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DIFFERENTIAL EFFECTS OF SEX, AGE, AND ABILITY ON WISC PROFILES OF BLIND CHILDREN.

BY- TILLMAN, M.H.
GEORGIA UNIV., ATHENS

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DESCRIPTORS- *VISUALLY HANDICAPPED, *TESTS, *EXCEPTIONAL CHILD RESEARCH, BLIND, INTELLIGENCE DIFFERENCES, INTELLIGENCE TESTS, BLIND CHILDREN, CHILDREN, EDUCATIONAL RESEARCH, INTELLIGENCE FACTORS, WECHSLER INTELLIGENCE SCALE FOR CHILDREN, WISC,

USING A CROSS-SECTIONAL SAMPLING PLAN, THE STABILITY OF WECHSLER INTELLIGENCE SCALE FOR CHILDREN (WISC) PROFILES, MEAN SCALE SCORES ON THE FOLLOWING SUBTESTS--INFORMATION, COMPREHENSION, ARITHMETIC, SIMILARITIES, VOCABULARY, AND DIGIT SPAN WAS EXAMINED AS A FUNCTION OF SEX, AGE, AND ABILITY LEVEL. FROM 167 WISC FORMS (OF BLIND BOYS AND GIRLS AGED EIGHT TO 12) 80 FORMS WERE USED FOR SEX AND AGE ANALYSIS. A SECOND GROUP OF 39 FORMS DRAWN FROM THE SAME POOL WERE USED FOR THE ABILITY ANALYSIS. SEX AND AGE EFFECTS WERE ANALYZED IN A THREE-FACTOR DESIGN WITH REPEATED MEASURES ON SUBTESTS, AND ABILITY EFFECTS WERE ANALYZED IN A TWO-FACTOR DESIGN WITH REPEATED MEASURES ON SUBTESTS. RESULTS SHOWED MAIN EFFECTS OF SEX AND AGE WERE NOT SIGNIFICANT. THE MAIN EFFECT OF SUBTESTS WAS SIGNIFICANT (.001 LEVEL). THESE INTERACTIONS WERE NOT SIGNIFICANT--SEX AND AGE, SEX AND SUBTESTS, AGE AND SUBTESTS, SEX AND AGE AND SUBTESTS. THIS RESULT ATTESTS TO THE ACCURACY OF GROUPING PROCEDURES. THE SECOND ANALYSIS SHOWED THAT MAIN EFFECTS AND INTERACTION EFFECTS WERE SIGNIFICANT--ABILITY GROUPS (.001 LEVEL), SUBTESTS (.001 LEVEL), ABILITY GROUP AND SUBTESTS (.05 LEVEL). THIS SIGNIFICANT MAIN EFFECT WAS PLANNED, SINCE GROUPS WERE FORMED BY LOW, AVERAGE, AND HIGH IQ. SEX AND AGE DIFFERENCES DID NOT PRODUCE PROFILE DIFFERENCES WHILE GROUPING BY LOW, AVERAGE, AND HIGH IQ DID YIELD DIFFERENT PROFILES. A LIST OF FIVE REFERENCES IS INCLUDED. (AA)

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# Differential Effects of Sex, Age, and Ability on WISC Profiles of Blind Children

M. H. Tillman

University of Georgia

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Change in mental growth is one aspect of cognitive development in blind children that has received special attention. Several investigators (Hayes, 1950; Hallenbeck, 1956) have, for example, pointed out that blind children of low measured intelligence often show marked improvement in intelligence scores with increased time in school. Moreover, with increased time in school, significant gains in IQs of blind children have been reported by Komisar and MacDonnell (1955) and Hopkins and McGuire (1967). Explanations of change may be derived from either of several of the following reasons: error of measurement due mainly to norming differences at various age levels, error of measurement involved in using different tests, the blossoming out effect mentioned by Hayes, and the slight increase in intelligence which some believe to accompany maturation.

The present study was undertaken to provide further comment upon the regularities or irregularities in the intellectual development of blind children. Using a cross-sectional sampling plan, the stability of WISC profiles, mean scaled scores on subtests Information, Comprehension, Arithmetic, Similarities, Vocabulary, and Digit Span, was examined as a function of sex, age, and ability level. A statistical analysis of subtest interaction with each of the independent variables, sex, age, and ability was therefore planned.

## Subjects and Procedure

One hundred and sixty-seven WISC forms were collected in five Southeastern residential schools: Alabama, Georgia, Florida, South Carolina, and North Carolina[1]. From these a sample of 80 forms were drawn, eight boys and eight girls at each age level from eight through twelve, such that males and females within age levels and groups across age levels did not differ in mean IQ. All means were within one and one-half points of 93; differences between means were not significant. This sample group was used for the sex and age analysis.

A second group, consisting of 39 forms drawn from the same pool, formed three ability levels: those with IQs above 120, between 90-110 and below 80. A total of 39 forms were selected with 13 at each ability level. Average age for each group was 10 with mean IQs 127.02, 94.92, and 70.15, respectively.

Subjects included for use in the present study were Braille readers. Those who could use large print or large print in addition to Braille were excluded. The age of onset of blindness ranged from birth to age one for approximately 95 per cent of the children with the remainder having onset before age three. Length of institutionalization and IQ were correlated for each sample in order to test the possibility of a sampling bias due to retention of duller children. The correlations, -.10 and .19, were not significant.

Sex and age effects were analyzed in a three-factor design with repeated measures on subtests; ability effects were analyzed in a two-factor design with repeated measures on subtests. A recent application of the repeated measure analysis on subtests may be

found in an article by Sefer and Henrikson (1966) who used an eight part word association test on aphasic and normal subjects.

## Results

In the first analysis, main effects of sex and age were not significant. The main effect of subtests was significant: $F(5,350) = 16.76$, $p<.001$. Interactions, sex x age, sex x subtests, age x subtests, and sex x age x subtests, were not significant. The fact that main effects of sex and age were not significant simply attests to the accuracy of the grouping procedures, that is, it was planned to have sex within age levels and groups across age equal on mean IQ. The significant main effect of subtests indicates that, as have previous analyses, blind children score significantly higher on some of the WISC subtests than others. From high mean to low mean, the subtests rank in the following order: Digit Span, Information, Arithmetic, Vocabulary, Comprehension, and Similarities. More to the point, it is clear from the interaction results that boys and girls have similar WISC profiles and furthermore, that these profiles are indeed stable across the five age levels from 8 through 12.

In the second analysis, main effects and interaction effects were significant: ability groups, $F(2,36) = 205.52$, $p<.001$; subtests, $F(5,180) = 15.96$, $p<.001$; and ability group x subtests, $F(10,180) = 2.4$, $p<.05$. The significant main effect of groups was, again, planned since the groups were selected deliberately on the basis of low, average, and high IQ.

A plot of the WISC profile across the three groups revealed that the high and average ability groups have similar profiles but that the

low ability profile differed in two ways: Digit Span, which exceeded Similarities and Comprehension in the high ability profile, exceeded five subtests in the low ability profile, that is, Digit Span assumed more relative weight in determining the IQ of the low group. Second, the opposite trend occurred with the Arithmetic subtest: in the high group, Arithmetic exceeded Similarities and Comprehension while, in the low group, Arithmetic had the lowest mean which was exceeded by Digit Span and Information. Consequently, the abilit x subtest interaction effect may be accounted for by the relatively high weight of Digit Span and the low weight of Arithmetic in the low ability group. In short, while sex and age differences did not produce profile differences, grouping by low, average, and high IQ did yield different profiles. WISC subtest performance of blind children is not, then, a game of musical chairs: subtests high or low at one level maintain relative position at other levels across sex and age. Changes in the profiles were found to be associated with different ability levels.

## References


Hallenbeck, Jane. Pseudo-retardation in retrolental fibrophasia. New Outlook for the Blind, 1954, 48, 301-307.

Hayes, S. P. Measuring the intelligence of the blind. In P. A. Zahl (Ed.) Blindness: modern approaches to the unseen environment. Princeton University Press, 1950, 141-173.

Hopkins, K. D. and McGuire, Lenore. IQ constancy and the blind child. The International Journal for the Education of the Blind, 1967, 16, 113-114.

Komisar, D. and MacDonnell, Marian. Gains in IQ for student attending a school for the blind. Exceptional Children, 1955, 21, 127-129.

Sefer, Joyce W. and Henrikson, E. H. The relationship between word association and grammatical classes in aphasia. Journal of Speech and Hearing Research, 1966, 9, 529-541.

## Footnotes

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