AN OVERVIEW OF THE COMMUNICATION SKILLS OF NTID STUDENTS WITH IMPLICATIONS FOR PLANNING OF REHABILITATION

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To design and implement a program of communication training for the young deaf adult involved in post-secondary technical education is a difficult task. For each student, individual decisions are required to determine: 1) priorities in training; and 2) the most efficient sequence in scheduling of specialized training in communication to meet top priority needs before the student leaves to enter the world of employment.

With an average two and one-half year duration of enrollment, it is impossible, in most instances, to plan individualized training in each area of deficiency. Furthermore, with students of college age, it may not be economical to offer specialized training in all areas of rehabilitation. For this reason, priorities for training must be established for each student.

Some deficiencies in communication may be more amenable to improvement than others. Training to increase skill in one area, such as auditory discrimination, may also have beneficial side effects relative to another, such as speech. Will spontaneous improvement occur in speech if a student develops sharper auditory discrimination? If articulation is improved, will visual reception of speech gestures in speechreading similarly improve? If a student's functional usage of English is improved and his vocabulary is expanded in writing and reading, will there be an associated improvement in speechreading and oral language usage?

At the present time, there are no definite answers to these important questions, yet answers would assist in determining priorities in the planning of rehabilitation. Perhaps some leads, without definite answers, can be attained by analyzing varied communication parameters and their inter-relationships. A report and discussion of such an analysis is the purpose of this writing.

The purpose of the NTID Communication profile requires restatement before discussing profile data and their inter-relationships are

introduced. The basic purposes of profile data collection are to sample communication skill, to categorize student competencies in various areas of communication, and to describe levels of competency in meaningful terms for the layman.

In a previous presentation, Dr. Johnson explained the tests and procedures employed in the NTID profiling system. As stated, raw scores are converted to profile ratings for screening and descriptive purposes. In efforts to refine understanding of the general inter-relationships between various receptive and expressive skills, it seems best to use raw scores rather than profile ratings, and to incorporate additional information derived from the articulation diagnostic testing. Such data may then be applied: 1) to verify the profile rating; and 2) to provide a better data base for studying inter-relationships among different measures of communication, such as articulation, speech discrimination, and speechreading.

The point emphasized is that profile raw scores for research purposes have limitations, because test material is, of necessity, brief, and derived in group testing situations. The value of the scores is also influenced by the quality of the test, testing conditions,* and the procedures employed in administering and scoring the test. The measurement system itself is not projected as perfect.

These comments are not made to depreciate profile data, but rather to point up the limitations from a research viewpoint. On the positive side, profile information in raw score form, with additional diagnostic information, does permit a good overview of communication performance. In this respect, inter-relationships among the data can be generally discussed and clinically interpreted.

Such discussion is requisite to intelligent rehabilitation planning for the young deaf adult, especially in instructional and clinical settings offering specialized training in speech and hearing to deaf adults coming from very diverse educational and social backgrounds. Although there seems to be overt agreement that all training in communication should be based upon the individual's functional knowledge and use of English, many times this concept is not expressed in clinical practice. Speech therapists can err by teaching the deaf to utter words they do not understand and consequently will not use. Likewise, unwittingly, instruction for auditory recognition of a sound pattern which has no semantic value to the individual may be undertaken. In teaching speechreading, attempts may be made to improve visual recognition of speech gestures, which involves considerable guessing, when, in reality, the individual cannot order or sequence words appropriately in English and suffers from a very restricted English vocabulary. Such errors in programs of instruction can be partially explained by the fact that it is difficult, if not impossible, for a speech therapist or audiologist to assess an individual's level of linguistic competence if speech is

**Before NTID moved to its present location, the speechreading films with sound were administered in large classrooms not equipped with hard wire amplification.*

unintelligible. To avoid such error, considerable information relative to English usage and vocabulary is needed before selecting material and a course of instruction.

The data summarized in this report attempt to point up some of the inter-relationships among parameters of communication, thereby emphasizing the importance of assessing varied communication skills to achieve a reasonable program of rehabilitation for each individual. Such a program requires a careful integration of curriculum for instruction in communication.

For a long time, and for very good reasons, the relationship between hearing and speech has been a focal point of clinical and research study. Certainly, the basic cues for establishing high priorities in rehabilitation are derived from audiological information pertaining to the age of onset, extent and character of the hearing loss. The fundamental questions in rehabilitation still apply: How much hearing does the student have? Can auditory discrimination for speech reception be improved? Does the student possess potential for using amplification? The questions posed here pertain to relationships between hearing and speech.

Several of the preceding speakers have explained that current procedures in assessing speech discrimination at NTID involve the use of CHABA sentence material. Because sentence material is used, rather than words, it is difficult to compare present observations with those of other investigators. Despite this fact, the relationship between hearing and speech, as assessed at NTID, can and should be described to facilitate planning of communication training.

The observations to be reported are based upon data collected from 274 students who entered NTID in 1972 and 1973. The measures described in this paper are gained from students at time of entry, usually during the first two weeks of their presence on campus.

SPEECH AND HEARING. In Table 1, communication data are grouped on the basis of speech profile categories. Speech profile ratings 5, 4, 3, 2, and 1 are vertically listed, with the number of students falling into each respective category. The 66 students who were profiled 5 in speech intelligibility had an associated mean speech discrimination score of 52%. The students profiled 4 in speech had an associated mean discrimination score of 31%.

Since intelligible speakers, profiled 5 and 4, had respective mean discrimination scores of 52% and 31%, it is suggested that a 30% discrimination scores on CHABA sentences should be associated with intelligible speech production. Although standard deviations are exceptionally large, further review of the data supports the generalization that 30% discrimination score on CHABA sentence material represents a level of hearing which should be associated with intelligible speech. If a student is observed to have a 30% discrimination score, and an associated speech pattern which is only semi-intelligible or unintelligible, referral for speech therapy is definitely indicated. The priority for

TABLE 1: Means and standard deviations for measures of speech discrimination, articulation error, speechreading with sound, manual reception, hearing (profile ratings), and reading comprehension, grouped on the basis of intelligibility profiles for entering NTID students, 1972-73 (N=274).

Intelligibility Profile		Speech Discrimination percent		Articulation % Correct percent		Speechreading w/s percent		Manual Reception percent		Hearing rating		Reading Comprehension score	
5	m	51.73	m	88.56	m	77.18	m	34.91	m	3.68	m	43.56
N=66	sd	39.57	sd	7.66	sd	15.12	sd	33.40	sd	1.37	sd	11.09
4	m	30.89	m	74.36	m	62.00	sd	30.13	sd	1.22	7	
N=66	sd	32.20	sd	10.32	sd	19.39	sd	30.13	sd	1.22	sd	7.21
3	m	5.84	m	66.84	m	43.71	m	51.90	m	1.97	m	35.97
N=70	sd	15.60	sd	12.37	sd	18.00	sd	25.75	sd	1.01	sd	8.38
2	m	.81	m	53.31	m	31.69	m	69.00	m	2.06	m	34.72
N=32	sd	3.59	sd	13.29	sd	11.92	sd	12.80	sd	.62	sd	9.51
1	m	0	m	34.62	m	11.60	m	71.00	m	1.58	m	35.35
N=40	sd	0	sd	20.16	sd	11.29	sd	10.88	sd	.50	sd	7.17

therapy should be very high, provided the student's need for amplification and auditory training have been previously met.*

Semi-intelligible speakers, profiled 3 in speech had an associated mean discrimination score of 6%. The descriptor for this level states that speech is difficult to understand; however, the gist of the content can be understood. If the average speaker in this group has about 6% discrimination, it would appear again, that speech status is commensurate with hearing.

Unintelligible speech is profiled 2 and 1. The 32 students profiled 2 in speech had a mean discrimination score of less than 1%. The descriptor for this category specifies that speech is very difficult to understand, only isolated words or phrases being intelligible. The 40 students profiled 1 in speech had 0% discrimination.

To generalize, 0% on CHABA sentences is usually associated with unintelligible speech. Exceptions do exist, however. Further analysis revealed 7 students profiled 5 in speech had 0% discrimination; 16 students profiled 4 had 0% discrimination. Taken together, these 23 students represent 17% of the total group with intelligible speech (N=32 students profiled 4 and 5).

One might reasonably conjecture that the 23 students with intelligible speech and 0% discrimination were all instances of adventitious deafness. Further search revealed this as only a partial answer. Eight students were found to have post-lingual onset; 12 students, however, did have pre-lingual onset. No data relating to etiology or onset were available for 3 students. These findings, interpreted within the scope of the total sample of 274 students, indicate that the attainment of intelligible speech with 0% speech discrimination and a pre-lingual onset is rare, since only 4% of the total sample achieved an intelligible oral status with no speech discrimination and an accompanying early onset of deafness. This type of oral skill demands recognition, and should serve to challenge oral/aural rehabilitation. These facts point to the need for caution in making decisions based *exclusively* upon a 0% discrimination score, regarding a student's potential for speech.

Before discussing other relationships between speech and hearing, subtle differences between speech and hearing profiles should be pointed out. As reported in Table 1, speakers profiled 5, 4, 3, 2, and 1, had associated hearing profiles of 3.68, 2.96, 1.97, 2.06, and 1.58, respectively. Thus, speech profile ranks of 5, 4, and 3, generally are one full rank higher than indicated by the hearing profile.

**Dr. Sims has reported preliminary results showing that a speech discrimination score of 50% or better on CHABA sentences indicates that a student follows conversational speech adequately in fact to face situations. This statement is of particular significance, since the 30% to 50% level of discrimination is also identified with intelligible speech production.*

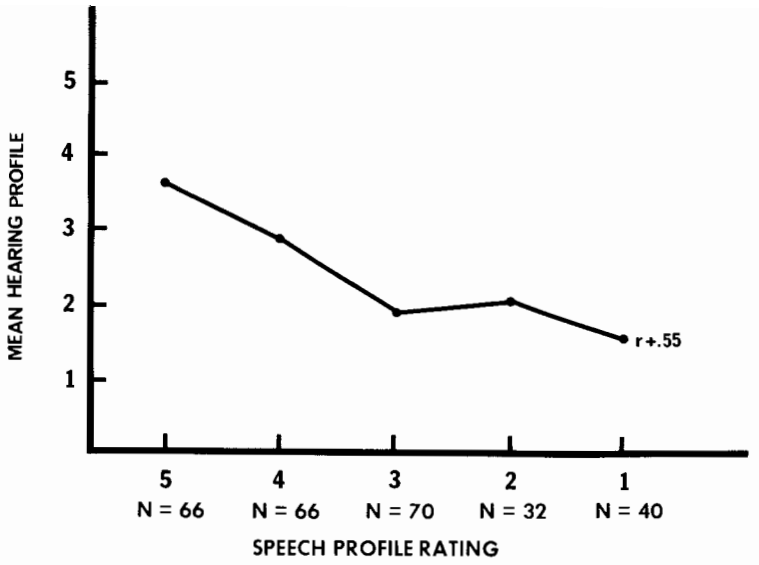

Figure 1. Mean hearing profile for students grouped on the basis of Speech Profile Rating (N = 274 students entering NTID 1972 - 73)

At the lower end of the speech profile, ratings of 2 and 1 were not clearly differentiated from hearing profile ranks. This lack of differentiation may be attributed to the fact that differences in hearing at the lower level of the hearing profile do not make a difference relative to speech performance. This inference is strengthened by the fact that all three hearing ratings of 1, 2 and 3, can include students with no discrimination for speech. If some reception for speech is considered the factor which applies most directly to the student's capability in producing intelligible speech, then no clear relationship would be expected between speech and hearing profiles at the lower end of the scale. A relatively low correlation (.55) between speech and hearing profiles supports this contention.

These points are made to emphasize that speech performance is generally better than would be indicated by the associated hearing performance. This fact is illustrated in Figure 2, which graphs speech profile levels relative to the associated hearing profile. As shown, 29% of the students have equal speech and hearing profiles; 26% of the students have speech profiles one rank higher than is indicated by hearing; 16% have speech profiles two ranks higher than hearing; 6 students have speech ratings three ranks higher than indicated by hearing. In general, then, with the exception of the profile rank 1, speech performance, as expressed by profile ratings, should be equal to or higher

than hearing performance as profiled. Whereas a comparison of speech and hearing profiles may permit a gross judgment of whether or not speech is commensurate with the hearing potential; a much better judgment can be attained by comparing the speech profile with the associated speech discrimination score.

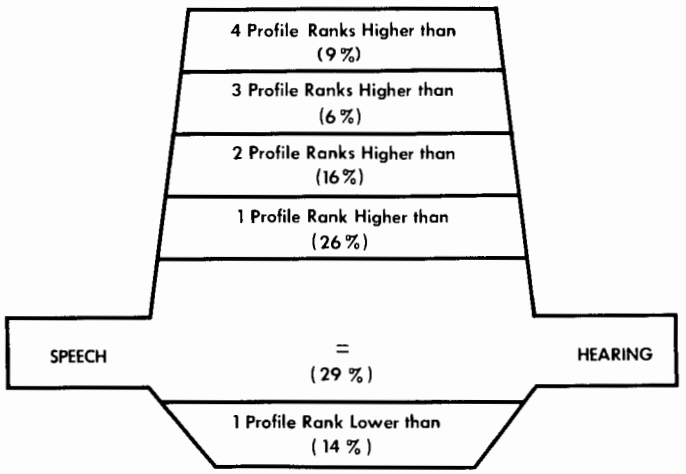

Figure 2. Graph showing Speech Intelligibility Relative to Hearing as defined by NTID Profiles (N = 266 students entering NTID 1972-73)

PROFILE RATINGS AND RAW SCORES. Intercorrelations among various measures of communication are reported in Table 2. The correlation between hearing profile ratings and speech discrimination scores was .80. The same high correlation was established between the speech intelligibility profile and articulation. These data show that the hearing profile is related to discrimination; indeed, it has been based upon discrimination ability. The findings also increase confidence in the intelligibility rating system, since good intelligibility, rated 5 is identified with good scores in articulation.

SPEECH INTELLIGIBILITY AND ARTICULATION. Figure 3 graphically presents the relationships among the various communication measures, with data again grouped by speech profile categories. Parameters of speech discimination, articulation, speechreading and manual reception are identified by solid, dashed, dotted and X-X lines. The associated means, expressed in percentages for each profile grouping, and for each parameter, are plotted vertically.

TABLE 2: Intercorrelations of Parameters Related to Communication for students entering NTID, 1972-73 (N=274).

	Articulation % Correct	Intelligibility Profile	Hearing Profile	Discrimination	Speechreading with Sound	Manual Reception
Articulation % Correct						
Intelligibility Profile	.80**					
Hearing Profile	.46**	.55**				
Dis crimination	.50**	.58**	.80**			
Lipreading withsound	.69**	.81**	.53**	.57**		
Manual Reception	−.34**	−.41**	−.25**	−.23**	−.38**	
Reading Comprehension	.24**	.28**	.06	.11	.25**	−.24**

** Significant at .01 level (v .181)
* Significant at .05 level (v .138)

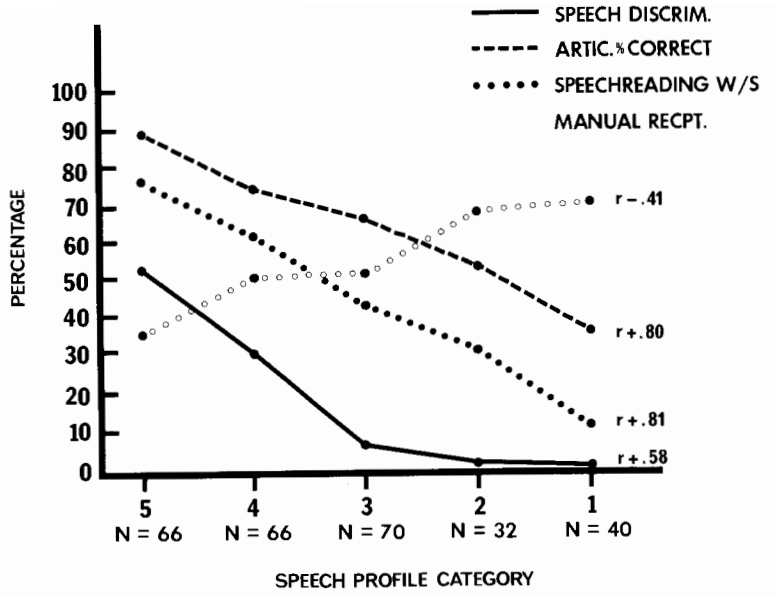

Figure 3. Means for speech discrimination, articulation, speechreading with sound and manual reception for students grouped on the basis of speech profile ratings (N= 274 students entering NTID 1972-73)

The strong correlation between speech intelligibility ratings and articulation scores is indicated by the dashed line. Students profiled 5 in speech scored 90% in articulation. Students profiled 4 in speech scored approximately 75% in articulation. These figures suggest that the speech of the deaf should be intelligible if a 75% score in articulation (25% error) can be achieved.

Speech profiled 2 and 1 had associated mean articulation scores of 53% and 35% respectively. On this basis, articulation scores below 55 percent (45% error) would be expected to be associated with an unintelligible speech pattern. Articulation scores ranging from 55% to 74% might reasonably be identified with semi-intelligible speech patterns.*

ARTICULATION AND SPEECHREADING. The dotted lines, graphing corresponding mean scores for speechreading, show a strong correlation between speechreading and speech intelligibility ratings (.81). Notice that this dotted line parallels the dashed line graphing means for the articulation scores. The remarkable difference is that the

**These data are useful in planning for speech therapy. Previous studies at NTID have shown that students average a 10% gain in articulation after receiving 18 hours of individualized speech therapy. Using the 10% gain, it is therefore reasonable to predict how much training would be required to elevate articulation scores sufficiently to attain an intelligible or semi-intelligible speech status.*

mean articulation score tends to be approximately 10% to 20% higher than the corresponding speechreading score for each speech profile grouping. Both articulation and speechreading performance show a strong relationship to the solid dark line graphing speech discrimination for the respective intellibility categories.

INTELLIGIBILITY AND SPEECHREADING. Speakers profiled 5 and 4 in speech had respective mean speechreading scores of 77% and 62%. Unintelligible speakers, profiled 2 and 1, had mean speechreading scores of 32% and 12%, respectively. These findings indicate a rather close relationship between a student's competence in producing words and his ability to identify words via the visible speech gestures of another person. The clinical implication, it would seem, relates to the fact that if the speech profile 3, 4, or 5, indicating semi-intelligible or intelligible speech, the speechreading performance should be about the same, with a tendency for the speech measure to be higher than the speechreading performance. Students with speechreading profiles lower than speech, profiled 3, 4, or 5, should be referred for speechreading instruction.

SPEECH AND MANUAL RECEPTION. Data graphed for manual reception shows a negative correlation between manual receptive skills and the intelligibility measures (-.41) In general, the intelligible speakers tended to have lower manual reception scores than demonstrated by the unintelligible speakers. This is a favorable finding. Students with unintelligible speech, no speech discrimination, and poor speechreading skill, hopefully would possess adequate receptive skill in manual reception.

It is interesting to note, however, that manual reception scores for unintelligible speakers with 0% discrimination averaged about 60%. This level can scarcely be considered adequate for educational purposes. For this group, training programs to improve speech, hearing, and speechreading may not be fruitful. Instead, clinical efforts to improve manual reception and reception in reading might be emphasized, with equal effort expended to achieve intelligible writing.

The speech status with associated profiles in manual communication is shown in Figure 4. In this illustration, data have been grouped on the basis of intelligible speech (profile 4 or 5), semi-intelligible speech (profile 3), and unintelligible speech (profile 2 or 1). In each group, the incidence of respectable profile ratings in manual reception are designated.

The areas indicating 5, or good performance in manual reception, should be compared for the various speech groups. Notice that approximately 25% of the intelligible group possess good manual reception. Almost *half* of the intelligible speakers were profiled 4 or 5 in manual communication.

These findings show that despite intelligible speech production, half of the NTID entering students are fairly adequate in manual communication to facilitate social and educational adjustment. This

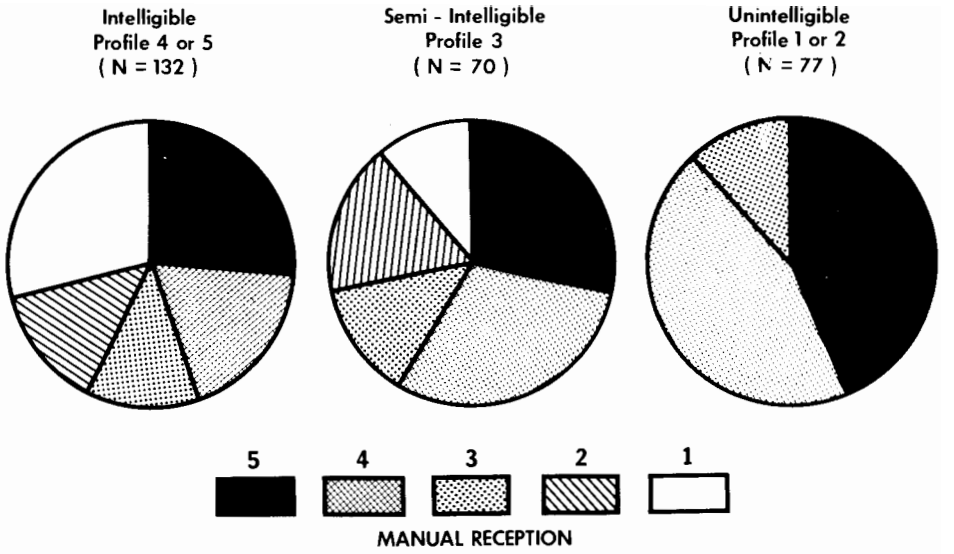

Figure 4. Data grouped on the basis of intelligible, semi-intelligible and unintelligible speech with incidence of respective profile ratings in manual reception (N = 279 students entering NTID 1972- 73)

would appear to be a positive factor socially and educationally within the NTID environment. The danger exists, however, that these students could well reduce oral/aural communication and assume a totally manual mode. The clinical implication is that continued practice should be provided to keep the oral students talking, listening and speechreading, so that these skills will be improved or, at the very least, maintained.

Over half the semi-intelligible speakers had good manual reception. In the unintelligible speech group, 88% were profiled 5 or 4; none were profiled 1 or 2; but 12% were profiled 3 in manual reception.

More intensive study of poor reception in manual communication was undertaken to determine whether or not, in fact, all poor manual reception was compensated for by good hearing and speechreading skill. Indeed, in most instances, that expectation did apply. However, exceptions were noted. If *all* areas of reception are low, an additional handicapping condition, such as a generalized learning disability, related to English language reception would be suspected. Such a diagnosis would have implication for the educational and rehabilitative process.

To pursue the need for such service, all receptive scores were

reviewed for each student profiled 1 or 2 in manual reception. The review revealed 5% of the 77 students profiled 1 or 2 in manual reception had no mode of reception (hearing, speechreading with sound, reading or simultaneous reception) with a rating higher than 3. Since a 3 rating generally indicates a semi-adequate reception level, it would indeed appear that students in this group warrant further study.

The low manual score may be related to the fact that manual test material is presented in signed English. It may be, as has been suggested by Mr. James Stangarone (NTID Interpreting Services Coordinator), and Dr. Kathleen Crandall (NTID English Services Coordinator), that these students are using American Sign Language (ASL) rather than English in communication. A test to determine whether or not this is true is being planned. Certainly, if poor English performance is related to ASL usage rather than other handicapping conditions, the teaching of English to this group should consider principles of teaching English as a second language working with the ASL base.

Further study was undertaken to determine the number of students in the total population with all receptive skills 3 or lower. This search revealed 9% (25 students) of the total group have no receptive skills in areas of hearing, speechreading, manual reception or reading, above a level of 3. The implications here seem quite clear. One area of reception should be bolstered to at least a 4 level to improve the educational and vocational potentials for the student.

SPEECH AND READING. Reading comprehension could not be plotted in Figure 2 because the data are reported in scores ranging from 20 - 80 rather than in percentage. Table 1 shows, however, that reading comprehension scores did not change appreciably as a function of speech intelligibility. On the basis of means, ranging from 35 - 44, very little difference in reading comprehension scores were observed among students with speech profiled 4, 3, 2, and 1. The correlation between speech intelligibility and reading comprehension (.28) was found to be significant but low in comparison to most other correlations (Table 2).

Some reservation in interpreting these data should be expressed. The rather low correlation between reading and speech may be partially attributed to test measures used in assessing reading comprehension(Comparative Guidance and Placement Program). The distribution of scores for NTID students on this test, designed to evaluate reading comprehension of hearing junior college students, is restricted in range and badly skewed to the low end of the scale. For this reason, further study of reading comprehension and related language parameters of speech, hearing discrimination and lipreading, is definitely needed.

These findings are summarized in Figure 5, which graphs the correlations between articulation measures and various receptive skills. Most of these have been mentioned previously. Simply note again, the correlation between articulation and speech discrimination is .50, and

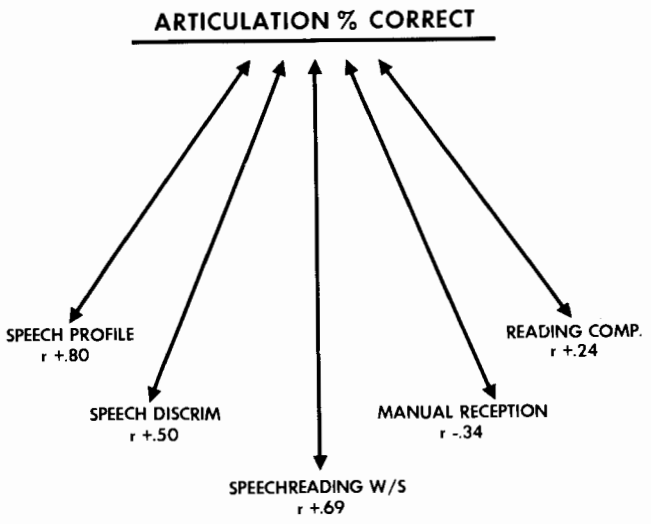

Figure 5. Graph of correlations between articulation measures, speech profile ratings, and receptive skills (N = 274 students entering NTID 1972 - 73)

the relationship between articulation and speechreading skill with sound is .69. The negative correlation between articulation and manual reception (-.34) indicates that, generally, better speech skill is associated with lower performance in manual reception. In other words, higher manual reception scores tended to be associated with lower articulation scores. The positive, but low correlation between articulation and reading scores is also shown (.24).

In order to strengthen the case for a multi-dimensional approach to rehabilitation, data were regrouped on the basis of hearing profile ranks (Table 3), and are displayed in Figure 6. Without belaboring the point, it can be said that the same general trend was revealed when the data were grouped on the basis of the intelligibility profile (Figure 3). Significant positive correlations have been described relating speech to hearing performance. Other positive correlations tie speechreading and speech together. Although correlations with reading are somewhat lower, speech, hearing, lipreading and reading measures tend to cluster. Figure 7 attempts to graphically display this clustered relationship. The strongest relationships seem to exist between speech and hearing functions as designated by positive correlations of .50 and .55; and between hearing discrimination, and speechreading, with a correlation of .57.

Since all parameters are considered to be language based, it is

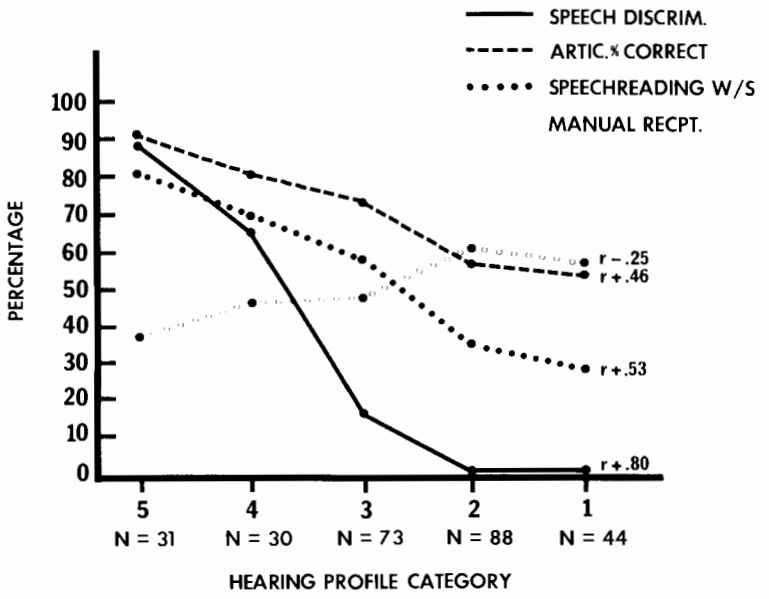

Figure 6. Means for speech discrimination, articulation, speechreading with sound and manual reception graphed for students grouped on the basis of hearing profiles (N = 266 students entering NTID 1972-73)

reasonable to assume that performance in these areas would be related. In some respects, intelligibility of speech may be considered a functional measure of hearing discrimination.*

SPEECH AND WRITING. Written language samples have also been secured and rated on the basis of the relative intelligibility of the written message. The overall distribution of profile ranks for 141 students entering NTID in the Summer of 1973 revealed: no students were profile 1 in writing; 11% were profiled 2, indicating unintelligible writing; about half of the sample (48%) were profiled 3 (semi-intelligible writing); and 41% (less than half) scored 4 or 5 in writing performance, indicating that their writing was intelligible. These data tend to identify writing deficiency as a central problem among post-secondary deaf students.

**Data described suggests that intelligible speech should be attained if a 30% speech discimination score is achieved on CHABA sentence material. Other criteria in hearing have been suggested to predict potential for intelligible speech. Boothroyd, (1) expresses the concept that a hearing loss of less than 90 dB at 2K, should predict intelligible speech potential. His work was done with a younger age group at the Clarke School. The 90 dB loss at 2K should be explored for its predictive value relative to speech in the NTID environment.*

TABLE 3: Means and standard deviations for measures of speech discrimination, articulation error, lipreading with sound, manual reception, speech intelligibility (profile ratings), and reading comprehension, with data grouped on the basis of hearing profiles, for entering NTID students 1972-73 (N=266)

Hearing Profile		Speech Discrimination percent		Articulation % Correct percent		Speechreading w/s percent		Manual Reception percent		Intelligibility Profile rating		Reading Comprehension score
5	m	87.36%	m	89.68%	m	80.00%	m	36.65%	m	4.77%	m	40.87%
N=31	sd	24.01	sd	8.32	sd	18.94	sd	29.29	sd	.50	sd	9.32
4	m	65.53	m	81.13	m	69.60	m	46.40	m	4.33	m	37.23
N=30	sd	14.18	sd	9.76	sd	15.59	sd	35.59	sd	.61	sd	9.19
3	m	15.25	m	72.56	m	57.86	m	47.56	m	3.85	m	36.89
N=73	sd	15.59	sd	14.45	sd	22.58	sd	30.45	sd	.97	sd	9.01
2	m	0.0	m	56.42	m	34.00	m	61.15	m	2.38	m	36.30
N=88	sd	0.0	sd	20.06	sd	22.35	sd	26.16	sd	1.05	sd	9.05
1	m	0.0	m	53.91	m	29.18	m	56.55	m	2.30	m	38.55
N=44	sd	0.0	sd	25.08	sd	20.27	sd	24.37	sd	1.27	sd	10.80

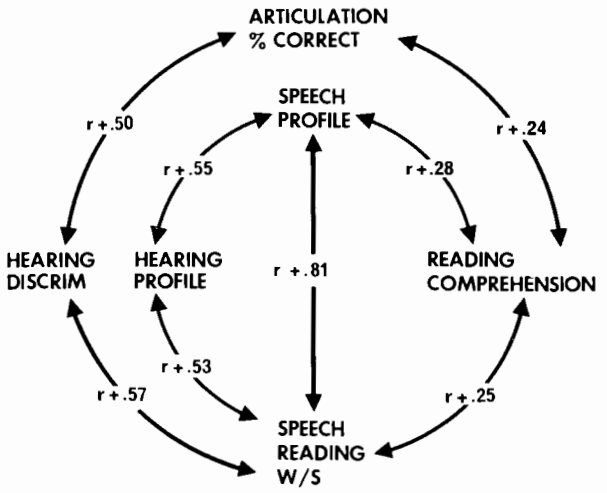

Figure 7. Illustration of correlations between varied parameters of communication (N=274 students entering NTID 1972–73)

In Figure 8, means and individual intelligibility ratings are plotted for each group of students categorized by writing profiles. A generalized trend is noted for expressive skills in writing and speaking to move upward together (.65). The individual ratings of intelligibility plotted for each profile group show considerable spread, however. Ratings in intelligibility range over the full profile scale for writing

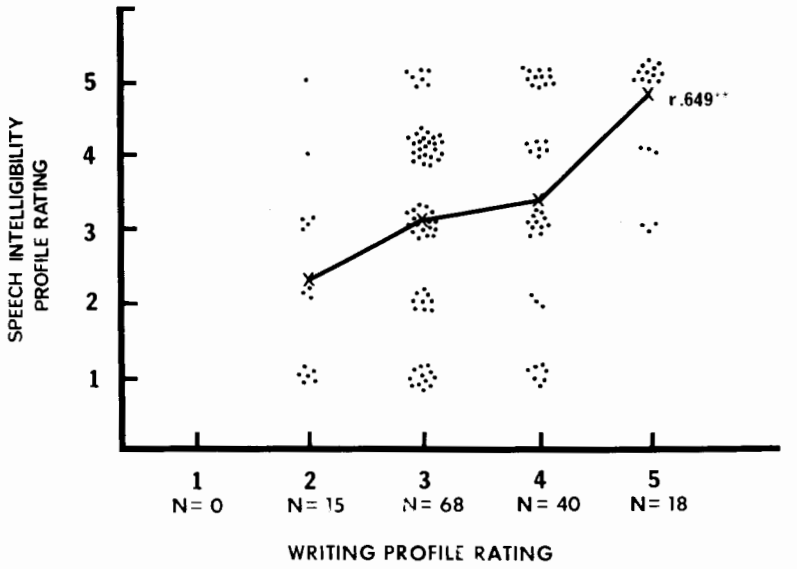

Figure 8. Graph showing individual speech profile ratings and means for data grouped on the basis of the writing profile ratings (N = 141 students entering NTID 1973)

profile categories of 2, 3, and 4. Notice that unintelligible writing (profile 2) is associated with intelligible speech (profiled 4 or 5) in *some* students. As a correlary, some students demonstrate good writing skill with only semi-intelligible speech.

One might hope that students who cannot speak intelligibly would develop compensatory expressive skill in writing. Another look at the lower right corner of the graph suggests that this does not commonly occur. Only 10 unintelligible speakers did achieve good writing competence (profiled 4). At the lower left, another unfortunate fact is graphically displayed. Nine unintelligible speakers (profiled 1 and 2) were also unintelligible writers (profiled 2).

The clinical implications to be drawn from these data are somewhat restricted because assessment of speech was based upon oral reading rather than self-generated oral language. Additional work is needed and underway now to correct this limitation. The data, however, do suggest some clinical implications.

Generally, those students with intelligible speech, profiled 4 and 5, have some residual functional hearing. Hence, it would seem their weakness in writing might reasonably be attacked via an oral-aural approach. The group identified with unintelligible speech, (profiled 1 or 2), and meager writing skill, (profiled 2 or 3), obviously need major attention. They neither write not speak intelligibly. These students might well be studied individually to determine if receptive skills in hearing, reading, speechreading, and manual reception are equally low, and to select the best mode of communication for educational purposes.

READING AND WRITING. Reading comprehension scores were also studied in relation to the writing profiles to define interrelationships between receptive and expressive skills. The correlation between those two parameters is graphed in Figure 9. The correlation (.38) indicates that there is a general tendency for reading and writing to be related. The dots plotting individual reading scores for students falling in respective profile categories established on the basis of writing, do, however, indicate exceptions to this generalization.

DISCUSSION AND CONCLUSIONS. The illustrations mentioned relative to writing and reading emphasize the importance of studying various aspects of communication and of integrating the curriculum in all areas of communication training, so that appropriate reinforcement of learning can be achieved. It could be said that speech, speechreading or hearing are not taught; rather people are taught to use speech and hearing to express and receive information through a language system identified in this environment as English. With this concept, the importance of appraising varied aspects of communication is underscored to identify relative strengths in one area of communication, so that it might be exploited to improve skill in another area of weakness, or to compensate for deficiencies which cannot be ameliorated.

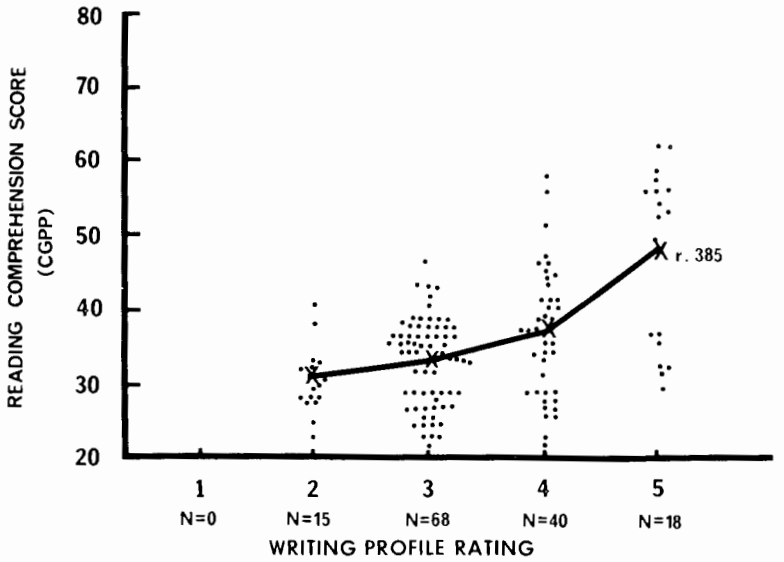

Figure 9. Graph showing individual scores and means for reading comprehension for data grouped on the basis of the writing profile ratings (N = 141 students entering NTID 1973)

Understanding the relationships which exist between parameters is also required to define teaching strategies. Any reasonable program of training in speech, speechreading, or audition cannot be defined by studying each parameter in isolation. The course, strategy, and content material used in training should be based upon the individual's language level; i.e., his relative competence in the functional use of English. This level may be defined by measures of vocabulary, reading comprehension, and writing skill.

In all instances, broader gains in communication probably can be achieved if the speech and audiological curriculum is integrated with the English program of instruction. Each area of instruction should reinforce and supplement other areas. In order for this to occur, the English curriculum must be well defined and students clearly identified by their functional level in English usage. To implement the reinforcement of English instruction, speech, speechreading and auditory training materials need to be developed and categorized by language level.

To conclude, the requisites for successful planning of communication programs for the deaf adult are stated in relative order of importance. It is necessary to understand: 1) the individual as a person; 2) his functional level in English usage; and 3) the characteristics of his hearing and speech.

REFERENCES

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