A STUDY OF THE RELATIONSHIP BETWEEN WECHSLER INTELLIGENCE SCALE FOR CHILDREN SCORES AND KOPPITZ'S HUMAN FIGURE DRAWING TEST SCORES FOR MENTALLY RETARDED CHILDREN

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CHAPTER I

INTRODUCTION

Most children love to draw and paint. When given the opportunity, they most often draw human beings (19). A child's drawing is a graphic expression, and as such, it is a statement which is basically no different from any other statement. Just as verbal statements can be analyzed for structure and content, so human figure drawings (hereafter referred to as HFDs) can be analyzed for formal structure and signs as well as for content and meaning (15). Drawings of human beings are one of the most widely used projective techniques of psychologists working with children. Silverstein (22), in his survey of ninety-six institutions for the mentally retarded, found it to be among the ten most widely used psychometric techniques.

As a projective technique, HFDs of children are analyzed for their structure and scored for objective signs and symbols which reflect children's mental maturity (15). The ease and speed of administration advanced the HFD techniques (7, 10, 15) to a position of popularity in institutions for the mentally retarded and other agencies where quick screening is a desirable factor.

HFDs of children are useful as a supplement to the usual structured intelligence test in the study of individual cases. HFDs, in contrast to the usual type of intelligence test, are more or less unstructured (4); instructions are general and kept at a minimum to permit variety and flexibility of responses. The subject need not verbalize in responding to the test situation. With few exceptions, the child performs the task willingly and in full view of the examiner. Ample opportunity prevails for observation of test behavior. HFDs of children serve very well as a performance test, adding considerably to the description of intellectual development provided by other tests applicable in the years from 4 to 10 (3).

The interest in children's drawings has a well-documented history. In 1926, Goodenough first published a description of her Draw-A-Man Test (D-A-M) which purported to measure the intelligence of children (7). The test was based upon the findings that the drawings of younger children have an intellectual rather than an aesthetic origin. These drawings are determined more by the stage of concept development of the child than by his visual imagery or manual skill. Drawings made by subnormal children resemble those of younger normal children in their lack of detail and in their defective sense of proportion. Children of inferior mental ability sometimes copy well, according to Goodenough, but they rarely do good original work in drawings (7).

Several comprehensive reviews of the literature on drawing and painting by children have been published (8, 9, 12, 14). A recurrent theme suggested in most of the published observations is that some characteristics of the drawings are subject to a developmental process and show significant maturational changes.

Clinicians who consider the drawings of human beings indicative of intelligence (8) are exponents of the developmental approach. That is, they believe that the presence of an item drawn into a HFD is primarily related to the child's age and maturation and not to his artistic ability, school learning, or to the instructions given about the specific drawing. A drawing is scored for parts present, certain relationships among parts, and certain dimensional qualities. The total score obtained by adding single units translates directly to a mental age.

Goodenough's book Measurement of Intelligence by Drawings (7) and Harris' Children's Drawings as Measures of Intellectual Maturity (8) are the foremost representatives of the developmental approach to HFDs. Goodenough's D-A-M and Harris' Draw-A-Person (D-A-P) have been used frequently for the purpose of assessing children's mental maturity. Traditionally HFDs have been scored by the Goodenough scoring system (7) or more recently by the Goodenough-Harris system (10).

Now a greatly simplified method for scoring HFDs has been developed by Koppitz (15). HFDs of children, age 5 to 12, can be analyzed and scored as a developmental test of mental maturity.

Koppitz's scoring system was developed and standardized on the drawings of 1856 public school children (15). To the best of Koppitz's knowledge, very few if any mentally retarded children were included among the subjects.

Research concerning the drawing of mentally retarded children was reported by Berrien (2). The study revealed that the drawings of mentally retarded children are similar in quality to the drawings of normals, the only difference being that the former are retarded and show the characteristics of younger children. These findings infer that the presence of items on a HFD are primarily related to the child's age and maturation, and that at specific chronological ages the absence form a child's HFD of expected items, for that age, might be considered diagnostically significant and reflect mental immaturity or retardation.

The D-A-M Test, which does not require the subject to verbalize in responding to the test situation, has been found to be a useful clinical device for measuring intellectual development of mentally retarded children who are either extremely shy or unable to verbalize freely (11). The researchers have concluded that mentally retarded

children may be willing and able to more adequately express themselves in a drawing than in verbal communication.

Goodenough (8) reported that the D-A-M Test diminished in validity at ages above ten and could not be considered an adequate instrument beyond the age of thirteen. There have been some investigations regarding the usefulness of HFDs for retarded populations who are chronologically too old for the D-A-M or D-A-P Tests but whose mental ages are equivalent to the standardization population. Berdie (1) found that the D-A-M technique could be applied to low ability male adults entering military service. Carkhuff (5) concluded that the D-A-M Test is a valuable technique for the quick estimate of intellectual level in noninstitutionalized adults of "dull normal" intelligence and below, especially those not amenable to the regiors of traditional intelligence tests. Results of McElwee's study (16) showed that the Goodenough Test can be used just as satisfactorily with mentally retarded children over twelve years of age as it can with younger children. Yepsen (26) and Jones and Rich (13), in separate studies, found the technique valid in the assessment of institutional mentally retarded individuals whose chronological ages are above ten.

Rohrs and Haworth (20) conducted a study which used mentally retarded children as subjects and made comparisons between the Wechsler Intelligence Scale for Children (WISC), the Stanford-Binet, L-M (S-B), and the D-A-M. The researchers

concluded that the S-B, L-M is more highly correlated with the WISC Full and Verbal Scales than with the Performance Scale, while the D-A-M correlates highest with the WISC Performance Scale. Previous studies (17, 18, 21, 23, 24, 25) have already validated the WISC as one of the chief psychometric instruments used to determine the intelligence of mentally retarded children ages 5 through 15.

HFDs of 335 Mexican school children, ages 5 to 12, were scored by the Goodenough method and then by the Koppitz method (6). Then the two sets of test scores were correlated for each age level. All six of the Pearson's product moment coefficients obtained were found to be significant. Therefore, it appears that HFDs can be analyzed with equal confidence by the Goodenough method or the Koppitz system.

Statement of the Problem

The purpose of the present study was to determine whether Koppitz's developmental scoring techniques of mental maturity are applicable to mentally retarded children ages 5 to 12.

Hypotheses

In view of previous research, the following hypotheses have been investigated: 1) that there is a significant correlation between the HFD scores and the WISC Full Scale scores; 2) that the correlation between the HFD scores and the WISC Performance Scale scores is also significant.

Description of Measuring Instruments

The Human Figure Drawing Test consists of thirty Developmental Items derived from the Goodenough-Harris scoring system and from Koppitz's own clinical experience (15). A Developmental Item is defined as an item that occurs only on relatively few HFDs of children of a younger age level and then increases in frequency of occurrence as the age of the children increases, until it gets to be a regular feature of many or most HFDs at a given age level (15). After extensive pre-testing and experimentation (15), Koppitz decided that the following thirty signs on HFDs could meet the criteria set up for Developmental Items (15):

1. Head
2. Eyes
3. Pupils
4. Eyebrows or eyelashes
5. Nose
6. Nostrils
7. Mouth
8. Two lips
9. Ear
10. Hair or head covered by hat
11. Neck
12. Body
13. Arms
14. Arms two-dimensional
15. Arms attached at shoulders
16. Arms pointing downward
17. Elbow
18. Hands
19. Fingers
20. Correct number of fingers
21. Legs
22. Legs two-dimensional
23. Knee
24. Feet
25. Feet two-dimensional
26. Profile
27. Good proportion

28. Clothing: 1 piece or none
29. Clothing: 2 or 3 pieces
30. Clothing: 4 or more pieces

Koppitz concluded that the presence of Developmental Items on a HFD is primarily related to the child's age and maturation and not to his artistic ability, school learning, or to the instructions given about the specific drawing (15).

The HFD Test can be administered either as a group test or as an individual test (15). The scoring method has been designed for HFDs of children ages 5 to 12. Children are asked to draw a "whole person" (15). The resulting drawings are then merely checked for the presence of the "Expected" and the "Exceptional" items for each subject's age level (15). Items which occur on more than 85 per cent of all drawings at a given age level are Expected items, while the Exceptional items are those which are shown on less than 16 per cent of all such drawings.

Each omission of an Expected item has been scored as minus one, while the presence of each Exceptional item is scored as plus one. In order to avoid negative scores, the value of five has been added to each child's HFD score.

The HFD scores, according to Koppitz (15), are then interpreted as follows:

HFD Score	Level of Mental Ability
8 or 7	High Average to Superior (IQ 110 upward)
6	Average to Superior (IQ 90-135)
5	Average to High Average (IQ 85-120)
4	Low Average to Average (IQ 80-110)
3	Low Average (IQ 70-90)
2	Borderline (IQ 60-80)
1 or 0	Mentally Retarded or functioning on a

retarded level due to serious emotional problems (IQ less than 70)

The HFD score does not yield a specific intellectual quotient score or percentile rank as other methods do. Instead it indicates the level of mental function into which a child falls.

The Wechsler Intelligence Scale for Children, from 5 through 15 years of age, is developed on the same principles and in the same form as the Wechsler Adult Intelligence Scale: verbal subtests, performance subtests, a verbal intelligence quotient, a performance intelligence quotient, and a full scale intelligence quotient. There are eleven scored subtests. The Verbal Scale includes tests of Information, Comprehension, Digit Span, Similarities, Arithmetic, and Vocabulary. The Performance Scale includes Picture Arrangement, Picture Completion, Block Design, Object Assembly, and Digit Symbol tests.

The reliability coefficients for the WISC are commendably high, .88 at age 7½, .96 at 10½ and again at 13½ for the Verbal Scale, and .86 at 7½, .89 at 10½ and .90 at 13½ for the Performance Scale, giving overall coefficients .92, .95, and .94 at those ages for the Full Scale. These are corrected split-half coefficients (4).

No validity figures for the test were quoted in the manual. Findings indicate that the WISC and Stanford-Binet correlate fairly highly (.8 plus) and differ little in their ability to predict academic attainment (4). The WISC is a

convenient, reliable instrument, for testing children, which uses up-to-date material intrinsically interesting to the child.

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CHAPTER II

METHOD

Subjects

The subjects of the present study consisted of thirty-one mentally retarded children, ages 5 to 12, residing at Denton State School, Denton, Texas. Of the thirty-one subjects, twenty were boys and eleven were girls.

Apparatus

The equipment employed in this study consisted of Koppitz's HFD Test and the WISC.

Procedure

The subjects for the sample population were selected from the dormitory listings of mildly retarded children at Denton State School. The subjects, ages 5 to 12, had intelligence quotients ranging from 50 to 70. These thirty-one children made up the total testable population at Denton State School. WISC scores and enough manual dexterity to manipulate a pencil have been required in order for a child to serve as a subject. The HFD Test and the WISC were administered to the thirty-one subjects. When administering the HFD Test, a

plain white sheet of 8½" x 11" paper was laid before the subject, a pencil was handed to him, and Koppitz's instructions were followed. "On this piece of paper, I would like you to draw a whole person. It can be any kind of a person you want to draw, just make sure it is a whole person and not a stick figure or a cartoon figure" (1).

The HFDs were scored for the presence of the Expected and the Exceptional items. The subjects were also given the WISC. Administration and scoring were done in the standard manner (2).

Thereafter the two Pearson product moment coefficients of correlation (r) were computed between HFD scores and WISC Full Scale scores and between HFD scores and WISC Performance Scale scores.

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CHAPTER III

RESULTS

Pearson product moment correlations were computed between the HFD Test scores and WISC Full and Performance Scale scores. The statistical significance of the correlations was determined by means of *t* tests. The correlation for the relationship between the WISC Full Scale scores and HFD Test scores ($r=.508$) was found to be significant at the .001 level of significance. The data relative to the comparison between the WISC Full Scale scores and HFD Test scores are reported in the form of group means, standard deviations, and product moment correlation coefficients in Table I.

TABLE I

SUMMARY OF THE MEANS, STANDARD DEVIATIONS, AND CORRELATIONS BETWEEN WISC FULL SCALE SCORES AND THE HFD SCORES FOR 31 MENTALLY RETARDED CHILDREN AGES 5 to 12

WISC FULL SCALE		HFD		
$\bar{x}$	S.D.	$\bar{x}$	S.D.	r
53.64	10.5	1.51	1.6	.508*

*p .001

It appears that the HFD Test scores are effective indicators of mental maturity, when the WISC Full Scale scores are used as the criterion, with a mentally retarded population in the age range under investigation. Whether this demonstrated relationship can be considered adequate for clinical screening purposes must be determined by the individual examiner.

The r between the WISC Performance Scale scores and HFD Test scores was .510 and was found to be highly significant at the .001 level of confidence. Table II indicates data relative to the comparison between the WISC Performance Scale scores and the HFD Test scores.

TABLE II

SUMMARY OF THE MEANS, STANDARD DEVIATIONS, AND CORRELATIONS BETWEEN WISC PERFORMANCE SCALE SCORES AND THE HFD SCORES FOR 31 MENTALLY RETARDED CHILDREN AGES 5 to 12

WISC PERFORMANCE SCALE		HFD		
$\bar{x}$	S.D.	$\bar{x}$	S.D.	r
54.38	14.89	1.51	1.6	.510*

*p .001

The highly significant comparison between the WISC Performance Scale and the HFD Test makes it evident that a major relationship between the HFD Test and the WISC is effected by the Performance section of the latter. Although evidence is lacking to describe the precise relationship of the HFD

Test to scales measuring performance ability, the HFD Test can provide a valuable supplement of a non-verbal or performance sort to the Binet-type test.

The correlation for the relationship between the WISC Full Scale score and HFD Test score ($r=.508$) was found to be significant at the .001 level of significance, as was the correlation for the WISC Performance Scale score and HFD Test score ($r=.510$). It is therefore possible to reject the null hypothesis. As a result, the empirical hypothesis is accepted. It appears that the HFD Test scores are effective indicators of intelligence quotient, when the WISC has been used as the criterion, with a retarded population ages 5 to 12.

As has been suggested above, the HFD Test can be of value as one part of a diagnostic battery, but must be considered in conjunction with other instruments. The HFD Test can be useful as a screening device or as an indicator of mental maturity. The ease and speed of administration is one advantage in using it as one type of data to be considered along with all of the other data obtained from a psychological test battery.

CHAPTER IV

DISCUSSION

Koppitz's scoring system was applied to the HFDs of thirty-one mentally retarded children, ages 5 to 12 years. The present findings that the HFD Test is highly correlated with the WISC Full and Performance Scale scores are consistent with previous research (1, 6). It would appear therefore that Expected and Exceptional items on HFDs of mentally retarded children, ages 5 to 12, can be used with confidence as a quick and easy method of assessing the level of mental maturity.

On the basis of the aforementioned results, it is reasonably safe to conclude that the HFD Test is a measure of mental ability in mentally retarded children of Wechsler intelligence quotient seventy or lower, between the ages of 5 to 12 years. Clinicians in need of a quick method of assessing children's mental maturity are provided another diagnostic tool in an age range, 5 to 12, where such devices are needed.

The HFD Test can provide a valuable supplement of a non-verbal or performance sort to the Binet-type test.

Categorizing the HFD Test as a performance test, however, may be doing violence to the concept of performance ability as it is associated with the scales of Arthur and Wechsler. Motor-speed is not a premium in this test. Neither is attention-span. Performance quality in the test is there mainly because the subject does something and leaves a record of having done it. By the same token, its non-verbal quality resides in the fact that the subject is not required to say anything.

Goodenough D-A-M scores and HFD scores have been found to measure similar aspects of mental maturity (3). It appears, therefore, that drawings can be analyzed with equal confidence according to the Goodenough or the Koppitz system.

The Koppitz system for scoring HFDs has the advantage of being exceedingly fast and easy to use. While Goodenough's D-A-M intellectual quotients did not correlate as well with the WISC and Binet scores of children with neurological impairment (1, 3), Koppitz has shown that the correlation between the HFD Test scores for the brain-injured children were not only statistically significant but also equalled in magnitude the correlations between HFD scores and intellectual quotients scores of children without brain injury (5). The disadvantage of the Koppitz method is that it is a very crude measure which yields no specific intelligence quotient or mental age scores, as does the D-A-M.

The broad categories of mental ability, according to Koppitz, are considered sufficient for differentiating between children who are mentally retarded and those who have average or above-average ability (5). Koppitz feels that placing children into such general categories of functioning is more meaningful than giving them specific intellectual quotient scores (5).

Although not offered as a substitute for a more complete intelligence testing in mentally retarded children, ages 5 to 12, results of the current study support the value of the HFD Test as a quick screening estimate of intellectual level.

Results of the current study could safely be generalized to at least the population of mentally retarded children, ages 5 to 12. Generalization to a population of mentally retarded individuals who are chronologically too old for the HFD Test but whose mental ages are equivalent to the standardization population should be reserved until further studies deem it to be a valid generalization.

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CHAPTER V

SUMMARY AND RECOMMENDATIONS

Summary

Thirty-one mentally retarded children, ages 5 to 12 have been used as subjects in the present study. This study investigated whether Koppitz's developmental scoring techniques of mental maturity are applicable to mentally retarded children, ages 5 to 12.

The following hypothesis were tested: 1) that there is a significant correlation between the HFD scores and the WISC Full Scale scores, 2) that the correlation between the HFD scores and the WISC Performance Scale scores is also significant. Statistical computations confirmed these hypotheses.

All subjects were administered the HFD Test and WISC. Administration and scoring were done in the standard manner. Pearson product moment coefficients of correlation were computed between HFD scores and WISC Full Scale scores and between HFD scores and WISC Performance Scale scores. The statistical significance of the two correlations was determined by means of *t* tests.

Computations indicated that the WISC Full and Performance Scale scores and HFD Test scores are significantly correlated at the .001 level of significance. These data warrant the conclusion that Koppitz's developmental scoring techniques of mental maturity are applicable to mentally retarded children, ages 5 to 12. The empirical hypothesis was confirmed on the basis of these results.

Recommendations

On the basis of the results and conclusions of this investigation, a modification of the experimental design might be advantageous. A study might investigate the applicability of Koppitz's scoring technique of HFDs for mentally retarded individuals who are chronologically too old for the HFD Test but whose mental ages are equivalent to the standardization population. Such a study could be of definite value since the chronological age of a large number of mentally retarded individuals exceeds 12 years.

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