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ABSTRACT

Twenty-seven hearing-impaired young adults with hearing potentially usable for language comprehension and a history of speech language therapy participated in this study of training in using residual hearing for the purpose of learning spoken language. Evaluation of their recalled therapy experiences indicated that listening to spoken language did not emerge as a memorable speech therapy activity for 81 percent of the subjects. This may indicate that essential listening practice was either neglected or minimized during speech language therapy. Subjects demonstrated poor listening skills (70 percent scored at chance or below on the listening task), and two-thirds reported negative feelings toward listening practice and thought that listening training would not be expected in a speech language therapy program. Study recommendations stress the need to identify clients with potentially usable aided audition and maximize their listening capabilities through training. (16 references)
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**Unique Auditory Language-learning Needs of Hearing-impaired Children:
Implications for Intervention**

Barbara Ann Johnson, Ph.D., & Marietta M. Paterson, Ed.D.

Historically, speech-language pathologists have played an increasingly significant role in facilitating spoken-language learning for hearing-impaired individuals (Abraham & Stoker, 1988; Hochberg, Levitt & Osberger, 1980; Hochberg, Schmidt, Solomon, Schiavetti, Godsave & Burgess, 1983; Potts & Greenwood, 1987; Woodford, 1987). Although most clinicians have sufficient training and expertise in language facilitation when the auditory system is intact, some (Abraham & Stoker, 1988; Hochberg, et al., 1980; Hochberg, et al., 1983; Potts & Greenwood, 1983; Woodford, 1987; Wray, Hazlett & Flexer, 1988) have expressed that many speech-language pathologists are unfamiliar with the unique language-learning needs of hearing-impaired individuals. Specifically, auditory capabilities, importance of maximizing residual hearing, and methods for maximizing auditory input are not fully understood by many clinicians who include hearing impaired individuals in their case-loads (Johnson & Paterson, 1987; Maxon, Brackett, Riordin, Pfeffer & Sancilio, 1987; Woodford, 1987; Wray, et al., 1988).

Purpose of the Poster Session

(1) Procedures and results of an investigation are reported. A sample of young hearing-impaired adults, having usable amplified hearing and a history of speech-language therapy, were probed to determine whether they had received training in using residual hearing for the purpose of learning spoken language.

(2) Having determined, through literature review and through investigation, that many speech-language pathologists may not habitually address unique auditory language-learning needs of hearing-impaired children, the session provides instruction in two areas: (a) proper identification of clients with potentially usable aided audition, and (b) maximizing listening capabilities in the context of speech-language intervention.

Procedures

Twenty-seven young hearing-impaired adults, with hearing potentially usable for language comprehension (Ling, 1981) and a history of speech-language therapy (X=10 years) participated. Each completed a two-part activity. Part-1, a listening performance probe, required subjects to listen and identify sentences according to type (questions vs statements). Part-2 required that subjects respond to questions concerning personal listening experience.

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Results

Although a long list of familiar therapy activities resulted, listening to spoken language did not emerge as a memorable speech therapy activity for 81% of the subjects. This may indicate that essential listening practice was either neglected or minimized during their many years of speech-language therapy, and this indication is corroborated by the following.

- (1) Seventy percent scored at chance (50%) or below on the listening task.
- (2) Approximately 67% reported negative feelings toward listening practice.
- (3) Approximately 67% reported that listening would NOT be expected in a speech-language therapy program, and
- (4) Most (78%) did not recall listening practice in previous speech-language therapy.

Discussion and Recommendations

It appears that many speech-language pathologists may not be in the habit of addressing unique language-learning needs of hearing-impaired children, specifically as related to auditory input. Further, according to impressions of the 27 long-term speech-language therapy recipients, many speech-language pathologists teach spoken language to hearing-impaired children primarily through visual and tactile sense modalities, overlooking audition which is the mode through which spoken language is learned naturally.

Speech-language pathologists have traditionally played a crucial role in teaching spoken language to the hearing impaired, and will continue to do so. Therefore, it is essential that we: (1) properly identify clients who have potentially usable aided audition; and (2) then teach them to maximize their own listening capabilities, while systematically providing an abundance of opportunities to listen to the language in its spoken form. An important function of the proposed session is to provide participants with information and resources to facilitate the achievement of these two recommendations. Therefore, information and resources will be provided on the following topics: (1) residual auditory capacity (Calvert & Silverman, 1983; Cole & Paterson, 1984a; Ling, 1976; Ling & Ling, 1978; Paterson, 1986; Pickett, 1980); (2) access to appropriate amplification (Ling, 1978; Ling & Ling, 1978; Ling, 1981); (3) maintaining and monitoring amplification (Ling & Ling, 1978; Woodford, 1987); (4) maximizing residual audition (Cole & Paterson, 1984b; Paterson, 1986), and; (5) auditory learning incorporated into educational planning (Cole & Paterson, 1984a; Ling, 1976; Ling, 1978; Ling & Ling, 1978; Paterson, 1982).

B I B L I O G R A P H Y

- Abraham, S., & Stoker, R. (1988). Language assessment of hearing-impaired children and youth: Patterns of text use. *Language, Speech & Hearing Services in the Schools*, 19, 160-174.
- Calvert, D. R., & Silverman, S. R. (1983). *Speech and Deafness: A Text for Learning and Teaching*. Alexander Graham Bell Association for the Deaf: Washington.
- Cole, E. B., & Paterson, M. M. (1984a). Assessment and treatment of phonologic disorders in the hearing impaired. In J. Costello (Ed.), *Speech Disorders in Children*. College-Hill Press: San Diego
- Cole, E. B., & Paterson, M. M. (1984b). The McGill University Project. In D. Ling (Ed.), *Early Intervention for Hearing-Impaired Children: Oral Options*. College-Hill Press: San Diego.
- Hochberg, I., Levitt, H., & Osberger, M.J. (1980). Improving speech services to hearing-impaired children, *ASHA*, 22, 480-484.
- Hochberg, I., Schmidt, J. L., Solomon, L. M., Schiavetti, N., Godsave, N., & Burgess, E. (1983). Improving speech services for hearing-impaired children in the schools: A consortium model for meeting continuing education and preservice training needs. *Language, Speech & Hearing Services in the schools*, 14, 181-194.
- Johnson, B. A., & Paterson, M. M. (1987). Teaching spoken language to the deaf: Which modalities make sense? A poster session presented at the American Speech-Language-Hearing Association Convention, New Orleans.
- Ling, D. (1976). *Speech and the Hearing-Impaired Child: Theory and Practice*. Alexander Graham Bell Association for the Deaf: Washington.
- Ling, D. (1978). Auditory coding and recoding. In M. Ross & T. Giolas (Eds.), *Auditory Management of Hearing-Impaired Children*. University Park Press: Baltimore.
- Ling, D., & Ling, A. P. (1978). *Aural Habilitation: The Foundations of Verbal Learning*. Alexander Graham Bell Association for the Deaf: Washington.
- Paterson, M. M. (1982). Integration of auditory training with speech and language for severely hearing-impaired children. In D. Sims, G. Walter, & R. Whitehead (Eds.), *Deafness and Communication: Assessment and Training*. Williams & Wilkins: Baltimore.
- Paterson, M. M. (1986). Maximizing the use of residual hearing with school-aged hearing-impaired students: A perspective. *The Volta Review (Monograph)*, 88, 5, 93-106.
- Pickett, J. M. (1980). *The Sounds of Speech Communication*. University Park Press: Baltimore.
- Potts, P. L., & Greenwood, J. (1987). Hearing aid monitoring: Are looking and listening enough? *Language, Speech & Hearing Services in the Schools*, 14, 157-163.
- Woodford, C. M. (1987). Speech-language pathologists' knowledge and skills regarding hearing Aids. *Language, Speech & Hearing Services in the schools*, 18, 312-322.
- Wray, D., Hazlett, J., & Flexer, C. (1988). Strategies for teaching writing skills to hearing-impaired students. *Language, Speech & Hearing Services in the Schools*, 19, 182-190.

INTRODUCTION

Historically, speech-language pathologists have played an increasingly significant role in facilitating spoken-language learning for hearing-impaired individuals. Although most clinicians have sufficient training and expertise in language facilitation when the auditory system is intact, some have expressed that many speech-language pathologists are unfamiliar with the unique language-learning needs of hearing-impaired individuals. Specifically, auditory capabilities, importance of maximizing residual hearing, and methods for maximizing auditory input are not fully understood by many clinicians who include hearing impaired individuals in their case-loads.

PURPOSES OF THE POSTER SESSION

(1) The primary purpose of the study was to determine whether a sample of young hearing-impaired adults had received training in using their residual hearing for the purpose of learning spoken language. All subjects were habitual hearing-aid wearers, had hearing potentially usable for language comprehension in the presence of amplification, and had a history of speech-language therapy.

(2) Having determined, through literature review and through investigation, that many speech-language pathologists may not habitually address unique auditory language-learning needs of hearing-impaired children, this poster session will provide instruction in two areas:

- (a) proper identification of clients with potentially usable aided audition.
- (b) maximizing listening capabilities in the context of speech-language intervention.

PROCEDURES

Description of the Subjects

Twenty-seven young hearing-impaired adults participated in the study. All subjects were severely-to-profoundly deaf with mean pure-tone averages of 96 dB bilaterally.

The extent of previous speech-language therapy ranged from one to 17 years, with an average of 10 years of previous speech-language therapy.

Hearing Potentially usable for language comprehension was available to all subjects through amplification, as indicated by aided thresholds that fell within the "banana-shaped" curve proposed by Ling (1981) as the lower limit for potentially usable hearing.

The Two Instruments

Instrument 1. Listening Performance Probe: The examiner instructed the subject to listen and not watch. The subject was informed that he/she would hear 10 sentences, that half would be questions, half would be statements, and that he/she should identify each as a question or statement. The grammar of each sentence allowed for flexibility, so that each sentence could be inflected as a statement or question, depending on speaker intent.

The examiner spoke each sentence to the subject, communicating a question or statement through vocal inflection. The subject identified the sentence as a question or statement.

The procedure was repeated for each of the 27 subjects.

Instrument 2. The questionnaire: Each subject immediately responded to a series of eight questions that were related to the listening exercise and previous listening experience. Subject responses were recorded anecdotally.

RESULTS

Although the subjects generated a long list of familiar therapy activities, indicating that they were intimately acquainted with the process of speech-language therapy, listening to spoken language did not emerge as a memorable therapy activity for 81% of the subjects. This may indicate that essential listening practice was either neglected or minimized during their many years of speech-language therapy. This indication is corroborated by the following:

- (1) Approximately 70% scored at chance or below on the listening task.
- (2) Approximately 67% reported negative feelings toward listening practice.
- (3) Approximately 67% reported that listening would NOT be expected in a speech-language therapy program.
- (4) Most (78%) did not recall listening practice in previous speech-language therapy.

TOOLS FOR IDENTIFYING CLIENTS WITH
POTENTIALLY USABLE AIDED AUDITION

Evaluation of Unaided Thresholds

Clients with unaided thresholds down to the following levels can generally be provided gain sufficient to allow them to detect the essential speech cues.

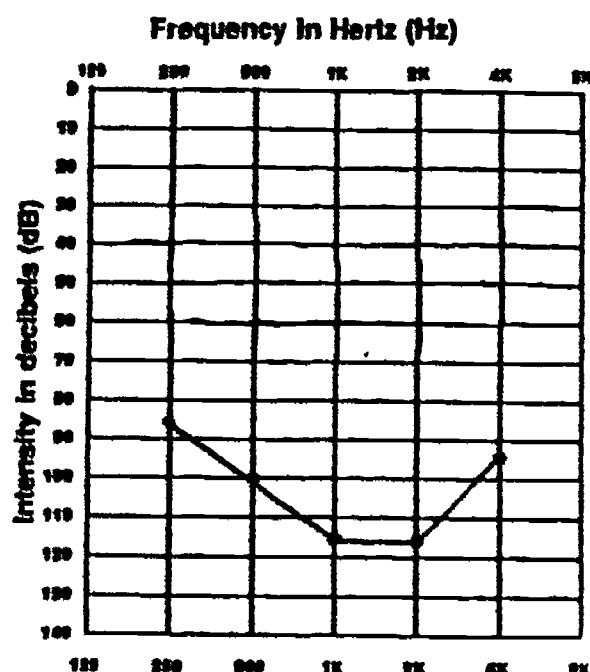
At 250 Hz, 85 dB

At 500 Hz, 100 dB

At 1000 Hz, 115 dB

At 2000 Hz, 115 dB

At 4000 Hz, 95 dB



**TOOLS FOR IDENTIFYING CLIENTS WITH
POTENTIALLY USABLE AIDED AUDITION**

Ling's "Speech Banana"

The client's aided hearing potential for language comprehension and language learning may be indicated by comparing the aided audiogram to Ling's (1981) banana-shaped curve. The "speech banana" was proposed by Ling as the lower limit for potentially usable aided hearing. These lower limits are approximately:

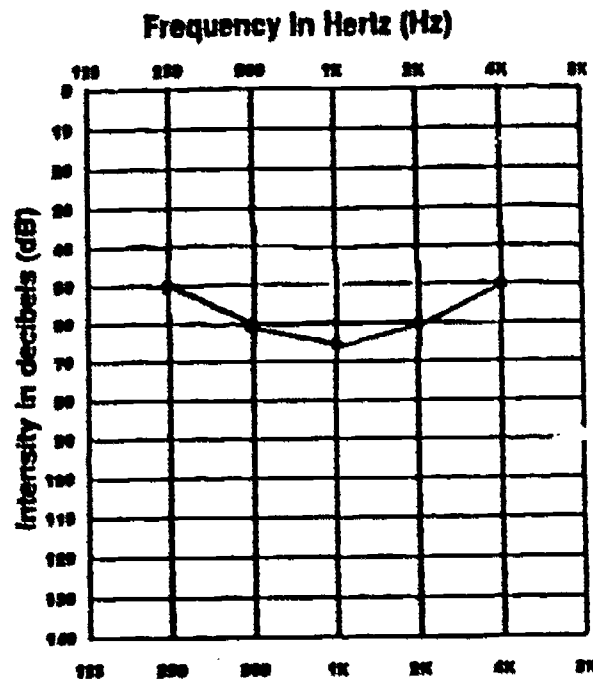
50 dB or better at 250 Hz

60 dB or better at 500 Hz

65 dB or better at 1000 Hz

60 dB or better at 2000 Hz

50 dB or better at 4000 Hz



**TOOLS FOR IDENTIFYING CLIENTS WITH
POTENTIALLY USABLE AIDED AUDITION**

The Five-Sounds Test

The five sounds [u], [a], [i], [ʃ] and [s] represent approximately the five routinely tested speech frequencies on an audiogram (250, 500, 1000, 2000 and 4000 Hz respectively). Clients down to the age of approximately two-and-a-half can be taught to respond to this test.

On administering the test, the speech-language pathologist says each of the sounds in random order while in a physical position that does not allow the client to see her face. The client may respond an age-appropriate response by repeating the sound heard, pointing to an icon representing the sound heard, raising his hand, clapping, or putting blocks in a box.

Three essential elements are gained through knowledgeable use of the "Five-Sounds Test":

- (1) The test can tell you whether the hearing aid is working.
- (2) It can indicate information about the client's frequency response curve.
- (3) It can approximate the most effective listening distance.

MAINTAINING AND MONITORING A HEARING AID:
Daily Checks

1. Batteries should have sufficient power.
 - a. Parents should check batteries at the end of every day, using a volt meter. Teachers may prefer to check batteries early each day.
 - b. Always check batteries first when hearing aid is not working properly.
 - c. Discard and replace batteries as soon as voltage drops below the level prescribed in that particular hearing aid's handbook.

2. Cords for body aid should be in good condition.
 - a. Replace broken cords.
 - b. Replace fractured cords. Place receiver against microphone and shake cord. Fractured cords will cause intermittent feedback.
 - c. If aid does not work and batteries are not at fault, replace cords as a next step in fault location.

3. Receivers for body aid should have no evidence of damage.
 - a. Examine casing for cracks.
 - b. Check washer between earmold and receiver for snug fit. Loose fit may result in feedback.
 - c. If hearing aid does not work and cords and batteries are known to be in good condition, a new receiver should be tried. If aid still does not function, internal damage may be assumed.

4. Hearing aids (both body aids and behind-the-ear aids) should reproduce speech clearly.
 - a. Using a custom earmold, stethoscope or plug with tubing, listen through the hearing aid to the five sounds, [u], [a], [i], [j], and [s]. Any distortion of sound may indicate internal malfunction.

TROUBLE-SHOOTING A HEARING AID**1. Complaint: The hearing aid is not working properly.**

- a. Check M-T-O position. Switch should be set to "M".
- b. Check battery for leakage. If leaking, wipe compartment, discard battery and replace it.
- c. Check battery for voltage using a volt meter. If below recommended level, discard battery and replace. If a volt meter is not handy, turn aid to full volume. If feedback does not occur, battery is weak.
- d. If sound distortion or intermittent signal occur, send hearing aid for repairs. It may have internal problems.
- e. Check for plugged tube. If plugged, remove blockage or replace tube.
- f. Check for clogged hook. If clogged, remove blockage or replace hook.
- g. Check for clogged filter. If clogged, wash or replace.
- h. Check tubing for tear or perforation. If torn or perforated, replace tubing.

TROUBLE-SHOOTING A HEARING AID

2. Complaint. Hearing aid is not working at all.

With the hearing aid system intact, turn the aid on full volume and listen for feedback.

- a. Turn up the volume. If there is no feedback, check the battery.
- b. If the battery has sufficient voltage, remove the earmold/ ear hook. If feedback occurs, the problem is external to the aid (earmold, tube or hook). Check the following:
 - i. Attach the ear hook. If no feedback occurs, the hook may be blocked. If the hook appears to be clear, check the screw threads.
 - ii. If, when you attach the hook, feedback continues, attach the earmold and tubing to the hook. If feedback stops, the earmold bore or tubing may be blocked.
- c. If no feedback occurs, the problem is internal to the aid. Check the following:
 - i. on/ off switch
 - ii. volume control
 - iii. battery compartment
 - iv. microphone port.

TROUBLE-SHOOTING A HEARING AID**3. Complaint: The hearing aid is "feeding back".**

With the hearing aid system intact, turn the aid to full volume and listen for feedback. Then:

- a. Cover the tip of the earmold with your finger. If the feedback stops, the cause may be a poor fitting earmold. Make arrangements to adjust the earmold fitting.
- b. If the feedback continues, remove the earmold and cover the tip of the hook with your finger. If the feedback stops, the cause may be a hole or tear in the tubing. Replace the tubing.
- c. If feedback continues, remove the hook and cover the tip of the microphone port with your finger. If feedback stops, the cause may be due to a broken hook. Replace the hook.
- d. If feedback continues, look for a crack in the case. If the case is intact, the problem is probably internal to the hearing aid. In either case, the hearing aid is in need of repair.

GENERAL PRINCIPLES FOR MAXIMIZING
THE USE OF RESIDUAL HEARING

1. Clients who are unaccustomed to listening for meaning should first develop confidence in listening activities with familiar language.
2. Listening for meaning can only occur if the instructor's voice is within appropriate listening distance and the ambient signal to noise ratio is considered.
3. Listening and attending for meaning must happen throughout the day and not only in individual session.
4. Clients initially need some syllable level and word level discrimination practice to focus their attention and clear up auditory confusions. This listening practice must be placed back into meaningful prosodic context as soon as possible.
5. The client must be an active participant in the listening process. Ask him to tell you what he hears.
6. The client should have opportunity to listen without benefit of visual cues. "Mouth covering" is not recommended. Instead, clients should be asked to listen and not to watch when the task is one that emphasizes listening alone.

**A MODEL FOR INCORPORATING AUDITORY LEARNING
INTO EDUCATIONAL PLANNING**

Listening and attending to auditory differences should be the first step in remediating speech. For example, many hearing-impaired individuals have difficulty with the nasal-oral contrast. However, within acoustic phonetic parameters, clients with appropriate amplification up to 500 Hz, with orientation, should be able to discriminate the oral from the nasal phoneme, even at the sentence level. Therefore, prior to initiating production remediation, attention should be given to clearing up perceptual problems.

Opportunities should be provided for the client to listen for meaning with known linguistic items, and with linguistic items that are highly predictable with regards to lexicon, semantics, syntax and prosody. The basis for this may be that many hearing-impaired individuals do not have an auditory pattern for familiar language.

In listening practice, the clinician should exploit the fact that in English both stress and timing patterns carry a heavy meaning load.

In speech practice, the student should be responsible for monitoring his own production through hearing whenever possible. Therefore, opportunities for listening to his own voice in a quiet environment will encourage this important skill of self-monitoring.

SUMMARY

It appears that many speech-language pathologists may not be in the habit of addressing unique language-learning needs of hearing-impaired children, specifically as related to auditory input. Further, according to impressions of the 27 long-term speech-language therapy recipients, many speech-language pathologists teach spoken language to hearing-impaired children primarily through visual and tactile sense modalities, overlooking audition which is the mode through which spoken language is learned naturally.

Speech-language pathologists have traditionally played a crucial role in teaching spoken language to the hearing-impaired, and will continue to do so. Therefore, it is essential that we (1) properly identify clients who have potentially usable aided audition, and (2) then teach them to maximize their own listening capabilities, while systematically providing an abundance of opportunities to listen to the language in its spoken form.

This poster session has provided information in the following areas: (1) residual auditory capacity, (2) access to appropriate amplification, (3) maintaining and monitoring amplification, (4) maximizing residual audition, and (5) auditory learning incorporated into education planning. Please refer to the bibliography for additional resources.