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Gender Differences in Cognitive Ability of Children with Hearing Impairment on the Wechsler Intelligence Scale for Children-3rd Edition

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Gender Differences in Cognitive Ability of Children With Hearing

Impairment on the Wechsler Intelligence Scale for Children-3rd Edition

(TITLE)

BY

Damian D. Jones

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ABSTRACT

This research thesis investigates possible gender differences of deaf children on the Wechsler Intelligence Scale for Children (3rd ed.). The Illinois School for the Deaf (ISD) in Jacksonville, Illinois collated the standard scores of the five standard WISC-III Performance scale subtests and the Performance IQ of 25 students attending ISD. To examine gender differences on the Performance scale subtests and the Performance IQ's, a series of oneway-analyses of variance was calculated. No significant differences were noted on any comparison. A hypothesis that gender differences would occur was not confirmed. The results are discussed with respect to the intellectual assessment of all persons who are deaf.

CHAPTER I

Gender Differences in Cognitive Ability of Children With Hearing Impairment on the Wechsler Intelligence Scale for Children-3rd Edition (WISC-III)

Research into the nature of gender differences in mental abilities has been a concern of psychologists and educational researchers for decades. Maccoby and Jacklin (1974), provided an often-cited comprehensive review of the literature which examined empirical evidence concerning possible gender differences on various psychological characteristics. These included personality, achievement, and intelligence. They concluded there were only three consistent differences between the sexes.

Gender Differences in Verbal Ability

Consistent differences in verbal ability have been noted. Maccoby and Jacklin (1974) reported that females generally perform better than males on measures of verbal fluency. Females tend to speak more clearly, as well as read, talk, and use sentences earlier than males (Sherman, 1978). Minton and Schneider (1980) wrote that females tend to score higher on tests of verbal fluency and other tasks (cited in Aiken, 1986).

Sincoff and Sternberg (1988) found that girls demonstrated more improvement on verbal fluency tasks with age than males did. Their findings were consistent with existing literature on verbal abilities showing that around age 10 or 11 girls begin to excel on verbal tasks (Maccoby & Jacklin, 1974). Denno (1982) supported this and stated that females are superior in verbal ability. This superiority develops in the preschool years and becomes more reliable after age 10 or 11.

It has been suggested that verbal gender differences are due to cultural, not biological, causes (Nash, 1979). Hyde (1981) conducted a meta-analysis, on the studies cited by Maccoby and Jacklin (1974), and concluded that only about 1% of the variability in verbal ability is attributable to genetic differences in gender. Gender differences in verbal ability are a controversial topic. Recent literature provides reason to believe that a gender gap in verbal ability, if it exists at all, has narrowed (Holden, 1991). Hyde and Linn (1988) proposed that gender differences in verbal ability have almost disappeared over the last few decades. They reviewed 165 studies and found a slight female superiority in performance; however, this difference was extremely small. They argued that gender differences in verbal ability no longer exist. Hogrebe, Nist, and Newman (1985) investigated the relationship between reading achievement at the high school level and gender. They found gender to account for less than 1% of the variance in reading achievement as measured by the High School and Beyond (HSB) national survey conducted in 1980.

Gender Differences in Mathematical Abilities

Maccoby and Jacklin (1974) found mathematical ability to be another area in which boys and girls have differences in performance. Although gender differences in mathematical ability are not present during the preschool years, males begin to show superiority in mathematical reasoning by the end of elementary-school. Other studies have shown that gender differences in mathematical ability are not pronounced before high school, but by the end of secondary school boys have excelled in mathematical computation and problem solving (Aiken, 1986). Maccoby and Jacklin (1974) noted that gender differences begin to emerge around age 12 to 13 when boys begin to excel at a higher rate. Studies with high school students show a more differentiated gender gap in observed mathematical abilities than studies with elementary students (Rudisill & Morrison, 1989). Hyde, Fennema, and Lamon (1990) performed a meta-analysis of 100 studies and found that gender differences emerged in high school and college. These gender differences were extremely small and have declined over time. Benbow and Stanley (1980) described the superior performance of bright boys as measured by scores on a standardized test of mathematical ability. The bright boys outscored the bright girls in every study. They concluded that gender differences in mathematical ability are biological in nature. Fennema and Sherman (1977) found that when mathematical backgrounds between males and females were controlled the differences between male and female groups in mathematical achievement were very small. The differences were likely due to the influence of socio-cultural factors and not inherent ability lending credence to the notion that socio-cultural factors often are concomitants of gender-related differences in mathematics achievement. More recently Fennema (1981) suggested the view that gender differences in achievement of mathematical ability are due to gender differences is based on faulty assumptions derived from isolated studies, intuitive belief, and/or a poorly done or interpreted piece of research.

Gender Differences in Spatial Ability

Gender differences have also been noted on tasks of spatial ability (Maccoby & Jacklin, 1974). Males have a reported superiority in spatial ability. This gender difference is the most likely of all differences mentioned to have a genetic component (Fennema, 1981). Maccoby and Jacklin (1974) argued that male superiority on spatial tasks emerges in adolescence and continues though adulthood. A male advantage in spatial ability is documented on the adult level, but there is little agreement as to when this advantage emerges (Johnson & Meade, 1987). Johnson and Meade (1987) found no gender difference in spatial ability in kindergarten, and that an advantage by males in the primary school years may be masked by an early female precocity in language skills. They concluded that a male advantage emerges as early as fourth grade (age 10). Linn and Petersen (1985) conducted a meta-analysis on gender differences in spatial ability. It suggested that gender differences are large for mental rotation, medium for spatial perception, and less defined for spatial visualization. As stated, large gender differences were only found on measures of mental rotation. When these differences are located, they exist across the lifespan. An analysis conducted by Hyde (1981) found the magnitude of spatial ability gender differences to be small and account for no more than 5% of the variability.

Relevant Research

Vance (1979) found significant gender differences on the WISC-R subtests for mentally handicapped subjects. However, there is little research that has investigated gender differences in performance with deaf or hard-of-hearing people. Vonderhaar and Chambers (1975) reported gender differences in WISC and WAIS Performance subtests for deaf adolescents. Both girls and boys performed significantly above their overall mean Performance on the Object Assembly subtest. The girls showed a relative weakness on Picture Arrangement. The boys exhibited relative weaknesses on Picture Completion and Digit Symbol. Sisco (1982) found gender differences on four of the Performance subtests when deaf children were administered the WISC-R (cited in Phelps & Ensor, 1987). No significant overall difference was found on the Performance Intelligent Quotient (PIQ). However, deaf males scored significantly higher on the Block Design, Object Assembly, and Picture Completion subtests. Deaf females scored significantly higher only on the Coding subtest. No significant gender difference was found on the Picture Arrangement subtest. Phelps and Ensor (1987) administered the Performance Scale of the WISC-R to 125 hard-of-hearing subjects. The only statistically significant gender difference was found on the Coding subtest with females outperforming males by a mean scaled score difference of 1.77 points.

Ensor and Phelps (1989) examined gender differences on the WAIS-R Performance Scale that was administered to 185 hard-of-hearing young adults. The Digit Symbol subtest had the only significant mean score difference with females outperforming males. Ensor and Phelps (1989) discussed the similarity of the Digit Symbol subtest to Coding B on the WISC-R. Consistent with earlier research females outperformed the males on this subtest (Vance, 1979; Sisco, 1982; Phelps & Ensor, 1987).

General Considerations in Assessment

Braden (1992) conducted a quantitative synthesis of 285 studies that investigated intelligence with deaf and hard-of-hearing people. Data showed that practitioners preferred to use the Wechsler Performance Scales for assessing the intelligence of deaf and hard-of-hearing individuals. Braden (1992) also reviewed quantitative estimates that suggest deaf and hard-of-hearing people have an IQ distribution similar to normal hearing people. The results imply that intelligence of deaf and hard-of-hearing individuals will be normally distributed. Braden (1992) also noted that IQ's differed due to the test administration method implemented in the studies. The results indicated that signed administration methods yield higher IQ's than verbal, gestured, or written directions. This is consistent with previous research showing that total communication (sign and speech) yields the highest test scores (Sullivan & Vernon, 1979). This is of considerable importance for placement decisions. Vess and Douglas (1990) elaborated "misdiagnosis occurs when it is assumed that a hearing impairment can be ignored or by-passed through the use of nonverbal tests and/or communication through pantomime, writing, slowed speech, etc." (p.866).

Emphasis has been placed on the use of instruments that can adequately measure intelligence without discriminating against the subject's language impairment. Phelps and Ensor (1986) noted "the need for a valid assessment instrument that measures intellectual capacity of the hearing impaired population has long been recognized and researched" (p.138). The assessment devices should not depend upon verbal language to assess intelligence. Such tests are more valid at assessing the hearing impaired child's language difficulty rather than assessing mental capacity (Sullivan, 1982). Intelligence tests loaded with verbal content yield significantly lower IQ's than tests with lower verbal content (Braden, 1992). Braden (1992) suggested that verbally loaded tests should not be administered because deaf and hard-of-hearing people do not have access to verbal content. The Wechsler Intelligence Scale for Children-3rd edition (WISC-III) may prove to be valuable in this context. However, Sattler (1992) listed Picture Completion, Picture Arrangement, and Block Design as having minimal factor loadings on the Verbal Comprehension factor. Sattler wrote that verbal processing may be involved in Picture Completion and Picture Arrangement and that Block Design's high g loading may explain its correlation with Verbal Comprehension. Because these tests load on the Verbal factor there might be important implications for practitioners who assess the intelligence of deaf and hard-of-hearing people using the WISC-III Performance Scale. It has already been stated that this population is insufficiently prepared to be tested with verbal tasks.

In the assessment of deaf and hard-of-hearing students there are numerous basic considerations and "Best Practices" to take into account. This is important because deaf and hard-of-hearing children may not understand key words or directions and respond incorrectly even when they are intellectually capable of giving the correct response (Vess & Douglas, 1990). Vess and Douglas expanded that difficulty in communicating instructions can result in misunderstanding of the task demand. A practitioner may incorrectly assume that a deaf or hard-of-hearing student understands the task demand because these students can mask their confusion with pleasant looks and knowing smiles (Vess & Gregory, 1985). Therefore, a practitioner should ascertain that the student understands task demands before continuing assessment. This can be accomplished when the examiner is establishing rapport.

School psychologists need to be aware of gender differences for the valid assessment of the hearing impaired. The possibility of gender differences in spatial ability is important for school psychologists developing Individual Educational Programs (IEP's) for hearing impaired students that match the child's abilities (Phelps & Ensor, 1987). Possible gender differences in spatial ability are important in the assessment of deaf and hard-of-hearing individuals (Phelps & Ensor, 1987). Most assessment devices for hard-of-hearing people include tasks that measure spatial ability. The Wechsler Intelligence Scale for Children-Revised (WISC-R) Performance Scale (Wechsler, 1974) and the Hiskey-Nebraska Test of Learning Aptitude (H-NTLA) (Hiskey, 1966) are two of the most commonly used instruments to assess deaf and hard-of-hearing people. These two instruments rely heavily on spatial problem solving tasks and gender differences demonstrated in this context could lead to a confoundment of test scores (Phelps & Ensor, 1987). Phelps and Ensor (1987) noted that the WISC-R Performance Scale relies on spatial problem solving tasks and that the resulting subtest scores and

Performance Intelligence Quotient (PIQ) may reflect gender bias rather than differences in mental abilities.

The possible identification of gender differences on the WISC-III Performance Scale and its subtests is of considerable value. This study was designed to examine the performance of hearing impaired boys and girls on the WISC-III (the latest edition of the Wechsler Intelligence test for children). Stinnett, Havey, and Oehler-Stinnett (1994) conducted a comprehensive study of the preferred psychological evaluation tests used by school psychologists in the United States. The results indicated that the WISC-III is perceived by these subjects as able to yield more important information than the previous WISC-R. It is administered often and appears that it will replace the WISC-R as intelligence instrument of choice. This study is important for the further evaluation of the validity of the WISC-III with deaf children. The passage of Public Law 99-371 (Education for the Deaf Act) increased the need for research concerning the cognitive skills of deaf and hard-of-hearing individuals (Ensor & Phelps, 1989).

CHAPTER II

Method

Participants

Fifteen male (*M* age= 13.07, SD= 2.49) and 10 female (*M* age= 12.70, SD= 1.42) deaf or hearing impaired children who were diagnosed by a Multidisciplinary evaluation according to state and federal guidelines for special education eligibility participated. The students were enrolled at the Illinois School for the Deaf in Jacksonville, Illinois.

Procedure

Archival data were used for the study. Students at Illinois School for the Deaf (ISD) were administered the WISC-III as part of their normal psychological battery. This information was collated by ISD staff. All students had been administered the WISC-III Performance Scale. The Performance Scale was the only scale of interest. All core subtests had been administered to the students. All students were tested within a one year time frame.

Instrumentation

The Performance scale consists of five primary subtests (Picture Completion, Picture Arrangement, Block Design, Object Assembly) and two optional subtests (Mazes, Symbol Search). The WISC-III is an individually administered standardized test of intellectual ability for children aged 6 years through 16 years, 11 months. Essentially it has the same features as its predecessor the WISC-R. However, the WISC-III has updated normative data, test content, administrative procedures, and more aesthetic test materials. As with the WISC-R, the WISC-III dichotomizes intelligence into Verbal and Performance (nonverbal) domains. The test yields a Verbal Intelligence Quotient (VIQ), a Performance IQ (PIQ), and a Full Scale IQ (FSIQ). Verbal subtests are language oriented and require verbal comprehension and the application of verbal skills. Performance subtests involve nonverbal visual-perceptual-motor skills and are timed tasks. In addition, four factor based scores can be calculated: Verbal Comprehension (VCI), Perceptual Organization (POI), Freedom from Distractibility (FDI), and Processing Speed (PSI) (Wechsler, 1991). Validity of these factors is less sound than the factor structure of the WISC-R. Freedom from Distractibility should not be interpreted and Processing Speed should only be interpreted cautiously

(Little, 1992).

Little (1992) reviewed the excellent reliability and standardization of the WISC-III. The VIQ, PIQ, and FSIQ reliability coefficients are in the .90s and factor index scores are .85 or above. Individual subtest reliabilities range from .69 to .87 and are acceptable. Test-retest coefficients are stable for the FSIQ and VIQ, but less stable for the PIQ (Sattler, 1992). Validity information shows strong correlations between the WISC-R and WISC-III. The correlations of the WISC-III and WISC-R are .89 for FSIQ, .90 for VIQ, and .89 for PIQ (Little, 1992). As is expected with updated norms, the WISC-III yields lower scores than the WISC-R. Full Scale IQ mean scores are approximately five points lower, VIQ mean scores are approximately two points lower, and PIQ scores fall approximately seven points lower than corresponding WISC-R scores. Approximately 27% of the items on the WISC-III were not included on the WISC-R.

CHAPTER III

Results

Means and standard deviations were calculated by gender for all Performance scale subtests and the Performance IQ. Table 1 presents these data.

Table 1

Means and Standard Deviations for PIQ, Picture Completion, Coding, Picture Arrangement, Block Design, and Object Assembly

SEX		PIQ	PC	CD	PA	BD	OA
Boys (n=15)	M	97.67	10.47	7.86	9.53	9.47	10.07
	SD	17.78	3.04	3.11	4.29	4.09	3.17
Girls (n=10)	M	94.80	10.50	8.60	10.20	8.70	7.60
	SD	15.96	3.17	1.84	4.37	3.62	3.86
Total (n=25)	M	96.52	10.48	8.17	9.80	9.16	9.08
	SD	16.79	3.03	2.63	4.24	3.85	3.60

To examine gender differences on the Performance scale subtests and the Performance IQ's in this sample a series of oneway-analyses of variance was calculated. There were no significant gender differences on the Performance IQ ($F(1,23)=.17$, $p>.05$). Table 2 presents the ANOVA summary for the Performance IQ.

Table 2

ANOVA Summary Table for PIQ by Gender

Source	SS	df	MS	F	P
Between Groups	49.3067	1	49.3067	.1688	.6850
Within Groups	6716.9333	23	292.0406		
Total	6766.2400	24			

note: PIQ= Performance IQ

One-way ANOVAS were also calculated to examine the effects on each of the Performance subtests. Tables 3 through 7 present these data.

Table 3

ANOVA Summary Table for PC by Gender

Source	SS	df	MS	F	P
Between Groups	.0067	1	0067	.0007	.9792
Within Groups	220.2333	23	9.5754		
Total	220.2400	24			

note: PC= Block Design subtest

Table 4

ANOVA Summary Table for CD by Gender

Source	SS	df	MS	F	P
Between Groups	3.2190	1	3.2190	.4536	.5076
Within Groups	156.1143	22	7.0961		
Total	159.3333	23			

note: CD= Coding subtest

Table 5

ANOVA Summary Table for PA by Gender

Source	SS	df	MS	F	P
Between Groups	2.6667	1	2.6667	.1429	.7078
Within Groups	429.3333	23	18.6667		
Total	432.0000	24			

note: PA= Picture Arrangement subtest

Table 6

ANOVA Summary Table for BD by Gender

Source	SS	df	MS	F	P
Between Groups	3.5267	1	3.5267	.2305	.6357
Within Groups	351.8333	23	15.2971		
Total	355.3600	24			

note: BD= Block Design subtest

Table 7

ANOVA Summary Table for OA by Gender

Source	SS	df	MS	F	P
Between Groups	36.5067	1	36.5067	3.0496	.0941
Within Groups	275.3333	23	11.9710		
Total	311.8400	24			

note: OA= Object Assembly subtest

No significant differences were noted on any comparison. No significant gender differences were found on the Picture Completion subtest ($F(1,23)=.0007$, $p>.05$). There were no significant gender differences on the Coding subtest ($F(1,22)=.45$, $p>.05$). No significant gender differences were obtained on the Picture Arrangement subtest ($F(1,23)=.14$, $p>.05$). There were no significant gender differences on the Block Design subtest ($F(1,23)=.23$, $p>.05$). No significant gender differences were found on the Object Assembly subtest ($F(1,23)=3.05$, $p>.05$). This comparison approached significance.

Discussion

As seen in Table I, males scored higher than females on two of the five Performance subtests (Block Design and Object Assembly) and on the PIQ; however, no group differences were significant. That is, gender differences were not obtained on any variable. This is in contrast to prior research showing gender differences with deaf or hard-of-hearing individuals (Ensor & Phelps, 1989; Phelps & Ensor, 1987; Vonderhaar & Chambers, 1975). Gender differences have been inconsistent on the Wechsler intelligence tests. Past research has shown gender differences on all Performance scale subtests; however, the most consistent finding is females outperforming males on the Coding subtest (Vance, 1979; Sisco, 1982; Phelps & Ensor, 1987; Ensor & Phelps, 1989). Females did score higher on the Coding subtest; however, this comparison was not significant. It is important to note that no typical deaf profile exists. Deaf children have an IQ distribution similar to normal hearing children (Braden, 1992). Practitioners should evaluate deaf students on an individual basis for determining strengths or weaknesses.

The Object Assembly subtest comparison approached significance. Sattler (1992) wrote that Block Design and Object Assembly have the highest loadings on the Perceptual Organization factor. The variance in performance on the Object Assembly subtest can be accounted for by factor variance and not subtest specificity. The Perceptual Organization factor on the WISC-III describes a hypothesized ability that includes tests that rely heavily on spatially oriented tasks. Previous research has alluded that boys tend to score stronger on spatial tests (Johnson & Meade, 1987; Linn & Petersen, 1985). This research does not support the hypothesized male superiority on spatial tasks. As stated, no significant difference was found between the genders on the PIQ. While the superior performance of males on visual-spatial tasks has been well documented, the nature of the WISC-III Performance subtest items did not result in significant score differences between the genders.

The total sample mean PIQ of 96.52 was considerably lower than the mean PIQ of the 30 deaf adolescents who were part of the WISC-III standardization sample. Wechsler (1991) reported the mean PIQ of the 30 deaf adolescents at 105.83. Although the present study's sample size is small (n=25), the Wechsler normative group only consisted of 30 students. The difference between obtained PIQ's may be due to the students comprising the samples. The present study used archival data of student's attending Illinois School for the Deaf in Jacksonville, Illinois. The sample is not representative of the entire United States. Another factor may be comorbidity of other handicaps (ie. mental retardation, vision difficulties, and physical handicaps) in the current sample. The present sample may be more "disabled" than students in a less restrictive setting.

Research into gender differences yields ambiguous results. Significant gender differences are not uniform across studies and may be effected by the sampling strategy employed in obtaining subjects. Further research into gender differences should attempt to control selection of subjects employed in these studies. The studies should provide more detailed descriptions of the sample.

Variance in obtained PIQ's of deaf children has implications for school psychologists in developing Individual Educational Program's (IEP's) that match the child's ability. The Wechsler PIQ's also have important clinical value because they help rule out mental retardation as a cause of the social, academic, and/or linguistic delays found with deaf children.

The current research suggests that the WISC-III PIQ is not gender biased. School psychologists should utilize the measure without fear of gender bias in developing Individualized Education Programs. This finding is in concordance with past gender difference research (Vance, 1979; Phelps & Ensor, 1987; Ensor & Phelps, 1989).

References

Aiken, L. (1986). Sex differences in mathematical ability: A review of the literature. Educational Research Quarterly, 10(4), 25-35.

Benbow, C.P., & Stanley, J.C. (1980). Sex differences in mathematics ability: Fact or artifact? Science, 210, 1262-1264.

Braden, J.P. (1992). Intellectual assessment of deaf and hard-of-hearing people: A quantitative and qualitative research synthesis. School Psychology Review, 21(1), 82-94.

Denno, D. (1982). Sex differences in cognition: A review and critique of the longitudal evidence. Adolescence, 17(68), 779-788.

Ensor, A., & Phelps, L. (1989). Gender differences on the WAIS-R Performance Scale with young deaf adults. Journal of the American Deafness and Rehabilitation Association, 22(3), 48-52.

Fennema, E. (1981). Women in mathematics: Does research matter? Journal for Research in Mathematics Education, 12, 380-385.

Fennema, E., & Sherman, J. (1977). Sex-related differences in mathematical achievement, spatial visualization and affective factors. American

Educational Research Journal, 14, 51-71.

Hiskey, M.S. (1966). The Hiskey-Nebraska Test of Learning Aptitude manual (revised). Lincoln, NE: 5640 Baldwin.

Hogrebe, M.C., Nist, S.L., & Newman, I. (1985). Are there gender differences in reading achievement? An investigation using the High School and Beyond data. Journal of Educational Psychology, 77(6), 716-724.

Holden, C. (1991). Is "gender gap" narrowing? Science, 253, 959-960.

Hyde, J.S. (1981). How large are cognitive gender differences? American Psychologist, 36, 892-901.

Hyde, J.S., & Linn, M.C. (1988). Gender differences in verbal ability: A meta-analysis. Psychological Bulletin, 104(1), 53-69.

Hyde, J.S., Fennema, E., & Lamon, S.J. (1990). Gender differences in mathematical performance: A meta-analysis. Psychological Bulletin, 107(2), 139-155.

Johnson, E.S., & Meade, A.C. (1987). Developmental patterns of spatial ability: An early sex difference. Child Development, 58, 725-740.

Linn, M.C., & Petersen, A.C. (1985). Emergence and characterization of sex differences in spatial ability: A meta-analysis. Child Development, 56, 1479-1498.

Little, S.G. (1992). The WISC-III: Everything old is new again. School Psychology Quarterly, 7(2), 136-142.

Maccoby, E., & Jacklin, C. (1974). The psychology of sex differences. Stanford, CA: Stanford University Press.

Nash, S.C. (1979). Sex roles as a mediator of intellectual functioning. In M. Wittig & A. Petersen (Eds.), Sex-related differences in cognitive functioning. New York: Academic Press.

Phelps, L., & Ensor, A. (1986). Concurrent validity of the WISC-R using deaf norms and the Hiskey-Nebraska. Psychology in the Schools, 23, 138-141.

Phelps, L., & Ensor, A. (1987). The comparison of performance by sex of deaf children on the WISC-R. Psychology in the Schools, 24, 209-214.

Rudisill, E.M., & Morrison, L.J. (1989). Sex differences in mathematical achievement: An emerging case for psychological factors. School Science and Mathematics, 89(7), 571-577.

Sattler, J.M. (1992). Assessment of children: WISC III and WPPSI-R supplement. San Diego, CA: Sattler.

Sherman, J. (1978). Sex-related cognitive differences. Springfield, IL: Thomas.

Sincoff, J.B., & Sternberg, R.J. (1988). Development in verbal fluency abilities and strategies in elementary-school-age children. Developmental Psychology, 24(5), 646-653.

Stinnett, T.A., Havey, J.M., & Oehler-Stinnett, J. (1994). Current test usage by practicing school psychologists: A national survey. Journal of Psychoeducational Assessment, 12, 331-350.

Sullivan, P.M. (1982). Administration modifications on the WISC-R Performance scale with different categories of deaf children. American Annals of the Deaf, 127, 780-788.

Sullivan, P.M., & Vernon, M. (1979). Psychological assessment of hearing impaired children. School Psychology Digest, 8(3), 271-290.

Vance, H. (1979). Sex differences on the WISC-R for retarded children and youth. Psychology in the Schools, 16, 27-30.

Vess, S.M., & Douglas, L.S. (1990). Best practices in working with students with a hearing loss, in A. Thomas & J. Grimes (Eds.), Best practices in school psychology, Washington D.C.: National Association of School Psychologists.

Vess, S.M., & Gregory, L.S. (1985). Best practices in the assessment of hearing impaired children, in A. Thomas and J. Grimes (Eds.), <u>Best practices in school psychology</u>, Kent, OH: National Association of School Psychology.

Vonderhaar, W.F., & Chambers, J.F. (1975). An examination of deaf students' Wechsler Performance subtest scores. <u>American Annals of the Deaf</u>, <u>120</u>, 540-544.

Wechsler, D. (1974). <u>Wechsler Intelligence Scale for Children-Revised.</u> New York: Psychological Corporation.

Wechsler, D. (1991). <u>Wechsler Intelligence Scale for Children (3rd ed.).</u> San Antonio: Psychological Corporation.