THE PERFORMANCE OF DEAF CHILDREN ON THE DRAW-A-PERSON TEST: A VALIDITY STUDY

A Thesis Presented to the Graduate Faculty

of

California State University, Hayward

In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Counseling

By

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July, 1992

ABSTRACT

Human figure drawings were scored for 30 deaf subjects ages 5 to 15 using the Goodenough-Harris Draw-A-Person method (DAP) in an investigation of the validity of this test as a measure of intellectual maturity in deaf children. DAP standard scores were shown to be positively correlated ($r = .43$, $p < .05$) with Performance Scale IQ scores of the Wechsler Intelligence Scale for Children-Revised (WISC-R), but negatively correlated with age ($r = -.41$, $p < .05$) for all subjects. A significant difference was found between DAP scores and WISC-R Performance IQ scores for all subjects: The mean WISC-R IQ score exceeded the mean DAP standard score by 10 points ($t = 2.7$, $p = .01$). Those deaf subjects whose parents were also deaf (DP) outperformed deaf subjects with hearing parents (HP) on the WISC-R Performance Scale by over one standard deviation ($t = -2.64$, $p < .01$). No difference was found in DAP scores between the DP and HP groups. It was concluded that the DAP is a valid measure of intellectual maturity in deaf children through age 12, but must be used with caution due to its tendency to underestimate criterion scores, and should be used with additional measures, as part of a larger test battery.

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By

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ACKNOWLEDGEMENTS

I would like to express my gratitude to Dr. Eloise McTigue, and Mr. Jacob Arcanin of the research committee at the California School for the Deaf, Fremont, for approving this research project. I would also like to thank the parents and students whose cooperation made this study possible.

I warmly thank Sherry Sporn for taking time from her own study to score all 30 protocols; her support throughout the writing of this project was invaluable. Finally, I sincerely thank my advisor, Dr. Tom Whalen, and reader, Dr. Leslie Mitchell, for assisting me complete my project during this summer of budget cuts, remodeling, and minor chaos.

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INTRODUCTION

Statement of the Problem

This study examined the use of the Goodenough-Harris Draw-A-Person test (referred to hereafter as DAP) as a measure of intellectual maturity in deaf children. Two specific questions, both related to test validity, were investigated:

1. To what extent are DAP scores correlated with IQ scores for a group of deaf children?

2. Do deaf children of deaf parents perform differently than deaf children of hearing parents on the DAP?

Background of the Problem

Developed in 1926 by Florence Goodenough, the Draw-A-Man test was used to measure intelligence in deaf children as early as 1930 (Levine, 1971). Goodenough herself coauthored a study in 1932, in which the Draw-A-Man test was used to evaluate deaf children in the Minnesota schools (cited in Levine, 1971). Originally designed for use with hearing individuals, the Draw-A-Man test, given its nonverbal response format, seemed to lend itself well to the assessment of the deaf. Harris's 1963 revision of

the Draw-A-Man test, the Goodenough-Harris Draw-A-Person test (DAP), has also been used to assess the intellectual maturity of deaf children (Cates, 1991).

Identifying assessment tools appropriate for the evaluation of deaf children has been an ongoing problem. Levine (1971) described the lack of instruments specifically designed for and normed on the deaf. She pointed out that the dearth of tools for the assessment of the deaf has resulted in the use of tests or parts of tests, such as nonverbal items, standardized on hearing children. This has been the case with drawing tests; the performance of deaf children has typically been compared to a normative sample of hearing children, and interpreted according to developmental expectations, under the apparent assumption that drawing tests measure the same abilities in deaf children that they measure in hearing children. Given that incomplete tests are often given, and norm groups are of questionable applicability, Levine stressed that using a battery of tests, rather than a single instrument, considered standard practice for all assessment, becomes even more important in the assessment of the deaf (1971). Both Levine (1971) and, more recently, Braden (1992) specifically recommended including a drawing test in an assessment battery for deaf children.

Not only have drawing tests been recommended for the assessment of deaf children, but, according to several

major surveys of the state-of-the-art practices in deaf assessment, drawing tests are already in widespread use by psychologists evaluating the deaf. In 1974, Levine surveyed psychologists across the United States who evaluated deaf children in various settings. Drawing tests ranked eighth, and the DAP, specifically, ranked tenth in the list of most frequently used assessment tools. The single most commonly administered test by a group of school psychologists serving hearing-impaired students in New Jersey was a drawing test: the House-Tree-Person test (Trott, 1984). In a replication of Levine's 1974 survey, Gibbins found that psychologists ranked human figure drawings as the most common tool for the assessment of the social-emotional functioning of their deaf referrals (1989). Reasons cited for the popularity of drawing tests in the assessment of the deaf included ease of administration (Levine, 1974), the nonverbal, visual-spatial nature of these tests (Cates, 1991), and basic familiarity of these tools among psychologists (Braden, 1992).

A large body of research in the area of assessment of the deaf has compared the performance of two groups of deaf children: deaf children whose parents are also deaf, and deaf children whose parents are hearing. Deaf children of deaf parents (DP) tend to outperform deaf children of hearing parents (HP) in terms of language development

(Geers & Schick, 1988; Orlansky & Bonvillian 1985), reading achievement (Kampfe & Turecheck, 1987), and cognitive tasks (Dolman, 1983; Kusche, Greenberg, & Garfield, 1983; Sisco & Anderson, 1978, 1980; Zwiebel, 1987), including the DAP (Zwiebel, 1987). The superiority of DP subjects over HP subjects has alternately been explained by early exposure to language in the DP group (Dolman, 1983; Zwiebel, 1987), hereditary factors and greater tendency toward additional handicapping conditions among the HP group (Mindel & Vernon, 1971), an evolutionary advantage in visual-spatial skills among the DP group (Kusche, et al., 1983), and greater parental acceptance in the DP group (Meadow, 1980).

Significance of the Problem

The present study represents an effort to contribute to the validity of the Goodenough-Harris method with deaf children. Given its widespread use in the evaluation of deaf children, despite the absence of a published norm group for the deaf, there is an ongoing need to demonstrate that an estimate of a deaf child's intellectual maturity based on the DAP is valid. The study also adds to the body of research comparing deaf children of deaf parents to deaf children of hearing parents.

Chapter 2

REVIEW OF THE LITERATURE

Introduction

Drawing tests are widely used in the assessment of children, both in the evaluation of personality, and as an estimate of cognitive functioning. The following review of the literature focuses on the Goodenough-Harris Draw-A-Person test (DAP) as a measure of cognitive ability. A historical overview of the DAP as an intelligence measure is followed by a discussion of the use of drawing tests with deaf subjects. Studies are then reviewed which compare deaf children of deaf parents (DP) to deaf children of hearing parents (HP) on a variety of measures, with the focus on how these two groups differ on tests of intelligence.

Historical Overview of the DAP

Interest in children's drawings as indicators of cognitive development began in the late nineteenth century (Harris, 1963). In 1926, Florence Goodenough developed the first quantitative scoring system for drawings; her Draw-A-Man test became a widely used measure of cognitive ability, for which reliability and validity was demonstrated (Harris, 1963). Beginning with Machover's "body image"

hypotheses, the period between 1949 and 1963 was dedicated to the investigation of the Draw-A-Man test as a projective technique for personality assessment. In 1949, Machover postulated that the child projects the self into the figure, and that the treatment of individual body parts reveals specific pathologies. Swensen (1957, 1968) and Roback (1968) undertook extensive reviews of the literature published between 1949 and 1967, and concluded that Machover's original hypotheses were overwhelmingly unsupported by the research. The 1960s saw a resurgence of interest in drawing tests as measures of intelligence with Harris's 1963 revision and renorming of Goodenough's Draw-A-Man test, and the development of a 30-item developmental scoring system by Koppitz in 1968.

In revising the original Draw-A-Man test, Harris (1963) added more items in an effort to extend the upper age limit from 12 to 15. He developed separate norms for boys and girls, and substituted standard scores, with a mean of 100 and a standard deviation of 15, for the original intelligence quotients. Harris considered the new Goodenough-Harris Draw-A-Person test (DAP) to be a measure of intellectual maturity, which he defined as the ability to form abstract concepts. His description of the development of this ability acknowledges the influence of experience on concept formation.

Scott (1981) thoroughly reviewed and evaluated research examining Harris's revision. She summarized studies evaluating the norms, attempts to establish reliability, research relating DAP scores to other measures of intelligence in investigations of criterion-related validity.

The DAP norms came into question following the administration of the DAP to a nationally representative sample of 13,000 children as part of the 1970 Health Examination Survey (HES), which resulted in scores which fell below the expected mean of 100 by an average of 10 points (cited in Scott, 1981). This large scale study revealed that the published norms have an approximate 10-point bias in the upward direction, reflecting the inadequate sampling of lower ability levels in the norm group. Scott also reported that Harris's attempts to raise the test ceiling from age 12 to age 15 were unsuccessful; According to the HES data, the DAP reliably discriminated between age groups for subjects aged 5 through 12, but failed to effectively discriminate the performance between age levels beyond age 12.

Harris (1963) reported inter-rater reliability coefficients ranging from .91 and .98. In her review of studies conducted since 1963, Scott summarized reliability estimates based on the agreement between two scorers as ranging from .80 to .90. Estimates of test-retest

reliability were considerably lower, falling within the .70 to .80 range (Scott, 1981).

Criterion-related validity of the DAP, as measured by correlating DAP scores with scores on other measures of intelligence such as the Wechsler Intelligence Scale for Children-Revised (WISC-R), and including the original Draw-A-Man test, was the focus of approximately 40 studies between 1963 and 1977 (Scott, 1981). DAP scores positively correlated with Draw-A-Man scores with an average magnitude of .89. Correlation coefficients with major intelligence tests such as the WISC-R and the Stanford-Binet tests had a mean value of approximately .50. Investigations of criterion-related validity appeared to support the DAP as measure of intellectual maturity. However, Scott cautioned that despite the significant correlations with intelligence measures, DAP scores tended to underestimate performance on the criterion instrument, especially in the above average range.

More recently, Naglieri and Maxwell reported an inter-rater reliability of .94 for the DAP protocols of mentally retarded, learning disabled, and non-disabled school-age children (1981). The authors further reported that DAP scores for all subjects correlated significantly with WISC-R scores, at a magnitude of .73. Consistent with Scott's findings, Naglieri and Maxwell found the DAP

standard scores to be significantly lower than the WISC-R scores of their subjects.

In 1987, Ward and Eliot demonstrated significant correlations between DAP scores and scores on both Cattell's Culture-Fair Intelligence Test and the Embedded Figures Test for a group of migrant children.

Performance of Deaf Subjects on Drawing Tests

A few studies have been conducted in an attempt to validate the use of drawing tests as projective techniques for the personality assessment of deaf children. In his examination of the human figure drawings of 7- to 12-year-old deaf boys, Johnson (1988) found a positive correlation between Koppitz's scoring for emotional indicators and a concurrent measure of response to stress. In a follow-up to Johnson's work, Cates (1991) used Koppitz's scoring system with a sample of deaf children, and included a comparison sample of hearing children. In contrast to Johnson's study Cates did not find evidence to support the validity of Koppitz emotional indicators as predictors of emotional disturbance in deaf children. Ouellette (1988) established concurrent validity between performance on the House-Tree-Person test (HTP) and counselors's clinical ratings for a group of deaf young adults. Davis and Hoopes concluded that the HTP was valid for use with deaf children based on their failure to find a difference between the

performance of deaf and hearing children on this test (1975).

As a cognitive measure, Goodenough's Draw-A-Man test was used with deaf children as early as 1930 (Levine, 1971). Shirley and Goodenough studied the intelligence of deaf children in the Minnesota school system using the Draw-A-Man test in 1932 (cited in Levine, 1971). An early factor analytic study comparing the performance of deaf and hearing children on intelligence measures included the Draw-A-Man test (Farrant, 1964). Farrant found no difference between the performance of deaf and the performance of hearing children on the Draw-A-Man test. Cates (1991) similarly found no difference in performance between his deaf subjects and a hearing control group on the DAP; the apparent equivalence between deaf and hearing subjects supported the validity of the DAP as a measure of intellectual maturity in deaf children. However, Cates intentionally excluded from his deaf sample deaf children of deaf parents (DP), acknowledging that these children may perform differently on the DAP than the deaf children of hearing parents (HP) he included in his study. In a study including more than 60 percent of the juvenile deaf population of Israel, Zwiebel examined performance on the DAP of 6-to 14-year-old, DP, HP, and hearing subjects (1987). He reported that the DAP performance of DP subjects was equivalent to that of the hearing subjects,

and that both hearing and DP subjects outperformed subjects in the HP group.

Parental Hearing Status and Performance of Deaf Subjects

Research comparing deaf children of deaf parents (DP) with deaf children of hearing parents (HP) has consistently demonstrated a DP advantage over HP subjects. Children in the DP group have shown more advanced language development (Geers & Schick, 1988; Orlansky & Bonvillian, 1985) and reading achievement (Kampfe & Turecheck, 1987) than their HP peers. DP have also outperformed HP subjects on cognitive measures, described in detail below.

Using data collected in the development of deaf norms for the WISC-R, Sisco and Anderson reported significantly higher Performance Scale IQs for DP subjects than for HP subjects (1980). The authors discounted early exposure to manual language as the probable cause for the DP advantage due to the fact that the mean Performance IQ for the DP group was also significantly higher than the mean of 100 for hearing children. Sisco and Anderson instead offered differences in child-rearing experiences as a possible explanation for the DP advantage.

Dolman compared DP and HP children ages 7 to 15 on a series of Piagetian tasks and found that the DP subjects exhibited slightly more advanced problem-solving skills

(1983). Dolman attributed the DP performance advantage to early and consistent exposure to sign language.

In contrast, Kusche, et al. (1983) cited Mindel and Vernon's (1971) discussion of the greater prevalence of additional handicapping conditions among the HP group to support their hypothesis that genetic factors have been responsible for the superior performance of DP subjects. They attributed the superior performance of the DP group to a genetically-based strength in visual-spatial processing which came about as the result of an evolutionary process.

Zwiebel (1987) refuted the argument of Kusche and her colleagues by pointing out that the typical DP subtest performance profile on intelligence measures has not supported a strength in perceptual-spatial processing. For example, DP subjects have tended to excel on the Picture Arrangement subtest of the WISC-R, which is a sequencing task. In his study, Zwiebel attempted to sort out conflicting nature and nurture postulates by including a second group of subjects with hereditary deafness, but without deaf parents: namely, deaf children with hearing parents, and at least one deaf sibling (DS). On both the Snijders-Oomen Non-Verbal Test (SON) and the DAP, Zwiebel's subjects performed on a continuum, with the DP group earning the highest scores, followed by the DS group, and the HP group respectively. Zwiebel concluded that his results demonstrated that nurture, or sign language

environment factors accounted for the superiority of the DP group.

Conrad and Weiskrantz (1981) also included a group of subjects with hearing parents and deaf siblings (DS) in their investigation of the performance of deaf subjects in England on portions of the British Ability Scales (BAS). In contrast to most research examining DP performance, no differences were found in the performance of DP, DS, and HP subjects on the BAS.

Consistent with the findings of Conrad and Weiskrantz, Parasnis (1983) demonstrated that a group of DP college students did not outperform HP college students on measures of abstract reasoning, locating embedded figures, field independence, or reading achievement. Parasnis concluded that the DP advantage noted in childhood did not persist into early adulthood, although his college student subjects might not have been representative of the young adult deaf population at large.

Summary

The use of drawing tests in the assessment of children's intelligence is a long-standing, well-established practice. Research has repeatedly demonstrated reliability and validity, although not problem-free, for Harris's 1963 revision of Goodenough's original Draw-A-Man test. Some preliminary research has been conducted to establish the validity of the Harris method for use as a

measure of intellectual maturity in deaf children. Studies investigating the performance of deaf children on intelligence measures have typically found that deaf children of deaf parents outperform their deaf peers of hearing parents. One study was reviewed which revealed the superior performance of deaf children with deaf parents on the Goodenough-Harris Draw-A-Person test (Zwiebel, 1987).

Chapter 3

DESIGN

Specific Statement of the Problem

This study investigated two specific questions related to the validity of the Goodenough-Harris Draw-A-Person test (DAP) as a measure of intellectual maturity in deaf children:

1. To what extent are DAP scores correlated with WISC-R Performance IQ scores for a group of deaf children?

2. Do deaf children of deaf parents outperform deaf children of hearing parents on the DAP?

Hypotheses

1. There is a positive correlation between WISC-R Performance IQ scores and standard scores on the DAP for all deaf subjects.

2. There is no correlation between subject age and standard score on the DAP.

3. There is no difference in performance between male and female subjects.

4. Deaf subjects of deaf parents will show higher WISC-R Performance IQ scores than deaf subjects of hearing parents.

5. Deaf subjects of deaf parents will show higher DAP scores than deaf subjects of hearing parents.

Population and Sample

The subjects were 30 students enrolled in regular programs and Special Unit (multihandicapped) classes at the California School for the Deaf in Fremont, California (CSD), a residential school serving the deaf population in Northern California from birth through 22 years of age. There was an equal number of males and females in the sample. Twelve subjects had deaf parents; 18 subjects had hearing parents. Subjects aged 5 to 15 years were included in the study to cover the entire age span of the DAP. Subjects were selected for the study by targeting the entire student population 18 years of age or older (n = 94), and requesting consent to review previously gathered assessment data in each student's file (a copy of the student consent request form appears in Appendix A). Additional requests to use data from student files were sent to the parents of a group of younger students (n = 28) who had recently undergone a triennial evaluation (see Appendix A for parent consent request form).

Procedure

All data were available from previously conducted psychoeducational assessments, and were collected from subjects' school files. For each subject, a WISC-R Performance Scale IQ was obtained, based on deaf norms (Anderson & Sisco, 1977). For one 5-year-old subject, a WPPSI-R Performance IQ, based on hearing norms was used.

This subject was retained in the study in order to sufficiently cover the age range of the DAP. A DAP protocol was temporarily removed from the file of each subject and photocopied. IQ scores and DAP protocols were selected which occurred chronologically close together, and from the same assessment whenever possible. Photocopied protocols were scored by an Intern School Psychologist familiar with the DAP scoring system but blind to the purpose of the study and the parental hearing status of each subject.

Instruments

Wechsler Intelligence Scale for Children-Revised (WISC-R). The WISC-R is an individually administered test of intelligence that measures a range of abilities, and predicts future academic performance for children 6 to 16 years old. Well-accepted and vastly popular among psychologists, the WISC-R is divided into two separate scales, a Verbal Scale and a Performance Scale. The Performance Scale is made up of several subtests requiring the manipulation of objects and visual motor activities, and yields an overall estimate of nonverbal reasoning ability. Anderson and Sisco (1977) compiled separate norms for the deaf for the WISC-R Performance Scale based on the protocols of 1,228 deaf children nationwide. Reliability estimates are excellent, averaging .90 for the Performance Scale (Sattler, 1988; Wechsler, 1974). Research has also

demonstrated adequate concurrent and predictive validity with estimates ranging from the high .30s to the low .80s (Sattler, 1988; Wechsler, 1974). The Performance Scale has a mean score of 100, and a standard deviation of 15.

Goodenough-Harris Draw-A-Person (DAP). The DAP is a simply administered, nonverbal drawing task, in which the child's drawing of a person is scored for the presence or absence of details expected to be included at each developmental level. Harris (1963) considered the DAP to be a measure of intellectual maturity, or the ability to form abstract concepts. Hearing norms are available for children ages 5 through 15. Reliability and validity of the DAP were discussed in detail in Chapter 2. The DAP also has a mean standard score of 100, and a standard deviation of 15.

Data Analyses

To test the first two hypotheses, a Pearson product-moment correlation matrix was computed for the variables of age, gender, IQ, and DAP score. An independent t-test was conducted between the mean DAP score for all female subjects and the mean DAP score for all male subjects to test the third hypothesis. The fourth hypothesis was tested via an independent t-test between the mean IQ score for subjects of hearing parents and the mean IQ score for subjects of deaf parents. A final t-test was conducted between mean DAP scores for these two groups to

test the last hypothesis. To factor out the potential influence of IQ on DAP scores, an analysis of covariance (ANCOVA) was conducted to compare DAP scores by parental hearing status, with IQ as the covariate. The significance level adopted was .05.

Chapter 4

RESULTS

This chapter presents the results of the statistical analyses conducted to test the research hypotheses. The raw data used in these analyses appear in Appendix B. Each hypothesis is discussed separately, followed by a presentation of additional findings.

Hypothesis 1

There is a positive correlation between WISC-R Performance IQ scores and standard scores on the DAP for all deaf subjects.

As hypothesized, a significant positive correlation was found between IQ and DAP scores for all subjects, resulting in a validity coefficient of .43. Table 1 depicts the correlation matrix for variable combinations.

Hypothesis 2

There is no correlation between subjects age and standard score on the DAP.

The second hypothesis was not supported by the calculation of a Pearson product-moment correlation coefficient, which revealed a negative correlation ($r = -.41$) between subject age and DAP standard score, significant at the .05 level (see Table 1).

Table 1. Pearson correlation coefficients between age, gender, IQ, and DAP combinations

	Age	Gender	IQ	DAP
Age	-----	.011	-.121	-.411*
Gender	.011	-----	.241	.029
IQ	-.121	.241	-----	.429*
DAP	-.411*	.029	.429*	-----

* $p < .05$

Hypothesis 3

There is no difference in performance between male and female subjects.

Independent t-tests yielded no significant gender differences in IQ or DAP scores. Hypothesis 3 was supported by these results. Mean scores for male and female subjects, and the results of the gender comparisons are shown in Table 2.

Table 2. Comparison of IQ and DAP scores for male and female subjects

	Females	Males	t	2-tail p
Mean IQ	98.5	107.2	-1.31	.20
Mean DAP	91.8	93.0	-0.15	.88

Hypothesis 4

Deaf subjects of deaf parents will show higher WISC-R Performance IQ scores than deaf subjects of hearing parents.

WISC-R IQ scores for all subjects ranged from 64 to 132 with a mean score of 102.8 and a standard deviation of 18.5. Deaf subjects with deaf parents had a mean IQ score of 112.8, while the mean score for deaf subjects with hearing parents was 96.2. As hypothesized, The results of the independent t-test revealed that subjects with deaf parents had a significantly higher mean IQ score than subjects with hearing parents ($t = -2.64$, $p = .007$). The findings supported hypothesis 4. Results are shown in Table 3.

Table 3. Comparison of IQ scores for deaf subjects by parental hearing status

Parents	Mean IQ	SD	t	1-tail p
Hearing	96.2	19.4		
Deaf	112.8	11.7	-2.64	.007*

* <.01

Hypothesis 5

Deaf subjects of deaf parents will show higher DAP scores than deaf subjects of hearing parents.

Results of the t-test comparing mean DAP scores for subjects with deaf parents to mean scores for subjects with hearing parents are depicted in Table 4. DAP standard scores for all subjects ranged from 60 to 136. The entire sample had a mean DAP score of 92.4, with a standard deviation of 21. The deaf parents group had a mean DAP standard score of 96.5; the mean DAP score for the hearing parents group was 89.7. This difference of approximately seven points was not statistically significant, and therefore hypothesis 5 was not supported by these results.

An additional test of hypothesis five was conducted using an analysis of covariance (ANCOVA), in order to control for potential differences in DAP scores due to differences in IQ. The ANCOVA procedure became necessary as a result of the significant IQ differences between the two subject groups. Consistent with the results of the t-test, the ANCOVA did not yield a significant main effect for parental hearing status ($F = .035$, $p = .854$), although IQ was a significant covariate ($F = 6.1$, $p = .02$).

Table 4. Comparison of DAP scores for deaf subjects by parental hearing status

Parents	Mean DAP	SD	t	1-tail p
Hearing	89.7	22.7		
Deaf	96.5	18.2	-.87	.19

Additional Findings

Upon finding a 10-point difference between the mean WISC-R score and mean DAP standard score for all subjects, a paired t-test was conducted to determine if this difference was statistically significant. The obtained t value of 2.7 confirmed that IQ scores for all subjects were higher than DAP standard scores to a significant degree ($p = .011$). The results of this additional comparison are found in Table 5.

Table 5. Comparison of DAP scores and WISC-R Performance IQ scores for all subjects

Test	Mean Score	t	2-tail p
WISC-R PIQ	102.8		
DAP	92.4	2.70	.011*

* <.05

Summary

As hypothesized, a significant positive correlation between WISC-R Performance IQ and DAP scores was found for the entire sample. An unexpected negative correlation was significant between age and DAP standard score for all subjects. Gender differences were not found on either measure.

Subjects with deaf parents had significantly higher IQ scores than subjects with hearing parents, but no

difference was found between the deaf parent group and the hearing parent group in scores on the DAP.

Additionally, for the entire sample, the mean IQ score exceeded the mean DAP score to a statistically significant degree.

Chapter 5

SUMMARY

Conclusions

Based on the data analyses, the following conclusions are made:

1. WISC-R Performance IQ scores correlated positively, to a statistically significant degree, with DAP standard scores for a group of deaf subjects.

2. There was a significant negative correlation between subject age and standard score on the DAP for the entire deaf sample.

3. There was no difference in performance between male and female deaf subjects on either the WISC-R Performance Scale on the DAP.

4. Deaf subjects of deaf parents exhibited significantly higher WISC-R Performance IQs than deaf subjects of hearing parents.

5. There was no difference between the DAP scores of deaf subjects of deaf parents and the scores of deaf subjects of hearing parents.

6. The mean WISC-R Performance IQ score was significantly higher than the mean DAP standard score for all deaf subjects.

Implications

The finding of a significant positive correlation between WISC-R Performance IQs and DAP standard scores for a group of deaf subjects supported the use of the DAP as a measure of intellectual maturity in deaf children. The obtained validity coefficient of .43 fell within the range reported by Scott (1981) in her summary of studies correlating the DAP with major intelligence measures for hearing subjects, but somewhat below the .73 coefficient reported by Naglieri and Maxwell, in their study correlating the DAP with the WISC-R (1981).

However, several of the present study's findings point to the limitations of the DAP as an intelligence measure. Scott pointed out that although positively correlated with major intelligence tests, the DAP has a tendency to underestimate performance on these measures (1981). This tendency to underestimate scores on the criterion instrument appears due in part to the test's ceiling effect: the DAP has failed to discriminate test performance between subjects 12 to 15 years of age (Scott, 1981). The finding of a negative correlation between subject age and DAP standard score in the present study was consistent with the ceiling effect reported by Scott. While raw scores would typically increase with age, standard score conversions of raw scores should account for raw score differences and therefore remain uncorrelated

with age. The standard scores for this group of deaf subjects failed to adequately control for developmental effects. Instead, as subject age increased, DAP standard scores declined. The results of the present study supported Scott's conclusion that the DAP is not an effective measure of intellectual maturity beyond the age of 12, for deaf as well as hearing subjects.

The major factor contributing to the underestimation of criterion scores seems to be the 10-point upward bias, described by Scott, which was the result of sampling error in the construction of the 1963 norms (1981). The present research revealed a significant 10-point difference between IQ scores and DAP for all deaf subjects, reflecting the upward bias in the DAP norms and tendency to underestimate performance on an intelligence test. These results supported past researchers' conclusions that the DAP be used as an intelligence measure with caution, and only as one part of a larger test battery (Braden, 1992; Levine, 1971; Scott, 1981)

Consistent with prior research (Sisco & Anderson, 1980), deaf subjects with deaf parents (DP), in the present study, were superior to deaf subjects with hearing parents (HP) on the WISC-R Performance Scale. The mean Performance IQ for the DP group fell in the high average range and exceeded the mean IQ for the HP group, which fell in the average range, by over one standard deviation. As in Sisco

and Anderson's study, the mean WISC-R Performance IQ for the DP group fell notably above the mean score of 100 for hearing children (1980). The results of the present study seemed, at first glance, to support the conclusions made by Sisco and Anderson that differences in child-rearing experiences may explain the DP advantage.

However, the superiority of the DP group was not reflected in the DAP standard scores, despite the demonstrated relationship between IQ and DAP performance. The failure to find a significant difference was inconsistent with Zwiebel's study in which DP subjects outperformed HP subjects on the DAP (1987). It is important to note that Zwiebel's study was conducted in Israel where deaf education is strictly oral, broadening the gap between DP students, exposed to sign language through their families, and HP students, who don't typically get the benefit of additional manual communication.

One explanation for the failure to find a difference between the DP and HP groups in the present study could be that the DAP is not as sensitive a measure of conceptual maturity as the Performance IQ of the WISC-R. Additionally, the possibility that a third factor accounted for the relationship between IQ and DAP score cannot be ruled out. Overall, any explanation which attempts to explain the superiority in IQ of DP over HP subjects must

also account for the lack of difference noted between the two groups on an alternate measure of intelligence, the DAP. Further research is needed to clarify the nature of the DP advantage.

Limitations and Recommendations

One limitation of the present study was the lack of a control group of hearing children. Comparisons were made instead to published test norms, which may have been out of date. The small sample size of the present study may have failed to adequately reveal real differences which exist in the deaf population at large, such as the significant difference in DAP scores between DP and HP subjects noted by Zwiebel (1987). The use of existing, previously collected data prevented the adequate control of administration procedures for both instruments, and scoring criteria for the WISC-R. One final limitation of the present study was its failure to test the reliability of the DAP with deaf subjects.

Based on the limitations of the current study, it is recommended that future research examining the use of the DAP with deaf subjects should examine a larger sample and include a control group of hearing subjects. Instruments should be administered and scored as part of the study to insure that standardized procedures are adhered to. Multiple scorers should be used in an examination of inter-rater reliability of DAP scores for

deaf children. Future studies should address the need for updated norms, including a revision of the age range of the test. Studies examining the performance of deaf subjects on the DAP might focus on the development of separate norms for the deaf, and standardized, sign language test instructions.

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APPENDIX A

BILL HONIG
SUPERINTENDENT
OF PUBLIC INSTRUCTION

STATE OF CALIFORNIA
DEPARTMENT OF EDUCATION

CALIFORNIA SCHOOL FOR THE DEAF
39350 GALLAUDET DRIVE
FREMONT, CALIFORNIA 94538
TELEPHONE (415) 794-3666

HENRY KLOPPING
SUPERINTENDENT

March 30, 1992

Dear CSD Parent,

This letter is to request your permission to use data from your child's school file in my Master's Thesis research project.

My name is Jennifer Simmons, and I am a graduate student in the School Psychology Program at California State University, Hayward. I have been at CSD since the beginning of this school year completing internship hours under the supervision of Dr. Moxley, Assessment Services Supervisor. As an Intern School Psychologist, I have conducted cognitive assessments of CSD students as part of their routine evaluations. My work at CSD has inspired me to investigate appropriate assessment tools for the evaluation of deaf students.

A commonly used assessment tool in the evaluation of CSD students is the **Draw-A-Person** test, in which the child is asked to draw a person, and the drawing is evaluated for the presence or absence of developmentally expected details. This test was originally developed for and normed on hearing children. How applicable is this test for use with deaf children? I plan to address this question by examining a collection of **Draw-A-Person** tests previously gathered as part of triennial evaluations and currently housed in CSD student files.

My study will require merely reviewing your child's file and photocopying a **Draw-A-Person**, with the child's name removed. I plan to keep a separate log that lists for each drawing the child's age, gender, IQ, parents' hearing status, and residential/day student status. The records will be kept completely confidential with no names listed.

The project does not involve student participation and will not take up any of your child's time in class.

The results of the project will be used only to fulfill the requirements of my Master's Thesis, and will not be submitted for publication. I want to emphasize again that the identity of each child will be kept confidential throughout the project. At the completion of the study, all photocopies of drawings and other information will be destroyed in a confidential manner.

If you have any questions, or would like more information about the study, I encourage you to contact me at CSD, at (510) 794-3683 on Mondays and Fridays, 7:30 - 4:00. Please sign and return the enclosed form as soon as possible to indicate your consent for your child's records to be reviewed. An additional copy is attached for your records.

Thank you for your time and consideration,

Jennifer Simmons
Intern School Psychologist

I, _____, give my consent for

my child, _____'s file to be reviewed as part of a Master's Thesis research project conducted by Jennifer Simmons, Intern School Psychologist. I agree to let Jennifer Simmons reproduce the following pieces of information from my child's file: **Draw-A-Person** test, age, gender, IQ, parents' hearing status, and residential/day student status. I understand that my child will not participate directly in the study, and that my child's identity will remain completely confidential. Furthermore, I understand that the results of this study will be used only to fulfill the requirements of the Master's Thesis and will not be submitted for publication.

_____ _____
Signature of Parent or Legal Guardian Date

I am interested in receiving a summary of the results of the project. _____YES _____NO

BILL HONIG
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FREMONT, CALIFORNIA 94538
TELEPHONE (415) 794-3666

HENRY KLOPPING
SUPERINTENDENT

March 2, 1992

Dear CSD Student,

This letter is to request your permission to use information from your school file in my Master's Thesis research project.

My name is Jennifer Simmons, and I am a student in the School Psychology program at California State University, Hayward. I have been working at CSD since the beginning of this school year as an Intern School Psychologist. To graduate, I need to do a research project.

All students at CSD have an evaluation every three years to check on progress. You may remember being asked to draw a person during an evaluation. For my research project, I would like to study these drawings, which are kept in the school files. I need your permission to make a photocopy of one of your drawings from your school file. I will make sure your name does not show up on the copy. I will also make a list with your age, your score on an IQ test, whether you are male or female, whether you are a cottage or day student, and whether your family is deaf or hearing. I WILL NOT PUT YOUR NAME ON THE LIST. All the drawings and lists will be kept confidential and will be destroyed when the study is finished.

You will not have to participate. The study will not take up any of your class time.

Please sign below to indicate that you agree to let me review your file for my study.

Thank you,

Jennifer Simmons
Intern School Psychologist

I, _____, give my permission to have my file reviewed by Jennifer Simmons as part of her Master's Thesis research project. I understand that she will make copies of the following information: a drawing, my age, my gender, my IQ, my residential/day student status, and my parents' hearing status. I further understand that I will not participate directly and that my identity will remain completely confidential.

_____ _____

Signature of Student Date

Appendix B

RAW DATA

Subject	Gender	Age	Parents	WISC-R	DAP
1	male	13	hearing	117	71
2	female	15	hearing	121	110
3	female	11	hearing	101	84
4	male	9	deaf	118	90
5	female	5	deaf	108	98
6	male	10	deaf	105	70
7	male	14	hearing	118	89
8	male	11	hearing	100	94
9	female	6	hearing	100	124
10	female	10	hearing	72	77
11	male	12	deaf	112	121
12	female	12	hearing	64	63
13	male	11	hearing	114	90
14	female	13	hearing	82	61
15	male	7	hearing	78	136
16	female	6	deaf	126	124
17	female	10	deaf	106	105
18	male	7	hearing	71	60
19	female	12	deaf	109	78
20	male	12	hearing	93	75
21	male	14	hearing	91	70
22	male	10	hearing	132	115
23	female	11	hearing	77	79
24	female	7	deaf	117	87
25	female	11	hearing	101	111
26	female	6	deaf	91	100
27	male	9	hearing	100	105
28	male	5	deaf	130	89
29	male	6	deaf	129	120
30	female	14	deaf	102	76
		X = 10		X = 103	X = 92