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Fifty years of Research on the Intelligence of Deaf and Hard-of-Hearing Children: A Review of Literature and Discussion of Implications

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FIFTY YEARS OF RESEARCH ON THE INTELLIGENCE OF DEAF AND HARD-OF-HEARING CHILDREN: A REVIEW OF LITERATURE AND DISCUSSION OF IMPLICATIONS

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There have been approximately 50 comparative studies of the intelligence of those who are deaf or hard-of-hearing published since the advent of intelligence testing in the early 1900's. This kind of intensive research effort is in large part recognition of the especially crucial role intelligence assumes in the lives of those who have severe hearing impairment. The data is also important because of the unfortunate but rather common misconception of many laypersons that deafness is associated with a lack of intelligence.

It is the purpose of this paper to present succinctly the major findings of 50 years of research, some general considerations in critically reviewing the studies, and the current implications of the research. In doing this, the investigations prior to 1930 are presented in narrative form, then a tabular summary of studies carried out from 1930 to 1967 is presented, followed by the review and implications sections.

Research Prior to 1930

Pintner & Patterson (1915, 1916, and 1917) were the first to administer intelligence tests to deaf children. They found that on the verbal IQ measures which they were using, the deaf as a group were scoring in the mentally retarded range (Pintner & Patterson, 1915). Realizing that what they were measuring was not intelligence but the language deprivation concomitant with deafness (Pintner & Patterson, 1921), they developed the Pintner Non –language Test (Pintner & Patterson, 1924) in order to be able to measure intelligence independent of the language variable. Although this instrument yielded findings which indicated deaf youths to be nearer in intelligence to the normal population than had the verbal tests, Pintner & Patterson's results (1924) still yielded means on samples of deaf children which were significantly below those obtained on normal hearing children.

During this same period, Reamer (1921) tested 2,500 deaf children using a battery of six nonlanguage tests, including the Pintner Drawing Completion Test

and an imitation test based on the Knox Cubes. Results indicated a mental age retardation of about two years of the deaf sample. Later, Day, Fusfeld, & Pintner (1928) in a survey of 4,432 pupils ranging in age from 12 to 21 plus came to the same conclusion.

The first investigation to contradict the finding of below-average intelligence among the deaf was that of Drever & Collins (1928). They published results of their performance test administered to 200 deaf and 200 hearing children, from which they concluded that when language was not a factor, deaf and hearing children were approximately equal in mental ability.

These pre-1930 studies were pioneering efforts in a new field. From them was learned the inappropriateness of verbal tests for measuring the intelligence of deaf children. These investigations also gave indications of what has later been found to be the error of attempting to do group intelligence testing with deaf subjects.

In view of later findings using improved psychological measures and techniques, the validity of the Day, Fusfeld, Pintner, and Reamer conclusions of mental age retardation ranging from two to five years among the deaf is no longer tenable. A contributing factor, aside from errors of test selection and administration, that would account for some of the retardation reported by these early studies could have been the practice (common in the early 1900's) of placing non-deaf mentally retarded children in schools for the deaf.

Research Since 1930

From 1930 until today many investigators have measured the intelligence of samples of deaf and hard-of-hearing children. These findings have been compared to those obtained on matched groups of normal hearing children, to test norms, and to subgroupings among the hearing impaired.

The 37 studies done during this period are presented in Table 1. The reference for each of these investigations is given along with data on the samples, tests used, and salient findings and/or conclusions.

General Considerations in Reviewing the Investigations

In the interest of brevity, no effort will be made to review each of these studies individually. Instead, certain problems common to groups of them will be enumerated. Also, basic principles involved in testing deaf and hard-of-hearing children which should be considered in evaluating the findings will be discussed.

A number of the studies used group testing techniques. As indicated earlier, this was found to be an inappropriate procedure. The communication problems of profound hearing loss, the attentive set of deaf children toward psychological examination, and other aspects of test administration rule out group intelligence testing if results are to have validity (Bridgman, 1939; Hiskey, 1955; Lane & Schneider, 1941; Levine, 1960, p. 221; Vernon and Brown, 1964). Most frequently, post-1930 efforts at group testing have involved the Goodenough Draw-A-Man Test and the Chicago Non-Verbal Examination. The latter has subtests which are difficult to administer individually to deaf children and almost impossible to give effectively in groups. The Goodenough, especially when given to groups, often requires that the examiner draw sample figures in order to convey directions. In addition, children in groups generally observe the work of one another, incorporating the ideas they gain into their own drawings. These administrative problems cast what might be euphemistically termed "a dubious light" on the validity of the results.

Another point to be considered is that almost all of the investigations involved only samples of deaf children who were in school programs for the hearing impaired. This approach involves incomplete sampling and leaves unanswered the question of the intelligence of deaf children not in these schools. Some may have been in hospitals for the retarded. Others may have been rejected by schools as retarded and been kept at home. Some were undoubtedly in programs for the normally hearing.

Finally, in evaluating the studies, it should be noted that the work done by investigators who were experienced in the psychological testing of deaf children at the time they did their work (see notations on Table 1) yielded results showing the deaf and the hearing more nearly equal in intelligence. As the experience of the examiner has strong direct bearing on the validity of test results, these studies must be given special emphasis in any consideration of the relative intelligence of deaf and hearing children on IQ measures.

INVESTIGATIONS OF THE INTELLIGENCE OF THE DEAF AND HARD OF HEARING: 1930 TO 1967

Reference	Sample and Age (Yr.)	Measuring Device or Test	Results
Peterson, E.G. and Williams, J.M. (1930)	466 deaf, 4-9	Goodenough	Average retardation: 1 10/12 yrs.
MacPherson, June and Lane, Helen S. (1932)[1]	61 deaf children	Hiskey, Randall's Island Series	Mean Iqs: 116.62 and 113.87, respectively
Meyer, M.F. (1932)	132 deaf, 5-20	Lectometer	Deaf scored slightly lower
Shirley, Mary, and Goodenough, Florence (1932)	406 deaf, 6-14	Goodenough, Pintner Nonlanguage	Medians 87.7 and 98.4, respectively

Lane, Helen S. (1933)	43 deaf preschoolers	Randall's Performance Grace Arthur, Pintner-Patterson, Drever-Collins, Pintner Nonlanguage	Medians 96 (in 1931); 97 (in 1932) Retardation: 1 yr. Or less; Pintner: less than 2 yrs.
MacKane, K. (1933)[1]	Deaf children	Not clear	Not clear
Lane, Helen S. (1934)[1]	43 deaf children	Randall's Performance	Median: 96 (in 1931); 97 (in 1932)
Lyon, V.W. (1934)	Deaf children	Grace Arthur, Pintner Nonlanguage	Medians 92 and 84, respectively
Bishop, Helen M. (1936)	90 deaf and hard of hearing	Grace Arthur	Normal distribution
Peterson, E.G. (1936)	100 deaf, 5 7/12-17	Kohs Block Design	Mean IQ: 92.5; range: 54-156; scores clustered around 80 and 100 with 17% at each
Scyster, Margaret (1936)	50 preschoolers	Minnesota Preschool, Merrill-Palmer, Pintner-Patterson	Deaf showed no retardation
Lane, Helen S. (1937 and 1938)[1]	250 deaf, 5-19	Lectometer, Randall's Performance	Equal ability; median 97.6
Lane, Helen S. (1938)[1]	50 deaf preschoolers	Drever-Collins	Deaf mean: 105-122; depending on scoring method
Springer, N. N. (1938)	330 deaf, 6-12	Goodenough	Deaf scored appreciably lower, with congenitally below adventitiously deaf
Streng, Alice, and Kirk, S.A. (1938)[1]	97 deaf children (4^{th} and 5^{th} graders) 1,404 hard of hearing 1,556 normal	Grace Arthur, Chicago Non-Verbal Pintner IQ Test Pintner IQ Test	Same results as normals; age at onset not a factor. Mean: 94.7 Mean: 101.6
Pintner, R., and Lev., J. (1939)	315 hard of hearing	Pintner Nonlanguage	No significant difference compared to normals
Zeckel, A., and Kalb, J. J. (1939)	100 deaf children	Porteous Maze	"Backward" IQ
Burchard, E. M., and Myklebust, H. R. (1942)[1]	189 deaf children	Grace Arthur	Deaf IQ is average; no significant difference between congenitally and adventitiously deaf
Johnson, Elizabeth H. (1947)	57 deaf children	Chicago Non-Verbal	Six groups with mean Iqs of 73, 69, 69, 78, 85 and 99, respectively, from pregrade 2 to grade 3
Kirk, S. A. and Perry, June (1948)	49 deaf and hard of hearing children	Ontario, Nebraska	No conclusion re: relative intelligence
Myklebust, H. R. (1948)[1]	Deaf children	WISC Performance	Mean IQ: 101.8
Glowatsky, E. (1953)	24 deaf and hard of hearing, 7.5-15.7	Goodenough	Mean IQ: 98.46
Graam, E. E., and Shapiro, Esther (1953)	20 deaf children	WISC Performance	Mean IQ: 96.1
Ross, Grace (1953)	61 deaf, 3-10	Ontario, Hiskey, Vineland	Mean IQs: 104.6, 104.8, and 94.7, respectively
Du Toit, J. M. (1954)	289 deaf children from different schools and 180 from same school	Du Toit's Nonlanguage Group Test	Mean IQ of 'different school' group: 98.53; mean IQ of 'same school' group: 99.96

Lavos, G. (1954)	90 deaf and hard of hearing children	Pittner General Tests, Chicago Non-Verbal, Revised Beta Examination	Correlation coefficients between tests ranged from 0.58-0.69; statistically significant
Frisina, D. R. (1955)[1]	3 midwestern schools for the deaf	Grace Arthur	9.2-12% below 79 in IQ
Hiskey, M. S. (1956)	380 normal children 466 deaf, 4-10	Hiskey	Mean IQs: normal hearers, 101; deaf, in mid-90s
Goetzinger, C. P., and Rousey, C. L. (1957)[1]	101 deaf, 14-21	WISC Performance	Mean IQ: 101.9
Vernon, M. (1957)	97 deaf children	Goodenough	Mean IQ: 90
Larr, A. L., and Cain, E. R. (1959)	248 deaf children 63 deaf children 77 deaf children	WISC Ontario Grace Arthur	Mean IQ: 97.8; range: 61-138 Mean IQ: 98.1; range: 52-129 Mean IQ: 101.1; range: 61-147
Brill, R. G. (1962)[1]	312 deaf, 5-16	WISC Performance	Mean IQ: 104.9
Mira, Mary P. (1962)	60 deaf preschoolers, mean age 4.77	Leiter, Hiskey	Mean IQs: 96.32 and 108.86, respectively
Anderson, R. M, Stevens, G. D., and Stuckless, E. R. (1966)[1]	1,600 deaf children from six residential schools	Performance Scales	19% below 83 IQ
Vernon, M. (1966)[1]	66 deaf children	Performance Scales	Genetic deaf mean IQ: 114
Vernon, M. (1966)[1]	39 deaf children	Performance Scales	Rh deaf mean IQ: 94
Vernon, M. (1967)[1]	92 deaf children	Performance Scales	Postmeningintic deaf mean IQ: 96
Vernon, M. (1967)[1]	115 deaf children	Performance Scales	Premature deaf mean IQ: 89
Vernon, M. (1967)[1]	98 deaf children	Performance Scales	Postmaternal rubella mean IQ: 95

[1] *Investigator experienced in the area of deafness at the time of the research cited.*

Implications

Within the scope of this paper no extensive efforts will be made to deal with the broad issue of the nature of intelligence. However, implicit in the work with the performance scales is the assumption that these tests measure to an appreciable extent innate potential for learning. As it has been demonstrated, performance tests correlate with academic achievement about as closely as verbal tests (Birch and Birch, 1956; Stuckless and Birch, 1963; Brill, 1962), this paper takes the position that there is substantial credulity to the assumption that performance scales are a reasonable valid measure of ability to learn.

With this general concept of intelligence as a frame of reference, important implications can be derived from the data. First, it is obvious from an examination of the IQ distributions given in the 37 studies that the range of intelligence among those with profound hearing loss is as great as the range among the normal hearing. Mean IQ values are also similar based on an overall consensus of the studies. However, some of the more recent investigations (Anderson, Stevens, and Stuckless, 1966; Frisina, 1955; Vernon, 1966; Vernon, 1967a; Vernon 1967b; Vernon, 1967c) suggest that there may be a disproportionately higher prevalence of low IQs among those in schools for the deaf and hard-of-hearing when

compared to expected values for IQ distributions. Similarly, studies of retarded populations suggest a higher prevalence of impaired hearing, but not necessarily deafness, than is found in non-retarded populations (Mathews, 1957, p. 540; Kodman, Powers, Weller, and Phillip, 1963, p. 465).

The author's findings in a series of studies (see table) which examined the relationship of etiology of deafness to intelligence and the changes in etiology growing out of medical advances in treatment offer possible explanations of this disproportionateness of low IQs. Based on these studies and on an understanding of the disease conditions causing deafness, it is apparent that many of the etiologies of profound hearing loss are also responsible for other neurological impairment which frequently results in lower intelligence. The point to be made is that the relationship, if any, between mental retardation and deafness is not causal but is due to the common etiology which brought about both the deafness and the retardation. The fact that certain of these etiologies and conditions—maternal rubella, purulent meningitis of early onset, premature birth, tuberculous meningitis, etc.—are responsible for an increasing percentage of the deaf school-age population suggests that there may be proportionately more retardation among deaf children in the future.

Another implication from the data in Table 1 comes from the studies comparing the hard-of-hearing with the deaf and the congenital deaf with the adventitiously deaf. These investigations indicate that there is no relationship between degree of hearing loss and IQ or age of onset of deafness and IQ. Exceptions were noted in the case of certain etiologies, such as meningitis (Vernon, 1967).

In sum, the implication of the research of the last fifty years which compares the IQ of the deaf with the hearing and of subgroups of deaf children indicates that when there are no complicating multiple handicaps, the deaf and hard-of-hearing function at approximately the same IQ level on performance intelligence tests as do the hearing.

In addition to what can be concluded from these research data about intelligence in hearing-impaired children, there are other areas to which the data can be generalized.

First, as the severely hearing-impaired are a language-deprived group and performance IQ tests are in essence cognitive tasks, the implication follows that level of language development may not be related to cognitive functioning. The logic of this position is that the deaf, a language-deprived group, score as well as the controls who have normal language development. A more through examination of this serendipitous interpretation of these data is in print (Vernon, 1967d).

Second, it has been noted that deaf children, a group with severe cultural deprivation due to lack of experience with language, do as well on performance IQ tests as normal hearing children without this deprivation. The implication is that cultural deprivation may not play the role currently being ascribed to it in the development of intelligence.

A final note, highly relevant to professionals working with deaf adults, is that no study of the intelligence of the adult deaf has been reported in the literature. This rather prominent gap in research might offer an area for productive investigation.

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