this. Thus, if the child demonstrates a functional efficiency score which is greater than his reality score, we would presume that this is a normal protocol for his intelligence. If, conversely, he shows a reality pattern equal to or greater than his functional efficiency pattern, we will have to suppose that in spite of his higher intelligence there is a constricting element, some sort of anxiety disturbance which is limiting his ability to perform at a level consistent with his potential, and this again would be adjudged a neurotic form of protocol.[18]

Protocol Evaluation

In order to test these "protocol assumptions," we must first have some idea of the normal or average score which may be expected at various age groups or levels. We can then test for differences in average or "normal" functional efficiency and reality scoring, considering levels of age, grade, and sex.

The young child would be reality oriented, whereas, the adult would be oriented toward the functional aspects of drawing. Since the diagnostic implications of Groups I,

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[18]The material used in the "Description of the Theoretical Protocol" was taken from the work by Leland, op. cit.

II, and III are based on the concept of a continuum of development with these two extremes, it is desirable to locate the midpoint of this continuum. The mid-point would be the age at which a balance in reality and functionality exists.

Since there are thirty-one functional items and twenty reality items on our scale, functional efficiency will eventually overcome reality, or through maturation, the functional aspects of drawing behavior will become dominant. The age level at which this may occur is not known; however, should this phenomenon appear before the age of thirteen it will be reflected in this study.

The identification of this particular age level shall be accomplished by grouping subjects according to age, grade, and sex. The total score earned will be analyzed to determine the proportion of the score representing Reality Content and Functional Efficiency. The mid-point of the previously discussed continuum will be represented by the group in which the subjects' total achieved score is comprised of approximately equal parts of Reality Content and Functional Efficiency. When this occurs, the young child's reality orientation in drawing behavior had become balanced with somewhat equal parts of functional orientation.

In view of this, the hypothesis would be stated, "Functional Efficiency (maturation) is the major contributing factor in the drawings of children before the thirteenth

year of age." If this hypothesis is rejected, this mode of measure could provide a valuable screening device, as an indicator of maturational level, in which upsets in the "normal protocol" could indicate possible psychopathology.

Scope and Limitations of This Study

The subjects used in this study were not older than twelve years, eleven months and thirty days nor younger than six years of age. This age group is distributed from grade one through grade seven in the public schools. In the public schools utilized for this study, all children in this age and grade group comprised the population of the study. A further division of the subjects for study is the separation of the sexes into different groups.

The population limits were fixed by the number of students in the grades described. This involved approximately 312 subjects, who participated in the initial testing program in which data were collected, consisting of three drawings per subject, parental occupations, and previous test scores.

The initial testing program consisted of all students in Grades 1-6 in the Washington Elementary School of Miami, Oklahoma. The rest of the subjects, those under thirteen years of age, but in the seventh grade, were taken from the Central High School of Miami, Oklahoma. The kindergarten of this school system was not available for study since

the Kindergarten School Board did not approve the project. However, it would be useful if a further study could be developed to test the behavior of kindergarten children.

CHAPTER II

REVIEW OF THE LITERATURE

Related Concerns in Evaluation

The Goodenough Draw-A-Man Test (DAM) came into being in 1926.[19] Research studies of the past thirty-six years have enhanced the acceptability of both the DAM and DAP Tests until they are presently accepted and widely used intelligence measures.

The test content is based upon four important points.[20]

1. The human figure is an item of familiarity to all children.

2. Minimal variability in essential characteristics.

3. Value is retained whether the figure is reproduced simply or in a complex fashion.

4. The figure is of universal interest and appeal.

In the question of reliability, Goodenough found a correlation between original scores and scores earned on retest the following day was .937 $\pm$ .006 for one hundred and ninety-four first grade children.[21]

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[19]Goodenough, Florence L. Measurement of Intelligence by Drawings. New York: Harcourt, Brace, and World, Inc., 1954. p. 1.

[20]Idem., pp. 15, 16.

[21]Idem., p. 48.

Average reliability was found to be .77 for ages five to ten years taken separately by the "split scale" and using the Spearman-Brown formula.[22]

Correlations between the Draw-A-Man and the Stanford Binet on three hundred and thirty-four children between four and ten years of age was r = 0.74.[23]

Special research in the areas of the effect of artistic talent and special training upon score did not indicate any significant effect upon the score. Sex differences are marked in favor of the girls; however, they are of a qualitative nature rather than quantitative.[24] This does not represent a crucial factor in the Draw-A-Man Test.

Projective Techniques

Projective tests are widely used in present day psychology. Controversy regarding the value of projective techniques has not lessened with use. To the rigid, experimentally

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[22] Idem., p. 48.

[23] Louttit, C. M. Clinical Psychology of Exceptional Children. New York: Harper and Brothers, 1957. p. 63.

[24] Goodenough, Florence L. Measurement of Intelligence by Drawings. New York: Harcourt, Brace, and World, Inc., 1954. p. 82.

oriented psychologist there may exist a question of their validity, and therefore of their value. A number of psychologists feel that although projective techniques are not the ultimate, they are an essential complement to other psychological measures.

The rationale of all projective techniques reflect, in some way, the projective hypothesis of David Rapaport:

"Every reaction of a subject is a reflection or projection of his private world."[25]

One of the criticisms of projective techniques may well be the lack of standardized presentation. Projective techniques do have standardized techniques of presentation, but this is not the rigid standardization of the experimental method. It is rather a standardization in which a series of stimuli will remain the same for all subjects, but the stimuli are vague, flexible or possess a fluidity of meaning readily adaptable to the inner perceptions of the subject's "private realities." There are no right or wrong answers; the instructions, although standardized, must allow an almost complete freedom of response. The clinician may gain valuable insight into the subject's personality dynamics through an analysis of these responses.[26]

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[25]Rapaport, David. Diagnostic Psychological Testing. Chicago: The Yearbook Publishers, Inc., 1946. Vol. 1, p. 10.

[26]Thorndike, R. L. and Elizabeth Hagen. Measurement and Evaluation in Psychology and Education. New York: John Wiley and Sons, Inc., 1955. p. 401.

Another criticism of projective techniques often encountered is the lack of standardization or difficulty in interpretation. This is beyond doubt a valid criticism. The situation may be alleviated somewhat since most psychologists agree that an undetermined amount of experience in interpretation is necessary before one may achieve success and accuracy in interpretation. The experience should be gained in working with subjects of known personality structure.

The validity of projective techniques is a crucial point to many psychologists; yet, one encounters great difficulty in trying to pin-point validity figures.

Since the Rorschach Ink Blot Test is the most commonly used projective technique[27] and it is somewhat representative, remarks regarding validity will be confined to this particular measure.

To formulate a brief reply to criticisms of validity, the Rorschach will be briefly discussed in terms of the four types of validity expounded in, "The Technical Recommendations," of the American Psychological Association.[28]

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[27]Buros, Oscar Krisen. Fourth Mental Measurement Yearbook. New Jersey: The Gryphon Press, 1953. p. 117.

[28]"Technical Recommendations for Psychological Tests and Diagnostic Techniques." Supplement to Psychological Bulletin, Vol. 51, March 1954. Washington, D. C.: American Psychological Association, 1954. p. 8.

The Rorschach cannot claim content validity since there is no relationship between the actual content of the ink-blots and the psychodiagnostic inferences to be drawn regarding intellectual effectiveness or emotionality.

In construct validity there must be a relationship between the manifest tasks presented to the subject and the inferences to be drawn.

> The term construct validity was used to refer to the adequacy of analysis of some broad construct, such as scientific thinking, into specific tasks.[29]

> But the analysis results in rather remote and crude analogies (i.e., movement does not exist in a blot; therefore, seeing it is a creative art), and these cannot serve as demonstrations of their own correctness.[30]

The attempts to predict future events (predictive validity) on the basis of Rorschach interpretations has been futile. Some rather high correlations have been obtained, but attempts to reproduce them by other researchers resulted in failure.[31]

In Cronbach's study at the University of Chicago, he found no significant indications of accuracy of prediction of success in relation to academic performance.[32]

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[29]Thorndike, R. L. and Elizabeth Hagen. Measurement and Evaluation in Psychology and Education. New York: John Wiley and Sons, Inc., 1955. p. 412.

[30]Ibid. [31]Idem., p. 415.

[32]Cronbach, L. J. "Studies of the Group Rorschach in Relation to Success in the College of the University of Chicago." J. Ed. Psychol., 1950, 41: 65-82.

It is possible for clinicians to identify personality types or groups using the Rorschach. This ability to differentiate groups known to be different on some basis is concurrent validity. The evidence here is for the Rorschach.

In using the Rorschach for "blind diagnosis," Benjamin and Ebaugh reported agreement in eighty-five per cent of forty-six cases where blind diagnosis was compared with established psychiatric diagnosis.[33]

In studies carried out by Siegel, she reported a sixty-two per cent agreement on an initial test and eighty-eight per cent agreement on a retest a year later between the Rorschach and the psychiatric diagnosis of twenty-six children.[34]

> Thus, in at least certain groups representing fairly extreme deviations from normality, the Rorschach has identified diagnostic categories with substantial accuracy.[35]

Further studies indicate that positive results are not uniformly obtained; therefore, the psychologist must rely greatly upon personal preference and prejudice.

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[33]Benjamin, J. D. and F. G. Ebaugh. "The Diagnostic Validity of the Rorschach Test." Amer. J. Psychiat., 1938, 94: 1163-1178.

[34]Siegel, Miriam G. "The Diagnostic and Prognostic Validity of the Rorschach Test in a Child Guidance Clinic." Amer. J. Orthopsychiat., 1948, 18: 119-133.

[35]Thorndike, R. L. and Elizabeth Hagen. Measurement and Evaluation in Psychology and Education. New York: John Wiley and Sons, Inc., 1955. p. 414.

> The reliability of the Rorschach, defined as consistency of measurement, can be judged only by agreement between interpreters.[36]

The following quotation provides a summation of the criticism of projective techniques and an estimate of their value.

> The profession of Psychology is much like living, which has been defined by Samuel Butler as "the art of drawing sufficient conclusions from insufficient premises." Sufficient premises are not to be found, and he who, lacking them, will not draw tentative conclusions cannot advance.[37]

Need for Screening Devices

In the rapidly advancing technological world of the present, one can hardly doubt the need for screening devices in the schools.

During the year 1916 Terman reported that from a four million dollar annual expenditure in the United States for school instruction, over ten per cent was used to re-teach children what they had previously been taught but had failed to learn.[38] This was influenced by the fact that one-third to one-half of the school children failed to progress

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[36]Buros, Oscar Krisen. Fourth Mental Measurement Yearbook. New Jersey: The Gryphon Press, 1953. p. 118.

[37]Murray, H. A., et al: Explorations in Personality. New York: Oxford University Press, 1938. p. 22.

[38]Terman, Lewis M. The Measurement of Intelligence. Boston: Houghton Mifflin, and Company, 1916. p. 3.

through the grades at an expected rate; ten to fifteen per cent were retarded two or more years and five to eight per cent were retarded three or more years.[39]

Terman emphasizes this as evidence that single standards of performance or progress are not satisfactory or logical and to overcome this we must measure out the work for the individual child in proportion to his ability.[40]

Although Terman did not directly advocate a screening program, the implication is clearly represented.

In a study conducted in the Oakland, California, Elementary schools, Dickson concluded that there was a wide variation in the progress of children through the grades. In normal progress the child completes one grade per year. In this study twenty-six and one-tenth per cent failed promotion in the first year and by the fifth year forty-five and two-tenths per cent failed one or more times.[41]

Dickson contends that this situation is a universal condition in the schools of the United States and is due largely to variations in the mental abilities of the students.[42]

Dickson emphasizes that all children should be tested

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[40] Idem., p. 4.

[41] Dickson, Virgil E. Mental Tests and the Classroom Teacher. New York: World Book Company, 1923. p. 12.

[42] Idem., p. 15.

upon their entrance into the school system and that such tests should be used as a device to develop tentative hypothesis regarding the child.[43]

Garrison and Force discuss the distribution of abilities in the school in terms of individual differences of the students existing under uniform instructional techniques.[44]

> The need for adjustment of the school program to the individual differences in ability of the pupils is clearly indicated when standardized tests are administered.[45]

The previously cited studies all bear common elements of agreement in that differences of ability do exist and some adjustment of school programming must be made to compensate for these differences. It is very doubtful that any group of present day psychologists would deny the existence of these common elements.

Garrison and Force emphasize the fact that the percentage of exceptional children in the schools is generally underestimated; the percentage is continuously increasing, and the majority of these exceptional children are not receiving the training needed for their optimum

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[43] Idem., pp. 88-91.

[44] Garrison, Karl C. and Dewey G. Force, Jr., The Psychology of Exceptional Children. New York: The Ronald Press Company, 1950. p. 9.

[45] Idem., p. 11.

development.[46]

The major problem inherent in this situation is the identification of the exceptional child and detection of problems needing special consideration.

> If exceptional children are to receive the optimum benefits from special training or treatment, it is very important that they be identified at an early age.[47]

These studies certainly imply the need for screening processes as a regular part of educational facilities. The economics of the situation are overshadowed by the need of individual optimal development.

If the normative data collected in this study substantiate, by inference, the normal protocol assumptions, this could be the initial step in the development of a valid, inexpensive method of rapid screening. This would be a two-edged method of intellectual level determination plus developmental or personality disorder determination.

Psychiatric Constructs

Dr. Lauretta Bender carried out extensive studies related to drawing. While these drawings were not replicas of persons, many of the psychiatric constructs developed by her seem to apply well to any type of drawing since many of

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[46] Idem., p. 18.

[47] Idem., p. 15.

them apply to the mechanics of drawing rather than to the figure produced.

Stages of development or maturation reflected in the Goodenough Draw-A-Man Test are parallel to those reflected in Bender's Visual-Motor Gestalt Test. Bender feels that the Goodenough Draw-A-Man Test is an excellent sensory motor gestalt test since the drawing represents the projection of the body image.[48]

> The Goodenough drawing of a man is not the man visually perceived, but a projection of one's own body image acquired by lifelong integration of all perceptual experience.[49]

In reference to the Goodenough Draw-A-Man Test and the Bender Visual-Motor Gestalt Test: "In our clinical work we usually use the two tests together."[50]

Hutt comments extensively on Bender's work, particularly some projective aspects. In reference to the arrangement of the drawings, Hutt feels that the methodical arrangement is an index of intellectual control and adaptation to reality which requires a minimum of dull average intelligence in the adult.[51] This implies that the methodical arrangement is a function of maturation and as

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[48] Bender, Lauretta. Childhood Psychiatric Techniques. Springfield, Ill.: Charles C. Thomas, 1952. p. 62.

[49] Ibid.

[50] Ibid.

[51] Hutt, Max L. A Tentative Guide for the Administration and Interpretation of the Bender-Gestalt Test. U.S.Army, Adjutant General's School, 1945. (restricted), p. 8.

such would not be found in drawings before some degree of maturation occurred. This is analogous to the developmental stages of drawing and the contention of this research that functional efficiency is also a function of maturation. The adult with less than dull average intelligence would draw without methodical arrangement or he would be drawing as a child would draw without benefits of maturation.

Hutt feels that the size of the drawing is of great importance.[52] The two styles represented in Bender's test are the expansive style in which the drawings are expanded or the compressive style in which the drawings are compressed. The expansive style is a projection of an elated or occasionally manic mood, whereas, the compressive style is a projection of depression, rigidity, and constriction. It may indicate a sense of personal inadequacy.

The exact implication of this for use with the Good-enough Draw-A-Man Test is not statistically validated; however, probabilities do exist. The exaggeration of a gifure or part of a figure drawn in the Draw-A-Man Test could easily have the same projective implications. When a child draws an extremely minute or enlarged figure there is a definite reason for this manner of drawing. While doubts may exist

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[52] Idem., p. 8.

in some minds we cannot discount the possibility that extremely minute figures or enlarged figures arise from the same factors prompting this type of drawing in the Bender-Gestalt Test.

Abt and Bellack discuss this in the relationship between the size of the drawing and available space in using human figures.

> The relationship between the size of the drawing and the available space may parallel the dynamic relationship between the subject and his environment, or between subject and parent figures.[53]

Although implications for the sequence of human figure reproductions are not clearly defined, the phenomena of distortion and omission suggest that conflicts may be related to the part distorted or omitted.[54]

Machover established many psychiatric constructs to her satisfaction or acceptance.[55] However, Machover has been sharply criticized regarding a lack of proper validation procedures. Some reviewers of Machover's book feel that it represents only a progress report compiled as a result of Machover's experience with the abnormal in

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[53]Abt, L. E. and Leopold Bellack. Projective Psychology. New York: Alfred A. Knopf, 1950. p. 270.

[54]Idem., p. 276.

[55]Machover, Karen. Personality Projection in the Drawing of the Human Figure. Springfield, Ill.: Charles C. Thomas, 1961.

a clinical setting.[56] The reviewers agree that at the present time the validity of the projective interpretability of human figure drawings is highly questionable at best. They prefer to consider Machover's book as an interesting commentary rather than a manual for any standardized interpretation of drawings.[57]

While many present day psychologists attempt to maintain high levels of validity and reliability, the fact remains that the use of many of our most prominent unstructured personality measures cannot be justified in this aspect. In view of this we cannot simply discard Machover's works on the premise that it must be statistically valid to be worthwhile.

> In the course of administering Goodenough's Drawing-of-a-Man Test for usual IQ purposes, it was discovered that a careful study of the individual drawings often yielded rich clinical material not related to the intellectual level of the subject.[58]

This quotation seems to summarize Machover's motivation in her extensive work with the Draw-A-Person Test.

Machover does not lay claim to any check list of discrete entities rendering differential diagnosis a process

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[56] Buros, Oscar Krisen. The Fourth Mental Measurements Yearbook. New Jersey: The Gryphon Press, 1953. pp. 112-113.

[57] Ibid.

[58] Machover, Karen. Personality Projection in the Drawing of the Human Figure. Springfield, Ill.: Charles C. Thomas, 1961. p. 20.

of "pigeon holing" symptoms. She does deal with patterns or traits which she refers to as "pathological and popular graphic traits," and normality or adjustment indicators." She does not, however, illustrate these as distinct entities.[59]

The relative importance of any feature depends upon the uniqueness of that feature. A conflict treatment of the hands and feet may not necessarily indicate a neurosis; however, such features as internal organs showing through a figure or confusion of a profile and full view of the head by an adult would cause a strong suspicion of psychosis.[60]

> Bizarreness, excessive incongruity, over-symbolic treatment, and silliness are also specifically indicative of mental pathology.[61]

The psychiatric constructs established by Machover are very lengthy and no purpose could be served by reproducing them in this paper.[62]

Machover is an advocate of the idea of developmental stages in drawing and is in complete agreement with Goodenough and others that the child draws what it knows rather than what it sees.[63] This agrees very well with the premises of reality content.

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[59] Idem., pp. 22-25.

[60] Idem., p. 22.

[61] Idem., p. 23.

[62] Idem., pp. 40-100.

[63] Idem., p. 103.

In comparison with the premise of functional efficiency, Machover states:

> Functionally considered, it is natural for a child of three or four to draw a person that looks more like a spider than a human being, that is, a sort of head with legs and arms attached to it.[64]
>
> The trunk has, as yet, not entered the child's consciousness significantly as a differentiated and meaningful experience.[65]

This supports the premise that at age six functional efficiency scoring will be extremely over-shadowed by reality scoring since the child will draw within his perceptual limits and what he knows as reality.

The military organizations of our country have no use for the Draw-A-Man Test as a test of intelligence, since it is a test designed for use with children. However, it is interesting to note that this test is represented in the Military Clinical Psychology Manual, under "Techniques for Personality Study," and the manual states, in reference to Machover's technique: "This procedure is particularly useful as a means of sampling some personality traits otherwise inaccessible to the clinician."[66]

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[64] Idem., p. 102.

[65] Idem., pp. 102-103.

[66] Military Clinical Psychology. Department of the Army Technical Manual (TM 8-242), Department of the Air Force Manual (AFM 160-45), 1951. p. 114.

CHAPTER III

DESIGN OF THE STUDY

The previous discussion of the young child's orientation to reality reflecting his own perceptual limits or "what he knows" as reality provides an important consideration for this study. The premise based upon this is: the young child will draw what he knows to be reality within his perceptual limits and, as a continuous process of maturation is occurring, the perceptual limits of the child will expand until the reality reflected in the drawings will include not only "what he knows as reality" but also "what he sees as reality." When the child is reality oriented and draws only what he knows, the effort in drawing behavior is directed toward the different parts of the drawing "being there," whereas sufficient maturation maturation and expansion of the perceptual limits will cause the child to direct his drawing behavior toward an inclusion of parts with accurate placement or "being correctly there."

In drawing the human figure, "being correctly there," means that the parts included are accurate representations of functionality. For example, the joints and the attachments of the limbs are definite "working" parts of human anatomy with limits and meaning in dimension and length. Thus, if

functionality is present in the drawing, the limbs will be represented with these functional features illustrated in a manner approximating the anatomical design of the human. The arms will be two dimensional, equal to the trunk in length, correctly attached to the trunk and joints will be indicated. This drawing is more "functionally perfect;" therefore, it contains more Functional Efficiency points as contrasted to the "stick" figure drawing, in which limbs are indicated by randomly attached straight lines. The limbs are present in the drawing, although not functional; this represents Reality Content.[67]

Since Functional Efficiency scores are a function of maturation they will increase in proportion to Reality Content scores as maturation progresses. This indicates that the normal six year old, due to a lack of maturation, will not draw functionally until some measure of maturation is attained. To illustrate this statistically, it is necessary to collect data with such an instrument as we have described, in which a clear differentiation of Reality Content points and Functional Efficiency points will be possible. This data must be collected from a population of sufficient size to permit analysis of "maturational levels" as reflected by chronological age.

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[67]Leland, op. cit., passim.

Description of the Population

The first aspect of the population to be investigated was the gross age distribution of the subjects. Since maturation is a gradual, continuous process and this study was trying to isolate one point within this process, it was essential that the population provide a cross-sectional view of several "maturational levels" in which the percentage of the population at each level was sufficient to permit non-parametric analysis of the differences in Reality Content score and Functional Efficiency score and differences in male-female scoring on each of these aspects of the total score. In Table II a percentage distribution of the population is presented by sex and chronological age of the subjects.

In Table II, the population is categorized by chronological age and sex of the subjects. The number of males and females within a chronological age is listed under the column "age N" with the next column indicating the total number of males and females within the chronological age. The percentage of males and females in the chronological age is presented in "% of age N" column with the last column listing the percentage of the total population represented by the males and females of a chronological age. The column "age N-total," represents the total cases by chronological age. These numbers do not represent a normal

TABLE II

PERCENTAGE DISTRIBUTION OF THE POPULATION BY SEX AND CHRONOLOGICAL AGE

Age	Age N M	Age N F	Age N Total	% of age N M	% of age N F	%-population N M	%-population N F
6	16	19	35	45.7	54.3	6.6	7.6
7	16	15	31	51.6	48.4	6.6	6.2
8	23	30	53	43.4	56.6	9.1	12.3
9	11	16	27	40.7	59.3	4.2	5.4
10	18	10	28	66.6	33.4	7.3	3.3
11	20	17	37	55.2	44.8	8.4	6.8
12	13	25	38	34.2	65.8	5.2	10.0
Total	118	131	249			47.3	52.7

distribution of the population *per se*; however, the number of cases per chronological age category and sex represents a sufficient balance of cases, that a normal distribution in terms of intellectual levels may be investigated.[68] A sufficient balance of cases means that all categories contain a number of cases not representing extreme highs and lows in total number.

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[68] Edwards, A. L. *Statistical Methods for the Behavioral Sciences*. New York: Rinehart and Company, Inc., 1954. p. 231.

Since there were enough subjects per chronological age to permit a cross-sectional view of various levels of maturation, the next step in determining the type of population in use was to investigate the socio-economic environment of the subjects. On the premise that there is a direct relationship between cultural deprivation and socio-economic status it seemed important to determine the distribution of subjects within various socio-economic levels. If large percentages of the parents were chronically unemployed, or had a very low income level, or subsisted generally upon financial aid from state agencies, it would be a safe assumption that the general educational philosophy of the parents was not as conducive to maximum effort on the part of the child. Conversely, if an extremely high percentage of the parents were professional people, one would assume that through the educational philosophy of the parents plus a stimulating and encouraging environment, the child might exert maximum effort. An extreme imbalance in the percentage of the population located at any one of the selected levels could have biased the study due to environmental conditions and the effort exerted by the child in making a response.

The occupational classifications selected to represent the socio-economic levels in Table III were arbitrary. While this may be a valid criticism, it has been found that

any selection of classifications would be subject to the same criticism. This is not a case of using the best, but using terminology of classification which seems to fit the situation. In reading the following definition of the classifications one may imagine many types of endeavor which would not fit any of the classifications. Fortunately, this was not a problem in this study, for all occupations encountered in this study clearly belonged in a particular area as defined. The classifications used are operationally defined and coded as follows:

"A" Professional. Those persons whose occupational requirements are regulated by some state or federal agency or organization. Educational requirements and controls exist.

"B" Managerial. Those persons occupied in the management of business or personnel in institutional, industrial, or commercial settings.

"C" Commercial. Those persons occupied in business, industry, or commercial settings, not involved in management of the concern, but directly serving the public to supply consumer needs.

"D" Hand Worker. Those persons not having a salable skill, not directly serving the public, but engaged in regularly supervised work. The housewife who is not employed for monetary gain but is the sole support of the family is placed in this classification.

"E" Unemployed. Those persons not regularly engaged in an occupation for monetary gain.

Table III represents the gross distribution of these occupational classifications. The classifications and codes are presented with the percentage of the total population studied, in each classification.

TABLE III

PERCENTAGE DISTRIBUTION OF THE POPULATION WITHIN THE OCCUPATIONAL CLASSIFICATION

Classification	Code	% of population	N
Professional	A	10.5	26
Managerial	B	9.4	23
Commercial	C	6.7	17
Hand Worker	D	71.7	179
Unemployed	E	1.7	4
N			249

The occupational classifications represented in Table III are ranked in the order of what would normally be the family income and cultural level with the professional person considered to have the highest monetary income and the most desirable cultural influences and the unemployed considered to have the lowest monetary income and the least desirable cultural influence. In examining Table III, it

is apparent that the "D" classification is nearly seven times larger than the "A" classification which is next in size. Since the classifications are rankings of what would normally be family income and cultural level, this high percentage of the population in this relatively low rank would seem to bias the study. In 1961, the Department of Labor, Bureau of Labor Statistics, reported an average weekly earning of $90.25 for production workers in the manufacturing industries of the nation.[69] This seems to be additional evidence that the largest percentage of the population were low income families. However, further investigation of those subjects in the "D" classification revealed that 84.4 per cent of the subjects within this classification were production workers in the employ of the B. F. Goodrich Manufacturing Company of Miami, Oklahoma, which reported average weekly production employee earnings of $123.00 for 1961.[70] This seems to indicate that low family income was not a crucial factor even though the largest percentage of the population was in the "D" classification. Theoretically, the parents in the "A" classification exert a more desirable cultural influence upon their children than the lower classification due to status and prestige in the community,

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[69]Hansen, H. (ed.) The World Almanac and Book of Facts. New York: New York World Telegram, 1962. p. 692.

[70]Local 318 News, Organ of the Rubber, Cork, Linoleum, and Plastic Workers of America, United. Jan., 1962. p. 3.

regardless of income.

In comparison, the percentage of the "A" and "B" classifications are quite low; however, the percentage of the "E" classification is quite satisfactory. The four cases in this classification represent only one actual case in which the parent was unemployed; the other three cases were retired persons caring for grandchildren.

In considering the various age groups of the population, it is necessary to separate these groups and place the child not only in his age group, but also in his grade group. Ages six and seven may both appear in the first grade, but with a year or more separating the subjects in age and maturity, the same drawing would not be expected. If like drawings were produced, the chronological age would cause a radical difference in the intelligence quotient. The percentage of each group contained in a particular age is represented in Table IV.

Since age twelve was the "cut-off" age for this study, this age represents one hundred per cent of grade seven in Table IV. The greater percentage indicated in each grade simply reflects normal progress through the school grades. For example, by law a child cannot enter this public school system unless he is six years of age prior to November the second of the school year; therefore, first graders should be six years old, second graders

TABLE IV

PERCENTAGE DISTRIBUTION OF THE POPULATION BY CHRONOLOGICAL AGE WITHIN THE SCHOOL GRADE

Grade	Chronological Ages 6	7	8	9	10	11	12
1	76.1%	23.9%					
2		52.0%	44.4%	3.6%			
3			79.4%	20.6%			
4				73.7%	26.3%		
5					41.0%	59.0%	
6						71.4%	28.6%
7							100.0%

should be seven and so on until at the age of twelve years we would expect the child to be in the seventh grade.

Elements of the Design

The data was organized by classifying subjects into diagnostic groups[71] to permit analysis of the total achieved score in terms of the percentage of Reality Content and Functional Efficiency; the significance of the differences of male-female scoring; and the significance of the difference between the above scores. Other groupings

[71] See above. Chapter I, p. 9.

were considered before classifying the subjects into the three diagnostic groups. The first group considered was a segregation of races to allow at least a minimal cultural balance since there is doubt that a test normalized on one racial group is biased when racial differentiation is present.

The public schools in which the data was collected had no negro students; thus, one group was eliminated without difficulty. The American Indian was considered for grouping until it became apparent that these students constituted only 1.2 per cent of the total population of the study. Empirically, their drawings did not seem to differ from others in the study; however, in spite of this, they were deleted from the study to make it neater.

The major groups of the population were those three main diagnostic groups previously discussed as Group I, normal IQ's by Goodenough scoring; Group II, sub-normal IQ's by Goodenough scoring; and Group II, extra-normal IQ's by Goodenough scoring. The normal IQ for this study was 86-110.[72] Since these groups were the diagnostic categories, all other groupings of the total population were in divisions of the three main groups. For example, when male and female groupings of the total population were used, the groups were Group I males and Group I females,

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[72]Leland, loc. cit.

and so on through the three diagnostic groups.

The third grouping, based upon the age of the subjects, was necessary from the viewpoint of developmental stages in drawing in terms of Reality Content and Functional Efficiency and was the focal point of this study in terms of the percentage of points achieved on these two entities. The Goodenough standardization does not pass the thirteenth year; therefore, this age was the upper limit of the age group.[73]

The fourth grouping, based upon the sex of the subjects, was necessary since there is no doubt that sex differences do exist in drawing[74] and maturation. Therefore, the age at which the achieved score reflects somewhat equal percentages of Reality Content and Functional Efficiency would not be the same for both sexes. If one accepts the premise of Functional Efficiency scoring as a function of maturation it logically follows that the first sex to develop dominant functional drawing behavior is maturing at a more rapid rate than the opposite sex. This is discussed in detail as the data is analyzed in Chapter IV.

In following the previously stated "projective hypothesis" of David Rapaport[75] it is logical to assume a greater projection of the personality into a drawing

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[73] Goodenough, op. cit., p. 40. [74] Idem., p. 13.

[75] Rapaport, loc. cit.

entirely representative of the drawer, or a self drawing. Thus in following the Goodenough instructions to "make a picture of a man," the male subjects may do very well since they can complete a self drawing without further instruction; the female subjects, however, may be penalized since they could not make a self drawing from these instructions. In order to minimize this bias the instructions for administration were modified for this study to include three pictures or drawings. Drawings of a man, woman, and a self drawing were collected, utilizing the following instructions.

Instructions:

> I am a student at Kansas State College of Pittsburg, Pittsburg, Kansas. We are conducting a study to find out how well young people your age can draw. We are particularly interested in your group; however, we are collecting drawings from many groups. To do this we need your help. Would you be willing to help us by drawing some pictures for me? There are three sheets of paper for each of you; use only a pencil to make these drawings. Make the best drawings you can.

The next four steps of the instructions were administered in sequence after completion of each step by the entire group.

1. Take a sheet of paper and put the number one on it. Now turn it over and draw a person.

2. Take another sheet of paper and put the number two on it and turn it over. Those of you who just finished the drawing of a man hold up your hands. This time you draw a woman and the rest of you draw a man.

3. Take the last sheet of paper and put the number three on it; turn it over and draw a picture of yourself.

4. As your name is called bring your papers to me.

Thus, in using the above stated instructions, everything possible was done to insure the presence of one drawing actually representative of the subject. Special sheets were prepared in advance of the administration, to be used in identifying the drawings and containing appropriate blanks to insure the facilitation of data collection after testing was completed.

Prior to or during the test administration, the classroom teacher entered each child's name on a cover sheet in the space designated "name," and circled the grade. Immediately after the completion of testing, the name of each child was called, and as he came forward his drawings were arranged in order and stapled to the cover sheet to insure accuracy of collection. A sample cover sheet is presented in Appendix H.

The school in which the data was collected was assigned by the Superintendent of Schools in Miami, Oklahoma. This simplified administration since the elementary school assigned had a teacher load of twenty-five to thirty students which allowed administration in units already in existence; therefore, no grouping or division was necessary in preparation for the administration of the tests.

Administration was preceded in all cases by a brief, informal conference with the classroom teacher in which information was exchanged concerning special notations on

the cover sheet, placing names on the cover sheets, and comments or reactions to questions during the administration. The teachers were cooperative and in no instance replied to any question, during the administration, regarding the drawings.

All subjects were allowed to finish each drawing before a new section of the instruction was given and upon completion of the last drawing the papers were collected and cover sheets were stapled to the individual students' drawings. The drawings were arranged in order of first, second, and third before stapling to the cover sheet. Upon completion of the administration, the class records were secured and utilized to complete the data requirements of the cover sheet. There is always a possibility of inaccurate recording on school records, especially on such items as the birthdate or previous tests, but one might find cooperation lacking if the birth certificate or raw material were required on each subject. Therefore, a routine examination of the existing files was done and it must be assumed the files are correct and accurate.

Informal conferences were again held with the classroom teachers after the administration of the test. The purpose of these second informal talks was to arrive at some estimate of the accuracy of the data to be used, particularly parental occupations, and to identify any

student with impairments of vision, hearing, or motor control which would penalize him on the test. Perhaps one of the most important features of these informal and highly informative talks was merely transmitting to the teacher an awareness that her assistance and opinions were valued and respected.

Informal conferences were held with the two administrators involved. Although a tremendous amount of information was collected from the classroom teacher, there were many items of the same nature discussed with the administrators, especially regarding parental occupations. The school records consisted of cards on which factual material was entered or merely checked; consequently, no anecdotal records were available. The administrators aided in the interpretation of many of these records along with their knowledge of various students.

Controls

The controls of this study were not the experimental-control group contrast one would find in the laboratory; rather they were conditions under which the study was carried out. There was no selectivity of subjects except as already noted since the entire population of an elementary school was tested and combined with the entire population of a seventh grade. The Superintendent of Schools designated the schools to participate.

The racial element may be considered as a control; however, since there were no negroes involved and only three Indians, they were not utilized as subjects in this study. Subjects who had reached their thirteenth birthday were not included in the study, although they participated in the testing with their classmates. The papers collected from the seventh grade contained 42 papers from subjects who had reached their thirteenth birthday.

From the conferences with the classroom teachers, four subjects were observed and finally excluded from the study. One of these subjects had lost his glasses, one had broken glasses, one apparently needed glasses he did not have, and one subject appeared to have difficulties of motor coordination. The drawing behavior of these subjects was labored as evidenced by deep squinting, face close to the paper, frequent blinking, and rubbing of the eyes and face. The subject who appeared to have problems of motor coordination seemed to have great difficulty in holding and using a pencil.

CHAPTER IV

ANALYSIS OF THE DATA

Computation of Scores

The main objective of this study was to isolate that particular age, sex, and grade level at which the child begins to draw as an adult would draw, or the percentage of Functional Efficiency is equal to or greater than the Reality Content, within the total score. This was considered within each diagnostic group to provide similar intellectual levels and between the diagnostic groups to provide different intellectual levels, in order to permit contrast and comparison of subjects within diagnostic groups or between different groups.

The subjects of this study were all less than 13 years old; therefore, the only limitation of the diagnostic groups was the IQ derived from the Goodenough scoring scale[76] as modified at the Parsons State Hospital and Training Center.[77] Therefore, the IQ was the only basis of classification or "sorting" subjects into the diagnostic groups. The three drawings collected from each subject were studied to ascertain which of the three would be

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[76] Goodenough, op. cit., p. 90.

[77] See above, Table I, p. 7.

chosen for scoring and in some instances it was necessary to score more than one drawing in order to utilize the drawing furnishing the highest score. The scores were used with the Goodenough norms[78] in computing the mental ages, and the standard formula of dividing the mental age by the chronological age ($IQ = \frac{MA}{CA}$) was used to compute the intelligence quotients. Each item in the Goodenough scoring scale was carefully considered to be certain of a clear distinction between Reality Content items and Functional Efficiency items.[79]

Comparison of Scores

A joint conference was held with the psychologists and examiner to discuss scoring procedure. Special consideration in the scoring of female figures was discussed in terms of rules to control the scoring which had been devised by the psychologists. These rules were closely followed in scoring the drawings. The rules are reproduced in Appendix A.

To evaluate the reliability of scoring, fifteen drawings were scored by the examiner on cards not attached to the drawings. The drawings were then scored by three clinical psychologists at the Parsons State Hospital and

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[78] Goodenough, op. cit., p. 39.

[79] See above Table I, p. 7.

Training Center. The psychologists' scoring was on cards not attached to the drawings, which allowed independent scoring in all cases. The Product Moment Correlation Coefficient[80] was used to analyze the relationship between the examiner's and psychologist's scoring. The value of "R" was .95 plus in all cases of independent correlation of the two scorings.

The modified Goodenough was scored and IQ's computed for all subjects in order to classify the subjects as members of the previously discussed diagnostic groups. The results of this classification are reported in the percentage of the total population, at each age level, within IQ intervals, and diagnostic groups, in Table V.

In Table V, the total population of this study has been classified into the diagnostic groups. The sub-totals of each group have been provided with the sub-totals of the percentage of the population in each chronological age category. It may be noted that of the 20 subjects in Group III the largest percentage appeared at age six. In Group I, 143 subjects are represented and in Group II, 86 subjects. The last two lines of the table provide the totals of the three groups by the percentage of the total population within each age category and the number of cases within each age category.

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[80]Edwards, op. cit., p. 142.

TABLE V

PERCENTAGE DISTRIBUTION OF THE POPULATION WITHIN THE DIAGNOSTIC GROUPS, CHRONOLOGICAL AGE, AND GOODENOUGH IQ INTERVALS

IQ	Group	N	6	7	8	9	10	11	12
131-135	III	2	0.4	0.4					
126-130		2			0.4		0.4		
121-125		1			0.4				
116-120		2	0.8						
111-115		13	2.1	1.2	0.4				
Total %		100	3.3	1.6	1.2		0.4		
Total N		20	11	4	3		2		
106-110	I	17	1.2	1.8	0.8	0.4	1.2	1.2	
101-105		18	1.8	1.7	0.8	0.4		2.1	1.6
96-100		36	2.5	2.1	1.6	2.2	0.8	3.8	1.2
91- 95		33	1.5	2.1	2.1	1.2	3.2	2.5	1.6
86- 90		39	1.8	1.7	4.3	2.8	1.2	2.5	1.2
Total %		100	8.8	9.4	9.6	7.0	6.4	12.1	5.6
Total N		143	19.0	24.0	24.0	18.0	14.0	30.0	14.0
81- 85	II	44	0.8	0.4	5.6	2.2	2.1	1.2	5.7
76- 80		21	0.8		2.4	0.8	1.2	1.2	2.0
71- 75		12	0.4	0.4	2.4	0.8	0.4		0.4
66- 70		5		0.4			1.2		0.4
61- 65		1						0.4	
56- 60		1							0.4
51- 55		0							
46- 50		2							0.8
Total %		100	2.0	1.2	10.6	3.8	4.9	2.8	9.7
Total N		86	5	3	26	9	12	7	24
Total %	All	100	14.1	12.2	21.4	10.8	11.3	14.9	15.3
Total N	All	249	35	31	53	27	28	37	38

In evaluating the linear relationship of the modified Goodenough with the previous test data on the subjects, it was necessary to work with the California Test of Mental Maturity (CTMM), Kuhlman-Anderson (K-A), and the Science Research Associations Basic Achievement Series (SRA). These tests all produce an intelligence quotient. Test records were non-existent on several students and were completely lacking in the first grade. The Product Moment Correlation Coefficient[81] was computed for divisions[82] of each diagnostic group classification as presented in Table VI.

Table VI lists the Product Moment Correlation Coefficients for each of the three diagnostic groups divided on the basis of the original classifications of age, sex, and grade. The values are represented by the symbol "r" and appear in two columns, one for male subjects and one for females. Columns under the symbol "N" represent the total cases in each division. Those divisions in which no previous test data were available are represented by asterisks and, with the exception of the first grade, occur in those divisions with a low number of cases. In Group III there were some divisions in which there were no subjects.

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[81] Ibid.

[82] A division of each diagnostic group is a specific age, sex, and grade level of subjects within the group, reported for Group I in Appendices B & C; Group II, Appendices D & E; and Group III, Appendices G & F.

TABLE VI

PRODUCT MOMENT CORRELATION COEFFICIENTS COMPUTED ON THE GOODENOUGH IQ SCORES AND PREVIOUS TEST DATA FOR SUBJECTS OF THE SAME AGE, SEX, AND GRADE LEVELS WITHIN THE DIAGNOSTIC GROUPS

Group	Division	Test	Age	Grade	Male		Female	
					r	N	r	N
I	1	*	6	1	*	9	*	10
	2	*	7	1	*	2	*	3
	3	K-A	7	2	.23	8	.32	9
	4	*	7	3	*	2		0
	5	K-A	8	2	*	1	.24	8
	6	CTTM	8	3	.15	8	.67	7
	7	K-A	9	2		0	.83	2
	8	*	9	3	*	2	*	1
	9	K-A	9	4	.28	7	.10	6
	10	K-A	10	4	.44	2	.76	2
	11	CTMM	10	5	.08	7	.65	3
	12	CTMM	11	5	.07	9	.41	10
	13	CTMM	11	6	.13	5	.50	6
	14	*	12	6	*	1		0
	15	SRA	12	7	.02	2	.08	11
II	1	*	6	1	*	4	*	1
	2	*	7	1	*	1		0
	3	K-A	7	2	.95	2		0
	4	*	7	3		0		0
	5	K-A	8	2	.66	5	.20	4
	6	CTMM	8	3	.11	8	.03	9
	7	*	9	2		0		0
	8	CTMM	9	3		0	.59	3
	9	K-A	9	4	.97	2	.08	4
	10	K-A	10	4	.07	4	.99	1
	11	CTMM	10	5	.03	4	.30	3

TABLE VI (cont.)

Group	Division	Test	Age	Grade	Male		Female	
					r	N	r	N
II (cont.)	12	CTMM	11	5	.86	3	.99	1
	13	CTMM	11	6	.58	3		0
	14	CTMM	12	6	.30	2	.48	4
	15	SRA	12	7	.16	8	.81	10
III**	1	*	6	1	*	3	*	8
	2	*	7	1		0	*	1
	3	K-A	7	2	.99	1	.98	2
	6	CTMM	8	3	.99	1	.98	2
	11	CTMM	10	5	.99	1		0
	13	CTMM	11	6	.99	1		0

*No previous test data available.

**Those divisions of Group III in which male and female N = 0 are not represented in the table.

These divisions are noted at the bottom of the table.

A major concern of this analysis was to determine the age, sex, and grade level at which drawing behavior becomes somewhat balanced in terms of Reality Content score and Functional Efficiency score. This was accomplished by a percentage analysis of each score to determine the proportions of the score representing Reality Content and Functional Efficiency. The total points possible are of no consequence for the main concern is not the possible score, but the achieved score. If the reality proportion is greater than the functional proportion, the subjects' drawing

behavior is basically reality oriented; whereas, if the situation is reversed, the subjects' drawing behavior is functionally oriented. The change in basic orientation begins to occur when the reality and functional proportions are equal.

Table VII lists the mean percentages and standard deviations of Reality Content scores and Functional Efficiency scores. The table presents this information by diagnostic groups, sex, and chronological age of the subjects. The mean percentage of Reality Content scores is symbolized "$\overline{X}R\%$" and the mean percentage of Functional Efficiency score is symbolized by "$\overline{X}F\%$". The data upon which Table VII is based were taken from Appendices C, E, and G, which contain each subject's individual score represented in proportions of Reality Content and Functional Efficiency.

In Table VII the change in the basic orientation of drawing behavior has occurred, as indicated in the category of "Group I, age 12, females." The change for this age is also apparent in Division XV in Appendix C, which furnishes the actual proportions of score for each subject within the group and also in Appendix B, which lists the raw scores, mean scores, and standard deviations of the divisions within the diagnostic group. The change seemed to be quite distinct for the age 12 females; however, there is no indication of change for the males. This seems to be

TABLE VII

MEAN PERCENTAGES AND STANDARD DEVIATIONS OF REALITY CONTENT AND FUNCTIONAL EFFICIENCY CONTENT WITHIN THE GOODENOUGH SCORES OF SUBJECTS, BY DIAGNOSTIC GROUPS, CHRONOLOGICAL AGE AND SEX

Group	Sex	Age	N	$\bar{X}R\%$	S.D.	$\bar{X}F\%$	S.D.
I	M	6	9	78.2	8.4	23.1	9.2
	M	7	12	68.0	6.7	31.7	6.6
	M	8	9	60.5	7.2	39.7	6.2
	M	9	9	60.8	4.7	37.0	5.3
	M	10	9	58.0	4.1	42.0	4.1
	M	11	14	57.4	4.7	42.5	4.7
	M	12	3	51.8	2.0	48.2	2.0
	F	6	10	75.7	2.5	29.2	2.3
	F	7	12	68.0	4.3	31.9	4.3
	F	8	15	65.0	9.5	35.7	9.6
	F	9	9	57.7	5.7	42.2	5.5
	F	10	5	53.2	4.6	46.8	4.6
	F	11	16	52.4	3.5	47.5	3.5
	F	12	11	49.8	2.5	50.2	4.8
II	M	6	4	82.6	16.4	17.4	4.6
	M	7	3	67.8	4.5	32.2	7.0
	M	8	13	69.9	7.5	30.1	7.3
	M	9	2	64.1	1.4	35.9	1.4
	M	10	8	62.2	5.9	37.8	4.1
	M	11	6	56.2	5.7	43.8	5.5

TABLE VII (cont.)

Group	Sex	Age	N	$\bar{X}R\%$	S.D.	$\bar{X}F\%$	S.D.
II (cont.)	M	12	10	57.2	14.6	42.8	12.6
	F	6	1	75.0	0.0	25.0	0.0
	F	7	0				
	F	8	13	69.8	10.2	30.2	7.2
	F	9	7	67.6	6.5	32.4	6.9
	F	10	4	64.8	10.2	35.2	10.2
	F	11	1	54.4	0.0	45.6	0.0
	F	12	14	53.2	5.6	46.8	5.6
III	M	6	3	63.6	2.5	36.4	2.5
	M	7	1	55.0	0.0	45.0	0.0
	M	8	1	57.6	0.0	42.4	0.0
	M	10	1	49.5	0.0	50.5	0.0
	M	11	1	49.5	0.0	50.5	0.0
	F	6	8	67.3	4.4	32.7	4.4
	F	7	3	63.8	8.9	36.2	8.9
	F	8	2	55.3	3.3	44.7	3.3

*Where N = 0 the age classification was not represented.

evidence of earlier maturation for the normal female than the male.

The child with a sub-normal IQ would be expected to mature slower or undergo this change in basic reality

orientation to functional orientation at a later age than the normal child. This is represented in Group II of Table VII, since the reality proportion is dominant for all ages and both sexes. Therefore, the child with the sub-normal IQ does mature at a slower rate than the child with the normal IQ. Appendix E lists the proportions of score for each division and subject within Group II. Appendix D lists the raw scores, mean scores, and standard deviations of score for Group II subjects.

Since the child with the sub-normal IQ matures more slowly than the child with the normal IQ, it would seem logical to expect the child with the extra-normal IQ to mature at a more rapid rate than the normal. Table VII, Group II, seemed to indicate that this is true. Unfortunately there were no females in Group III above the age of eight years. However, the males of this group seemed to be undergoing this change at ages ten and eleven. There was inadequate sampling in this group, which was unavoidable since an entire population of a school was tested with no attempt to select subjects. Although based upon the inadequate number of subjects available, this may be worth investigating by further study. Proportions for all of the subjects in Group III are listed in Appendix G with the raw scores, mean scores, and standard deviations of score in Appendix F.

Evaluation of the Differences of Score

The Sign Test for Paired Observations[83] was selected to test the significance of the difference in the percentage of Reality Content score and Functional Efficiency score. This study was concerned with paired observations of two aspects of a total score. Reality Content and Functional Efficiency, to be viewed as contrasting aspects of the score, provide the paired observations. This test seemed to be the most appropriate measure to use in evaluating the difference in scores. The Sign Test for Paired Observations was applied to those proportions of score found in Appendices C, E, and G. Dominant proportions of Reality Content were scored minus and dominant proportions of Functional Efficiency were scored plus. The Sign Test results for the three diagnostic groups may be found in Table VIII.

The Sign Test results in Table VIII indicate a significant difference in scores. Since the plus scores indicate functional dominance and they were in the minority, high reality scores were responsible for the significance. Non-significance was indicated in various areas and this was very important in this study. The first point of non-significance was in Group I, age 12, of the combined sexes. The sexes were combined in order to increase the sample size within the chronological age groups. In this

category a low number of males was combined with the females and these scores were non-significant or there was no dominance indicated in the proportion of score. Since the males could not be tested separately, it was presumed that the non-significance for the age 12, combined sexes, is due to the presence of the females, since eleven of the fourteen subjects of this category were females.

TABLE VIII

SIGN TEST RESULTS COMPUTED BY APPLYING PLUS SIGNS TO DOMINANT FUNCTIONAL EFFICIENCY SCORES AND MINUS SIGNS TO DOMINANT REALITY CONTENT SCORES WITHIN THE DIAGNOSTIC GROUPS, SEX, AND CHRONOLOGICAL AGE OF THE SUBJECTS

Group	Age	Sex	Scores Plus	Scores Minus	N	z	Significant*
I	6	M-F		19	19		yes
	7	M-F		24	24		yes
	8	M-F		24	24		yes
	9	M-F	1	17	18	2.83	yes
	10	M-F	3	11	14	2.92	yes
	11	M-F	5	25	30	3.68	yes
	12	M-F	6	8	14	.88	no
	11	M	1	13	14	6.20	yes
	11	F	2	8	10	2.59	yes
	12	M**			3		
	12	F	5	6	11	.40	no
Total	All	M	2	63	65	7.38	yes
	All	F	12	66	78	5.86	yes

TABLE VIII (cont.)

Group	Age	Sex	Scores Plus	Scores Minus	N	z	Significant*
II	6	M-F		5	5		yes
	7	M-F		3	3		yes
	8	M-F		26	26		yes
	9	M-F		9	9		yes
	10	M-F		12	12		yes
	11	M-F		7	7		yes
	12	M-F	6	18	24	3.76	yes
	12	M	3	7	10	1.44	no
	12	F	3	11	14	2.35	yes
Total	All	M	3	43	46	5.47	yes
	All	F	3	37	40	5.13	yes
III***	All	M	2	5	7		
	All	F	0	13			yes

*.05 per cent (z = 1.96)

**Edwards, op. cit., p. 288. (Minimum of 10 cases required; therefore, the males of this age cannot be tested as a separate category--see also Group III, Males.)

***Diversity of ages within the group would not permit an analysis of ages.

These eleven, age 12, females were tested separately and the results were non-significant. This is exactly what one would expect in terms of the previous discussion, in which age 12, females, provided that point at which Reality

Content becomes dominated by or balanced with Functional Efficiency. The non-significance indicated that scoring on the two entities was very similar or they were somewhat in balance. This seemed to be further evidence that the female matures at a faster rate than does the male. Although the age 12, males could not be tested due to sample size, the age 11 males in Group I indicated a much higher level of significance than the age 11 females. This was also reflected in the total under Group I. The total plus points assigned for functional dominance were accredited 12 to the females and 2 to the males. Both male points were accredited at age 12; whereas, the females were accredited plus points from the age of 9 through the age of 12. The actual score-proportions may be found in Appendix C.

In the sub-normal IQ, Group II of Table VIII, we would expect a slower rate of maturation and this seems to be indicated since there were no plus points accredited for either sex until age 12. At age 12, the plus points for functional dominance are equally distributed between the sexes with non-significance indicated for the males and significance indicated for the females. This might have been due to sample size or to the etiology of the retardation. For example, these subjects were retarded or they would not have been in the low IQ group; however, the

etiology of the retardation may have been organic or functional. If it was functional retardation due to some psychogenic process, it must be presumed that at least some of these subjects were capable of a higher response and, therefore, belonged in the normal IQ diagnostic group. An analysis of this would involve a detailed study of more data than were available for this study. In Group I, 10.0 per cent of the total score for both sexes was accredited in functional dominance or plus scores; whereas, in Group II, only 6.0 per cent of the total score, both sexes, was accredited to functional dominance. This seemed to be further evidence of slower maturation in Group II. The actual score-proportions may be found in Appendix E.

In considering Group III of Table VIII, we would expect a faster rate of maturation since these subjects have extra-normal IQ's. The sample size of Group III is small with no females above age eight. The females' scores were significantly different as indicated; however, due to sample size the males could not be tested. Due to the sample size and diversity of ages within Group III, it was not possible to formulate any conclusions regarding differences of score. The actual score-proportions may be found in Appendix C.

The difference between the Reality Content scores and the Functional Efficiency scores has been discussed and it seems pertinent to discuss the differences in male and

female performance on each of these entities. The Mann-Whitney U Test[84] was used to test for the significance of the differences in male-female Reality Content scores and male-female Functional Efficiency scores. This test may be used when an ordinal measure has been achieved and it is the most powerful alternative to the "t" test when the measurement of the research is weaker than interval.[85] The Mann-Whitney U Test seemed to be the most appropriate measure for our purpose and data.

Table IX provides a comparison of Reality Content scores between males and females of the same chronological age within the three diagnostic groups. The "Critical U Values"[86] provided a .05 per cent level of significance. Since a directional hypothesis was being tested, it was predicted that the females would score higher on both the Reality Content and the Functional Efficiency than the males. Therefore, significance would indicate higher female scores than male scores. Non-significance would indicate that male and female scores were quite similar.

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[84] Siegel, S. Non-Parametric Statistics for the Behavioral Sciences. New York: McGraw-Hill Book Co., Inc., 1956. p. 116.

[85] Ibid.

[86] Idem., p. 277.

TABLE IX

THE MANN-WHITNEY U TEST AS A COMPARISON OF REALITY CONTENT SCORES BETWEEN MALES AND FEMALES OF THE SAME CHRONOLOGICAL AGE

Group	Age	N		U values[87]		Significant
		M	F	Observed	Critical	
I	6	9	10	22	24	no
	7	12	12	67	42	yes
	8	9	15	53	39	yes
	9	9	9	27	21	yes
	10	9	5	11	9	yes
	11	14	16	92	71	yes
	12	3	11	5	5	no
II*	8	13	13	148	51	yes
	12	10	14	174	41	yes
III**	6-11	7	13	71	24	yes

*Subjects within this group were too scattered to allow contrast within all ages.

**Subjects within this group were too scattered to allow any contrast between ages.

Table IX, Group I, indicates that there was no significant difference in the reality scoring of males and females at age six. This would be expected since it was previously stated that the young child, regardless of sex,

[87] Idem., p. 277.

is basically reality oriented. In Group I, ages seven through eleven, there were significant differences of score indicating that the females consistently scored higher on Reality Content than the males. In examining the raw score data and mean score found in Appendix B, this was what happened. In Group I, age 12, there was no significant difference indicated. The males and females were drawing somewhat alike, in that the Reality Content proportions of score were quite similar for both sexes.

Table IX is a reflection of drawing behavior in which the young child is reality oriented and both sexes score about the same. Evidences of earlier female superiority of Reality Content scoring began with the significance of scores at age seven and were in evidence through age 11. At age 12, the males overcame this superiority of the females and both sexes were, again, scoring about the same. This is the point at which the female becomes functionally oriented and the male is beginning the change in basic orientation. This change was reflected in the balance of Reality Content and Functional Efficiency and since Table IX is concerned with only Reality Content scores this non-significance of male-female Reality Content scores at age 12 was what was expected.

In Table IX, Group II, age 12, there is significance indicated in the difference of male and female scoring. Since this group was expected to be later in development

than the other groups, similar scoring between the sexes would not be expected, since age 12 for the normals would not be "equal" to age 12 for the sub-normals.

Specific age categories could not be tested in Group III, Table IX, due to the scatter of ages within the group; therefore, no conclusions were possible regarding significant differences of scores.

Table X is a comparison of the Functional Efficiency scores between males and females of the same chronological age.

TABLE X

THE MANN-WHITNEY U TEST AS A COMPARISON OF FUNCTIONAL EFFICIENCY SCORES BETWEEN MALES AND FEMALES OF THE SAME CHRONOLOGICAL AGE

Group	Age	N		U Values		Significant
		M	F	Observed	Critical	
I	6	9	10	26	24	yes
	7	12	12	65	42	yes
	8	9	15	49	39	yes
	9	9	9	28	21	yes
	10	9	5	11	9	yes
	11	14	16	41	71	no
	12	3	11	22	5	yes
II*	8	13	13	252	51	yes
	12	10	14	122	41	yes
III**	6-11	7	13	126	24	yes

*Subjects within this group were too scattered to allow contrast within all ages.

**Subjects within this group were too scattered to allow contrast within all ages or at any age.

The prediction was that the female would consistently score higher than the males. Group I, age six, indicated a significant difference in male-female scores (functional), which was not found in the male-female reality score. The females did score consistently higher as indicated by the significant differences in all cases except age 11. At age 11 in Group I the male-female functional scoring was quite similar, since no significant differences existed and at age 12 the differences again became significant.

At age 11, the similar scoring of the two sexes indicated that they were very near the point at which the basic orientation changes from reality to functional. The scoring for both sexes was balanced or equal. At age 12, the females again scored higher than the males; therefore, the females were more functionally oriented. This seemed to be another indication of earlier female maturation than male.

Group II of Table X indicated significant differences in favor of the females with no indication of the 12 year old males being near the 12 year old females. The age spread of the subjects of Group III would not permit testing by age categories. Therefore, no conclusions were possible regarding differences of male-female scoring in Group III.

CHAPTER V

RESULTS OF THIS STUDY

Summary

This study was carried out to examine the relationship of Reality Content and Functional Efficiency in the human figure drawings of children between the ages of 6 and 13. The rationale of these two entities is the drawing behavior of the child as a reflection of reality orientation or functional orientation. The earliest legible drawings are reality oriented since they are based on what the child knows as reality, not what he sees. The major concern is in "getting it all in the picture" or "being all there," as contrasted to "being correctly there" as in the drawings of children who are functionally oriented.

This rationale led to the division of the Goodenough scale for the Draw-A-Man Test presented in Table I. The test is scored on a basis of mere presence of items (being there) and an increase of score when the item is improved upon (being correctly there). Thus, the mere presence of an item is reality, whereas, an improvement upon that item to cause it to be more functionally "perfect" is a manifestation of Functional Efficiency and is awarded an increase in score. This study poses the hypothesis, "Functional Efficiency is the major contributing factor in the drawings

of children before the thirteenth year of age."

Various aspects of the population examined in this study were investigated in order to develop a comprehensive picture of the population type. The gross age distribution of the population was investigated and presented in Table II. In Table II, the number of subjects within each chronological age seems adequate to insure a cross-sectional view of the maturational process which is represented by consecutive chronological ages. The socio-economic environment of the population was investigated in order to arrive at some estimate of the number of subjects from homes of various income levels. Occupational classifications were defined to group the population at various socio-economic levels. The results of this classification are reported in Table III. The largest percentage of the population appears in the "D" classification which is a relatively low income rank in the table; however, 84.4 per cent of the subjects within this classification had average weekly earnings which were $22.75 higher than the national average. Any generalization from the results of this study are limited by this characteristic of the population. The high family income for this group, as compared to the per capita income of the area, was derived from a major industry located in a farming area. In considering the family income of this occupational class, it is not logical to assume that they were "middle class" families

on the social scale of the area, but rather "upper middle class" due to family income. This situation creates difficulty in estimating cultural level since there were families of the "D" classification with a higher family income than some families within the "A" classification, although higher cultural levels of the "A" classification in Table III must still be presumed. Generalizations of this study should not be made unless the populations are very similar in socio-economic backgrounds and distribution within the occupational classifications.

The relationship of chronological age to school grade was investigated and the results reported in Table IV. This table illustrates the percentage of chronological ages within a specific school grade. For example, in grade one, Table IV indicates that 76.1 per cent of the subjects were age six and 23.9 per cent were seven years of age. The greater percentage indicated in each grade simply reflects normal progress through the school grades since the six year would be expected to be in grade one, the seven year old to be in grade two, and so on, until at age 12 we would expect the child to be in grade 7. However, this does not imply retardation in all of the other percentages represented for many of these subjects had birthdays between the beginning of the school year and the time at which this study was carried out in February. Indications of retardation are much stronger in cases of the nine year old child being in

grade two where we would ordinarily expect the seven year old.

Various groupings within the population provided an organization of the data for analysis. Racial groupings were considered, but such a slight number of non-Caucasions were encountered they were deleted. The main groups of the population were the three diagnostic groups, classified by IQ's derived from the Goodenough scoring modified at Parsons State Hospital and Training Center, Parsons, Kansas, as presented in Table V. The subjects were grouped according to chronological age, sex, and grade level within the three diagnostic groups. These groups were discussed in Chapter I in terms of age limits, IQ limits, and normal protocol assumptions. In Group I, the normal IQ group, the drawings of younger children should be in terms of inclusion of parts rather than quality of drawings; thus, when Reality Content scoring tends to be greater than the Functional Efficiency scoring, there seems to be a normal protocol for a child. The scores for each individual within Group I were divided into percentages of Reality Content and Functional Efficiency and are presented in Appendix C. The information in Appendix C indicates that of the 65 male subjects, three males had dominant Functional Efficiency scores; and of the 78 females, 12 had dominant Functional Efficiency scores. These 15 subjects did not have the usual protocol pattern since the Functional

Efficiency scores were equal to or greater than the Reality Content score. These subjects seemed to be preoccupied with the quality of the drawing, probably more sensitive to their environment than the rest of the group, and possibly able to do better work. Since the ability to do better work is indicated, we must assume an artificial lowering of ability which could be considered some sort of psychogenic process. The remaining subjects of Group I (128) had drawing protocols which fit the normal protocol assumption.

The subjects of Group II were placed in this group due to sub-normal IQ's. The normal protocol assumption for this group was similar to Group I; however, it was more pronounced. The emphasis of the normal protocol assumption for Group II is still upon the fact that the young child tends to draw reality elements. When the subjects of this group earn a high reality score, yet their IQ's are sub-normal, this constitutes some sort of interruption with perception, but of a nature that seems to be due to organic or congenital causes, rather than to functional causes, and this would be described as a mentally retarded child. In Group II of this study, the drawing protocols of 43 of the 46 males, and 37 of the 40 females, indicated mental retardation. These subjects earned higher Reality Content scores than Functional Efficiency scores; however, they did not achieve a normal IQ. Appendix V lists the

percentage of Reality Content scores and Functional Efficiency scores for each subject in Group II. There were three subjects of each sex in Group II who earned higher Functional Efficiency scores than Reality Content scores although the IQ was sub-normal. It would seem that these subjects could do better and that this failure to achieve a higher total score was based upon other than primary or organic factors; therefore, the lowering of the IQ was primarily functional and a result of some psychogenic process. Psychogenic problems in this group were more serious than those of Group I, for in this group, the psychogenic problems had already caused an artificial lowering of the IQ.

In the extra-normal IQ group, Group III, we would expect the child to draw with a ratio of Functional Efficiency score that is greater than his Reality Content score. This would be a normal protocol for the level of intelligence and age as previously discussed in Chapter I. However, if the Group III subject drew with a higher ratio of Reality Content than Functional Efficiency we would suppose that in spite of his higher intelligence there was a constricting element, some anxiety disturbance which is limiting his ability to perform at a level consistent with his potential. The score of each subject in Group III was divided into percentages of Reality Content and Functional

Efficiency scores and is presented in Appendix G. Unfortunately, there was an inadequate number of subjects in Group III to allow an interpretation of performance. However, the size of Group III was sufficient to illustrate a fallacy in the previous discussion. The child in Group III should not be expected to draw with a ratio Functional Efficiency that is greater than his Reality Content until some measure of maturation is attained. For example, we have indicated that the normal protocol for the Group III child is in a drawing pattern similar to that of the adult, or possessing a higher ratio of Functional Efficiency than Reality Content. This seems to imply that this is the normal protocol regardless of age, whereas, the results of the tests of this group indicate that the younger children were reality oriented, regardless of IQ score in this study. In view of this, the Group III normal protocol must be revised to include components of the other protocols, in consideration of the drawing habits of younger children, in all three diagnostic groups, being in terms of Reality Content, or the inclusion of parts. The main distinction of the protocols should be in terms of the rate of development in emotional or intellectual maturity, in which the normal child would draw with a dominant ratio of Functional Efficiency at a particular age; the retarded would draw in this manner at a later age than the normal, which indicates

a slower rate of development in emotional or intellectual maturity; and the extra-normal IQ child would draw in this manner at an earlier than the normal, which would indicate a faster rate of development in emotional or intellectual maturation. The actual score proportions used as the basis for this discussion may be found in Appendix G.

There were factors within the study which seemed to indicate earlier intellectual or emotional maturation for the females than the males. Since we were examining a continuum with one extreme of reality drawings in the young child, and the other extreme of functional drawings in the adult, it would seem logical to assume that the child drawing in a fashion similar to the adult is more mature than the child producing a "child's" reality drawing. Therefore, the approximate "mid-point" of this continuum is that point at which a balance exists in the percentage of score representing the Reality Content and Functional Efficiency. The "mid-point" of this continuum is the point at which the subject is drawing neither as a child nor as an adult. This point is illustrated in Table VIII, Group I, at age 12, for the combined sexes and at age 12 for the females. Since the number of males in the combined sexes category was slight. No real conclusions can be drawn since there were only three in this category and therefore

they could not be tested as a separate group. This non-significance was the result of applying the Sign test for Paired Observations to the Reality Content and Functional Efficiency within the total achieved scores. Non-significance for the age 12 females indicates that the "mid-point" of the continuum had been reached and the age 12 females were drawing neither as children nor as adults since there was no significant difference indicated between the Reality Content score and the Functional Efficiency scores. Group measurement, using the Sign Test, indicated non-significance for the age 12 females as a group; however, in examining the percentages of Reality Content score as contrasted to the Functional Efficiency score listed for individual subjects of Group I in Appendix C, we find that four age 12 females had a sominant percentages of Functional Efficiency in their scores; therefore, they were drawing as adults would be expected to draw. Since this occurred only in Group I females, there seems to be evidence that they were drawing as adults earlier than the males and therefore maturing at a more rapid rate than the males.

In Group II, scores in which Functional Efficiency is dominant occurred only at age 12 and were equally divided between males and females. This information is in Appendix E which contains the percentages of Reality Content and Functional Efficiency for each subject's score in Group II. Indications for a more rapid female maturation do not

exist when the subjects, both male and female, possess sub-normal IQ's.

Since the extra-normal IQ child has a higher mental age than the normal IQ child we would expect earlier maturation in both sexes when this group is compared to the other groups, in terms of dominant percentages of Functional Efficiency in the score at an earlier age. The number of subjects in Group III was too limited to make any inferences; however, it is interesting to note that in Group III the single, male 10 year old subject and the single, male 11 year old subject both scored with a dominant percentage of Functional Efficiency. The scores for all Group III subjects were divided into percentages of Reality Content and Functional Efficiency and may be found in Appendix G.

There were other indications of early female maturation in the study; however, they are based upon the percentages of Reality Content and Functional Efficiency of the total score as they have been discussed. The other indications will be noted at various points in the summary as they occurred in the study.

The Product Moment Correlation Coefficient was used to evaluate the linear relationship between the Goodenough IQ's derived from scoring the tests of this study and previous test data on the subjects. These coefficients are reported in Table V. All Coefficients were positive,

ranging from .03 to .99, and were reported for subjects of each age, sex, and grade level within the diagnostic groups.

The total achieved score for each subject was divided into percentages of Reality Content and Functional Efficiency. This data is presented in Appendix C with the raw score data from which it was taken being presented in Appendix B. Table VII provides the mean percentages for age, sex, and grade levels within the diagnostic groups. These mean percentages represent the average of the percentages of Reality Content and Functional Efficiency of the subjects' scores within the division of the diagnostic group. This table provides evidence of earlier female maturation as reflected in a dominant mean percentage of Functional Efficiency score for the age 12 females of Group I.

The Sign Test for Paired Observations was used to evaluate the differences of Reality Content scoring and Functional Efficiency scoring. The Sign Test results were reported in Table VIII with non-significance indicated at age 12 for the females of Group I, which seems to be additional evidence for earlier female maturation, as previously discussed.

The Mann-Whitney U Test was used to evaluate the differences in male-female reality scores and male-female functional scores. The test was based upon the prediction

that females would score significantly higher on both reality and functional points. The results of the comparison of male-female reality scores were reported in Table IX with non-significance appearing at ages 6 and 12. The non-significance at age 6 would be expected since it has previously been stated that the young child is basically reality oriented regardless of sex. In Group I, ages 7 through 11, there were significant differences of score indicating that the females consistently scored higher on Reality Content than the males. This seems to be evidence of earlier female superiority of Reality Content scoring in ages 7 through 11. At age 12, the males had overcome this superiority and both sexes were, again, scoring about the same. This is the point at which the female becomes functionally oriented and the male is beginning the change in basic orientation.

The comparison of male-female Functional Efficiency scores is listed in Table X. The male-female scoring of Reality Content was expected to be non-significant since the basic orientation of both sexes at age 6 is in reality; however, in functional scoring at age 6 there were significant differences indicated in favor of the females. The females scored consistently higher than the males in all cases except age 11. At age 11, the similar scoring of the two sexes seems to indicate that they were very near the point at which the basic orientation changes from reality

to functional. At age 12, the females of Group I, again scored higher than the males; therefore, the females were more functionally oriented. This seems to be an indication of earlier female maturation.

In Group II of Tables IX and X, representing both aspects of male-female scoring, significant differences were indicated at all ages in favor of the females. The age spread of Group III subjects would not permit testing by age categories; therefore, no conclusions were possible regarding the differences of male-female scoring in Group III.

Conclusions

(1) Females begin to draw with a predominance of Functional Efficiency at age 12, grade 7, when the IQ is normal.

(2) Males begin to draw with a predominance of Functional Efficiency later than age 12, grade 7, when the IQ is normal.

(3) Females draw functionally at an earlier age than the males, and therefore, mature intellectually or emotionally at a more rapid rate than the males, when the IQ is normal for both sexes.

(4) Age 6 males and females draw with about the same percentage of Reality Content which is the dominant percentage of score; therefore, both sexes are reality oriented at age 6,

within all IQ groups.

(5) Males and females of sub-normal IQ's are retarded in maturation when compared to normal males and females.

(6) Females of sub-normal IQ's are reality oriented through age 12.

(7) Functional Efficiency is the major contributing factor in the drawings of normal females at age 12.

(8) Functional Efficiency is not the major contributing factor in the drawings of normal IQ males or Sub-normal IQ's of either sex before the thirteenth year of age.

Recommendations

The need for continued research in child development and child psychopathology is eminent. Early diagnosis is important in any indication of psychopathology or deviation from our socially imposed behavioral norms. One of the major functions of psychology is the prevention of behavioral disorders in which early diagnosis is imperative. In order to perfect techniques of early diagnosis, a vast store of knowledge concerning what is normal is necessary.

This study involved a relatively low number of subjects (249) from a single geographic area. This does not provide conclusive evidence, but could be used as a basis for continued study in this specific area. Continued studies in this area will be necessary since the upper age

limits of this study were too low for the normal IQ males and sub-normal IQ groups of both sexes. Due to a limited group of extra-normal IQ subjects in this study there were no conclusions possible regarding this group. Researchers involved in future studies in this area should devise some method to insure an adequate number of subjects in each area of the diagnostic groups, to serve the purpose of their particular study.

This study would have been more comprehensive if it had been carried out early in the school year. This would have increased the age range to a greater number of six year old subjects plus a greater number of seventh graders who normally reach their thirteenth birthdays during the school year.

If future studies validate the results of this study, one more indicator of the normalcy of development would be provided. This could provide a screening device to evaluate the intellectual maturation of children in terms of the normal protocol as previously discussed. This could provide a device to determine intellectual level plus indications of psychopathology. The insight into the personality of the child provided by this technique would be invaluable to the early identification and diagnosis of psychogenic and functional disorders plus indications of organicity. Information of this type could be used by the school psychologist or other specialist, who would not work

from mere "cut-off" ages produced from a machine scored standardized test, but could select specific subjects from a screening program and have some idea of the type of disorder, plus many other indications of personality content, before making a complete psychological examination of the child. Screening and evaluation based upon the drawings of children would be a very inexpensive technique. The need for such a technique cannot be denied as long as there are children in the public schools who do not progress normally through the grades, or who manifest any type of behavior which deviates from socially imposed norms.

The actual value of this study depends a great deal upon future studies involving other age groups since the upper cut-off age for this study did not permit evaluation above age 12 and present evidence indicates that this age is near the point at which the child may draw as an adult; however, this can be validated only by future studies. The chronological age of 12 years is recommended as the lower age limits of any future study.

In considering this study, we may assume with a great deal of merit, that there are many aspects of personality projection in the drawings of children not yet explored that will furnish material for future research for many years. This research is not only practical, but

essential, for children are our greatest concern and much more knowledge concerning their growth and development is necessary before we can be certain that they are getting the best education and care possible.

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APPENDICES

APPENDIX A

SPECIAL INSTRUCTIONS FOR SCORING FEMALE DRAWINGS ON THE DAP*

Many aspects of the Goodenough Draw-A-Man Test will not apply to the female drawing. Thus in keeping with the concept that patients draw themselves best, it is necessary that certain modifications in the scoring instructions be made so that a female self-drawing may be scored with some degree of consistency.

The following suggestions are offered:

Items	1	8b	14a
	2	9a	14b
	3	9c	14c
	4a	9d	14d
	4c	9e	14f
	6a	10a	16a
	6b	10b	16b
	7a	10c	16c
	7b	10d	16d
	7c	10e	17a
	7d	11a	17b
	7e	12e	18a
	8a	13	18b

will be scored according to present Goodenough instructions.

Item 4b: The trunk is presumed to stop below the waist at a distance equal to one-half of the distance above the waist. If there is no waist indicated in any manner, and clothing is present, one-fourth of the distance down from either the neckline or the bottom of the head, if there

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*Leland, H. Special Instructions for Scoring Female Drawings on the DAP. Mimeographed, Parsons State Hospital and Training Center, 1962. Facsimile.

is no neck present, to the bottom of the drawing will be considered the waist.

Item 5a: This may be credited if legs, or just feet under an evening dress, are present, and not obviously incorrectly attached.

Item 5b: As in 5a for legs.

Item 9b: A dress must clearly indicate that it is a blouse and skirt in order to count as two pieces. Thus, there must be a clear collar, buttons must stop at the belt, or there must be some indication of difference in design.

Item 11b: This item may be scored if the legs show any taper or inward angulation.

Item 12a: The trunk is to be figured in accordance with the instructions given in Item 4b.

Item 12b: As above in reference to the trunk.

Item 12d: This should be credited if feet shown below an evening gown are not obviously out of proportion (see 4b and 5a above).

Item 14e: This should be credited if legs are covered by a dress, but arms are shown properly and 5a has been credited.

Item 15a: This point may be credited if the hairdo is one which under normal circumstances would cover the

ears and 8b has been credited.

Item 15b: This is not credited in terms of 15a above, but must be earned in terms of Goodenough's instructions.

APPENDIX B

RAW SCORES, MEAN SCORES, AND STANDARD DEVIATIONS OF SCORE REPORTED FOR REALITY CONTENT AND FUNCTIONAL EFFICIENCY BY AGE, SEX, AND GRADE LEVELS OF GROUP I, NORMAL IQ SUBJECTS

Division	Subject	Age	Grade	Male		Female	
				R	F	R	F
I	1	6	1	10	4	11	7
	2			12	3	12	5
	3			14	1	13	5
	4			11	5	11	4
	5			10	2	11	5
	6			10	3	10	3
	7			12	3	11	2
	8			13	4	12	4
	9			13	3	12	4
	10					12	7
Mean:				11.7	3.1	11.5	4.6
S. D.:				1.65	.095	1.13	1.57
N:				9		10	
II	1	7	1	13	6	13	7
	2			14	9	14	6
	3					13	4
Mean:				13.5	7.5	13.3	5.7
S. D.:				.071	2.12	.93	1.65
N:				2		3	

Division	Subject	Age	Grade	Male R	Male F	Female R	Female F
III	1	7	2	15	8	16	7
	2			13	5	18	6
	3			11	5	11	7
	4			13	7	14	6
	5			14	4	15	9
	6			14	3	14	8
	7			14	8	13	6
	8			11	7	13	7
Mean:				13.1	5.9	14.3	7.1
S. D.:				1.46	1.85	2.04	1.07
N:				8		9	
IV	1	7	3	13	8		
	2			13	5		
Mean:				13	6.5	0	
S. D.:				0.0	2.01		
N:				2		0	
V	1	8	2	13	7	15	5
	2					13	3
	3					12	7
	4					14	8
	5					14	5

Division	Subject	Age	Grade	Male R	Male F	Female R	Female F
V (cont.)	6					14	7
						14	6
						14	11
Mean:				13	7	13.8	6.5
S. D.:						1.02	2.38
N:				1		8	
VI	1	8	3	14	11	18	10
	2			13	9	17	9
	3			14	5	11	11
	4			13	9	13	11
	5			13	13	12	10
	6			14	8	12	11
	7			14	7	15	5
	8			14	3		
Mean:				13.6	9.4	14.0	9.5
S. D.:				0.16	2.82	2.70	1.13
N:				8		7	
VII	1	9	2			15	10
	2					15	11
Mean:						15	10.5
S. D.:						0.0	.707
N:				0		2	

Division	Subject	Age	Grade	Male R	Male F	Female R	Female F
VIII	1	9	3	13	8	17	18
	2			14	12		
Mean:				13.5	10		
S. D.:				.707	2.83		
N:				2		1	
IX	1	9	4	15	8	16	4
	2			13	10	15	2
	3			16	8	13	11
	4			18	9	15	9
	5			18	12	17	8
	6			15	12	15	10
	7			16	10		
Mean:				15.9	9.9	15.2	10.7
S. D.:				1.78	1.33	1.40	2.1
N:				7		6	
X	1	10	4	17	12	17	17
	2			17	11	14	16
Mean:				17.0	11.5	15.5	16.
S. D.:				0.0	.707	2.12	.
N:				2		2	

Division	Subject	Age	Grade	Male		Female	
				R	F	R	F
XI	1	10	5	19	15	19	15
	2			17	12	17	12
	3			16	14	17	14
	4			17	15		
	5			16	3		
	6			16	10		
	7			19	10		
Mean:				17.1	12.7	17.9	13.[illegible]
S. D.:				1.35	1.32	1.16	1.[illegible]
N:				7		3	
XII	1	11	5	20	11	19	14
	2			18	13	19	15
	3			17	13	18	19
	4			17	14	19	18
	5			20	20	17	15
	6			18	11	18	18
	7			18	16	17	13
	8			20	17	19	18
	9			17	12	17	13
	10					17	18
Mean:				18.3	14.0	17.7	16.
S. D.:				1.43	3.02	1.08	2.
N:				9		10	

Division	Subject	Age	Grade	Male		Female	
				R	F	R	F
XIII	1	11	6	21	20	19	21
	2			19	10	20	18
	3			21	14	18	13
	4			18	12	19	18
	5			19	16	17	18
	6					20	18
Mean:				19.6	14.4	18.8	17.7
S. D.:				1.32	2.83	1.22	2.7
N:				5		6	
XIV	1	12	6	20	17		
Mean:							
S. D.:							
N:				1			
XV	1	12	7	18	17	17	18
	2			19	19	19	19
	3					19	18
	4					17	20
	5					20	21
	6					21	26
	7					20	20
	8					20	20

Division	Subject	Age	Grade	Male R	Male F	Female R	Female F
XV (cont.)	9					18	18
	10					18	16
	11					21	23
Mean:				18.5	18.0	19.0	19.1
S. D.:				.707	1.41	1.45	2.86
N:				2		11	
Total Group:							
Mean:				15.4	10.0	16.2	12.1
S. D.:				2.91	4.62	3.01	5.93
N:				65		78	

APPENDIX C

PERCENTAGES OF REALITY CONTENT AND FUNCTIONAL EFFICIENCY WITHIN THE GOODENOUGH SCORES OF GROUP I, NORMAL SUBJECTS BY AGE, SEX, AND GRADE LEVEL

Division	Subject	Age	Grade	Male		Female	
				R%	F%	R%	F%
I	1	6	1	71.4	28.6	65.5	34.5
	2			80.0	20.0	70.5	29.5
	3			93.3	7.7	72.2	27.8
	4			62.4	37.6	73.3	26.7
	5			83.3	16.7	62.4	37.6
	6			76.0	34.0	76.0	34.0
	7			80.0	20.0	84.6	15.4
	8			76.4	23.6	75.0	25.0
	9			81.2	19.8	75.0	25.0
	10					63.1	36.9
	N			9		10	
II	1	7	2	68.4	31.6	65.0	25.0
	2			60.9	39.1	70.0	30.0
	3					76.4	23.6
	N			2		3	

Division	Subject	Age	Grade	Male R%	Male F%	Female R%	Female F%
III	1	7	2	65.2	34.8	69.5	30.5
	2			72.2	27.8	75.0	25.0
	3			62.4	37.6	65.5	34.5
	4			65.0	35.0	70.0	30.0
	5			77.7	22.3	62.5	37.5
	6			82.3	17.7	63.6	36.4
	7			63.6	34.4	68.4	31.6
	8			65.5	34.5	65.0	35.0
	9					65.2	34.8
	N			8		9	
IV	1	7	3	61.9	38.1		
	2			72.2	27.8		
	N			2		0	
V	1	8	2	65.0	35.0	75.0	25.0
	2					81.2	19.8
	3					63.1	36.9
	4					63.6	36.4
	5					73.6	26.4
	6					66.6	33.4
	7					70.0	30.0
	8					56.0	44.0
	N			1		8	

Division	Subject	Age	Grade	Male R%	Male F%	Female R%	Female F%
VI	1	8	3	56.0	44.0	64.3	35.7
	2			59.1	41.9	65.4	34.6
	3			73.6	26.4	50.0	50.0
	4			59.1	41.9	54.1	45.9
	5			50.0	50.0	54.5	45.5
	6			63.6	36.4	52.2	47.8
	7			66.6	33.4	75.0	25.0
	8			51.8	48.2		
	N			8		7	
VII	1	9	2			60.0	40.0
	2					57.7	42.3
	N			0		2	
VIII	1	9	3	61.9	38.1	48.6	51.4
	2			53.8	46.2		
	N			2		1	
IX	1	9	4	65.2	34.8	53.3	46.7
	2			56.5	43.5	55.5	44.5
	3			66.6	33.4	54.1	45.9
	4			66.6	33.4	62.5	37.5
	5			60.0	40.0	68.0	32.0
	6			55.5	44.5	60.0	40.0
	7			61.5	38.5		
	N			7		6	

Division	Subject	Age	Grade	Male		Female	
				R%	F%	R%	F%
X	1	10	4	58.6	41.4	50.0	50.0
	2			60.6	39.4	46.7	53.3
	N			2		2	
XI	1	10	5	55.8	44.2	55.8	44.2
	2			58.6	41.4	58.6	41.4
	3			53.3	46.7	54.8	45.2
	4			53.1	46.9		
	5			55.2	44.8		
	6			61.5	38.5		
	7			65.5	34.5		
	N			7		3	
XII	1	11	5	64.5	35.5	57.5	42.5
	2			58.0	42.0	55.9	44.1
	3			56.0	44.0	49.0	51.0
	4			54.8	45.2	51.0	49.0
	5			50.0	50.0	53.1	46.9
	6			62.0	38.0	50.0	50.0
	7			52.9	47.1	56.6	43.4
	8			54.0	46.0	51.0	49.0
	9			58.6	41.4	56.6	43.4
	10					48.6	51.4
	N			9		10	

Division	Subject	Age	Grade	Male		Female	
				R%	F%	R%	F%
XIII	1	11	6	51.2	48.8	47.5	52.5
	2			65.5	34.5	52.6	47.4
	3			60.0	40.0	58.0	42.0
	4			60.0	40.0	51.0	49.0
	5			57.1	42.9	48.6	51.4
	6					52.6	47.4
	N			5		6	
XIV	1	12	6	54.0	46.0		
	N			1		0	
XV	1	12	7	51.4	48.6	48.6	51.4
	2			50.0	50.0	50.0	50.0
	3					51.4	48.6
	4					54.0	46.0
	5					48.7	51.3
	6					44.7	55.3
	7					50.0	50.0
	8					50.0	50.0
	9					50.0	50.0
	10					52.9	47.1
	11					47.7	52.3
	N			2		11	

APPENDIX D

RAW SCORES, MEAN SCORES, AND STANDARD DEVIATIONS OF SCORES REPORTED FOR REALITY CONTENT AND FUNCTIONAL EFFICIENCY BY AGE, SEX, AND GRADE LEVELS OF GROUP II, SUB-NORMAL IQ SUBJECTS

Division	Subject	Age	Grade	Male		Female	
				R	F	R	F
I	1	6	1	7	5	9	3
	2			10	1		
	3			10	1		
Mean:				9.25	2.0	9	3
S. D.:				1.2	2.0	0.0	0.0
N:				4		1	
II	1	7	1	8	4		
Mean:				8	4		
S. D.:				0.0	0.0		
N:				1			
III	1	7	2	11	4		
	2			7	4		
Mean:				9.0	4.0		
S. D.:				2.8	0.0		
N:				2			

Division	Subject	Age	Grade	Male		Female	
				R	F	R	F
IV		7	3	0	0	0	0
V	1	8	2	10	4	14	4
	2			9	5	15	4
	3			13	4	12	4
	4			13	4	13	4
	5			13	4		
Mean:				11.6	4.2	13.5	4.0
S. D.:				1.9	0.75	1.12	0.0
N:				5		4	
VI	1	8	3	11	4	13	6
	2			13	6	12	3
	3			12	3	10	6
	4			11	7	11	8
	5			13	5	14	5
	6			11	5	12	7
	7			13	7	13	8
	8			10	8	10	6
	9					17	7
Mean:				11.8	5.6	12.4	6.2
S. D.:				1.2	1.2	4.8	2.7
N:				8		9	

Division	Subject	Age	Grade	Male R	Male F	Female R	Female F
VII		9	2	0	0	0	0
VIII	1	9	3			12	7
	2					11	5
	3					14	5
Mean:						12.3	5.6
S. D.:						1.6	1.5
N:						3	
IX	1	9	4	16	7	16	7
	2			12	7	15	7
	3					13	9
	4					13	4
Mean:				14	7	14.2	6.7
S. D.:				2.8	0.0	1.5	2.1
N:				2		4	
X	1	10	4	16	8	13	5
	2			15	9		
	3			13	6		
	4			13	12		
Mean:				14.2	8.7	13	5
S. D.:				1.5	3.1	0.0	0.0
N:				4		1	

Division	Subject	Age	Grade	Male		Female	
				R	F	R	F
XI	1	10	5	15	7	15	5
	2			16	9	15	11
	3			14	10	12	10
	4			15	11		
Mean:				15	9.2	14	8.6
S. D.:				0.81	1.3	1.7	3.5
N:				4		3	
XII	1	11	5	11	7	16	13
	2			13	12		
	3			18	7		
Mean:				13.6	8.6	16	13
S. D.:				3.0	5.5	0.0	0.0
N:				3		1	
XIII	1	11	6	19	12		
	2			19	12		
	3			16	14		
Mean:				18	12.6		
S. D.:				1.7	1.1		
N				3			

Division	Subject	Age	Grade	Male		Female	
				R	F	R	F
XIV	1	12	6	18	14	17	15
	2			18	13	15	18
	3					14	16
	4					15	14
Mean:				18	13.5	15.2	15.7
S. D.:				0.0	0.07	1.3	1.7
N:				2		4	
XV	1	12	7	18	13	17	16
	2			15	18	17	14
	3			11	4	15	12
	4			17	15	13	7
	5			13	2	15	16
	6			15	16	17	16
	7			17	16	16	15
	8			15	17	12	11
	9					17	14
	10					16	9
Mean:				15.1	11.3	15.5	13.0
S. D.:				2.2	6.3	1.7	3.1
N:				8		10	
Total:							
Mean				13.9	8.2	13.9	8.7
S. D.:				3.1	5.0	2.1	4.5
N:				46		40	

APPENDIX E

PERCENTAGES OF REALITY CONTENT AND FUNCTIONAL EFFICIENCY WITHIN THE GOODENOUGH SCORES OF GROUP II, SUB-NORMAL IQ SUBJECTS BY AGE, SEX, AND GRADE LEVEL

Division	Subject	Age	Grade	Male		Female	
				R%	F%	R%	F%
I	1	6	1	58.0	42.0	75.0	25.0
	2			90.9	9.1		
	3			90.9	9.1		
	4			90.9	9.1		
	N			4			
II	1	7	1	66.6	33.4		
	N			1			
III	1	7	2	73.3	26.7		
	2			63.6	36.4		
	N			2			
IV		7	3	0		0	
V	1	8	2	71.4	28.6	77.7	22.3
	2			64.4	35.6	78.9	21.1
	3			76.4	23.6	75.0	25.0
	4			76.4	23.6	76.4	23.6
	5			76.4	23.6		
	N			5	4		

Division	Subject	Age	Grade	Male		Female	
				R%	F%	R%	F%
VI	1	8	3	73.3	26.7	80.0	20.0
	2			68.4	31.6	62.4	37.6
	3			80.0	20.0	58.0	42.0
	4			61.9	39.9	73.6	26.4
	5			72.2	27.8	63.1	36.9
	6			68.6	31.4	61.9	38.1
	7			65.0	35.0	62.4	37.6
	8			55.5	44.5	70.8	29.1
	9					68.4	31.6
	N			8		9	
VII		9	2	0	0	0	0
VIII	1	9	3			63.1	36.9
	2					68.7	31.3
	3					73.6	27.4
	N					3	
IX	1	9	4	65.2	34.8	65.2	34.8
	2			63.1	36.9	68.1	31.9
	3					59.1	41.9
	4					76.4	23.6
	N			2		4	

Division	Subject	Age	Grade	Male		Female	
				R%	F%	R%	F%
X	1	10	4	66.6	33.4	72.2	27.8
	2			62.5	37.5		
	3			68.4	31.6		
	4			52.0	48.0		
	N			4		1	
XI	1	10	5	68.1	31.9	75.0	25.0
	2			64.0	36.0	57.6	42.4
	3			58.3	41.7	54.5	45.5
	4			57.7	42.3		
	N			4		3	
XII	1	11	5	61.1	38.9	54.4	45.6
	2			52.0	48.0		
	3			51.7	48.3		
	N			3		1	
XIII	1	11	6	61.2	38.8		
	2			61.2	38.8		
	3			53.3	46.7		
	N			3			
XIV	1	12	6	56.2	43.8	53.1	46.9
	2			56.4	43.6	45.4	54.6
	3					46.6	53.4
	4					51.6	48.4
	N			2		4	

Division	Subject	Age	Grade	Male		Female	
				R%	F%	R%	F%
XV	1	12	7	54.8	45.2	51.5	48.5
	2			45.4	54.6	54.8	45.2
	3			73.3	26.7	55.5	44.5
	4			53.1	46.9	65.0	35.0
	5			86.6	13.4	48.3	51.7
	6			48.3	51.7	51.6	49.4
	7			46.7	53.3	51.3	49.7
	8			51.5	48.5	52.1	47.9
	9					54.8	45.2
	10					64.0	36.0
	N			8		10	

APPENDIX F

RAW SCORES, MEAN SCORES, AND STANDARD DEVIATIONS OF SCORE REPORTED FOR REALITY CONTENT AND FUNCTIONAL EFFICIENCY BY AGE, SEX, AND GRADE LEVELS OF GROUP III, EXTRA-NORMAL IQ SUBJECTS

Division	Subject	Age	Grade	Male		Female	
				R	F	R	F
I	1	6	1	13	8	15	5
	2			14	7	12	7
	3			15	9	13	6
	4					16	8
	5					15	6
	6					14	7
	7					14	9
	8					14	7
Mean:				14.0	8.0	14.1	6.8
S. D.:				1.0	1.0	2.0	2.6
N:				3		8	
II	1	7	1			16	6
N:						1	
III	1	7	2	14	11	16	9
	2					17	14
Mean:				14	11	16.5	11.5
S. D.:				0.0	0.0	0.7	2.9
N:				1		2	

Division	Subject	Age	Grade	Male		Female	
				R	F	R	F
VI	1	8	3	19	14	19	14
	2					17	15
Mean:				19	14	18	14.5
S. D.:				0.0	0.0	1.0	.70
N:				1		2	
XI	1	10	5	19	24		
XII	1	11	6	21	22		

Note: In Divisions IV, V, VII, VIII, IX, X, XII, XIV, AND XV, N = 0.

APPENDIX G

PERCENTAGES OF REALITY CONTENT AND FUNCTIONAL EFFICIENCY WITHIN THE GOODENOUGH SCORES OF GROUP III, EXTRA-NORMAL IQ SUBJECTS BY AGE, SEX, AND GRADE LEVEL

Division	Subject	Age	Grade	Male		Female	
				R%	F%	R%	F%
I	1	6	1	61.9	38.1	75.0	25.0
	2			66.6	33.4	63.1	36.9
	3			62.5	37.5	68.4	31.6
	4					71.3	28.7
	5					66.6	33.4
	6					66.6	33.4
	7					60.8	39.2
	8					66.6	33.4
	N			3		8	
II	1	7	1		72.6	27.4	
III	1	7	2	55.0	45.0	64.0	36.0
	2					54.7	45.3
	N			1		2	
VI	1	8	3	57.6	42.4	57.6	42.4
	2					53.1	46.9
	N			1		2	
XI	1	10	5	49.5	50.5		
XIII	1	11	6	49.5	50.5		

Note: In Divisions IV, V, VII, VIII, IX, X, XII, XIV, and XV, N = 0.

APPENDIX H

COVER SHEET USED IN THE COLLECTION OF DATA AND SUBJECT IDENTIFICATION

Name _____ _____ _____ Date _____ _____ _____
(Last) (First) (Middle) (Yr.) (Mo.) (Day

Grade Sp. Ed. K 1 2 3 4 5 6 Birth _____ _____ _____
(Yr.) (Mo.) (Da

7 8 9 10 11 12

Sex M F Race _____ CA _____ _____ _____
(Yr.) (Mo.) (Day

Parent (Guardian) Occupation _____
Code A B C D E

GOODENOUGH

IQ: _____ Reality _____ Functional Efficiency _____

PREVIOUS TESTS

Administering Agency _____ Date _____

Title and Form _____

Scores: Verbal _____ Non-Verbal _____ MA _____ IQ _____

Administering Agency _____ Date _____

Title and Form _____

Scores: Verbal _____ Non-Verbal _____ MA _____ IQ _____