

Speechreading and Auditory Perception Training for the Adult with an Acquired Hearing Loss

Carol Tulko and Frances Santore
New York League for the Hard of Hearing

Clinicians planning aural rehabilitation programs for the adult with an acquired hearing loss are confronted with questions related to appropriate communications therapy recommendations. This paper attempts to answer some of these questions by providing an outline for an in-depth evaluation of oral receptive language skills and defining criteria for determining therapy candidacy. Specific goals and therapy procedures for improving auditory perception and speechreading skills are presented. In addition, other problems such as deciding whether to use group or individual instruction and what should be the criteria for termination of therapy are also addressed. The evaluation and therapy procedures outlined in this paper are currently employed in the Communication Therapies Department of the New York League for the Hard of Hearing.

The areas of assessing and improving communication function in the adult with an acquired hearing loss continue to pose many problems for both the experienced and inexperienced clinician. Historically, the therapeutic focus for this population has been primarily aimed at providing speechreading instruction. For the provisions of this instruction, the clinician has at her/his disposal numerous texts, manuals, and articles which describe specific therapeutic procedures (Berger, 1972; Bruhn, 1949; Bungler, 1952; Jeffers & Barley, 1971; Kinzie & Kinzie, 1931; Nitchie, 1930; O'Neill & Oyer, 1961; Sanders, 1971; Schow & Nerbonne, 1980; Walden & Anderson, 1978). Unfortunately, much less attention has been given to the nature and effectiveness of auditory training programs (Bode & Oyer, 1970; Kelly, 1953; Oyer, 1966; Santore, 1978; Schow & Nerbonne, 1980). As Alpiner (1978) has pointed out, this area continues to be a vague issue for the adult client.

Recently, however, several important advances have been made toward

Carol Tulko, M.A., is Senior Speech Pathologist in the Communication Therapies Program at the New York League for the Hard of Hearing. Frances Santore, M.A., is Director of the Communication Therapies Department at the New York League for the Hard of Hearing.

correcting this deficiency. In particular, the creation of comprehensive diagnostic outlines and communication scales (Alpiner, 1978; Berger, 1972; Berkowitz & Hochberg, 1971; Binnie, Jackson, & Montgomery, 1976; Giolas, Owens, Lamb, & Schubert, 1979; High, Fairbanks, & Glorig, 1964) have greatly aided the clinician in determining individual communication needs and establishing appropriate therapy recommendations. Although extremely helpful, these clinical tools do not provide specific answers to several important questions. Among these questions, four are especially significant:

1. How does one determine if a client is a candidate for training in speechreading and/or auditory perception?
2. If therapy is provided, how does one develop goals and expectations for each client?
3. Should the client be scheduled for group or individual instruction?
4. How often should therapy be provided and when should it be terminated?

In an attempt to provide answers to these questions, this paper: (a) describes a functional communication diagnostic evaluation which is designed to assess oral receptive language skills (i.e., speechreading and auditory perception) and (b) offers specific guidelines for therapy based on the results of this evaluation. The focus for both the diagnostic evaluation and therapy techniques is improving receptive language skills since this poses the greatest problem to the adult with an acquired hearing loss. The information that will be presented is based on the aural rehabilitation program presently used in the Communication Therapies Department at the New York League for the Hard of Hearing (League).

COMMUNICATION THERAPIES EVALUATION TEST PROCEDURES

General

Once audiological and medical treatment have been completed either by personnel at the League or other clinical settings, clients may be referred to the Communication Therapies Department for an extensive evaluation of their expressive and receptive language skills. The purpose of the evaluation is to learn how the client functions in daily living situations when faced with obstacles such as distance, noise, changes in volume level, etc., and to determine what may assist her/him in achieving optimal comprehension. The portion of the evaluation concerned with assessing reception or oral language is outlined in Appendix A. Three modes of functional speech comprehension are tested. These responses include: (a) with visual clues alone (speechreading), (b) auditory clues alone (auditory perception), and (c) combined visual

and auditory clues. All testing is carried out in sound-treated therapy rooms measuring approximately 15 × 14 × 16 feet in size. Speech stimuli are presented via live voice in a quiet environment at barely audible (25-40 dB HL) and conversational (50-60 dB HL) levels. When background noise (taped cafeteria noise) is introduced, it is presented at a level that is approximately equal to the speaker's voice. All speechreading tasks are administered at a distance of 4-5 feet from the client while auditory tasks are presented at a variety of distances.

Prior to the administration of formal tests, the clinician discusses the objectives of the evaluation with the client and asks specific questions related to the client's case history and/or communication problems. This informal conversation enables the clinician to make a subjective judgment of how the client uses combined auditory and visual clues to comprehend highly familiar conversational material.

Speechreading Tests

All speechreading tests are administered with the clinician using barely audible voice. The tests are presented in three levels of difficulty: (a) familiar questions, (b) Barley Speechreading Test, and (c) paragraphs. The familiar questions (Appendix B) may be given two times with 10 points allotted for each correct response. The client has a possibility of receiving 100 points after the first or second presentation. If the client's score is greater than 50 points, the clinician administers the Barley Speechreading Test (Jeffers & Barley, 1971) which is at the second level of difficulty. This test consists of 22 unclued sentences (sentences with which clients have not been familiarized) drawn from the CID Everyday Sentence Test (Davis & Silverman, 1970). In scoring the test, one point is allotted for each word perceived correctly. Although comparative data for this test with other speechreading tests have been provided by Jeffers and Barley (1971), no interpretation of test scores is available. Based on the experiences of League staff members with this test, it has been deduced that clients who achieve a total score of less than 20 points are not yet dependent on the visual modality for communication. Those clients who achieve scores of greater than 60 points have developed varying degrees of functional speechreading skills. No definitive pattern appears to exist for clients who score between 20 and 60 points. In addition, there also appears to be a general trend for the score on this test to be higher as the hearing loss becomes more severe. It should be noted that, along with degree of hearing loss, other variables seem to affect this score.

Only if a client receives a score of more than 20 points on the Barley Speechreading Test, will the clinician administer paragraph material which has been devised by League staff members (see Appendix C). These paragraphs consisting of 4-6 sentences, are arranged in three groups (simple, compound, and complex). The sentences serve as an effective clinical tool in

evaluating perception of connected discourse. They vary according to sentence type and length as well as redundancy and complexity of language. The client receives a score of 20-25% for each sentence in the paragraph in which the main idea is correctly perceived.

Each paragraph is presented in order of difficulty with a maximum of two presentations per paragraph. If the client receives a score of approximately 80-100% after the first presentation (which is given without any clues), the clinician proceeds and administers a paragraph at the next level of difficulty. When a client comprehends less than 80% of the material after the first presentation, additional clues in the form of words, topical statements, or questions are provided in conjunction with a second presentation. Assessment of comprehension of paragraph material is discontinued once the client demonstrates an inability to comprehend more than 50% of the information presented even with the assistance of clues.

The highest level of paragraph material partially comprehended is then readministered in the final part of the assessment of the client's speechreading skills. In an effort to determine to what extent s/he makes use of the visual modality in conjunction with audition, the paragraph is introduced in the presence of background noise and the clinician uses conversation-level voice. The paragraph is presented twice (if necessary), and the clinician notes the percentage score and the effects of the background noise on the client's comprehension and ease of concentration.

Auditory Perception Tests

The next phase of the evaluation involves assessment of the client's auditory perception (auditory alone) for monosyllabic words and sentences. Phonemic confusions and the effects of distance, speed of presentation, rhythm, length of sentences, and noise are evaluated.

Aided and Unaided Testing

Based on the client's Pure-Tone Average (PTA), auditory tasks are presented at expected distances (Appendix D). These distances have been derived from demonstrated skills of clients who have previously completed the audio-therapy program at the League.

Tests presented with and/or without the client's own hearing aid include the Tonality Test (see Appendix E) and the CID Everyday Sentence Test (Davis & Silverman, 1970). The Tonality Test, which is in the process of being standardized, consists of lists of 25 words divided into five frequency groups ranging from low frequency (concentration of acoustic energy below 800 Hz) to high frequency (concentration of acoustic energy above 2000 Hz). Each word, which is allotted four points, is given twice (if necessary), and scores are obtained for each presentation. The Tonality Test is administered under aided and unaided conditions. For monaural unaided testing, the

opposite ear is masked.

The CID Everyday Sentence Tests are then presented in both quiet (List A) and in the presence of noise (List C with one noise source, List D with two noise sources). These sentence tests are presented in the aided condition or the binaurally unaided condition if the client is not a candidate for amplification. The distance for this test presentation is the same as the aided Tonality distance. If the client is unable to follow sentence-level material in noise at the expected distance, then the clinician reduces the distance by several feet and readministers the test material. Generally, a difference in the scores of more than 30% between List A and List C indicates that the client's auditory perception is significantly impaired by the presence of background noise.

Optimal Field of Hearing

The final part of the evaluation of receptive communication skills is the determination of the client's optimal field of hearing. This is a frequency response determined monaurally and/or binaurally which appears to give the client maximum auditory perception. The optimal field of hearing is arrived at by using the SUVAG I and II auditory training units. These units are broad band amplifying systems that allow for the possibility of continuous and discontinuous transmission of speech, auditorily and vibrotactily. Features of these units include a flat frequency response, low and high filters for which roll offs on both sides can be modified, resonant peaks which can be varied in width and amplitude, and additional treble and bass controls. To obtain the optimal field of hearing, the unaided Tonality results and the client's audiogram serve as guides for selection of the first setting. Tonality words are administered, and the frequency response on the unit is modified based on observed errors. The frequency response at which the client achieves maximum perception (as verified by Tonality and PB scores) with minimal decibel gain is the optimal setting. An improvement in Tonality and PB scores of 20% or more over unaided conditions indicates potential for improvement in auditory perception. At the optimal field of hearing, sentence level material is presented at rapid rates to determine if a timing problem exists. This evaluation may be conducted in the presence of background noise. In addition, an attempt is made to determine if, with the assistance of vibrotactile input, specific perceptual errors can be reduced in number.

INTERPRETATION OF TEST RESULTS

Criteria for Not Recommending Therapy

Of the approximately 200 people seen annually at the League for a Communication Therapies Evaluation, not everyone is a candidate for therapy. There are two general groups of clients with acquired hearing losses who are

communicating adequately or to the best of their ability.

The first group consists of people who are making maximum use of their residual hearing and are not in need of speechreading instruction. The people who are part of this group tend to have a mild to moderate, relatively flat, sensorineural hearing loss. Further, they: (a) exhibit good discrimination in an audiological evaluation (i.e., 80% or better aided or unaided at conversational levels); (b) have good functional skills for achieving expected Tonality Test results at anticipated distances; and (c) exhibit sentence comprehension of 90% or better at expected distances for the CID Sentence Test in quiet and 70% or better at the same distance in the presence of background noise. The people in this category are truly auditory, generally have not begun to develop speechreading skills, and often do not benefit from instruction in this area. For the clients in this category who may be having specific communication problems (e.g., in group situations or understanding television), the communication therapy goals involve investigation of infrared, F.M. systems, or other auditory devices to be used in specific situations.

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The second group of people not in need of communication training are those who have minimal auditory skills but excellent speechreading skills. The clients in this group generally have a severe and/or profound sensorineural hearing loss, have fair to poor discrimination relative to the loss, and do not exhibit improvement of this skill under optimal amplification conditions with the SUVAG unit. People who fall into this category often do not have PB discrimination scores of better than 40% (aided or under headphones) and cannot meet expected distances or scores for the Tonality and CID Sentence Tests. These people are highly dependent on the visual modality for communication and use auditory clues to augment comprehension. They receive scores above 50 points on the Barley Speechreading Test and can follow complex paragraph material well after two presentations. These individuals are generally unaffected by the presence of background noise.

The two groups include people who are not referred for communication therapy. What then are the criteria for recommending therapy for clients who do not fit these categories?

Criteria for Audio Therapy

The initial recommendation for improving communication functioning is related to the client's auditory perception and whether s/he is making maximum use of her/his residual hearing. A client may be scheduled for individual audio therapy for the following reasons:

1. To improve phonemic perception if potential exists (20% or more increase in Tonality and PB scores at the optimal field of hearing when compared to aided or unaided test results).
2. To improve auditory perception (for aided and unaided clients) of

connected discourse in the presence of background noise or at expected distances (See Appendix D).

3. To evaluate and select appropriate amplification for "difficult to fit" clients.
4. To help clients adjust to and accept the use of amplification if resistance is present.

Criteria for Speechreading Instruction

A recommendation for speechreading training often depends on the client's residual hearing. Generally, a client who has a mild to moderate hearing loss and excellent auditory skills is not a candidate for speechreading training. It has been the experience of the League staff that these clients do not make good progress in the development of this skill.

Usually, clients referred for this training have moderate to profound hearing losses, are making maximum use of their residual hearing (generally having PB discrimination scores of less than 80%), and have acquired "some" speechreading skills. They often have significant difficulty following speech in the presence of background noise even when provided with combined auditory and visual clues. While no age limitations are placed on clients seen for therapy, visual, medical, and travel limitations are considered.

Speechreading instruction at the League is provided in day and evening classes. Instruction is divided into six levels. All clients seen during the day are first scheduled in the Orientation/Movements group and are then placed in a group at a level for which the goals are appropriate to their skills (see Appendices F through K). For example, a person who can only follow some familiar questions and who has a score of less than 20 points on the Barley Speechreading Test would be placed in a Low Beginning level following the Orientation group. However, a person who follows compound paragraph material with clues after two presentations might go into an Intermediate level group.

Clients who are seen in evening classes generally have acquired speechreading skills and are functioning at levels of Low-Intermediate and above. A more detailed discussion of the goals for speechreading training, as well as the rationale for assignment to individual or group instruction, is provided in the next section of this paper which represents a discussion of therapy procedures.

THERAPY GOALS AND PROCEDURES

Audio-Therapy Procedures

The audio-therapy program at the New York League for the Hard of Hearing is based on the verbotonal aural rehabilitation methodology and system (Guberina, 1972). One of the unique features of this system involves

individualized diagnosis and remediation of auditory perception for both the aided and unaided client (Santore, 1978). Other factors that are highly important to this therapy program are the potential that each person has for improvement and the clinician's role in helping the client realize and achieve this potential.

The clients are seen in individual therapy for two one-hour sessions per week for a period lasting from one to three months. During each therapy session, the client listens to live connected discourse presented at the optimal field of hearing both on the SUVAG unit and in an unaided condition. The material may include specially constructed sentences saturated with phonemes in which perceptual errors had been noted. In addition, newspaper and magazine articles are used. The client's perceptual needs, language level, and interests are considered in the selection of material. The client is asked to repeat each phrase or sentence as it is read. All listening activities are conducted without the assistance of visual clues. Connected speech is utilized since each phoneme is affected by its phonemic environment. This procedure is a departure from most existing auditory training programs which have emphasized perception of isolated words or word pairs.

Improving Rate and Auditory Memory

If the client exhibits difficulty comprehending speech material because of the rate of presentation, exercises are constructed to improve this area of perception prior to the correction of phonemic confusions. The clinician begins by introducing sentence-level material at the client's optimal speed and gradually increases the rate of presentation. In addition, the client repeats at the same speed at which the material is presented. When the client is able to follow sentences at the desired speed, which is usually faster than a conversational rate, the stimulus is decreased to two- and three-word units. If the client exhibits a problem in auditory memory or stops listening to a sentence because of a misperceived word, the clinician follows a procedure similar to that of improving rate of speed.

The clinician begins by presenting phrases or sentence units that are two to three words in length. Slowly, the number of words is increased by one to two words at a time, always trying to produce units that lend themselves to natural phrasing and linguistic content. The goal, which is related to retention, is generally to achieve memory for sentences averaging from seven to ten words in length. As the clinician increases the sentence length, s/he encourages the client to repeat the main idea of the unit, rather than to concentrate on each word as an individual unit. When the client begins to do this, the clinician provides positive reinforcement in helping the client overcome her/his fear of missing something crucial.

Correcting Phonemic Errors

When the client is able to perceive speech material at the desired rate

and/or length, the clinician can begin correcting phonemic confusions. If a word is misperceived in a sentence, the clinician attempts to correct the perception by: (a) changing the parameters of her/his voice (pitch, intonation, intensity, rate, duration, etc.); (b) putting the word in a different sentence and thereby changing phonemic and contextual clues; and/or (c) modifying the frequency response on the SUVAG equipment. Once the error word is perceived correctly, it is then presented in a variety of sentences with the clinician maintaining natural production.

As the client's auditory perception improves, attempts are made to introduce more difficult listening situations by: (a) lowering the volume on the earphones and vibrator, (b) eliminating the vibrator, (c) increasing the distance of the clinician from the microphone or the aided and/or unaided ear, and (d) introducing background noise. If the client has different optimal fields of hearing for each ear, then the above steps may be undertaken monaurally.

Selecting Hearing Aids

If the client is to be aided, then the final stage of the therapy program includes hearing aid fitting. Aids which correspond to the client's optimal field of hearing are evaluated in therapy. If the client has acquired an aid prior to enrollment in therapy, this aid is also evaluated. Steps are taken to modify the frequency response of the client's own aid if necessary. The aid with which the client functions best is lent to her/him to use for the duration of the therapy program. This is done to reinforce the client's newly acquired skills with appropriate amplification outside of the therapy setting. At the end of the therapy program, the client is scheduled for a standard hearing aid evaluation in which the aid selected in therapy is compared to three to four other aids in order to arrive at a final determination.

Therapy Procedures for Unaided Clients

In some cases, amplification will not be recommended during the course of therapy. Generally, clients who remain unaided have normal hearing sensitivity through 2000 Hz or have normal hearing through 1000 Hz with only a mild hearing loss at 1500 Hz and 2000 Hz. These clients, who have excellent discrimination skills in quiet at close distances, are seen for short-term therapy lasting from four to eight weeks. For these clients, the therapy procedures are similar to those for the aided client with some modifications. The first modification involves using minimal gain at the optimal field of hearing. Secondly, if a high pass filter is part of the original optimal field of hearing, this is slowly eliminated during the therapy process forcing the client to rely primarily on the low and mid frequencies for speech perception. Finally, to further train perception, speech is presented to the client through the use of an oscillator that is placed on the tragus or temple area with the

clinician standing at a distance of 15 feet or more from the client. The oscillator is gradually eliminated and the clinician may now slowly introduce progressively more difficult noise sources into the listening environment.

Termination of Audio Therapy

As stated earlier, clients are seen for audio therapy from one to three months. Generally, improvement in perception is apparent after four weeks of training. If none is seen after a maximum of six weeks, the client's therapy is terminated. Those clients who have improved are terminated when they: (a) have met goals in terms of rate or auditory memory for longer sentence units as described earlier, (b) demonstrate few to no perceptual errors at their optimal field of hearing, (c) exhibit increased distances for following speech unaided and aided achieving the expected distance and scores for Tonality Test materials, and (d) are using amplification consistently if it has been recommended.

In the course of the eight years that this audio therapy program has been used at the League, it has become apparent that certain groups of clients will not benefit from this program. These groups include people who exhibit fluctuating hearing losses, those who have retinitis pigmentosa or Parkinson's disease in addition to a progressive hearing loss, and clients who have sharply sloping mild through severe to profound losses through 1000 Hz with severe recruitment.

Therefore, clients who have these characteristics and who may demonstrate some potential for improvement in auditory perception, are usually not seen for audio therapy except on a trial basis.

This then concludes the description of the audio-therapy program for adult clients. It is a selective therapy program and one that is recommended for only approximately 20-25% of the people seen for a Communication Therapies Evaluation. A far greater number of clients who have this evaluation are recommended for speechreading training. A description of this program follows.

Speechreading Procedures

In 1910, Edward Nitchie and two of his collaborators founded the New York League for the Hard of Hearing. Their goal was to provide free speechreading instruction to adults who were hearing impaired. A modified version of the Nitchie method (Nitchie, 1930; Ordman & Ralli, 1965) continues to serve as the basis for speechreading instruction at the League today.

Over the years it has become apparent to the clinical staff that not everyone needs, nor benefits, from instruction in this area. In terms of acquiring speechreading skills, clients tend to fall into three groups: (a) those who acquire these skills on their own and are not in need of formal training; (b) those who have not acquired the skills, but can be taught; and (c) those

who have not acquired the skills and do not appear to have this facility even after training. Speechreading is not learned easily or quickly. It may require that a person work one to three years to reach her/his highest level of proficiency. Therefore, short-term therapy is not recommended. Improvement has been seen in the speechreading skills of individuals of advanced age and those who have limited vision. It seems imperative, therefore, that consistent training be provided over extended periods to help individuals reach their potential, as well as to realize and accept their limitations.

Levels of Instruction

The present speechreading program at the League encompasses six levels of instruction: (a) Orientation/Movements, (b) Low Beginning, (c) Beginning, (d) Low Intermediate, (e) Intermediate, and (f) High Intermediate/Advanced. The goals for these levels can be found in Appendices F through K. All clients who are seen for therapy during the day are enrolled in the Orientation/Movements group initially and are then placed in the next appropriate level; i.e., Beginning, Intermediate, etc., depending on their skills evidenced in the Communication Therapies Evaluation. The goals for each group are to be achieved in a 16-week period, with the clients attending two one-hour sessions per week. If the goals are achieved prior to or at the end of the 16-week period, the clients progress to the next level until they have reached their highest level of proficiency.

Modifications of the Nitchie Method

As stated earlier, the present speechreading system involves modifications from Nitchie's recommended approach. These modifications include, first, teaching only the following visemes: /p,b,m/, /f,v/, /w/, /r/, /s,z/, /ʃ,tʃ,dʒ/, /θ,ð/, /l/, /t,d,n/, /k,g,h/. Vowels are not taught specifically but are introduced in terms of general awareness of degree of mouth opening and lip extension. The second modification is that paragraph and story materials are introduced according to degree of complexity as found in the various instructional levels. The third modification is that instruction is carried out with both full-face and profile views. A fourth change includes alteration of the learning environment by adding background noise and changing lighting conditions. In addition, at all levels the clinicians use minimum volume when speaking so that class members are forced to concentrate on visual reception. Clients who have better auditory perception may be asked to lower the volume on their hearing aids or move further from the speaker. Finally, dialogues and cross conversation are stressed at the more advanced levels so that group members become skilled in speechreading one another as well as the clinician instructing the class.

Group vs. Individual Instruction

Speechreading training at the League is generally conducted in small

groups of no more than seven members. The Orientation/Movements group is the only one which is larger and may have a maximum of twelve members.

Individual training is provided for clients who have recently experienced a sudden profound hearing loss and for those who have language or neurological problems which hinder their ability to take part in a group learning situation. Individualized instruction is often more intensive, generally taking place three times per week for a period of three to six months. For those clients who have had a sudden hearing loss, an additional therapy goal is to train the necessary visual skills which will enable them to enter a group class.

Another group of people who are seen for individual training are those who may be evaluating the benefits of vibrotactile amplification (Dahlberg GB hearing aid) in assisting speechreading comprehension. This is generally short-term training (four to six weeks) in which clients are trained to be aware of suprasegmental features as an aid to visual reception of speech. Clients who are seen for this training have profound hearing losses and have not been able to benefit from standard amplification systems.

Termination of Speechreading Therapy

Clients seen for individualized therapy two or more times per week may be seen for anywhere from one to six months, depending on their individual needs. The decision for termination is related to prescribed goals.

Clients seen in group speechreading instruction are required to meet prescribed goals at the end of a 16-week period. In order to advance to the next level, clients must demonstrate 90% correct comprehension after two presentations of most of the material presented at each level. If they are unable to achieve the goals at the end of the 16-week period, they are given the opportunity to repeat this level once. However, at the end of this second period, if they still have not been able to master the goals, formal therapy is terminated. If they wish, clients may then be placed in a practice group which meets one time per week. The practice group gives them the opportunity to maintain the skills they have acquired; psychologically, it seems to have great value in providing the group members with the possibility of socializing and sharing experiences with other hearing-impaired people on a regular basis. The practice group also instills the need to continue working on a skill which can help to some degree in compensating for their hearing loss.

SUMMARY

In recent years, advances have been made in the areas of developing comprehensive diagnostic outlines and communication scales for the adult with an acquired hearing loss. Unfortunately, however, many adults still do not receive appropriate training toward improving auditory perception and speechreading skills. Part of the problem has been that clinicians are uncertain about the type of therapy to recommend and the goals to be established

for each client.

The purpose of this paper has been to provide professionals in the area of aural rehabilitation with specific test procedures for evaluating functional auditory perception and speechreading skills of an adult with an acquired hearing loss. An attempt has been made to answer questions related to therapy candidacy, goals, and therapy termination. With this information, it is hoped that clinicians will be able to better evaluate communication functioning and, consequently, implement more appropriate therapy programs.

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APPENDIX A

COMMUNICATION THERAPIES EVALUATION

- I. Assessment of Receptive Skills
 - A. Speechreading (vision alone)
 1. In Quiet
 - a. Familiar Questions
 - b. Barley Speechreading Test
 - c. Simple Paragraph
 - d. Compound Paragraph
 - e. Complex Paragraph
 2. In Noise (vision and audition)
 - a. Present highest level achieved in quiet
 - B. Auditory Perception (audition alone)
 1. Aided Testing
 - a. Tonality Test in quiet
 - b. CID Sentence Test
 - 1) in quiet
 - 2) with one noise source
 - 3) with two noise sources
 2. Unaided Testing
 - a. The Tonality Test is administered to each ear, monaurally and the opposite ear is masked
 3. Determination of the Optimal Field of Hearing
 - a. An optimal is selected for each ear individually and/or binaurally
 - b. PB and Tonality Tests are given to verify the optimal settings
 - c. Testing of Perception of Sentences presented rapidly at optimal field of hearing
 - d. Selection of position for bone oscillator

APPENDIX B

FAMILIAR QUESTIONS

1. What is your name?
2. How old are you?
3. Where do you live?
4. How are you?
5. What time is it?
6. What is your telephone number?
7. Where do you work?
8. What kind of work do you do?
9. Are you married?
10. Do you have any children?

APPENDIX C

SPEECHREADING PARAGRAPHS

Simple Paragraphs

I've been working here for four years. I take the subway to work. It takes me 45 minutes. My job is from 9 to 5. I work 5 days a week.

I live in a one-bedroom apartment. It has a large kitchen. The bathroom is small. The rent is too high. I'm looking for a new apartment.

Compound Paragraphs

Because my alarm didn't go off, I woke up late. I called my office and told them I would be one half hour late. I dressed quickly and grabbed some coffee and a muffin. I took a cab and got to work at 9:30.

Because I had a toothache, I went to the dentist. I had a 9 o'clock appointment but the dentist didn't see me until 10:30. Luckily, I had only one cavity which he filled. He also cleaned my teeth and took a set of X-rays.

Complex Paragraphs

A person who has a square palm and short fingers is a practical person with a down-to-earth outlook on life. While s/he is well balanced emotionally, s/he is not strongly intellectual. S/he makes decisions based on intuition rather than through her/his intellect. Although this person makes a steadfast and reliable friend, s/he is inclined to be critical or suspicious of others. This person enjoys physical activities, outdoor work, and sports.

A person who has a long palm and long fingers is an intellectual person with an undirected emotional life. While s/he appears outwardly self-possessed, s/he is insecure, sensitive, and withdrawn. Although s/he is perceptive emotionally, s/he basically likes to be alone. S/he can be idealistic and receptive to new ideas, but s/he is as changeable as the wind and requires outside direction and support.

APPENDIX D

EXPECTED DISTANCES FOR CLIENTS SEEN IN AUDIO THERAPY

PTA	Aided Quiet		Unaided Quiet	
	Tonality Score	Distance	Tonality Score	Distance
26 - 40 dB	90% or better	15 feet or more	90% or better	6 feet
41 - 55 dB	90% or better	15 feet or more	90% or better	2 feet
56 - 70 dB	80%	12 - 14 feet	80%	6 inches - 1 foot
71 - 80 dB	62 - 78%	8 - 10 feet	62 - 78%	at ear
81 - 90 dB	42 - 60%	6 feet	42 - 60%	at ear with loud voice
91 dB	40%	2 - 4 feet	40%	at ear with loud voice

APPENDIX E
TONALITY TEST*

LIST

	L	LM	M	MH	H	
(1)	1. prune	1. mop	1. rock	1. talk	1. see	1st _____
	2. blow	2. loud	2. heart	2. sit	2. sheet	
	3. new	3. bug	3. tack	3. this	3. east	2nd _____
	4. loan	4. go	4. red	4. kite	4. cease	
	5. row	5. blood	5. fat	5. jet	5. chest	
	_____	_____	_____	_____	_____	Total _____

LIST

	L	LM	M	MH	H	
(2)	1. wood	1. on	1. hurt	1. spit	1. seize	1st _____
	2. room	2. pound	2. like	2. heat	2. sheep	
	3. blue	3. more	3. hack	3. three	3. cheek	2nd _____
	4. now	4. duck	4. far	4. tell	4. tease	
	5. load	5. lamb	5. rat	5. ice	5. six	
	_____	_____	_____	_____	_____	Total _____

LIST

	L	LM	M	MH	H	
(3)	1. worm	1. bump	1. hat	1. kiss	1. each	1st _____
	2. blown	2. all	2. fire	2. feet	2. cheat	
	3. low	3. dog	3. jar	3. hit	3. teach	2nd _____
	4. bone	4. plow	4. top	4. yeast	4. seek	
	5. rope	5. book	5. get	5. cheek	5. east	
	_____	_____	_____	_____	_____	Total _____

LIST

	L	LM	M	MH	H	
(4)	1. blue	1. comb	1. rock	1. sit	1. seize	1st _____
	2. own	2. on	2. cat	2. yeast	2. cheat	
	3. new	3. pop	3. top	3. tell	3. she	2nd _____
	4. row	4. bug	4. fire	4. kiss	4. each	
	5. load	5. up	5. hat	5. jet	5. seek	
	_____	_____	_____	_____	_____	Total _____

*This present list was devised at the University of Tennessee under the direction of Dr. Carl Asp.

APPENDIX F

GOALS: ORIENTATION/MOVEMENTS SPEECHREADING GROUP

1. To provide a basic theoretical understanding of, and realistic expectations for, speechreading skills. Emphasis should be placed on: utilization of all visual clues; acceptance of the

inherent limitations of hearing impairment and speechreading in general; the importance of controlling environmental factors and assertiveness training in terms of strategies to be used with family, friends, and strangers.

2. To facilitate quick recognition skills for the visual characteristics of the individual sounds and/or sound groups of speech, as they occur in words and sentences. All major sound groups should be introduced at this level in accordance with the procedure outlined by Nitchie in his text to provide practice in various phonetic contexts. The following sound groups should be emphasized in this order: /p, b, m/, /f, v/, /w/, /r/, /s, z/, /ʃ, tʃ, dʒ, ʒ/, /θ, ð/, /l/, /t, d, n/, /g, k/, and /h/.
3. To improve overall visual awareness skills. Emphasis should be placed on improving observational skills through such tasks as recording various attributes, states, and/or actions of friends, strangers, T.V. programs, or pictures.
4. To improve overall visual memory skills. Emphasis should be placed on recalling/resequencing digital sequences, a series of objects, and familiar words (to a maximum of seven) presented for limited periods of time.
5. To improve visual closure skills. Emphasis should be placed on anticipating and filling in sentence-level material on the basis of one's knowledge of the language and/or the immediate nonlinguistic context (e.g., discuss topics first; make up list of possible sentences; present a sentence with one word missing).
6. To teach appropriate techniques of mirror practice after Nitchie.
7. To diagnostically evaluate the client's individual rate of progress and potential to acquire functionally adequate speechreading skills.
8. To determine whether any members need to repeat this level group or whether any members may be advanced.

APPENDIX G

GOALS: LOW BEGINNING SPEECHREADING GROUP

1. To teach comprehension of 55 clued highly familiar questions. (Appendix H)
2. To review speech movements formed by the lips: /p, b, m, f, v, w/ utilizing Quick Recognition and Quick Identification Exercises (Jeffers & Barley, 1971).
3. To teach comprehension of highly clued beaded sentences.
4. To train comprehension of word-clued, short, simple sentences.
5. To facilitate associations between words and topics. When provided with word clues, the client will identify the topic related to these words; and when provided with a topic clue, the client will suggest word clues.
6. To facilitate recognition of sentences related to a specific topic, given a word clue.
7. Background noise is not used.

APPENDIX H

SENTENCES FOR THERAPY

1. What is your name?
2. How old are you?
3. Where do you live?

4. How are you?
5. What time is it?
6. Do you work?
7. Where do you work?
8. What kind of work do you do?
9. Are you married?
10. Do you have any children?
11. What's your address?
12. How do you feel?
13. How do you spell that?
14. May I help you?
15. What do you want to eat?
16. Where do you want to go?
17. What's your telephone number?
18. How many children do you have?
19. How many grandchildren do you have?
20. What's new?
21. What did you do last night?
22. How ya doing?
23. What did you do over the weekend?
24. What are you doing this weekend?
25. What movies have you seen lately?
26. Are you hungry?
27. How do you get here?
28. Do you want a cup of coffee?
29. Do you think it's going to rain?
30. What is the temperature?
31. Is that too loud?
32. Is it loud enough?
33. Did you understand me?
34. Are you listening to me?
35. Did you hear me?
36. Where were you last week?
37. Where did you buy that?
38. How much did it cost?
39. How does it fit?
40. How much do you want?
41. Do you want it delivered?
42. Do you live alone?
43. May I have your charge card?
44. Cash or charge?
45. What's your account number?
46. What did the doctor say?
47. Did you go to the doctor?
48. Are you going home now?
49. Haven't we met before?
50. Are you finished?
51. Are you wearing your hearing aid?
52. Do you want to meet me?
53. Do you get social security?
54. Did you sleep last night?
55. Where were you?

APPENDIX I**GOALS: BEGINNING SPEECHREADING GROUP**

1. To review speech movements formed by the tongue and revealed by the lips: /r, s, z, ʃ, tʃ, dʒ, ʒ, pr, br, fr, sw/ utilizing Quick Recognition and Quick Identification Exercises.
2. To teach comprehension after one presentation of unclued familiar questions taught at the Low Beginning Level.
3. To teach comprehension of clued, short, simple sentences.
4. To train comprehension of highly clued paragraph material containing simple sentences.
5. All material should be presented in presence of low-level background noise.

Strategies to Facilitate Comprehension of Sentence Material

1. Sentences based on Jeffers and Barley's "Overlearned Speech—Familiar Phrases."
2. Sentences may include compound subjects or predicates.
3. Sentences may be based on a clue word that has a variety of meanings and/or different spellings.
4. Sentences may require a true/false answer.
5. Sentences may be presented with words omitted that must be filled in by class members.

Strategies to Promote Comprehension of Paragraph Material

1. A clue word for each simple sentence.
2. Beaded order of sentences so that key word from the first sentence is repeated in the sentences that follow; (e.g., I just bought a new car; my new car is a compact model).

APPENDIX J**GOALS: LOW INTERMEDIATE SPEECHREADING GROUP**

1. To review speech movement formed and revealed by the tongue: /θ, ð, l, t, d, n/ and tr, dr, pl, bl, sl, st, slr, θr, blends of the above and prior movements, utilizing Quick Recognition and Quick Identification Exercises.
2. To teach comprehension of less familiar questions that start with: "Have you," "Can you," "Do you."
3. To teach comprehension of highly familiar questions from a side view.
4. To train comprehension of highly familiar compound sentences requiring anticipated endings following the conjunctions: and, but, or, nor. A key word clue will be presented for the first clause.
5. To teach comprehension of less familiar compound sentences with word clue for either clause.
6. To teach comprehension of topic-clued, simple sentences.
7. To introduce humor through:
 - a. clued "one-line" jokes

- b. written passages with "punch line" presented orally.
- 8. To review unclued, familiar questions through introduction of dialogue, presented from a front and side view.
- 9. To teach comprehension of the main ideas of clued paragraphs containing simple and compound sentences.
- 10. All material should be presented in the presence of low-level background noise.

Strategies Facilitating Comprehension of Paragraph Materials

- 1. Answering simple "wh" questions about the paragraph.
- 2. Repeating sentences of the paragraph provided in varied sequential order.
- 3. Providing solutions to a problem presented in the paragraph.
- 4. Making a decision about the conclusion of the paragraph or what may happen based on the information presented.

APPENDIX K

GOALS: INTERMEDIATE SPEECHREADING GROUP

- 1. To review less visible speech movements: /k, g, h, j, gl, kl, kr, gr/ utilizing Quick Recognition Exercises.
- 2. To teach comprehension of less familiar questions from a side view.
- 3. To teach comprehension of word-clued complex sentences containing the following conjunctions: since, if, however, moreover, because, therefore, nevertheless, etc.
- 4. To teach comprehension of topic-clued paragraphs containing six to eight simple sentences.
- 5. To teach comprehension of clued paragraphs, containing simple, compound, and complex sentences.
- 6. To facilitate comprehension of clued jokes and humorous short anecdotes.
- 7. To teach ability to comprehend spontaneous dialogue of two group members.
- 8. All material should be presented in the presence of background noise.

Strategies Facilitating Comprehension of Paragraph Materials

- 1. Those listed for the Low Intermediate group.
- 2. Description of objects, people, events, etc., in paragraph material.
- 3. Some type of game activity in which a clue is provided (written, picture, puzzle) and a paragraph is presented to describe the object or event.

APPENDIX L

GOALS: HIGH INTERMEDIATE/ADVANCED SPEECHREADING GROUP

- 1. Review of Quick Identification Exercises of homophonous words with the least visible movements. Sounds presented in the low-intermediate and intermediate levels should be emphasized.

2. To train comprehension of side-view topic clued or word-clued simple through complex everyday sentences related to current events.
3. To train comprehension of side-view, clued, simple paragraphs four to six sentences in length.
4. To facilitate comprehension of topic-clued paragraphs containing simple through complex sentences (six to ten sentences in length). This may be lecture-type material.
5. To train the ability to follow on-going group discussion with rapidly changing topics. (No clues provided.)
6. To teach following of lecture-type material that is presented by the clinician while cross conversation by part of the group is conducted in the background.
7. To teach comprehension of demonstrations or speeches by various group members.
8. To train comprehension of activities such as word games, puns, crossword puzzles, etc.

Strategies for Increasing Difficulty of Tasks

1. Different lighting conditions (spotlight, candlelight, light behind the speaker, etc.).
2. Following the speaker from different angles.
3. Different levels and types of background noise within each session (music, news, cafeteria noise, etc.).
4. Repeated presentations of known complex paragraph material in which specific information may or may not have been changed.