DEVELOPMENT OF AN INTELLIGENCE SCORING SYSTEM
FOR HUMAN FIGURE DRAWINGS

THESIS

Presented to the Graduate Council of the
North Texas State University in Partial
Fullfillment of the Requirements

For the Degree of

MASTER OF SCIENCE

By

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Denton, Texas
August, 1982
Hickox, Sherrie Danene, Development of an Intelligence Scoring System for Human Figure Drawings. Master of Science (Clinical Psychology), August, 1982, 40 pp., 4 tables, references, 13 titles.

This research proposed developing a multivariate intelligence scoring system for human figure drawings. The 115 subjects were drawn from clinical, medical, and noninstitutionalized populations. Initially, 72 of these drawings were analyzed for detail, proportion, perspective, and overall quality. The initial factor analysis revealed two factors corresponding roughly to the WAIS Verbal Comprehension and Perceptual Organization factors. DAP items evidencing high colinearity with FSIQ were retained. Two-stage regression of DAP items within subtests onto the WAIS FSIQ using the data from all 115 subjects yielded the final model ($R = 0.85$, $p < 0.0001$). Cronbach's Alpha and mean item commonality were computed as estimates of internal consistency (0.95 to 0.999). A second factor analysis revealed six factors associated with intelligence in the DAP.
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Development of an Intelligence Scoring System for Human Figure Drawings

The decades since the initial introduction of the concept of intelligence testing have been marked by continual attempts to improve the definition and measurement of intellectual capacity. Over these years there has been a change of focus from assessment of generalized descriptions of human behavior to the ascertaining of specific individual differences. The concentration on individual differences awakened the interest in establishing uniform criteria with which to identify and classify mentally defective persons who were institutionalized in order to provide higher quality care and more effective treatment strategies (Matarazzo, 1979).

A brief history of the development of the concept of intelligence testing will be presented first. Following this, the work of J. N. Buck in the area of intelligence estimation using human figure drawings will be expounded upon. Past research efforts in this area will then be reviewed. Next, a possible method which could be used to overcome the difficulty of deriving an intelligence scale applicable to the human figure drawing technique will be discussed. Finally, the utility of such a scale within a clinical population will be explored.
J. McKeen Cattell (1890) initially introduced the concept of mental tests. Notable followers of his lead were Alfred Binet and Theodore Simon, whose research in the education of mentally retarded children culminated in the 1908 revised Binet-Simon Scale which introduced the concept of mental age. Group administration of adult intelligence tests began during World War I with the design and implementation of the Army Alpha for literate recruits and the Army Beta for the illiterate in the selection and classification of military personnel (Anastasi, 1976). The research of David Wechsler in the 1930's marked the return to the assessment of individual differences. He revised Binet's concept of mental age with the formulation of the deviation IQ which describes intellectual ability as an index of the individual's status commensurate with one's age group. In 1955, a revision of this scale was introduced, the Wechsler Adult Intelligence Scale, which although a revision has been published, is still in use today. Comprehensive reviews of the development of intellectual assessment can be found in Anastasi (1976) and Matarazzo (1979).

One method which has departed from both individually administered and standard paper and pencil tests has been the attempt to measure mental ability using human figure drawings. This concept has been investigated since the turn of the century with inconclusive but promising results.
Binet (1905) first used human figure drawings as a part of his test but dropped this component when it became difficult to determine group averages by age which could be objectively measured. More recent efforts were attempted by J. N. Buck in which he sought to find correlates of more highly standardized and comprehensive verbal and performance measures, such as the Stanford-Binet (S-B). Buck (1964) in his examination of mentally retarded children utilized the House-Tree-Person test (H-T-P) from the standpoint of perspective, proportion and detail. Although he realized somewhat more success, he still obtained low correlations. His approach was an analysis of drawings as "flaw" (items appearing in 50% of the drawings of below average intelligence), "good" (items appearing in 50% of the drawings of above borderline intelligence), and "superior" (items appearing in 50% of the drawings of superior intelligence, but in less than 50% of average and below intelligence). However, the flaw score appeared to be too heavily weighted which strongly influenced the overall IQ score, causing it to be unduly low. Further, no assessment was made of the overall integrative quality of the drawings.

Research aimed at establishing meaningful correlations between intelligence and human figure drawings has focused primarily on the assessment of children and shown only limited success in establishing valid constructs of mental ability. Ritter and Duffey (1974) sought to establish a
reliable estimate of intelligence by comparing the Draw-A-Person (DAP), employing the Goodenough-Harris scoring system, with the Peabody Picture Vocabulary Test (PPVT) and the S-B in a kindergarten population. Their results indicated that the DAP significantly underestimated IQ when compared with the S-B, but found that the variability of the DAP and PPVT was approximately the same as that of the S-B on a test-retest basis. Specifically, IQ scores comparable with the S-B were only obtained for the lower levels of intellectual functioning. Similarly, Reisman and Yamokoski (1973) undertook to ascertain the degree to which the Draw-A-Man (DAM) IQ score corresponds to the Wechsler Intelligence Scale for Children (WISC) or S-B IQ scores. Their results also indicated that the DAM tends to underestimate children of average and superior intelligence and was thus useful only for obtaining a rough approximation of an IQ score. Celotta (1973) compared the IQ scores obtained from the S-B with those of the Manikin Construction Task, also using the Goodenough-Harris scoring system, with results indicating that the Manikin Construction Task was useful in measuring knowledge of specific parts and proportions, but not general intelligence except at the 3-year level. Sinha (1977) also found the DAP to be a poor measure of intelligence, but her results did suggest that the draw-yourself is a more accurate measure of school achievement than either the DAM or Draw-A-Woman. Pihl and
Nimrod (1976) attempted to establish a reliable and valid measure of intelligence from the DAP using the Harris scoring system and the "eyeball" method. Their results intimated that the DAP is a relatively good measure of intelligence based on the agreement between the rater's scores.

Research employing adult subjects in the derivation of an IQ score from graphic representations has also yielded promising results. Berdie (1945) sought to determine whether or not intelligence could be predicted from the DAM technique for use in classifying low ability male adults entering military service. His results were promising but due to the restricted sample population they could not be generalized to normal and superior adults. Carkhuff (1962) employed the WAIS as a criterion measure to determine whether a reliable estimate of intelligence could be obtained from the Goodenough DAM test in a group of noninstitutionalized subnormal adults. His results evidenced high inter-rater and test-retest reliability and a significant correlation between the two measures. Again, his results were primarily applicable to adults of below normal intelligence. Koslowsky, Deren, and Sofer (1976) used four predictors, "detail in body parts, detail in clothing, proportion of head size to body size, and area covered by drawing" to determine an IQ score from the DAP with the Revised Beta as a criterion measure (p. 772). Their results
suggested that adult intelligence could not be accurately determined from these predictors but that it could perhaps be employed as a screening instrument for clients at the extremes of the spectrum, especially the lower end. Eyal and Lindgren (1977) sought to determine the validity of the H-T-P as a nonverbal measure of mental ability using the H-T-P manual (Buck, 1951) and a global, impressionistic estimation on a group of undergraduates and grade school students. Their graphic products were also scored for creativity. Their results indicate that the global, impressionistic ratings for both intelligence and creativity correlated with verbal intelligence for females, but not males. They further noted that the manual ratings correlated with the verbal intelligence of the university women, but not the grade school girls.

One factor which could have potentially effected the results in previous attempts to utilize human figure drawings as indices of intelligence was the insensitivity of the measuring technique. The predominant difficulty appears to have concerned the assigning of unit weights, so that each measured feature of the graphic product contributed an equal amount to the score. If factors contributing to the total score were limited to unit weights, then problems such as Buck's (1964) imbalance due to the flaw score may have inflated the measurement error. However, if for example, a flaw score of "eye omission" had counted three times the
value of "finger omission," then this potential for distortion of the scale could have possibly been reduced. From this perspective, a more effective approach would be to employ a form of score aggregation in which items would contribute to the total score in different strengths. The assigning of proportional weights to the scores would provide a relative balance among the items within the groups. For example, a flaw score would reduce the total score value, but an average or superior score would increase the value.

Graphic representations such as human figure drawings have been frequently employed in the assessment of both personality and intelligence. The utility of a brief scoring system for graphic products to produce an index of intelligence arises from this dual application. In a clinical setting, obtaining a human figure drawing is no more utilitarian than giving the Wechsler Vocabulary subtest. The Vocabulary subtest is known to provide a good brief estimate of the full scale IQ score. However, a human figure drawing would also be open to projective interpretation, while the Vocabulary responses may only occasionally yield signs of pathology or dynamic functioning. Further, in a screening assessment, a discrepancy between an average Vocabulary subtest score and a below average human figure drawing score might prove to be independently interpretable and point toward the need for a more detailed dynamic
assessment. This is similar to a below average Bender-Gestalt received from a highly verbal subject which would suggest the need for a neuropsychological assessment. In order to expedite the assessment process within the clinical setting, a psychometrically valid and reliable measure of intelligence obtained from the human figure drawing would be beneficial, affording the test a dual application. In order to accrue maximum benefit from the test, the degree to which psychological disorders influence overall intellectual functioning will also need to be ascertained.

The purpose of the present study was to examine drawings made by patients in varying diagnostic classifications, utilizing perspective, proportion, detail and overall integrative quality items in order to determine weights of various components and how well these scores correlated with the criterion measure, namely the Wechsler Adult Intelligence Scale (WAIS). The goal of this research was to develop a scoring system for human figures drawn by adults using flexible multivariate item scoring paradigms.

Method

Subjects

Subjects were drawn from three populations. The first group was comprised of approximately 60 clients from a clinical psychopathological population who had completed the WAIS and DAP as part of their diagnostic battery. The second group consisted of approximately 25 medical patients
from an inpatient food and environmental sensitivities unit who had also completed the WAIS and DAP as a routine portion of their diagnostic battery. The third group consisted of approximately 30 unselected volunteers who had been administered the WAIS and DAP by graduate students in the partial fulfillment of their requirements for a psychological assessment course. The selection process produced a sample more heavily weighted with abnormal individuals than the general population. The purpose of biasing the sample in this manner was to increase the number of representatives from the subpopulations with which this instrument will be eventually used.

Apparatus

The testing materials employed in the subject's battery included the WAIS and DAP. The WAIS is a verbal and performance measure of adult intellectual functioning which was standardized in 1950, with a nationwide sample of 1700 adults (Wechsler, 1955). The DAP is a graphic technique used in the assessment of personality and the development of conceptual thinking (Harris, 1963).

Appendix A contains the scoring form which was implemented in the assessment of intellectual functioning from the DAP. Appendix B contains the general scoring dictionary by subtest for each of the items included in this study. Appendix C contains an expanded scoring dictionary for the Detail subtest. While the major focus of this study was to
develop a scoring system, the inter-rater reliability of these definitions were also examined by having 75 protocols scored independently with results being compared.

The WAIS scores were derived from the standard administration. The fact that many different scorers were used undoubtedly contributed error variance. However, this is a problem under which all clinical instruments must function.

Procedure

The data from the clinical and medical populations was obtained from patient charts without reference to name or identity. The data from the volunteer group was collected by graduate students enrolled in a psychological assessment course. As a routine requirement of this course these students are required to administer and score five WAIS protocols. In addition, they had each of their subjects produce a human figure drawing under standard administration. The scoring of the WAIS protocols was checked and the figure drawings scored by the experimenter.

Results

Initially, the drawings of 72 subjects were analyzed on the four dimensions of perspective, proportion, detail, and overall quality in terms of the correlations of items to the DAP subtest sum, inter-rater reliability, factorial composition, and regression onto WAIS FSIQ. Those DAP items within each subtest evidencing a high degree of colinearity
with FSIQ were pooled to produce the final subtests, thus establishing concurrent validity. Items which regressed onto FSIQ but which would have attenuated the reliability and internal consistency of the final prototype scale were eliminated by analyzing the inter-rater and item-subtest total correlations and, to a lesser extent, the factor analysis.

A two-stage regression of DAP items within subtests onto the WAIS FSIQ was computed using all 115 subjects in order to obtain the final model. Another factor analysis of all DAP items was explored in order to determine the factorial composition of the final DAP intelligence measurement. Cronbach's Coefficient Alpha and mean item commonality were computed as estimates of internal consistency of DAP subtest scores.

Table 1 of Appendix D contains a summary of the study variables. The descriptive statistics of the demographic variables indicated that both males and females were approximately equally represented. The average subject was characterized as a 32.6-year-old white person with a twelfth grade education.

Initial Factor Analysis. Table 2 of Appendix E contains the factor loading matrix from the principal components factor analysis of the DAP items and WAIS subtest scores. This analysis evidenced two factors which somewhat
correspond to the Verbal Comprehension and Perceptual Organization factors of the WAIS (Matarazzo, 1979).

Although the employment of the DAP items distorted the WAIS factors, the analysis did reveal findings which provided theoretical support for DAP productions yielding an IQ scale. There was definite commonality found among WAIS and DAP scores. Although the DAP items loaded primarily on what appeared to be perceptual organization factor, there was some DAP commonality found with the Verbal subtests. Thus, there was sufficient association found among DAP items to interpret it as reflecting a complex trait rather than a group of weakly related attributes.

The development of the DAP scale did not rely heavily upon the initial factor analysis. Regression modeling was the principle empirical guide to item selection.

**Item Selection.** The regression of the individual items onto the WAIS FSIQ was examined in a series of multiple linear regression (MLR) models. The results of these analyses are not reported since the purpose was to develop an understanding of the DAP item set. One of the more salient characteristics found was that items of a given type (e.g., detail items vs. ratio items) tended to suppress the regression of items of another type. For example, error variance on some detail items suppressed covariance between overall subtest items and FSIQ.
The finding of suppression of items by other item types lead to the classifying of the items into subtests: Details, Proportion, Perspective, Overall Quality. The criteria for selecting items for inclusion in these subtests were: (a) item product-moment correlation with WAIS FSIQ, (b) item inter-scorer correlations reflecting reliability (these ranged from 0.2419 to 0.9025 with a mean of 0.68 for the items selected) and (c) partial correlations of the items onto FSIQ independent of items of the same subtest type. Since the Ratio items evinced a departure from accurate reproduction with a deviation either above or below the optimum, the squared terms were included to reflect these curvilinear relationships.

Table 3 of Appendix F contains the results of the final MLR analysis which was a two-stage model. In this analysis, the predicted scores from the first-stage regression of subtest items onto WAIS FSIQ were, in the second stage, regressed again onto the FSIQ criterion score. This allowed the error variance from each subtest of items to remain independent from the other items. This reduced the suppression previously found.

Inspection of the two-stage regression results revealed that the overall multiple correlation was relatively high ($R = 0.85, p < 0.0001$). While the subtest multiple correlations (Detail=0.65; Proportion=0.53; Ratio=0.53; Overall=0.61) were statistically reliable ($p$ ranges from
0.0001 to 0.30), the relatively lower values indicated that the prediction of FSIQ with these alone would be weak.

Reliability and Item Commonality. Since the actual items used in the DAP subtests were the original DAP scores multiplied by the appropriate beta-weight, the apparent internal consistancy as estimated from Cronbach's Coefficient Alpha were very high, ranging from 0.95 to 0.999. This method tended to give spuriously high estimates since the regression weight factoring reduces item error variability. However, these can be taken as the upper limit of internal consistancy. A lower limit may be found from the commonality of the items within the regression using the sum of the squared standardized beta-weight which range from 4.58 to 14.77 for the several subtests.

Second Factor Analysis. Table 4 of Appendix G contains the results of the second factor analysis. This analysis was undertaken to better explore the DAP IQ scale; it also yields some information as to what aspects of a DAP production reflect intelligence. This analysis, which used only the DAP items retained on the scale, revealed six factors which were being reflected in the DAP IQ. These six factors can be interpreted as the Human appearance of the figure, Relative head size, Relative leg size, Appropriateness of facial reproduction, Human appearance of trunk and appropriateness of arm, and Precision of drawing.
Discussion

The development of a brief scoring system to assess intellectual functioning in a clinical setting would be of considerable utility. Such an assessment tool would expedite the assessment process and thus be particularly relevant in county or state mental health facilities where professional time would be at a premium. A standard assessment battery commonly employs the projective technique of human figure drawings. Thus, the development of an intelligence scoring system applicable to human figure drawings would further enhance the efficiency of the assessment process by allowing for a dual application of one assessment tool (e.g., one that could be used both objectively and projectively). The results of this study support the expectation that such a procedure is functionally obtainable.

The initial estimation of FSIQ was relatively good using weighted DAP items. The overall DAP intelligence scale was also found to have sufficient reliability. However, some validity shrinkage would be expected upon cross-validation. The overall multiple correlation for the DAP-IQ scale was found to be 0.85. Kangas and Bradway (1971) found the test-retest reliability of the WAIS FSIQ, over a 13 year interval, to be 0.73. Thus, even with the expectation of some validity shrinkage following cross-validation, the DAP-IQ scoring system would serve as a
relatively accurate predictor of FSIQ. One obvious advantage of the DAP-IQ scale as compared to the WAIS FSIQ would be the absence of practice effects. It could thus be used as a more reliable measure of pre-post treatment assessment.

The use of weighted scores on the DAP-IQ scale increased the reliability of the instrument as compared to previous attempts. However, few studies have used the Wechsler Scale as a criterion measure. Reisman and Yamokoski found the correlation between IQ estimates using the Harris scoring system and WISC to be 0.50. Carkhuff found the correlation between WAIS FSIQ and the Goodenough IQ estimate to be 0.74 with a test-retest reliability of 0.88 over a one day to one week interval in a group of noninstitutionalized subnormal adults. Berdie found the correlation between the shortened form of the WAIS and the DAI to be 0.62 using a regression equation. The validity estimate of 0.85 found with the DAP-IQ scale is thus promising. However, the mean inter-rater reliability of 0.68 could be improved during cross-validation by increasing the specificity of the scoring criteria and removing the more subjective items.

The initial factor analysis evidenced a bias in the DAP-IQ toward the perceptual organization factor. The intelligence estimate from human figure drawings would thus appear to be reflecting PIQ rather than FSIQ. However,
there was sufficient commonality found among the DAP items and the Verbal subtests of the Wechsler scales to suggest that the DAP-IQ scale was measuring a more complex trait than performance abilities. Those Verbal subtests evidencing a relatively high commonality were: Information (0.41); Comprehension (0.35); Similarities (0.39); Vocabulary (0.52).

The second factor analysis revealed six factors predictive of intelligence, which further indicated that something more than a group of weakly related attributes was being measured. If the results should cross-validate, these six factors could be used as one means of estimating current intellectual functioning. For example, a clinician could obtain a human figure drawing from a client which, by subjective evaluation, evidenced good Human appearance, Relative head size, Relative leg size, Human appearance of trunk and Appropriateness of arm, but which showed weak Appropriateness of facial rendering and Precision of rendering. The clinician could then conclude that there would be no gross intellectual deficit since four of the six factors were strong.

The actual implementation of this scale within a clinical setting could also involve using the betas to weight the items and then computing the predicted FSIQ. This would necessitate calculation beyond simple counting if the present model were to be used. In addition, the
subjective evaluation of the raw sums within the DAP subtests could be interpreted as a rough estimate of the general level of FSIQ, following the successful cross-validation and development of norms for such a direct interpretation.

The results of this study were a promising initial step in the development of a brief intelligence scoring system applicable to human figure drawings. However, other than as a guide in the subjective evaluation of human figure drawings, it is not yet useable as a diagnostic instrument until cross-validation has been accomplished. Aspects of the process which will need to be controlled would be a more representative sample and blind, naive raters. There was also the expectation of capitalization on chance due to correlated errors in this sample, just as there would be in any initial sampling which cross-validation would control.

A cross-validation study should retain all the initial items in this scale with raters being given only the drawings and a scoring manual. Pending the attainment of high inter-rater and item reliability, a representative sample should be established and the DAP-IQ scoring system normed for use within an applied setting.
## Appendix A

### DAP-IQ Scoring Sheet

<table>
<thead>
<tr>
<th>ID#</th>
<th>D.O.B.: / /</th>
<th>Age:</th>
<th>Sex:</th>
</tr>
</thead>
</table>

**Ethnic Origin:** __________________  **Educational Level:** __________________

**Diagnostic Classification:** ____________________________________________

<table>
<thead>
<tr>
<th>WAIS</th>
<th>__</th>
<th>DSy</th>
<th>VIQ</th>
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<tbody>
<tr>
<td>I</td>
<td>__</td>
<td>PC</td>
<td>PIQ</td>
</tr>
<tr>
<td>C</td>
<td>__</td>
<td>BD</td>
<td>FSIQ</td>
</tr>
<tr>
<td>A</td>
<td>__</td>
<td>PA</td>
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<tr>
<td>S</td>
<td>__</td>
<td>OA</td>
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</table>

| DSp   | __ |     |     |

**Details:** 0 = missing  3 = above average  1 = poor  4 = superior  2 = average

<table>
<thead>
<tr>
<th>Eyes</th>
<th>Hair</th>
<th>Hands</th>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nose</td>
<td>Neck</td>
<td>Legs</td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mouth</td>
<td>Trunk</td>
<td>Feet</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chin</td>
<td>Shoulders</td>
<td>Clothing</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Ears</td>
<td>Arms</td>
<td>Additional</td>
</tr>
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**Proportion:** 0 = deviant  3 = above average  1 = poor  4 = superior  2 = above average

<table>
<thead>
<tr>
<th>Facial Inter-part</th>
<th>Ratios:</th>
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<tbody>
<tr>
<td>Head Proportion</td>
<td>Trunk:Face :: 1</td>
</tr>
<tr>
<td>Arm Proportion</td>
<td>Trunk:Head :: 1:</td>
</tr>
<tr>
<td>Leg Proportion</td>
<td>Trunk:Arm :: 1:</td>
</tr>
<tr>
<td>Dimensional Scatter</td>
<td>Trunk:Leg :: 1:</td>
</tr>
</tbody>
</table>

**Perspective:** (same scoring as Proportion)

<table>
<thead>
<tr>
<th>Arm to Trunk Attachment</th>
<th>Placement on Page</th>
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<tbody>
<tr>
<td>Placement of Arms</td>
<td>Method of Presentation</td>
</tr>
<tr>
<td>Position of Arms</td>
<td>Animation of Persons</td>
</tr>
<tr>
<td>Finger Attachment</td>
<td>Type of Person</td>
</tr>
<tr>
<td>Leg Attachment</td>
<td></td>
</tr>
</tbody>
</table>

|                  |                  |
|                  |                  |
Appendix A--continued

Overall Quality: (same scoring as Proportion and Perspective)

- Balance (proportion and perspective of aesthetic quality)
- Comfort of Figure
- Expression
- Consistency of Execution
- Part to Whole Relationship
- Movement
- Relevance of Figure to Societal Standards
- Comprehensiveness
- Gestalt Quality
  (0 = yes; 1 = no)
- Transparency
- Bizarre Appearance
- Face Profile Only
Appendix B

DAP-IQ General Scoring Dictionary

Details:

0 = **missing.** the absence of any items listed on the protocol.

1 = **poor quality.** lack of appropriate angulation; absence of general features; misplaced features; gross distortions of features. (e.g., mitten hand; single line or two dots for nose; neck too thick or thin; box or circle trunk; uneven shoulders; one dimensional fingers; jagged fingers).

2 = **average quality.** relatively well angulated; general features fairly distinct. (e.g., dots or circles for eyes; two dimensional eyes, nose, mouth, ear, etc.).

3 = **above average quality.** symmetrical appearance; extra and/or fine details. (e.g., eyes and ears are symmetrical).

4 = **superior quality.** details are elaborated; humanness of appearance. (e.g., features appear human rather than animated).

Proportion, Perspective, and Overall Quality:

0 = **deviant.** bizarre effect; lacks realism. (e.g., distortion of body size and placement; figure drawn off page; transparency; head cut off).

1 = **poor quality.** asymmetrical body parts. (e.g., lopsided figure; figure drawn to one side of page; back view of figure; telescopic view of any body parts).
2 = average quality. relatively symmetrical quality; balanced gestalt of a person. (e.g., body parts connected; extremities adequately proportioned).

3 = above average quality. effects a sense of reality. (e.g., reflects a close approximation of actual human features).

4 = superior quality. very symmetrical features; smooth, even execution of drawing; centered on page. (e.g., attachment of extremities not broken by a space or line; features accurately spaced; communicative expression).
Appendix C

Expanded Scoring Dictionary for Detail Subtest

Eyes:
Iris
Pupil
Eyebrow
Eyelashes (upper and/or lower)
Eye socket
Smile lines around eyes

0 = eye missing
1 = 1 characteristic or empty eye without additional detail
2 = 2 characteristics
3 = 3 characteristics
4 = 4 or more characteristics

Nose:
Nares (holes)
Flare (widening at base for nares)
Bridge (hump or knot in middle)
Projection (projects forward from rest of face)
Lower shape (must show rounding to score)
Extension (from eyes to just above upper lip)

0 = nose missing
1 = 1 or 2 characteristics
2 = 3 characteristics
3 = 4 characteristics
4 = 5 or more characteristics

Mouth:
Teeth
Lips (actually drawn)
Tongue (actually drawn)
Extension (horizontal from under pupil to under pupil)
Cavity (opening suggested)
Dip in upper lip (even if upper lip is not actually drawn)

0 = mouth missing
1 = 1 characteristic
2 = 2 characteristics
3 = 3 or 4 characteristics
4 = 5 or 6 characteristics

Chin and Jaw:

0 = chin and jaw missing.
1 = symbolic suggestion of chin and jaw
Appendix C--continued

2 = clear suggestion of chin proper or narrowing of face below mouth via jaw line
3 = clearly drawn chin or lower jaw
4 = chin and jaw reflect a sense of realism

Ears:
Placement
Outer shape
internal meatus (hole)
Folds of external meatus (part one can grab)
ear lobes (either detached or suggested by narrowing of oval)

0 = ears missing
1 = ears poorly drawn or inappropriately emergent from hair
2 = if appropriately covered by hair or drawn appropriately with inner and outer folds demarked
3 = 3 characteristics
4 = 4 or 5 characteristics

Hair:
Strands
Parts
Curls
Side burns
Shaped at neck
Flip
Ponytail, braid, etc.
Long hair flowing behind trunk
Hair begins on top of forehead rather than being on top like a hat

0 = hair missing
1 = 1 characteristic
2 = 2 characteristics
3 = 3 characteristics
4 = 4 or more characteristics

Neck:
0 = neck missing
1 = neck too long, too thick, too thin, etc.
2 = neck drawn but with minimal detail (2 to 4 lines)
3 = neck drawn with some detail (e.g., adam's apple, hollow at base, folds, musculature)
4 = clearly superior realism

Trunk:
Snake (e.g., different from neck)
Pectoral muscles/breasts
Waist/hips
Clear separation from neck
Appendix C—continued

0 = trunk missing
1 = 1 characteristic
2 = 2 characteristics
3 = 3 characteristics
4 = 4 characteristics

Shoulders:
0 = shoulders missing
1 = major problem with either top curve from neck or underarm to trunk
2 = both top and bottom produce accurate gestalt
3 = added details (e.g., bones, muscles, relationship with pectoral muscles on chest)
4 = clearly superior realism

Arms:
Elbows
Extension on side of trunk
Wrists (including narrowing above)
Muscles
0 = arms missing
1 = 1 characteristic
2 = 2 characteristics
3 = 3 characteristics
4 = 4 characteristics

Hands and Fingers:
Any of the five fingers
Thumb as different including length
Nails/nuckles
Fingers curved
0 = hands and fingers missing
1 = 1 characteristic or a mitten hand with or without thumb
2 = 2 characteristics
3 = 3 characteristics
4 = 4 characteristics

Legs:
Extension
Knees
Calf
Thigh
Ankle
Muscles
0 = legs missing
1 = 1 characteristic
2 = 2 characteristics
3 = 3 characteristics
4 = 4 or more characteristics
Feet and Shoes:

Extension
Toes
Heel (heel must be appropriate to type of shoe drawn)
Arch
Nails/knuckles
Shoe

0 = feet and/or shoes missing
1 = 1 characteristic
2 = 2 or 3 characteristics
3 = 4 characteristics
4 = 5 or 6 characteristics

Clothing

0 = clothing missing
1 = some definite indication of clothing
2 = either: (a) shirt/blouse and slacks/skirt/shorts (with clear hem line) or
     (b) dress with clear hem line
3 = must reach criteria for #2 level plus evidence
   buttons, zippers, belts, etc.
4 = clothing must show nature of fabric in addition to all the above

Additional Detail Bonus Points:

Dress accessories such as watches, jewelry, neckties, underwear, etc.

0 = no additional details
1 = 1 characteristic
2 = 2 characteristics
3 = 3 characteristics
4 = 4 characteristics
Appendix D

Table 1

Summary of Descriptive Statistics for Study Variables

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*55% males and 45% females*

*b 83% white and 17% non-white*
### Appendix E

**Table 2**

Principal Factors Analysis of DAP Items and Wechsler Subtest Scores  
(72 Observations)

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## Appendix F

### Table 3

**Two Stage Regression of DAP Items Onto WAIS FSIQ (N = 115)**

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## Appendix G

### Table 4

Second Factor Analysis: Only DAP Items on Final Scale

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References


Cattell, J. M. *Mental tests and measurement*. *Mind*, 1890, 15, 373-381.

Celotta, B. K. *Knowledge of the human figure as measured by two tasks*. *Developmental Psychology*, 1973, 3, 377-381.


