STATISTICAL ANALYSIS OF THIRTY-THREE ITEMS FROM

MACHOVER'S DRAW A PERSON TEST

By

PAULA KAY UMPHERS

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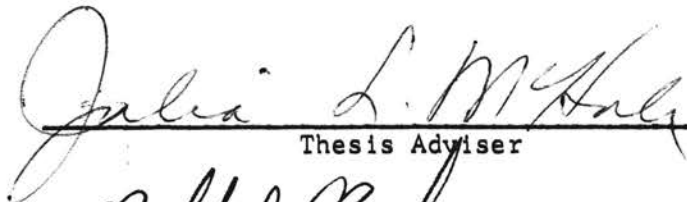
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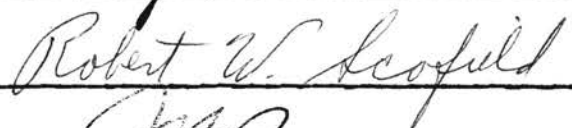for the degree of
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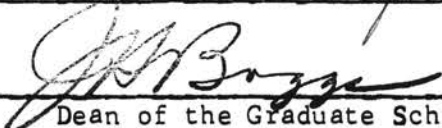
Thesis Approved:

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Thesis Adviser

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Robert W. Scofield

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Dean of the Graduate School

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PREFACE

Machover's Draw A Person Test is a projective technique which makes use of the drawing of the human figure as a specific expression of one's needs and conflicts. The assumptions underlying the use of this technique are psychoanalytic in nature.

A considerable amount of research has been done on the quantifiable aspects of Machover's test, but it has usually dealt with adult populations. The purpose of this study was to attempt to ascertain the discriminative value of thirty-three concrete signs from the test, using children as subjects.

I should like to express my deep appreciation to all those who have been of assistance in this study.

Mr. Jack Paxton, Director of Special Education in Tulsa, Mrs. Leona Inman, Coordinator of Elementary Schools in Edmond, and the public school teachers of Tulsa and Edmond have been most helpful in securing the children's drawings used in this thesis.

Special thanks go to all members of my committee, who have been very kind in offering any advice asked of them. I feel especially indebted to Dr. Richard Rankin and to Dr. Julia McHale, who have given many hours of their time in helping me with this study, and have shown much concern with other aspects of my professional development. Appreciation is also expressed to Dr. Robert Scofield, who has also served on the thesis committee.

I should also like to express my appreciation to Mr. James Johnston and to Mrs. Ann Ray for their valuable assistance.

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CHAPTER I

INTRODUCTION AND BACKGROUND

In 1949, Karen Machover proposed a method of personality appraisal
based on the clinical interpretation of human figure drawings. The
drawings, obtained by asking the subject to "Draw a person" or to
"Draw somebody", are seen as projections of the body image, or self
image. Various sensations, perceptions, and emotions are thought
to be associated with certain body organs; therefore, the drawing of
a person is said to constitute a specific expression of one's needs
and conflicts. These needs and conflicts are defined within the
context of Freudian psychoanalytic theory. In interpreting the
drawings, the method of direct analogy is often employed; for example,
tiny feet on the drawn figure are said to indicate insecure footing
in the artist. This subjectivity has been criticized as a weakness
of Machover's system. Although many of Machover's "signs" cannot be
experimentally verified, it was felt that a certain number of these
could be submitted to test. The present study has undertaken to do
just this.

In this study an attempt has been made to ascertain which of
thirty-three Machover signs discriminate between normal and retarded
children. These signs were chosen for concreteness and are listed
in Table 1 (See Appendix). An attempt was also made to ascertain
what differences will be found on the selected items as a function

of sex of subjects.

It was hypothesized that there would be a significant difference between normal and retarded children on the inclusion of these items. It was also hypothesized that significant differences would be found between males and females on the inclusion of these items.

Background and Review of Literature

The use of the human figure drawing as a projective technique probably owes its existence to Florence Goodenough. The Goodenough Draw-A-Man Test has been extensively employed as a measure of mental age, and has stimulated much interest among researchers. Merguet (1958) has found the test particularly useful with children of normal and subnormal intelligence; however, she found it more meaningful as a projective device with brighter children.

The Goodenough scale has been said to go far toward eliminating cultural bias in intelligence testing. Britton (1954) demonstrated little relationship between performance on this test and social class status. However, several American Indian groups significantly excelled the white norms (Dennis, 1942; Havighurst, 1946; Russell, 1943). This is probably attributable to the fact that much greater value is placed on artistic achievements in certain Indian cultures.

In a comparison of the Goodenough Test with Thurstone's Primary Mental Abilities Test and with the Tracing, Tapping, and Dotting subtests of the MacQuarrie Test for Mechanical Ability, Ansbacher (1956) found the Goodenough scale to correlate most highly with the factors of Reasoning (.40), Space (.38), and Perception (.37). It had little in common with Verbal Meaning (.26) or Number (.24). Its lowest

correlations were with the MacQuarrie Tapping (.23) and Dotting (.16) subtests, which are primarily tasks involving manual dexterity and simple coordination.

Hanvik (1953), using 25 psychiatric patients aged five to twelve years, contrasted Goodenough with WISC IQ's. Significantly lower mean IQ's were found on the Goodenough than on the WISC. The rank order correlation between IQ's on the 2 scales was only .18. Hanvik suggested that the Goodenough procedure focuses on a conflict area--that of social relationships--thus stirring up anxiety and impairing intellectual functioning. He recommended that an index of neuroticism be developed, based on the Draw-A-Man technique.

Bliss and Berger (1954), using matched groups of retarded children falling into the "organic", "familial", and "unexplained" categories, compared mental ages obtained under Goodenough's instructions ("...Draw the very best picture that you can...") and under Machover's instruction ("Draw somebody.") On the basis of the entire sample, no differences were found with the two sets of instructions. However, within the familial group, mental ages obtained with Machover's instructions were significantly lower than with Goodenough's instructions. Within the other groups, there were no differences. It was suggested that under Goodenough's more highly motivating instructions, familials may do better because (1) they may be more perceptive of social stimulation to do a good job, (2) their levels of aspiration may become greater, (3) they may be more conforming to the nature of a situation, or (4) the relative absence of personality maladjustment in this group, as contrasted with the "unexplained" group, may facilitate adaptability to reality-oriented situations.

Reichenberg-Hackett (1953) found mental ages obtained under Goodenough instructions to increase after a gratifying experience. Ss were 106 children between ages nine and eleven. A pleasant and relaxing experience was interpolated between two administrations of the Goodenough Test for the experimental group. The controls received the Stanford-Binet as their interpolated experience. While there was a rise in point score for the experimental Ss on the second administration, the controls lost points. Reichenberg-Hackett suggested that the opportunity for social relations with the experimenter was important in accounting for the improvement in the experimental group. However, the Stanford-Binet also involves a social relationship. It may have constituted a frustrating experience, or simply an exhausting one.

Johnson, Ellerd, and Lahey (1958) studied the Goodenough Test as an aid to the interpretation of children's school behavior. Ss were the entire population of defective children at a state hospital. Teachers were asked to rate the children on eleven traits by observation, while psychologists rated the children on the same traits using drawings. There was 54.4% agreement among teachers and psychologists. Psychologists were predominately more negative in their judgments than were teachers. It would seem that the drawings brought out traits not visible to the teachers, or that the children might not have had the necessary motor abilities to adequately express themselves in the drawings. The teachers likely rated the children within their own group (for example, as leaders), while the psychologists would tend to compare them with normals. This lack of agreement is thought to support the drawing technique. An overload of agreement would mark the projective technique as futile, since clinically significant traits would be directly

observable. It would be desirable to determine the percentage of agree-
ment without using drawings.

The drawing of the human figure has been in wide use as a projective
technique since the publication of Machover's monograph in 1949. It
has been praised by clinicians because of the array of information it
provides about the covert behavior of the individual, and damned by
many researchers because of the untestability of many of its assumptions.
Few studies have been published concerning its use with children.

In a study supporting this technique, sixteen male and sixteen
female first graders were matched (Koppitz, 1960). It was hypothesized
that neither the Bender-Gestalt Test nor the DAP, when scored develop-
mentally, would be influenced by teacher attitude. However, when
scored as projective tests, both techniques would reflect the attitudes
of an authoritarian, driving, restrictive teacher as contrasted with
those of a warm, easy-going one. These attitudes would be seen in the
high or low incidence of tension indicators in the drawings. As
predicted, developmental scores on either test were not influenced
by teacher attitude. The Bender-Gestalt also proved insensitive to
the situation when scored as a projective test; however, the DAP did
reflect teacher attitudes in that there was much more constriction
in the drawings.

Machover (1952), interested in the developmental aspects of
drawings, found that Negro kindergarten children responded to the
"Draw A Person" task by first drawing a house or flowers, making
false starts, and drawing multiple figures or objects. Arms and
fingers were frequently omitted, in contrast to the long arms and
stickfingers found in a comparable white group. The long legs, profuse

shading, and "hair excitement" of the white boys' drawings were not found in the Negro group.

Machover's Jewish orthodox subjects, aged seven to nine, in contrast with white public school children, drew "older" heads with longer noses and jutting chins, many times in profile. The white group drew "weaker" circle heads. Shading, transparencies, and omission of arms were more frequently seen in the Jewish group. Machover interpreted these differences as showing an excess of sexual and aggressive impulses among the Jewish subjects, attributable to the "damming up of self-assertion, paralleled by the orthodox cultivation of dependent and obedient attitudes." (p. 88)

While Machover's information is useful, much of its value is lost in her failure to report size of samples and frequencies with which the above characteristics were found.

Weider and Noller (1953), using 438 boys and girls between eight and twelve, found that significantly more of the younger children placed their human figures in the upper left. No significant differences were found when high and low IQ $\underline{S}$s were compared in frequency of full-face as opposed to profile drawings.

Zuk (1962) found size of figure drawn to increase directly with Binet MA. Median height of both male and female figures about doubled from MA six to fifteen. Median width increased about 50%.

Transparency in drawings was shown to decrease progressively with age in a study by Boussion (1950). Using 4500 Paris school children, he found transparency rare after age eight; by thirteen, it had practically disappeared.

Jolles (1952) studied the developmental aspects of sexual identification in 2560 drawings collected from school children. In general, he found, children preferred to depict their own sexes. Those between ages five and eight drew more unlike-sexed figures than did older children. Boys at these ages drew their own sex significantly more often than did girls. Females at ages eleven and twelve drew significantly more male figures than did the younger girls. On the whole, females tended to draw males more often than males drew females. Jolles concluded that one must be cautious in evaluating the significance of drawn persons of the opposite sex among males aged five to seven and among females aged eleven and twelve, since these trends seem typical for these age levels.

Weider and Noller (1950), using eight- to eleven-year-old children from the upper, middle, and lower socio-economic classes, found socio-economic level to be unrelated to sex drawn larger. Without regard to class, 52% of the boys and 80% of the girls drew their own sex larger, while 74% of the boys and 97% of the girls drew their own sex first. About half of the boys and 75% of the girls drew full-face figures.

Butler and Marcuse (1959) questions the validity of the studies by Jolles and by Weider and Noller. Were their findings representative, their samples large enough? On what basis were the 2560 drawings that Jolles used selected from the 8500 that he initially obtained? Did his combining different ages conceal developmental changes?

Butler and Marcuse (1959), using 810 boys and 734 girls aged five to eighteen, saw that below age eight, the tendency to draw same or opposite sexed figures was equally strong in both sexes. Above

this age, "normal" males drew their own sex first most of the time; but it was common for females to draw the opposite sex first. The writers saw these results as a reflection of the growing awareness among females of male dominance in contemporary western civilization.

In contradiction, Swensen and Newton (1955) found that females drew their own sex first significantly more often than males.

Fisher (1961) saw a difference between retardates and normals in the development of sexual identification as measured by sex of first-drawn figure. $\underline{S}$s were 744 retarded females from age seven to seventy-two, ranging in IQ from 18 to 106. The frequency with which the females was drawn first seemed affected by IQ, but not by chronological age. Fisher (1960) pointed out that since the process of identification is learned, the retardate would be less strongly identified with a sex role. It follows that retardates would draw their own sex less frequently than normals, that they would be less reliable in sex of first-drawn figure; and that with increasing age for any IQ level, the self-sex would be represented more frequently. In the study that followed (1960), retardates did in fact draw their own sex less frequently than normals, but none of the other predictions were confirmed.

Remarkably few studies have been done concerning the use of the DAP technique with retardates. It is logical that this measure of personality would prove valuable where other tests such as the Children's Manifest Anxiety Scale (Castenada, et al, 1956) are not appropriate because of word and language difficulties.

Popplestone (1958), in a study comparing the drawings of emotionally disturbed children with those of normals, predicted that disturbed

children would draw more like younger children than like their chrono-logical peers, that the disturbed would show more variability than normals and that the disturbed would include aspects in their drawings which are infrequent in those of normals. $\underline{S}$s were 363 normal children aged seven to ten and 67 child guidance bureau referrals aged nine and ten. The drawings were analyzed for 150 items. Statistical criteria for the significance of differences were rigid and cross validated. The disturbed group did not show more variability. However, immaturity did seem present to a greater degree in their drawings. These children also tended, with disregard to the instruction, "Draw a man", to draw a female and to add extraneous marks more frequently than normals.

In summarizing the literature, it may be said that there are some differences of opinion of researchers concerning the exact inter-pretation of human figure drawings of children. Many studies indicate differences between the sexes and between normal and abnormal individuals but there are also a number indicating no significant difference between these groups. It is hoped that the present study will throw some light on this problem.

CHAPTER II

EXPERIMENTAL METHOD

The experimental problem concerns an item analysis of 33 items on the Machover Draw A Person Test. These items were selected for concreteness and testability (see Appendix). Two drawings each were scored for 120 subjects (60 normal and 60 retardates).

Subjects

Two groups of subjects were used--one group consisting of normal subjects and the other of retarded subjects. Characteristics of each group is given below:

TABLE I

CHARACTERISTICS OF EACH GROUP

	Mean MA	Standard Deviation of MA's	Mean CA	CA Range
Normal Ss	98.52 mo.	9.11 mo.	96.57 mo.	89 mo. to 109 mo.
Retarded Ss	97.02 mo.	6.32 mo.	135.69 mo.	117 mo. to 167 mo.

Normal subjects: Sixty children of normal intelligence were chosen from the second grades of the Edmond Public Schools. Measured IQ according to California Test of Mental Maturity and/or S.R.A. Primary Mental Abilities Test ranged from 90-115. All children used were in

correct grade for their ages. Mean Chronological Age was 96.57 mo., with a range from 89 mo. to 109 mo. Average Mental Age was computed from these tests and considered to be 98.52 months (8 yrs. 2 months) with a range from approximately 7-9.

Retarded subjects: Sixty children classified as educable mentally handicapped were taken from special classes in the Tulsa Public School System. Mean Chronological Age was 135.69 mo., with a range from 117 to 167 mo. Stanford Binet IQ's ranged from 60 to 80. Average Mental Age computed from these scores was considered to be 97.02 months (8 years, 1 month) with a range from 7 years, 7 months to 8 years, 7 months.

Procedure

All children were tested in a group in their own homerooms by their own teacher. It was felt that better results might be obtained if E were not present.

E met with the teachers at both Edmond and Tulsa and explained that she wanted to study children's drawings. Standardized instructions as to procedure and materials were given to teachers at that time and they were requested to use these exactly. Instructions are included in Appendix B.

Drawings were subsequently delivered to E. E analyzed each drawing and scored for the 33 concrete characteristics adapted from Machover's monograph. Male figures were analyzed completely; female figures were used to compare the heights and head sizes of male and female drawings.

Scoring procedure consisted of placing a "1" if the characteristic were present and a "0" if it were absent.

Treatment of the Data

The number of "1" scores were tallied on each item for each of the two groups. The two groups were then subdivided on the basis of sex. Proportions scoring on each item were computed for each group and each subdivision. Seven comparisons were made for each item: (1) proportion of retardates scoring on an item with proportion of normals scoring, (2) proportion of normal versus retarded males scoring, (3) normal males with retarded females, (4) normal males with normal females, (5) normal females with retarded females, (6) normal females with retarded males, (7) retarded females with retarded males.

To determine the significance of differences between uncorrelated proportions, t tests were used, following Guilford's formula which is formula 10.15 in Ferguson (1949). The t values of these differences are shown in Appendix C.

Following this procedure, the discriminating items were inter-correlated, by treating each item as a test with a score of one or zero. The resulting 28 "tests" were intercorrelated, using the Pearson product-moment correlation teachique. Following Ferguson (1949) it is to be noted that this procedure generates phi coefficients which are a special case of Pearson r.

The results of these intercorrelations led to speculation that some of these items were measuring the same attribute. In an effort to determine this, a Thurstone complete centroid factor analysis was by the method given by Fructer (1954). Variance contributions

from each factor were computed following Guilford (1954). Following Thurstone's suggestions, the reliabilities for each item were considered to be equivalent to the re-estimated communality.

CHAPTER III

RESULTS

Of the 33 items in this instrument (see Appendix A), eight were found to discriminate between subjects on the basis of the t tests. These were (1) length of figure greater than 6½ inches, (2) length of figure less than 4½ inches, (3) shading, (4) figure low on page, (5) vigorous shading, (6) male figure larger than female figure, and (7) eyes showing two or more of the following: brows, lashes, pupils, and iris, and (8) hair very smooth or neatly parted.

Results of the t tests for these items are shown in Appendix C, and their intercorrelations are shown in Appendix D. A comparison of the two appendices indicates that the items which discriminated most highly (shading and eye detail) correlate .52. The two items relating to length of figure discriminated only between normal and retarded females (p < .05). As would be expected, a rather high negative correlation was found between these items (r = -.53). The item "figure low on page" differentiated normals from retardates as a group, normal males from retarded males, and normal females from retarded males (p < .05). This item correlated negatively with "figure greater than 6½ inches" (r = -.31), as might be expected, since a large figure can rarely be judged as placed low on the page. A positive correlation was found between this item ("figure low on page") and "length of figure less than 4½ inches" (r = .33).

The item "hair very smooth or neatly parted", assumed to be related to femininity, and "vigorous shading", supposedly an aggression indicator, differentiated only between normal and retarded males ($p < .05$). A rather interesting positive correlation was shown between "vigorous shading" and "length of figure less than 4½ inches". None of the other "signs" of aggression were found to be significant; however, two retardates scored on the item "toes on otherwise fully clothed figure", and the rarity of this sign may have some clinical significance but would need extensive cross validation.

Normals as a group scored on the item "male figure larger" significantly more than did retardates as a group ($p < .05$). This item is thought to indicate an attitude of male dominance.

The intercorrelations of the eight significant items were factored, using a Thurstone complete centroid analysis (see Appendix D). Five factors were extracted, three of which were usable. The first two accounted for 31% of the variance in the matrix. Factor I was a length factor (long figure). Factor II was a second length factor (short figure). Factor III appeared to be shading, and accounted for a small percent of the variance. Detailing of eyes constituted a residual factor.

An attempt at orthogonal rotation indicated that there were not enough tests for a satisfactory solution.

From the factor analysis, the lower bounds of the reliabilities for each item could be estimated, by examining the communalities for each item. Thus it could be assumed that the following items were reliable: length of figure greater than 6½ inches (reliability coefficient = .70), length of figure less than 4½ inches (.86), shading (.73), and eye detail (.66).

CHAPTER IV

DISCUSSION

From the factor analysis, it can be seen that three kinds of items in the instrument adapted from Machover's test (1949) have predictive value in situations similar to the one used in this experiment. The kinds of items are (1) those related to shading, (2) those having to do with length of figure, and (3) those concerned with eye detail. This is seen by examining the loadings of these items on the factors.

The discriminating item, "figure low on page", assumed to be a sign of depression, is related to size of figure, since a large figure could rarely be judged as either high or low on the page. Therefore, the two items "length of figure less than $4\frac{1}{2}$ inches" and "figure low on page" are probably confounded.

The item "vigorous shading", assumed to be related to aggressive tendencies, discriminated between normal and retarded males at the .05 level. This item is difficult to quantify and to separate from the "shading" item. Because of this weakness, because its level of significance could have been reached by chance, and because it is the only item in the "aggression" subtest which did discriminate, no conclusions can be drawn regarding the aggressive tendencies of the children in the sample.

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The drawings of normal children contain more indications of depression, anxiety, and lack of confidence was partly confirmed. Results on the items "length of figure less than $4\frac{1}{2}$ inches" and "figure low on page", taken together, suggest that this is the case. If shading indicates anxiety, then part of the hypothesis is overwhelmingly confirmed in that sex times IQ interaction is indicated by the finding that normal males shaded significantly more than did normal females ($p < .05$). No significant difference was found with regard to shading among retarded males as contrasted with retarded females.

The only sign in the masculinity-femininity subtests which was found to have predictive value was eye detail (supposedly found in "feminine" drawings). It did in fact discriminate between males and females of both groups at a highly significant level (alpha level ranging from $p < .05$ to $p < .01$). The other discriminating sign, "hair very smooth or neatly parted" (in the femininity subtest) differentiated only between normal and retarded males ($p < .05$). This item is difficult to quantify and probably should not be included in the instrument.

CHAPTER V

SUMMARY AND CONCLUSIONS

A study was done to ascertain which of thirty-three signs from Machover's Draw A Person Test discriminate between normal and retarded children, and to determine what differences will be found on the selected items as a function of sex of subjects. The drawings of sixty educable retarded children from intermediate special education classes were compared with those of sixty normal second graders.

Of the thirty-three signs chosen on the basis of concreteness, eight were found to discriminate between subjects on the basis of t tests. Factor analysis of the eight significant items indicated that length of figure and shading accounted for most of the variance. It can therefore be said that items related to length of figure and shading have predictive value in situations similar to the one used in this experiment.

The hypotheses that significant differences would be found between normal and retarded children and between males and females on the inclusions of the signs in the drawings were confirmed for eight of thirty-three signs.

Because of the small amount of support found for Machover's test in this study and in other research, it cannot be said that the Draw A Person Test has sufficient predictive value to warrant its use. However, much of the research has been with adults, and further

research with children is needed.

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APPENDICES

APPENDIX A

ITEMS USED IN THE STUDY

1. Length of figure greater than 6½ inches

2. Length of figure less than four-and-one-half inches

3. Faint line over entire figure

4. Heavy line over entire figure

5. Shading

6. Erasures

7. Figure low on page

8. Arms hanging very close to sides

9. Heavy line on any part of figure

10. Teeth present

11. Nostrils present

12. Toes on otherwise fully clothed figure

13. Vigorous shading

14. Reinforced line

15. Male figure larger

16. Head of male proportionately larger

17. Female figure larger

18. Head of female proportionately larger

19. Buttons as only representation of clothing

20. Pockets present

*21. Accessory characteristic present (pipe, house, scenery--not hat)

*22. Trousers or skirt transparent

*23. Figure walking or running as shown by bend at knee

*24. Arms reaching below knee

*25. Necktie shown

*26. Feet more than one-sixth total body length

*27. Feet larger than head

*28. Nose represented by two dots

*29. Feet less than one-twentieth total body length

*30. Eyes showing two or more of the following details: brows, lashes, pupils, iris

*31. Hair very smooth or neatly parted

*32. Arm length not greater than head length

*33. Legs not more than one-fourth trunk length

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*First suggested by Goodenough (1926)

APPENDIX B

INSTRUCTIONS TO TEACHERS

This study is designed to determine the validity of the Draw A Person Test for children. Your part in the study would involve about twenty minutes of class time, plus about thirty minutes of your own time.

The children should be given about twenty minutes at some time during the school day to complete separate drawings of a man and a woman. The only materials required are two sheets of blank white paper (8½" by 11") for each child, and a pencil for each child. The children should be instructed in this way:

> "Put your first and last name at the top of
> both pieces of paper that I have given you. (Pause)
> On one sheet of paper, draw a man, the best man that
> you can draw. On the other piece, draw a woman, the
> best woman that you can draw. Take your time and
> work carefully. Use pencils. Do not use ball point
> pens, crayons, or colored pencils."

It is important that the teacher does not give any information about how the picture should be drawn. The only requirement is that the child draws the whole body, not just the head or the head and bust. The only comments that should be made in addition to the above instructions are "Draw a man", "Draw a woman", "Are you finished?" and "Draw the whole person."

In addition to the drawings themselves, the following information is needed: Chronological age of the child
                    Sex
                    IQ (On which test?)

Thank you for your cooperation.

APPENDIX C

STUDENT'S t VALUES OF DIFFERENCES BETWEEN UNCORRELATED PROPORTIONS

Item	Proportions Checking Item				t
	Normals		Retardates		
1. Length of figure greater than 6½"	.22		.35		1.58
	Males	Females	Males	Females	---
	.28	.16	---	---	1.13
	.28	---	---	.50	1.61
	.28	---	.26	---	.51
	---	.16	---	.50	2.49*
	---	.16	.26	---	1.13
	---	---	.26	.50	1.88
2. Length of figure less than 4½"	.48		.35		1.92
	Males	Females	Males	Females	---
	.38	.58	---	---	1.55
	.38	---	---	.23	1.14
	.38	---	.42	---	.66
	---	.58	---	.23	2.51*
	---	.58	.42	---	1.15
	---	---	.42	.23	1.49
3. Faint line over entire figure	.15		.15		.00
	Males	Females	Males	Females	---
	.07	.23	---	---	1.47
	.07	---	.18	---	1.30
	.07	---	---	.09	.37
	---	.23	---	.09	1.33
	---	.23	.18	---	.66
	---	---	.18	.09	.72
4. Heavy line over entire figure	.27		.25		.31
	Males	Females	Males	Females	---
	.28	.26	---	---	.37
	.28	---	.21	---	.74
	.28	---	---	.32	.56
	---	.26	---	.32	.61
	---	.26	.21	---	.48
	---	---	.21	.32	.62
5. Shading	.73		.35		4.17**
	Males	Females	Males	Females	---
	.86	.61	---	---	2.18*
	.86	---	.37	---	4.08**
	.86	---	---	.32	3.95**
	---	.61	---	.32	2.08*
	---	.61	.37	---	1.99*
	---	---	.37	.32	.66

Item	Normals		Retardates		t
6. Erasures	.68		.58		.75
	Males	Females	Males	Females	---
	.69	.68	---	---	.21
	.69	---	.53	---	1.32
	.69	---	---	.68	.26
	---	.68	---	.68	.00
	---	.68	.53	---	1.11
	---	---	.53	.68	1.13
7. Figure low on page	.28		.12		2.20*
	Males	Females	Males	Females	---
	.31	.26	---	---	.72
	.31	---	.08	---	2.44*
	.31	---	---	.18	1.05
	---	.26	---	.18	.84
	---	.26	.08	---	2.02*
	---	---	.08	.18	1.16
8. Arms hanging very close to sides	.12		.18		.75
	Males	Females	Males	Females	---
	.17	.06	---	---	1.07
	.17	---	.13	---	.51
	.17	---	---	.27	1.01
	---	.06	---	.27	1.52
	---	.06	.13	---	.91
	---	---	.13	.27	1.35
9. Heavy line on any part of figure	.60		.65		.67
	Males	Females	Males	Females	---
	.69	.52	---	---	1.34
	.69	---	.58	---	1.13
	.69	---	---	.77	.83
	---	.52	---	.77	1.85
	---	.52	.58	---	.54
	---	---	.58	.77	1.49
10. Teeth present	.10		.10		.00
	Males	Females	Males	Females	---
	.07	.13	---	---	.74
	.07	---	.08	---	.21
	.07	---	---	.14	.75
	---	.13	---	.14	.19
	---	.13	.08	---	.66
	---	---	.08	.14	.74
11. Nostrils present	.27		.10		2.40*
	Males	Females	Males	Females	---
	.17	.32	---	---	1.34
	.17	---	---	.18	.20
	---	.32	---	.18	1.14

Item	Normals		Retardates		t
12. Toes on otherwise fully clothed figure	Proportions checking this item not sufficient for test				
13. Vigorous shading	.30		.18		1.54
	Males	Females	Males	Females	---
	.41	.19	---	---	1.86
	.41	---	.18	---	2.07*
	.41	---	---	.18	1.91
	---	.19	---	.18	.44
	---	.19	.18	---	.51
	---	---	.18	.18	.00
14. Reinforced line	.48		.58		.96
	Males	Females	Males	Females	---
	.52	.45	---	---	.74
	.52	---	.58	---	.64
	.52	---	---	.59	.66
	---	.45	.58	---	.97
	---	.45	---	.59	1.01
	---	---	.58	.59	.21
15. Male figure larger	.48		.30		2.02*
	Males	Females	Males	Females	---
	.48	.45	---	---	.27
	.48	---	.32	---	1.33
	.48	---	---	.27	1.52
	---	.45	.32	---	1.07
	---	.45	---	.27	1.33
	---	---	.32	.27	.76
16. Head of male proportionately larger	.35		.38		.45
	Males	Females	Males	Females	---
	.31	.39	---	---	1.01
	.31	---	.45	---	1.17
	.31	---	---	.27	.66
	---	.39	.45	---	.98
	---	.39	---	.27	.91
	---	---	.45	.27	1.38
17. Female figure larger	.45		.57		1.32
	Males	Females	Males	Females	---
	.41	.48	---	---	.93
	.41	---	.55	---	1.14
	.41	---	---	.59	1.27
	---	.48	.55	---	.87
	---	.48	---	.59	1.09
	---	---	.55	.59	.73

Item	Normals		Retardates		t
18. Head of female proportionately larger	.52		.43		1.01
	Males	Females	Males	Females	---
	.48	.52	---	---	.81
	.48	---	.39	---	.99
	.48	---	---	.50	.34
	---	.52	.39	---	1.08
	---	.52	---	.50	.30
	---	---	.39	.50	.97
19. Buttons as only representation of clothing	.10		.12		.41
	Males	Females	Males	Females	---
	.14	.06	---	---	1.03
	.14	---	.11	---	.64
	.14	---	---	.14	.00
	---	.06	.11	---	.96
	---	.06	---	.14	1.23
	---	---	.11	.14	.73
20. Pockets present	Proportions checking this item not sufficient for test				
21. Accessory characteristic present (pipe, house, scenery-- <u>not</u> hat)	.10		.17		.19
	Males	Females	Males	Females	---
	.17	---	.13	---	.20
	.17	---	---	.23	.53
	---	---	.13	.23	.08
	Proportion of normal females checking inadequate for test				
22. Trousers of skirt transparent	Proportions checking inadequate for test				
23. Figure walking or running as shown by bend at knee	Proportions checking inadequate for test				
24. Arms reaching below knee	.10		.07		.00
	Males	Females	Males	Females	---
	.07	.13	---	---	.86
	.07	---	.11	---	.44
	---	.13	.11	---	.24
	Proportion of retarded females checking inadequate for test				
25. Necktie shown	Proportions checking inadequate for test				
26. Feet more than 1/6 total body length	Proportions checking inadequate for test				

Item	Normals		Retardates		t
27. Feet larger than head	Proportions checking inadequate for test				
28. Nose represented by 2 dots	.07		.00		.00
	Males	Females	Males	Females	---
	.07	.06	---	---	.16
	Proportion of retardates checking inadequate for test				
29. Feet less than 1/20 total body length	.13		.05		.00
	Males	Females	Males	Females	---
	.10	.16	---	---	.67
	.10	---	---	.09	.12
	---	.16	---	.09	.88
	Proportion of retarded males checking inadequate for test				
30. Eyes showing 2 or more of the following: brows, lashes, pupils, iris	.30		.22		.06
	Males	Females	Males	Females	---
	.14	.42	---	---	2.40*
	.14	---	.11	---	.34
	.14	---	---	.41	2.19*
	---	.42	---	.41	.22
	---	.42	.11	---	2.97**
	---	---	.11	.41	2.71**
31. Hair very smooth or neatly parted	.23		.35		1.44
	Males	Females	Males	Females	---
	.14	.32	---	---	1.66
	.14	---	.37	---	2.11*
	.14	---	---	.32	1.55
	---	.32	---	.32	.00
	---	.32	.37	---	.41
	---	---	.37	.32	.30
32. Arm length not greater than head length	.53		.52		.18
	Males	Females	Males	Females	---
	.41	.65	---	---	1.86
	.41	---	.45	---	.37
	.41	---	---	.64	1.63
	---	.65	.45	---	1.66
	---	.65	---	.64	.27
	---	---	.45	.64	1.54
33. Legs not more than 1/4 trunk length	Proportions checking inadequate for test				

  * Significant at the .05 level or better
 ** Significant at the .01 level or better

APPENDIX D

INTERCORRELATIONS AND RESIDUALS FOR THE EIGHT DISCRIMINATING ITEMS

.052	.047	-.074	.017	-.022	-.047	.051	-.023
-.53	.055	-.055	.011	-.061	-.012	-.011	-.025
-.02	-.01	.001	-.003	.026	.012	.011	.032
-.31	.33	.06	.024	.021	-.020	-.023	-.027
.12	.39	.16	.05	.047	.029	-.048	.009
.22	-.26	.00	.05	.04	.031	-.003	.009
.10	-.07	.52	.09	-.02	.12	.051	-.028
.09	-.17	-.06	-.06	-.10	.06	.21	.051

Residuals are located in upper quadrant
Intercorrelations are located in lower quadrant
Communalities are located in diagonal

VITA

Paula Kay Umphers

Candidate for the degree of

Master of Science

Thesis: STATISTICAL ANALYSIS OF THIRTY-THREE ITEMS FROM MACHOVER'S DRAW A PERSON TEST

Major Field: Psychology

Biographical:

> Personal Data: Born in Ardmore, Oklahoma, September 2, 1938, the daughter of Roger and Lorene Umphers.

> Education: Received elementary and secondary education in the Shawnee, Oklahoma, Tishomingo, Oklahoma, and Edmond, Oklahoma school systems; graduated from Edmond High School in 1956; received the degree of Bachelor of Science in Education from Central State College, Edmond, Oklahoma, in 1960; completed requirements for the Master of Science degree with a major in psychology in May, 1964.

> Professional Experience: After receiving Bachelor of Science degree, taught third grade in the Wichita, Kansas school system from January, 1960, to May, 1961. Served as psychologist trainee at Children's Medical Center in Tulsa, Oklahoma, during the summer of 1963.

> Professional Organizations: Member of Psi Chi, student affiliate of the American Association on Mental Deficiency, and member of the International Society for General Semantics.