Speech and language training for the hearing-impaired using the auditory-verbal approach.

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SPEECH AND LANGUAGE TRAINING FOR THE HEARING-IMPAIRED
USING THE AUDITORY-VERBAL APPROACH

by
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B.A., University of Montana, 1984

Presented in partial fulfillment of the requirements
for the degree of
Master of Communication Sciences and Disorders
University of Montana
1989

Approved by

Chairman, Board of Examiners

Dean, Graduate School

Date

9/24/89
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ACKNOWLEDGEMENTS

The author wishes to gratefully acknowledge the guidance of Dr. Donald M. Goldberg, from whom I learned of the Auditory-Verbal philosophy. Appreciation is extended to the staff of the Helen Beebe Speech and Hearing Center for their encouragement and to the parents of the children discussed in this paper. In addition, the author wishes to thank Ms. Julie Roth and Ms. Diane Trechsel Besser for their assistance in the typing of this manuscript.

Catherine B. Lebahn
CHAPTER ONE

PURPOSE

This paper discusses speech and language training for hearing-impaired children using the Auditory-Verbal approach. The Auditory-Verbal approach is defined and the philosophy and goals of this approach are presented. Requisites of the Auditory-Verbal approach and specific procedures used in therapy are also included.

The Helen Beebe Speech and Hearing Center in Easton, Pennsylvania, is a major advocate for the Auditory-Verbal approach. Two case studies from their clinic files are examined and teaching strategies applied to both cases. Measures to document therapy effectiveness are also suggested.

A number of other methods exist for facilitating communication skills in hearing-impaired children, particularly those children with severe to profound hearing deficits. These approaches include oral training, manual communication/sign systems, and Total Communication. These methods are briefly described and the strengths and limitations of each discussed.

Finally, attention is given to the lack of empirical evidence in the area of speech and language training for the
hearing-impaired using the Auditory-Verbal approach. Little research exists which supports this or any methodology as superior to other approaches for promoting speech and/or language development in hearing-impaired children.
CHAPTER TWO
INTRODUCTION

Communication is the process of transferring information from one source to another. Although this may be accomplished in a number of ways, in man it is primarily learned through the use of hearing and speech. These two components are interfaced in the complex process of communication such that they are often intertwined. A lack of or impairment in hearing frequently causes delayed speech and language development.

Hearing-impairment may be quantified in a number of ways. One of the most objective ways of quantifying hearing-impairment is through audiometric measurement. In order to avoid inconsistency, audiometric descriptions used in this paper will adhere to Northern and Downs (1984) descriptions of hearing loss: 1) normal limits (0-15 dB HL), 2) slight loss (16-25 dB HL), 3) mild loss (26-40 dB HL), 4) moderate loss (41-65 dB HL), 5) severe loss (66-95 dB HL), and 6) profound loss (96+ dB HL).

Another important consideration in hearing-impairment is the age at the onset of the loss. Onset may be categorized as congenital or prelingual (present at or shortly after birth) or adventitious (occurring sometime
after speech and language development). The potential impact of hearing-impairment on speech and language may be quite different, depending on the age of the individual at the onset of the hearing loss. It is widely accepted that the earlier the onset of hearing loss in children, the greater the potential for related speech and language difficulties (Moog and Geers, 1988; Northern and Downs, 1984; Whetnall and Frey, 1964; Kretschmer and Kretschmer, 1978). Numerous studies show that hearing-impaired children demonstrate substantial difficulties in both comprehension of language (Kretschmer and Kretschmer, 1978; Davis, 1986) and expression of language (Geers and Schick, 1988; Kretschmer and Kretschmer, 1978). As a result, most severely and profoundly hearing-impaired children are placed in educational programs which attempt to reduce speech and/or language difficulties.
CHAPTER THREE

METHODS FOR TRAINING OF THE HEARING-IMPAIRED

There are numerous methods currently practiced to facilitate speech and language development in the hearing-impaired. Throughout this paper, discussion focuses on severely and profoundly hearing-impaired children. Approaches to the educational management of children who demonstrate this degree of hearing loss are many and varied in nature. Determining which method may provide the most optimal benefit for each hearing-impaired child is a formidable task frequently fraught with controversy. Some of the methods are described.

All approaches described advocate the use of the child's residual hearing by means of appropriate amplification and audiological management. However, the degree to which residual hearing is utilized during training ("Auditory Training") may vary between approaches and/or programs. American Sign Language (ASL), Signed English, and Cued Speech include a visual representation of language. They represent language in signs, gestures, or, as in the case of Cued Speech, as a hand supplement to speech reading.

American Sign Language (ASL) is a manual communication system considered to be the language of the adult deaf population. ASL is a language system which is

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linguistically different from the English language. Meaning is conveyed by the movement, direction and place of the signs and facial expression as well as by the actual semantics. ASL may be an appropriate method of communication for hearing-impaired children with various degrees of hearing loss. It is particularly appropriate for children with severe to profound hearing losses as an alternative to oral language reception and production.

A potential advantage of methods which incorporate a manual component is that the visual representation of language may facilitate early language development in hearing-impaired children (Bodner-Johnson in Schwartz, 1987; Kretschmer and Kretschmer, 1978). Kretschmer and Kretschmer (1978) state "The acquisition advantage seems to be with sign language because it is apparently easier to initiate than spoken language" (p.99). In addition, no evidence exists which documents that including a manual component during training interferes with the development of spoken language in hearing-impaired children.

Another advantage of the ASL system is that deaf children who use ASL may become part of the deaf community. These children assist in preserving and perpetuating the community's culture. It is well documented that children with prelingual severe to profound hearing losses often may not develop oral language spontaneously (Ling and Ling, 1978; Northern and Downs, 1984; Ling, 1984; Kretschmer and
Kretschmer, 1978). ASL provides these children with a means of communication with other individuals who sign.

Although ASL provides an adequate means of communication for many hearing-impaired individuals, the lack of oral language production may segregate the ASL user from the hearing population. This, in turn, may limit the social, educational and vocational opportunities available to the ASL user. Another potential disadvantage of ASL is that teachers of the hearing-impaired often do not sign as well as their students (Clements and Prickett, 1986). Therefore, the students may not receive as much educational benefit from a teacher who is a poor signer.

In addition, the syntax of ASL differs from English syntax. Therefore, ASL could not be used to directly represent written or spoken English (Pollack, 1985). Based on this assumption, a need arises to represent English appropriately in structure and meaning.

This need to manually represent English is addressed by the advent of manual communication systems based on English. These include Signed English, Seeing Essential English (S.E.E.-1), and Signing Exact English (S.E.E.-2). These systems are intended to be used with children with moderate to profound hearing losses. The advantages and disadvantages are similar to those found in ASL. Other advantages of these systems are that they follow English word order and allow for a more exact representation of the
structure of English. The use of these English-based sign systems is advocated so that hearing-impaired children may learn the language of the hearing culture. In addition, these systems are considered to provide an appropriate foundation for reading and writing skills as these children are exposed to and learn the grammar and syntax present in the written form (Gustason, Pfetzing and Zawolkow, 1980; Kretschmer and Kretschmer, 1978).

Another communication option is Cued Speech. Developed by Dr. R. Orin Cornett in 1966, Cued Speech "is a phonemically-based hand supplement to speechreading" (Williams-Scott and Kipila in Schwartz, 1987). In Cued Speech, the speaker uses manual cues simultaneously with connected speech. Cued Speech is a system appropriate for children with moderate to profound hearing losses and "can be very effective with totally deaf children" (Ling, 1984, p.8). It is frequently used with profoundly hearing-impaired children although it is uncertain if Cued Speech significantly aids in the acquisition of oral language in moderately or severely hearing-impaired children (ibid., 1984). A unique advantage of Cued Speech is that cues are always used simultaneously with oral language. Therefore, it is viewed by some as a way to bridge the oralism versus manualism controversy (Northern and Downs, 1984).
Another advantage of Cued Speech is that it alleviates the ambiguity of the phonemes during speechreading. This manual system is organized such that homophenous phonemes (those that appear the same on the lips) may be distinguished from one another. There are eight hand configurations which represent the consonants. Vowels are represented using an open handshape at four positions near the mouth area. All cues are executed in this area in order to draw attention to the speaker's lips and face. According to Northern and Downs (1984), a hearing person may become fairly fluent in Cued Speech in about thirty hours. However, some argue that this system is "too complex for easy learning" (Northern and Downs, 1984, p.324).

The following method, termed Total Communication, is considered to be a comprehensive program for the educational management of hearing-impaired children. English-based Sign Systems and fingerspelling may constitute a portion of a Total Communication program but are excluded from the Oral Approaches.

Total Communication (T.C.) is considered to be a philosophy rather than a singular method. The term "Total Communication" was introduced and gained popularity in the 1970's. According to this philosophy, the hearing-impaired child should be exposed to all forms of communication. These forms include "speech, signs, gestures,
fingerspelling, speechreading, reading, writing" and the use of residual hearing (Bodner-Johnson in Schwartz, 1987).

T.C. is appropriate for children with moderate to profound hearing losses and is frequently considered the method of choice for severely to profoundly hearing-impaired children. This belief is reflected in its historical and current popularity. An advantage of T.C. is based the assumption that the combination of communication modes would provide the child with the maximum opportunity to learn language. Also, the need to choose a single communication method was alleviated. Total Communication became so popular that in 1978, 62% of all education programs for deaf children were reportedly using this approach (Bodner-Johnson in Schwartz, 1987).

Adversaries of the T.C. philosophy argue that the presence of a number of methods may confuse the hearing-impaired child. Northern and Downs (1984) report that critics of T.C. argue "over-stimulation of the deaf child is actually detrimental to communication" (p.322).

Evaluating the effectiveness of any singular method within T.C. is difficult as the methods are to be utilized in conjunction with one another. Also, the child and/or the teacher may demonstrate a bias toward a particular method used in the T.C. approach.

The Oral approach may be considered as another group of methods. Each method included in this group emphasizes
spoken language as the mode for communication. The use of sign and/or gestural systems is excluded. The Oral approach is appropriate for children with hearing losses ranging from mild to profound. A major advantage of the Oral approach is that hearing-impaired children are not segregated from the hearing population. Ling (1984) writes that:

"...hearing-impaired children should be given the opportunity to learn to speak and to understand speech, learn through spoken language in school, and later function as independent adults in a world in which people's primary mode of communication is speech."

(p.9)

Spoken language has also been positively correlated with academic success (e.g. reading and writing skills) in school-aged hearing-impaired children (Truax, 1978 in Ling, 1984). Jensema and Trybus, 1978 (in Ling, 1984) did not find this same correlation with hearing-impaired children using sign.

A chief disadvantage of Oral approaches is that not every child may achieve a high level of competence in oral language production. Frequently, hearing-impaired children are placed in oral programs as a first preference. It may be determined that a child is not progressing at an acceptable rate in the program using an Oral approach. Therefore, valuable language learning time may be lost. That is, the child may have been better served initially in a program which incorporates a visual representation of language (e.g. T.C., Cued Speech, etc.).
Oral methods which include the use of visual cues or tactile feedback are termed multi-sensory. Those methods which use residual hearing exclusively are termed unisensory. In this discussion of oral approaches multisensory methods are considered the "traditional Oral approach." Unisensory methods are considered as a separate methodology, although they share many common features. The traditional Oral approach is defined as a "synthetic approach to teaching speech relying heavily on lipreading and tactile feedback" (Northern, 1976).

Northern and Downs (1984) separate the traditional Oral approach into three basic categories. They state that it is common practice in the United States to use these three categories in the order listed below. In the event the first method of oral training fails, the second method is attempted, and finally, the third method is used.

These descriptions, from Northern and Downs, are: "pure oralism" or "auditory stimulation." As in other methods, the child is fitted with hearing aids and exposed to speech and oral language. Attention is given to visual cues provided during speech and auditory stimulation is stressed. The second category is termed "multisensory/syllable unit method." It includes the same features as pure oralism with the addition of reading and writing and tactile feedback. The third oral method is termed "language association-element method" or "natural
language method." This type of oral training stresses speech and language learning through natural activities. Teachers of this method "continually talk to the deaf children and encourage them to ask questions with speech" (Northern and Downs, 1984). Although Northern and Downs separate the Oral approach into these categories, it would seem likely that many programs may incorporate elements from each type into their curriculum.

The last classification of methods for training of the hearing-impaired to be presented in this paper is an oral approach termed the Auditory approach. This approach is defined as a method using "intensive training of amplified residual hearing using normal language acquisition as a model" (Northern, 1976). For the purpose of this paper, the Auditory approach is considered as a methodology in and of itself, although it bears many of the characteristics of the Oral approach. Methods which may be considered "auditory" are those which make use of the child's residual hearing exclusively for speech and language training. This approach is also known as "Acoupedics," "unisensory training," and the "Auditory-Verbal" philosophy. Advocates of these approaches consider them to be comprehensive programs for aural habilitation (Pollack, 1985; Beebe, 1975 cited in Nix, 1976). Discussion of the Auditory approach will focus on the Auditory-Verbal philosophy as put forth by the Helen Beebe Speech and Hearing Center in Easton, Pennsylvania.
The Auditory-Verbal philosophy may be considered an extension or specialization of other Oral approaches. However, the Auditory-Verbal philosophy differs from these approaches with respect to the presentation mode used during training. The focus of this approach is to capitalize on the child's residual hearing exclusively in order to facilitate speech and language development. This may be accomplished through the use of "Auditory Training." Ling (1986) defines auditory training as "a label for an ill-defined set of procedures related to the use of residual hearing in both children and adults." Erber (1976) states that auditory training entails "contrived situations through which hearing-impaired children can acquire the auditory skills which normally hearing children acquire via the natural environment." Whetnall and Frey (1964) concur with Erber's statement that hearing-impaired children should acquire speech and language in the same manner as normal hearing children. This approach stresses the use of audition such that hearing becomes integrated into the personality of the hearing-impaired child (Pollack, 1985; Beebe, 1975 cited in Nix, 1976). In essence, the goal is for the hearing-impaired child to become a "listening child." Intensive training of auditory skills is a necessary component in the development of a hearing-impaired child who truly listens.
HISTORY OF AUDITORY TRAINING. The importance of utilizing residual hearing for the development of verbal communications has long been recognized. In the early 1800's, a French audiologist named Itard claimed that deaf children could be taught to hear words through the use of their residual hearing. Itard's work influenced a number of individuals, including Toynbee and Wilde in England. Toynbee wrote of the advantages of enabling the deaf to hear their own voices and modulate them (Markides, 1986).

In the late 1800's, Urbantschitsch of Vienna, Austria, advocated the use of residual hearing in the education of deaf children. His method primarily consisted of introducing loud speech close to the ear.

Urbantschitsch's ideas were perpetuated in the United States by Max Goldstein. Goldstein "defined his 'Acoustic Method' (1939) as the stimulation of the hearing mechanism and its associated sense organs by sound education" (Pollack, 1985). Ewing, Ewing and Little conducted a survey in 1936 in an attempt to define the hearing capabilities of deaf students. They found that few children in schools for the deaf in the United Kingdom were totally deaf. This led to the suggestion that most deaf children could make use of residual hearing in order to learn how to speak.

Wedenberg (1951) and Beebe (1953) expressed similar views and discouraged lipreading. They believed that teaching lipreading interfered with a child's ability to
learn to listen. Pollack (1964, 1985) supported this theory, writing that there "can be no compromise because once emphasis is placed upon 'looking' there will be divided attention, and vision, the unimpaired modality, will be victorious" (Pollack, 1985 cited in Markides, 1986).

PHILOSOPHY OF THE AUDITORY-VERBAL APPROACH. The importance of residual hearing lends strength to many of the concepts of the Auditory-Verbal approach. However, misconceptions relating to hearing-impairment remain. Beebe, Pearson and Koch (1984) write, "sometimes it seems we are working to overcome the prejudices of centuries, namely, that a deaf child has to grow up mute" (in Ling, 1984). As in other oral approaches, the philosophy of the Auditory-Verbal approach embodies the belief that hearing-impaired children may learn to use their residual hearing and speak given the appropriate training.

In an attempt to define the Auditory-Verbal approach and "maintain the universal quality of all auditory-verbal programs" (Auditory-Verbal International, 1986), a group was formed to accomplish these goals - Auditory-Verbal International. This group, also known as A.V.I., seeks to "extend opportunities for each child with a hearing impairment to acquire natural communication, that is auditory-verbal communication, from the earliest possible age" (ibid., 1986).
A.V.I. states that auditory-verbal communication can be accomplished through:

1. Promoting early detection programs.

2. Fitting as early as possible the most appropriate form of amplification for the children, usually binaural.

3. Teaching the child to acquire and process language through the habitual and maximal use of residual hearing regardless of auditory acuity.

4. Expecting the child to function independently in the most normal learning and living environment possible.

5. One-to-one teaching.

6. Having a parent/caretaker centered approach.


8. Developing spoken language communication, that is, living and learning through natural sounding language communication.


The concepts set forth by A.V.I. are supported by those who practice this unisensory approach, including Pollack (1985) and Beebe (1986). In addition to the concepts previously mentioned, Beebe incorporates behavioral management into her program. (See Appendix D for specific behavioral suggestions.)

TEACHING STRATEGIES FOR THE AUDITORY-VERBAL APPROACH. The Auditory-Verbal approach is not considered to be a teaching curriculum in, and of, itself. That is, it is not an approach which may be executed in a "cookbook" fashion.
Instead, it is a group of goals which may be accomplished through training in a number of areas.

Language acquisition is considered to be a generative, rule-governed process. Therefore, in the Auditory-Verbal approach, the child needs to learn strategies for organizing and producing language. The goal of instruction at the Helen Beebe Speech and Hearing Center is to have the child learn strategies for acquiring language rather than merely teaching a specific language structure. The teaching of these strategies is divided into four components: 1) auditory development, 2) language training, 3) speech training, and 4) cognitive development. NOTE: Skills are not taught to the mastery level at the Helen Beebe Speech and Hearing Center. The child is exposed to a more difficult task even though 100% accuracy is not achieved. This strategy is conducted in an attempt to continually encourage the child to "work harder" and thus, perhaps increase his/her performance. Examples of activities which may be used in each component of training are included.

**AUDITORY DEVELOPMENT.** Capitalizing on the child's residual hearing is a key element in the Auditory-Verbal approach. Training of the auditory channel is performed based on principles from Erber (1982). Erber arranges auditory skills in a hierarchy of difficulty. The acquisition of these skills is approached following his model:
"DETECTION: the ability to determine the presence or absence of sound.

DISCRIMINATION: the ability to perceive differences between sounds; that is, differences in acoustic qualities, intensities, durations, and/or pitches.

IDENTIFICATION: the ability to label or name what has been heard, by repeating, pointing to, or writing the word, sentence or environmental sound perceived.

COMPREHENSION: the ability to understand the meaning of acoustic messages by reference to his/her knowledge of language. The response differs in content from the stimulus, but is closely associated in some way (i.e. answering questions about a story, paraphrasing a story, giving the opposing of the word, etc.)" (ibid., 1982)

Level One: Detection. The detection of sound is targeted using a variety of noisemakers as well as speech sounds. The child is positioned such that the sound source is not within his line of vision. The sound is presented and the child is alerted to its presence by the clinician. Cues such as "I heard that." and pointing to the ear following presentation of the sound are used. This procedure is repeated a number of times.

Level Two: Discrimination. Teaching the child to discriminate between sounds is similar to the teaching of detection of sounds. That is, the sounds are presented outside his field of vision and the child is assisted in performing the task. Example: The clinician chooses two noisemakers. The first sound is presented and the child is asked, "Which one did you hear?" Both noisemakers are
placed in front of the child and he is guided to select the correct noisemaker. The sequence is repeated. As the child begins to learn a sound, others are added and the difficulty of the task is increased (e.g. noisemakers are selected that are more similar in sound).

Level Three: **Identification.** The identification of sounds may be taught by presenting a number of sounds and allowing the child to select the appropriate one. A variety of sounds including noisemakers, speech sounds, words, anomontopaeic sounds and environmental sounds are used. The procedure for the discrimination of sounds is used with an array of choices placed in front of the child. The sound is presented and the child is asked "Which one did you hear?" Noisemakers, toy animals, toy vehicles, or pictures are especially useful. Human voices and animal sounds add variety to the child's repertoire.

Level Four: **Comprehension.** The most difficult level of auditory skill is the use of auditory information for the comprehension of language. At this level the child is required to respond appropriately to the clinician following an auditory message. This may include pointing to the correct objects following a label provided by the clinician, answering questions, following commands and directions or responding appropriately to a statement. Activities for training at this level are numerous and varied. Refer to Appendix A for a more comprehensive list of activities.
Development of the listening function may be enhanced in a number of ways including placement at an appropriate distance from the speaker, loudness level and rate of speech. Additional suggestions for improving listening conditions may be found in Appendix B.

**LANGUAGE TRAINING.** The development of language skills in hearing-impaired children is a central goal in the Auditory-Verbal approach. According to this approach, language is viewed as the vehicle through which the child organizes his world, expresses himself, and may eventually grow into an independent member of the hearing community.

Children may acquire language in a number of ways. Most notably, however, they acquire it based on everyday communicative interactions. Numerous studies support this theory including Kretschmer (1978); he writes that children learn language based on "language imparted to the child by his communicative environment" (p. 46). Therefore, we may infer that utilizing natural language situations when teaching language skills to children is important.

The Auditory-Verbal approach makes use of a natural language model for language development. Language training at the Helen Beebe Speech and Hearing Center operates on the premise that "play is the work of children." Language skills are targeted during playful interaction with the clinician and activities focus on the introduction of new
vocabulary items, syntactic structures, semantic relationships and the development of concepts. For a more specific listing of therapy activities and their progressions refer to Appendix C.

In addition, appropriate usage of the pragmatics of language is stressed at all times. Skills are taught in a conversational style. The use of structured drills and rote production of targets is discouraged as a consistent methodology to be used in therapy sessions.

Children are encouraged to relate their own experiences to the clinician during each therapy session. During this time the child is not required to correct any of his utterances; it is intended to be a time of sharing with the clinician and to encourage his efforts to communicate. Children are also urged to put their experiences into what has come to be known as the "Experience Book." Pictures, momentos, photographs, etc. usually inspire the child to comment copiously to the clinician. The Experience Book is designed to chronicle events that the child considers to be important. (On occasion, family pictures pale in comparison to a treasured candy wrapper or old balloon.)

In summary, the natural language approach consists of learning language based on the model of normal language acquisition. Mischook and Cole (1986) write that "For the hearing-impaired child, the learning environment consists of these normal everyday events, but must be 'enriched'..."
The work of the Auditory-Verbal therapist is to capitalize on these experiences and enrich them with his/her professional knowledge.

**SPEECH TRAINING.** One of the most common misconceptions concerning deaf children is that they will not learn to speak. This may be due in part to the fact that many hearing-impaired children do not speak clearly. However, the presence of a hearing-impairment does not mandate poor speech production. Ling (1986) writes that "...with modern methods of treatment, most hearing-impaired children can learn to speak intelligibly - and some normally - if they are given adequate opportunity to do so..." (p.26).

Speech training at the Helen Beebe Speech and Hearing Center focuses on two primary aspects of speech production - articulatory competence and natural voice quality. The Center makes use of the **Phonetic Level Speech Evaluation (PLE)** (Ling, 1976) as the foundation for articulatory competence. The rationale for employing this model is that Ling's approach is comprehensive, systematic and specific in its guidelines for the acquisition of speech goals.

The **PLE** contains a comprehensive repertoire of speech skills ranging from the suprasegmental aspects of speech to the production of consonant blends. It suggests immediate teaching goals based on the results of the initial administration of the evaluation. Therefore, the **PLE**
suggests a hierarchy of speech skills to be taught. For instance, suprasegmental aspects of speech are considered to be a prerequisite for the teaching of Step One and Step Two simple consonants.

During the initial phase of training, the Phonetic Level Speech Evaluation is administered to the child. Based on the information obtained during this phase, individual speech targets and goals are established. Training focuses on presenting speech targets auditorily, then allowing the child an opportunity to produce the target following the clinician model. Visual, tactile and kinesthetic cues are discouraged. Infrequently, these non-auditory cues may be given, however, the clinician immediately repeats the target without visual cues and requests that the child attempt to produce it once again. The circumstances for including non-auditory cues are determined at the discretion of the clinician.

The second component in speech training pertains to voice quality. Many hearing-impaired children demonstrate deviant voice qualities as a result of an inability to monitor their own voices and modulate them. One approach that is aimed at attaining and maintaining a natural voice quality is the "Chewing Approach" (Beebe, 1956). This approach is utilized at the Helen Beebe Speech and Hearing Center as a means of assisting the hearing-impaired child in obtaining an appropriate voice quality, but is also
recognized in the treatment of other voice disorders (Boone, 1983). The chewing approach is anchored in the theory that coupling a vegetative function (chewing) with a non-vegetative one (speaking) may enhance the learning of the non-vegetative function. Beebe writes "...it would seem without question that an approach based on the natural function would be more advantageous than one which has been synthetically devised." (p.109). In practice, the clinician may have the child chew something (Beebe frequently uses a cookie) and vocalize while chewing. This process is continued until an appropriate quality emerges. The child is then asked to pretend to chew the cookie while continuing to vocalize. This approach is described as offering a relatively quick way of achieving an improved voice quality in many children. Beebe (1956) points out that both the clinician and the child must guard against placing too much emphasis on momentary success, and continue to employ the approach to ensure more lasting results (p.111). The child is encouraged to practice chewing/vocalizing using nonsense syllables several times a day. Once "nonsense chewing" is achieved the child may count, produce short phrases and eventually "chew his speech," that is, produce speech while chewing using the emerging natural voice quality.

**Cognitive Development.** The final component of training at the Helen Beebe Speech and Hearing Center includes
cognitively-based tasks. Cognitive development is not considered to be a singular goal, but is incorporated into most language activities. (See Appendices A and C.) The Beebe Center targets cognitive skills directly to facilitate organizational thinking processes deemed integral to the process of organizing thought into language. Activities such as sequencing of events or those which require inferential thinking are used (e.g. "This girl is crying. Why do you think she is crying?").

The exact nature of the relationship between language and cognition is not fully defined. Research regarding the relationship between language and cognition in the hearing-impaired population is even less well-defined and yields mixed results. Current research argues that cognitive development in young hearing-impaired children does not differ significantly from hearing children of the same age (Bond, 1987). However, Zwiebel and Mertens (1985) argue that differences in cognitive structure (e.g. rate of development, weak abstract thinking, greater reliance on visual perceptual skills) are evident in deaf children as compared to hearing children. In a later study, Zwiebel (1987) remarks that the cognitive development of deaf children is equal to that of "normally hearing children under certain circumstances" (p.19). Based on the Piagetian theory that language emerges as a "part of the more general process of cognitive development" (Kretschmer and
Kretschmer, 1978, p.49), including cognitive stimulation as a part of a language learning program is prudent.
CHAPTER FOUR
LITERATURE COMPARISON

Research concerning the various methodologies for aural habilitation is abundant. Despite the profusion of studies, no single approach emerges as the panacea for eliminating the negative effects of hearing-impairment on speech and language development.

The Auditory-Verbal approach encompasses a number of elements that are reported to enhance speech and language development. These most closely resemble strategies employed in "aural/oral" training and "auditory/oral" training. To date, no research exists which is strictly Auditory-Verbal in nature.

Luterman (1976) compared the language abilities between two groups of children in the same preschool program. The first group received "traditional" oral training (visual/oral); the second group was trained using an auditory/oral approach (no visual cues). Results of the study indicated that the auditorily trained children were "superior in language skills to the visually trained children" (p.392). In addition, thirty-six percent of the children in the auditory/oral program were fully integrated into the classroom setting compared to less than ten percent.
of the visual/oral children. Luterman hypothesized that children who achieved fully integrated placement did so as a result of their superior communication skills. He suggested that this superiority was due to auditory/oral training.

A major strength of Luterman's study was that some variables which frequently confounded previous studies were eliminated. For example, both groups of children were initially trained in the same setting, with a parent-centered approach and tested by the same examiner.

Difficulties in this study are that Luterman examined a relatively small number of children (49); a larger sample would lead to a greater level of confidence in the results. In addition, eighteen of the total number of children enrolled in the program during the period studied were eliminated due to a diagnosis of a multiply handicapping condition or their families moved from the state. The inclusion of these children in the study may have had an impact on the type of results obtained. Also, during the first years of the program all children were taught using a visual/oral approach. Therefore, there were no auditory/oral children who had not received initial training using a visual/oral approach. The training the children received in the interim between the nursery program training and this study was not examined. The academic performance of the children may have been a result of training received subsequent to the nursery program.
Robinson (1988) examined auditory only and auditory-visual presentation of the Test of Auditory Comprehension of Language (TACL) (Carrow, 1973) to moderately hearing-impaired children. He found that the mode of presentation had no significant effect on the subjects performance. Robinson stated that the receptive language abilities of these children were not enhanced by the inclusion of visual cues. Therefore, an approach which incorporated visual cues, such as lipreading, may not necessarily have led to greater comprehension of spoken language. Robinson did not study the effects of Auditory-Only and Auditory/Visual presentation of the TACL to severely and profoundly hearing-impaired children. Application of the results are limited; they can not be directly applied to severely and profoundly hearing-impaired children. A study of this nature which focused on more severely hearing-impaired children would have greater potential use for programs which serve that population. Also, Robinson did not define the training the subjects received prior to the administration of the TACL; program approach, teacher competence, type and length of training and intellectual factors are not considered. This study did not support or refute the use of either mode of presentation.

Geers, Moog and Schick (1984) compared the language production of aural/oral children and Total Communication
(TC) children using the Grammatical Analysis of Elicited Language - Simple Sentence Level (GAEL-S) (Moog and Geers, 1979). They found that manually coded English did not advance the development of spoken English. Also, the spoken production of T.C. children (signed and spoken) were inferior in over 80% of the test categories studied. These results suggested that the children who received aural/oral training demonstrated greater competence in English grammar than those educated in T.C. programs.

A potential problem with the validity of this study is that there are a number of subject preselection factors which may have had an impact on the results obtained. For instance, those children who demonstrated learning disabilities (secondary to hearing impairment) and those children who transferred from an oral program were excluded from the T.C. group. Also, those children "judged to have better prognosis for acquiring speech may have been referred to O/A (oral/aural) programs, while those who were considered to be poor candidates for developing spoken language entered T.C. programs." (Geers, et al, 1984, p.385). Other variables cited by the authors which may have influenced this study included a number of family variables, the subject's educational programs as well as the lack of a stricter definition of spoken language. The authors stated that the spoken production of the O/A group was superior. However, they fail to define the criteria for accepting a
child's vocalization as a spoken word or as an unintelligible vocalization. The loosely defined criteria for describing a spoken production detracts from the central idea in this study - to measure the subject's expressive competence in English syntax. The authors considered a spoken production to be a "consistent oral representation for the word that matched the intended word on some dimension." (p.386). The measurement of spoken language is not qualified sufficiently to lend unquestionable support to the results.

In summary, the research presented indicated that children who received auditory/oral training demonstrated greater abilities in some areas of language, most notably auditory comprehension of language and English grammar. In addition, a greater percentage of oral (including auditory/oral) children were fully integrated into the educational mainstream (Ling, 1984; Northcott, 1981; Luterman, 1976).

Advocates of approaches which included manual cues argue that oral approaches may deny deaf children their position in the deaf culture (Clements and Prickett, 1986; Matkin and Matkin, 1985). In addition, deaf parents who use sign language may prefer to have their children learn to communicate in the manner that is practiced at home. It has also been reasoned that speech skills may be more difficult
for a deaf child to learn than a sign language system (Arnold, 1983).

In a review of literature compiled over the past 25 years, Goppold (1988) examined the longitudinal academic effects based on the program methodology (Oral versus Total Communication). Results of that review indicated that children with severe to profound hearing impairments who received early intervention (before age two) using Total Communication demonstrated advantages in academic success, speech reading, and reading and writing skills as compared to those children trained using an oral approach.

Goppold noted that deaf children of deaf parents (dc/dp) performed better academically than deaf children of hearing parents (dc/hp). Goppold summarized that "some of the reasons for the superior performance of dc/dp over dc/hp as: the nature and characteristics of the measures used and child nurturing experiences (Sisco and Anderson, 1980); hereditary versus nonhereditary etiologies (Mindel and Vernon, 1971); and interpretation of each person's definition of 'success' within any academic program (Craig, 1964)" (p.287).

A potential difficulty with Goppold's review was that she gave limited attention to the problems of retrospective research. In order to draw causal relationships from the data relating academic success and program methodology, a prospective experimental study design is necessary. In
addition, Goppold reviewed only twelve articles from the past 25 years. A greater number of articles included in the review would add credibility to the author's assertions. Finally, only four of the seventeen references in this review were published in the last ten years. More current research results may yield a different view of hearing-impaired children's academic success as related to program methodology.

Geers and Schick (1988) concurred with Goppold's assertion that hearing-impaired children of deaf parents (HIP) demonstrate linguistic advantages in both spoken and signed English compared with hearing-impaired children of hearing parents (HP). The authors noted that the superior performance of the HIP subjects emerged near ages seven and eight years when learning manually coded English.

A major strength of Geers and Schick's study was that a number of variables are controlled, allowing for a greater degree of confidence in the results. These include a relatively large sample of subjects (100), the same instrument to measure each subject's ability and "stringent criteria" in selecting subjects. Also, similarity in educational program was judged to be the highest priority of the selection factors for each subject. The authors stated that "whenever possible a matching HP child was selected from the same program as the HIP..." child allowing for a
greater degree of confidence in the comparisons drawn between subjects.

A difficulty in this study was that the criteria for determining an acceptable production (either spoken or signed) is deemed "quite liberal" by the authors. A stricter definition of an acceptable production may allow any potential ambiguity in scoring the test to be reduced. This in turn may yield more reliable and valid data affording greater confidence in the results.

Disadvantages that pertain directly to the Auditory-Verbal approach include:

1. There appears to be a critical period for the acquisition of speech and language skills using the Auditory-Verbal approach. Currently, no precise guidelines exist which state the ages at which children may benefit most from this approach. However, a crucial component in the Auditory-Verbal approach is early identification of the hearing loss coupled with intensive training at the earliest possible age. It may then be inferred that older children and adults may not experience the same degree of success as those children who begin Auditory-Verbal training at an early age.

2. Children who are trained in the Auditory-Verbal approach may not experience consistency in the mode of presentation (auditory only vs. auditory/visual
presentation). Therapy activities are conducted without visual cues and parents are encouraged to eliminate visual cues at home. However, the general population will not be likely to eliminate visual cues. Children may learn to rely on visual cues and become frustrated when they are not included in therapy and at home.

3. Auditorily trained children must rely on a signal that may be fragmented or of imperfect quality. One would expect that a poor signal may result in poor receptive communication skills in that the child must "compensate for missing or ambiguous elements" in the speech signal by using contextual information to gather meaning (Grove and Rodda, 1984, p. 383).

4. Parents must be committed to the Auditory-Verbal approach. Much of the responsibility for training rests with the parents. Parents are required to make entries in their child's Experience Book daily. They are also required to provide five home therapy sessions weekly between forty-five minutes and one hour in length. Therefore, parents with time-consuming or demanding careers or other family obligations may be unable or unwilling to devote the time necessary to achieve maximum benefit from this approach.

5. The availability of Auditory-Verbal therapy is unclear. Currently, no criteria exists for certification of Auditory-Verbal therapists. Therefore, the number of
professionals who practice Auditory-Verbal therapy or the number of educational programs which employ Auditory-Verbal therapists is unknown.

6. The Auditory-Verbal approach is not appropriate for those children who demonstrate no response to auditory stimuli even with appropriate binaural amplification. Pollack (1985) stated "...less than five percent of so-called deaf children are totally deaf..." (p.vii). Therefore, those children who demonstrate no residual hearing would not benefit from a program which uses auditory skills exclusively for facilitating speech and language development.
CHAPTER FIVE

CASE PROFILES

Two children were chosen from a total caseload of 38 hearing-impaired clients who were enrolled in the Beebe Center as of December, 1988, to illustrate how the Auditory-Verbal philosophy and goals may be implemented with children who differ with respect to chronological age, degree of hearing loss, skill level and demonstrate different communicative and/or academic needs. Goals are included for both cases in the following areas: 1) audition, 2) speech, 3) language, and 4) cognition. Measures to document therapy effectiveness are suggested.

Case selection factors included children who:

1. Were presently receiving Auditory-Verbal therapy at the Helen Beebe Speech and Hearing Center.

2. At the time of writing both clients were assigned to the author's case load and had been receiving Auditory-Verbal therapy from her for a minimum of four months. This factor was included to ensure familiarity with the children, their abilities and their needs.

3. Did not demonstrate handicapping conditions other than hearing impairment.

Child K, chronological age three years, one month, was selected to represent the preschool population with a
prelingual, bilateral severe-to-profound sensorineural hearing loss. K was selected for study as she received the most current evaluation as of November, 1988.

Child E, chronological age nine years, five months, was selected to represent the school-age population with a prelingual, bilateral moderate-to-severe sensorineural hearing loss. E was the only school-age (grade 1-12) hearing-impaired child on the author's case load.

K Date of Birth: December 14, 1985; (Chronological Age Three Years, One Month)

BACKGROUND

K was originally seen at the Helen Beebe Speech and Hearing Center on April 22, 1987, for an informal speech, language and hearing evaluation. Shortly thereafter, she enrolled in therapy twice a week for one-hour sessions.

K was originally fit at age nine months with one Oticon body aid with a Y-cord. At age 13 months, K was seen by an audiologist at Pennsylvania State University who prescribed binaural Unitron El-PL hearing aids. Reportedly, K performed significantly better with the Unitron hearing aids than with the Oticon aid. She was fit with Unitron El-PL and Unitron El-P hearing aids. K was seen at the Pennsylvania State University Speech and Hearing Clinic on September 26, 1988, for an audiological and hearing aid evaluation. Results of that evaluation indicated that K's
hearing aids were functioning within manufacturer's specifications. When tested aided binaurally, K responded to speech at 30 dB HL and warble tones of 500 Hz at 45 dB HL, 1,000 Hz at 45 dB HL and of 2,000 Hz at 45 dB HL. Results indicated that K was appropriately aided with two Unitron hearing aids. Unaided, K demonstrated a severe-to-profound hearing loss.

K received hearing therapy twice a week for one hour through Intermediate Unit 29 (Educational Center for Exceptional Children) from October, 1986, through April, 1987. A sensory integration screening was performed in July, 1987. Results of that screening indicated occupational therapy was not necessary at that time. K also received a full opthalmological evaluation on June 10, 1987, which stated that she did not demonstrate any ocular deficit and appeared to have normal vision.

K's medical history included severe trauma to the right side of her head at birth. According to her parents the right side of her head was filled with fluid subsequent to a difficult birth. During the initial weeks of therapy, K demonstrated unusual staring episodes. These episodes had decreased in number, but were still evident occasionally.

Her developmental history, with the exception of the speech and language delay secondary to her hearing loss, has been normal according to parent report.
THERAPY SUMMARY

K's therapy included structured and nonstructured activities to expose her to and develop various aspects of speech, for example, suprasegmentals, vowels, diphthongs and basic consonants. Therapy activities also focused on increasing receptive and expressive vocabulary, listening skills, reasoning skills and the introduction of basic concepts. In addition, some activities were targeted to increase K's turn-taking and "choosing" skills.

NOTE: The following goals were included to represent the components present in a typical Auditory-Verbal therapy session as interpreted by this clinician. Behavioral objectives were included in each of the four areas previously mentioned to provide a means to measure treatment effectiveness and therefore promote professional accountability for services rendered. These objectives were not reflective of the style of interaction which were actually used in the sessions between the child and the clinician.

In the four core areas of auditory skills, speech skills, language skills and cognition, the child's present level of functioning will be described. In addition, a short-term goal will be stated for these areas.

1) **Auditory Skills**

K indicated hearing a novel sound by pointing to her ear and vocalizing. K consistently responded to her own
name when called and actively responded to both speech and environmental sounds. She also demonstrated an increase in "tuning in" behavior (i.e. the staring episodes mentioned earlier decreased in number) and she responded appropriately to simple questions, commands and comments.

**SHORT-TERM GOAL:**

The clinician will call attention to environmental sounds and their meanings—for example, a ringing telephone means someone is calling or a car honking means a nearby vehicle—during therapy sessions with 100% accuracy. 100% accuracy was selected as the criterion level for this clinician-oriented goal. 100% alerting behavior from the child is not the intended goal.

2) **Speech Skills**

K demonstrated a number of suprasegmental aspects of speech, both on demand and spontaneously. She imitated all of the vowels and diphthongs in isolation and in repetition, with the exception of /ɜː, əɪ, ɔ/ which were inconsistently produced. K provided low, mid and high pitches both discretely and continuously although she tended to "skip over" some pitches. K produced several of the Step 1 and Step 2 consonants on the Ling Phonetic Level Evaluation (including /m, b, d, w and h/) on demand, and often produced these spontaneously.
SHORT-TERM GOAL:

K will produce Step 1 consonants /p, f, θ/ and Step 2 consonants /l, t, n/ in single syllables with the vowels /a, i, u/ following the clinician's model during structured therapy sessions with 80% accuracy.

3) **Receptive Language**

No formal testing to assess receptive language was attempted. On a parent-scored language development scale, K appeared to be between 20 and 22 months receptively in August of 1988. This was an increase of between two and four months since April of 1988 and an increase of approximately 16 months since May of 1987. These results indicated that K was progressing at an average of one month receptively for each month of instruction. This type of growth is considered to be good progress in language for any child, but is particularly impressive progress for a profoundly hearing-impaired child. In addition, the score obtained on the language development scale (20-22 months) was in excellent agreement with K's hearing age of 21 months. Results of the language development scale indicated that K did not label or identify common nouns considered to be age-appropriate (e.g. animals and household items).

SHORT-TERM GOAL:

K will identify an object given the label during structured therapy sessions with 80% accuracy (e.g. "Find the Cow."). NOTE: A gesture such as pointing or giving the
object to the clinician is considered to be an appropriate response. The identification of the object need not be an oral production of the label (for the object).

Expressive Language

On a parent-scored language development scale, K appeared to be between 20 and 22 months expressive in August, 1988. These results were in excellent agreement with her receptive language skills and her hearing age. Results of the expressive position of the language development scale indicated that K produced intelligible single word utterances.

K's spontaneous expressive language was subjectively judged to be "jargon-like" although she interjected actual words on occasion. According to parent report, K has an expressive vocabulary of nearly 70 words and "talks all the time."

SHORT-TERM GOAL:

K will imitate a two-word simple command using two familiar vocabulary items during structured therapy activities following the clinicians model with 80% accuracy (e.g. "Open up" or "Cookie, please").

4) Cognition

SHORT-TERM GOAL:

K will sort objects into two categories based on a primary attribute or feature in structured therapy activities with 80% accuracy.
E  Date of Birth:  August 24, 1979
(Chronological Age Nine Years, Five Months)

BACKGROUND

E was diagnosed as having a moderate, bilateral sensorineural hearing loss in April, 1982, at the age of two years, four months. The loss was thought to be hereditary since both mother and older sister have mild hearing losses. E was aided bilaterally with Oticon E27F ear level hearing aids all waking hours with no difficulty reported.

Due to her hearing loss and delayed speech and language development, E received speech therapy at East Stroudsburg University from June through August, 1982. She then attended Project Promise Nursery School with speech therapy provided through the school. In the 1985 school year E attended a regular kindergarten class. She received academic tutoring with the resource teacher every afternoon as well as speech therapy three afternoons a week. Last year E attended third grade in a regular classroom. She was seen for reading and saw a speech therapist three times a week for a half hour. She received unisensory therapy twice a week for a half hour at the Helen Beebe Speech and Hearing Center. According to parent report E has been doing "very satisfactory" work in fourth grade. She sees the school hearing therapist twice a week for a half hour and comes to the Beebe Center once a week for one hour.
**THERAPY SUMMARY**

Therapy focused on building vocabulary and included activities which involved categorization, sequencing, time concepts, story modeling and exchange of questions, retelling stories and games involving descriptive phrases. More refined articulation has been expected and interspersed throughout activities rather than through drills.

1) **Auditory Skills**

Based on interaction with the clinician during therapy, E's auditory skills appeared excellent. She infrequently asked for repetition of information for comprehension. However, E occasionally did not wait for an entire message to be completed before responding. As a result, E made a number of errors when completing activities involving oral directions.

**SHORT-TERM GOAL:**

E will follow oral commands up to four steps in length during structured activities with 100% accuracy. NOTE: 100% criteria was established as listening to an entire message, deemed a prerequisite for further language activities.

2) **Speech Skills**

E's speech was subjectively judged by this clinician to sound natural. Nasality and resonance were assessed to be
normal. E's speech was subjectively judged by this clinician to be 95-100\% intelligible in an unknown context. She demonstrated some distortion of sh, ch and /j/ and consonant blends st, str, sk, and skr during conversational speech.

**SHORT-TERM GOAL:**

E will correctly produce sh, ch, st, str, sk, skr and /j/ following the clinician's model in conversational speech during therapy sessions with 80\% accuracy.

3) **Receptive Language**

The **Comprehensive Tests of Basic Skills (CTBS)** (McGraw-Hill, 1981) was administered in April, 1988. Results of that test indicated that E demonstrated mastery of receptive language skills ranging from "partial knowledge" to the "mastery" level. E obtained a grade equivalency (GE) of 3.4 on vocabulary, 3.0 on reading comprehension and 3.8 on language mechanics (including pronouns, titles and comprehension of question forms). E's total battery grade equivalency score was 3.5 compared to her grade level of 3.7.

The **Test of Auditory Comprehension of Language-Revised (TACL-R)** (Carrow-Woolfolk, 1985) was administered on October 22, 1986. E obtained a percentile ranking of 23 which translated into an age equivalent score of six years, one
month to eight years, zero months on Word Classes and Relations; a percentile ranking of 31 which translated into an age equivalent score of seven years, three months to eight years, four months on Grammatical Morphemes; a percentile ranking of 33 which translated into an age equivalent score of seven years, five months to seven years, nine months on Elaborated Sentences with a total percentile ranking of 29 which translated into a total age equivalent score of seven years, three months to seven years, eight months. This placed E two to seven months above her chronological age of seven years, one month at the time of testing.

The Peabody Picture Vocabulary Test Revised - Form L (PPVT-R/FORM L) (Dunn and Dunn, 1981) was administered on May 18, 1988. E obtained a standard score of 76 and a percentile ranking of five which translated into an age equivalent score of six years, nine months compared to her chronological age of eight years, nine months at the time of testing. This indicated that E performed two years below her chronological age in receptive vocabulary skills.

**SHORT-TERM GOAL:**

E will define, in writing, five new vocabulary items per week assigned by the clinician. She will write a sentence using each vocabulary item correctly with 100% accuracy.
Expressive Language

The Structural Photographic Expressive Language Test-II (SPELT-II) (O'Hara Werner and Kreschick, 1983, 1974) was administered on March 3, 1987. E obtained a percentage correct score of 100 which indicated an age equivalent score of nine years, zero months to nine years, five months for expressive syntactical structures. This placed E between one year, six months to one year, eleven months above her chronological age of seven years, six months at the time of testing.

A spontaneous language sample was not obtained. However, E demonstrated some difficulty in formulating interrogative statements during conversational speech during a therapy session on January 11, 1989. For example, E demonstrated rising intonation only to indicate question forms rather than using an interrogative transformation of a statement (e.g. "He was going?" rather than "Was he going?"). No other syntactical difficulties were noted at that time.

SHORT-TERM GOAL:

E will correctly produce the question transformations was and were in conversational speech during therapy sessions with 80% accuracy.

4) Cognition
Cognition was not formally assessed by this clinician. Sequencing of events and logical thinking skills were targeted using games which involved reasoning and inferential thinking (e.g. Battleship or Clue by Milton Bradley).

SHORT-TERM GOAL:

E will increase the percentage of correct "guesses" offered while playing Clue with one other player during therapy sessions to 50% accuracy.

The behavioral goals suggested for both case profiles may be achieved using a variety of activities. Refer to Appendices A and C for specific activity suggestions.

A PROPOSED STUDY DESIGN TO DOCUMENT TREATMENT EFFECTIVENESS.

In order to document treatment effectiveness one may compare children who were trained following Auditory-Verbal behavioral goals to a group(s) who was trained under different therapy paradigms to determine whether behavioral changes observed are due to maturational factors or are a result of the treatment (Auditory-Verbal or other technique) applied. In addition, a control group would not receive treatment and the differences between the three groups could then be studied. A group study may yield pertinent information, but limitations exist.
For example, hearing-impaired individuals are not a homogeneous group and therefore matching subject variables is extremely difficult, especially regarding family dynamics and parenting factors. These factors prove hard to quantify (Ling and Ling, 1978). In addition, a large number of subjects would be required to draw significant conclusions from the data. Obtaining such a large sample of children to include in a study such as this may be extremely difficult if not prohibitive.

Single subject designs should provide researchers with a tool with which to examine treatment effectiveness in the hearing-impaired population. In addition, single subject designs may be replicated across subjects such that generality of results may be suggested from the individual to other persons (Hersen and Barlow, 1976). The following experiment using a single subject design is suggested for measuring treatment effectiveness. Child K (chronological age three years, one month) mentioned in the previous section will serve as the subject for the discussion of measuring treatment effectiveness.

A multiple baseline across behaviors with three phases including baseline, treatment and withdrawal (A-B-A) would be selected. For example, the speech goal for Child K will be the acquisition of Step 1 consonants /p, f, θ/ on the Ling Phonetic Level Evaluation (PLE). Baseline measurements
of performance would be obtained until a stable baseline is established.

A second, independent behavior which may be utilized in this design would be receptive vocabulary development. The number of receptive vocabulary items as represented by objects correctly identified within a closed set of five items will be calculated as a percentage correct score.

Once stable baselines (A phase) have been established for both behaviors the treatment phase (B phase) for speech skills may be initiated. During this phase receptive vocabulary development would be monitored (A phase) but no treatment condition would be applied to this behavior. Treatment would then be withdrawn and the speech behavior would continue to be monitored through generalization probes. During the withdrawal phase for speech skills, the treatment will be implemented on the second goal (receptive vocabulary development). The treatment paradigm for both behaviors would be consistent (A-B-A) except the treatment phase for each behavior would be staggered in time such that the subject would receive therapy throughout the course of the study. A distinct advantage of the multiple baseline design is that "It limits the practical and ethical problems posed by the absence of treatment that would otherwise occur..." (Barlow, Hayes and Nelson, 1984, p.225).

The length of time allotted for the treatment phase for each behavior would be based on the subject's progress over
time. That is, treatment would not be withdrawn until the subject obtained 80% correct on generalization probes.

**MEASUREMENTS.** Measurements of performance would be obtained on a weekly basis for all three phases (A-B-A) for both behaviors. The generalization probes administered for the acquisition of the Step 1 consonants /p, f, θ/ would consist of a set of five single words containing the target in the initial position for a total of fifteen words. A percentage correct score for each target consonant would be calculated. Generalization probes for receptive vocabulary development would consist of a set of four one-step commands in which each of the target vocabulary is the only novel item for a total of twenty probe items. A percentage correct score would be calculated for each target item. The percentage correct scores obtained for each target consonant and receptive vocabulary item in the generalization probes would be plotted for visual inspection and interpretation.

Interrater reliability would be established by videotaping the child and the clinician during the course of study. This measure would be obtained every third session across all three phases of the experiment. A second clinician, experienced in the administration and scoring of the generalization probes would view the videotape and score the child's responses for comparison with the original clinician's results. Reliability for scoring the child's
responses on the receptive vocabulary development probes would also be obtained. The second clinician should be a therapist with at least six months training using the Auditory-Verbal approach at the Helen Beebe Speech and Hearing Center. The second clinician would view the videotape and score the child's responses calculated as a percentage correct score.

The level of confidence in these results would be influenced by the number of times the study was replicated across different subjects. A greater number of replications of this study yielding similar results lends strength and credibility to the integrity of the design.

Standardized tests and a spontaneous speech and language sample would be obtained. New goals would be established and implemented based on these results. In addition, an annual conference between the clinician, clinical director and the child's parents would be conducted to discuss the child's present status, progress over the period and future goals.

As previously stated, no empirical research exists which isolates the Auditory-Verbal approach/techniques from other Oral methods. Results of a study of this nature, demonstrating treatment effectiveness and progress over time, would provide pioneering information on the effectiveness of the Auditory-Verbal approach. This, in turn, would contribute to the general body of knowledge and
literature regarding education options for hearing-impaired children.
CHAPTER SIX
SUMMARY AND CONCLUSIONS

In the literature presented, concepts on teaching strategies that are similar to those used in the Auditory-Verbal approach appear to provide effective results. For instance, auditory training has a positive effect on the use of the auditory channel. Children who experience auditory training become more "practiced listeners" than those children who are not taught in this manner. A number of studies document success in facilitating speech and language development using principles incorporated in the Auditory-Verbal approach. However, it must be noted that the Auditory-Verbal approach has not been studied exclusively. In order to support the assertion that the Auditory-Verbal approach is effective it must be empirically documented and compared to other methods in the literature as well as in case studies.

To more closely define the strengths and weaknesses of the Auditory-Verbal approach, a longitudinal study design is suggested. It would be appropriate to study Auditory-Verbally trained subjects systematically in the course of development. That is, a record of the subject's performance and progress should be kept at regular
intervals. A retrospective study may yield restricted information. It is necessary to utilize a prospective study design which may allow causal relationships to be drawn from the data. However, the variables involved in designing such a study are numerous. It is suggested that subjects trained using the Auditory-Verbal approach should be compared to subjects trained using other methodologies. In addition, it would prove advantageous to longitudinally compare Auditory-Verbal subjects to non-hearing-impaired subjects of the same age.

Advocates of the Auditory-Verbal approach argue that children trained using this approach narrow the gap that exists between chronological age and performance in speech and language skills with increased age. Therefore, one would expect older children to perform at a level closer to that of their hearing peers. Currently, no documentation in this area exists. A longitudinal study which compares the speech and language skills of Auditory-Verbal children and non-hearing-impaired children may supply useful information on this relationship.

It must be noted that a single subject design would allow comparisons to be drawn between treatment approaches and therefore provide immediate and pertinent information regarding treatment effectiveness. In much of the literature, oral training has been compared to other methods for facilitating speech and language development. An
overriding difficulty for the Auditory-Verbal approach is that oral training has not been isolated from strictly Auditory-Verbal programs. Therefore, research is necessary which parallels results from an oral training program and an Auditory-Verbal approach. Researchers must apply the scientific method of investigation to measure and document the strengths and weaknesses of the variety of educational programs available for hearing-impaired children.

In summary, controversy regarding the most effective approach for the education of hearing-impaired children remains. Regardless of the methodology utilized, severely and profoundly hearing-impaired children do not perform on a level commensurate with their hearing peers in speech and language development (Lane, 1976; Ling, 1984; Kretschmer and Kretschmer, 1978; Geers, Moog and Schick, 1984; Davis, Elfenbein, Schum and Bentler, 1986; Robinson, 1988; Musselman, Lindsay and Wilson, 1988). Further research is necessary to reveal which approach may provide the optimal benefit for hearing-impaired children. However, research results alone can not determine which approach will provide the maximum benefit for every child. The number of variables involved when considering program placement is great, including type and degree of the hearing loss, family preference, availability of services, family dynamics, and a host of variables associated with each individual child. The selection of the most appropriate educational program

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for the hearing-impaired child ultimately rests with child and his/her family. The clinician must serve as a source of information and guidance which may enable the child's family to make an informed and appropriate decision regarding their child's future educational placement.
APPENDIX A

TEACHING SUGGESTIONS

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Primary Goal: Cognitive and linguistic growth through audition. It must be kept in mind that the main concern is always the strategies your child employs for learning, although content is also extremely important. The following suggestions for specific areas to work on may be helpful. While some of the suggestions may not be applicable at the moment, they may be useful in the future. GOOD LUCK!

1. Special workbook. Use this notebook as a starting point for a new vocabulary, questions, etc. Unusual projects or hobbies should be documented in this book.

2. Buy several inexpensive workbooks. Have your child do one page each day.

3. Sentence memorization for pictures. Have your child remember three sentences for each picture.

4. Have your child tell a story about a specific picture.

5. Descriptive guessing games.

6. Direction games emphasizing prepositions.
7. Parts of objects - teach vocabulary for all parts of object.
8. Describe objects stressing descriptive adjectives (see, smell, taste, feel).
10. Tell your child a story and then show him pictures. Ask him about story. (For this task he should only listen - don't have him repeat the story.)
11. Sequence story.
12. Same and different. Why are objects different.
13. Keep adding new auditory tasks. Increase Auditory Memory!
14. Have your child repeat a story as it is told.
15. What are objects for?
16. Action game. Do a specific action and have him tell you what you are doing.
17. Name five things we can buy at the bakery, etc.

*Make sure he knows what is expected of him in each task. For instance, is he only to listen or only repeat, etc.

*Do not neglect routine work with vowel-consonant nonsense syllables. Vary intensity, duration and pitch.

*Stimulate questions.
Vocabulary that may be overlooked:

top          forward          beginning (end)
some, not many separate            never (always)
over          equal             zero
nearest       away from        left
row           few              third
center        most             inside
alike         corner           around
right         after            whole
every         side             behind
skip          backward         half
through       together         other
middle        in order         medium-sized
widest        next to          above
second        farthest         pair
different (same) between        least
as many        several
not first or last almost

*Remember to vary your presentation. Use words in many
different ways. Do not become "locked into" certain
sentence constructions.
APPENDIX B

IDEAL LISTENING CONDITIONS

Used with permission of the Helen Beebe Speech and Hearing Center.

Listening will be enhanced if you...

1. are very close to the child: 6 - 18 inches away from his microphone.
2. use a normal conversational tone, not too loud or too quiet.
3. use interesting inflectional patterns so he can pick up the melody of your speech.
4. tell him rather than ask him (unless you're sure he knows the answer). If he doesn't understand, show him and tell him again.
5. use short, simple phrases or sentences - if you use single words, immediately incorporate them into short phrases.
6. talk about the here and now - what he is doing, seeing, feeling, hearing, etc.
7. slow your rate of speech somewhat.
8. make a comment, pause and let his brain process what you have said before making another comment.
9. use normal gestures but not in excess and DO NOT POINT. (Eye clues are helpful and eye contact is
to be encouraged as it might be with any child, but be careful not to make it so helpful that listening is sacrificed.)

10. talk to him as well as for yourself. Model or expand his language.

11. use similar language in routine situations until you know he understands.

12. ask simple questions, remembering to supply the answer if needed.

It is easiest for a child to learn if he can predict what may happen. Routine and consistency are important to his understanding and development.

Help your child feel good about himself. Encourage him. Expect him to succeed. Minimize mistakes. Encourage his attempts at self-expression. He has the same needs, desires and frustrations as any other child.
APPENDIX C

PROGRESSION OF THERAPY ACTIVITIES

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All activities, etc. should be discussed and demonstrated before the child is required to make a choice given and auditory stimulus.

Always begin with a small number of objects/pictures, etc. (three or four). Continue to increase the number as the child can tolerate it (five, seven, ten, etc.).

I. Vocabulary Development

a. Identify picture/object given the label. (Where's the ball?)

b. Identify picture/object given a simple description including the label. (Throw the ball.)

c. Identify picture/object given a description without the label. (Find something that you throw.)

d. Associate another word in the stimuli. (Find a ball. It goes with a bat.)

e. Identify the picture/object given the associated word. (What goes with the bat?)

f. Identify, given a category description and category name. (Find a toy. It's something to play with.)

g. Identify, given the category name. (Find the toy.)
Games to develop vocabulary development:

Lotto games               Flashcards
Sticker pairs             Puzzles
Go Fish/memory games      Toys
Go Together cards         Junk Box

II. Directions

*Begin by teaching vocabulary as above using objects rather than pictures.

a. Start with familiar items and vary obvious directions (brush, milk, car—brush your hair, drive the car, etc.).

b. Increase the number of objects in the field (3, 5, 7, 10, etc.).

c. Give two directions using familiar objects (Brush your hair and drink the milk.).

d. Associate objects that can go together (Put the spoon in the cup, etc.).

e. Increase the number of objects that can be associated.

f. Include unpredictable directions (Put the brush in your pocket. Put the cat in the box, etc.).

g. Use three parts in a direction (Put the dog in the car and take him for a ride. Wash the kitty with the cloth.).

*Because the complexity of the direction has increased, drop back to directions that are predictable, then move on to ones that are not.
*Directions including time concepts. (First put the dog in the box, then put the horse in the basket.)

Materials for directions:

- animals and food
- people, toys, furniture, etc.
- puzzle pieces
- a junk box of objects from around the house

III. Prepositions

Early Stage: in  Stage 2: in front
on     behind
under  beside
Stage 3: above-over
        below-beneath
inside
outside

a. Teach these by using familiar objects and one preposition at a time. (Put the dog in the house.. spoon in the cup..cat in the basket.)
b. Proceed to "on" and "under" then mix them up.
c. Add "in front" and "behind."
d. Mix up all five.
e. Continue until you have worked on all the preposition words.
f. Always give the child the opportunity of playing teacher once he understands turn-taking and has some vocalizations.
IV. **Adjectives**--putting language together

a. Colors, size words such as big, little and numbers should be talked about as part of a language lesson.

b. Informally, playtime allows the best opportunity to introduce words such as sticky, soft, quiet, loud, heavy, etc.

*By working on these types of activities, expanding language around the home and thinking up new ways to use materials, the child will be exposed to language naturally.*
APPENDIX D

GENERAL RECOMMENDATIONS

Used with permission of the Helen Beebe Speech and Hearing Center.

HEARING AIDS

Check EVERYDAY (at least once) with a stethoscope or personal earmold. (See separate guidelines for hearing aid checks and trouble shooting.)

Aids should be worn during every waking moment.

Never allow the child to take aids off (without valid reason).

COMMUNICATION

Whenever possible, avoid visual cues (lipreading, gestures, contextual cues).

Cover your mouth, talk from beside or behind child. DO NOT ALLOW LIPREADING.

Speak clearly, emphasize key words--but not too much!

Provide silences for processing what you have said.

DON'T TALK TOO MUCH.

Do not repeat too much. (Child will otherwise expect repetition and learn not to listen the first time.)

Be natural. EXPECT A RESPONSE and provide time for that response.

Don't limit yourself to predictable language.
DAILY LESSONS

Establish routine for lessons: Same time--same place everyday.

Eliminate distractions:
   Table should be completely clear.
   Child should not face visually distracting area of the room.
   Siblings should not be allowed to interrupt (unless they are involved cooperatively in the lesson).
   Vary activities as much as possible.
   Always finish what you start (even if you have to speed it up).
   Finish an activity before the child tires of it.
   Reinforce success! (Be sure the child knows when he is right--and wrong!)
   Make activities fun but with clear expectations and limits.
   End on a positive note.
   You decide when the lesson is over. Actively dismiss the child. (Don't be tempted to go on--you want to end the lesson wanting more.)

MANAGEMENT

Do not allow the child to control an activity.
You determine what is acceptable behavior (and be strict); then IMMEDIATELY curb unacceptable behavior:
1st "offense": Say "no!" (very firmly) - define limit.

2nd "offense": "Do you want to go to the corner?" - define consequence.

3rd "offense": Follow through on consequence. This is **vital**! DO NOT give idle threats.

4th, 5th, etc: Follow through as many times as necessary to curb unacceptable behavior. (Reassess consequence if it is ineffective.)

Do NOT give child what s/he wants unless he has given you an appropriate, acceptable vocalization.

**CONSTANTLY INCREASE YOUR EXPECTATION LEVEL!**
SUGGESTED MATERIALS FOR GETTING STARTED

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doll furniture
family (small dolls)
cars, boats, planes, trains, etc.
small plastic animals (pets, farm, zoo)
puzzles with simple pictures
books with simple pictures and clear story line
"action" pictures
wind-up toys (a great attention getter)
stacking blocks or rings
plastic food (fruits, vegetables, mini groceries)
box of "junk"
  boxes (small), buttons, paper clip, pencil, spoon,
  fork, cup, pictures, string, whistle, ball, small toys,
  old jewelry - ANYTHING and EVERYTHING!
tape recorder and tapes
paper (plain, lined, colored)
crayons and pencils
"pop-up" toys
plastic beads
"playdough" and an assortment of cookie cutters
puppets
small blackboard and chalk
doll house
blocks
flash cards with simple pictures (good to have duplicate sets for pairs activities)
camera (Polaroid if possible) to take pictures of familiar places, people and special events - and not so special events, too!
small set of drawers filled with miscellaneous small objects and miniatures
simple gameboards
simple "lotto" games
musical toys
YOUR IMAGINATION!

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RELEASE OF INFORMATION

To Whom It May Concern:

I hereby authorize release of the following information regarding my child_________________________ to Catherine Lebahn for use in the preparation of a professional paper. Initials will be used in lieu of names to preserve professional confidentiality.

_____Speech/Language Evaluation and Reports

_____Psychological Reports

Academic Testing:

_____a. Standardized Achievement Tests

_____b. Grade Transcripts

_____Audiological Evaluation and Reports

_____Medical Records

_____Physical/Occupational Therapy Evaluation and Reports

_____Other, specifically:


Date:  Signature:

________________________________________________________________________

______________________________  __________________________

Parent/Legal Guardian
REFERENCES


Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Hearing-Impaired Children and Youth. Washington, D.C.: 
A.G. Bell Association for the Deaf, Inc.

NORTHCOTT, W.E. (1973) ed. The Hearing Impaired Child in a 
Regular Classroom: Preschool, Elementary, and 
Association for the Deaf, Inc.


NORTHERN, J. (1976) ed. Hearing Disorders. Boston: Little, 
Brown and Company.

Baltimore: Williams and Wilkins.

and Speech Discrimination by Hearing-Impaired Children. 
The Volta Review, 86, 2, 72-80.

Structural Photographic Expressive Language Test - II. 
Sandwich, IL: Janelle Publications, Inc.

PATERSON, M. (1986) Maximizing the Use of Residual Hearing 
with School-Aged Hearing-Impaired Students - A 

POLLACK, D. (revised 1985) Educational Audiology for the 
Limited Hearing Infant. Springfield, IL: Charles C. 

Presentations of the Test of Auditory Comprehension of 
Language to Hearing-Impaired Children. Language, Speech 
and Hearing Services in Schools, 19, 349-351.

The Volta Review, 78, 7, 324-328.

The Whitefriars Press Limited.

Communication on the Cognitive Development of Deaf 

ZWIEBEL, A., & MERTENS, D.M. (1985) A Comparison of 
Intellectual Structure in Deaf and Hearing Children. 