DOCUMENT RESUME

ED 131 121 TM 005 847

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TITLE The Relationship Between Academic Achievement and the Demographic Characteristics of Hearing Impaired Children and Youth. Series R, No. 2.
INSTITUTION Gallaudet Coll., Washington, D.C. Office of Demographic Studies.
PUB DATE Sep 75
NOTE 19p.

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Academic Achievement; *Achievement Tests; Age; *Aurally Handicapped; *Demography; Elementary Secondary Education; Ethnic Groups; Hard of Hearing; Hearing Loss; Sex Differences; Special Education; Standardized Tests; Statistical Analysis; *Student Characteristics

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CARL JENSEMA

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OFFICE OF DEMOGRAPHIC STUDIES
Gallaudet College

Washington, D.C.

September, 1975

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INTRODUCTION

In the spring of 1974 the Office of Demographic Studies (ODS) at Gallaudet College in Washington, D.C., conducted a nationwide achievement test standardization program for hearing impaired students. This testing program utilized the 1973 Stanford Achievement Test, Special Edition for Hearing Impaired Students (SAT-HI). The SAT-HI was administered to a carefully selected stratified random sample of 6,873 students in special educational programs for the hearing impaired. Extensive demographic information on these students was also collected. Detailed descriptions of the 1974 standardization program and of the development of the SAT-HI will be available in the near future. The results of two earlier testing programs can be found in ODS publications D-1, D-2, D-8, D-9, D-11, and D-13.

The SAT-HI has six separate battery levels, each battery level containing subtests whose content and difficulty are appropriate for students at various levels of elementary education. There are four subject areas which are tested at all six battery levels and which may be considered as "core" areas: vocabulary, reading comprehension, mathematics concepts, and mathematics computation. This paper will concentrate on the four "core" areas and attempt to relate achievement in them to a number of important demographic variables.

The raw scores obtained on the SAT-HI subtests are, of course, not directly comparable either across subtests or across battery levels. A number of derived scores are available, however, and those referred to as "scaled scores" are the most appropriate for the present purpose. These scaled scores were developed by the test publisher, Harcourt Brace Jovanovich, Inc., through an application of Thurstone's absolute scaling method. A scaled score of 132 was set to correspond to the median raw score obtained by normal hearing students in the second month of the third grade. Similarly, a scaled score of 182 was set to correspond to the median raw score of normal hearing students in the second month of the eighth grade. Each scaled score unit then represents an equal amount of academic growth for normal hearing students, using the specified five year period as a baseline. The advantage of scaled scores over other types of derived scores is that they provide equal interval units of growth which are comparable from battery to battery and which are thus more appropriate for statistical manipulation than are grade equivalents or other more commonly used normative scores.

AGE

Obviously, any analysis of academic achievement must give consideration to the age of the students. Of the 6,873 subjects in this study, the age of two students was unknown, and these two were eliminated from further analysis. Table 1 gives a breakdown of the 6,871 remaining students by age and also gives scaled score means and standard deviations for each age group on each of the four subtest areas. Notice that age groups 9 and 15 have an unusually large number of students. These age groups correspond to the rubella epidemics of 1964 and 1958.

TABLE 1: SCALED SCORE STATISTICS BY AGE GROUP ON EACH OF FOUR ACHIEVEMENT SUBTESTS*

Age	Total Number of Students	Vocabulary			Reading Comprehension			Math Concepts			Math Computation		
		N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.
Under 8	108	103	91.7	11.7	102	109.2	12.5	105	97.9	16.8	94	116.6	12.4
8	530	520	92.8	13.5	514	113.3	10.6	520	104.7	17.8	499	119.4	12.7
9	1,395	1,358	92.8	13.8	1,351	114.6	11.1	1,348	106.8	17.5	1,288	122.5	13.7
10	520	513	98.7	17.6	508	119.9	14.3	505	117.8	20.3	500	131.4	17.5
11	436	429	101.6	18.3	428	123.1	15.5	428	122.7	20.0	428	137.7	19.7
12	484	479	104.7	21.2	475	127.6	17.7	478	129.2	23.5	474	145.6	21.6
13	500	489	106.7	22.4	485	128.6	19.2	486	131.8	23.5	482	150.8	22.1
14	580	569	110.7	25.1	569	132.0	20.7	571	135.7	26.6	565	155.9	24.5
15	801	793	113.2	25.4	792	134.8	22.5	791	140.1	28.1	787	158.8	24.2
16	496	491	119.8	31.3	492	139.0	24.8	491	147.6	30.3	489	164.8	25.3
17	394	393	122.1	30.8	394	142.9	24.9	393	152.1	32.9	391	169.5	26.7
18	319	318	125.6	33.5	317	145.3	25.5	315	154.5	32.8	319	170.9	26.6
19	194	194	126.9	29.1	194	144.2	23.0	194	154.2	30.9	194	172.0	24.7
Over 19	114	114	129.6	29.2	114	148.4	24.4	112	160.0	29.8	113	177.1	24.7
All Ages	6,871	6,763	106.4	25.4	6,735	127.4	21.6	6,737	128.2	30.2	6,623	145.3	28.0

* For comparison purposes, it should be remembered that a scaled score of 132 corresponds to the median raw score obtained by a normal hearing student at the 3.2 grade level and a scaled score of 182 corresonds to the median raw score obtained by a normal hearing student at the 8.2 grade level.

From Table 1 it appears that hearing impaired children in special educational programs make relatively limited progress academically and that the differences among individual students, as measured by the standard deviation of each age group, increase markedly as the students become older. The slow progress of hearing impaired students is especially apparent when it is compared with the typical progress of students with normal hearing. For example, in the 10 year period from age 8 to age 18 the average hearing impaired student increases his vocabulary score only as much as the average normal hearing student does between the beginning of kindergarten and the latter part of the second grade. During the same period of time the scaled score standard deviations increase from 13 to 33 points. Similar results may be seen in the other three subtest areas. Very few hearing impaired students show progress on a par with their hearing age-mates. The point of interest in the remainder of this paper is to determine what demographic characteristics other than age are related to educational achievement.

To do this, the influence of age on the scores must be eliminated so that the entire sample of 6,871 students may be considered as a single group with scores which are comparable regardless of student age. The easiest way to do this is to take each student's scaled score on a subtest, subtract the mean score for his/her age group, and then divide by the standard deviation of the subtest for that age group. This yields an age-deviation score which has a mean of zero and a standard deviation of one. It may be interpreted as a student's deviation from the mean of his or her age group. Since each age group now has its scores on the same scale, the age-deviation scores obtained may now be considered without regard to the student's age.

Table 1 indicates that not all students completed all tests. If it is assumed that students with missing scaled scores have academic achievement distributed in the same way as other students in their age group, the missing scaled scores may be replaced by an age-deviation score of zero. In effect, the assumption is made that students with missing scores are "average" students.

The statistical result of this is to reduce the standard deviation very slightly. The final data on the 6,871 students yielded an age-deviation score standard deviation of approximately .99 on each of the four subtests.

In order to interpret the age-deviation scores meaningfully in the remainder of this paper it is necessary to have a firm grasp of their nature. As was mentioned earlier, the age-deviation score of a student on a particular subtest represents the student's deviation from the mean for his or her age group in that academic area. The age-deviation scores in this study are approximately normally distributed and may be interpreted as though normal. For example, a score of 1.00 places a student in the 84th percentile while a score of -1.00 would place the student in the 16th percentile of his or her age group.

SEX

The means and standard deviations of the age-deviation scores according to the students' sex are given in Table 2. In each area females do slightly better than males. In practical terms, Table 2 indicates that there is no meaningful difference in academic achievement of hearing impaired males and females, except possibly in the area of reading comprehension.

TABLE 2: AGE-DEVIATION SCORES BY SEX

Sex	N	Vocabulary		Reading Comprehension		Math Concepts		Math Computation	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Male	3,667	-.03	.99	-.09	1.00	-.02	.99	-.03	.98
Female	3,204	.04	.98	.10	.96	.02	.98	.03	.97
Both Sexes	6,871	.00	.99	.00	.99	.00	.99	.00	.98

AGE AT ONSET OF THE HEARING LOSS

The next variable to be considered is the student's age at the onset of the hearing loss. The great majority of students in special educational programs for the hearing impaired have had a hearing loss from the time they were born. Further, those children who lose their hearing at a later age are also less likely to be enrolled in a special educational program. One of the most important considerations related to age at onset of a hearing loss is the degree to which language development has progressed. In general, the better a child's grasp of language fundamentals, the better equipped he or she will be to take advantage of the prevalent education environment. Correspondingly, the later the age at which a child suffers a hearing loss, the better the child's language development may be expected to be. For this reason, researchers frequently divide age at onset of hearing loss into three categories: at birth, birth through age two, and age three or over. These categories are assumed to correspond to a child's exposure to spoken language prior to the onset of a hearing loss; they might also be roughly labeled as no language exposure, prelingual, and postlingual, respectively.

Table 3 gives the mean and standard deviation of the age-deviation scores for each academic area according to the three age at onset categories discussed above. This table also contains a sizeable fourth category composed of those

students whose age at onset is either unknown or not reported. From Table 3 it is apparent that those whose hearing loss occurred after age three have higher age-deviation mean scores and a larger standard deviation in all academic areas being considered except mathematics computation, the subtest which is the least dependent on language skills. Further, notice that the greatest difference of mean age-deviation scores among the three categories is found in vocabulary, the subtest most dependent on spoken language.

TABLE 3: AGE-DEVIATION SCORES BY AGE AT ONSET OF THE HEARING LOSS

Age at Onset	N	Vocabulary		Reading Comprehension		Math Concepts		Math Computation	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
At Birth	4,433	-.01	.94	.01	.95	.02	.97	.04	.98
Birth through Age 2	1,123	-.18	.91	-.16	.86	-.15	.95	-.10	.95
Age 3 or Over	362	.30	1.32	.20	1.27	.13	1.08	.02	.98
Unknown	953	.17	1.07	.06	1.12	.02	1.04	-.06	.99
All Onsets	6,871	.00	.99	.00	.99	.00	.99	.00	.98

One interesting result shown in Table 3 is that those students who had a hearing impairment from birth did better than those whose loss occurred after birth but before age three. There are a number of possible explanations for this which are not directly related to exposure to spoken language. For example, heredity was reported as a cause of loss for more than 13% of the 4,433 students whose hearing impairment was present at birth. Since the genetic nature of inherited deafness often goes undetected, especially in cases of recessive inheritance, the 13% rate of reported occurrence is almost certainly an underestimate. Children reported as having an inherited hearing impairment are known to have a low incidence of additional handicapping conditions (Jensema & Mullins, 1974) and may have a higher mean IQ (Brill, 1960, 1970), both obviously important factors in the achievement of hearing impaired students. They are also more likely to have parents who are experienced with the condition of hearing impairment and who consequently may be better able to provide educational and personal guidance for the child.

CAUSE OF THE HEARING LOSS

Table 4 gives the age-deviation score mean and standard deviation of each subtest area for those students for whom one or more specific causes of hearing loss were reported. Those students reported as having an inherited hearing loss clearly have academic achievement which is superior to those with other reported causes except mumps and otitis media. These two exceptions are both diseases which tend to strike at a later age when the child has already experienced substantial language development.

TABLE 4: AGE DEVIATION SCORES BY REPORTED CAUSE OF HEARING LOSS

Cause of Hearing Loss	N*	Vocabulary		Reading Comprehension		Math Concepts		Math Computation	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Rubella	1,334	-.04	.92	-.01	.94	-.05	.94	-.06	.82
Pregnancy Complications	223	.01	.90	.00	.92	.02	.96	.00	.84
Prematurity	334	-.18	.87	-.27	.86	-.28	.88	-.30	.78
Rh Incompatibility	189	-.06	1.07	.05	1.02	.06	.92	.02	.91
Birth Trauma	140	-.10	.79	-.02	.87	-.13	.91	-.10	.80
Heredity	607	.24	1.01	.33	1.01	.37	1.00	.33	.90
Meningitis	418	-.10	.96	-.09	.97	-.07	.98	-.09	.86
Mumps	41	.46	1.38	.57	1.24	.34	1.11	.42	1.12
Measles	139	.01	1.07	-.02	1.00	.00	1.05	-.02	.95
Otitis Media	72	.48	1.28	.32	1.26	.27	1.19	.29	1.11
Trauma after Birth	74	.12	1.17	-.01	1.06	-.05	1.13	-.06	1.05
Fever	158	-.01	1.05	.00	1.07	-.03	1.04	-.01	.94
Infection	94	.07	1.38	.01	1.36	-.05	1.19	-.09	1.16
Other	257	.02	.92	.04	1.03	.06	.88	.02	.84
Cause Unknown or Unreported	3,120	.00	.99	-.03	.98	-.03	.99	-.02	.97
All Students	6,871	.00	.99	.00	.99	.00	.99	.00	.98

* The N's reported will add up to more than the total because multiple causes were reported for some students.

In considering Table 4 it is important to note that for a large number of hearing impaired students the cause of the hearing loss is unknown or unreported. In this study 3,120 of the 6,871 students (45%) had no known reported cause. The means for this group closely parallel the means for the total sample.

DEGREE OF HEARING LOSS

Table 5 presents the mean and standard deviation of the age-deviation scores according to the five hearing loss categories suggested by the Committee on Conservation of Hearing of the American Academy of Ophthalmology and Otolaryngology in 1965 (Davis & Silverman, 1970). A sixth category composed of students for whom a specific hearing loss value was not reported is also given in the table. The results shown in Table 5 give a very clear indication of the effect of hearing loss on academic achievement. The mean age-deviation score steadily declines as the degree of hearing loss becomes more severe. This tendency is apparent in all subtest areas but is most profound in vocabulary and least apparent in mathematics computation. This finding reinforces an observation which has been made many times in the literature: hearing impairment manifests itself in retardation of language skill aquisition and this retardation tends to be directly related to the degree of hearing loss.

TABLE 5: AGE-DEVIATION SCORES BY DEGREE OF HEARING LOSS

Hearing Loss in ISO-dB	N	Vocabulary		Reading Comprehension		Math Concepts		Math Computation	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Normal (<27dB)	64	1.28	1.27	.78	1.11	.50	.89	.19	.86
Mild (27-40dB)	140	.85	1.36	.65	1.30	.58	1.11	.28	1.04
Moderate (41-55dB)	367	.59	1.10	.51	1.16	.39	.98	.24	.92
Moderately Severe (56-70dB)	775	.22	1.06	.18	1.11	.16	1.02	.08	1.02
Severe (71-90dB)	1,838	-.03	.94	.02	.97	-.04	.98	-.02	.98
Profound (>90dB)	3,464	-.16	.88	-.12	.87	-.09	.94	-.04	.96
Unknown	223	.14	1.08	.00	1.07	.11	1.08	-.07	1.07
All Students	6,871	.00	.99	.00	.99	.00	.99	.00	.98

One other aspect of Table 5 deserves comment. In the mathematics subtests those students who have a mild hearing loss have higher mean age-deviation scores than those whose loss is within normal limits. There are several possible reasons for this. First, the hearing loss categories refer to better ear averages. It is quite possible that many students in the "normal" category have a unilateral hearing loss; while they may have only a mild loss in one ear, they may have a profound loss in the other ear. If they had only a slight loss in both ears it is unlikely that they would require enrollment in a special educational program for the hearing impaired. Second, if a student has only a slight hearing loss in both ears and still requires enrollment in a special program, it is likely that there is some other handicap or condition which necessitates special education.

ADDITIONAL HANDICAPPING CONDITIONS

Of the 6,871 students in the sample, 1,843 (27%) were reported as having at least one educationally significant additional handicapping condition. Table 6 gives the age-deviation score means and standard deviations of the subtests for nine specific types of educationally significant additional handicapping conditions. For each subtest every

TABLE 6: AGE-DEVIATION SCORES BY REPORTED SPECIFIC EDUCATIONALLY SIGNIFICANT ADDITIONAL HANDICAPS

Additional Handicapping Conditions	N*	Vocabulary		Reading Comprehension		Math Concepts		Math Computation	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Brain Damage	145	-.30	.80	-.37	.84	-.50	.88	-.58	.93
Cerebral Palsy	197	-.19	1.08	-.28	1.12	-.34	1.02	-.41	.97
Epilepsy	51	-.33	.75	-.43	.78	-.32	.80	-.46	.86
Heart Disorder	179	-.25	.84	-.30	.85	-.35	.89	-.34	.84
Mental Retardation	339	-.54	.64	-.75	.75	-.86	.78	-.95	.79
Orthopedic	113	-.15	1.06	-.28	1.12	-.45	1.04	-.59	1.02
Perceptual Motor	382	-.21	.75	-.36	.80	-.39	.82	-.43	.84
Emotional/ Behavioral	509	-.22	.87	-.29	.77	-.36	.83	-.38	.82
Visual	380	-.16	.92	-.18	.95	-.28	.97	-.31	.92
Other	291	-.14	.89	-.15	.92	-.20	.93	-.25	.93
None	5,028	.08	1.01	.11	1.00	.13	.98	.14	.96
All Students	6,871	.00	.99	.00	.99	.00	.99	.00	.98

* The N's reported will add up to more than the total because multiple additional handicapping conditions were reported for some students.

condition has a mean age-deviation score well below that of the total sample. Interestingly, the mean scores of students reported as having an additional handicapping condition tend to be lower for the mathematics subtests than for the language subtests. This would seem to indicate that when additional handicapping conditions are present, the simple concept of language deprivation influencing achievement scores is no longer sufficient. Each particular condition influences the educational process (and, indeed, the student's entire life style) in its own special way. As the number of additional handicapping conditions increases, the more complex the educational issue becomes.

To get some idea of how each additional handicapping condition adds to the complexity of the situation, the data may be divided into categories according to the number of conditions reported. In Table 6 notice that those students reported as being mentally retarded have mean age-deviation scores which are much lower than the mean scores of students with other reported handicapping conditions. For these scores to be meaningful, the students reported as being mentally retarded must be considered separately. Table 7 gives the age-deviation score means and standard deviations by the number of educationally significant handicapping conditions reported, excluding those students who were reported as being mentally retarded.

TABLE 7: AGE-DEVIATION SCORES BY NUMBER OF EDUCATIONALLY SIGNIFICANT ADDITIONAL HANDICAPPING CONDITIONS (EXCLUDING STUDENTS WITH REPORTED MENTAL RETARDATION)

Number of Reported Handicapping Conditions in Addition to Hearing Impairment	N	Vocabulary		Reading Comprehension		Math Concepts		Math Computation	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
None	5,028	.08	1.01	.11	1.00	.13	.98	.14	.96
One	1,111	-.14	.90	-.16	.89	-.18	.89	-.19	.89
Two	298	-.20	.90	-.24	.83	-.34	.88	-.39	.83
Three	72	-.22	.87	-.42	.93	-.53	.88	-.59	.82
Four or More	23	.05	1.00	-.13	1.21	-.45	1.18	-.49	.97
All Students	6,871	.00	.99	.00	.99	.00	.99	.00	.98

With the exception of 23 students reported as having four or more handicapping conditions in addition to hearing impairment, the mean scores in Table 7 steadily decline with each extra condition. This drop in mean score is most apparent in the mathematics computation subtest and least apparent in vocabulary. The scores of those few students in the four-condition category should probably be viewed with some suspicion. The sample is very small, and the individual capacities of the students become very complex. There is also considerable doubt concerning the reliability and validity of ordinary paper and pencil tests for a hearing impaired student having at least four other educationally significant handicapping conditions.

ETHNIC BACKGROUND

Another demographic variable which relates to academic achievement is ethnic background. The majority of the students in this study (65%) were classified as "white"; 30% were from minority backgrounds, and 5% had no ethnic background reported. Table 8 gives the age-deviation score statistics of each subtest area for each ethnic group. The white group had much higher mean age-deviation scores in all subtest areas than did the other groups. This is consistent with what is usually found in educational achievement studies involving hearing students.

The data presented in Table 8 demonstrate some interesting differences in academic achievement among the minority groups. In general, the small group of Asian-Americans have a higher achievement level than the other minority groups. The differences in mean age-deviation scores are greatest for the mathematics computation subtest. The highest and lowest mean scores on this particular subtest were obtained by Asian-Americans and blacks, respectively. On the vocabulary and reading subtests the lowest mean scores were obtained by students of Spanish-American descent. It is possible that this relates, at least in part, to the use of Spanish as the principal language in the homes of some of these students.

TABLE 8: AGE-DEVIATION SCORES BY ETHNIC BACKGROUND

Ethnic Background	N	Vocabulary		Reading Comprehension		Math Concepts		Math Computation	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
White	4,481	.13	1.00	.20	.98	.20	.98	.20	.95
Black	1,149	-.20	.93	-.42	.84	-.43	.87	-.48	.85
Spanish-American	838	-.35	.87	-.46	.86	-.40	.85	-.38	.87
American Indian	49	-.30	.76	-.25	.86	-.29	.93	-.17	.83
Asian-American	31	-.19	.75	-.09	.80	.10	1.04	.41	1.16
Other	8	.13	.34	.03	.80	.01	1.01	-.26	1.37
Not Reported	315	-.03	.92	-.09	1.02	-.12	1.01	-.10	1.03
All Students	6,871	.00	.99	.00	.99	.00	.99	.00	.98

TYPE OF EDUCATIONAL PROGRAM

A discussion of the academic achievement of hearing impaired students would not be complete without investigating differences according to the types of special educational programs the students attend. Nine program classifications have been used. The age-deviation score means and standard deviations for each of these program types are given in Table 9. The classifications used should be largely self-explanatory to those involved in education of the hearing impaired. However, the following list gives a working description of each program type as used by the Office of Demographic Studies:

1. Residential School for Deaf St[illegible]l facility in which hearing impaired students are [illegible]sed and cared for. The program is intended exclusive[illegible]earing impaired students.
2. Day School for Deaf Students: A facility where all classes are conducted in a building(s) exclusively for hearing impaired students, all of whom live at home and attend school during the day.
3. Full-Time Special Educational Classes: Special classes consisting entirely of hearing impaired children. Classes are located in an elementary or secondary school building in which hearing children also attend classes.
4. Part-Time Special Educational Classes: The student's time is spent partly in special educational classes consisting entirely of hearing impaired students and partly in regular classes with hearing children.
5. Itinerant Program: Hearing impaired student is enrolled in a regular class with hearing students. In addition, he/she receives the services of an itinerant teacher of the hearing impaired.
6. Resource Room: A special classroom located in a regular school for hearing children which contains personnel, services and facilities specifically designed for hearing impaired students. Student participates in regular classroom activities and receives special help in resource room as needed.
7. Speech and Hearing Clinic Services: Hearing impaired child receives clinical services such as auditory or speech training generally on an individual basis.
8. Other: This is a "catch-all" category for hearing impaired students whose educational program does not quite fit into the above categories. Most of these students are in regular classes full time but may receive some minimal special help such as tutoring or speech therapy.
9. Multiply Handicapped Program: School is primarily for multiply handicapped students and has a special program for hearing impaired students with additional handicaps.

In Table 9 there seems to be a rough inverse correspondence between the amount of time a student spends in special education for his hearing impairment and the mean age-deviation scores on the subtest. This is to be expected, since the better students should need less special educational support. However, a real comparison of program types must take into consideration the differences

in demographic makeup of the students from school to school. There are many ways of weighting variables such as the ones used in this study. Probably the simplest acceptable way is to subtract the mean age-deviation score of each relevant demographic category to which a student belongs from that student's age-deviation score. In this study, correction was made for degree of hearing loss, age at onset of loss, number of additional handicapping conditions, presence of mental retardation, and reported ethnic background. The method of correction used tends to preserve the overall mean while reducing the standard deviation of the population's age-deviation scores. It must be emphasized that the age-deviation score adjustments were based on only a few of the most important demographic variables and the method used was only one of many such methods which could have been applied. The purpose of the adjustment was to demonstrate that much of the discrepancy in mean academic achievement among different programs is attributable to various characteristics of the students rather than to differences in the quality of teaching or the particular method of teaching.

TABLE 9: UNADJUSTED AGE-DEVIATION SCORES BY TYPE OF SPECIAL EDUCATIONAL PROGRAM

Type of Special Educational Program	N	Vocabulary		Reading Comprehension		Math Concepts		Math Computation	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Residential School	3,073	-.15	.83	-.08	.83	-.08	.90	-.04	.91
Day School	1,018	-.29	.93	-.36	.88	-.32	.95	-.30	.91
Full-Time Special Education Class	1,975	.08	.95	.02	1.02	.05	.98	.03	1.01
Part-Time Special Education Class	329	.50	1.17	.63	1.14	.54	1.07	.46	1.06
Itinerant Program	215	1.26	1.28	1.16	1.28	.94	1.08	.65	1.02
Resource Room	192	.47	1.18	.45	1.03	.37	1.01	.24	1.00
Speech and Hearing Clinic	28	.60	1.11	.36	1.06	.47	1.04	.24	.97
Other	29	1.62	1.77	1.35	1.62	.96	1.26	.76	1.06
Multiply Handicapped Program	12	.20	.74	-.02	1.02	.08	.91	.11	1.05
All Types	6,871	.00	.99	.00	.99	.00	.99	.00	.98

The means and standard deviations of the adjusted age-deviation scores by type of special educational program attended are given in Table 10. Comparison of Table 10 with Table 9 shows a considerable narrowing of the discrepancy among the means of the various program types. The most striking changes over subtests are found in the language-related areas of vocabulary and reading. Among the program types the greatest changes resulting from the age-deviation score adjustments are for the "itinerant" and "other" categories. This is not surprising, since these two types of programs have more students with mild hearing loss, later age at onset, and no additional handicapping conditions, a set of circumstances which would be expected to produce large score changes when the correction procedure is applied.

TABLE 10: ADJUSTED AGE-DEVIATION SCORES BY TYPE OF SPECIAL EDUCATIONAL PROGRAM

Type of Special Educational Program	N	Vocabulary		Reading Comprehension		Math Concepts		Math Computation	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Residential School	3,073	-.09	.82	-.06	.78	-.10	.84	-.09	.84
Day School	1,018	-.13	.91	-.14	.82	-.11	.91	-.11	.86
Full-Time Special Education Class	1,975	.04	.90	-.01	.93	.02	.89	.02	.91
Part-Time Special Education Class	329	.24	1.09	.37	1.05	.31	.99	.28	.98
Itinerant Program	215	.69	1.23	.71	1.20	.56	1.02	.42	.94
Resource Room	192	.19	1.07	.22	.97	.17	.93	.13	.92
Speech and Hearing Clinic	28	.18	.96	.10	1.04	.25	1.00	.17	.89
Other	29	.95	1.53	.82	1.45	.51	1.09	.49	1.04
Multiply Handicapped Program	12	.34	.70	.15	1.05	.29	.87	.34	1.04
All Types	6,871	.00	.92	.00	.89	-.01	.89	-.02	.89

The various program types clearly differ according to the number and kinds of special educational services they offer. For example, day schools are more likely than residential schools to offer highly specialized classes for multiply handicapped hearing impaired children; and partly as a manifestation of this, day schools enroll a higher percentage of multiply handicapped

students (Gentile & McCarthy, 1973). Ethnic background is another demographic variable which is related to day school versus residential school differences. Probably as a result of socio-economic factors and geographic distribution, a higher percentage of non-whites attend day schools (Ries, Bateman & Schildroth, 1975). Different types of programs enroll different types of students, and the mean age-deviation scores obtained for the program categories in this study reflect these differences.

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THE OFFICE OF DEMOGRAPHIC STUDIES

The Office of Demographic Studies was established in 1968 to serve as a national statistical center for the field of deafness. Its purpose is to collect, analyze, and publish information on hearing impaired persons, to provide tabulations, national sampling frames, and other data-oriented services to special educational programs and to professionals in the field, to collaborate in cooperative research projects, and to serve as consultant and resource for projects involving data collection and analysis.

The data collected by the Office are confidential; no information which would permit the identification of an individual or cooperating school as the source of that information is ever released without the necessary written permission. Within the limits of this confidentiality, the Office actively encourages the use of its information and services by administrators, researchers, teachers, and others providing services to hearing impaired persons.

In its work of developing and disseminating useful information, the Office has the benefit of the guidance and advice of its National Advisory Committee, whose names are listed earlier in this publication. Among its members are hearing and deaf individuals, administrators, teachers and specialists from other areas within the field of hearing impairment. Every attempt is made to maintain a wide diversity of interests and competencies, as well as geographic representation, among its members.

Funding for the Office comes from the Department of Health, Education, and Welfare as part of its substantial support for the programs and services of Gallaudet College. The College is an equal opportunity/affirmative action employer.

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