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ABSTRACT

This manual summarizes technical information regarding the 1982 Stanford Achievement Test, Seventh Edition when administered to hearing-impaired students. In Section 1, the procedures used to select the norming sample (7,557 hearing-impaired students) are described, and the demographic characteristics of the resulting sample are compared to those of the Annual Survey. In Section 2, evidence for the reliability and validity of the test for the hearing-impaired student population is presented, including a discussion of the standard error of measurement and its implications in determining the significance of gains noted in scores from year to year. Section 3 contains a set of norm tables for selected subgroups of the sample, including: regions of the United States (Northeast, Midwest, South, and West); types of educational programs (residential schools, day schools, local schools with hearing students); three levels of hearing loss; students with and without additional impairments; and ethnic groups (White, Black, and Hispanic). (CB)

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UNDERSTANDING THE SCORES

HEARING-IMPAIRED STUDENTS

and the

STANFORD ACHIEVEMENT TEST

(7th Edition)

Thomas E. Allen

Gallaudet Research Institute
Center for Assessment and Demographic Studies

1986

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PREFACE

The purpose of this manual is to summarize technical information about the 1982 Stanford Achievement Test, 7th Edition (Madden, Gardner, Rudman, Karlsen, & Merwin, 1982) when administered to hearing-impaired students. The Stanford (Form E) was normed with a national sample of hearing-impaired students in the spring of 1983 by the Gallaudet Research Institute's Center for Assessment and Demographic Studies (CADS). Funding for the project was provided by the U.S. Office of Education, Special Education Programs (Grant Number G008300004) and by the Gallaudet Research Institute.

In the norming, Form E of the Stanford was administered to 8,331 hearing-impaired students, of whom 7,557 provided valid age information on their answer sheets and were therefore included in the computation of the norms. These students were selected from the data base developed by CADS through its Annual Survey of Hearing-Impaired Children and Youth, a data base containing demographic and educational information on more than 50,000 hearing-impaired students. Since the norming, age-based percentile ranks have been published, and they have become part of a computerized score reporting system developed and now offered as a service by CADS. Several articles have been published that use data from the norming. The current manual is intended to provide technical support for these various uses of the Stanford test score data.

The manual is divided into three sections. In Section 1, the procedures used to select the norming sample are described, and the demographic characteristics of the resulting sample are compared to those of the Annual Survey. In Section 2, evidence for the reliability and validity of the Stanford for the hearing-impaired student population is presented. Included in this section is a discussion of the standard error of measurement and its implications in determining the significance of gains noted in scores from year to year. Section 3 contains a set of norm tables for selected subgroups of the sample. These allow more specific comparisons between individual scores and referenced norm groups than do the previously published norms computed on the entire sample. Separate decile tables are provided for the following subgroups:

1. Each of the four regions of the United States—Northeast, Midwest, South, and West
2. Each of three types of educational programs—residential schools, day schools, and local schools with hearing students
3. Each of three levels of hearing loss—less-than-severe, severe, and profound

4. Each of two additional handicap status groups—students *with no* reported handicaps in addition to their hearing-impairment and students *with* additional handicaps
5. Each of three ethnic groups—White non-Hispanic, Black, and Hispanic

Sections 1 and 2 of this manual will be useful for researchers who wish to know the technical properties of the Stanford when it is administered to hearing-impaired students. It will also be helpful for researchers engaged in future large-scale normings of standardized tests with this population. The discussion of standard error will be beneficial to educators who wish to interpret longitudinal Stanford data for their students. The validity discussion is designed to help educators decide if the content measured by the Stanford Reading Comprehension and Mathematics Computation subtests is adequately matched to their curricula. Section 3 enables educators to be more specific about the normative comparisons they can use to make judgments about their students' academic abilities.

This manual is intended to supplement rather than replace previously published material that contains important technical information about the Stanford Achievement Test for use with hearing-impaired students. The reader is directed to the following publications for additional information.

- Allen, T. E. (1984). Interpreting the new Stanford Achievement Test for hearing-impaired students. *Perspectives*, 2, 21-23.
- Allen, T. E. (1984). *Out-of-level testing with the Stanford Achievement Test (Seventh Edition): A procedure for assigning students to the correct battery level*. Washington, D.C.: Gallaudet Research Institute Monograph Series 1.
- Center for Assessment and Demographic Studies. (1983). *Administering the 1982 Stanford Achievement Test (Seventh Edition) to hearing-impaired students*. Washington, D.C.: Gallaudet Research Institute.
- Hotto, G., & Schildroth, A. (1984). *A resource for educators and parents of hearing-impaired students: Seventh Edition Stanford Achievement Test for use with hearing-impaired students*. Washington, D.C.: Center for Assessment and Demographic Studies.

CADS gratefully acknowledges the students and staff from the more than 600 individual schools that participated in the norming project. The names of the 154 programs that served as coordinating reporting sources are listed in the Appendix. Without their support, this important project would have been impossible.

DESCRIPTION OF THE NORMING SAMPLE

Sampling Procedures

The goal of the norming project was to compute Stanford Achievement Test norms for a sample that adequately represented the population of hearing-impaired students receiving special education services in schools throughout the United States. This population was defined by the data base created through the Annual Survey of Hearing-Impaired Children and Youth. This data base, maintained by the Gallaudet Research Institute's Center for Assessment and Demographic Studies (CADS), contains demographic and educational information for a large sample of hearing-impaired students receiving special education services. Due to logistical and financial considerations, it was not possible to randomly select *students* from the Annual Survey data base for participation in the project. Instead, *programs* were randomly selected from those which participated in the 1980-1981 Annual Survey. An attempt was made to stratify the programs in such a way that the resulting student sample would be representative.

All of the programs that participated in the 1980-1981 Annual Survey were classified by region of the country and by program type. Table 1.1 shows the four Bureau of the Census regions used to stratify the sample and indicates the states (and territories) included in each.

Table 1.2 contains a listing of the different types of programs that supply data to the Annual Survey and the sam

TABLE 1.1
Regions of the United States

Region	States/Territories
Northeast	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Puerto Rico, Virgin Islands
Midwest	Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin
South	Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia
West	Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming, Guam

TABLE 1.2
Types of Reporting Sources in the Annual Survey and
Corresponding Sampling Categories

Type of Reporting Source	Sampling Category
Residential School for the Deaf	Residential
Day School for the Deaf	Day
General Local School Program (self-contained or mainstream status unspecified)	Local
Full-time Special Education Classes within Local School Districts	
Part-time Special Education within Local School Districts	
Mixed Full- and Part-time Special Education within Local School Districts	
Multihandicapped Program	Omitted
Rehabilitation Program	
Preschool Program	
Speech and Hearing Program	
Other Education	
Other Non-Education	

pling categories to which they correspond. These include residential schools, day schools, and local schools that serve hearing-impaired students. Four types of local school programs were combined into one sampling category. This category includes both self-contained special education classes and mainstream classes within local regular schools serving hearing students. It also contains both public and private schools. Several program types enrolling special groups of students for whom the Stanford is not likely to be appropriate were not considered for inclusion in the sample. Also, students who were younger than 7 years of age and older than 19 years of age were deleted. The Stanford has limited applicability for hearing-impaired students at these ages; therefore, the project was not designed to compute normative information for these students. (In fact, because of small num-

bers of 7-year-olds in the resulting sample, norms were computed only for students between the ages of 8 and 19.) The 1980-1981 Annual Survey data base, used to draw the sample, contained 40,427 students in 855 programs after these two sets of deletions were made.

Table 1.3 presents the sampling plan for the norming. Column I shows the number of reporting sources in the data base in each of the 12 stratification groups defined by cross-classifying each program according to region and program type. Column II shows the total number of students attending programs in the 12 stratification groups. Column III shows the number of students needed in the sample from each group. The number was calculated for a 95% confidence level using a 3% margin of error for a proportional variable from a finite population where the population proportion was assumed to be .50. This yielded very conservative estimates of sample size. The target number was then multiplied by 1.33 to allow for a 75% response rate.

The target sample sizes listed in Column III were divided by the population sizes listed in Column II to determine the proportion of students needed from each group to adequately represent it. These proportions are listed in Column IV. The proportion of programs randomly sampled from each stratification group was equal to the proportion of students needed from that group. The number of reporting sources sampled is listed in Column V.

Finally, those programs that had participated in the pilot testing of the Stanford screening tests developed by CADS the previous year (and had not already been selected through the stratification procedure) were added to the sample. The number of programs added to each group is listed in Column VI, and the total number of programs contacted are indicated in Column VII. A total of 227 programs

TABLE 1.3

Procedures for Determining Sample Proportions Stratified on Region and Reporting Source Type

Region	I Number of Reporting Sources	II Number of Students, 1980-81 Annual Survey	III Total Number of Students Needed	IV Total Proportion of Stratifica- tion Group Needed	V Total Number of Reporting Sources to Contact	VI Additional Programs Invited	VII Total Number of Programs Contacted
Northeast							
Residential	16	2,491	985	.39	7	0	7
Day	15	758	533	.70	11	0	11
Local	116	4,886	1,173	.24	28	+ 8	36
Midwest							
Residential	15	2,262	920	.41	6	0	6
Day	4	394	267	.68	3	+ 1	4
Local	178	6,867	1,200	.17	31	+ 11	42
South							
Residential	26	3,915	1,172	.24	7	+ 1	8
Day	10	382	267	.70	7	0	7
Local	299	9,105	1,266	.14	42	+ 16	58
West							
Residential	12	1,907	928	.49	6	0	6
Day	-	411	267	.65	4	0	4
Local	157	6,049	1,200	.20	52	+ 6	58
	855	40,427	10,178	.25	204	43	227

were invited to participate. Of this number, 171 agreed to participate (75%), and 154 (68%) completed all phases of the project.

Description Of Sample Characteristics

Stratification Variables

Table 1.4 shows the proportional breakdown of the sample into stratification groups. Since day school students represented a small proportion of the total sample, they were combined with residential school students for the purpose of analyzing sample characteristics. Comparisons to the 1982-1983 Annual Survey are also included. It is clear that, in the norming sample, students from residential and day schools were overrepresented and local public school students were underrepresented. Roughly two thirds of the students reported to the Annual Survey were from local schools; one third, from special schools. Nearly two thirds of the sample, however, were from special schools.

This deliberate bias in the sample toward special school students resulted because the sampling strategy used sought to represent adequately each of the twelve groups of students designated in Table 1.3. Doing so resulted in a total sample that does not fully represent the population as a whole with respect to its program type composition. Many public school programs have only a few hearing-impaired students. To select programs in such a way that the sample would have contained local school students in proportion to their numbers in the Annual Survey would have nearly doubled the number of reporting sources needed for the project. To explore the effects of this bias on the resulting score distributions, the sample was weighted for several analyses. The results of these analyses are presented in the Weighted Sample Analysis section (page 6).

TABLE 1.4
Comparisons of 1983 Norming Sample with the 1983 Annual Survey With Respect to Stratification Characteristics

Stratification Groups	Norming Sample N = 7,557	1982-83 Annual Survey N = 43,830*
Northeast		
Residential/Day Schools	14.1%	9.1%
Local School Districts	7.5%	12.6%
Total % = 21.6		Total % = 21.7
Midwest		
Residential/Day Schools	15.5%	6.9%
Local School Districts	10.5%	16.6%
Total % = 26.0		Total % = 23.5
South		
Residential/Day Schools	22.1%	14.7%
Local School Districts	12.7%	21.6%
Total % = 34.8		Total % = 36.3
West		
Residential/Day Schools	10.0%	6.7%
Local School Districts	7.6%	11.8%
Total % = 17.6		Total % = 18.5
Program Type Totals Across Regions		
Residential/Day Schools	51.7%	37.4%
Local School Districts	38.3%	62.6%

*This number represents students in the Annual Survey who were between the ages of 7 and 19 in the spring of 1983 and who were reported to the survey by residential, day, or local district special education programs.

TABLE 1.5
Demographic Profile of 1983 Norming Sample
Compared to 1983 Annual Survey*

	1983 Norming Sample	1983 Annual Survey
Age		
7	2.3%	5.5%
8	4.7%	6.2%
9	5.3%	6.4%
10	7.8%	6.3%
11	7.7%	7.3%
12	7.8%	7.5%
13	8.2%	7.8%
14	8.8%	7.8%
15	8.3%	7.5%
16	8.7%	7.5%
17	12.2%	11.1%
18	16.9%	14.2%
19	3.4%	5.0%
	N = 7,624 (1.7% missing)	N = 43,830 (0% missing)
Sex		
Male	53.3%	53.7%
Female	46.7%	46.3%
	N = 7,730 (0.3% missing)	N = 43,830 (0% missing)
Ethnic Background		
White	65.9%	67.7%
Black	18.3%	18.5%
Hispanic	12.2%	10.0%
Other, or Multi-Ethnic	3.6%	3.7%
	N = 7,740 (0.2% missing)	N = 42,558 (2.9% missing)
Hearing Loss		
Less-than-severe	17.6%	34.3%
Severe	25.3%	21.3%
Profound	57.1%	44.4%
	N = 7,662 (1.2% missing)	N = 43,047 (1.8% missing)
Additional Handicaps		
None	73.8%	68.8%
Physical only	9.9%	8.8%
Cognitive (with and without physical)	16.3%	22.4%
	N = 7,523 (1.7% missing)	N = 42,099 (3.9% missing)
Age at Onset of Hearing Loss		
Prelingual (0-2 years)	94.8%	92.8%
Postlingual (3 years or older)	5.2%	7.2%
	N = 6,915 (10.9% missing)	N = 35,787 (18.4% missing)
Cause of Deafness		
Maternal Rubella	35.6%	30.0%
Meningitis	12.1%	10.9%
Hereditary	19.2%	18.3%
Otitis Media	2.3%	4.6%
Other at birth	12.4%	14.5%
Other after birth	9.4%	10.6%
Other not listed	9.0%	11.1%
	N = 5,080 (34.5% missing)	N = 36,868 (38.7% missing)

*See note for Table 1.4

Demographic Variables

Table 1.5 shows the distribution of the sample for selected demographic characteristics. The percentages from the 1982-1983 Annual Survey are also given. In regard to age, the very youngest students (7-, 8-, and 9-year-olds) were slightly underrepresented in the sample, and the oldest students (18-year-olds) were overrepresented. Norms were not computed for 7-year-olds due to their small numbers.

The distribution of males and females was virtually identical in the sample and the Annual Survey, as was the distribution of whites, blacks, and Hispanics. Many students with less-than-severe hearing losses were not selected in the sample: This category included only 17.6% of the sample, compared to 34.3% reported from the Annual Survey. This fact is undoubtedly related to the underrepresentation of local school students since, as previous research has shown (Allen & Osborn, 1984; Wolk, Karchmer, & Schildroth, 1982), program placement is related to hearing loss.

It also appears that many students with additional cognitive handicaps were systematically excluded from the sample. Cognitive handicaps include mental retardation, specific learning disabilities, and social-emotional problems. While only 16.3% of the sample were reported with such handicaps, 22.4% of the Annual Survey were. If only physical handicaps are considered, such as cerebral palsy, visual problems, etc., little difference is noted between the norming sample and the Annual Survey.

Finally, there were no dramatic differences between the sample and the Annual Survey with respect to age at onset and cause of deafness. A slightly higher proportion of students in the sample was prelingually deaf. Again, this is undoubtedly related to program type: Prelingually deaf students would be found in greater proportion among special school students who, as we have seen, are overrepresent-

ed in the sample. Also, a slightly higher percentage of the sample reported maternal rubella as a cause of deafness. This would be expected from the age differences noted earlier since the sample had a slightly higher proportion of 18-year-olds, students born during the rubella epidemic of 1964-1965.

In sum, the norming sample differed from the Annual Survey from which it was drawn in three important ways. First, it was more heavily weighted toward special school students. Second, there were fewer students in the sample with less-than-severe hearing losses than would be expected from the population. Third, fewer students with additional cognitive handicaps were in the sample than would be predicted from the Annual Survey figures.

These differences imply that the highest and lowest achieving hearing-impaired students were not represented well by the sample. Mainstreamed students, especially those with less-than-severe hearing losses, were not well represented, indicating that they were not as often selected for testing with a special test adapted for hearing-impaired students. Also excluded were students with additional cognitive handicaps that, in their teachers' opinions, impeded their ability to take the test. The sample, then, most adequately represents the large number of hearing-impaired students in special education who would benefit from special procedures but who are not so cognitively handicapped that the test is determined to be too difficult for them.

Distribution of Test Level Assignments

All students in the norming sample were administered separate reading and mathematics screening tests to determine what levels of the Stanford they should take. The results of the reading screening tests were used to place students into ap-

propriate subtest levels for Reading Comprehension and the other subtests requiring reading skills, such as Science and Social Science. The results of the math screening test were used to place students into appropriate levels of the Mathematics Computation and the Concepts of Number subtests. Assignment of students into levels of the Mathematics Applications subtest was left to the discretion of the teachers administering the test, but, since this subtest involves a strong language component, teachers were encouraged to use the results of the reading screening test for placing students into appropriate levels of this subtest.

TABLE 1.6
Number and Percent of Hearing-Impaired Students Assigned by Screening Procedure to Different Levels of the Stanford Achievement Test (7th Edition), Stanford Norming Project, 1983

	Reading Comprehension	Mathematics Computation	Mathematics Applications
Primary 1	1555 (22%)	1169 (17%)	1133 (25%)
Primary 2	1560 (22%)	621 (9%)	709 (16%)
Primary 3	1736 (24%)	1296 (18%)	986 (22%)
Intermediate 1	1082 (15%)	1826 (26%)	771 (17%)
Intermediate 2	258 (4%)	1046 (15%)	353 (8%)
Advanced	917 (13%)	1091 (15%)	539 (12%)
Total	7108 (100%)	7049 (100%)	4491 (100%)

Table 1.6 presents the distribution of test level assignments for Reading Comprehension, Mathematics Computation, and Mathematics Applications. The total number of students assigned to Mathematics Applications levels (4,491) is considerably smaller than the total number of students assigned in the other two categories because the Mathematics Applications subtest is an optional subtest. Table 1.6 shows the number of students assigned to different levels of the battery for different subtests. In general, students were assigned to higher levels of the battery for their mathematics subtests than

for their reading subtests. This result is consistent with a wealth of previously published research which shows that hearing-impaired students, as a group, are farther behind their hearing peers in the development of reading skills than in the development of mathematics skills (e.g., Allen & Karchmer, 1981; Trybus & Karchmer, 1977; Wolk & Allen, 1984).

Weighted Sample Analysis

To explore the effects of differences in characteristics between the sample and the Annual Survey, the sample was weighted for analysis. All students were classified according to responses to the following questions:

Did they attend a special school (residential or day) or a local school program?

Were they less-than-severely, severely, or profoundly deaf?

Did they have no additional handicaps, additional physical handicaps, or additional cognitive handicaps?

Based on their classifications with regard to these questions, students were placed into 1 of 18 cells defined by cross-classifying on the two levels of program type, three levels of hearing loss, and three levels of additional handicap status. For each age cohort, relative frequency distributions were determined for the 18 cells. The same operation was performed for the Annual Survey. Then, students in the sample were weighted by the ratio of the Annual Survey relative frequency to the sample relative frequency for the particular cell defined by their program type, hearing loss, and additional handicap status characteristics. The weighting resulted in a sample of the same size as the norming sample, but "matched" the Annual Survey on these characteristics.

sample. It is clear from these figures that weighting the sample had little effect on the resulting distributions. (Only the medians are plotted here; the other percentile levels have been examined and show the same similarities.) Therefore, it appears that the bias in the sample did not skew the score distributions used to compute the norms. It is possible, however, that the weighting did not overcome all sources of bias in the sample. The weighting procedure assumes that subgroups of students within the sample (e.g., those who are mainstreamed) adequately represent the students not in the sample who have the same characteristics. Since teachers in local schools used their judgment in selecting which students should take the Stanford (as adapted for hearing-impaired students), it is possible that those selected for the sample were not representative of those not selected, even though they have the same demographic characteristics.

This potential sampling bias is not as detrimental to interpreting the norms adequately as it may appear. Certainly the sample represents special education students who are normally selected for special achievement testing. Educators should be aware, however, that the percentiles they obtain for their hearing-impaired students do not place them among *all* hearing-impaired students in a particular age group, but among those who are normally selected for special achievement testing.

Figures 1 through 5 show the results of recomputing the norms for five of the Stanford subtests based on the weighted

FIGURE 1

Achievement Patterns
Stanford Achievement Test, 7th Edition
READING COMPREHENSION

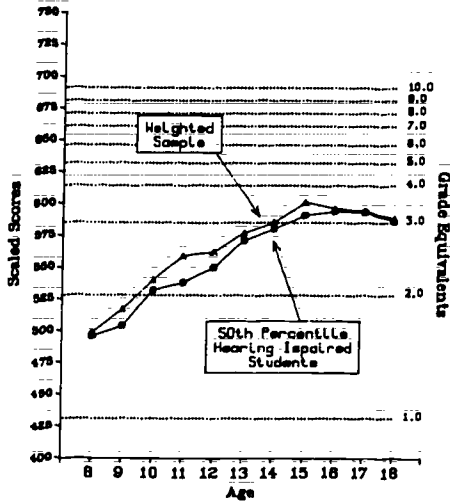


FIGURE 2

Achievement Patterns
Stanford Achievement Test, 7th Edition
MATH COMPUTATION

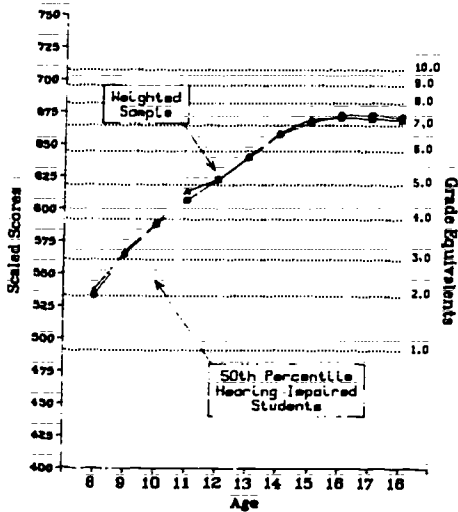


FIGURE 3

Achievement Patterns
Stanford Achievement Test, 7th Edition
MATH APPLICATIONS

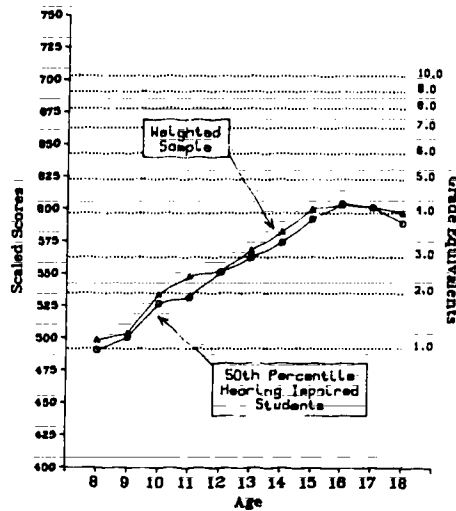


FIGURE 4

Achievement Patterns
Stanford Achievement Test, 7th Edition
CONCEPTS OF NUMBER

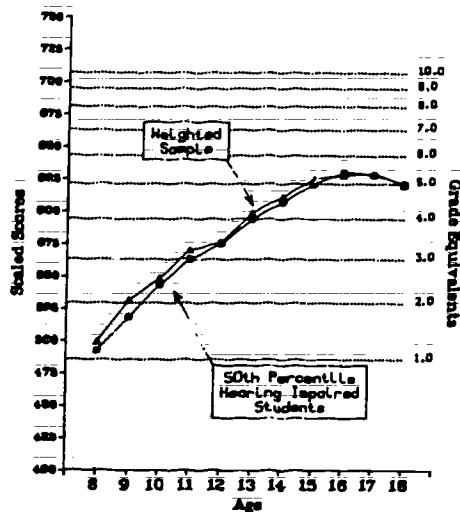
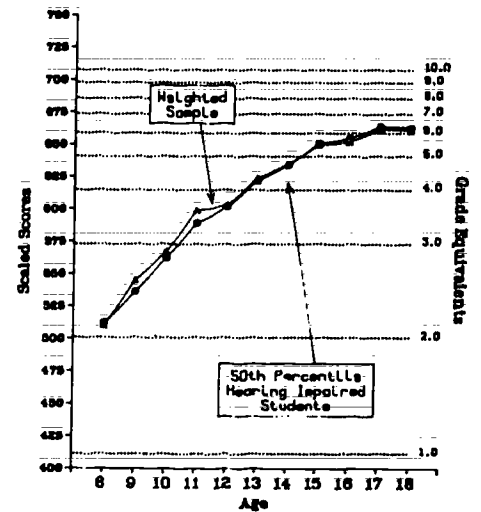


FIGURE 5

Achievement Patterns
Stanford Achievement Test, 7th Edition
SPELLING



RELIABILITY AND VALIDITY ANALYSIS

TABLE 2.1

Sample Sizes, Means, Standard Deviations, K-R 20 Reliability Coefficients, and Standard Errors of Measurement: Stanford Achievement Test (7th Edition), Hearing-Impaired Norming Sample, Stanford Norming Project, 1983

Subtest	Required Subtests		Test Level			
	P1	P2	P3	I1	I2	Ad
Word Reading			(subtest does not appear at these levels)			
N	1866	1749				
Mean	24.7	21.9				
SD	6.3	5.5				
N Items	33	33				
K-R 20	.89	.83				
Standard Error	2.1	2.3				
Reading Comprehension						
N	1867	1753	1949	1225	291	1055
Mean	23.9	22.5	35.0	33.7	31.2	32.8
SD	7.0	5.8	8.4	10.7	9.7	11.1
N Items	40	40	60	60	60	60
K-R 20	.85	.80	.91	.89	.89	.91
Standard Error	2.7	2.6	3.3	3.2	3.2	3.3
Spelling						
N	1703	1671	1919	1204	286	1048
Mean	22.7	20.3	29.2	32.3	37.6	35.7
SD	6.2	7.1	5.7	6.4	8.2	8.5
N Items	30	30	36	40	50	50
K-R 20	.90	.91	.89	.89	.90	.90
Standard Error	2.0	2.1	1.9	2.1	2.6	2.7
Language						
N	(subtest does not appear at these levels)		1922	1200	281	1046
Mean			24.3	31.6	32.6	34.9
SD			6.4	6.7	5.5	8.6
N Items			46	53	53	59
K-R 20			.78	.79	.66	.85
Standard Error			3.0	3.1	3.2	3.3
Concepts of Numbers						
N	1520	668	1455	2044	1155	1252
Mean	19.7	20.3	19.0	18.0	19.9	20.6
SD	5.9	5.7	5.9	6.4	5.1	6.1
N Items	34	34	34	34	34	34
K-R 20	.82	.81	.83	.84	.76	.84
Standard Error	2.5	2.5	2.4	2.6	2.5	2.4
Mathematics Computation						
N	1529	663	1464	2039	1160	1254
Mean	15.4	29.7	31.0	33.0	33.4	28.2
SD	5.5	5.3	7.7	7.1	6.1	7.5
N Items	22	38	42	44	44	44
K-R 20	.89	.83	.90	.88	.84	.87
Standard Error	1.8	2.2	2.4	2.5	2.4	2.7

Reliability

Two measures of reliability were computed for the Stanford test score data: internal consistency (K-R 20 formula) and parallel forms. The latter was based on a special study of the relationship between hearing-impaired students' performance on Forms E and F of the Stanford Achievement Test. The methodology for this study is described more fully in the Parallel Forms section (page 10).

Internal Consistency

As specified in the special instructions for teachers administering the Stanford to hearing-impaired students (CADS, 1984a), the subtests in the Stanford are divided into three categories of appropriateness: Category 1, those that are most often appropriate for hearing-impaired students; Category 2, those that are sometimes appropriate (depending on the individual students and their curricula); and Category 3, those that are rarely appropriate. In the norming project, all students in the sample were required to take the subtests from Category 1; Category 2 and Category 3 subtests were optional. Norms were not computed for Category 3 subtests. It should be noted that the optional nature of the Category 2 subtests for the norming sample imposes some restrictions on the interpretation of those norms. (See Allen, 1984a, for a discussion of interpreting percentiles for Category 2 subtests.)

Table 2.1 presents the K-R 20 reliability information for the required Category

1 subtests, and Table 2.2 presents the same for the optional Category 2 subtests. The reliabilities for all of the required subtests except Language are predominantly above 80. For Language, the reliabilities are between 70 and 80 for the Primary 3 and Intermediate 1 levels, 66 for Intermediate 2, and 85 for the Advanced level of the test. Concepts of Numbers is 76 at the Intermediate 2 level but above 80 at all other levels. Reading Comprehension, Spelling, and Mathematics Computation are above 80 at all levels of the test.

As is evident from Table 2.2, the Environment subtest, which appears only at the Primary 1 and Primary 2 levels of the test, is not highly reliable. All other optional subtests have reliabilities similar in range to those noted for the required subtests. It should be remembered that students tested with these optional subtests are those for whom teachers made independent judgments about the subtests' appropriateness. It is not possible to judge what the reliability coefficients would be if these subtests had been required of the entire sample.

In general, Tables 2.1 and 2.2 show that the Category 1 and Category 2 subtests of the Stanford have excellent reliability for the hearing-impaired student population, although the Environment subtest at the Primary 1 and Primary 2 levels and the Language subtest at the Primary 3 through Advanced levels are somewhat less reliable than the others.

The standard errors of measurement (SEM) are also given in Tables 2.1 and 2.2. These are expressed in terms of raw score points. They present a clearer picture than do the reliability coefficients alone of the degree of accuracy of the measures by allowing the construction of intervals around observed scores within which it can be fairly certain that the students' true scores lie. A more comprehensive discussion of standard error is presented in the section, A Further Dis-

ussion of Standard Error (page 11).

The Primary 1 Mathematics Computation and Applications subtest requires a comment. At that level of the test the two subject areas are combined into one 45-item test. Since hearing-impaired students often have more difficulty with the Applications portion of that combined subtest, the CADS norms for hearing-impaired students separate the subtest into its two sections. The Mathematics Computation section contains 22 items; the Mathematics Applications section contains 23 items. Reliabilities for the separate sections of the subtest are given in Tables 2.1 and 2.2.

TABLE 2.2
Sample Sizes, Means, Standard Deviations, K-R 20 Reliability Coefficients, and Standard Errors of Measurement: Stanford Achievement Test (7th Edition), Hearing-Impaired Norming Sample, Stanford Norming Project, 1983

Subtest	Optional Subtests		Test Level			
	P1	P2	P3	I1	I2	Ad
Environment			(subtest does not appear at these levels)			
N	924	895				
Mean	14.0	14.9				
SD	4.1	4.1				
N Items	27	27				
K-R 20	.66	.68				
Standard Error	2.4	2.3				
Science						
N	(subtest does not appear at these levels)		1058	644	168	644
Mean			21.9	36.7	34.8	34.7
SD			6.3	8.4	7.5	11.6
N Items			44	60	60	60
K-R 20			.79	.84	.79	.92
Standard Error			2.9	3.4	3.4	3.3
Social Studies						
N	(subtest does not appear at these levels)		1100	674	177	640
Mean			22.2	34.0	31.7	35.5
SD			7.2	11.1	9.3	11.5
N Items			44	60	60	60
K-R 20			.84	.91	.87	.92
Standard Error			2.9	3.3	3.4	3.3
Mathematics Applications						
N	1529	761	1092	863	395	644
Mean	11.7	19.7	19.8	21.5	19.3	20.4
SD	4.6	6.2	7.1	8.5	7.9	8.1
N Items	23	35	38	40	40	40
K-R 20	.80	.84	.87	.90	.88	.88
Standard Error	2.1	2.5	2.6	2.7	2.7	2.8

TABLE 2.3
Sample Sizes, Means, Standard Deviations, of Required Subtests
Forms E and F, Stanford Achievement Test (7th Edition),
and Parallel Forms Reliability Coefficients for
Hearing Impaired Students, 1984

Subtest	Required Subtests		Test Level			
	P1	P2	P3	I1	I2	Ad
Word Reading			(subtest does not appear at these levels)			
N	122	158				
N Items	33	33				
Mean Form E	20.5	22.2				
SD Form E	5.7	4.9				
Mean Form F	24.4	22.6				
SD Form F	6.3	4.8				
R(E,F)	.79	.72				
Reading Comprehension						
N	130	177	202	131	46	73
N Items	40	40	60	60	60	60
Mean Form E	23.8	22.0	35.3	37.1	32.7	36.3
SD Form E	7.8	5.4	8.6	10.8	9.3	8.9
Mean Form F	25.3	21.7	30.2	32.7	29.2	36.7
SD Form F	7.2	5.4	8.4	9.8	10.1	8.9
R(E,F)	.56	.66	.65	.75	.69	.84
Spelling						
N	114	157	181	128	41	66
N Items	30	30	36	40	50	50
Mean Form E	23.1	19.9	28.6	31.0	36.8	36.4
SD Form E	6.0	6.7	6.0	6.1	8.4	7.3
Mean Form F	22.7	21.2	29.5	31.8	38.2	36.4
SD Form F	6.6	5.7	6.0	6.5	7.0	7.8
R(E,F)	.85	.81	.80	.87	.91	.68
Language						
N	(subtest does not appear at these levels)		179	127	41	65
N Items			46	53	53	59
Mean Form E			23.3	31.8	32.2	36.2
SD Form E			6.1	6.5	6.0	8.7
Mean Form F			23.2	31.0	30.9	37.4
SD Form F			6.3	6.2	6.2	7.6
R(E,F)			.79	.65	.62	.82
Concepts of Numbers						
N	104	74	162	191	97	124
N Items	34	34	34	34	34	34
Mean Form E	20.5	18.9	18.8	18.0	21.2	21.5
SD Form E	4.9	5.3	5.8	6.3	4.5	6.4
Mean Form F	19.4	19.2	18.5	18.9	21.3	21.6
SD Form F	5.4	5.6	5.9	6.1	4.5	6.4
R(E,F)	.70	.64	.76	.82	.79	.86
Mathematics Computation						
N	109	79	172	191	100	125
N Items	22	38	42	44	44	44
Mean Form E	16.1	29.9	30.8	32.4	34.7	29.0
SD Form E	5.2	4.9	8.0	7.6	5.5	8.1
Mean Form F	16.1	28.8	30.9	33.1	35.2	29.4
SD Form F	5.3	6.2	8.0	7.5	5.6	8.5
R(E,F)	.83	.72	.81	.78	.69	.83

Parallel Forms

A study was conducted by CADS during the 1983-1984 school year to determine the relationship between the two published forms of the 7th Edition of the Stanford (Forms E and F). In the project, 805 hearing-impaired students from 13 programs randomly sampled from those participating in the 1983 norming took selected subtests from both forms of the test within a two-week period. Half of the participating programs were requested to administer Form E first; the others were requested to administer Form F first. As with the norming, programs were asked to administer the required Category 1 subtests from both forms of the test; Category 2 subtests were again optional.

Table 2.3 presents the means and standard deviations of the raw scores for the required subtests for both forms. It also presents the Form E-Form F correlation coefficients, $R(E,F)$, for each of the subtests. These correlations represent the parallel forms reliabilities. Table 2.4 presents the same information for the optional subtests.

In general, the reliability estimates from the parallel forms analysis are somewhat lower than the estimates based on the internal consistency analysis. This is expected since these estimates are derived from two different test administrations. They are therefore associated with more sources of error than are estimates based on only one test administration. Nonetheless, almost all of the reliabilities reported are greater than .65, and many are above .80. These values indicate a high level of consistency between the scores obtained on the two tests. The parallel forms reliability coefficient for the Reading Comprehension subtest at the Primary 1 level is only .56, indicating that scores obtained from this subtest are perhaps less accurate than scores obtained from other subtests. Greater care should be given in interpreting scores from this test. The Environment

subtest at the Primary 1 and Primary 2 levels of the battery obtained low parallel forms reliabilities of .46 and .45, respectively. Given that the internal consistency estimates were also low for these subtests, it is reasonable to question the usefulness of these tests for hearing-impaired students.

The mean raw scores and their standard deviations obtained on the various subtests were highly consistent across forms of the test, indicating that the Form E and Form F score distributions were highly similar. In only a few instances did the mean raw scores of the two forms of the same subtest differ by more than three points. However, these instances reveal a systematic pattern. They include the following:

- Primary 3 Reading Comprehension (Form E easier)
- Intermediate 1 Reading Comprehension (Form E easier)
- Intermediate 2 Reading Comprehension (Form E easier)
- Intermediate 1 Science (Form E easier)
- Advanced Science (Form E easier)
- Advanced Social Science (Form E easier)

When differences in mean performance levels of individual subtests were more than three raw score points (roughly one standard error), it was always Form E that had a higher mean raw score. This pattern occurred at three levels of the Reading Comprehension subtest. Investigation into the reason why Form E was easier for some subtests (especially Reading Comprehension) should be undertaken.

The results of the parallel forms analysis show that Form E and Form F of the test are highly correlated. Programs that choose to use Form F can do so and expect results similar to those they would obtain with Form E. On the other hand, the scores are not interchangeable, and administering different forms of the test for the purpose of tracking longitudinal achievement gain should not be done. The results also do not warrant using Form F scaled scores to determine the hearing-

TABLE 2.4
Sample Sizes, Means, Standard Deviations, of Optional Subtests
Forms E and F, Stanford Achievement Test (7th Edition),
and Parallel Forms Reliability Coefficients for
Hearing-Impaired Students, 1984

Subtest	Optional Subtests					
	P1	P2	P3	11	12	Ad
Environment						
N	39	84	(subtest does not appear at these levels)			
N Items	27	27				
Mean Form E	13.9	15.0				
SD Form E	3.2	3.7				
Mean Form F	13.8	15.5				
SD Form F	3.1	3.9				
R(E,F)	.46	.45				
Science						
N	(subtest does not appear at these levels)		89	42	*	29
N Items			44	60	*	60
Mean Form E			22.0	38.8	*	38.9
SD Form E			6.0	9.2	*	8.6
Mean Form F			22.9	35.3	*	35.7
SD Form F			7.2	10.2	*	7.0
R(E,F)			.73	.78	*	.70
Social Science						
N	(subtest does not appear at these levels)		91	45	*	29
N Items			44	60	*	60
Mean Form E			23.3	37.1	*	39.4
SD Form E			6.0	8.4	*	8.4
Mean Form F			24.3	35.7	*	33.3
SD Form F			6.2	8.8	*	10.3
R(E,F)			.81	.80	*	.86
Mathematics Applications						
N	102	40	94	110	63	74
N Items	23	35	38	40	40	40
Mean Form E	12.2	16.8	15.9	17.0	19.8	21.2
SD Form E	3.8	6.8	6.0	7.9	8.0	9.6
Mean Form F	11.7	17.3	15.4	17.3	20.4	22.3
SD Form F	4.2	6.2	5.5	7.2	8.5	8.7
R(E,F)	.68	.68	.73	.89	.88	.84

*The number of students responding to this subtest was insufficient for the calculation of meaningful summary statistics.

impaired student percentile ranks from the Form E norm tables.

A Further Discussion Of Standard Error

In Tables 2.1 and 2.2, the standard errors of measurement are given for the Stanford subtests. This section of the manual presents some illustrations of how these standard errors can be used to de-

termine the level of accuracy of student scores obtained from the Stanford.

The most important point is that the standard errors are expressed in raw score points, *not* scaled score or grade equivalent points. This fact is important because, if the standard error is used to construct an interval around an observed score within which a student's "true" score probably lies, it will be noted that intervals of similar raw score width can convert to vastly different norm ranges, depending on the level of the test and the value of the observed raw score.

Table 2.5 illustrates this point. On the Reading Comprehension subtest, Student 1 obtains a raw score of 20 at the Primary 1 level. Student 2 obtains the same raw score at the Intermediate 2 level. Student 3 also takes the Intermediate 2 level, but scores 50, which is near the top of the range. (There are 60 items on this test.) Student 1's raw score converts to a grade equivalent of 1.3 and a scaled score of 458. Student 2's raw score converts to a grade equivalent of 3.1 and a scaled score of 590. Student 3's raw score converts to a grade equivalent of 10.0 and a scaled score of 690. The question to be answered is, "To what extent can these scores be taken at face value?"

The standard errors for these three situations are shown in Table 2.5. To determine the accuracy of a measure, construct an interval within which it can be 95% certain that an individual's true score will fall. This interval is simply computed by multiplying the standard error by 1.96 (the z-score associated with the 95% confidence interval) and then adding and subtracting the resulting value to and from the observed score.

These computations have been performed for the three examples. The 95% confidence interval around Student 1's observed score of 20 ranges from 15 (20 minus 5.3) to 25 (20 plus 5.3). The range for Student 2 is 14 to 26 (note that the observed score of 20 is a little less accurate for Intermediate 2 than it is for Primary 1); the range for Student 3 is from 44 to 56. (Student 3's score is from the same test as that taken by Student 2 and therefore has the same standard error.)

Another way of describing these confidence intervals is to say, "If Student 1 were to take the Primary 1 Reading Comprehension subtest 100 times (assuming the test questions were not remembered), the student would obtain a raw score between 15 and 25 in 95 of those test administrations." The width of this range is directly related to reliability. The higher the reliability of a test, the narrower the confidence interval and the more precise the measure.

The more interesting aspects of these examples come when the raw scores defined by the upper and lower values of the intervals are converted to norms. For Student 1, the converted grade equivalent range becomes 1.1 to 1.5. These values correspond to the raw scores 15 and 25 for the Primary 1 Reading Comprehension subtest. It could be said that Student 1's "true" grade equivalent falls somewhere between 1.1 and 1.5. Not nearly as accurate a statement can be made about Student 2's grade equivalent. The 95% confidence interval yields a grade equivalent range from 2.7 to 3.8. For student 3

TABLE 2.5

Standard Error Illustrations Using Example Scores from Reading Comprehension Subtests

	Student 1 Primary 1	Student 2 Intermediate 2	Student 3 Intermediate 2
Raw Score	20	20	50
Grade Equivalent	1.3	3.1	10.0
Scaled Score	458	590	690
Standard Error	2.7	3.2	3.2
95% CI (1.96xSE)	± 5.3	± 6.3	± 6.3
Ranges			
Raw Score	15 to 25	14 to 26	44 to 56
Grade Equivalent	1.1 to 1.5	2.7 to 3.8	7.5 to Post High School
Scaled Score	437 to 478 (41 pts)	569 to 609 (40 pts)	665 to 730 (65 pts)

the degree of precision becomes less. The converted confidence interval for grade equivalents yields a range from 7.5 to post high school.

The grade equivalent difference between Student 1 and Student 3 is striking. Student 1's reported 1.3 grade equivalent suggests that the student's "true" achievement level is somewhere in the first half of the first grade. The reported grade equivalent for Student 3 gives far less information. Student 3's results imply a grade equivalent that could be anywhere beyond the 7th-grade level.

These illustrations lead to the following two rules for interpreting test results: (1) No score is completely accurate; all reported scores should be interpreted as representing a range of scores; (2) the standard error is not of constant size across subject areas and test levels, especially when one is talking about converted scores. It cannot generally be said, for example, "Six months' grade equivalency growth constitutes significant gain after accounting for error due to unreliability." In the examples, such an assertion would be warranted for Student 1 but not for Students 2 and 3. Rather, a separate judgment about a significant gain would have to be made about each individual student's scores: If the score ranges for two scores on a subtest obtained at different testing times do not overlap, the gain (or loss) could be labelled "significant."

One possible implication of Table 2.5 is that the results for Student 3 are not interpretable, and discussion of these results with parents and educators might easily lead to confusion. However, it should be noted that the scaled score confidence interval is only 20 points wider for Student 3 than it is for Students 1 and 2, indicating that the difference in the precision of these two scores is not as great as the grade equivalent intervals would imply. The reason for this disparity is that grade equivalents do not form an equal interval scale, whereas the scaled scores do. The range from 7.5 to post high school seems enor-

mously wide, but in terms of actual difference in skill level it is not. Students in the early grades gain reading comprehension skills at a much faster pace than do students in the later grades. Therefore, in determining significant growth a student's starting position must be considered along with information about test reliability.

Validity

The validity of a test cannot be determined without knowledge of its purpose. Since the Stanford is the only large-scale standardized achievement test that has been adapted for use with hearing-impaired students, it is widely used for many purposes. Very little statistical data have been published to support the extent to which the battery is used validly. However, individual situations are known where the Stanford has been used in ways that support assertions about its validity in several contexts. In one school, for example, results of the Reading Comprehension and Mathematics Computation subtests were highly correlated with a measure of IQ. These correlations are evidence for the construct validity of the Stanford.

In another situation, the Stanford was administered to a group of entering preparatory and freshmen students at Gallaudet College. The students' scores on the Stanford were found to be related to both grade point average and attrition after one semester. These findings support a notion of criterion-related validity for the Stanford, i.e., the Stanford as a predictor of success at college.

The most compelling evidence to date for the content validity of the 7th Edition Stanford concerns the relationship between the objectives measured by the test and hearing-impaired students' curricula. Harnisch and Allen (in preparation) conducted a study of the linkage between the Mathematics Computation and Reading Comprehension subtests of the Stanford and the curricula offered in special edu-

cation programs serving hearing-impaired students throughout the United States.

Data for the Harnisch and Allen study were collected at the time of the norming. For a random subsample of over 2,500 students from the larger norming sample, each student's teacher(s) were asked to evaluate how much opportunity the students had had to learn the content tested by particular items. Twelve different questionnaires corresponding to the six Mathematics Computation subtests and the six Reading Comprehension sub-

tests were sent to the teachers. The students had been divided into 12 groups based on their screening test results and on random assignment.

The six mathematics questionnaires asked teachers to respond to two questions about each computation subtest item appearing in the test booklet taken by the targeted student: (1) To what extent has this student had an opportunity to learn the content of this item (not at all, minimally, adequately, or heavily?), and (2) Will the student answer the item correctly (yes or no)? Since it would have been difficult for teachers to respond to the same questions about each and every Reading Comprehension item, the six Reading Comprehension questionnaires asked the same opportunity-to-learn and expectation questions about groups of items appearing on the test. These groups were predefined by the test publisher as representing the different content categories measured by the test.

TABLE 2.6

Mean Percentage of Items Within Stanford Mathematics Computation Content Categories Reported as Being Adequately or Heavily Covered and Mean Percentage of Items Answered Correctly Within Each Category: Stanford Norming Project, 1983

Content Category**	Test Level*					
	P1	P2	P3	I1	I2	Ad
	(Numbers are percentages)					
Add, whole numbers				89 (84)	87 (87)	
Addition facts	75 (69)	83 (83)				
Three 1-digit addends	74 (79)					
Addition, no renaming	72 (76)	93 (89)	86 (88)			
Addition, with renaming		89 (76)	89 (83)			
Missing addends			71 (82)			
Subtraction, whole numbers					91 (85)	
Subtraction facts	78 (70)	91 (75)				
Subtraction, no renaming	63 (62)	92 (81)	85 (78)	93 (87)		
Subtraction, with renaming		87 (33)	88 (53)	91 (72)		
Multiplication, whole numbers					85 (87)	87 (84)
Multiplication facts		71 (75)	79 (79)	69 (84)		
Multiplication numbers <10			72 (67)	86 (88)		
Multiplication 2-digit numbers				79 (70)		
Division, whole numbers						85 (79)
Division facts			71 (72)	89 (80)	90 (96)	
Division, numbers <10			60 (43)		89 (79)	
Division, 1 & 2 digit divisors				76 (63)	84 (75)	
Computations, fractions & decimals				62 (65)		
Computations with decimals					80 (81)	
Decimals, addition & subtraction						85 (85)
Decimals, multiplication & division						80 (71)
Computations with fraction					72 (56)	
Fractions, addition & subtraction						84 (47)
Fractions, multiplication & division						81 (57)
Percent						50 (41)
Estimation				35 (32)	48 (67)	45 (60)
Proportions					56 (76)	
Proportions, linear equations						48 (52)

*Actual performance means of the curriculum study subsamples are given in parentheses.

**The content categories listed are mutually exclusive within level.

Table 2.6 shows the mean curriculum coverage scores and the mean actual performance scores on all of the content categories assessed in each of the six Mathematics Computation subtests. A coverage score for an individual student is the percentage of items within a content cluster reported by the teacher as being adequately or heavily covered in the curriculum of the individual student. Thus, the 75 appearing in Table 2.6 under Primary 1 Addition Facts indicates that the mean percentage of items covering "addition facts" reported by teachers as being adequately covered in the curricula of programs for hearing-impaired students was 75. The 69 is the mean percentage of items answered correctly by students who took the Primary 1 Mathematics Computation subtest.

In general, Table 2.6 reveals that the level of coverage of mathematics objectives appearing on the Stanford is consistently high and that performance on these ob-

jectives co-varies with coverage. In other words, coverage is generally good, and lower performance is usually associated with poorer curricular coverage. There are three qualifications to this statement. First, the more difficult objectives appearing only at the upper levels of the test are not as well covered as the objectives at the lower levels. These upper level objectives include percent, estimation, proportions, and linear equations. Second, subtraction with renaming remains very difficult for hearing-impaired students (the performance means are low) through the Primary 3 level, despite very high levels of coverage. Third, computation with fractions remains difficult at the upper levels of the test, despite moderately high levels of coverage.

Table 2.7 shows similar results for the Reading Comprehension content categories. Since the reading comprehension questionnaires asked questions at the content category level and not the individual item level, the coverage scores reported in Table 2.7 have a slightly different interpretation than those reported in Table 2.6. The numbers in Table 2.7 are the percentages of students in the sample reported as having had adequate opportunity to learn the content represented by the category. Thus, the 46 appearing under Primary 1 two-sentence stories indicates that only 46% of the students in the Primary 1 Reading Comprehension sample were reported to have had adequate to heavy coverage of this content category.

As with Mathematics Computation, coverage levels of the Reading Comprehension categories were fairly high throughout. There is one notable exception: The two-sentence story category appearing at the Primary 1 level is not well covered in the curricula of these programs, and students do not perform very well on items representing this category. Furthermore, inferential comprehension was somewhat less well covered for students at the Primary 3 and Intermediate 1 levels

TABLE 2.7
Percentage of Students Judged by Teachers to Have Had Adequate to Heavy Coverage of Stanford Reading Comprehension Content Categories and Mean Percentage of Items Answered Correctly Within Each Category: Stanford Norming Project, 1983

Content Category**	Test Level*					
	P1	P2	P3	I1	I2	Ad
	(Numbers are percentages)					
Two-sentence stories	46 (49)					
Cloze passages	64 (63)	74 (86)				
Short paragraphs		75 (52)				
Textual passage			68 (57)	82 (60)	74 (39)	82 (54)
Functional passages			73 (55)	78 (68)	78 (63)	73 (55)
Recreational passages			72 (65)	79 (56)	65 (61)	61 (59)
Literal items**			84 (62)	90 (68)	85 (60)	87 (61)
Inferential items**			60 (56)	68 (47)	85 (47)	78 (51)

*Actual performance means of the curriculum study subsample are given in parentheses.

**The content categories listed are not mutually exclusive. Both literal and inferential items comprised the textual, functional, and recreational categories; the same items are grouped by type of passage and by type of question to form the five groups presented in the table for the Primary 3 through Advanced levels.

of the test than was coverage of literal comprehension. Performance on inferential comprehension items lagged behind the performance of literal comprehension items at each of the four upper levels of the battery.

Tables 2.6 and 2.7 show that, in general, the Stanford Math Computation and Reading Comprehension subtests have good content validity, i.e., the content areas assessed by these tests are adequately covered by the students' curricula. There are isolated content categories that are not as well covered, as has been discussed, and some content areas remain difficult for students despite high levels of coverage. The latter are areas where curriculum development is needed. The high level of coverage implies that educators feel that the content areas are important. The lower levels of performance imply, perhaps, that better teaching methods are needed.

SPECIAL NORMS TABLES

Description of Special Norms

It is evident from Section 1 that the norming sample was considerably heterogeneous with respect to various demographic and educational characteristics. This heterogeneity can lead to problems in interpreting the percentiles of individual students. For example, if a particular student has cognitive handicaps in addition to a hearing impairment, it is perhaps not appropriate to use the percentiles that are based on the entire hearing-impaired student population. Similarly, it is not appropriate to compare mainstreamed students who have less-than-severe hearing losses to the larger group which includes residential school students who have profound hearing losses.

To permit more appropriate comparisons, special norms tables were prepared. The tables show, for students with specific characteristics, scaled score distributions at each age level for various Stanford subtests. Since dividing the sample considerably reduced the number of students in each norm group, only deciles are reported. Reporting individual percentile ranks requires a large sample. In some cases, the number of students comprising a norm group of a particular age and with a particular characteristic is as low as 50 students. Obviously, since percentiles divide a distribution into 100 equal intervals, these small groups are not adequate. The solution to this problem was to compute deciles for the groups of interest. (Deciles are not printed for norm groups that consist of fewer than 50 students.)

Deciles divide distributions into 10 equal parts. That is, the lowest 10% of the scorers are assigned a decile value of 1 indicating that they are in the first

decile. The top scorer in this first decile has a level of performance equal to the tenth percentile. Similarly, the top 10% of the scorers are in the 10th decile. This decile corresponds to the 91st through the 100th percentile.

To use the tables to compute a special norm for an individual student, the following must be known: the student's age and Stanford Achievement Test scaled score, and the group with which an appropriate achievement comparison is to be made. An example will help explain how the special norms tables can be used. Suppose a 10-year-old student scored 464 on the Stanford Reading Comprehension subtest. Use of the regular hearing-impaired student norms (CADS, 1984b) would reveal that the student scored at the 18th percentile. However, a teacher of this student might feel that the 18th percentile, which is in the 2nd decile, is not a fair measurement since the student has additional handicapping conditions. Table 3.13 provides the special norms for students in the norming sample who had additional handicaps. For 10-year-olds with additional handicaps, the observed 464 is between 463 and 483. Therefore, this student scored in the 4th decile, i.e., between the 31st and 40th percentile among hearing-impaired students with a similar additional handicap.

Tables for the following subgroups of students are provided:

- Students residing in the Northeastern Region of the United States
 - Students residing in the Midwestern Region of the United States
 - Students residing in the Southern Region of the United States
 - Students residing in the Western Region of the United States
 - Students attending residential schools
 - Students attending day schools
 - Students attending residential or day schools (combined group)
 - Students attending local schools with hearing students
 - Students with profound hearing loss
 - Students with severe hearing loss
 - Students with less-than-severe hearing loss
 - Students with no reported handicap(s) in addition to their hearing impairment
 - Students with reported handicap(s) in addition to their hearing impairment
 - White non-Hispanic students
 - Black students
 - Hispanic students
-

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students residing in the Northeastern Region

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns	
Age: 11												
DECILE												
316-432	311-420		326-444	335-431	338-433	1	316-463	311-470	453-579	326-472	335-509	338-458
433-442	421-436		445-457	432-446	434-446	2	464-485	471-518	580-593	473-501	510-551	459-471
443-451	437-455		458-467	447-463	447-463	3	486-505	519-540	594-607	502-526	552-577	472-497
452-470	456-480		468-475	464-488	464-481	4	506-521	541-561	608-613	527-551	578-593	498-518
471-500	481-507		476-484	489-514	482-493	5	522-536	562-586	614-625	552-568	594-608	519-532
501-517	508-548		485-513	515-536	494-502	6	537-561	587-602	626-632	569-585	609-627	533-547
518-538	549-572		514-529	537-557	503-515	7	562-576	603-627	633-636	586-601	628-650	548-563
539-566	573-598		530-545	558-590	516-536	8	577-598	628-651	637-642	602-615	651-660	564-581
567-604	599-651		546-573	591-610	537-564	9	599-636	652-676	643-651	616-639	661-688	582-611
605-827	652-826		574-823	611-847	565-836	10	637-827	677-826	652-822	640-823	689-847	612-836

Age: 12												
DECILE												
316-446	311-453		326-443	335-452	338-440	1	316-469	311-480	453-580	326-505	335-539	338-487
447-460	454-473		444-469	453-498	441-462	2	470-494	481-523	581-599	506-525	540-580	488-514
461-477	474-488		470-481	499-522	463-476	3	495-518	524-553	600-605	526-547	581-592	517-533
478-489	489-515		482-503	523-548	477-492	4	519-540	554-579	606-609	548-572	593-614	534-552
490-505	516-535		504-512	549-565	493-507	5	541-555	580-604	610-618	573-588	615-635	553-567
506-528	536-555		513-526	566-580	508-516	6	556-578	605-623	619-622	589-605	636-653	568-578
529-544	556-583		527-548	581-598	517-525	7	579-597	624-645	623-630	606-618	654-666	579-593
545-559	584-601		549-577	599-632	526-548	8	598-614	646-659	631-646	619-628	667-683	594-612
560-601	602-642		578-602	633-652	549-595	9	615-638	660-681	647-659	629-649	684-703	613-625
602-827	643-826		603-823	653-847	596-836	10	639-827	682-826	660-822	650-823	704-847	626-836

Age: 13												
DECILE												
316-448	311-442		326-453	335-484	338-440	1	316-474	311-504	453-592	326-498	335-545	338-503
449-454	443-468		454-478	485-512	441-465	2	475-495	505-550	593-602	499-534	546-577	504-525
455-473	469-493		479-502	513-539	466-490	3	497-526	551-578	603-609	535-561	578-600	526-547
474-496	494-513		503-524	540-568	491-507	4	527-555	579-601	610-615	562-578	601-631	548-563
497-517	514-547		525-541	569-584	508-523	5	556-571	602-624	616-625	579-595	632-649	564-569
518-556	548-587		542-552	585-621	524-539	6	572-591	625-645	626-631	596-615	650-657	570-589
557-575	588-606		553-570	622-645	540-557	7	592-608	646-653	632-638	616-628	658-674	590-612
576-591	607-640		571-604	646-660	558-575	8	609-623	654-684	639-647	629-649	675-698	613-627
592-628	641-675		605-630	661-673	576-618	9	624-642	685-717	648-660	650-667	699-722	628-646
629-827	676-826		631-823	674-847	619-836	10	643-827	718-826	661-822	668-823	723-847	647-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students residing in the Northeastern Region

24

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns
Age: 17											
DECILE											
316-482	311-511	453-584	326-526	335-567	338-515	316-500	311-560	453-595	326-557	335-600	338-528
483-517	512-551	585-595	527-554	568-596	516-538	501-551	561-599	596-604	558-589	601-639	529-562
518-539	552-593	596-606	555-570	597-628	539-548	552-577	600-632	605-615	590-614	640-658	563-593
540-566	594-607	607-618	571-583	629-644	549-566	578-597	633-646	616-621	615-633	659-672	594-613
567-580	608-628	619-627	584-608	645-657	567-580	598-609	647-663	622-627	634-652	673-683	614-627
581-591	629-651	628-638	609-623	658-667	581-604	610-625	664-675	628-637	653-665	684-693	628-641
592-617	652-661	639-650	624-640	668-686	605-643	626-642	676-693	638-648	666-679	694-700	642-661
618-634	662-677	651-660	641-668	687-705	644-669	643-653	694-711	649-672	680-695	701-711	662-684
635-658	678-708	661-678	669-696	706-731	670-691	654-685	712-744	673-683	696-712	712-733	685-702
659-827	709-826	679-822	697-823	732-847	692-836	686-827	745-826	684-822	713-823	734-847	703-836

Age: 18											
DECILE											
316-515	311-551	453-582	326-541	335-602	338-525	316-500	311-554	453-587	326-530	335-586	338-514
516-540	552-601	583-599	542-569	603-617	526-549	501-540	555-617	588-597	531-570	587-628	515-544
541-559	602-622	600-606	570-595	618-631	550-565	541-566	618-646	598-606	571-591	629-651	545-564
560-577	623-645	607-620	596-612	632-654	566-586	567-579	647-657	607-615	592-612	652-662	565-579
578-594	646-653	621-631	613-627	655-670	587-601	580-595	658-666	616-626	613-627	663-675	580-596
595-612	654-673	632-640	628-641	671-680	602-627	596-608	667-675	627-634	628-640	676-688	597-612
613-629	674-682	641-651	642-663	681-695	628-654	609-624	676-692	635-645	641-660	689-700	613-635
630-640	683-699	652-663	664-680	696-713	655-672	625-642	693-713	646-657	661-679	701-717	636-659
641-671	700-711	664-683	681-701	714-732	673-694	643-661	714-736	658-670	680-701	718-738	660-691
672-827	712-826	684-822	702-823	733-847	695-836	662-827	737-826	671-822	702-823	739-847	692-836

316-504	311-552	453-602	326-533	335-567	338-535
505-557	553-618	603-613	534-588	568-636	536-573
558-588	619-647	614-621	589-614	637-652	574-591
589-606	648-659	622-630	615-629	653-670	592-607
607-618	660-673	631-638	630-647	671-686	608-625
619-628	674-680	639-648	648-660	687-696	626-643
629-638	681-694	649-659	661-679	697-707	644-659
639-646	695-710	660-665	680-694	708-721	660-675
647-676	711-726	666-684	695-709	722-745	676-685
677-827	727-826	685-822	710-823	746-847	686-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students residing in the Midwestern Region

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	
Age: 11												
DECILE												
316-442	311-435		326-459	335-457	338-455	1	316-469	311-492	453-591	326-479	335-536	338-474
443-454	436-459		460-469	458-497	456-466	2	470-496	493-521	592-604	480-525	537-551	475-496
455-470	460-476		470-485	498-529	467-480	3	497-511	522-562	605-608	526-544	552-578	497-520
471-493	477-501		486-491	530-538	481-491	4	512-530	563-584	609-612	545-560	579-604	521-549
494-499	502-520		492-505	539-551	492-501	5	531-550	585-602	613-618	561-579	605-622	550-556
500-518	521-535		506-517	552-567	502-509	6	551-568	603-626	619-627	580-588	623-632	557-567
519-537	536-557		518-531	568-581	510-514	7	569-592	627-637	628-632	589-606	633-646	568-582
538-549	558-580		532-545	582-590	515-526	8	593-612	638-654	633-635	607-619	647-665	583-603
550-581	581-607		546-577	591-650	527-555	9	613-628	655-688	636-658	620-636	666-687	604-627
582-827	608-826		578-823	651-847	556-836	10	629-827	689-826	659-822	637-823	688-847	628-836

Age: 12												
DECILE												
316-455	311-454		326-454	335-452	338-449	1	316-487	311-505	453-570	326-506	335-531	338-475
456-468	455-476		455-473	453-504	450-466	2	488-510	506-534	571-582	507-524	532-555	476-507
469-485	477-500		474-494	505-525	467-480	3	511-524	535-559	583-603	525-548	556-583	508-524
486-493	501-522		495-509	526-550	481-489	4	525-538	560-583	604-610	549-561	584-622	525-538
494-507	523-550		510-524	551-567	490-499	5	539-555	584-601	611-614	562-578	623-639	539-547
508-526	551-568		525-534	568-581	500-514	6	556-577	602-621	615-621	579-590	640-654	548-562
527-555	569-593		535-562	582-590	515-527	7	578-596	622-645	622-631	591-609	655-669	563-584
556-570	594-610		563-580	591-614	528-546	8	597-608	646-660	632-642	610-635	670-678	585-602
571-609	611-642		581-603	615-650	547-569	9	609-630	661-678	643-649	636-654	679-697	603-630
610-827	643-826		604-823	651-847	570-836	10	631-827	679-826	650-822	655-823	698-847	631-836

Age: 13												
DECILE												
316-453	311-461		326-471	335-493	338-469	1	316-481	311-522	453-589	326-519	335-552	338-482
454-477	462-497		472-491	494-526	470-489	2	482-527	523-577	590-602	520-550	553-588	483-511
478-489	498-519		492-516	527-543	490-502	3	528-549	578-601	603-607	551-571	589-616	512-532
490-507	520-544		517-532	544-559	503-520	4	550-565	602-620	608-614	572-593	617-630	533-552
508-532	545-568		533-555	560-575	521-531	5	566-581	621-635	615-621	594-606	631-648	553-558
533-552	569-589		556-567	576-592	532-544	6	582-596	636-652	622-628	607-621	649-663	559-579
553-571	590-613		568-581	593-618	545-565	7	597-614	653-664	629-638	622-641	664-680	580-590
572-594	614-649		582-602	619-635	566-579	8	615-638	665-677	639-645	642-655	681-692	591-605
595-630	650-672		603-630	636-669	580-601	9	639-656	678-706	646-660	656-680	693-710	606-637
631-827	673-826		631-823	670-847	602-836	10	657-827	707-826	661-822	681-823	711-847	638-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students residing in the Midwestern Region

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	
Age: 17												
DECILE												
316-493	311-543	453-591	326-541	335-568	338-511	1	316-492	311-551	453-581	326-531	335-587	338-510
494-535	544-584	592-602	542-578	569-622	512-521	2	493-528	552-595	582-600	532-571	588-622	511-544
536-559	585-608	603-610	579-593	623-645	522-533	3	529-555	596-621	601-609	572-593	623-643	545-561
560-575	609-628	611-618	594-608	646-660	534-561	4	556-577	622-643	610-616	594-612	644-658	562-583
576-597	629-641	619-622	609-620	661-673	562-571	5	578-591	644-660	617-624	613-626	659-670	584-600
598-608	642-662	623-629	621-640	674-687	572-597	6	592-605	661-674	625-630	627-639	671-680	601-632
609-623	663-674	630-638	641-654	688-695	598-617	7	606-624	675-690	631-640	640-660	681-690	633-646
624-644	675-688	639-648	655-664	696-707	618-629	8	625-643	691-702	641-658	661-673	691-709	647-665
645-661	689-715	649-663	665-686	708-726	630-664	9	644-663	703-721	659-674	674-702	710-728	666-685
662-827	716-826	664-822	687-823	727-847	665-836	10	664-827	722-826	675-822	703-823	729-847	686-836

Age: 18

DECILE												
316-500	311-529	453-586	326-546	335-571	338-510	1	316-500	311-574	453-585	326-536	335-578	338-492
501-538	530-596	587-603	547-557	572-619	511-545	2	501-538	575-602	586-598	537-567	579-628	493-519
539-564	597-610	604-610	558-586	620-642	546-569	3	539-565	603-628	599-608	568-588	629-651	520-549
565-581	611-634	611-620	587-612	643-659	570-578	4	566-581	629-645	609-618	589-612	652-665	550-594
582-595	635-652	621-625	613-627	660-671	579-600	5	582-594	646-663	619-628	613-628	666-675	595-610
596-610	653-666	626-634	628-638	672-681	601-617	6	595-610	664-677	629-638	629-641	676-686	611-631
611-630	667-676	635-648	639-656	682-697	618-640	7	611-628	678-693	639-646	642-657	687-697	632-658
631-649	677-693	649-664	657-677	698-709	641-661	8	629-646	694-714	647-660	658-675	698-708	659-678
650-664	694-718	665-676	678-694	710-727	662-694	9	647-668	715-737	661-678	676-695	709-728	679-703
665-827	719-826	677-822	695-823	728-847	695-836	10	669-827	738-826	679-822	696-823	729-847	704-836

316-497	311-532	453-594	326-541	335-575	338-498
498-545	533-587	595-603	542-569	576-617	499-540
546-560	588-618	604-616	570-591	618-631	541-576
561-575	619-641	617-621	592-616	632-660	577-598
576-591	642-652	622-630	617-630	661-672	599-615
592-611	653-666	631-636	631-651	673-686	616-638
612-630	667-678	637-645	652-664	687-701	639-648
631-646	679-691	646-650	665-679	702-713	649-668
647-671	692-712	651-668	680-697	714-738	669-684
672-827	713-826	669-822	698-823	739-847	685-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students residing in the Southern Region

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applcatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applcatns	
Age: 11												
DECILE												
316-437	311-436		326-435	335-449	338-430	1	316-460	311-469	453-568	326-477	335-527	338-464
438-454	437-455		436-460	450-475	431-445	2	461-478	470-508	569-580	478-503	528-546	465-487
455-464	456-474		461-468	476-494	446-457	3	479-494	509-521	581-590	504-523	547-566	488-503
465-482	475-487		469-477	495-513	458-472	4	495-509	522-557	591-607	524-537	567-582	504-512
483-493	488-505		478-486	514-527	473-485	5	510-533	558-577	608-613	538-550	583-597	513-526
494-512	506-521		487-504	528-540	486-499	6	534-554	578-593	614-622	551-565	598-612	527-541
513-531	522-550		505-524	541-567	500-516	7	555-571	594-616	623-628	566-581	613-629	542-561
532-543	551-568		525-542	568-585	517-528	8	572-590	617-636	629-634	582-604	630-642	562-580
544-592	569-602		543-572	586-613	529-546	9	591-618	637-671	635-656	605-622	643-669	581-610
593-827	603-826		573-823	614-847	547-836	10	619-827	672-826	657-822	623-823	670-847	611-836

Age: 13

DECILE												
316-431	311-437		326-453	335-482	338-451	1	316-466	311-478	453-582	326-470	335-517	338-456
432-460	438-466		454-469	483-517	452-463	2	467-478	479-513	583-589	471-497	519-550	457-477
461-474	467-489		470-486	518-539	464-471	3	479-498	514-537	590-598	498-518	551-565	478-492
475-487	490-509		487-513	540-551	472-485	4	499-518	538-572	599-603	519-540	566-586	493-512
488-506	510-533		514-525	552-567	486-495	5	519-543	573-596	604-615	541-555	587-602	513-527
507-523	534-556		526-540	568-572	496-516	6	544-556	597-605	616-620	556-570	603-618	528-549
524-550	557-582		541-552	573-588	517-527	7	557-576	606-637	621-627	571-586	619-636	550-564
551-572	583-603		553-570	589-612	528-545	8	577-597	638-662	628-636	587-605	637-654	565-575
573-593	604-636		571-593	613-643	546-566	9	598-620	663-691	637-656	606-629	655-680	576-599
594-827	637-826		594-823	644-847	567-836	10	621-827	692-826	657-822	630-823	681-847	600-836

Age: 15

DECILE												
316-461	311-469		326-469	335-494	338-457	1	316-479	311-511	453-568	326-506	335-550	338-483
462-488	470-510		470-492	495-530	458-475	2	480-505	512-531	569-584	507-525	551-580	484-512
489-500	511-530		493-507	531-556	476-489	3	506-528	532-569	585-594	526-543	581-602	513-530
501-517	531-550		508-523	557-568	490-504	4	529-544	570-589	595-606	544-566	603-617	531-543
518-539	551-572		524-537	569-588	505-522	5	545-564	590-606	607-613	567-582	618-632	544-553
540-555	573-597		538-556	589-613	523-530	6	565-579	607-625	614-626	583-595	633-642	554-563
556-565	598-612		557-575	614-634	531-538	7	580-594	626-646	627-634	596-612	643-655	564-575
566-582	613-642		576-597	635-649	539-550	8	595-611	647-674	635-643	613-633	656-673	576-608
583-609	643-669		598-613	650-660	551-577	9	612-641	675-696	644-663	634-661	674-691	609-643
610-827	670-826		614-823	661-847	578-836	10	642-827	697-826	664-822	662-823	692-847	644-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students residing in the Southern Region

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns
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Age: 17

DECILE

316-478	311-510	453-520	326-513	335-565	338-485	1	316-494	311-550	453-584	326-530	335-577	338-501
479-510	511-546	571-592	514-540	566-594	486-526	2	495-526	551-601	585-601	531-567	578-616	502-540
511-535	547-579	593-603	541-554	595-610	527-537	3	527-555	602-624	602-614	568-594	617-645	541-555
536-552	580-610	604-610	555-577	611-623	538-553	4	556-569	625-649	615-620	595-611	646-666	556-575
553-571	611-631	611-619	578-591	624-639	554-563	5	570-588	650-663	621-631	612-624	667-673	576-588
572-586	632-649	620-630	592-604	640-654	564-576	6	589-610	664-674	632-639	625-649	674-684	589-606
587-599	650-660	631-639	605-620	655-668	577-589	7	611-627	675-686	640-647	650-661	685-699	607-626
600-619	661-675	640-644	621-648	669-688	590-620	8	628-641	687-700	648-657	662-681	700-716	627-653
620-647	676-704	645-659	649-682	689-710	621-648	9	642-660	701-725	658-673	682-706	717-738	654-671
648-827	705-826	660-822	683-823	711-847	649-836	10	661-827	726-826	674-822	707-823	739-847	672-836

Age: 18

DECILE

316-490	311-514	453-578	326-524	335-567	338-488	1	316-494	311-551	453-580	326-523	335-573	338-501
491-524	515-577	579-591	525-555	568-607	489-519	2	495-522	552-595	581-593	524-555	574-614	502-524
525-553	578-605	592-603	556-577	608-635	520-540	3	523-548	596-618	594-602	556-577	615-639	525-543
554-566	606-626	604-611	578-594	636-645	541-559	4	549-565	619-643	603-609	578-593	640-654	544-557
567-583	627-642	612-621	595-613	646-663	560-576	5	566-578	644-655	610-617	594-613	655-665	558-575
584-601	643-659	622-629	614-627	664-672	577-593	6	579-591	656-673	618-622	614-631	666-674	576-591
602-622	660-674	630-641	628-642	673-686	594-617	7	592-603	674-683	623-631	632-650	675-688	592-612
623-642	675-691	642-653	643-666	687-697	618-634	8	604-624	684-695	632-642	651-664	689-698	613-636
643-669	692-714	654-679	667-694	698-717	635-665	9	625-647	696-717	643-654	665-686	699-719	637-661
670-827	715-826	680-822	695-823	718-847	666-836	10	648-827	718-826	655-822	687-823	720-847	662-836

316-495	311-550	453-583	326-537	335-579	338-494
496-530	551-594	584-598	538-565	580-620	495-537
531-549	595-622	599-606	566-583	621-643	538-552
550-573	623-635	607-617	584-602	644-655	553-561
574-590	636-650	618-621	603-623	656-670	562-578
591-601	651-664	622-629	624-638	671-680	579-607
602-617	665-675	630-638	639-653	681-689	608-630
618-635	676-693	639-651	654-663	690-698	631-648
636-662	694-720	652-681	664-686	699-719	649-678
663-827	721-826	682-822	687-823	720-847	679-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students residing in the Western Region

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns
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Age: 11

DECILE

316-437						316-451	311-476		326-460	335-479	338-460
438-449						452-466	477-516		461-481	480-526	461-471
450-455						467-487	517-551		482-498	527-567	472-484
456-464						488-512	552-579		499-531	568-575	485-499
465-475						513-549	580-589		532-557	576-595	500-509
476-493						550-575	590-618		558-575	596-629	510-540
494-504						576-588	619-644		576-595	630-643	541-551
505-548						589-607	645-660		596-610	644-661	552-579
549-574						608-630	661-675		611-635	662-671	580-613
575-827						631-827	676-826		636-823	672-847	614-836

Age: 12

DECILE

316-429	311-432	326-444	335-443			316-465	311-521		326-495	335-540	338-485
430-448	433-453	445-466	444-469			466-483	522-549		496-530	541-567	486-507
449-457	454-472	467-476	470-506			484-515	550-583		531-548	568-591	508-517
458-471	473-489	477-479	507-525			516-529	584-597		549-568	592-611	518-535
472-481	490-516	480-489	526-549			530-544	598-617		569-580	612-632	536-554
482-505	517-562	490-527	550-557			545-571	618-629		581-587	633-642	555-569
506-551	563-591	528-561	558-581			572-583	630-642		588-606	643-653	570-585
552-563	592-615	562-587	582-622			584-599	643-652		607-620	654-664	586-594
564-605	616-651	588-633	623-653			600-621	653-675		621-639	665-691	595-644
606-827	652-826	634-823	654-847			622-827	676-826		640-823	692-847	645-836

Age: 13

DECILE

316-444	311-467	326-468	335-503			316-461	311-506	453-592	326-496	335-519	338-470
445-463	468-492	469-489	504-542			462-498	507-550	593-599	497-524	520-572	471-509
464-482	493-521	490-514	543-551			499-527	551-583	600-603	525-550	573-597	510-528
483-503	522-545	515-529	552-572			528-548	584-600	604-616	551-575	598-611	529-555
504-520	546-550	530-542	573-583			549-567	601-611	617-620	576-594	612-636	556-567
521-536	551-569	543-554	584-593			568-578	612-639	621-627	595-607	637-654	568-584
537-546	570-600	555-574	594-607			579-593	640-656	628-636	608-619	655-674	585-595
547-568	601-605	575-600	608-626			594-612	657-674	637-646	620-638	675-689	596-626
569-596	606-637	601-628	627-658			613-645	675-692	647-662	639-680	690-709	627-652
597-827	638-826	629-823	659-847			646-827	693-826	663-822	681-823	710-847	653-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students residing in the Western Region

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns
Age: 17											
DECILE											
316-485	311-529	453-581	326-524	335-566	338-519	316-477	311-575	453-591	326-529	335-569	338-510
486-518	530-577	582-600	525-554	567-596	520-543	478-526	576-605	592-600	530-560	570-623	511-537
519-542	578-605	601-609	555-576	597-619	544-558	527-551	606-634	601-605	561-583	624-640	538-561
543-565	606-626	610-616	577-592	620-639	559-572	552-567	635-652	606-613	584-606	641-659	562-583
566-576	627-639	617-621	593-613	640-659	573-597	568-589	653-665	614-620	607-619	660-669	584-598
577-597	640-659	622-629	614-627	660-667	598-608	590-606	666-675	621-631	620-637	670-680	599-614
598-614	660-676	630-635	628-646	668-677	609-624	607-622	676-684	632-639	638-651	681-688	615-636
615-625	677-698	636-654	647-651	678-698	625-639	623-633	685-710	640-651	652-664	689-707	637-657
626-662	699-724	655-676	652-670	699-723	640-667	634-653	711-724	652-667	665-684	708-725	658-676
663-827	725-826	671-822	671-823	724-847	668-836	654-827	725-826	668-822	685-823	726-847	677-836

Age: 18

DECILE											
316-473	311-520	453-579	326-501	335-566	338-509	316-489	311-550	453-579	326-531	335-570	338-524
474-517	521-579	580-593	502-555	567-616	510-531	490-508	551-601	580-598	532-552	571-622	525-548
518-548	580-601	594-605	556-576	617-639	532-557	509-543	602-622	599-603	553-586	623-645	549-562
549-569	602-617	606-616	577-593	640-653	558-578	544-564	623-647	604-614	587-609	646-662	563-577
570-590	618-644	617-623	594-611	654-664	579-596	565-578	648-661	615-620	610-628	663-670	578-595
591-605	645-663	624-629	612-629	665-674	597-616	579-594	662-675	621-627	629-638	671-679	596-613
606-615	664-679	630-642	630-644	675-684	617-628	595-608	676-688	628-634	639-653	680-688	614-639
616-628	680-698	643-648	645-666	685-701	629-650	609-626	689-699	635-642	654-662	689-700	640-652
629-657	699-722	649-670	667-694	702-725	651-676	627-645	700-736	643-651	663-683	701-719	653-675
658-827	723-826	671-822	695-823	726-847	677-836	646-827	737-826	652-822	684-823	720-847	676-836

316-464	311-547	453-593	326-520	335-542	338-482
465-513	548-586	594-601	521-559	543-610	483-523
514-532	587-612	602-610	560-582	611-642	524-546
533-559	613-629	611-614	583-602	643-659	547-564
560-585	630-652	615-629	603-621	660-671	565-590
586-602	653-670	630-635	622-632	672-687	591-614
603-619	671-675	636-646	633-656	688-697	615-634
620-638	676-694	647-659	657-686	698-710	635-668
639-659	695-710	660-685	687-712	711-730	669-696
660-827	711-826	686-822	713-823	731-847	697-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students attending RESIDENTIAL schools

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmput	Math n	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns
Age: 11												
DECILE												
316-436	311-430		326-446	335-432	338-436		316-462	311-482	453-574	326-465	335-521	338-457
437-449	431-449		447-465	433-456	437-460		463-481	483-517	575-588	466-487	522-542	458-474
450-459	450-463		466-470	457-478	461-472		482-499	518-544	589-598	488-519	543-562	475-489
460-472	464-486		471-479	479-509	473-479		500-511	545-567	599-607	520-533	563-581	490-503
473-490	487-510		480-487	510-520	480-491		512-532	568-583	608-611	534-551	582-597	504-517
491-499	511-525		488-497	521-536	492-498		533-554	584-601	612-615	552-568	598-609	518-541
500-513	526-550		498-516	537-551	499-509		555-571	602-622	616-623	569-583	610-631	542-552
514-535	551-566		517-524	552-569	510-515		572-586	623-643	624-629	584-599	632-652	553-574
536-576	567-593		525-545	570-607	516-537		587-611	644-669	630-634	600-619	653-670	575-608
577-827	594-826		546-823	608-847	538-836		612-827	670-826	635-822	620-823	671-847	609-836

Age: 12

DECILE												
316-453	311-451		326-447	335-445	338-447		316-471	311-492	453-568	326-492	335-534	338-471
454-467	452-477		448-465	446-485	448-461		472-490	493-530	569-579	493-516	535-554	472-491
468-476	478-498		466-475	486-513	462-469		491-512	531-564	580-588	517-532	555-578	492-510
477-487	499-511		476-484	514-537	470-478		513-532	565-584	589-601	533-552	579-599	511-525
488-496	512-529		485-505	538-552	479-495		533-547	585-601	602-609	553-569	600-618	526-547
497-507	530-550		506-519	553-567	496-513		548-557	602-619	610-617	570-580	619-637	548-562
508-528	551-576		520-533	568-586	514-526		558-576	620-640	618-621	581-598	638-654	563-570
529-556	577-600		534-562	587-606	527-545		577-595	641-655	622-631	599-626	655-671	571-587
557-590	601-635		563-594	607-651	546-569		596-614	656-672	632-648	627-646	672-692	588-617
591-827	636-826		595-823	652-847	570-836		615-827	673-826	649-822	647-823	693-847	618-836

Age: 13

DECILE												
316-455	311-456		326-465	335-497	338-454		316-479	311-512	453-577	326-505	335-550	338-483
456-477	457-501		466-489	498-526	455-475		480-503	513-550	578-588	506-526	551-579	484-516
478-487	502-529		490-507	527-542	476-490		504-533	551-580	589-601	527-550	580-599	517-534
488-508	530-550		508-520	543-557	491-504		534-548	581-600	602-605	551-571	600-619	535-543
509-530	551-568		521-536	558-575	505-522		549-560	601-611	606-611	572-584	620-635	544-559
531-547	569-586		537-556	576-588	523-530		561-577	612-635	612-620	585-598	636-648	560-565
548-556	587-602		557-570	589-621	531-543		578-594	636-652	621-627	599-617	649-661	566-578
557-572	603-642		571-582	622-642	544-557		595-609	653-664	628-634	618-635	662-680	579-600
573-600	643-663		583-605	643-665	558-581		610-639	665-690	635-647	636-660	681-700	601-637
601-827	664-826		606-823	666-847	582-836		640-827	691-826	648-822	661-823	701-847	638-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students attending RESIDENTIAL schools

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	
Age: 17												
DECILE												
316-484	311-523	453-585	326-524	335-573	338-514	1	316-505	311-568	453-584	326-541	335-589	338-514
485-519	524-558	586-602	525-554	574-607	515-529	2	506-538	569-602	585-599	542-574	590-630	515-543
520-544	559-602	603-611	555-573	608-626	530-543	3	539-560	603-631	600-608	575-599	631-651	544-566
545-566	603-627	612-618	574-591	627-644	544-560	4	561-578	632-652	609-616	600-613	652-666	567-584
567-583	628-637	619-624	592-607	645-659	561-569	5	579-594	653-665	617-624	614-629	667-674	585-600
584-599	638-654	625-632	608-621	660-672	570-585	6	595-608	666-674	625-632	630-649	675-684	601-619
600-614	655-672	633-638	622-643	673-686	586-609	7	609-625	675-685	633-640	650-661	685-697	620-634
615-632	673-686	639-650	644-662	687-701	610-644	8	626-640	686-701	641-652	662-679	698-715	635-655
633-659	687-711	651-664	663-687	702-720	645-678	9	641-657	702-721	653-668	680-703	716-735	656-677
660-827	712-826	665-822	688-823	721-847	679-836	10	652-827	722-826	669-822	704-823	736-847	678-836

Age: 18

DECILE												
316-495	311-534	453-579	326-533	335-570	338-507	1	316-498	311-555	453-583	326-533	335-582	338-503
496-537	535-596	580-592	534-559	571-617	508-534	2	499-533	556-601	584-594	534-561	583-624	504-528
538-560	597-613	593-603	560-583	618-639	535-558	3	534-553	602-628	595-602	562-585	625-649	529-545
561-575	614-635	604-610	584-600	640-654	559-577	4	554-569	629-649	603-609	586-605	650-661	546-559
576-587	636-652	611-620	601-615	655-665	578-587	5	570-582	650-663	610-618	606-621	662-671	560-575
588-601	653-663	621-628	616-629	666-673	588-604	6	583-595	664-674	619-625	622-634	672-679	576-592
602-617	664-675	629-639	630-647	674-688	605-630	7	596-608	675-687	626-634	635-651	680-689	593-614
618-639	676-694	640-649	648-666	689-706	631-648	8	609-628	688-696	635-645	652-666	690-706	615-637
640-658	695-714	650-670	667-685	707-725	649-670	9	629-648	697-720	646-662	667-690	707-727	638-661
659-827	715-826	671-822	686-823	726-847	671-836	10	649-827	721-826	663-822	691-823	728-847	662-836

316-491	311-540	453-591	326-532	335-570	338-497
492-536	541-596	592-603	533-565	571-615	498-536
537-557	597-621	604-614	566-589	616-640	537-554
558-576	622-641	615-620	590-613	641-657	555-577
577-596	642-654	621-628	614-628	658-671	578-597
597-611	655-672	629-636	629-640	672-684	598-619
612-626	673-679	637-643	641-656	685-695	620-640
627-637	680-692	644-651	657-672	696-708	641-659
638-656	693-712	652-668	673-695	709-726	660-679
657-827	713-826	669-822	696-823	727-847	680-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students attending DAY schools

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns
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Age: 11

DECILE

1	316-449	311-457	326-463	335-456							
2	450-459	458-490	464-478	457-506							
3	460-469	491-512	479-495	507-537							
4	470-480	513-531	496-523	538-560							
5	481-499	532-550	524-543	561-583							
6	500-515	551-579	544-555	584-602							
7	516-535	580-601	556-570	603-618							
8	536-555	602-620	571-583	619-635							
9	556-580	621-653	584-610	636-660							
10	581-827	654-826	611-823	661-847							

Age: 12

DECILE

316-422	311-437	326-443	335-430	338-413	1	316-449	311-454	326-465	335-503	338-464
423-438	438-456	444-459	431-464	414-448	2	450-460	455-489	466-507	504-532	465-482
439-455	457-469	460-475	465-494	449-455	3	461-479	490-512	508-520	533-564	483-499
456-463	470-489	476-484	495-511	456-466	4	480-490	513-533	521-535	565-586	500-514
464-480	490-519	485-511	512-526	467-480	5	491-511	534-551	536-550	587-596	515-518
481-492	520-533	512-522	527-550	481-500	6	512-523	552-581	551-566	597-610	519-533
493-518	534-552	523-529	551-564	501-513	7	524-544	582-601	567-580	611-635	534-553
519-534	553-589	530-539	565-587	514-518	8	545-569	602-631	581-594	636-652	554-564
535-576	590-611	540-562	588-642	519-532	9	570-611	632-652	595-624	653-679	565-597
577-827	612-826	563-823	643-847	533-836	10	612-827	653-826	625-823	680-847	598-836

Age: 13

DECILE

316-425		326-444	335-483		1	316-460	311-481	326-482	335-501	338-461
426-442		445-454	484-505		2	461-468	482-516	483-513	502-542	462-493
443-451		455-476	506-520		3	469-489	517-533	514-533	543-567	494-510
452-457		477-497	521-541		4	490-503	534-576	534-550	568-582	511-516
458-487		498-512	542-557		5	504-528	577-596	551-570	583-604	517-528
488-495		513-536	558-569		6	529-556	597-612	571-581	605-621	529-546
496-517		537-552	570-612		7	557-578	613-637	582-595	622-645	547-564
518-582		553-576	613-627		8	579-597	638-653	596-616	646-660	565-584
583-619		577-634	628-659		9	598-618	654-687	617-650	661-707	585-614
620-827		635-823	660-847		10	619-827	688-826	651-823	708-847	615-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students attending DAY schools

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Mat' Computatn	Math Applicatns
Age: 17											
DECILE											
316-458	311-497		326-492	335-538	338-478	316-454			326-479	335-515	
459-481	498-512		493-530	539-567	479-491	455-461			480-498	516-540	
482-496	513-553		531-551	568-581	492-514	462-479			499-533	541-588	
497-523	554-580		552-572	582-602	515-526	480-497			534-564	589-610	
524-542	581-604		573-587	603-624	527-543	498-525			565-587	611-640	
543-570	605-624		588-599	625-641	544-563	526-544			588-616	641-655	
571-581	625-643		600-614	642-657	564-591	545-569			617-622	656-677	
582-599	644-652		615-634	658-679	592-608	570-597			623-637	678-688	
600-620	653-675		635-650	680-693	609-638	598-620			638-639	689-706	
621-827	676-826		651-823	694-847	639-836	621-827			640-823	707-847	

Age: 18

DECILE											
316-471	311-523		326-511	335-566		316-466	311-550	453-577	326-501	335-542	
472-494	524-551		512-548	567-598		467-481	551-582	578-595	502-538	543-584	
495-505	552-601		549-556	599-614		482-505	583-616	596-603	539-563	585-620	
506-538	602-611		557-580	615-626		506-530	617-635	604-609	564-582	621-640	
539-556	612-633		581-592	627-640		531-569	636-646	610-612	583-595	641-659	
557-579	634-646		593-615	641-654		570-583	647-658	613-620	596-622	660-672	
580-593	647-666		616-631	655-670		584-593	659-675	621-628	623-638	673-683	
594-618	667-690		632-648	671-687		594-612	676-703	629-638	639-654	684-689	
619-637	691-716		649-682	688-715		613-627	704-737	639-659	655-675	690-715	
638-827	717-826		683-823	716-847		628-827	738-826	660-822	676-823	716-847	

316-454	311-538	326-505	335-516
455-475	539-590	506-540	517-566
476-512	591-610	541-560	567-597
513-526	611-619	561-573	598-631
527-547	620-637	574-593	632-652
548-557	638-645	594-609	653-665
558-580	646-656	610-629	666-674
581-591	657-670	630-639	675-691
592-614	671-681	640-666	692-709
615-827	682-826	667-823	710-847

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students attending residential OR day schools
(Both types of schools are considered as a single group)

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns
Age: 11											
DECILE											
316-433	311-428		326-443	335-433	338-432	316-456	311-468	453-574	326-465	335-503	338-453
434-447	429-444		444-456	434-455	433-448	457-471	469-511	575-586	466-484	504-536	454-466
448-455	445-460		457-467	456-470	449-459	472-487	512-527	587-591	485-512	537-552	457-479
456-464	461-481		468-473	471-496	460-471	488-503	528-556	592-605	513-532	553-579	480-496
465-485	482-504		474-482	497-517	472-480	504-520	557-578	606-609	533-549	580-592	497-509
486-494	505-522		483-491	518-530	481-495	521-537	579-600	610-614	550-565	593-608	510-526
495-509	523-550		492-509	531-549	496-501	538-564	601-611	615-622	566-580	609-625	527-546
510-533	551-566		510-524	550-567	502-516	565-580	612-639	623-629	581-594	626-648	547-565
534-569	567-596		525-550	568-603	517-539	581-609	640-667	630-639	595-619	649-669	566-603
570-827	597-826		551-823	604-847	540-836	610-827	668-826	640-822	620-823	670-847	604-836
Age: 12											
DECILE											
316-442	311-447		326-446	335-442	338-442	316-465	311-484	453-570	326-486	335-525	338-468
443-456	448-469		447-464	443-478	443-456	466-480	485-518	571-584	487-512	526-551	469-490
457-470	470-488		465-475	479-509	457-466	481-500	519-550	585-591	513-531	552-569	491-509
471-480	489-507		476-484	510-524	467-475	501-517	551-576	592-606	532-546	570-590	510-522
481-490	508-522		485-506	525-550	476-491	518-536	577-598	607-610	547-564	591-613	523-539
491-504	523-544		507-523	551-567	492-509	537-550	599-609	611-618	565-576	614-629	540-558
505-524	545-571		524-532	568-579	510-518	551-567	610-631	619-621	577-592	630-651	559-568
525-555	572-601		533-555	580-603	519-531	568-589	632-650	622-632	593-614	652-667	569-586
556-584	602-632		556-576	604-651	532-555	590-614	651-667	633-649	615-639	668-689	587-617
585-827	633-826		577-823	652-847	556-836	615-827	668-826	650-822	640-823	690-847	618-836
Age: 13											
DECILE											
316-444	311-446		326-457	335-493	338-438	316-469	311-510	453-577	326-498	335-534	338-477
445-457	447-479		458-480	494-517	439-465	470-490	511-532	578-590	499-524	535-567	478-509
458-481	480-514		481-498	518-537	466-479	491-517	533-572	591-601	525-542	568-593	510-523
482-494	515-532		499-513	538-552	480-492	518-540	573-594	602-606	543-566	594-609	524-539
495-514	533-550		514-532	553-569	493-509	541-557	595-608	607-612	567-581	610-628	540-553
515-539	551-578		533-550	570-588	510-527	558-572	609-631	613-620	582-594	629-643	554-564
540-554	579-601		551-566	589-618	528-538	573-591	632-647	621-626	595-613	644-659	565-577
555-574	602-638		567-581	619-643	539-549	592-607	648-663	627-634	614-630	660-679	578-597
575-610	639-663		582-608	644-661	550-576	608-635	664-689	635-648	631-658	680-701	598-633
611-827	664-826		609-823	662-847	577-836	636-827	690-826	649-822	659-823	702-847	634-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students attending residential OR day schools
(Both types of schools are considered as a single group)

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	
Age: 17												
DECILE												
316-477	311-511	453-582	326-519	335-565	338-498	1	316-490	311-551	453-584	326-530	335-576	338-509
478-506	512-551	583-599	520-549	566-593	499-525	2	491-526	552-601	585-599	531-569	577-621	510-537
507-533	552-592	600-607	550-570	594-616	526-538	3	527-554	602-625	600-607	570-594	622-646	538-561
534-556	593-615	608-614	571-584	617-631	539-554	4	555-571	626-646	608-614	595-612	647-663	562-581
557-575	616-632	615-621	585-603	632-651	555-566	5	572-590	647-663	615-621	613-625	664-673	582-596
576-590	633-651	622-628	604-617	652-662	567-580	6	591-605	664-673	622-631	626-642	674-683	597-614
591-604	652-663	629-637	618-635	663-680	581-604	7	606-623	674-683	632-639	643-657	684-695	615-633
605-624	664-676	638-646	636-655	681-692	605-636	8	624-636	684-700	640-651	658-673	696-710	634-654
625-651	677-710	647-663	656-680	693-716	637-671	9	637-656	701-720	652-668	674-700	711-729	655-676
652-827	711-826	664-822	681-823	717-847	672-836	10	657-827	721-826	669-822	701-823	730-847	677-836

Age: 18

DECILE												
316-494	311-532	453-579	326-532	335-568	338-509	1	316-494	311-555	453-582	326-532	335-573	338-501
495-527	533-595	580-593	533-555	569-612	510-533	2	495-526	556-601	583-594	533-558	574-621	502-525
528-554	596-610	594-603	556-580	613-634	534-555	3	527-549	602-628	595-602	559-584	622-645	526-543
555-571	611-633	604-609	581-596	635-649	556-574	4	550-566	629-649	603-609	585-600	646-660	544-558
572-583	634-650	610-619	597-613	650-663	575-583	5	567-581	650-662	610-618	601-620	661-670	559-574
584-597	651-663	620-626	614-628	664-672	584-597	6	582-594	663-674	619-625	621-634	671-679	575-592
598-615	664-675	627-638	629-642	673-687	598-626	7	595-607	675-685	626-634	635-651	680-688	593-612
616-637	676-693	639-647	643-665	688-702	627-644	8	608-627	686-696	635-644	652-665	689-703	613-636
638-657	694-716	648-670	666-686	703-725	645-668	9	628-647	697-721	645-662	666-689	704-726	637-661
658-827	717-826	671-822	687-823	726-847	669-836	10	648-827	722-826	663-822	690-823	727-847	662-836

316-481	311-541	453-589	326-527	335-562	338-490
482-526	542-597	590-600	528-561	563-611	491-531
527-549	598-619	601-610	562-586	612-635	532-551
550-570	620-638	611-619	587-605	636-654	552-570
571-589	639-652	620-625	606-624	655-669	571-593
590-605	653-669	626-633	625-638	670-680	594-614
606-621	670-676	634-642	639-654	681-694	615-638
622-635	677-692	643-650	655-670	695-707	639-658
636-654	693-712	651-668	671-695	708-726	659-679
655-827	713-826	669-822	696-823	727-847	680-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students attending local schools with hearing students
(Includes BOTH mainstreamed and self-contained classrooms)

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	
Age: 11												
DECILE												
316-439	311-435		326-455	335-463	338-440	1	316-468	311-475	453-589	326-492	335-531	338-482
440-456	436-458		456-469	464-491	441-457	2	469-492	476-520	590-604	493-514	532-561	483-502
457-469	459-476		470-477	492-511	458-472	3	493-519	521-550	605-609	515-541	562-579	503-517
470-491	477-497		478-490	512-533	473-476	4	520-537	551-579	610-618	542-560	580-603	518-536
492-510	498-515		491-512	534-550	487-501	5	538-561	580-600	619-625	561-575	604-621	537-551
511-530	516-540		513-527	551-566	502-514	6	562-578	601-621	626-631	576-593	622-635	552-563
531-545	541-575		528-542	567-582	515-520	7	579-594	622-639	632-635	594-607	636-650	564-577
546-563	576-594		543-562	583-603	521-535	8	595-616	640-665	636-645	608-623	651-663	578-597
564-605	595-621		563-593	604-642	536-557	9	617-638	666-686	646-656	624-646	664-688	598-620
606-827	622-826		594-823	643-847	558-836	10	639-827	687-826	657-822	647-823	689-847	621-836
Age: 12												
DECILE												
316-442	311-441	453-573	326-456	335-496	338-451	1	316-477	311-507	453-582	326-497	335-537	338-473
443-463	442-470	574-588	457-477	497-527	452-471	2	478-503	508-537	583-596	498-525	538-568	474-508
464-482	471-489	589-594	478-497	528-550	472-480	3	504-529	538-564	597-605	526-552	569-591	509-526
483-500	490-529	595-602	498-515	551-565	481-491	4	530-550	565-594	606-612	553-567	592-616	527-543
501-525	530-552	603-613	516-533	566-568	492-502	5	551-572	595-613	613-618	568-585	617-635	544-562
526-546	553-580	614-623	534-554	569-587	503-516	6	573-589	614-633	619-626	586-598	636-651	563-573
547-560	581-598	624-631	555-574	588-601	517-538	7	590-604	634-652	627-632	599-614	652-660	574-589
561-584	599-617	632-638	575-592	602-626	539-558	8	605-618	653-668	633-644	615-628	661-679	590-607
585-614	618-652	639-659	593-616	627-652	559-581	9	619-640	669-695	645-659	629-655	680-692	608-630
615-827	653-826	660-822	617-823	653-847	582-836	10	641-827	696-826	660-822	656-823	693-847	631-836
Age: 13												
DECILE												
316-458	311-464	453-577	326-473	335-495	338-464	1	316-487	311-527	453-594	326-519	335-553	338-491
459-482	465-496	578-595	474-502	496-538	465-489	2	488-527	528-569	595-601	520-548	554-595	492-526
483-499	497-520	596-605	503-518	539-565	490-505	3	528-549	570-596	602-610	549-573	596-621	527-549
500-518	521-548	606-611	519-534	566-582	506-520	4	550-570	597-611	611-621	574-594	622-638	550-561
519-543	549-574	612-618	535-549	583-592	521-533	5	571-583	612-635	622-630	595-608	639-652	562-575
544-563	575-599	619-624	550-571	593-616	534-547	6	584-600	636-652	631-638	609-621	653-666	576-590
564-577	600-612	625-632	572-593	617-636	548-565	7	601-619	653-672	639-644	622-639	667-684	591-612
578-598	613-639	633-641	594-605	637-652	566-580	8	620-638	673-690	645-658	640-657	685-697	613-633
599-630	640-675	642-659	606-635	653-668	581-619	9	639-658	691-715	659-668	658-681	698-716	634-659
631-827	676-826	660-822	636-823	669-847	620-836	10	659-827	716-826	669-822	682-823	717-847	660-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students attending local schools with hearing students
(Includes BOTH mainstreamed and self-contained classrooms)

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	
Age: 17												
DECILE												
316-502	311-534	453-583	326-530	335-570	338-521	1	316-497	311-551	453-596	326-540	335-593	338-533
503-536	535-578	584-597	531-557	571-602	522-544	2	498-540	552-600	597-608	541-571	594-626	534-551
537-554	579-602	598-605	558-580	603-629	545-557	3	541-564	601-632	609-618	572-600	627-645	552-573
555-572	603-622	606-616	581-596	630-650	558-571	4	565-584	633-652	619-625	601-617	646-663	574-595
573-586	623-636	617-626	597-614	651-664	572-587	5	585-605	653-663	626-632	618-634	664-671	596-612
587-603	637-656	627-635	615-630	665-672	588-609	6	606-623	664-682	633-642	635-652	672-687	613-636
604-620	657-674	636-646	631-649	673-688	610-624	7	624-639	683-694	643-655	653-670	688-697	637-657
621-640	675-691	647-658	650-664	689-707	625-646	8	640-653	695-714	656-667	671-687	698-713	658-678
641-672	692-717	659-681	665-695	708-727	647-676	9	654-679	715-740	668-687	688-712	714-735	679-700
673-827	718-826	682-822	696-823	728-847	677-836	10	680-827	741-826	688-822	713-823	736-847	701-836

Age: 18

DECILE												
316-502	311-528	453-589	326-538	335-584	338-516	1	316-505	311-551	453-587	326-532	335-580	338-518
503-541	529-588	590-605	539-560	585-619	517-544	2	506-542	552-602	588-602	533-566	581-622	519-550
542-560	589-610	606-619	561-590	620-643	545-568	3	543-565	603-627	603-614	567-585	623-644	551-582
561-584	611-632	620-625	591-616	644-660	569-588	4	566-585	628-648	615-621	586-608	645-660	583-598
585-606	633-653	626-636	617-631	661-673	589-605	5	586-599	649-664	622-630	609-629	661-673	599-613
607-622	654-670	637-646	632-647	674-683	606-624	6	600-616	665-679	631-639	630-646	674-688	614-639
623-635	671-682	647-658	648-664	684-696	625-654	7	617-639	680-695	640-647	647-664	689-697	640-657
636-656	683-698	659-672	665-685	697-710	655-677	8	640-651	696-717	648-659	665-679	698-710	658-675
657-677	699-721	673-688	686-702	711-735	678-696	9	652-678	718-737	660-679	680-697	711-726	676-696
678-827	722-826	689-822	703-823	736-847	697-836	10	679-827	738-826	680-822	698-823	727-847	697-836

316-514	311-550	453-592	326-539	335-590	338-518
515-545	551-594	593-608	540-574	591-634	519-553
546-571	595-622	609-617	575-597	635-651	554-571
572-590	623-643	618-623	598-622	652-669	572-594
591-604	644-661	624-633	623-635	670-681	595-615
605-621	662-674	634-643	636-654	682-688	616-633
622-639	675-689	644-652	655-668	686-701	634-653
640-656	690-700	653-665	669-692	702-717	654-676
657-683	701-725	666-686	693-712	718-737	677-699
684-827	726-826	687-822	713-823	738-847	700-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students with PROFOUND hearing loss
(>90 dB average threshold in the better ear)

Reading Comprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Comprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	
Age: 11												
DECILE												
316-432	311-435		326-444	335-440	338-432	1	316-455	311-465	453-581	326-469	335-511	338-457
433-448	436-451		445-462	441-463	433-450	2	456-471	466-511	582-592	470-492	512-538	458-475
449-457	452-466		463-469	464-489	451-464	3	472-488	512-530	593-605	493-513	539-557	476-494
458-465	467-484		470-478	490-510	465-475	4	489-504	531-556	606-609	514-533	558-581	495-509
466-485	485-509		479-487	511-524	476-487	5	505-521	557-578	610-615	534-550	582-600	510-522
486-495	510-521		488-498	525-540	488-497	6	522-541	579-601	616-626	551-568	601-618	523-542
496-511	522-548		499-522	541-567	498-509	7	542-568	602-627	627-629	569-589	619-640	543-557
512-534	549-574		523-533	568-585	510-517	8	569-587	628-643	630-633	590-607	641-655	558-578
535-564	575-603		534-565	586-640	518-537	9	588-621	644-675	634-649	608-625	656-674	579-607
565-827	604-826		566-823	641-847	538-836	10	622-827	676-826	650-822	626-823	675-847	608-836

Age: 12

DECILE												
316-444	311-448		326-447	335-448	338-443	1	316-468	311-485	453-577	326-493	335-531	338-467
445-458	449-469		448-467	449-487	444-454	2	469-485	486-522	578-589	494-519	532-564	468-494
459-472	470-490		468-478	488-517	455-466	3	486-505	523-550	590-601	520-541	565-588	495-517
473-481	491-509		479-498	518-540	467-477	4	506-521	551-576	602-609	542-560	589-613	518-530
482-494	510-532		499-513	541-556	478-486	5	522-540	577-600	610-613	561-575	614-629	531-552
495-511	533-553		514-525	557-573	487-502	6	541-555	601-616	614-620	576-587	630-645	533-535
512-532	554-580		526-543	574-589	503-517	7	556-579	617-636	621-625	588-606	646-660	566-582
533-560	581-606		544-571	590-617	518-532	8	580-599	637-653	626-635	607-626	661-675	583-596
561-603	607-648		572-602	618-651	533-565	9	600-623	654-679	636-648	627-649	676-698	597-624
604-827	649-826		603-823	652-847	566-836	10	624-827	680-826	649-822	650-823	699-847	625-836

Age: 13

DECILE												
316-444	311-445	453-572	426-459	335-479	338-441	1	316-469	311-509	453-579	326-498	335-533	338-478
445-462	446-478	573-586	460-479	480-511	442-464	2	470-496	510-532	580-595	499-525	534-570	479-509
463-481	479-504	587-600	480-499	512-540	465-477	3	497-518	533-573	596-601	526-540	571-596	510-521
482-496	505-531	601-606	500-513	541-559	478-491	4	519-538	574-595	602-609	541-567	597-615	522-538
497-514	532-550	607-615	514-533	560-574	492-506	5	539-557	596-610	610-613	568-582	616-635	539-553
515-542	551-578	616-621	534-551	575-594	507-522	6	558-574	611-635	614-624	583-599	636-650	554-564
543-555	579-600	622-627	552-570	595-624	523-534	7	575-590	636-652	625-633	600-617	651-662	565-577
556-577	601-638	628-639	571-595	625-649	535-554	8	591-609	653-675	634-642	618-643	663-688	578-597
578-611	639-675	640-671	596-625	650-667	555-586	9	610-641	676-700	643-659	644-668	689-710	598-638
612-827	676-826	672-822	626-823	668-847	587-836	10	642-827	701-826	660-822	669-823	711-847	639-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students with PROFOUND hearing loss
(>90 dB average threshold in the better ear)

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	
Age: 17												
DECILE												
316-479	311-518	453-580	326-519	335-566	338-499	1	316-494	311-561	453-587	326-540	335-584	338-514
480-510	519-550	581-599	520-546	567-592	500-525	2	495-531	562-604	588-599	541-573	585-623	515-543
511-533	551-594	600-605	547-567	593-615	526-539	3	532-555	605-633	600-608	574-597	624-646	544-565
534-556	595-617	606-614	568-587	616-643	540-554	4	556-577	634-652	609-615	598-612	647-661	566-584
557-571	618-635	615-620	588-605	644-655	555-564	5	578-594	653-664	616-625	613-625	662-672	585-600
572-589	636-652	621-627	606-618	656-671	565-580	6	595-608	665-674	626-632	626-647	673-682	601-620
590-604	653-664	628-635	619-635	672-685	581-604	7	609-624	675-686	633-640	648-660	683-694	621-637
605-623	665-676	636-646	636-655	686-700	605-631	8	625-635	687-700	641-653	661-679	695-712	638-656
624-650	677-710	647-665	656-680	701-725	632-670	9	636-656	701-721	654-670	680-701	713-733	657-681
651-827	711-826	666-822	681-823	726-847	671-836	10	657-827	722-826	671-822	702-823	734-847	682-836

Age: 18

DECILE

316-488	311-528	453-576	326-527	335-566	338-506	1	316-491	311-551	453-583	326-526	335-570	338-501
489-527	529-591	577-598	528-555	567-610	507-524	2	492-521	552-595	584-595	527-554	571-614	502-527
528-553	592-614	579-604	556-578	611-635	525-550	3	522-545	596-622	596-602	555-577	615-640	528-544
554-569	615-636	605-616	579-596	636-647	551-572	4	546-565	623-644	603-609	578-595	641-655	545-560
570-583	637-652	617-622	597-616	648-663	573-586	5	566-579	645-659	610-617	596-615	656-670	561-578
584-598	653-666	623-629	617-634	664-674	587-603	6	580-591	660-674	618-623	616-634	671-680	579-595
599-615	667-680	630-639	635-651	675-689	604-630	7	592-604	675-683	624-633	635-650	681-688	596-614
616-635	681-695	640-652	652-668	690-708	631-651	8	605-622	684-696	634-643	651-664	689-706	615-639
636-658	696-717	653-676	669-694	709-727	652-684	9	623-647	697-720	644-659	665-689	707-726	640-665
659-827	718-826	677-822	695-823	728-847	685-836	10	648-827	721-826	660-822	690-823	727-847	666-836

316-488	311-547	453-589	326-535	335-582	338-497
489-529	548-595	590-601	536-565	583-624	498-534
530-550	596-620	602-611	566-587	625-646	535-554
551-571	621-642	612-618	588-607	647-661	575-577
572-590	643-658	619-625	608-626	662-673	578-597
591-604	659-672	626-633	627-641	674-688	598-614
605-621	673-682	634-643	642-655	689-697	615-635
622-635	683-694	644-652	656-672	698-709	636-656
636-655	695-714	653-669	673-696	710-728	657-683
656-827	715-826	670-822	697-823	729-847	684-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students with SEVERE hearing loss
(71-90 dB average threshold in the better ear)

Reading Comprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns	Reading Comprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns
Age: 11											
DECILE											
316-440	311-441		326-446	335-443	338-440	316-470	311-501		326-492	335-529	338-465
441-457	442-460		447-459	444-474	441-453	471-488	502-521		493-513	530-565	466-482
458-468	461-478		460-468	475-495	454-467	489-511	522-550		514-537	566-575	483-500
469-480	479-497		469-479	496-515	468-476	512-531	551-579		538-553	576-595	501-509
481-501	498-530		480-494	516-537	477-488	532-543	580-593		554-565	596-611	510-525
502-518	531-550		495-513	538-567	489-497	544-565	594-612		566-578	612-625	526-543
519-540	551-578		514-524	568-577	498-514	566-577	613-639		579-589	626-639	544-557
541-555	579-595		525-546	578-586	515-529	578-596	640-653		590-605	640-654	558-573
556-580	596-617		547-563	587-606	530-539	597-619	654-678		606-625	655-688	574-601
581-827	618-826		564-823	607-847	540-836	620-827	679-826		626-823	689-847	602-836
Age: 12											
DECILE											
316-430	311-433		326-450	335-480	338-443	316-471	311-491	453-568	326-489	335-522	338-461
431-454	434-458		451-467	481-509	444-458	472-490	492-522	569-581	490-512	523-549	462-491
455-464	459-481		468-477	510-523	459-468	491-508	523-550	582-590	513-528	550-571	492-509
465-478	482-512		478-486	524-545	469-477	509-530	551-587	591-610	529-548	572-590	510-518
479-498	513-538		487-501	546-552	478-495	531-553	588-602	611-614	549-561	591-608	519-543
499-511	539-563		502-516	553-567	496-501	554-562	603-620	615-620	562-575	609-635	544-553
512-536	564-586		517-530	568-588	502-513	563-579	621-644	621-628	576-589	636-650	554-567
537-555	587-603		531-557	589-619	514-531	580-605	645-659	629-641	590-614	651-661	568-585
556-576	604-627		558-580	620-645	532-546	606-629	660-683	642-662	615-641	662-688	586-613
577-827	628-826		581-823	646-847	547-836	630-827	684-826	663-822	642-823	689-847	614-836
Age: 13											
DECILE											
316-457	311-472		326-458	335-490	338-464	316-477	311-527	453-586	326-502	335-539	338-472
458-483	473-507		459-486	491-533	465-484	478-514	528-553	587-599	503-524	540-574	473-509
484-496	508-526		487-512	534-553	485-501	515-542	554-588	600-605	525-553	575-613	510-532
497-512	527-550		513-527	554-572	502-519	543-557	589-606	606-613	554-582	614-626	533-558
513-525	551-580		528-541	573-586	520-527	558-572	607-629	614-619	583-599	627-639	559-562
526-556	581-600		542-560	587-613	528-539	573-585	630-649	620-625	600-612	640-653	563-570
557-569	601-619		561-576	614-627	540-555	586-598	650-662	626-634	613-630	654-678	571-591
570-595	620-651		577-605	628-653	556-578	599-611	663-675	635-642	631-650	679-688	592-618
596-621	652-676		606-638	654-667	579-609	612-640	676-702	643-661	651-671	689-709	619-648
622-827	677-826		639-823	668-847	610-836	641-827	703-826	662-822	672-823	710-847	649-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students with SEVERE hearing loss
(71-90 dB average threshold in the better ear)

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	
Age: 17												
DECILE												
316-483	311-518	453-582	326-524	335-567	338-493	1	316-499	311-565	453-591	326-542	335-598	338-519
484-513	519-574	583-594	525-552	568-603	494-530	2	500-529	566-601	592-609	543-574	599-634	520-546
514-541	575-594	595-606	553-576	604-623	531-548	3	530-555	602-627	610-616	575-604	635-658	547-567
542-559	595-613	607-613	577-590	624-638	549-562	4	556-577	628-645	617-621	605-618	659-670	568-585
560-580	614-630	614-621	591-604	639-654	563-576	5	578-594	646-666	622-629	619-633	671-678	586-606
581-593	631-646	622-632	605-620	655-663	577-593	6	595-609	667-675	630-636	634-647	679-688	607-626
594-613	647-663	633-638	621-645	664-679	594-620	7	610-629	676-692	637-645	648-661	689-700	627-640
614-628	664-687	639-648	646-658	680-688	621-646	8	630-645	693-707	646-654	662-676	701-716	641-665
629-655	688-712	649-662	659-672	689-710	647-677	9	646-660	708-734	655-671	677-707	717-736	666-694
656-827	713-826	663-822	673-823	711-847	678-836	10	661-827	735-826	672-822	708-823	737-847	695-836

Age: 18

DECILE												
316-508	311-521	453-583	326-541	335-577	338-512	1	316-495	311-551	453-582	326-524	335-578	338-503
509-536	522-591	584-594	542-559	578-624	513-539	2	496-537	552-602	583-595	525-562	579-624	504-529
537-554	592-607	595-604	560-588	625-645	540-558	3	538-558	603-629	596-605	563-583	625-649	530-549
555-572	608-625	605-614	589-609	646-660	559-576	4	559-575	630-649	606-614	584-606	650-662	550-570
573-593	626-646	615-625	610-620	661-672	577-591	5	576-591	650-662	615-621	607-625	663-671	571-586
594-612	647-669	626-631	621-635	673-680	592-610	6	592-604	663-674	622-630	626-639	672-680	587-605
613-626	670-678	632-647	636-650	681-695	611-631	7	605-621	675-690	631-636	640-657	681-690	606-627
627-644	679-700	648-657	651-680	696-712	632-660	8	622-637	691-702	637-646	658-671	691-707	628-649
645-660	701-721	658-674	681-700	713-734	661-687	9	638-655	703-732	647-665	672-689	708-727	650-670
661-827	722-826	675-822	701-823	735-847	688-836	10	656-827	733-826	666-822	690-823	728-847	679-836

316-468	311-526	453-586	326-510	335-551	338-488
469-522	527-583	587-598	511-553	552-609	489-530
523-549	584-614	599-614	556-588	610-644	531-553
550-574	615-637	615-623	589-614	645-662	554-577
575-587	638-652	624-630	615-628	663-673	578-600
588-610	653-668	631-636	629-642	674-685	601-628
611-625	669-681	637-646	643-659	686-695	629-646
626-643	682-695	647-655	660-680	696-710	647-664
644-666	696-718	656-684	681-702	711-731	665-687
667-827	719-826	685-822	703-823	732-847	688-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students with LESS THAN SEVERE hearing loss
(< 70 dB average threshold in the better ear)

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns
Age: 11											
DECILE											
316-440	311-427		326-454	335-465	338-442	316-488	311-499	453-588	326-502	335-530	338-491
441-458	428-457		455-469	466-496	443-460	489-525	500-534	589-596	503-534	531-567	492-519
459-488	458-476		470-478	497-516	461-473	526-543	535-567	597-608	535-550	568-588	520-537
489-499	477-499		479-490	517-533	474-490	544-560	568-590	609-611	551-565	589-600	538-553
500-518	500-509		491-514	534-540	491-509	561-581	591-611	612-620	566-580	601-616	554-561
519-531	510-537		515-530	541-556	510-517	582-591	612-622	621-630	581-598	617-630	562-573
532-549	538-563		531-548	557-567	518-529	592-604	623-634	631-634	599-610	631-641	571-593
550-572	564-590		549-569	568-595	530-541	605-619	635-659	635-643	611-629	642-654	591-612
573-616	591-631		570-591	596-619	542-583	620-642	660-689	644-658	630-653	655-671	611-621
617-827	632-826		592-823	620-847	584-836	643-827	690-826	659-822	654-823	672-847	622-836
Age: 12											
DECILE											
316-456	311-458		326-457	335-483	338-467	316-494	311-504	453-585	326-512	335-545	338-497
457-486	459-483		458-502	484-536	468-491	495-527	505-535	586-599	513-533	546-567	498-516
487-505	484-511		503-526	537-550	492-505	528-545	536-579	600-603	534-547	568-588	517-539
506-529	512-533		527-539	551-566	506-525	546-572	580-595	604-610	548-570	589-597	540-550
530-554	534-562		541-550	567-570	526-536	573-583	596-609	611-619	571-588	598-619	551-562
555-563	563-582		551-567	571-587	537-547	584-597	610-628	620-627	589-597	620-635	563-575
564-577	583-598		568-577	588-603	548-559	598-607	629-646	628-637	598-613	636-653	576-589
578-594	599-621		578-595	604-630	560-579	608-626	647-672	638-650	614-625	654-666	590-605
595-619	622-652		596-624	631-649	580-604	627-655	673-686	651-660	626-658	667-690	606-629
620-827	653-826		625-823	650-847	605-836	656-827	687-826	661-822	659-823	691-847	630-836
Age: 13											
DECILE											
316-458	311-457		326-481	335-518	338-478	316-507	311-519	453-586	326-533	335-568	338-515
459-485	458-501		482-513	519-537	488-498	508-547	520-576	587-604	534-560	569-591	516-543
486-511	502-517		514-531	538-557	499-523	548-570	577-600	605-611	561-582	592-614	544-556
512-538	518-545		532-537	558-580	524-533	571-577	601-617	612-620	583-598	615-631	557-573
539-556	546-565		538-557	581-591	534-538	578-604	618-636	621-628	599-615	632-645	574-591
557-565	566-594		558-571	592-611	539-558	605-617	637-651	629-637	616-621	646-662	592-609
566-580	595-610		572-584	612-629	559-570	618-628	652-655	638-647	622-637	663-680	610-616
581-595	611-630		585-601	630-643	571-579	629-643	656-677	648-658	638-655	681-689	617-637
596-626	631-656		602-621	644-660	580-610	644-658	678-706	659-668	656-682	690-715	638-657
627-827	657-826		622-823	661-847	611-836	659-827	707-826	669-822	683-823	716-847	658-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students with LESS THAN SEVERE hearing loss
(< 70 dB average threshold in the better ear)

Reading Comprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns	Reading Comprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns	
Age: 17												
DECILE												
316-512	311-513	453-589	326-521	335-565	338-519	1	316-487	311-514	453-583	326-502	335-566	338-510
513-544	514-571	590-602	522-561	566-602	520-536	2	488-545	515-583	584-604	503-558	567-609	511-544
545-561	572-611	603-610	562-580	603-623	537-561	3	546-563	584-611	605-613	559-598	610-638	545-579
562-585	612-628	611-624	581-595	624-643	562-575	4	564-578	612-635	614-622	599-615	639-665	580-599
586-599	629-647	625-634	596-620	644-660	576-589	5	579-597	636-656	623-634	616-639	666-673	600-612
600-613	648-663	635-645	621-637	661-672	590-621	6	598-626	657-675	635-647	640-656	674-688	613-640
614-638	664-675	646-655	638-652	673-689	622-630	7	627-643	676-691	648-662	657-672	689-696	641-661
639-651	676-698	656-664	653-676	690-709	631-646	8	644-659	692-717	663-673	673-686	697-708	662-680
652-684	699-721	665-687	677-696	710-727	647-669	9	660-690	718-747	674-689	687-712	709-734	681-700
685-827	722-826	688-822	697-823	728-847	670-836	10	691-827	748-826	690-822	713-823	735-847	701-836

Age: 18

DECILE												
316-499	311-543	453-587	326-533	335-595	338-520	1	316-526	311-572	453-585	326-556	335-599	338-527
500-550	544-587	588-604	534-571	596-617	521-556	2	527-549	573-610	586-599	557-584	600-627	528-560
551-575	588-609	605-615	572-593	618-637	557-567	3	550-570	611-628	600-610	585-595	628-647	561-576
576-598	610-619	616-621	594-614	638-652	568-585	4	571-588	629-652	611-622	596-617	648-662	577-600
599-613	620-635	622-637	615-624	653-666	586-606	5	589-601	653-672	623-632	618-632	663-672	601-613
614-629	636-654	638-644	625-639	667-674	607-618	6	602-620	673-683	633-642	633-647	673-686	614-633
630-646	655-666	645-660	640-655	675-683	619-645	7	621-637	684-694	643-645	648-656	687-694	634-651
647-659	667-682	661-672	656-672	684-692	646-671	8	638-653	695-713	646-659	657-673	695-701	652-665
660-691	683-706	673-686	673-693	693-711	672-679	9	654-686	714-739	660-677	674-698	702-719	666-682
692-827	707-826	687-822	694-823	712-847	680-836	10	687-827	740-826	678-822	699-823	720-847	683-836

316-525	311-558	453-594	326-537	335-561	338-549
526-552	559-600	595-606	538-573	562-594	550-559
553-571	601-621	607-613	574-594	595-632	560-571
572-590	622-632	614-625	583-611	633-644	572-591
591-606	633-646	626-633	612-630	645-659	592-611
607-618	647-660	636-640	631-648	660-673	612-635
619-637	661-674	641-650	649-664	674-686	636-655
638-647	675-691	651-663	665-672	687-700	656-659
648-682	692-717	664-679	673-701	701-719	670-688
683-827	718-726	680-822	702-823	720-847	689-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students with NO reported handicaps in addition to their hearing impairment

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	
Age: 11												
DECILE												
316-439	311-444	453-576	326-453	335-462	338-441	1	316-468	311-503	453-583	326-485	335-536	338-472
440-453	445-461	577-594	454-469	463-489	442-458	2	469-490	504-533	584-594	486-520	537-563	473-500
454-467	462-482	595-600	470-475	490-509	459-472	3	491-512	534-567	595-605	521-542	564-582	501-516
468-487	483-502	601-613	476-486	510-524	473-483	4	513-534	568-585	606-610	543-560	583-599	517-534
488-498	503-520	614-617	487-501	525-539	484-496	5	535-554	586-601	611-618	561-574	600-615	535-547
499-516	521-537	618-628	502-518	540-560	497-509	6	555-571	602-623	619-625	575-588	616-630	548-559
517-536	538-566	629-634	519-532	561-570	510-516	7	572-586	624-639	626-631	589-604	631-642	560-574
537-553	567-582	635-641	533-550	571-594	517-529	8	587-603	640-655	632-640	605-618	643-661	575-597
554-590	583-619	642-657	551-589	595-638	530-553	9	604-634	656-683	641-654	619-638	662-687	598-622
591-827	620-826	658-822	590-823	639-847	554-836	10	635-827	684-826	655-822	639-823	688-847	623-836

Age: 12

DECILE												
316-447	311-456	453-575	326-457	335-483	338-447	1	316-480	311-513	453-580	326-512	335-552	338-491
448-465	457-481	576-584	458-475	484-521	448-466	2	481-503	514-550	581-591	513-539	553-583	492-516
466-481	482-511	585-594	476-498	522-540	467-480	3	504-522	551-577	592-604	540-555	584-603	517-535
482-495	512-532	595-601	499-514	541-553	481-493	4	523-544	578-600	605-609	556-573	604-622	536-552
496-518	533-552	602-611	515-528	554-567	494-509	5	545-565	601-615	610-617	574-584	623-636	553-564
519-541	553-579	612-616	529-546	568-586	510-520	6	566-579	616-632	618-621	585-598	637-652	565-577
542-558	580	617-626	547-567	587-604	521-538	7	580-597	633-650	622-629	599-614	653-662	578-590
559-579	602-618	627-634	568-584	605-630	539-556	8	598-612	651-663	630-643	615-630	663-679	591-606
580-605	619-651	635-649	585-611	631-652	557-582	9	613-635	664-685	644-658	631-655	680-698	607-636
606-827	652-826	650-822	612-823	653-847	583-836	10	636-827	686-826	659-822	656-823	699-847	637-836

Age: 13

DECILE												
316-455	311-475	453-576	326-471	335-510	338-463	1	316-485	311-522	453-585	326-523	335-565	338-503
456-480	476-509	577-591	472-482	511-535	464-483	2	486-522	523-576	586-598	524-547	566-595	504-529
481-496	510-529	592-604	493-513	536-556	484-493	3	523-548	577-600	599-605	548-541	596-617	530-544
497-518	530-550	605-609	514-532	557-573	494-510	4	549-566	601-617	606-613	572-589	618-634	545-560
519-542	551-576	610-617	533-545	574-589	511-527	5	567-579	618-635	614-621	590-604	635-650	561-570
543-557	577-599	618-623	546-565	590-616	528-538	6	580-593	636-650	622-629	605-618	651-665	571-586
558-571	600-618	624-632	566-580	617-635	539-553	7	594-609	651-664	630-638	619-638	666-683	587-601
572-594	619-649	633-643	581-604	636-652	554-577	8	610-629	665-678	639-646	639-655	684-697	602-624
595-631	650-676	644-669	605-630	653-669	578-609	9	630-651	679-710	647-663	656-678	698-718	625-653
632-827	677-826	670-822	631-823	670-847	610-836	10	652-827	711-826	664-822	679-823	719-847	654-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students with NO reported handicaps in addition to their hearing impairment

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns
Age: 17											
DECILE											
316-505	311-534	453-590	326-541	335-580	338-519	316-521	311-600	453-594	326-565	335-612	338-543
506-536	535-591	591-602	542-571	581-614	520-544	522-555	601-627	595-605	566-594	613-645	544-565
537-557	592-619	603-611	572-587	615-636	545-561	556-576	628-646	606-614	595-612	646-663	566-586
558-572	620-633	612-619	588-606	637-652	562-570	577-591	647-662	615-621	613-627	664-672	587-601
573-591	634-650	620-625	607-619	653-665	571-587	592-605	663-673	622-629	628-641	673-682	602-620
592-604	651-662	626-634	620-637	666-679	588-609	606-622	674-682	630-636	642-656	683-689	621-635
605-623	663-674	635-643	638-651	680-688	610-626	623-633	683-693	637-646	657-670	690-704	636-653
624-640	675-692	644-656	652-666	689-707	627-654	634-646	694-711	647-660	671-686	705-719	654-670
641-664	693-718	657-670	667-688	708-727	655-680	647-671	712-736	661-678	687-712	720-738	671-701
665-827	719-826	671-822	689-823	728-847	681-836	672-827	737-826	679-822	713-823	739-847	702-

Age: 18

DECILE											
316-512	311-580	453-583	326-552	335-598	338-521	316-515	311-586	453-584	326-550	335-608	338-522
513-550	581-606	584-599	553-578	599-633	522-549	516-548	587-616	585-598	551-579	609-639	523-545
551-566	607-627	600-609	579-597	634-650	550-571	549-565	617-639	599-605	580-595	640-655	546-562
567-584	628-647	610-619	598-618	651-664	572-585	566-579	640-652	606-613	596-615	656-666	563-578
585-600	648-662	620-625	619-630	665-673	586-601	580-591	653-666	614-621	616-630	667-675	579-596
601-617	663-674	626-635	631-646	674-684	602-628	592-604	667-675	622-629	631-644	676-687	597-614
618-631	675-690	636-646	647-661	685-697	629-649	605-618	676-691	630-638	645-658	688-696	615-637
632-648	691-701	647-662	662-680	698-713	650-669	619-636	692-704	639-647	659-674	697-709	638-654
649-670	702-721	663-678	681-700	714-737	670-692	637-657	705-728	648-664	675-695	710-728	655-680
671-827	722-826	679-822	701-823	738-847	693-836	658-827	729-826	665-822	696-823	729-847	681-836

316-518	311-581	453-595	326-555	335-611	338-523
519-548	582-617	596-605	556-586	612-640	524-553
549-571	618-634	606-615	587-607	641-659	554-582
572-587	635-651	616-622	608-625	660-671	583-600
588-601	652-663	623-630	626-638	672-680	601-622
602-617	664-674	631-638	639-654	681-689	623-639
618-631	675-686	639-646	655-666	690-700	640-655
632-644	687-696	647-657	667-683	701-714	656-672
647-668	697-718	658-680	684-704	715-735	673-691
669-827	719-826	681-822	705-823	736-847	692-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students WITH reported handicaps in addition to their hearing impairment

Reading Comprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns	Reading Comprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns
Age: 11											
DECILE											
						1	316-453	311-456	326-457	335-473	338-450
						2	454-462	457-474	458-477	474-524	451-464
						3	463-478	475-504	478-493	525-539	465-474
						4	479-488	505-518	494-508	540-551	475-487
						5	489-503	519-533	509-525	552-572	488-503
						6	504-522	534-555	526-538	573-593	504-509
						7	523-543	556-579	539-551	594-619	510-517
						8	544-564	580-603	552-575	620-644	518-549
						9	565-598	604-633	576-615	645-654	550-579
						10	599-827	634-826	616-823	655-847	580-836
Age: 12											
DECILE											
316-435	311-425		326-443	335-413	338-438	1	316-457	311-468	326-460	335-484	338-453
436-449	426-436		444-452	414-458	439-451	2	458-470	469-493	461-485	485-526	454-465
450-457	437-452		453-469	459-480	452-519	3	471-481	494-517	486-504	527-539	466-482
458-468	453-469		470-477	481-504	460-468	4	482-494	518-532	505-518	540-558	483-501
469-478	470-491		478-484	505-519	469-475	5	495-519	533-550	519-531	559-569	502-513
479-490	492-503		485-498	520-550	476-483	6	520-531	551-579	532-549	570-589	514-524
491-504	504-526		499-517	551-557	484-500	7	532-545	580-601	550-565	590-611	525-539
505-524	527-560		518-535	558-573	501-517	8	546-573	602-620	566-581	612-638	540-559
525-555	561-601		536-564	574-599	518-531	9	574-605	621-666	582-612	639-668	560-582
556-827	602-826		565-823	600-847	532-836	10	606-827	667-826	613-823	669-847	583-836
Age: 13											
DECILE											
316-435	311-428		326-443	335-450	338-441	1	316-462	311-484	453-573	326-480	335-508
436-452	429-452		444-461	451-491	442-452	2	463-480	485-519	574-587	481-502	509-547
453-462	453-471		462-481	492-511	453-473	3	481-498	520-537	588-599	503-520	548-567
463-483	472-489		482-509	512-537	474-491	4	499-518	538-557	600-609	521-532	568-584
484-497	490-515		510-520	538-556	492-506	5	519-536	558-585	610-612	533-552	585-602
498-511	516-533		521-532	557-569	507-523	6	537-556	586-601	613-619	553-573	603-623
512-536	534-570		533-553	570-586	524-531	7	557-566	602-619	620-630	574-591	624-638
537-558	571-600		554-575	587-603	532-547	8	567-587	620-652	631-637	592-612	639-653
559-579	601-620		576-605	604-641	548-573	9	588-621	653-677	638-655	613-635	654-671
580-827	621-826		606-823	642-847	574-836	10	622-827	678-826	656-822	636-823	672-847

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Students WITH reported handicaps in addition to
their hearing impairment

Reading Comprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns	Reading Comprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns
Age: 17											
DECILE											
316-465	311-487	453-559	326-487	335-526	338-478	316-467	311-484	453-569	326-480	335-530	338-466
466-481	488-515	560-578	488-522	527-555	479-505	468-489	485-528	570-583	481-525	531-569	467-507
482-500	516-550	579-588	523-537	556-584	506-519	490-507	529-576	584-597	526-545	570-604	508-520
501-527	551-573	589-604	538-555	585-603	520-531	508-527	577-598	598-604	546-568	605-627	521-535
528-544	574-600	605-610	556-568	604-623	532-538	528-543	599-611	605-612	569-584	628-641	536-556
545-564	601-610	611-620	569-585	624-642	539-548	544-559	612-633	613-622	585-607	642-652	557-570
565-581	611-630	621-632	586-599	643-659	549-573	560-579	634-656	623-628	608-617	653-665	571-592
582-597	631-660	633-643	600-620	660-673	574-600	580-610	657-675	629-642	618-641	666-681	593-621
598-631	661-682	644-664	621-654	674-707	601-633	611-635	676-697	643-655	642-662	682-697	622-669
632-677	683-826	665-822	655-823	708-847	634-836	636-827	698-826	666-822	663-823	698-847	670-836

Age: 18

DECILE											
316-465	311-498	453-580	326-493	335-535	338-486	316-469	311-504	453-572	326-493	335-539	338-477
466-490	479-522	561-591	494-532	536-574	487-511	470-490	505-547	573-588	494-523	540-568	478-502
491-524	523-558	592-600	533-549	575-609	512-527	491-513	548-578	589-599	524-541	569-598	503-517
525-539	559-585	601-608	550-560	610-619	528-544	514-535	579-601	600-605	542-558	599-624	518-536
540-558	586-603	609-615	561-578	620-638	545-565	536-553	602-630	606-614	559-576	625-644	527-553
559-577	604-630	616-620	579-597	639-650	566-582	554-574	631-651	615-622	577-598	645-659	554-576
578-596	631-647	621-630	598-616	651-665	583-597	575-594	652-670	623-631	599-622	660-673	575-596
597-613	648-664	631-643	617-636	666-680	598-613	595-608	671-691	632-642	623-647	674-688	597-616
614-642	665-679	644-660	637-662	681-706	614-631	609-643	692-720	643-659	648-672	689-709	617-646
643-827	680-826	661-822	663-823	707-847	632-836	644-827	721-826	660-822	673-823	710-847	647-836

316-453	311-473	453-562	326-466	335-511	338-456
454-472	474-511	563-585	467-507	512-546	457-488
473-489	512-540	586-594	508-532	547-568	489-510
490-526	541-576	595-601	533-555	569-604	511-539
527-545	577-601	602-615	556-575	605-630	540-553
546-562	602-625	616-622	576-587	631-645	554-565
563-583	626-650	623-630	588-606	646-659	566-585
584-612	651-674	631-639	607-633	660-683	586-612
613-630	675-704	640-658	634-660	684-707	613-644
631-827	705-826	659-822	661-823	708-847	645-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: White, non-Hispanic students

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns
Age: 11											
DECILE											
316-447	311-443		326-458	335-458	338-455	316-473	311-502	453-588	326-491	335-531	338-476
448-462	444-467		459-475	459-493	456-470	474-499	503-531	589-598	492-524	532-567	477-500
463-478	468-482		476-484	494-520	471-481	500-520	532-563	599-608	525-545	568-589	501-520
479-494	483-510		485-496	521-534	482-497	521-538	564-586	609-612	546-565	590-606	521-539
495-510	511-529		497-514	535-550	498-502	539-565	587-602	613-621	566-580	607-622	540-550
511-529	530-551		515-524	551-567	503-511	566-579	603-625	622-628	581-593	623-639	551-562
530-544	552-575		525-539	568-582	512-519	580-596	626-643	629-633	594-607	640-652	563-577
545-564	576-594		540-556	583-599	520-535	597-616	644-665	634-642	608-620	653-668	578-600
565-606	595-631		557-593	600-641	536-562	617-636	666-688	643-655	621-640	669-689	601-621
607-827	632-826		594-823	642-847	563-836	637-827	689-826	656-822	641-823	690-847	622-836

Age: 12

DECILE

316-461	311-465	453-575	326-465	335-483	338-456	316-484	311-513	453-580	326-509	335-550	338-490
462-477	466-492	576-589	466-480	484-521	457-473	485-512	514-550	581-591	510-540	551-571	491-516
478-492	493-519	590-596	481-504	522-549	474-486	513-531	551-578	592-605	541-559	572-599	517-534
473-509	520-542	597-607	505-519	550-562	487-502	532-553	579-600	606-610	560-575	600-623	535-552
510-527	543-561	608-614	520-532	563-571	503-517	554-569	601-615	611-618	576-586	624-642	553-566
528-550	562-585	615-625	533-553	572-588	518-527	570-588	616-634	619-623	587-604	643-654	567-580
551-567	586-602	626-630	554-570	589-610	528-544	589-602	635-652	624-631	605-619	655-668	581-590
564-586	603-626	631-639	571-590	611-631	545-558	603-615	653-665	632-643	620-635	669-683	591-605
587-614	627-657	640-658	591-616	632-652	559-592	616-637	666-691	644-658	636-661	684-702	606-636
615-827	658-826	659-822	617-823	653-847	593-836	638-827	692-826	659-822	662-823	703-847	637-836

Age: 13

DECILE

316-457	311-465	453-579	326-480	335-510	338-467	316-488	311-523	453-586	326-514	335-552	338-490
458-482	466-504	580-595	481-508	511-533	468-490	489-525	524-574	587-600	515-541	553-593	491-525
483-499	505-529	596-605	509-519	534-555	491-507	526-550	575-600	601-609	542-571	594-619	526-544
500-523	530-550	606-611	520-536	556-569	508-524	551-564	601-616	610-614	572-587	620-632	545-559
524-545	551-579	612-618	537-551	570-589	525-530	565-582	617-635	615-622	588-604	633-649	560-569
546-562	580-601	619-621	552-570	590-615	531-543	583-596	636-652	623-632	605-618	650-660	570-585
563-577	602-624	622-627	571-591	616-636	544-562	597-611	653-664	633-639	619-635	661-674	586-607
578-596	625-652	628-639	592-607	637-651	563-579	612-631	665-682	640-650	636-655	675-689	608-628
597-630	653-677	640-658	608-635	652-670	580-616	632-651	683-711	651-665	656-676	690-715	629-655
631-827	678-826	659-822	636-823	671-847	617-836	652-827	712-826	666-822	677-823	716-847	656-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: White, non-Hispanic students

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math. Cmputatn	Math. Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math. Cmputatn	Math. Applicatns
Age: 17											
DECILE											
316-518	311-553	453-595	326-554	335-590	338-526	316-523	311-587	453-594	326-557	335-607	338-525
519-550	554-601	596-605	555-576	591-619	527-542	524-556	588-622	595-605	558-590	608-638	526-564
551-571	602-623	606-615	577-595	620-645	543-561	557-576	623-644	606-614	591-611	639-660	565-584
572-588	624-636	616-623	596-612	646-659	562-574	577-593	645-660	615-623	612-626	661-670	585-600
589-602	637-652	624-630	613-625	660-670	575-595	594-608	661-672	624-630	627-646	671-680	601-619
603-615	653-664	631-638	626-642	671-683	596-616	609-624	673-682	631-639	647-657	681-690	620-637
616-630	665-675	639-646	643-656	684-689	617-635	625-636	683-694	640-649	658-671	691-704	638-655
631-646	676-695	647-657	657-671	690-710	636-664	637-651	695-711	650-664	672-688	705-720	656-673
647-669	696-721	658-676	672-695	711-727	665-681	652-676	712-739	665-683	689-713	721-741	674-706
670-827	722-826	677-822	696-823	728-847	682-836	677-827	740-826	684-822	714-823	742-847	707-836

Age: 18

DECILE											
316-517	311-572	453-590	326-546	335-599	338-517	316-517	311-578	453-588	326-545	335-596	338-517
518-554	573-601	591-604	547-571	600-631	518-548	518-554	579-616	589-600	546-579	597-637	518-545
555-573	602-628	605-615	572-597	632-648	549-574	555-571	617-643	601-608	580-598	638-655	546-565
574-590	629-647	616-621	598-618	649-661	575-591	572-585	644-656	609-617	599-620	656-668	566-586
591-604	648-661	622-627	619-630	662-672	592-610	586-599	657-672	618-624	621-634	669-678	587-598
605-620	662-673	628-639	631-648	673-684	611-630	600-611	673-678	621-633	635-650	679-688	599-618
621-637	674-682	640-647	649-662	685-697	631-648	612-627	679-692	634-642	651-664	689-697	619-637
638-652	683-700	648-663	663-680	698-710	649-669	628-642	693-709	643-650	665-679	698-710	638-656
653-674	701-720	664-680	681-702	711-737	670-690	643-660	710-734	651-666	680-697	711-731	657-679
675-827	721-826	681-822	703-823	738-847	691-836	661-827	735-826	667-822	698-823	732-847	680-836

316-521	311-577	453-594	326-550	335-590	338-527
522-556	578-613	595-607	551-581	591-631	528-554
557-575	614-635	608-617	582-603	632-654	555-576
576-595	636-652	618-625	604-622	655-670	577-599
596-608	653-665	626-631	623-638	671-680	600-615
609-622	666-675	632-639	639-654	681-689	616-635
623-634	676-688	640-647	655-667	690-702	636-651
635-646	689-699	648-660	668-684	703-715	652-670
647-670	700-720	661-680	685-704	716-736	671-690
671-827	721-826	681-822	705-823	737-847	691-836

Special Norms for Subgroups of Hearing-Impaired Nonring Population

Stanford Achievement Test
Spring, 1983

Subgroup: Black students

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns
Age: 11											
DECILE											
						316-449	311-455		326-460	335-477	338-443
						450-463	456-476		461-472	478-535	444-455
						464-477	477-519		473-488	536-547	456-466
						478-492	520-539		489-523	548-566	467-500
						493-512	540-569		524-539	567-574	501-509
						513-534	570-585		540-550	575-594	510-517
						535-548	586-599		551-560	595-614	518-532
						549-566	600-631		561-580	615-635	533-558
						567-587	632-653		581-606	636-653	559-587
						588-827	654-826		607-823	654-847	588-836
Age: 12											
DECILE											
						316-452	311-474		326-467	335-498	338-453
						453-470	475-497		468-495	499-529	454-467
						471-483	498-522		496-511	530-546	468-491
						484-508	523-550		512-523	547-566	492-509
						509-525	551-557		524-532	567-588	510-517
						526-543	558-601		533-549	589-602	518-527
						544-552	602-611		550-565	603-619	528-539
						553-570	612-642		566-585	620-631	540-554
						571-588	643-662		586-602	632-652	555-576
						589-827	663-826		603-823	653-847	577-836
Age: 13											
DECILE											
						316-463	311-490		326-475	335-515	338-474
						464-479	491-521		476-513	516-551	475-474
						480-500	522-543		514-529	552-568	495-513
						501-517	544-580		530-537	569-583	514-522
						518-535	581-600		538-554	584-597	523-532
						536-554	601-613		555-569	598-617	533-544
						555-570	614-641		570-592	618-628	545-562
						571-585	642-652		593-613	629-655	563-577
						586-626	653-685		614-638	656-688	578-619
						627-827	686-826		639-823	689-847	620-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Black students

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	
Age: 17												
DECILE												
316-469	311-496		326-486	335-523	338-469	1	316-469	311-492	453-574	326-495	335-547	338-475
470-481	497-516		487-520	524-565	470-494	2	470-489	493-564	575-583	496-537	548-577	476-507
482-509	517-550		521-541	566-588	495-525	3	490-517	565-586	584-597	538-555	578-610	508-519
510-530	551-577		542-552	589-607	526-536	4	518-539	587-621	598-606	556-584	611-633	520-543
531-547	578-603		553-573	608-623	537-554	5	540-555	622-641	607-610	585-604	634-654	544-550
548-566	604-625		574-587	624-642	555-562	6	556-574	642-659	611-619	605-617	655-663	551-563
567-580	626-643		588-602	643-659	563-575	7	575-593	660-674	620-631	618-621	664-673	564-581
581-592	644-658		603-619	660-676	576-594	8	594-620	675-690	632-638	622-639	674-685	582-610
593-615	659-690		620-649	677-704	595-624	9	621-636	691-718	639-648	640-665	686-697	611-641
616-827	691-826		650-823	705-847	625-836	10	637-827	719-826	649-822	666-823	698-847	642-836

Age: 18

DECILE

316-465	311-504		326-490	335-519	338-478	1	316-478	311-523	453-569	326-500	335-551	338-480
466-489	505-547		491-526	520-568	479-521	2	479-501	524-576	570-582	501-533	552-587	481-500
490-515	548-585		527-546	569-602	522-533	3	502-526	577-601	583-589	534-554	588-613	501-515
516-541	586-608		547-562	603-617	534-548	4	527-539	602-620	590-599	555-570	614-630	516-527
542-554	609-622		563-589	618-637	549-558	5	540-556	621-635	600-607	571-584	631-646	528-544
555-569	623-634		590-607	638-656	559-564	6	557-571	636-652	608-613	585-598	647-659	545-556
570-590	635-650		608-619	657-670	565-574	7	572-584	653-672	614-621	599-617	660-671	557-577
591-619	651-675		620-634	671-684	575-595	8	585-595	673-691	622-629	618-634	672-685	578-598
620-632	676-705		635-650	685-697	596-621	9	596-616	692-716	630-640	635-655	686-698	599-624
633-827	706-826		651-823	698-847	622-836	10	617-827	717-826	641-822	656-823	699-847	625-836

316-457	311-511	453-563	326-499	335-518	338-450
458-491	512-561	564-591	500-537	519-577	451-488
492-532	562-589	592-597	538-551	578-606	489-514
533-548	590-617	598-603	552-570	607-632	515-528
549-566	618-627	604-609	571-600	633-646	529-548
567-578	628-642	610-621	601-627	647-661	549-562
579-591	643-654	622-627	628-635	662-673	563-586
592-608	655-676	628-637	636-654	674-688	587-627
609-641	677-700	638-650	655-671	689-706	628-653
642-827	701-826	651-822	672-823	707-847	654-836

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Hispanic students

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Cmputatn	Math Applicatns
Age: 11											
DECILE											
			316-458			311-453			326-466		335-472
			459-467			454-497			467-492		473-530
			468-480			498-515			493-501		531-542
			481-493			516-528			502-512		543-558
			494-506			529-543			513-527		559-571
			507-520			544-556			528-545		572-588
			521-536			557-587			546-556		589-614
			537-552			588-604			557-567		615-628
			553-577			605-634			568-592		629-651
			578-827			635-826			593-823		652-847
Age: 12											
DECILE											
			316-459			311-467			326-467		335-524
			460-471			468-490			468-497		525-553
			472-483			491-518			498-515		554-567
			484-490			519-536			516-533		568-583
			491-499			537-550			534-546		584-596
			500-522			551-585			547-556		597-613
			523-540			586-601			557-566		614-630
			541-570			602-626			567-586		631-640
			571-616			627-649			587-614		641-655
			617-827			650-826			615-823		656-847
Age: 13											
DECILE											
			316-463			311-480			326-498		335-517
			464-479			481-511			499-518		518-562
			480-496			512-550			519-533		563-590
			497-525			551-575			534-557		591-599
			526-540			576-590			558-573		600-609
			541-565			591-602			574-589		610-638
			566-578			603-623			590-606		639-656
			579-593			624-650			607-633		657-682
			594-610			651-675			634-661		683-709
			611-827			676-826			662-823		710-847

Special Norms for Subgroups of Hearing-Impaired Norming Population

Stanford Achievement Test
Spring, 1983

Subgroup: Hispanic students

Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns	Reading Cmprhnsn	Spelling	Language	Concepts of Number	Math Computatn	Math Applicatns
Age: 17											
DECILE											
316-456	311-494		326-503	335-549	338-480	1	316-468	311-513	326-515	335-565	
457-481	495-519		504-524	550-570	481-501	2	469-489	514-540	516-549	566-617	
482-490	520-535		525-535	571-586	502-518	3	490-508	541-580	550-569	618-633	
491-511	536-566		536-553	587-602	519-542	4	509-525	581-601	570-587	634-645	
512-535	567-579		554-577	603-627	543-553	5	526-540	602-618	588-607	646-662	
536-547	580-604		578-589	628-638	554-569	6	541-562	619-633	608-624	663-675	
548-559	605-621		590-599	639-654	570-578	7	563-593	634-659	625-639	676-685	
560-582	622-648		600-625	655-672	579-607	8	594-612	660-675	640-652	686-699	
583-604	649-669		626-650	673-690	603-630	9	613-630	676-691	653-669	700-711	
605-827	670-826		651-823	697-847	631-846	10	631-827	692-826	670-823	712-847	

Age: 18

DECILE

316-465	311-503		326-494	335-564	338-495	1	316-465	311-499	326-512	335-555	338-510
466-496	504-525		495-542	565-581	496-510	2	466-478	500-534	513-533	556-596	511-528
497-525	526-572		543-554	582-614	511-528	3	479-501	535-575	534-552	597-631	529-542
526-541	573-598		555-570	615-632	529-545	4	502-521	576-594	553-567	632-645	543-552
542-554	599-611		571-585	633-641	546-566	5	522-545	595-622	568-585	646-659	553-559
555-565	612-623		586-594	642-661	567-575	6	546-558	623-636	585-611	660-670	560-577
580	624-646		595-615	662-671	576-581	7	559-575	637-652	612-630	671-679	578-599
597	647-669		616-632	672-682	582-593	8	576-589	653-675	631-645	680-688	600-634
618	670-697		633-658	683-715	594-624	9	590-619	676-694	646-673	689-708	635-662
637	698-826		659-823	716-847	625-836	10	620-827	695-826	674-823	709-847	663-836

316-456	311-493		326-496	335-564	
457-476	494-526		497-530	565-614	
477-509	527-551		531-565	615-637	
510-527	552-595		566-575	638-650	
528-531	596-611		576-594	651-657	
532-556	612-629		595-619	658-666	
557-582	630-644		620-629	667-680	
583-595	645-664		630-646	681-693	
596-624	665-679		647-667	694-704	
625-827	680-826		668-823	705-847	

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APPENDIX

List of Participating Programs, Stanford Norming Project, 1983

Arizona

Arizona School for the Deaf and Blind
Cortez High School (Glendale Union
High School District)
Scottsdale Unified School District

Arkansas

Arkansas School for the Deaf*

California

Alhambra Area Education Program
Covina Valley Unified School District
Carnegie Junior High (Los Angeles
Unified School District)
La Mesa-Spring Valley School District
Lompoc Unified School District*
Office of Special Education, Long
Beach
Marlton School for the Deaf (Los
Angeles)
Newport-Mesa Unified School District
St. Joseph's School for the Deaf
(Orinda)
Gerald Smith School (San Bernadino
County Schools)
San Luis Coastal Unified Schools
Santa Ana Unified School District
Orange County Hearing-Impaired
Program
John Adams Junior High School (Santa
Monica Unified School District)
Armijo Annex (Fairfield-Solano
County)*
Tulare County Schools

Colorado

Colorado School for the Deaf and
Blind*
Jefferson County Public Schools
Pueblo School District # 60

Connecticut

American School for the Deaf
Bunnell High School, Hearing Im-
paired Program (Stratford)
Hartford Board of Education

Delaware

Margaret S. Sterck School for the Hear-
ing Impaired

District of Columbia

Model Secondary School for the Deaf
D.C. Public Schools, Division of Spe-
cial Education
Kendall Elementary School
Kendall Elementary School*

Florida

Florida School for the Deaf
Exceptional Student Education
(Tampa)
Leon County Program for Hearing Im-
paired
Valparaiso Elementary (Okaloosa
County Schools)
Jefferson Davis Middle School (West
Palm Beach)
Pasco County District School Board

Georgia

Atlanta Area School for the Deaf
Clarke County Program for Exceptional
Children
Clayton County Schools, Morrow
Annex
Griffin Middle School (Smirna)
Royston Elementary School (Franklin &
Hart County Hearing Impaired
Program)
Griffin-Spalding County Schools

Illinois

A. G. Bell Elementary School
(Chicago)
Jefferson Junior High School, Aurora
(Northwestern Illinois Association)
Special Education Association of
Adams County*
Whitney M. Young High School
(Chicago)
Sparta-Lincoln Attendance Center (Ten
County Regional Program for the
Hearing Impaired)
Dupage-West Cook Regional Special
Education Association
Mid-Central Regional Program for
Hearing Impaired

Indiana

Horizon Learning Center (Elkhart Pub-
lic Schools)
Gary Community Schools
Lebanon Hearing Impaired Program
Northwest Indiana Special Education
Cooperative

Iowa

Arrowhead Area Education Agency #5
Area Education Agency #7

Kansas

Kansas School for the Deaf
Wyandotte Special Education
Cooperative
Curtis Junior High School (Wichita
Public Schools)*

Kentucky

Jefferson County Public Schools
Newport Board of Education

Louisiana

Ascension Parish Schools
 Bossier Parish Schools
 Caddo Parish Schools
 Jonesville Elementary (Catahoula Parish Schools)
 East Baton Rouge Parish Schools
 Chinchuba Institute for the Deaf
 Richland Parish Schools

Maine

Bridgton Junior High School (SAD #61)

Maryland

Montgomery County Public Schools

Massachusetts

Beverly School for the Deaf
 Boston School for the Deaf
 Clarke School for the Deaf
 Concord Area Special Education Collaborative*
 Bartlett School (Bell)
 F D C O Secondary Hearing Impaired (Newtonville)
 Willie Ross School for the Deaf*
 M.E. Small Elementary School (West Yarmouth)

Michigan

Battle Creek Public Schools
 Bay Arenac Intermediate School District
 Williams Elementary School (Jonesville)
 Mecosta-Osceola Intermediate School District
 Way Elementary School (Bloomfield Hills)*
 Owosso Junior High School (Shiawassee Independent School District)
 Traverse Bay Intermediate School District

Minnesota

Minneapolis Public Schools

Mississippi

Clarksdale Speech & Hearing Clinic**

Missouri

Missouri School for the Deaf
 South Elementary (Jefferson City Public Schools)
 Loughead Learning Center, J.M. Smith School (Poplar Bluff)
 Malden R-1 School District

Montana

Montana State School for the Deaf and Blind

Nebraska

Nebraska School for the Deaf*

Nevada

John F. Miller Elementary School (Las Vegas)

New Hampshire

Regional Co-operative Program for Hearing Impaired (North Country Education Services-Berlin)
 Manchester Program for the Hearing Impaired

New Jersey

Special Services School District of Bergen County
 Bruce Street School for the Deaf (Newark)
 Jersey City Board of Education
 Thomas E. Bowe School (Glassboro)*
 A. Harry Moore School (Jersey City)
 Summerfield Elementary (Neptune)
 Toms River School System

New Mexico

New Mexico School for the Deaf

New York

New York State School for the Deaf (Rome)
 St. Mary's School for the Deaf (Buffalo)*
 Albany, Schoharie, Schenectady BOCES
 Monroe County BOCES
 Broome County BOCES
 Cleary School for the Deaf (Ronkonkoma)
 St. Joseph School for the Deaf (Bronx)
 Corcoran High School (Syracuse City School District)
 Onondaga/Madison BOCES Deaf Program

North Carolina

North Carolina School for the Deaf (Morganton)
 Roanoke Rapids City Schools

Ohio

St. Rita School for the Deaf (Cincinnati)
 Belle Stone School (Canton City Public Schools)
 Special Education Branch, Cincinnati Public Schools
 Four County Program for Hearing Impaired (Wauseon)
 Steubenville City Schools
 Millridge Center for Hearing Impaired (Cleveland)
 Dayton Public Schools
 Toledo Public Schools

Oregon

Oregon State School for the Deaf

Pennsylvania

Scranton State School for the Deaf
Willis and Elizabeth Martin School
(Philadelphia)
Intermediate Unit #1 (California)
Allegheny Intermediate Unit #3
Lancaster-Lebanon Intermediate Unit
#13
Montgomery County Intermediate Unit
#23

South Carolina

School District #5 (Anderson)
School District of Greenville County
Spartanburg County Hearing Hand-
icapped Program

South Dakota

South Dakota School for the Deaf

Tennessee

Harrison Chilhowee Baptist Academy
(Seymour)
Memphis Oral School for the Deaf

Texas

Arlington Regional Day School for the
Deaf
San Antonio Regional Day School
Brownsville Regional Day School for
the Deaf
Burleson Independent School District
Comal Independent School District
Hays-Blanco Special Education
Cooperative
Houston Regional Day Program for the
Deaf
Houston School for Deaf Children
Temple Regional Day School for the
Deaf
East Harris County Cooperative
Seguin Independent School District
Waxahachie Regional Day School for
the Deaf

Virginia

Alexandria City Public Schools
Hearing Impaired Program
(Midlothian-Chesterfield County Pub-
lic Schools)
Wise County Schools

Washington

Columbia Basin Children's Hearing
Program
Highline Public Schools

West Virginia

Central Elementary School (Beckley-
Raleigh County Schools)

Wiscon

Wiscon the Deaf

Wyoming

Wyoming School for the Deaf

* Programs who also participated in the
study of parallel forms reliability, 1984.

** Although speech and hearing clinics
were deleted from the sampling plan,
Clarksdale had participated in the pilot
testing of the screening test and was there-
fore invited to participate in the norming.