

# GROUP TESTING OF HEARING DISCRIMINATION

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**INTRODUCTION.** At NTID, unaided hearing discrimination scores (and pure tone thresholds) are the basic diagnostic measures on which individualized programs for aural rehabilitation are based. However, assessing hearing discrimination in a large population is a time-consuming activity when tests are individually administered to the 260+ students admitted each Summer.

In the Spring of 1973, the Audiology Service Section investigated an alternative method of administering hearing discrimination tests. A comparison of group and individual testing methods was conducted. Two measures were used to compare these methods, hearing discrimination profile ranks\* and scores on the CID Everyday Sentences Test (Davis and Silverman, 1970). This sentence test was developed by the Committee on Hearing and Bioacoustics (CHABA).

**PROCEDURES.** The subjects for the initial study were 21 NTID students comprised of 15 males, 6 females. The same students were used in both group and individual testing, and were paid an hourly rate for their time.

The equipment used in the group method was a single auditory training table seating 8 students. The auditory training table consists of a surface area for writing, eight storage areas, a J.L. Warren Gated

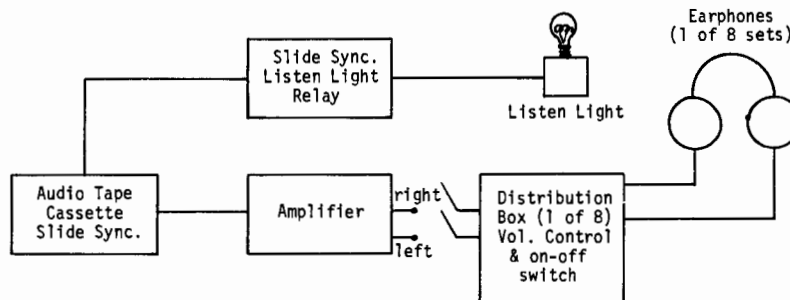


Figure 1. Auditory training table equipment.

Compression Model D-1 amplifier, eight sets of TDH Model 140 earphones connected to eight Eckstein Model 38-BT auditory distribution boxes with individual earphone volume controls for the monaural signal. A Wollensak Model 2555AV audio cassette playback with slide synchronized alerting light system was used to play the test tapes.

The equipment used for the individual audiometric tests was either a Tracor RA115A Audiometer, or a Grason-Stadler 162 Speech Audiometer, depending upon test room availability. The Wollensak, model 2556AV audio cassette playback, and a synchronized alerting light system was used to play the test tapes. A male speaker, chosen by NTID students in a previous NTID study as a speaker with good intelligibility, prerecorded the test materials. The speech materials used in both methods for the discrimination testing were:

1. SAME-DIFFERENCE TEST - List 1 and List 2\*
2. SPONDEE DISCRIMINATION TEST - List 1 and List 2\*\*
3. CHABA lists "1" and "9" for the right and the left ears respectively in group testing.\*\*\*
4. CHABA lists "4" and "6" for the right and the left ears, respectively, in individual testing.

Procedures were slightly different for the two conditions. In group testing the presentation level of the speech material was determined by the students who adjusted their own gain controls to find the most comfortable listening level while listening to either spondee words or everyday sentences, depending on which test was to follow. In individual testing the audiologist determined MCL using a bracketing technique. Instructions were administered using speech and sign language simultaneously. In the group condition, instructions were also displayed on overhead transparencies, and student responses were written and partially student graded. In individual testing, students responded in one of two ways: 1) by pushing buttons on student response systems located in test suites, or 2) by writing their responses

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\*The same-Difference Test consists of ten selected spondees used to produce 20 test items, each test item consisting of two spondees administered at MCL. Students listen to each test item and respond "same" if the two words sound like the same word (e.g., baseball-baseball) or "different" if the two words sound like different words (e.g., baseball-cowboy).

\*\*The Spondee Discrimination Test utilizes ten selected spondees and consists of 20 test items. Students are required to identify these items when administered at MCL. Each test administration is preceded by a practice period during which each spondee is presented simultaneously in print and auditorily.

\*\*\*The CHABA Test (CID Everyday Sentences Test) consists of ten sentences in which 50 test items (key words) are embedded.

when tested with the CHABA sentences. All responses obtained in individual testing were graded by an audiologist.

Initially, approximately half of the students were tested under the group condition; the other half were first tested under the individual test conditions. CHABA sentence scores reported here were obtained by changing raw scores to corrected scores using the Z statistic described in an earlier paper by Sims (The Validation of the CID Everyday Sentence Test for use with the Severely Hearing Impaired) to validate the CHABA sentences with this population.\*

RESULTS AND DISCUSSION. Table 1 lists all corrected CHABA scores for both ears as determined by group and individual testing. For the better ears of the 21 students participating in the study, differences between group and individual profile ranks were found in three instances. In group testing, two students moved up one profile rank and one student moved down one rank.

TABLE 1: CHABA discrimination scores in percent correct for both ears of 21 students as determined in group and individual testing.

Student Numbers	Right Ear			Left Ear		
	Group	Individual	Difference	Group	Individual	Difference
1	14	15	- 1	17	15	+ 2
2	59	89	-30	73	77	- 4
3	78	86	- 8	65	75	-10
4	71	72	- 1	81	67	+14
5	DNT	DNT		DNT	DNT	
6	DNT	DNT		DNT	DNT	
7	74	74	0	71	84	-13
8	83	84	- 1	71	70	+ 1
9	14	9	+ 5	10	11	- 1
10	11	14	- 3	12	11	+ 1
11	54	47	+ 7	18	11	+ 7
12	21	17	+ 4	29	18	+11
13	40	41	- 1	29	31	- 2
14	33	34	- 1	21	26	- 5
15	DNT	DNT		DNT	DNT	
16	83	81	+ 2	74	75	- 1
17	DNT	DNT		DNT	DNT	
18	42	32	+10	50	43	+ 7
19	61	64	- 3	62	59	+ 3
20	DNT	DNT		DNT	DNT	
21	66	DNT		65	64	+ 1

In five instances there were differences between group and individual profile ranks for both ears of the 21 students. The profile ranks for two subjects moved up one rank in group testing and those of three moved down one rank.

These profile rank differences were analyzed statistically using the Spearman Rank Order Correlation and the t-test for small samples.

\*See D. Sims, "The Validation of the CID Everyday Sentence Test for Use With the Severely Hearing Impaired."



individual testing observed in the small group data was encouraging, we recognized that the ultimate utility of speech discrimination testing rests on its capacity to categorize single individuals unequivocally for the purposes of individual, therapeutic program planning in (re-) habilitative audiology. As one may see from Table 1, certain individuals varied in performance (10 to 30 percentage points) from individual to group retest. Further, Tables 3 and 4 show that the standard deviations approach 30% for group vs. individual tests. Thus, these data suggest that group procedures resulted in the usual errors of measurement associated with precision, individual testing.

Thus due to the high correlations and lack of significant differences with regard to mean data, it appears that group test results may be useful in exposing general population trends in auditory speech discrimination testing and with further study to refine procedures and equipment, group test results may be found to be useful in planning individual, therapeutic programs in (re-) habilitative audiology.

#### BIBLIOGRAPHY

Davis, H., and S. R. Silverman, *Hearing and deafness*, Revised 3rd Edition, Holt Rinehart and Winston, New York, 1970.