COMMUNICATION CHARACTERISTICS
OF NTID STUDENTS

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The Primary Goal of the NTID (National Technical Institute for the Deaf) Communication Center is to help each individual student strengthen and/or develop those communication skills necessary for successful job placement and community involvement. The Center is made up of five distinct service sections that work cooperatively to help all students achieve this goal: 1) Speech Pathology; 2) English; 3) Audiology; 4) Experimental Educational Theatre; and 5) Interpreting. In order to accomplish their task of helping students upgrade their lagging communication skills, Communication Center personnel have developed a battery of evaluative instruments which make it possible to not only determine communication skill levels of entering students, but also chart their progress during the duration of their stay at NTID. The collective results from the administration of this test battery make up what is known as a "Communication Profile."*

It should be understood at the outset that the individual test instruments which make up the communication profile battery are "performance-type" and not diagnostic in nature: i.e., they only allow the test administrator to look at general skill levels and do not provide the very specific and detailed types of information necessary for formulation of an individualized instructional program. Thus, in addition, a diagnostic battery is necessary to allow for an in-depth study of each of those expressive and receptive communication parameters which are measured during performance evaluations. Such a diagnostic battery is now under development and evaluation at NTID.

The assessment of student performance in major communication skill areas presently includes nine components — six receptive and three expressive: Receptive: 1) hearing (speech) discrimination, 2) speechreading without sound, 3) speechreading with sound, 4) manual reception, 5) simultaneous reception and 6) reading comprehension (language); Expressive: 1) speech intelligibility, 2) writing intelligibility

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*Determination of the various evaluation instruments to be utilized within the Communication Profile was accomplished in the main by the Communication Profile Committee made up of the following members: Dr. Donald D. Johnson, NTID, Chairman; Dr. Joanne Subtelny, NTID; Dr. Diane Castle, NTID; Dr. William Castle, NTID; Dr. Harry Levitt, City University of New York; Dr. Kathryn Harris, City University of New York.

(language) and 3) emotive intelligibility (body language). The following list of definitions should be helpful in gaining an overview of these nine communication parameters:

1. *Hearing (speech) Discrimination* - Under optimum conditions, how well can the student receive information when audition is his only mode of information reception;

2. *Speechreading without Sound* - Under optimum conditions, how well can the student receive information when he has only speechreading (lipreading) as his mode of information reception;

3. *Speechreading with Sound* - Under optimum conditions, how well can the student receive information when speechreading and listening are combined;

4. *Manual Reception* - Under optimum conditions, how well can the student receive information when signs and finderspelling are his only mode of information reception;

5. *Simultaneous Reception* - Under optimum conditions, how well does the student receive information when he has a combination of listening, speechreading and manual communication as his mode of information reception;

6. *Reading Comprehension (Receptive Language)* - Under optimum conditions, how well can the student read and understand written English;

7. *Speech Intelligibility* - Under optimum conditions, how well can the student make himself understood when reading aloud from a preselected passage, and speech is his only mode of communication;

8. *Writing Intelligibility (Expressive Language)* - Under optimum conditions, how well can the student make himself understood when written English is his only mode of communication;

9. *Emotive Intelligibility (Body Language)* - Under optimum conditions, how well can the student express himself when body language and gesture (no signs or fingerspelling) are his only mode of communication.

Figure 1 presents an overview of the performance section of the communication profile with its concomitant rating scale. Students are rated on a 5-point scale with a 5 rating being highest and a 1 rating lowest. Ratings, depending on the communication parameter in question, are derived from raw scores, percentage scores or averaged or most common subjective ratings. Suitable functional descriptors have or are being developed for each level within a parameter. Research to

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validate the individual instruments and their respective rating systems and descriptors is nearing completion and will ultimately be formally documented for purpose of information dissemination.*

COMMUNICATION CENTER - NTID

COMMUNICATION PROFILE

(PERFORMANCE SECTION)

RATING	RECEPTIVE						EXPRESSIVE		
	HEARING DISCRIMINATION	SPEECHREADING WITH SOUND	SPEECHREADING NO SOUND	MANUAL RECEPTIVE	SIMULTANEOUS RECEPTIVE	READING COMPREHENSION	SPEECH INTELLIGIBILITY	WRITING INTELLIGIBILITY	EMOTIVE INTELLIGIBILITY
HIGH V (5)									
IV (4)									
III (3)									
II (2)									
LOW I (1)									

Figure 1. Rating system and receptive and expressive components of NTID Communication Profile

It is the purpose herein to present an overview of some of the communication characteristics of "entering" NTID students as derived from the results of administration of the various performance instruments. Not all parameters will be presented because the existing data is presently suspect for one or more reasons.

Hearing (Speech) Discrimination. Each student's assigned hearing discrimination skill rating is based completely on his ability to discriminate speech. The test battery is made up solely of CID Everyday Sentence lists and selected spondee words. Test administration occurs at predetermined "most comfortable loudness levels" established with that type of stimulus to be utilized during the actual evaluation. The five ratings and their concomitant levels of hearing discrimination functioning are listed below in Table 1. All tests are generally adminis-

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*For all parameters of the present Communication Profile, functional descriptors, percentage ranges and numerical descriptors were selected on the basis of pilot information and suitable rationale. Preliminary evaluation indicates that they are close. When research has been completed, the various instruments, together with an instructional package containing validation and reliability data will be available on a loan or purchase basis.

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tered individually under headsets in an IAC sound-treated environment in an effort to simulate optimum listening conditions. Recent research conducted at NTID has made it possible to perform these evaluations in groups of from 8 to 25 students. (This research is reported by Mss. Karen Snell and Valerie Retzinger within the present proceedings.)

TABLE 1: Rating system utilized by NTID for deriving levels of speech diccrimination ability of individual students.

Profile Rating	Level of Discrimination Functioning
V (5)	Correct identification of 90 to 100% of 50 key-words during administration of CID Everyday Sentence list
IV (4)	Correct identification of 50 to 88% of 50 key-words during administration of CID Everyday Sentence list
III (3)	50% level of recognition of 10 selected spondee words and 0 to 48% correct identification of 50 key-words during administration of CID Everyday Sentence list
II (2)	Correct identification of 15 or more of 20 items in a same-difference task utilizing 10 selected spondee words
I (1)	Less than 15 items correctly identified during a same-difference task utilizing 10 spondee words

The functional descriptors which are presently being utilized for each of the respective clinical ratings for hearing discrimination are presented in Table 2.

TABLE 2: Rating system and functional descriptors utilized by NTID for defining student speech discrimination ability.

Profile Rating	Functional Descriptor
V (5)	Student understands the complete message
IV (4)	Student understands most of the content of the message
III (3)	Student understands with difficulty about half of the message (understanding may improve with increased exposure)
II (2)	Student understands little of the content of the message, but does understand a few isolated words or phrases
I (1)	Student cannot understand any of the message

Figure 2 demonstrates the hearing discrimination profile ratings derived from hearing tests performed on 147 students entering NTID during Summer Session, 1973. These results indicate that approximately 16 percent (profile rating of 1) of the students had no ability to discriminate speech at any level (only approximately 10 percent of this total population had no measurable hearing). Approximately 33 percent of the students (profile rating of 2) had learned to utilize gross cues in speech to determine that two words are the same or different, but had not learned to recognize the word itslef. The remaining 51 percent (profile ratings of 3, 4 and 5) were able to utilize their residual hearing to some advantage in making speech sound discriminations.
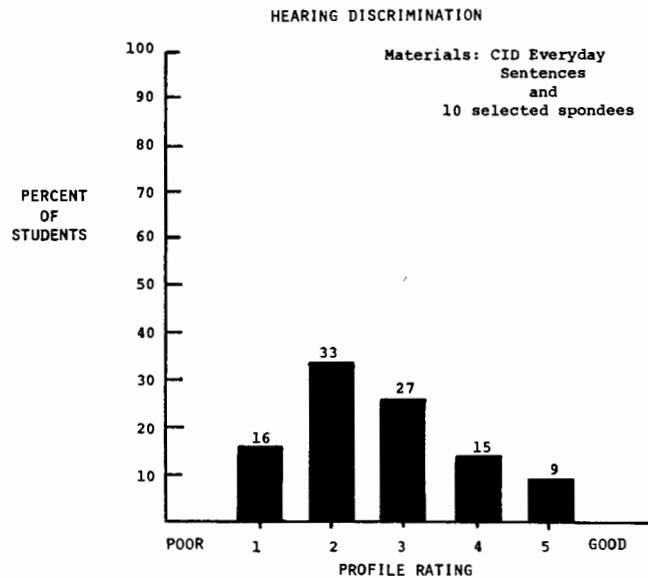
Figure 2. Summary of results on tests of Hearing Discrimination for NTID students entering Summer, 1973 (N=147)

Information derived from parental information forms distributed to the parents of all students entering NTID Summer, 1973 indicates that approximately 75 percent (N=135) owned their own HAs. Only 74 percent of those owning hearing aids were using them all or most of the time while 12 percent never used them; the remaining students used them seldom or only on special occasions (TV, dances, movies, etc.).

A study of the total population presently at NTID indicates that approximately 63 percent are working below their predicted potential for hearing discrimination. Many of these students are in need of one or more quarters of auditory training in order to attempt to help them upgrade their listening skills in preparation for a more successful job placement.

Speechreading. Speechreading ability with and without sound is assessed on all incoming students. NTID color film adaptations of the CID Everyday Sentence lists are used to make this assessment. Because conditions for administration of the test for speechreading ability *with sound* were found to be inappropriate for the students entering NTID prior to 1974, these results will not be reported herein. Each of the ten films presently being utilized includes two practice and ten test sentences. Research carried out at NTID has demonstrated that it is only necessary to administer one film to assess the general speechreading skill of a student. Each list of ten sentences contains approximately seventy words; fifty of these are key-words. The student writes word for word what he is able to speechread and scoring is based upon the percentage of key-words which are correctly identified.

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Table 3 presents the profile ratings and percentage ranges for deriving general speechreading skill levels along with their concomitant functional descriptors.

TABLE 3: Profile ratings, percentage ranges and functional descriptors for assessment of speechreading ability of NTID students.

Profile Rating	Percentage Range	Functional Descriptor
V	75-100%	Student understands the complete message
IV	54-74	Student understands most of the content of the message
ii	33-53	Student understands with difficulty about half of the message (understanding may improve with increased exposure)
II	11-32	Student understands little of the content of the message, but does understand a few isolated words or phrases.
I	0-10	Student cannot understand the message

Figure 3 summarizes the results of speechreading tests administered to 153 students entering NTID during Summer Session, 1973.
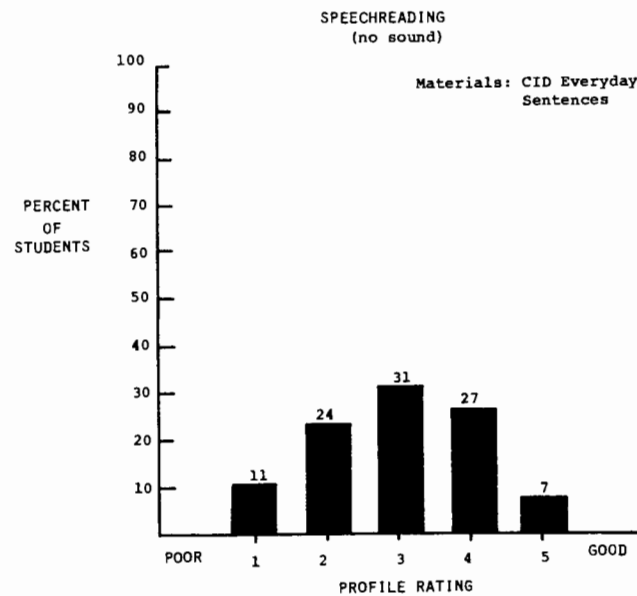

Figure 3. Summary of results on a test of Speechreading Ability for NTID students entering Summer, 1973 (N=153)

These results indicate that approximately 35 percent of the students (profile ratings of 1 and 2) had very poor speechreading ability

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and probably would not be able to function in the educational or other situations if speechreading was their only means of information reception. Approximately 34 percent (profile ratings of 4 and 5) of the students had good to excellent speechreading skills while an additional 31 percent (profile rating of 3) barely reached adequate speechreading proficiency. This latter group is quite likely to encounter some difficulty in most communication situations. Based upon this information, it appears that approximately 66 percent or more of this NTID student population (profile ratings of 1, 2 and 3) would be in need of additional speechreading training if they are to be more appropriately prepared for successful job placement. These figures have remained essentially stable for entering student populations over a three year period.

Manual Reception. Each student entering NTID is assessed for his ability to receive information when signs and fingerspelling alone are his mode of information reception. Again, NTID color film adaptations of the CID Everyday Sentence lists are used to make this assessment. As with the films for speechreading, scoring is based upon correct identification of key-words in a list of ten sentences. Each test list contains approximately 70 words; 50 are key-words. The student is asked to write word for word what he thinks the protagonist on the film is signing and fingerspelling. Table 4 presents the profile ratings and percentage ranges for deriving general manual receptive skill levels along with their concomitant functional descriptors.

TABLE 4: Profile ratings, percentage ranges and functional descriptors for assessment of manual receptive ability of NTID students.

Profile Rating	Percentage Range	Functional Descriptor
V	75-100%	Student understands the complete message
IV	54-74	Student understands most of the content of the message
III	33-53	Student understands with difficulty about half of the message (understanding may improve with increased exposure)
II	11-32	Student understands little of the content of the message, but does understand a few isolated words or phrases
I	0-10	Student cannot understand the message

Figure 4 demonstrates the results of tests for manual reception administered to 146 students entering NTID during the Summer Session, 1973.

These results indicate that approximately 63 percent (profile ratings of 4 and 5) of the students arriving at NTID had already acquired a high degree of proficiency at receiving information through the manual mode. Twenty-seven percent (profile ratings of 1 and 2)

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of the students were relatively unskilled in this mode information reception while 10 percent (profile rating of 3) had probably just enough familiarity with sign language to allow them to receive information, but with some difficulty.

Simultaneous Reception. Again, as in the case of hearing discrimination, speechreading and manual reception, the test for simultaneous
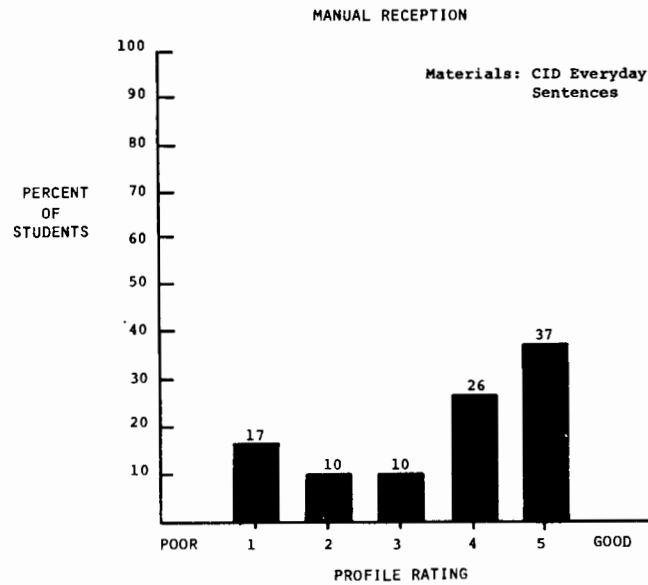
MANUAL RECEPTION

Figure 4. Summary of results on a test of Manual Receptive Ability for NTID students entering Summer, 1973 (N=146)

receptive ability utilizes the CID Everyday Sentence lists. The student's profile rating (Table 5) is based upon the percentage of 50 key-words

TABLE 5: Profile ratings, percentage ranges and functional descriptors for assessment of simultaneous receptive ability of NTID students.

Profile Rating	Percentage Range	Functional Descriptor
V	75-100%	Student understands the complete message.
IV	54-74	Student understands most of the content of the message
III	33-53	Student understands with difficulty about half of the message (understanding may improve with increased exposure)
II	11-32	Student understands little of the content of the message, but does understand a few isolated words or phrases
I	0-10	Student cannot understand the message

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identified from ten sentences. NTID color film adaptations of the ten, 10-sentence lists provide the stimulus materials for these evaluations. The protagonist signs and/or fingerspells the words in each sentence while he simultaneously speaks them. The student is thus provided with multiple cues (listening, speechreading, signs and/or fingerspelling for receiving information). Figure 5 summarizes the results of information derived from evaluation of the simultaneous receptive skills of 146 students entering NTID during Summer Session, 1973. These results indicate that approximately 88 percent of these students (profile ratings of 4 and 5) would probably be able to receive information in the academic environment when it is presented through the simultaneous mode of expression provided that the vocabulary level was not totally inappropriate for them. Twelve percent of the students (profile ratings of 1, 2 and 3) would probably experience severe to extreme difficulty in their attempts to receive information. Thus, when this latter group of students is identified, steps must be taken immediately to provide them with instruction (speechreading, audition, language and manual) which will allow them to function in the classroom during the Fall Quarter.
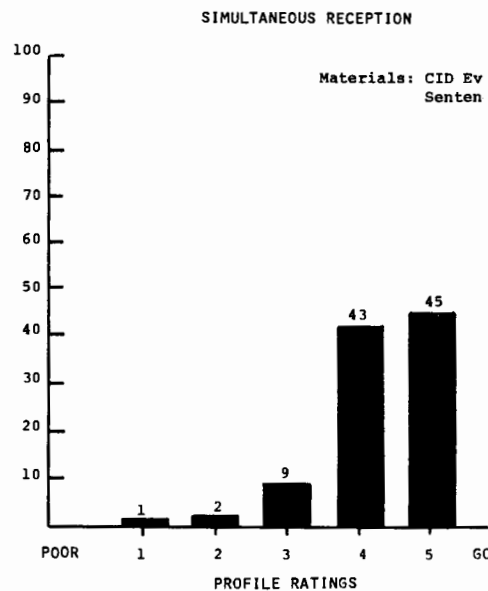
SIMULTANEOUS RECEPTION

Figure 5. Summary of results on a test of Simu
Receptive Ability for NTID students
Summer, 1973 (N=146)

Speech Intelligibility. Tape recordings of each incoming student reading the "Rainbow Passage" are utilized to assess speech intelligibility. These recordings are made after the students are given the opportunity to familiarize themselves with the passage. A panel of five especially trained speech pathologists listens to and independently rates the

students' speech on a scale of 1 (poor) to 5 (good). The most common score is then assigned to derive a scale score for intelligibility. Unpublished research conducted at NTID (Subtelny and Speech Staff, 1973-74) has not only established the validity of this rating procedure, but has demonstrated that students are judged significantly better when reading than when speaking spontaneously in response to pictorial stimuli. On the average, (for profile rating levels of 1, 2, 3 and 4) ratings of readings were one profile rank higher than the ratings based upon spontaneous speech. Spontaneous and read speech ratings for students with a profile 5 intelligibility level were the same as would be expected. Indications were that the difference is apparently related to the students' difficulty in generating appropriate English for conversational purposes. This research is presently continuing and will be prepared formally for dissemination when complete.

Table 6 presents the profile ratings together with their respective

TABLE 6: Profile ratings and functional descriptors utilized by NTID for defining student speech intelligibility levels

Profile Rating	Functional Descriptor
V	Listener understands the complete message
IV	Listener understands most of the content of message
III	Listener understands with difficulty about half of the message. (Intelligibility may improve after a listening period.)
II	Listener understands little of the content of the message, but does understand a few isolated words or phrases
I	Listener cannot understand the message

functional descriptors for defining student speech intelligibility. Figure 6 summarizes the results of tests of speech intelligibility administered to 159 students entering NTID during the Summer Session, 1973.

The results reported in figure 6 indicate that approximately 31 percent (profile ratings of 1 and 2) of the students arriving at NTID did not have speech which could be understood by the general public while another 24 percent (profile ratings of 3) were only semi-intelligible. The remainder of the students (profile ratings of 4 and 5), 46 percent, had achieved intelligible speech levels although their speech may not have been without major distortions.

Implications for speech pathology are far-reaching. A review of all speech communication data obtained for 48 students entering NTID during Fall Quarter, 1969 and exiting Spring Quarter, 1972 indicated that 67 percent of these students had improved in speech intelligibility by one or more scale score ranks while the remaining 33 percent stayed the same (Subtelny and Speech Staff, 1973). More definitive research on this matter is being conducted at the present time.

An unpublished study (Subtelny, Myers, Walter and Chen, 1973) has demonstrated that students with out-going, happy-go-lucky and venturesome personalities are apparently better candidates for speech therapy, perhaps because of more positive attitudes and greater motivation toward speech improvement. The student who is attention-seeking, dependent and over-protected is a less likely candidate. However, all NTID speech research clearly indicates that many of the young
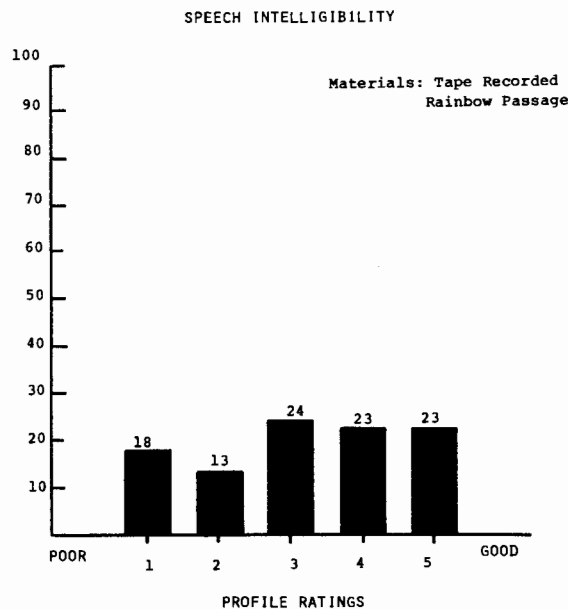
SPEECH INTELLIGIBILITY

Figure 6. Summary of results on a test of Speech Intelligibility for NTID students Entering Summer, 1973 (N=159)

severely hearing impaired students in the NTID student population are capable of making improvements in their overall speech intelligibility providing they receive individualized instruction in correct speech production and utilize their speech continually.

Language. The Comparative Guidance and Placement Program (CGPP) is administered to all incoming students. This test battery is published by the Educational Testing Service and has been standardized on entering hearing, junior college students. A conventional silent reading test, Section IV of the CGPP, was selected as a measure of receptive language for profile purposes. An investigation of the more recent thinking in linguistics lead to selection of a measure of grammatical competence as an indicator of expressive language or writing intelligibility (Section V, CGPP). Since these measures have been standardized on hearing, junior college students, it is possible to make a comparison of hearing and NTID college students. Scoring is based on a potential of 20 to 80 points. Table 7 demonstrates the profile

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ratings and their associated numerical descriptors which have been suggested by unpublished research conducted at NTID (J. Kelly, M. Enders and Subtelny, 1973).

Table 8 demonstrates the functional descriptors that coincide with the profile ratings for writing intelligibility as measured by the CGPP

TABLE 7: Rating system and associated numerical descriptors for assigning skill levels in receptive and expressive language (as measured by CGPP test administration).

Profile Rating	Numerical Score	Associated Descriptor
V	50-80	Equal to the average entering, hearing, junior college student; that is, in the 46th to 99th percentile of those given the test nationally
IV	41-49	Superior within the NTID student population, and falling within the 16th and 45th percentile of entering, hearing, junior college students given the test nationally
III	31-40	Average within the NTID population and within the 3rd and 15th percentile of entering, hearing, junior college students given the test nationally
II	25-30	Below average within the NTID population and falling in the 2nd percentile of entering, hearing, junior college students given the test nationally
I	20-24	Extremely poor performance in the 1st percentile and below of entering, hearing, junior college students given the test nationally

and presented in Table 7. Functional Descriptors for reading comprehension are not presented herein since they are in the process of development at the present time and research has not been completed.

TABLE 8: Profile ratings and associated functional descriptors for expressive (writing intelligibility) language levels as measured by CGPP.

Profile Rating	Functional Descriptor
V	Student expresses the complete message in acceptable English
IV	Student expresses most of the content of the message with noticeable errors in English
III	Student expresses, with difficulty and many errors, about half of the content of the message in English
II	Student expresses little of the content of the message, but does use isolated words or phrases appropriately in English
I	Student cannot express the content of the message in English

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Figure 7 presents the results of expressive and receptive language data derived from CGPP tests administered to 156 students entering NTID during Summer session, 1973.
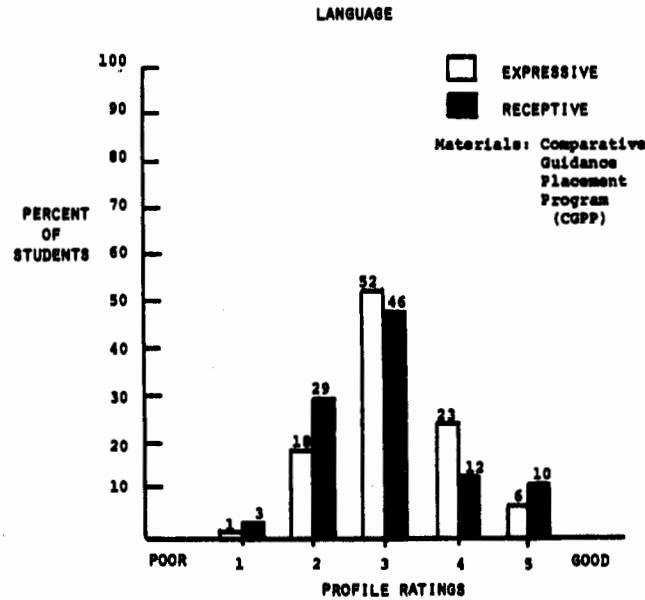
LANGUAGE

Figure 7. Summary of results of tests of Receptive and Expressive Language Ability for NTID students entering Summer, 1973 (N=156)

These data indicate that only approximately 5 to 10 percent (profile rating of 5) of these students entering NTID during Summer session, 1973 were equal to the average entering, hearing, junior college student to whom the test is administered nationally on those measures selected to represent expressive and receptive language (CGPP). Approximately 75 percent (profile ratings of 3, 2 and 1) of the same population of NTID students fell at the 15th percentile and below for the two measures as compared to their hearing counterparts.

This language information, although extremely general in nature, has profound implications for all aspects of training which are carried out at NTID. Most students need extensive preparatory instruction to build English skills if they are to succeed in the academic environment at RIT (Rochester Institute of Technology) and later on the job: i.e., if they cannot receive information from the written page, it is difficult to perceive how they can hope to obtain those skills necessary for successful job placement, job longevity and job mobility. Moreover, chances for continued success both in the academic and job environments are diminished considerably when the student cannot express himself intelligibly through grammatically correct English.

Often other communication skills are also affected when language

skills such as reading and writing have not developed properly. For instance, recently an attempt was made (Subtelny, 1974) to examine the relationship between written language and the speech, speech-reading and hearing discrimination skills of a group of NTID students. A two-minute film, "Mr. Koumal," was administered to 125 students. The students were given twenty minutes to write an essay on how they felt about the film or what it was about. Twelve percent of those students to whom the test was administered received a profile rating of 2 or essentially unintelligible writing skills. Of that 12 percent, 63 percent had unintelligible speech; virtually the identical 63 percent had developed no ability to speechread and 50 percent had no ability to discriminate speech sounds. The study of these relationships is continuing and will be presented at a later date.

Emotive Intelligibility. A new instrument for evaluating performance skill levels in body language (emotive intelligibility) has recently been developed at NTID. One of the purposes of evaluating students with this method of expressive communication is to determine whether there are entering students who have not developed intelligible levels of speech or written English, and, in addition, have not learned to convey information through gesture or body language. This means essentially that these students would have no effective way of expressing themselves in most communication situations. It also appears that this instrument will be helpful in discovering students who have or lack these communication talents which may be further strengthened and/or developed through participation in Experimental Educational Theatre (EET) while they are working to develop their other communication skills.

The test procedures include videotaping individual students acting out a three minute answer to one of twelve formal preplanned problems. Of importance is not only the student's ability to intelligibly present his information, but to work within specified time and space constraints. The student is instructed that he may not utilize signs or

TABLE 9: Rating system and functional descriptors utilized at NTID for defining student emotive intelligibility levels

Profile Rating	Functional Descriptors
V	Body language completely intelligible; evaluator understands complete message
IV	Body language is intelligible; occasional movements are unclear
III	Body language is difficult to understand; evaluator understands about half the message
II	Body language difficult to understand; only isolated body movements convey appropriate message
I	Body language completely unintelligible; none of the appropriate message is understood

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fingerspelling to convey his information, only gestures and body movements.

A panel of three especially trained EET staff members view the videotapes and independently rate the students' emotive skills on a scale of 1 (poor) to 5 (good). The most common rating is then utilized to derive a scale score for intelligibility.

Table 9 presents the profile ratings for emotive intelligibility along with their respective functional descriptors.

Figure 8 demonstrates the emotive intelligibility ratings of 199 students entering NTID Summer, 1974. This was the first formal evaluation of NTID students utilizing this evaluation technique. Thus, it is not possible to report the emotive skills of the 1973 entering students utilized in describing the various other communication parameters in this report. In addition, these results were not available until the day preceding the Summer ARA Institute, and many questions still remain unanswered. Therefore, interpretation of the information in the figure should be extremely guarded.

In general, the figure demonstrates that there were approximately 34 percent of these students (profile ratings of 1 and 2) who were totally incapable of making themselves understood through body language; an additional 40 percent (profile rating of 3) would experience great difficulty in doing so. If there are among these students those who did not possess intelligible speech and writing, they will most
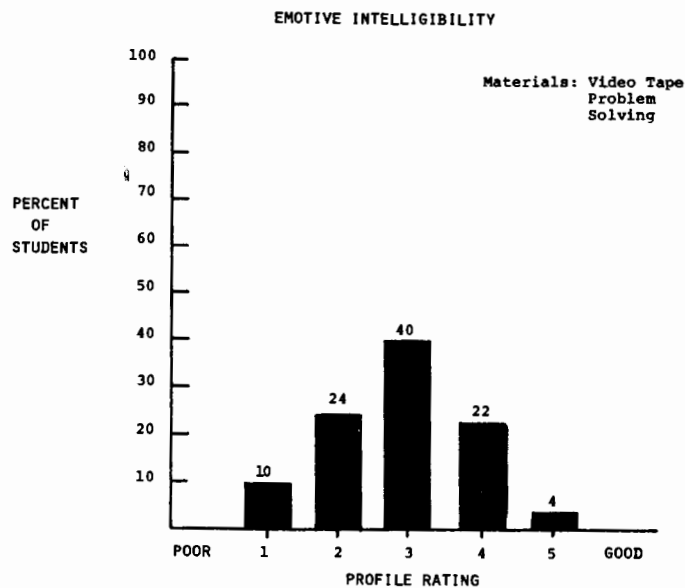
EMOTIVE INTELLIGIBILITY

Figure 8. Summary of results on a test of Emotive Intelligibility for NTID students entering Summer, 1974 (N=199)

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likely not succeed in making themselves understood either at RIT and later on the job if something is not done to provide them with appropriate instruction to help upgrade their lagging expressive skills.

Research is presently underway to answer some pertinent questions about this instrument such as appropriate number of evaluation team members, the appropriateness of the problems being presented to the students, the relationship between emotive intelligibility and other communication skills, etc. In addition, a diagnostic instrument has been designed and is being evaluated.

Summary. In summary, a battery of instruments for defining the general performance levels of the communication skills of NTID students has been presented. This battery contains instruments for measuring six receptive and three expressive communication skill areas. The information from this battery does not allow the NTID Communication Center professional staff members to design individualized instructional programs for the students. A diagnostic battery is being developed for that purpose.

The performance profile battery does, however, allow the professional staff to rapidly discover in which areas of a student's communication weaknesses do occur so that the student can be counseled accordingly. The profile also presents that kind of information necessary for demonstrating the communication characteristics of the total NTID population so that appropriate program administration is a possibility. Research on the individual instruments in this battery is in the final stages, and the data will be prepared formally for dissemination when complete.

The data presented herein indicates that for the students entering NTID during Summer session, 1973: 1) at least 31 percent had unintelligible speech and an additional 24 percent were only semi-intelligible; 2) at least 66 percent of the students would experience considerable difficulty in speechreading everyday conversational information; 3) approximately 90 percent of the students were below average in reading comprehension and writing intelligibility when compared to the average entering, hearing, junior college student; 4) approximately 63 percent of the students were possibly working below their predicted potential for hearing discrimination; and 5) approximately 12 percent had developed *no* means for receiving information in the classroom at RIT (speechreading, listening or manual skills).

If these students are to be properly prepared for eventual successful employment and community involvement, a great deal of individualized and small group student instruction, in-service staff training and continuing applied research and program development and evaluation will necessarily have to take place. These are all goals to which NTID and Communication Center are committed.