

**AUDITORY LEARNING MANUAL FOR
ENGLISH SPEAKING HEARING-IMPAIRED
CHILDREN**

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Certificate

This is to certify that the Dissertation entitled "AUDITORY LEARNING MANUAL FOR ENGLISH SPEAKING HEARING-IMPAIRED CHILDREN" is the bonafide work done in part fulfillment for the degree of Master of Science (Speech and Hearing) of the student (Register No. M 2K03).

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This is to certify that the Dissertation entitled "AUDITORY LEARNING MANUAL FOR ENGLISH SPEAKING HEARING-IMPAIRED CHILDREN" has been prepared under my supervision and guidance. It is also certified that this has not been submitted earlier in any other University for the award of any Diploma or Degree.

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Declaration

This dissertation entitled "AUDITORY LEARNING MANUAL FOR ENGLISH SPEAKING HEARING-IMPAIRED CHILDREN" is the result of my own study under the guidance of Dr. Asha Yathiraj, Reader & Head, Department of Audiology, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier at any other University for the award of any Diploma or Degree.

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Dedicated to

THE ETERNAL

POWER

&

MY PARENTS

*Who had given me the
sincerity, optimism and
straight forwardness
in my life*

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INTRODUCTION

"We live in a world of sound. We are surrounded by all kinds of sounds. We are regulated and also interrupted by sounds. Hearing-impaired individual lives within a world of sounds but are not fully part of the world. In this sense they are outsiders in a hearing world"(Huggins, 1971, pp.17). This statement emphasizes the importance of hearing. The reception and expression of the spoken linguistic code is primarily dependent on the intactness of the auditory modality. Lieberman (1984, cited in Laughton and Hasenstab, 2001) noted that, as humans, speech perception and speech production are our evolutionary inheritance. Spoken language is biologically determined human characteristic (Nelson, 1996, cited in Laughton and Hasenstab, 2001). Thus, newborns are prepared to analyze their world, including the language within the scope of their world.

Normal hearing children possess ability to learn to analyze complex auditory stimuli. The processing of such stimuli depends on their age & development level. The development of auditory processing depends on the children's experience, auditory events, the analyses made by their auditory systems will provide the substance for initial cognitive representation of sounds. This would perform the criteria against which new information is compared so that new or revised knowledge can occur. Thus, learning is a crucial factor in effective auditory processing.

Ling (1984, cited in Ling, 1986) recommended the term 'auditory learning' rather than auditory training. This term was preferred because formal auditory training may make the child conscious and make him perceive the activity as an exercise to satisfy others (external demands). However, they should actually develop the activities, as far as possible, unconsciously. This would enable them to refine their perceptions of acoustic events that naturally surround them. Thus, the essential of auditory learning is learning through listening and not just learning to listen.

Erber (1982) defined auditory learning as a process by which the hearing-impaired person develops his/her auditory perceptual skills through guided listening practice. Auditory learning activities help the hearing-impaired client:

- 1) to exploit all available auditory information during speech perception
- 2) to participate more effectively in conversations where only acoustic information is available
- 3) to recognize acoustic cues made newly available by amplification devices and/or
- 4) to recognize the perceptual limitations of one's own auditory system.

Thus, the focus of early auditory learning and teaching of hearing-impaired infants is on maximizing the use of audition rather than vision. This is simply because audition is the most efficient and appropriate sense modality for speech reception & for developing functional verbal communication skills (Pollack, 1964). The hearing-impaired child must be taught to use listening skills as a tool for effective communication to meet the challenges of adult life in the "real world". This indicates the need for a therapy manual, which would be useful in developing auditory learning skills of hearing-impaired children.

Aim of the study

Aim of this study is to develop an auditory learning manual for the English speaking hearing-impaired children and to check its usefulness on the target population.

Need for the study

The auditory mechanism is the most efficient sense organ for speech perception and comprehension. Hence, hearing-impaired children should be trained to listen and perceive auditory signal. A manual on auditory learning would help train the hearing-impaired listeners utilize their residual hearing to the maximum.

It is important to select speech sounds for auditory learning based on the frequency as well as temporal characteristics of speech sounds. This is necessary to ensure that training is given to enable the hearing-impaired child to perceive the speech sounds having different frequency characteristics and temporal characteristics.

There is a need to have a series of lessons, varying in complexity. This would enable hearing-impaired children perceive simple as well as complex speech signals. Further, if the activities are given in a hierarchy, starting with simple ones and progressing towards more complex tasks, the child is likely to perform better.

Any manual giving guidelines for therapy will be useful for the professionals because of the following reasons:

1. The therapist would have ready-made material and would not need to spend time to prepare lessons for each session.
2. As the manual is based on the frequency characteristics of speech sounds, the therapist would be able to select the most appropriate material for individuals having different configurations.
3. The scoring schedule used in the manual, will enable the therapist to maintain a more objective record of the child's progress.

Thus, this systematic readymade material will be useful for the professionals who are involved in training the hearing-impaired children.

REVIEW OF LITERATURE

The use of audition is the fastest, easiest, and most direct means of acquiring spoken language. It is auditory input, in the presence of communicative experience, which plays the primary role in the speech and language development of hearing children. In order to perceive (recognize) and produce (express) speech patterns, the child must have adequate, if not consistent, exposure to oral language in a context which is meaningful to him (Paterson, 1982). Hirsh (1970) suggested a model of speech reception learning/training. This model suggests the following:

- (1) Auditory speech reception requires the processing of sequential yet overlapping stages of detection, discrimination, identification and comprehension of meaningful verbal stimuli.
- (2) The development of these auditory skills is maximized when combined with motor speech production by the child.
- (3) Normal stages of oral language acquisition should be followed in the programming of the meaningful training stimuli.

Thus, to rehabilitate a child with hearing loss, training needs to be given to improve both the speech and language abilities. Some auditory training programs give more emphasis on audition and speech while others incorporate speech and language training along with auditory training. The former mainly emphasizes on improving listening skills while the latter aims at improving both language as well as listening skills. The auditory training/ learning programs for children, described in the literature, are classified under the above two categories and are described in the section that follows.

I. Programs that focus on audition and speech:

1. Carhart's approach
2. Traditional approach (Erber & Hirsh, 1978)
3. The Ling speech curriculum
4. An analytic distinctive feature approach to auditory training

II. Programs which focus on audition, speech and language:

1. Acoupedic method
2. Cognitive auditory approach
3. Auditory-verbal therapy

I. Programs which focus on audition and speech:

These programs give more emphasis to the utilization of residual hearing in order to improve the individual's communicative function. Their goal is not to improve hearing; rather, the objective is to improve communication by increasing the contributions of the auditory channel to message reception and comprehension. These programs are detailed in the following section.

1. Carhart's approach

Carhart (1947) was one of the first audiologists to describe a systematic program of auditory training for children. He viewed the goals of auditory training as aiding in:

1. developing command of the language
2. instructing the child to speak and
3. encouraging better adjustment to the hearing world.

His auditory training program comprises the following four major stages:

Stage 1: Sound awareness:

The goal of this stage is for the child to recognize when a sound is present and to attend to it. The child should be surrounded with sounds that are related to daily activities and that are clearly audible.

Stage 2: Gross sound discrimination:

The child is trained to distinguish between highly dissimilar nonspeech sounds, such as bells, drums, cymbal, and whistles. In addition, animal sounds or other environmental noises are often employed. Training at this stage includes discrimination of several parameters of sound, such as intensity (loud versus soft), duration (long versus short), and frequency (high versus low pitch). Once the child can discriminate among highly dissimilar sounds, finer discrimination for each of the acoustical parameters is carried out.

Though this stage is labelled as discrimination task, it is mainly identification that is done at this stage.

Stage 3: Broad discrimination among simple speech patterns:

By now, according to Carhart (1947), the child should be aware that sounds differ and should be ready to apply this knowledge to the understanding of speech. He recommended that the clinician begin by teaching the child to distinguish among vowels or familiar meaningful phrases that are sufficiently different to minimize confusion. "Show me the dog", and "Give me the baby", are examples of utterances that might be used. From the example, it is evident that though he termed the task as "discrimination" the activity involved identification.

Stage 4: Fine discrimination of speech:

The child is trained to focus on subtle differences between similar vowel and consonant sounds. Ideally, the child should be trained to recognize subtle phonemic differences, learn a large vocabulary of spoken words, and be able to follow connected discourse. As with the previous stage, this stage also includes discrimination and identification.

Carhart's approach has been criticized for several reasons. The inclusion of environmental sound discrimination has received much criticism. Asp (1973, cited in Chermak, 1981) asserted that this type of discrimination task does not prepare the child for linguistic discrimination he/she will need in perceiving speech. Ling (1974) concurred and indicated that the perception and recall of verbal and nonverbal materials involves different processes. Speech and nonspeech materials are likely to be processed in different hemispheres of the brain (Ling, 1976). Perceptual and memory strategies appropriate for one type of sound are inappropriate for the other (Ling, 1976).

Ling (1978) contends that little or no amelioration of speech discrimination can be expected to result from training with gross nonverbal sounds. However, there are experts who support the use of nonverbal material. Nonspeech signals are used as training material due to the ease with which children respond to and manipulate noise makers (Rodel, 1978). Knowledge of environmental sounds is important in its own right as these sounds often provide warning of impending danger (Withrow, 1974).

2. Traditional approach:

Several authors (Ling, 1976) have described four levels of audition that contribute to the perception of conversational speech: detection, discrimination, identification, and comprehension. Erber and Hirsh (1978) suggested an auditory training program in which increasingly complex speech stimuli are presented for processing through the four levels of audition. The stimuli are speech elements, syllables, words, phrases, sentences and connected discourse. The results are recorded in the auditory skills matrix, shown in table 1.

Table 1 : Auditory skills matrix (Erber, 1982)

		Speech stimulus					
		Speech Elements	Syllables	Words	Phrases	Sentences	Connected discourses
Response Task	Detection						
	Discrimination						
	Identification						
	Comprehension						

Detection requires the child only to determine if sound is present or absent, however, discrimination requires that the child be able to distinguish one sound from another. To carry out this task, the child needs to understand the concept of "same" and "different" and he/she should be able to generalize sounds into categories. During the identification task, the child has to recognize the speech signal and be able to identify it in some way such as pointing to a picture, writing the word or syllable heard, or repeating the stimulus. Comprehension involves understanding of the message on a cognitive and linguistic basis. The child demonstrates comprehension by answering questions or performing appropriate tasks.

Mastery of the lower levels of detection and discrimination is considered to be a prerequisite for successful performance at the higher levels of identification and comprehension. Children should progress through the four levels and the various stimulus complexities, at their own rate, and to the extent dictated by the status of their residual hearing.

Although the terms used to label the first two skills are similar to the stages proposed by Carhart (1947), there are fundamental differences. The detection level in the matrix does not correspond to the awareness stage as proposed by Carhart, because it focuses on speech reception rather than awareness of sounds in general. In

addition, there is no corollary in the Erber and Hirsh (1978) paradigm for the development of gross discrimination of nonspeech sounds as proposed by Carhart (1947). Further, unlike the Carhart approach (1947), this approach does not suggest progressing from gross discrimination or identification to fine discrimination or identification. No emphasis is given to the acoustical aspects of speech.

3. The Ling speech curriculum:

Ling (1976) developed a speech training system that has the following characteristics: (1) is based upon the acoustic characteristics of speech, (2) emphasizes listening aided by amplification, (3) involves segmental as well as supra-segmental emphasis, and (4) recognizes the need to attain vocal system, respiration and motor control coordination (phonetic level) prior to the use of speech in meaningful contexts (phonological level).

Ling (1976) emphasized that speech should be taught primarily at the phonetic level, rather than at the phonological level. At the phonetic level, the child gains experience and supra-segmental features of speech (pitch, loudness, and rhythm), which are without meaning. The child must experience these patterns and combinations of patterns until they become automatic. Finally, the use of these patterns in meaningful expression is fostered (the phonological level).

The Ling program is theoretically based and appropriately sequenced. The major weakness of this program may lie in the transition from the non-meaningful use of speech to the meaningful use of speech. Unlike the Carhart's approach, the Ling program uses only speech stimuli. Ling (1976) reported that there are marked differences in the way speech and nonspeech sounds are processed and that no benefits can be expected from training with nonverbal sounds. While training in the detection and identification of nonspeech sounds may be worthwhile for other reasons, present evidence indicates that it is not essential for auditory learning of language.

It is evident that the major emphasis of the above mentioned auditory training programs was to primarily improve the auditory perceptual skills. Unlike Carhart's approach in which nonverbal materials were used, Erber & Hirsh (1978) and Ling (1976) used only verbal material.

4. An analytic distinctive features approach to auditory training:

Voicing cues available through lip reading contain reliable information for identification of place of articulation, but do not provide sufficient acoustic cues for auditory distinction among homophonous consonants which differ only by voicing or nasality features (man-pad) (Owens, 1978). Erber (1972) indicated that if persons can be trained to recognize the voicing and nasality cues, their auditory consonant recognition abilities were improved and could more reliably supplement visual information. That is, severely hearing-impaired individuals can combine the auditory (manner) and visual (place) information "to achieve high comprehension of speech" (Erber, 1974, pp.178).

This program was recommended for clients with severe to profound hearing losses who derive some benefit from acoustic amplification and have very poor hearing discrimination for sentence-length material, poor speech, and intermediate skills in speech reading. This type of client did not obtain enough auditory and visual information to effectively carry on conversations without difficulty and could not reasonably benefit from associational or synthetic approaches.

The training program consisted of over 200 exercises for each of three auditory features: voicing, nasality, and sibilancy. The goal of the program is to develop auditory manner recognition in single syllable words to supplement visual place cues. Each level began with a same/different discrimination task and progressed to a short-term memory task, to a long-term memory task, and finally to identification drills. The subject was required to repeat the task and continuous exercises in the level until a criterion of 80% or better was attained.

On the basis of an individual's performance on the Phoneme Identification Test, a unique listening program was developed to build skills in the area which indicated a specific deficiency (in one or more of the categories of voicing, nasality or sibilancy). That is, by examining an error matrix for a given stimulus, the percent of correct identifications of a specific phonemic as well as auditory category performance was determined. For example, if the listener was given the stimulus /da/ and his responses were /ta, fa, and ka/, the individual would begin training in the voicing category. The curriculum provided the following materials for each category:

- a. pre-test/post-test (recorded on cassette)
- b. series of task drills (recorded on cassette)
- c. answer lists
- d. columns to record task scores

The words used in these materials were taken from vocabulary lists, which did not exceed an eighth grade reading level. Words whose pronunciation differed from the way they were spelled were noted on each exercise sheet as they occurred. Each unit provided consonant training separately in the initial and final position of words.

The subjects received feedback after every drill by correcting the exercise themselves. The answers on the subject worksheet were covered during practice and tests. The listener was required to repeat a task until the criterion level was achieved. The subject then continued on another drill task in that level. If a subject's pre-test score on one level within a distinctive feature category met this criterion level, the participant moved to the next level and did not practice the task.

The design of these training tasks allowed the listener to advance through progressively more difficult drills as consonant recognition ability improved. The hierarchy for the program began by asking the subject to decide if two words were the same or different. With the answers covered or folded back, the individuals checked their responses after each item or upon completion of the task. The voicing category

included drills separated into tasks with consonants first in the initial position and then in the final position at the same/different level. When an individual became competent at this level, he/she advanced to drills containing short-term retention tasks. At this level, the participant heard five words. The first word, which was printed on the exercise sheet, was the same as one of the next four words. The listener's task was to determine which of the subsequent four words heard was the same as the given first word. The same practice words in the materials were used through all of the four levels of practice difficulty.

The next level of practice, the long-term retention drill, built on the skills acquired in both the same/different and short-term memory levels. In this task, one given target word was printed, and the listener heard four words. The subject chose which of the four words was the given printed target word. That is, the listener compared the heard words to stored memory of the correct pronunciation.

The identification task drills were designed to be the most difficult. The individual listened to one word and identified it out of a set of four similar printed foils.

Hutchinson (1990) evaluated this approach on 26 subjects. Results showed that the subjects improved on tests given before and after practice within each task level.

II. Programs which focus on audition, speech and language:

These programs emphasize the relationships among listening, language development, speech perception, speech production and academic learning. Such programs, which focus on audition, speech and language, are detailed in the following section.

1. The Acoupedic method:

The term "Acoupedic" was first used by Dr. Henk Huizing of Holland in 1959, to describe the procedures, which had been developed empirically to meet the needs of young children whose hearing losses, had been diagnosed at an early age, and who were being fitted with powerful hearing aids. Contending that the use of audition is hampered when attention is divided between two or more sensory inputs, Pollack (1964) proposed a unisensory approach toward education and habilitation of hearing-impaired children. The acoupedic approach recommends the following:

1. Hearing impairment must be detected early in life.
2. Binaural hearing aids should be selected as soon as the hearing impairment is diagnosed.
3. The child must be given the "fullest opportunity" to use residual hearing, hence visual stimuli are not provided initially. In other words, lip reading cues available to the child are kept minimal. This does not mean that the child never has the opportunity to see the speaker's face; it means that no formal lip reading instruction is employed and the child is expected to develop his auditory capacity in preference to his visual skills in developing speech and language.
4. Normal patterns of language are stimulated through the visual auditory channel, eliminating the need to present language visually.
5. A favourable attitude must be established for auditory learning. In short, the people who are involved must believe that the child can hear and learn to communicate normally.
6. Parents must become the primary teachers, assuming responsibility for providing intensive auditory stimulation more or less continuously.

The following are the listening skills to be worked on:

- a. Awareness of sounds : loud then quiet sounds
- b. Attending to sounds : increasing the range

- c. Responding to sounds
- d. Localizing sounds
- e. Discriminating between sounds
- f. Developing auditory feedback mechanism

The auditory training activities used by Pollack and others who advocate intensive auditory stimulation are similar to those described by Carhart (1947) and to the paradigm proposed by Erber & Hirsh (1978), with some additions. Emphasis is placed on the development of language through the auditory modality. The child develops an auditory feedback loop, which is demonstrated and refined by repeated imitation of auditory stimuli. Pollack does not suggest an age beyond which introduction of the acoupedic approach may not be feasible, but the procedures are designed for infants and toddlers.

2. Cognitive auditory approach:

Grammatico (1975) proposed an auditory approach similar to that of Pollack's (1964) in which auditory training is not viewed as an activity to be set apart from other educational procedures. The auditory skills that are developed in her approach include sound awareness, discrimination, localization, imitation of intonational patterns and memory.

These skills are similar to those described by other authors, but the manner in which they are reinforced and the purpose given by Grammatico for their development is unique. She views audition as the basis for development of cognitive skills, and the materials and procedures employed are designed to foster thinking as well as listening skills. Children are encouraged to classify and group stimuli, to determine similarities and differences, and to generalize information from one situation to other. In so far as traditional activities for identification, discrimination, and localization of sound can be used to enhance thinking skills, they are included in

activities throughout the day. Visual stimuli are not emphasized and their use is mildly discouraged.

3. Auditory-Verbal Therapy (AVT):

Auditory-verbal practice is the application of techniques, strategies, conditions, and procedures that promote optimal acquisition of spoken language through listening, which becomes a major force in nurturing the development of the child's personal, social, and academic life. When auditory-verbal practice is performed with the necessary thoughtfulness, expertise, guidance and love, many children who are deaf or hard-of-hearing learn to develop exceptional conversational competence (Estabrooks, 1994 cited in Estabrooks, 2000).

Goals of auditory-verbal therapy for infants and toddlers may include drawing attention to sounds in the environment, developing the learning to listen to sounds and songs, babbling, learning early vocabulary and beginning small conversations. Goals for older children may include developing speech and auditory skills in the presence of noise, enhancement of voice quality, conversational repair strategies, paraphrasing, story telling and retelling, higher level auditory/cognitive skills, and learning school-based subject material. All goals are tied to the developmental stage and hearing age of each child and are incorporated in structured activities, in ordinary daily routines, in song, and most importantly, in play.

(Estabrooks, 1998, cited in Estabrooks, 2000) gave the following hierarchy of listening skills which is a continuum - Detection Discrimination Identification

Comprehension.

Detection:

The child is trained for the following in detection task:

- > Spontaneous awareness of sound
- > Selective attention to sound

- > Conditioned response to sound
- > Detection and identification of a variety of noise-makers, environmental sounds, learning to listen to sounds, and sounds of the Ling's six-sound test.

Discrimination:

In this task, the child learns to attend to differentiate between and among sounds and to respond differently to different sounds. Same/different tasks are primarily used for clarification of identification and comprehension errors. Specific discrimination activities are generally used for remediation, such as confusion of singular and plurals and place, manner, and voicing errors.

Identification:

Identification refers to the ability to label by repeating, pointing to, or writing the speech stimulus heard. The tasks involve identification of suprasegmentals and segmentals. Suprasegmental tasks are enumerated below:

- > Prosodic features of speech (duration, rate, pitch, intensity, stress, intonation))
- > Recognition of male, female and child voices.
- > More learning to listen to sounds and word approximation.

Segmental tasks include the following:

- > Phonemes by manner.
- > Imitating a variety of phonemes.
- > Words varying in number of syllables.
- > One-syllable words varying in vowel and consonant content.
- > Develop memory and expressive production for one word.
- > Recognition of familiar expressions and directions.

- > Words in which the consonants are identical and the vowels differ
- > Words in which the vowels are identical and the consonants differ in manner and place of articulation and in voicing
- > Words in which the vowels are identical and the consonants differ only in manner of articulation
- > Words in which the vowels are identical and the consonants differ only in voicing

Comprehension:

Comprehension refers to the ability to understand the meaning of speech by answering questions, following an instruction, paraphrasing, or participating in a conversation.

The child's response must be qualitatively different than the stimuli presented, i.e., the child has to understand and respond appropriately, not necessarily by repeating the stimuli. Telephone work, listening to a taped signal and listening with competing stimuli are commenced when the children are confident listeners. Continuous speech tracking is used with older children.

Children with hearing impairment who are taught through the auditory-verbal approach can develop language abilities very similar to their peers with normal hearing (Clark, 1989, cited by Robertson and Flexer, 1993). They are learning more than just speaking skills; they are acquiring natural, well-formed and standard language skills through repeated contact with speakers using language as do people with normal hearing. In the auditory-verbal method, the child's therapist alerts the child's attention to speech sounds, causing her or him to discriminate among the many phonemes of language (Ling, 1989). The child relies upon her or his residual hearing, which is augmented by well-fitted hearing aids, because the parents and therapist do not provide speech reading or other visual cues (Pollack, 1985). Apart from lesson times, parents, other family

members, teachers and friends are encouraged to converse with the child in very normal ways. In addition to the language abilities, children taught according to the auditory-verbal method are almost always mainstreamed in schools and extracurricular activities with children who have normal hearing ((Pollack, 1985). Surrounded by auditory language, the child is constantly listening to sounds and assigning meaning to them within the mainstream of standard language usage. What is heard becomes what the child can speak. While the process may take longer for a child with hearing impairment, such language acquisition appears to be similar to the language acquisition of children with normal hearing (Ling, 1989).

Thus it can be seen from this literature that auditory training/learning programs can emphasize mainly the utilization of residual hearing (Carhart's approach, traditional approach, Ling's program and Analytic distinctive feature approach) or emphasize the interdependent relationship that exists between auditory processing and language learning (Acoupedic method, Cognitive auditory approach and AVT). Though there are differences in these approaches, the integral components of rehabilitation programs for children are to achieve adequate speech perception skills, speech production skills, language skills, and adjustment to amplification and educational achievement. The following section shows the effectiveness of auditory training/learning on speech perception, speech production and language abilities.

Effectiveness of auditory training/learning

(i) Effect on speech perception

Itard (1821, cited in Chermak, 1981) was the first researcher who discovered that regular exposure to loud sounds improved speech perception in hearing-impaired children.

Bode and Oyer (1970) conducted a study to find the effectiveness of four approaches to train the hearing impaired 32 adults having mild sensori-neural hearing loss with gradual-to-steep decline (15-20 dB per octave) for frequencies above 500 Hz participated in the short-term auditory training program in two listening conditions (S/N varied, S/N ratio constant) and in two response formats (open set and closed set). Results indicated a statistically significant increase in auditory discrimination in both the listening conditions. Similarly the two types of training material brought about equivalent increase in overall speech discrimination.

The speech recognition performance of twenty adults with mild to moderate sensori-neural hearing impairments was studied by Rubinstein and Boothroyd (1987). The results revealed a small, but statistically significant increase in speech recognition performance subsequent to intensive auditory training for a month.

Wedenberg (1954, cited in Berg, 1970) also noted that even profoundly hearing-impaired children could benefit from auditory training. He taught three such children, beginning at 1½ to 2½ years of age, to perceive auditorily dynamic, temporal, and certain phonetic features of speech. Daily stimulation, an auditory unisensory approach, and carefully selected speech signals were employed. All of the children developed spontaneous speech and a listening attitude after many months of training.

Improvement in speech perception for implanted children using oral communication than who used total communication has been reported by Berliner,

Tonokawa, Dye and House, 1989; Osberger et al., 1991; Meyer, Svirsky, Kirk and Miyamoto, 1998.

(ii) Effect on speech production and perception.

There are several studies to show that after a brief period of auditory training, there is improvement both in terms of speech production and perception.

Hudgins (1953) conducted auditory training using profoundly hearing-impaired children as subjects. He noted that these children, who were 8-12 years of age, improved in speech perception and speech intelligibility following two-year periods of academic instruction in which high quality group amplification equipment was employed.

Similar improvement in speech perception and speech intelligibility has been reported by Kelly (1953, cited in Berg, 1970) utilized listening drills in communication training for hard-of-hearing children from public schools. He noted that speech perception scores typically improved about 20 percent following a six-week remedial program, which included daily auditory training. The speech intelligibility of children also improved. This improvement in speech intelligibility might be attributed to a combination of transfer effect from perception to production and/or to practice in speaking during remedial periods.

Research by Larson (1970, cited in Berg, 1970) confirms the hypothesis that speech perception and production improves with auditory training. He conducted auditory training for a 9-year old boy having a relatively flat binaural hearing impairment of 92 dB. The instruction was conducted during a short period on a daily basis for 10 weeks. During the first four weeks, the subjects demonstrated between members of many pairs of isolated consonants and vowels. During the next six weeks, there was a similar improvement in the auditory recognition of selected words. In addition, pre and post spectrographic comparison of training words

uttered by the subject showed corresponding improvements in accuracy of speech production.

Improvement in speech perception and speech intelligibility for the implanted children using oral communication was reported by Archbold, Nikolopoulos, Tait O'Donoghue, Lutman and Gregory (2000). They studied 46 children at the three-year, 26 at the four-year and 20 at the five-year intervals. All these children received cochlear implants before the age of seven. With auditory training all these children showed improvement in speech perception and speech intelligibility.

(iii) Effect on language:

There are certain studies which reported improvement in the language of the hearing impaired children subsequent to auditory training/learning.

Geers and Moog (1989) involved 100 hearing-impaired young people aged 16-17 years who followed an auditory-oral approach. All the subjects had a hearing loss greater than 85 dBHL. The results revealed an average reading age of 13-14 years, only 15% having a reading age of around 8 years or less. 80% of subjects demonstrated proficiency with spoken English from both a language and speech intelligibility point of view.

Harrison, Simpson and Stuart (1991, cited in Lynas, 2000) reported on the written language of twenty-eight orally educated children aged 5-17 years with hearing losses greater than 90 dB HL. Results indicated that twenty-two of the children produced written language that was judged to demonstrate 'a fluent and expressive use of complex language allowing easy extraction of meaning'. Clearly, twenty-two out of twenty-eight were achieving genuine literacy.

Improvement in language understanding, vocabulary level and voice production after a short period of auditory training has also been reported by Imai and Hoshi (1966, cited in Oyer and Frankmann, 1966). Musselman, Lindsay and Wilson (1988) studied the language skills of 139 preschool children with severe to profound hearing loss. They distinguished the language skills of children in total communication program from those in auditory/oral programs. These researchers found that those children in total communication programs scored higher on measures of receptive language and mother-child communication, whereas children in auditory/oral programs had better spoken language.

Thus, it can be seen that speech perception, speech production and language abilities of a hearing-impaired individual can be improved by intensive auditory training/learning. Through this method, an individual can be taught to make maximum use of his/her residual hearing.

METHOD

The auditory learning manual has been recommended for English speaking hearing-impaired children whose hearing loss has been identified as early as by one year of age and have been fitted with appropriate amplification devices. The study was conducted in the following two stages:

Stage 1: Development of material for the auditory learning manual.

Stage 2: Checking the usefulness of the manual by administering it on English speaking hearing-impaired children.

Stage 1: Development of material for the auditory learning manual.

This auditory learning manual was divided into four sections (Sections I, II, III & IV), which progressed from the simplest level of auditory processing to a more complex level. The four sections were:

Section I - Detection

Section II - Discrimination

Section III - Identification

Section IV - Comprehension.

After section I, either section II or section III can be worked on. For the development of this manual, special attention was given to the frequency and duration characteristics of speech sounds.

Classification of phonemes based on the frequency:

Vowels and consonants can be classified as being low, mid or high frequency depending on the concentration of energy. This classification also depends on the frequency where the major cues to identify them are present.

Peterson & Barney (1952) gave the first and second formant frequencies of the vowels. Based on the frequency, the vowels were classified as low frequency, mid frequency and high frequency vowels as given in table 2.

Table 2 . Classification of vowels based on frequency characteristics

Low frequency vowels	Mid frequency vowels	High frequency vowels
/o/	/a/	/i/
/u/	/æ/	/ɪ/
/ʊ/		/d/
/ɔ/		/ɛ/

Jorgensen (1967) classified consonants as high, mid and low frequency sounds based on their frequency components. Bilabials and nasals were classified as low frequency consonants, while velars and retroflex as mid frequency, and dentals and palatals as high frequency consonants. Lisker (1957, cited in Borden and Harris, 1980) gave the second and third formant frequencies for /r/, /l/, /j/, and /w/ which are major cues used to distinguish between them. Based on the frequency concentration of the speech sounds, given by the above two studies, the classification of consonants was made, as given in table 3.

Table 3 : Classification of consonants based on frequency characteristics

Low frequency consonants	Mid frequency consonants	High frequency consonants
/p/	/k/	/t/
/b/	/g/	/d/
/m/	/r/	/t/
/n/		/tʃ/
/ŋ/		/dʒ/
/w/		/ʃ/
		/z/
		/f/
		/v/
		/s/
		/z/
		/h/
		/l/
		/j/
		/d/

Selection of material for the manual:

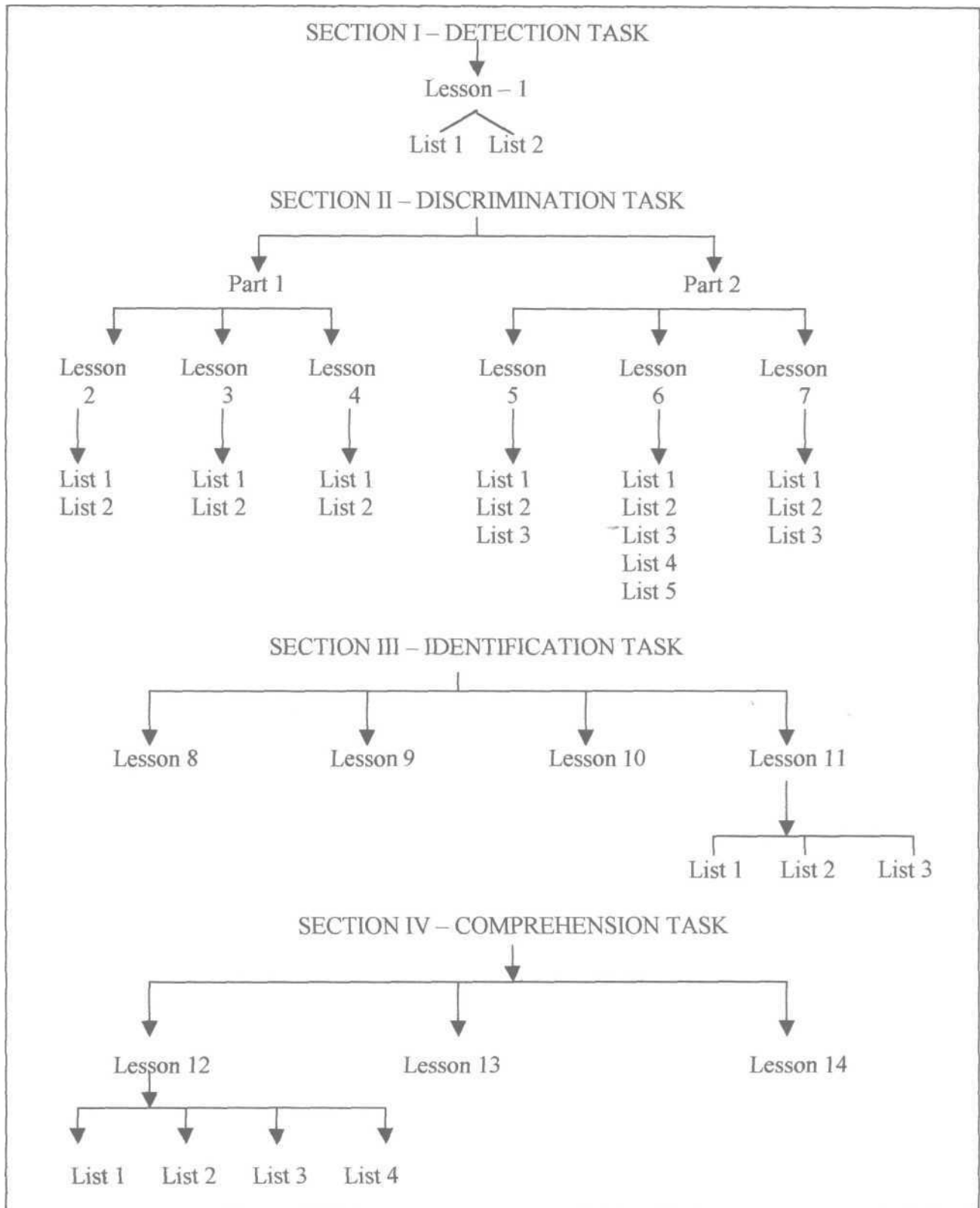
To develop the items in the lists, meaningful words comprised of low, mid and high frequency consonants and vowels were taken from the English books of preschool, grade 1 and grade 2 children. Simple phrases, sentences and stories were also constructed. To confirm that these items were familiar, a pilot study was conducted. Twenty normal children in the age range of 4-6 years from different English medium schools were considered as subjects.

During testing, each child was asked to describe the words read out by the tester or point to the picture of the word, depending on the abilities of the children. The familiarity of phrases, sentences, and stories were also checked in a similar fashion. The responses were noted down as correct or incorrect. Only those words, phrases, sentences and stories with 80-90% correct response were selected for the manual, while the rest were discarded.

Contents of the manual:

The manual contains four sections. Each of these sections comprise of one to six lessons. Four sections and the lessons under these sections are outlined in figure 1.

Figure 1: Flowchart of the contents of the manual



A brief outline of the sections and the lessons within each of them are given below.

SECTION I: DETECTION

Lesson- 1 : Detection of the verbal stimulus

SECTION II: DISCRIMINATION

Part 1: Discrimination of varying lengths of utterances

It has three lessons.

Lesson - 2 : Discrimination between monosyllabic words (Vs.) 6-9 syllabic phrases/sentences

Lesson - 3 : Discrimination between 3-4 syllabic words/phrases (Vs.) 6-8 syllabic phrases/sentences

Lesson - 4 : Discrimination between monosyllabic words (Vs.) trisyllabic words

Note: Lessons 2,3 and 4 each has two lists.

Part 2 : Discrimination between words based on the frequency characteristics

It has three lessons.

Lesson - 5 : Discrimination between words which differ in the frequency characteristics of both consonants and vowels

List 1 - High frequency consonant and High frequency vowel
(Vs.)

Low frequency consonant and Low frequency vowel

List 2 - Low frequency consonant and High frequency vowel
(Vs.)

High frequency consonant and Low frequency vowel

List 3 - Low frequency consonant and Low frequency vowel
(Vs.)

Mid frequency consonant and Low frequency vowel

Lesson - 6 : Discrimination between words which differ in the frequency characteristics of vowels

List 1 - Low frequency vowel (Vs.) High frequency vowel

List 2 - Mid frequency vowel (Vs.) High frequency vowel

List 3 - Mid frequency vowel (Vs.) Low frequency vowel

List 4 - Low frequency vowel (Vs.) Low frequency vowel

List 5 - High frequency vowel (Vs.) High frequency vowel

Lesson - 7 : Discrimination between words which differ in the frequency characteristics of consonants

List 1 - High frequency consonant (Vs.) Low frequency consonant

List 2 - Mid frequency consonant (Vs.) Low frequency consonant

List 3 - High frequency consonant (Vs.) Mid frequency consonant

SECTION III: IDENTIFICATION

Lesson - 8 : Identification of simple words which differ in terms of the frequency characteristics

Lesson - 9 : Identification of minimal pairs which differ in the frequency characteristics of vowels

Lesson - 10 : Identification of pair of words which differ in the frequency characteristics of consonants

Lesson - 11 : Identification of key words in a sentence context which differ in the frequency characteristics

List 1

Identification of key word with low frequency consonant
(Vs.)

Identification of key word with high frequency consonant

List 2

Identification of key word with low frequency consonant
(Vs.)

Identification of key word with low frequency consonant

List 3

Identification of key word with high frequency consonant
(Vs.)

Identification of key word with high frequency consonant

SECTION IV: COMPREHENSION

Lesson - 12 : Comprehension of related questions

Lesson - 13 : Comprehension of commands

Lesson- 14 : Comprehension of unrelated questions

Note: There are four lists in lesson 13

DESCRIPTION OF EACH LESSON

SECTION I: DETECTION

At this level of auditory processing, the child has to indicate the presence of verbal stimulus.

Lesson 1: Detection of the verbal stimulus

There are two lists in this lesson each of which consists of fifteen items. The material in these lists consists of words/phrases of varying length. The length ranges from monosyllabic words to four syllabic phrases. The lists consist of high, mid and low frequency words and phrases.

The clinician says a phrase/word and the child responds to the presence of the verbal stimulus by pointing to a picture indicating a cartoon speaking. At random intervals, the clinician has to remain silent presenting no signals. The child would have to point to either the picture of a cartoon depicting silence or remain silent.

E.g. 1: Clinician says /lock/.

The child has to respond by pointing to the picture indicating a cartoon speaking.

E.g. 2: Clinician maintains silence.

The child has to point to the picture of a cartoon depicting silence or remain silent.

SECTION II: DISCRIMINATION

At this level of auditory processing, the child has to differentiate between two verbal stimuli. The child's task is to indicate whether the two stimuli are same/different.

Part 1; Discrimination of varying lengths of utterances

It contains three lessons (lessons 2, 3 & 4), which are arranged in the order of difficulty ranging from gross discrimination to fine discrimination.

Lesson - 2 : Discrimination between monosyllabic words (Vs.) 6-9 syllable phrases/sentences

This lesson has two practice items and two lists with 10 items in each. In both the lists, there are equal numbers of same and different items. The order of these items is random in the lists.

The clinician says the pair and the child responds indicating whether the two pairs presented are same/different by pointing to the picture with same length trains or to the picture with different length trains.

E.g.1: Clinician says /car/ - /He is clapping his hands/.

The child has to point to the picture where both the trains are of different lengths.

E.g. 2: Clinician says /book/ - /book/

The child has to point to the picture where both the trains are of same length.

Lesson - 3: Discrimination between 3-4 syllabic words/phrases (Vs.) 6-8 syllabic phrases/sentences

This lesson consists of two practice items and two lists each of which has eight items. There are equal numbers of same and different items in both lists. These items are arranged in random manner.

The clinician presents the pair and the child responds by indicating whether the pair is same/different in terms of their length. The child has to pick up two small pencils when the pair is same and two pencils of different length when the pair is different.

E.g. 1: Clinician says /close your eyes/ - /He is sleeping on the bed/.

The child has to pick up two pencils of different lengths.

E.g. 2: Clinician says /A big blue ball/ - /A big blue ball/.

The child has to pick up two pencils of same length.

Lesson - 4: Discrimination between monosyllabic words (Vs.) trisyllabic words

There are two practice items and two lists in this lesson. Each list consists of ten items. As with lessons 2 and 3, both the lists have equal number of same and different items, which are arranged randomly.

The clinician says a pair of words and the child responds by making two toy dolls jump over the two single hillocks in the picture if

both are same. If both the words are of different length, then the child responds by making one doll jump over single hillock and the other doll jump over the two hillocks in the picture.

E.g. 1: Clinician says /food/ - /food/.

The child has to make the dolls jump over the similar looking hillocks in the picture.

E.g. 2: Clinician says /afternoon/ - /ant/.

The child has to make one doll jump over the single hillock and the other doll over the double hillock in the picture.

Part 2 ; Discrimination between words based on the frequency characteristics

It has three lessons (lessons 5,6 and 7).

Lesson - 5 : Discrimination between words which differ in the frequency characteristics of both consonants and vowels

This lesson has two practice items and three lists for therapy. Each list has twelve items where the pairs of words differed in the frequency characteristics of both consonants and vowels. Within these twelve items, six have same frequency characteristics and six have different frequency characteristics. All the items are arranged in a random manner. Examples of the items used in lists 1,2 and 3 are given below.

List 1 - High frequency consonant and high frequency vowel
(Vs.)

Low frequency consonant and low frequency vowel

E.g: /zip/ - /boot/

List 2 - Low frequency consonant and high frequency vowel
(Vs.)

High frequency consonant and low frequency vowel

E.g: /pig/ - /suit/

List 3 - Low frequency consonant and low frequency vowel
(Vs.)
Mid frequency consonant and low frequency vowel
E.g: /boot/ - /root/

The clinician says the pair of words. The child responds by showing the set with similar pictures if the pair of words is same. If the pair of words is different, then the child responds by showing the set with different pictures.

E.g. 1: Clinician says /feet/ - /feet/.

The child has to show the set with similar pictures.

E.g. 2: Clinician says /boat/ - /sheet/.

The child has to show the set with different pictures.

Lesson - 6: Discrimination between words which differ in the frequency characteristics of vowels

This lesson incorporates two practice items and five lists for therapy. Each list has eight pairs of items where the minimal pairs differ only with respect to the vowels. Out of the eight pairs of items in each list, four pairs have the same vowel frequency and four pairs have different vowel frequency. The pairs of items are arranged in a random manner. Example of the items given in each list is as follows:

List 1: Low frequency vowel (Vs.) High frequency vowels.

E.g: /boot/ - /beat/

List 2 - Mid frequency vowel (Vs.) High frequency vowel

E.g: /sad/ - /seed/

List 3 - Mid frequency vowel (Vs.) Low frequency vowel

E.g: /boot/ - /board/

List 4 - Low frequency vowel (Vs.) Low frequency vowel

E.g: /bin/ - /bean/

List 5- High frequency vowel (Vs.) High frequency vowel

E.g:/bat/-/boot/

The clinician says the pair of words and the child responds by showing two scales, which are similar or dissimilar depending on whether the pair of words is same/ different.

E.g: 1: Clinician says /see/ - /see/.

The child has to show the scales, which are similar.

E.g: 2: Clinician says /boat/ - /beat/.

The child has to show two scales, which are dissimilar.

Lesson - 7 : Discrimination between words which differ in the frequency characteristics of consonants

In this lesson there are two practice items and three lists for therapy. Each list has eight items with four items having minimal pairs differing in terms of the frequency characteristics of the consonants. The other four pairs have the same words. These items are arranged in a random manner in all the lists. An example of the task used is given below.

List 1 - High frequency consonant (Vs.) Low frequency consonant

E.g: /fat/ - /bat/

List 2 - Mid frequency consonant (Vs.) Low frequency consonant

E.g: /cone/ - /bone/

List 3 - High frequency consonant (Vs.) Mid frequency consonant

E.g: /hut/ - /cut/

The clinician says the pair of words and the child responds by sticking two similar coloured bindis in circle A, if the words are same. If the words are different, the child has to stick two different coloured bindis in circle B.

E.g. 1: Clinician says /fat/ - /bat/.

The child has to stick two different coloured bindis in circle B.

E.g. 2: Clinician says /cat/ - /cat/.

The child has to stick two same coloured bindis in circle A.

SECTION III: IDENTIFICATION

In this section, the child is taught to identify the verbal stimulus presented. It has four different lessons i.e., lessons 8 to 11. Lessons 8 to 10 have one list each while lesson 11 has three lists. The lessons vary in terms of frequency characteristics of the phonemes.

Lesson - 8 : Identification of simple words which differ in the frequency characteristics

This lesson includes two practice items and fifteen items for therapy. Within the fifteen items, five are low frequency words, five are mid frequency words and five are high frequency words. These words are arranged in a random manner. Each item has a picture representing it.

The clinician says the word and child responds by repeating it or by pointing to the picture of that word.

E.g: Clinician says /sheep/.

The child has to respond by repeating the word or by pointing to the picture of/sheep/.

Lesson - 9 : Identification of minimal pairs which differ in the frequency characteristics of vowels

This lesson has one practice item and a list of twelve items. Each pair of word in the list differs in terms of the frequency characteristics of the vowels. Out of twelve items, four word pairs differ in terms of low frequency vowel, four word pairs in terms of mid frequency vowel and four word pairs in terms of high frequency vowel.

The clinician says the pair of words. The child responds by repeating it or by pointing to the pictures representing these words.

E.g: Clinician says /wheel/ - /wall/.

The child has to repeat the words or point first to the picture of /wheel/ and then to the picture of /wall/.

Lesson - 10 : Identification of pair of words which differ in the frequency characteristics of consonants

This lesson consists of one practice item and a list of 15 items. Each pair of words in the list differs in terms of the frequency characteristics of the consonants. The table 4 gives the contents of the list in terms of the frequency characteristics. All the items in the list are randomly distributed.

Table 4 : Break up of number of items and their frequency distribution.

No. of items	Description
3	Low frequency consonant (Vs.) High frequency consonant
3	Mid frequency consonant (Vs.) High frequency consonant
3	Low frequency consonant (Vs.) Low frequency consonant
3	Low frequency consonant (Vs.) Mid frequency consonant
3	High frequency consonant (Vs.) High frequency consonant

The clinician says the pair of words. The child responds by repeating it or by pointing to the pictures representing these words.

E.g: Clinician says /goat/ - /boat/

The child has to repeat these words or point to the picture of/goat/ first and then to the picture of/boat/.

Lesson - 1 1 : Identification of key words in a sentence context which differ in the frequency characteristics

This lesson has one practice item and three lists each of which has ten items. The three lists vary with reference to the frequency characteristics of the key words. Details of these are as follows:

List 1: Identification of key word with low frequency consonant (Vs.)

Identification of key word with high frequency consonant

E.g: He is bathing
He is sleeping.

List 2: Identification of key word with low frequency consonant (Vs.)

Identification of key word with low frequency consonant

E.g: She is drawing a black dog.
She is drawing a brown dog.

List 3: Identification of key word with high frequency consonant (Vs.)

Identification of key word with high frequency consonant

E.g: The girl is eating chips.
The girl is eating toffees.

The clinician has to say the pair of sentence. The child has to point to the pictures representing these sentences.

E.g: Clinician says "/He is sleeping/ - /He is eating/".

The child has to point first to the picture representing /He is sleeping/
and then to the picture representing /He is eating/.

SECTION IV: COMPREHENSION

In this section, the child has to understand the spoken verbal stimuli and carry out an appropriate activity. This section has three lessons, which includes comprehension of commands, related questions and unrelated questions.

Lesson - 12: Comprehension of related questions.

There are four simple stories in this lesson. Each story has five questions, which the child has to answer after having heard the story. A series of sequential pictures depicting the stories may be used to make the child comprehend the story, if required. However, while asking the questions no visual cues are to be given. An example of the questions used is as given below:

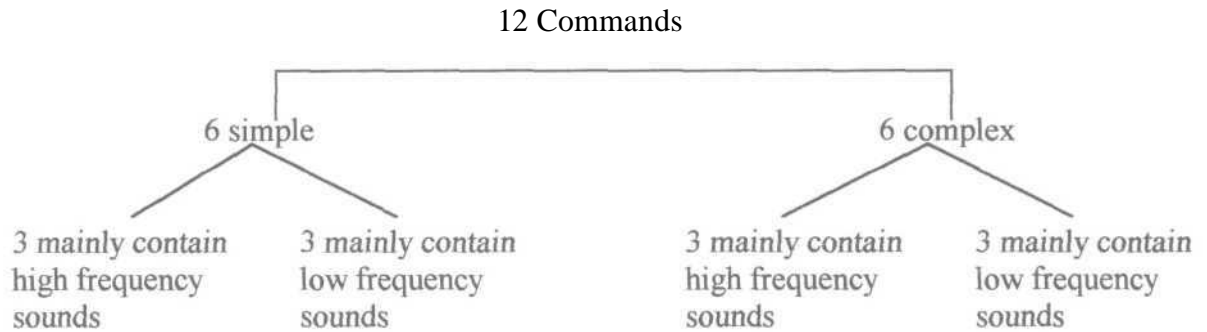
E.g: The clinician asks /which was the bird in this story? /

The child has to respond by saying /crow/.

Lesson - 13: Comprehension of commands

This lesson includes one practice item and twelve commands. The contents of the lesson are enumerated in figure 2.

Fig. 2: Flow chart of contents of comprehension of command



The clinician says the command and the child enacts the command.

E.g: Clinician says /shake your hands/.

The child has to shake his hands.

Lesson - 14: Comprehension of unrelated questions

This lesson has ten unrelated questions. The child's task is to answer these questions, which are asked one-by-one. The question can be repeated and rephrased in case the child does not answer it the first time. If the child is unable to answer an open-ended question, four multiple choices can be given. The child has to respond by telling the appropriate answer or by pointing to the picture representing the correct answer.

E.g: Clinician asks "Where does man live?"

The child has to say "House" or point to the picture of "House" among four multiple choices.

Stage 2: Checking the usefulness of the manual by administering it on English speaking hearing-impaired children.

After the development of the manual, eight English hearing-impaired children were selected for checking the usefulness of the manual. The criteria for the selection are as follows:

- Awareness of speech at normal conversational level (approximately 40-45 dB HL) with their prescribed hearing aid.
- The child should have been taught English.
- The age of intervention should be less than 2 years.
- The child should have undergone therapy for a minimum period of 6 months.
- The child should have a minimum language ability of 4-5 years. This was checked by administered the test, scales of early communication skills (SECS) (Moog & Geers, 1975).

Eight children in the age range of 4-13 years were selected. They were divided into two groups based on their age. The younger age group had an age range of 4-8 years while the older age group had an age range of 8-13 years. Four of the children wore binaural behind-the-ear (BTE) hearing aids and remaining four wore binaural body level hearing aids. All of them had congenital severe to profound sensorineural hearing loss. The age of intervention for these children ranged from 3 months to 2 years. The child had undergone therapy for varying duration. It ranged from a minimum period of 1 year to a maximum period of 6 years.

The manual was administered on each child individually in a quiet room, free from distraction. The number of sessions varied between 5-10, depending on the cooperation and ability of the child. The responses of each child was noted which were later analyzed across the different tasks. A descriptive report is given, regarding their performance. Depending on the performance, modifications will be incorporated in the manual which will be given in the Appendix.

RESULTS AND DISCUSSION

A descriptive report regarding the responses of the children who were administered the auditory learning manual is given in this section. In addition, the mean score, range and percentage of response the subjects got on each lesson are reported. A comparison is also made between the performance of the four younger age group (age range 4-8 years) and four older age group (age range 8-12 years) in all the tasks of the manual. The above is described for the four sections, which contain fourteen lessons.

SECTION I: DETECTION

Lesson -1 : Detection of the verbal stimulus

There was no marked difference in performance between the younger age group and older age group. The younger age group obtained a mean of 14.5 (99.5%) **and a** range of 13-15 while the older age group obtained a mean of 15 (100%). This reveals that in a detection task, hearing-impaired children as young as four years of age are able to do as well as older children, having a similar problem.

It was observed that subjects preferred to respond by remaining silent when there was no stimulus rather than pointing to the picture of the cartoon depicting silence.

SECTION II: DISCRIMINATION

Part 1; Discrimination of varying lengths of utterances.

There are three lessons (lessons 2, 3 & 4) in this part, in which the stimuli vary in their lengths of the utterance. The scores of both the groups in these lessons are given in table 5.

Table 5: Discrimination scores based on varying lengths of utterances

Lesson Number	Lesson Name	Younger age group		Older age group	
		Mean	Range	Mean	Range
2	Discrimination between monosyllabic words (Vs.) 6-9 syllabic phrases/ sentences	8.77 (87.5%)	7-10	9.5 (95%)	8-10
3	Discrimination between 3-4 syllabic words/phrases (Vs.) 6-8 syllabic phrases/ sentences	7.25 (72.5%)	5-8	7.25 (72.5%)	5-8
4	Discrimination between monosyllabic words (Vs.) trisyllabic words	7.25 (72.5%)	5-8	7.25 (72.5%)	5-8

Table 5 reveals that there was no marked difference in performance between the younger age group and older age group. The fact that all the subjects were able to score more than 70% in this part indicates that hearing-impaired children perceive durational cues relatively with greater ease. This is in accordance with the findings of Erber (1977, cited in Revoile, Pickett, Holden and Talkin, 1982) and Godfrey and Millay (1978) who reported that temporal cues are perceived with greater ease than spectral cues by hearing-impaired.

It was observed that all the children needed extra explanation with a practical demonstration using pictures, to understand the task of discrimination. The older age group needed relatively less explanation than the younger age group.

Part 2: Discrimination between words based on the frequency characteristics

There are three lessons in this part (lessons 5,6 & 7) in which the stimuli differ in terms of the frequency characteristics of the speech sounds. Since the discrimination task had been explained in the previous task, they did not need much explanation to carry out these lessons. The performance of the subjects in these lessons is described in the following section.

Lesson - 5: Discrimination between words which differ in the frequency characteristics of both consonants and vowels

There are three lists in this lesson. The performance of both the groups varied depending on the frequency characteristics of the speech sounds. The scores obtained by the children in all the three lists are given in table 6.

Table 6 : Discrimination scores based on the frequency characteristics of both consonants and vowels

List Number	Lesson Name	Younger age group		Older age group	
		Mean	Range	Mean	Range
1	Discrimination between high frequency consonant and high frequency vowel (Vs.) low frequency consonant and low frequency vowel	12 (100%)	12	12 (100%)	12
2	Discrimination between low frequency consonant and high frequency vowel (Vs.) high frequency consonant and low frequency vowel	11 (91.6%)	10-12	9.5 (79.16%)	8-12
3	Discrimination between low frequency consonant and low frequency vowel (Vs.) mid frequency consonant and low frequency vowel	11 (91.6%)	10-12	9.75 (81.25%)	7-11

Table 6 reveals that both the groups performed equally well in list 1, indicating their ability to easily carry out a gross discrimination task. However, in list 2 and 3 there is a difference in performance between both the groups. The younger age group showed a superior performance over older age group. This could be attributed to their good listening skills for fine discrimination in frequency. The poorer performance of the older age group could be due to the late onset of training (5-7 ½ years of age) for speech perception skills in contrast to the younger age group children. This indicates the need to start auditory listening activities as early as possible.

Lesson - 6 : Discrimination between words which differ in the frequency characteristics of vowels

This lesson consists of five lists, which are arranged hierarchically starting with gross discrimination and progressing to fine discrimination of vowels. Table 7 gives the performance of both the group of children in these lists.

Table 7 : Discrimination scores based on the frequency characteristics of vowels

List Number	Lesson Name	Younger age group		Older age group	
		Mean	Range	Mean	Range
1	Discrimination between low frequency vowel (Vs) high frequency vowel	8 (100%)	8	7.5 (93.5%)	7-8
2	Discrimination between mid frequency vowel (Vs) high frequency vowel	8 (100%)	8	6.75 (84.4%)	6-8
3	Discrimination between mid frequency vowel (Vs) low frequency vowel	8 (100%)	8	6.75 (84.4%)	6-8
4	Discrimination between low frequency vowel (Vs) low frequency vowel	7.5 (93.5%)	6-8	6.75 (74.4%)	6-8
5	Discrimination between high frequency vowel (Vs) high frequency vowel	7.5 (93.5%)	6-8	6.75 74.4%	5-8

As with lesson 5, in this lesson also, two of the older children exhibited difficulty in the fine discrimination task. In list 2, these two children had difficulty in discriminating between a high frequency vowel and a mid frequency vowel (eg: // (Vs.) /ae/). Similar observation was noted in list 3 also. In list 5, two of older children and one of younger child had difficulty in discriminating between high frequency vowels such as /i/, // and /I/. This is in accordance with the findings of Revoile and Pickett (1982) who reported that vowels with higher frequency formants are difficult to perceive. Poor perception of /il, // and /I/ could also be due to the poor discrimination of the second formant in individuals with severe to profound sensori-neural hearing loss (Pickett et al., 1972).

Lesson - 7 : Discrimination between words which differ in the frequency characteristics of consonants

The three lists in this lesson are arranged in a hierarchical manner, progressing from gross discrimination to fine discrimination. The scores of both the groups in the three lists are given in table 8.

Table 8 : Discrimination scores based on the frequency characteristics of consonants

List Number	Lesson Name	Younger age group		Older age group	
		Mean	Range	Mean	Range
1	Discrimination of words with high frequency consonant (Vs.) low frequency consonant	8 (100%)	8	6 (75%)	4-8
2	Discrimination of words with mid frequency consonant (Vs.) low frequency consonant	7.5 (93.75%)	6-8	6.5 (81.25%)	5-8
3	Discrimination of words with high frequency consonant (Vs.) mid frequency consonant	7.75 (96.87%)	7-8	6.5 (81.25%)	6-7

As with lesson 6, the younger children outperformed the older children. This could be due to their early training in speech perception skills and hence their good listening skills in contrast to the older age group. Two of older children and one of younger child had difficulty in perceiving high frequency consonants, especially, the fricatives like /s/ and /f/. This could be attributed to the lower amplitude of these consonants. Pittman and Stelmachowicz (2000) had reported restricted range of audibility for fricatives due to their lower amplitude thus making it difficult to perceive by the hearing-impaired. Similarly, Dubno and Levitt (1981) had also reported that hearing-impaired listeners experience difficulty in identifying the fricatives.

It was also observed that older children, who relied on visual cues for perception, performed poorer in lists 2 and 3, indicating poor fine auditory discrimination skills.

They were unable to discriminate between speech sounds, which show subtle differences in their frequency characteristics.

E.g.: mid frequency consonant (Vs.) low frequency consonant,
mid frequency consonant (Vs.) high frequency consonant.

In contrast, children who relied primarily on their auditory abilities to perceive speech were able to carry out the fine discrimination task.

SECTION III: IDENTIFICATION

Lesson - 8 : Identification of simple words which differ in the frequency characteristics

In this lesson, both the groups scored above 80% with the younger age group outperforming the older age group. The younger age group obtained a mean of 14.5 (96.6%). The scores ranged from 13-15. The older age group obtained a mean of 12.5 (83.3%) and a range of 10-15. The older children probably had more errors on account of their poor fine discrimination skills.

Lesson - 9 : Identification of minimal pairs which differ in the frequency characteristics of vowels

The younger age group scored a mean of 23.5 (97.9 %) and a range of 22-24 whereas older age group scored a mean of 21.5 (89.58 %) and a range of 17-24. As seen in lesson 6, the subjects exhibited difficulty in fine discrimination of vowels (e.g. /l/ vs //). These vowels have similar second formant frequency. Pickett et al. (1972) had reported that second format region of vowel sounds is not clearly discriminable to severe to profound sensorineural hearing loss listeners. Also, Owens, Talbott and Schubert (1968) had reported more error probabilities for the vowel // which is seen in this group of children also.

Lesson - 10 : Identification of pair of words which differ in the frequency characteristics of consonants

The younger Children obtained a mean of 27.75 (92.5%) with a range of 21-30. This is higher in comparison to older children who scored a mean of 26 (86.6%) with a range of 24-28. Three subjects (two from the younger age group and one from the older age group) exhibited difficulty in the fine differentiation task. As the frequency contrast decreased they had greater difficulty identifying the items. Phonemes that had more contrast were identified more easily. Hence these subjects required greater training to be able to differentiate between fine frequency variations.

Lesson -11 : Identification of key words in a sentence context which differ in the frequency characteristics

The three lists in this lesson are arranged hierarchically. The scores of both the groups in these three lists are given in the table 9.

Table 9 : Identification scores of keywords in a sentence context which differ in the frequency characteristics.

List Number	List Title	Younger age group		Older age group	
		Mean	Range	Mean	Range
1	Identification of key word with low frequency consonant (Vs) Identification of key word with high frequency consonant	19.75 (98.7%)	19-20	17.25 (86.25%)	11-20
2	Identification of key word with low frequency consonant (Vs) Identification of key word with low frequency consonant	19.75 (98.7%)	19-20	19.5 (97.5%)	18-20
3	Identification of key word with high frequency consonant (Vs) Identification of key word with high frequency consonant	19.5 (97.5%)	18-20	18.75 (93.75%)	15-20

As can be seen from the table 9, the younger age group obtained higher scores when compared to the older children. This was similar to the results of the previous lessons. This could be attributed to their better fine discrimination skill. The analysis of errors also revealed that the phonemes that were misperceived were the same as that seen in discrimination task. The overall performance of the two groups was better when compared to the previous lessons involving identification tasks. This may be due to the additional semantic cues present in the sentence, which made the task easier for them.

SECTION IV: COMPREHENSION

Lesson -12 : Comprehension of related questions

The older children were able to respond correctly to all the questions when visual cues were given. However, without visual cues they scored a mean of 2.5 (50%). In the younger age group, only two of the children responded correctly and they scored a mean of 3.5 (70%). The other two younger children could not carry out the activity as they had not been trained in this task.

Lesson -13 : Comprehension of commands

This lesson consists of six simple and six complex commands. Of the eight children, only three younger and two older children were able to carry out the task. The mean and scores of the younger & older children who could able to carry out the task was 12 (100%) and 10 (83.3%) respectively. All these children exhibited difficulty in carrying out the complex commands whereas they were able to perform the simple commands. However with practice they were able to carryout the complex commands.

Lesson - 14 : Comprehension of unrelated questions

In this lesson, only one old child and two younger children answered the questions. The older child scored 9/10 (90%) while the younger children scored 7/10 (70%). The other children were not able to carry out the activity due to their lower language abilities when compared with the children who performed the activity.

This indicates that these auditory learning activities have to be done along with other training activities.

Summary of findings

It can be seen in general that the easier tasks such as detection tasks were formed well by both the younger and older children. As the activities got more complex, the younger children tended to perform better than the older children. This could be because the auditory verbal philosophy has been used more intensively with the younger children, than with the older children. The older age group has been trained mainly using a multi sensory approach. Hence, they relied more on visual cues during the activities.

The performance of both the groups was better in identification task than the discrimination task. This could be attributed to the availability of semantic cues in identification task. During the identification tasks the children had to point to pictures of the words they had to identify. Such pictures were not utilized during the discrimination tasks.

The performance of both the groups in the comprehension task was poorer when compared with other tasks. The older children were able to do the comprehension task only with the visual cues and additional explanation. Most of the younger children found this task rather difficult.

Based on the performance of the children in all the tasks of the manual the following modifications were incorporated in the manual:

- > Since all the children performed relatively well in the task of discrimination of lengths of utterances, one more lesson was included in the manual. The lesson involved discrimination of minimal pairs, which differ in their vowel length. This was done to increase the complexity of the task.

- > In the identification tasks, the stimuli can be presented either in pairs or one by one depending on the auditory memory of the children.

The manual contains activities that can be carried out for hearing-impaired children of any age group. This manual will help the hearing-impaired children to perceive the different aspects of speech like spectral and temporal which will in turn improve their speech production also. It will be better if the activities are started as early as possible, so that the children can make best use of their residual hearing at a much earlier age. These activities along with the activities for language and cognitive improvement will enhance the communication abilities of the hearing-impaired children.

SUMMARY AND CONCLUSION

Auditory learning is an important aspect in aural rehabilitation program. The activities in auditory learning help the hearing-impaired individual to perceive the different parameters of speech, which in turn improve their speech production skills. (Hudgins, 1953).

The present study aimed at developing auditory learning manual for English speaking hearing-impaired children. This manual is recommended for the hearing impaired children who have been identified preferably as early by one year of age and have been fitted with appropriate amplification devices. The study was conducted in the following two stages:

Stage 1: Development of material for the auditory learning manual.

Stage 2: Checking the usefulness of the manual by administering it on English speaking hearing impaired children.

Stage 1: Development of material for the auditory learning manual

To develop this manual, phonemes were classified based on their frequency characteristics. Meaningful words, phrases, sentences and stories taken from the English books of preschool, grade 1 and grade 2 children were utilized to construct the manual.

To confirm that these items were familiar to young children, a pilot study was conducted on twenty normal hearing children in the age range of 4-6 years. The medium of instruction of these children was English. Only the items that were familiar to 80-90% of the children were selected for the manual.

The manual contains four sections. Each of these sections comprise of one to six lessons. In total, there were fourteen lessons. Each lesson had up to five lists. The number of lists ranged from 1-5.

Section I dealt with detection of verbal stimuli.

Section II was designed to train the children to discriminate speech utterances that varied either in terms of temporal aspects or frequency.

Section III involved training the children to identify words that varied in terms of the frequency characteristics of the vowels or consonants.

Section IV included comprehension tasks.

The lessons within each of these sections varied in complexity, progressing from simple to complex activities.

For each lesson, practice items, lists, material required for the activity, instruction to the clinician, instruction to the child, scoring system and reinforcement are suggested.

Stage 2: Checking the usefulness of the manual by administering it on English speaking hearing-impaired children

After the development of the manual, it was administered on eight English speaking hearing impaired children in the age range of 4-13 years. The subjects were divided into two groups based on their age. The younger age group had an age range of 4-8 years while the older age group had an age range of 8-13 years. The number of sessions for each child varied between 5-10, depending on the cooperation and ability of the child. The responses of each child were noted and were analyzed in terms of mean score, range and percentage of response. A comparison was also made between the performances of the two groups in all the tasks of the manual.

A report was given regarding their performance. The results revealed that younger children performed better than older children in most of the tasks. This could be because the auditory verbal philosophy has been used more intensively with the younger children. The older children had been training mainly using a multi-sensory approach. Hence, they relied more on visual cues during the activities. The performance of both the groups was well in detection task. Temporal discrimination was found to be easier than discrimination between stimuli that varied in terms of frequency. The performance of both the groups was better in the identification task than the discrimination task. This could be attributed to the availability of semantic cues in the identification task. The performance of both the groups in the comprehension task was poorer when compared with other tasks. The older children were able to do the comprehension task only with the visual cues and additional explanation. Most of the younger children found this task rather difficult. This could be because of their lower language level when compared with the older children.

Based on the performance of the children in all the tasks of the manual the following modifications were incorporated in the manual.

- > One more lesson was included in the task of discrimination of lengths of utterances. This lesson involved discrimination of minimal pairs, which differ in their vowel length.
- > In the identification tasks, the stimuli could be presented either in pairs or one by one depending on the auditory memory of the children.

Recommendations:

- 1) It is recommended to start the activities as early as possible for making best use of the child's residual hearing.
- 2) **Auditory** learning activities along with the language and cognitive training will enhance the communication abilities of the hearing-impaired children.
- 3) The activities in the manual can be carried out for hearing-impaired children of any age group who require such training.
- 4) Similar auditory learning manual can be developed in other Indian languages.

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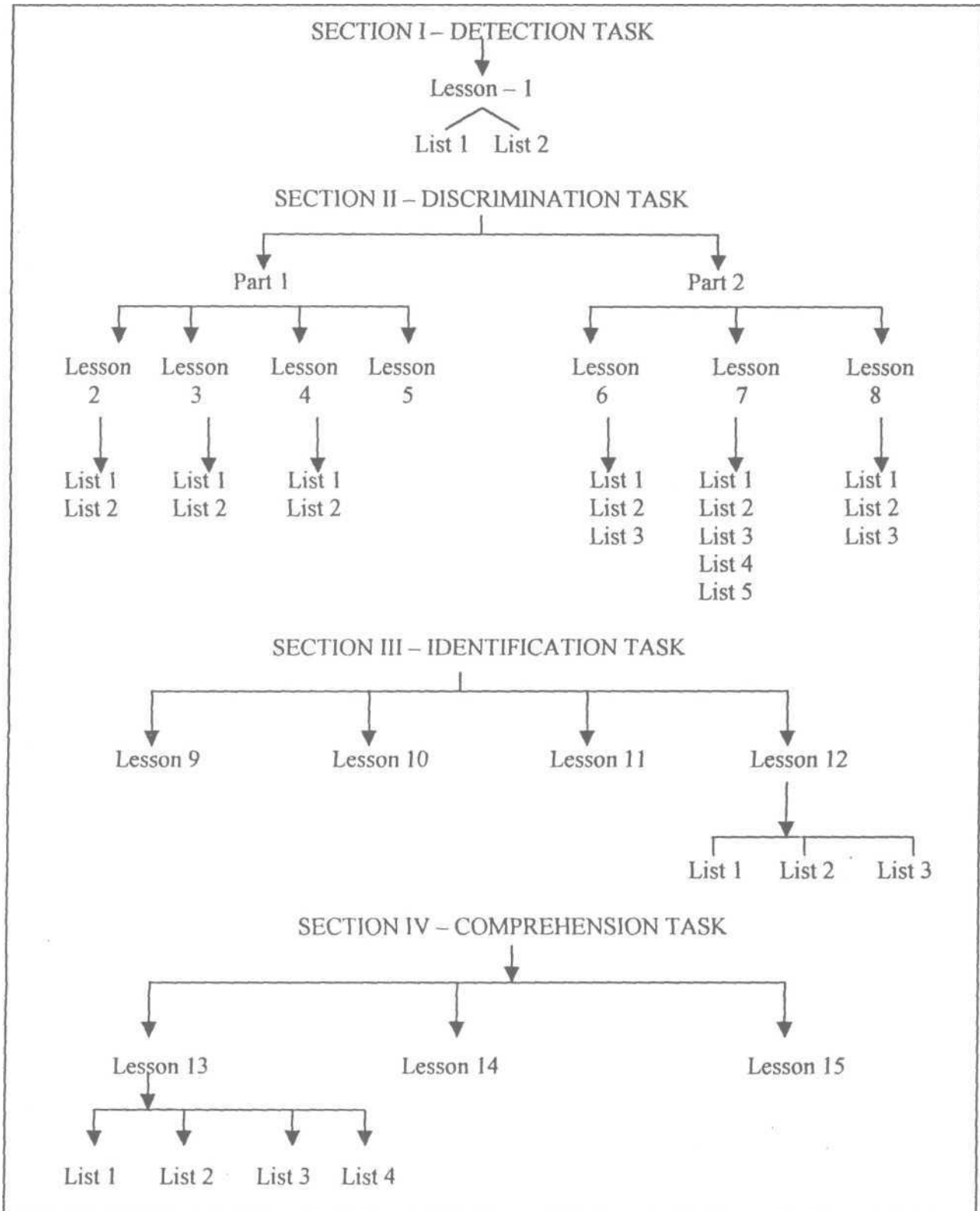
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APPENDIX

AUDITORY LEARNING MANUAL FOR ENGLISH SPEAKING HEARING-IMPAIRED CHILDREN

This auditory learning manual is recommended for the English speaking hearing-impaired children who have been identified as early preferably by one year of age and have been fitted with appropriate amplification devices. The activities in this manual can be carried out for hearing-impaired children of any age group who require such training. The auditory learning activities along with the language and cognitive training will enhance the communication abilities of the hearing-impaired children. This manual contains four sections. Each of these sections comprise of one to seven lessons. Each lesson comprises of one to five lists. Four sections and the lessons under these sections are outlined in the following flow chart.

FLOW CHART OF THE CONTENTS OF THE MANUAL



A brief outline of the sections and the lessons within each of them are given below.

SECTION I: DETECTION

Lesson- 1 : Detection of the verbal stimulus

SECTION II: DISCRIMINATION

Part 1: Discrimination of varying lengths of utterances.

It has four lessons.

Lesson - 2 : Discrimination between monosyllabic words (Vs.) 6-9 syllabic phrases/sentences.

Lesson - 3 : Discrimination between 3-4 syllabic words/phrases (Vs.) 6-8 syllabic phrases/sentences.

Lesson - 4 : Discrimination between monosyllabic words (Vs.) trisyllabic words.

Lesson - 5 : Discrimination between words which differ in vowel length.

Note: Lessons 2, 3 and 4 each has two lists.

Part 2 : Discrimination between words based on the frequency characteristics.

It has three lessons.

Lesson - 6 : Discrimination between words which differ in the frequency characteristics of both consonants and vowels.

List 1 - High frequency consonant and High frequency vowel
(Vs.)

Low frequency consonant and Low frequency vowel

List 2 - Low frequency consonant and High frequency vowel
(Vs.)

High frequency consonant and Low frequency vowel

List 3 - Low frequency consonant and Low frequency vowel
(Vs.)

Mid frequency consonant and Low frequency vowel

Lesson - 7 : Discrimination between words which differ with respect to frequency characteristics of vowels.

List 1 - Low frequency vowel (Vs.) High frequency vowel

List 2 - Mid frequency vowel (Vs.) High frequency vowel

List 3 - Mid frequency vowel (Vs.) Low frequency vowel

List 4 - Low frequency vowel (Vs.) Low frequency vowel

List 5 - High frequency vowel (Vs.) High frequency vowel

Lesson - 8 : Discrimination between words which differ with respect to frequency characteristics of consonants.

List 1 - High frequency consonant (Vs.) Low frequency consonant

List 2 - Mid frequency consonant (Vs.) Low frequency consonant

List 3 - High frequency consonant (Vs.) Mid frequency consonant

SECTION HI: IDENTIFICATION

Lesson - 9 : Identification of simple words which differ in the frequency characteristics

Lesson - 10 : Identification of minimal pairs which differ in the frequency characteristics of vowels.

Lesson - 11 : Identification of pair of words which differ in the frequency characteristics of consonants.

Lesson- 12 : Identification of key words in a sentence context which differ in the frequency characteristics.

List 1

Identification of key word with low frequency consonant
(Vs.)

Identification of key word with high frequency consonant

List 2

Identification of key word with low frequency consonant
(Vs.)

Identification of key word with low frequency consonant

List 3

Identification of key word with high frequency consonant
(Vs.)

Identification of key word with high frequency consonant

SECTION IV : COMPREHENSION

Lesson - 13 : Comprehension of related questions.

Lesson - 14 : Comprehension of commands

Lesson - 15 : Comprehension of unrelated questions.

Note: There are four lists in lesson 13.

SECTION I: DETECTION

The aim of this section is to make the child aware of verbal stimuli.

Lesson 1 - Detection of the verbal stimulus

Practice items: Train
Lock

List 1

- 1) Ant
- 2) Basket
- 3) Hair Brush
- 4) Ship
- 5) Kangaroo
- 6) Fruits
- 7) Goat
- 8) Mango
- 9) Nose
- 10) Watch
- 11) Joker
- 12) Table
- 13) She is swimming
- 14) Leg
- 15) Vegetables

List 2

- 1) Apple
- 2) Bucket
- 3) Hospital
- 4) Shampoo
- 5) Kite
- 6) Finger
- 7) Eagle
- 8) Money
- 9) Neck
- 10) Wheel
- 11) Jump
- 12) Tortoise
- 13) A small red car
- 14) Lamp
- 15) Van

Procedure to carry out the activity

Materials required. (i) For carrying out the activity, the below mentioned pictures are used.



(ii) For scoring and reinforcement, star stickers can be used.

Instructions to the clinician

In the above pictures, one cartoon indicates the presentation of the verbal stimulus and the other one indicates silence. Keep both the pictures on the table.

Present the verbal stimulus given in the list. The child has to respond to the presence of stimulus by pointing to the picture indicating a cartoon speaking. Maintain silence between the words randomly, for different durations of time, to make the child detect the presence or absence of the phrase/word.

Instruction to the child

Listen to me carefully. If you hear me speaking, then point to the picture with a cartoon speaking. Otherwise, point to the cartoon which is silent (or) do not point to either of the pictures.

E.g. 1 : Clinician says "train".

The child has to respond by pointing to the picture indicating the cartoon speaking.

E.g. 2 : Clinician maintains silence.

The child has to point to the picture of the cartoon depicting silence or remains silent.

Scoring system and reinforcement

Have around 30 colourful star stickers. A star sticker is given for each correct response. At the end count the number of stickers collected by the child which will be equal to the number of correct responses. The maximum score which can be obtained is 15 in each list. If the child passes at least 10/15 stimuli in each list, then the next task can be taken-up.

SECTION II: DISCRIMINATION

Part 1 ; Discrimination of varying lengths of utterances

The aim of this part is to help the child to discriminate between two stimuli that differ in their length (number of syllables).

Lesson 2 - Discrimination between monosyllabic words (Vs) 6-9 syllabic phrases/sentences.

Practice items:

1. Car - He is clapping his hands
2. Book - Book

List 1

- | | |
|------------------------------------|-----------------------------|
| 1. Ant | The lion is sleeping |
| 2. Boy | The sheep is eating grass |
| 3. The boy is eating his breakfast | Watch |
| 4. Rose | Rose |
| 5. Close your eyes and keep quiet | Hand |
| 6. He is clapping | He is clapping |
| 7. Tap | Tap |
| 8. The boy is reading | The boy is reading |
| 9. Zoo | Zoo |
| 10. Dog | The boy is riding a bicycle |

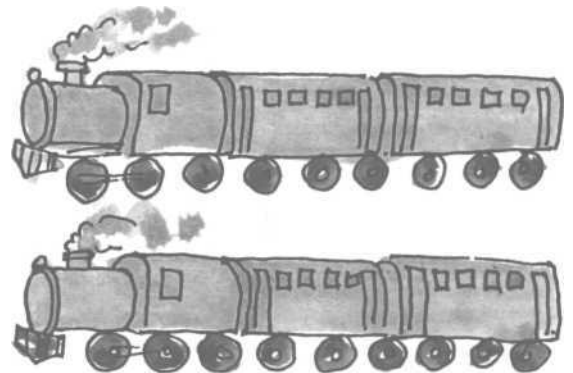
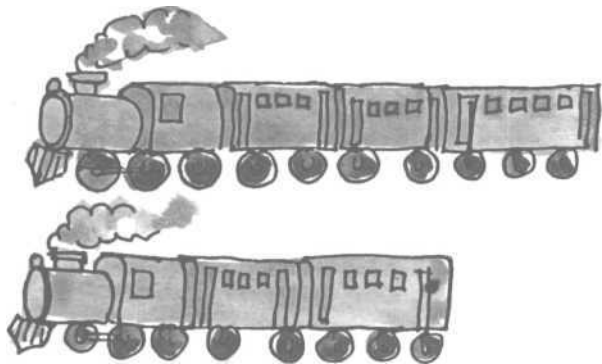
List 2

1. The boys are playing cricket
2. The fish are eating fish food
3. The boy is throwing a ball
4. Jug
5. Nose
6. Man
7. Pen
8. Bend down and touch your feet
9. Black
10. He is sitting on the sofa

- Eye
The fish are eating fish food
The boy is throwing a ball.
Jug
The flower vase is on the table
Man
The boys are playing cricket
Young
Black
Sun

Procedure to carry out the activity:

Materials required: (i) For carrying out the activity, the below mentioned pictures, colourful beads and thread can be used.



(ii) For scoring and reinforcement, star stickers can be utilized.

Instructions to the clinician

In one picture card, there are two trains of the same length. In the other card, there are two trains of different length. Place both the picture cards on the table in front of the child.

The lists contain pairs of stimuli. Say the first word/ sentence of the pair. Give a gap of around 2-3 seconds and then say the second word/ sentence of the pair. Once the child responds to the pair by pointing to the picture representing same/different, then say the next pair. Visual clues should not be given while presenting the stimuli.

Instruction to the child

Listen to both the sets of words carefully. If the two sets have the same length, then point to the card in which both the trains are of same length. If one set is long and the other short, point to the picture card which has two trains of different length.

E.g. 1 : Clinician says "book - book".

The child has to point to the picture where both the trains are of same length.

E.g. 2 : Clinician says "ship - The lion is sleeping".

The child has to point to the picture which has two trains of different length.

Scoring system and reinforcement

The child is allowed to thread beads to make a chain. Every time the child responds correctly, add one bead to the chain. The length of the chain depends upon the number of correct responses. At the end, an equivalent number of stickers are given as reinforcement. The maximum score which can be obtained by the child is ten in each list. If the child obtains at least 7/10 in list 1 then the next lesson can be taken-up, without him having to do list 2. Otherwise, list 2 should also be worked on.

Lesson 3 - Discrimination between 3-4 syllabic words / phrase (Vs)
6-B syllabic phrases / sentences.

Practice items

- | | |
|--------------------|---------------------------|
| 1. Close your eyes | He is sleeping on the bed |
| 2. A big blue ball | A big blue ball |

List 1

- | | |
|------------------------------------|---------------------------|
| 1. Bullock cart | The lion is sleeping |
| 2. Comb your hair | Comb your hair |
| 3. The boy is throwing a ball | Touch your feet |
| 4. Banana | Banana |
| 5. The flower vase is on the table | Put on powder |
| 6. Jump forwards | Jump forwards |
| 7. Coconut | He is sitting on the sofa |
| 8. He is clapping his hands | He is clapping his hands |

List 2

- | | |
|------------------------------------|-------------------------------------|
| 1. The man is cutting the wood | The man is cutting the wood |
| 2. Vegetables | Vegetables |
| 3. Open your mouth | The lion is sleeping under the tree |
| 4. The fish are eating fish food | The fish are eating fish food |
| 5. She is shopping | She is dancing with her friends |
| 6. The girl is swimming in the sea | Talcum powder |
| 7. Pineapple | Bend down and touch your feet |
| 8. Dining table | Dining table |

Procedure to carry out the activity

Materials required: (i) Two short pencils and one long pencil are to be used,
(ii) The same procedure as in lesson 2 can also be used.

Instructions to the clinician

Keep two small pencils and one long pencil on the table, in front of the child- Present each pair, one at a time, as given in the list. Give a gap of around 3-4 seconds between the two pairs of verbal stimuli. The child has to respond by picking up two pencils of the same length, if the two sets of words are the same in terms of their length. Otherwise, the child has to pick up two pencils of different lengths.

Instruction to the child

You will hear two sets of words. Listen to me carefully. If the two sets are same in terms of their length, then pick up two pencils of the same length. If the two sets are different in their lengths, then pick two pencils of different lengths.

E.g. 1: Clinician says "A big blue ball - A big blue ball".

The child has to respond by picking up two pencils of same lengths.

E.g. 2 : Clinician says "Close your eyes - The lion is sleeping".

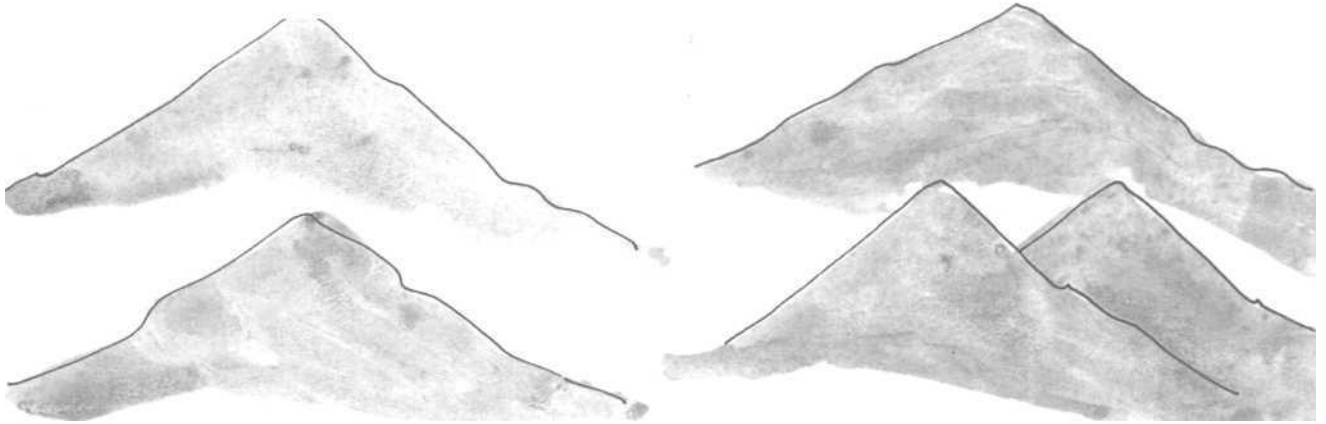
The child has to respond by picking up two pencils of different lengths. .

Scoring and reinforcement

Every time the child gives a correct response, draw a star in his notebook. At the end of the lesson, calculate the number of correct responses by counting the number of stars. The maximum score in each list that can be obtained is 8. If the number of correct responses is $\frac{5}{8}$ two small pencils may be given and if it is greater than $\frac{5}{8}$ give one long and one short pencil. If the child gets $\frac{8}{8}$, all the three pencils may be given. If the scores of the child is greater than $\frac{5}{8}$, then the clinician can proceed to the next lesson, skipping list 2.

Procedure to carry out the activity

Materials required: (i) For carrying out the activity, two toy dolls and picture of hillocks as given below, can be used.



(ii) For scoring and reinforcement, a small toy doll and a drawing of a ladder with 10 rungs can be used.

Instructions to the clinician

Draw hillocks on the floor or on a slate as given in the picture above. Present the pairs of words as given in the list. Say the first word in the pair, give a gap of 3-4 seconds and then say the next word. The child has to listen to both the words. If the words are of the same length, then the child has to make the 2 toy dolls jump over two single hillocks. If both the words are of different lengths, then the child has to make one doll jump over single hillock and the other doll jump over the two hillocks.

Instruction to the child

Listen to me carefully. If both the words are of same length, then make the two toy dolls jump over two single hillocks. Otherwise, make one doll jump over the two hillocks and the other over the single hillock.

E.g.. 1 : Clinician says "Food - Food".

The child has to make the dolls jump over the similar looking hillocks in the picture.

E.g.. 2 : Clinician says "Afternoon - Ant".

The child has to make one doll jump over the single hillock and the other doll jump over the two hillocks.

Scoring system and reinforcement

Draw a ladder with 10 rungs. When the child responds correctly, move the doll one step up on the ladder. Place three balloons on the last rung of the ladder. Once the doll reaches the top, the child can take the balloons. Each correct item carries a score of one. The maximum score for this lesson is 10 in each list. The doll will reach the last rung of the ladder only if the child responds to all the stimuli correctly. If the child passes at least 7/10 in list 1, then the next lesson can be taken-up, without having to carry out list 2.



Lesson 5 - Discrimination between words which differ in vowel length.

Practice items: Pool - Pool
Sit - Seat

List

- | | | | |
|----|------|---|-------|
| 1) | Ship | - | Sheep |
| 2) | Feet | | Feet |
| 3) | Bin | - | Bean |
| 4) | Sit | | Sit |
| 5) | Pull | | Pool |
| 6) | Beat | | Beat |
| 7) | Mill | - | Meal |
| 8) | Bed | | Bed |

Procedure to carry out the activity

- Materials required. (i) For carrying out the activity, two long scales and one short scale, can be used.
- (ii) For scoring and reinforcement, stacking cups and toffees can be used.

Instructions to the clinician

Keep two long scales and one short scale on the table in front of the child. Present each pair, one at a time, as given in the list. Give a gap of around 3-4 seconds between the two pairs of verbal stimuli. The child has to respond by picking up two scales of the same length if the two sets of words are of the same length. If both the words differ in their length, then the child has to respond by picking up one long scale and one short scale.

Instruction to the child

You will hear two sets of words. Listen to me carefully. If the two sets are of same length, then pick up two scales of the same length. If both the sets are different in length, then pick up one short scale and one long scale.

E.g. 1: Clinician says "Sit - Seat".

The child has to pick up one short scale and one long scale.

E.g. 2: Clinician says "Pool - Pool".

The child has to pick up two long scales.

Scoring and reinforcement

Every time the child gives a correct response, stack one cup. At the end of the lesson, calculate the number of correct responses by counting the number of drums stacked. If the number of correct responses is 8/8, give three toffees. If the response is 5-8, give two toffees. The maximum score that can be obtained in this lesson is 8. If the child scores less than 5, further training is required.

Part 2 - Discrimination between words based in the frequency characteristics.

The aim of this part is to help the child to discriminate between two stimuli that differ in their frequency characteristics.

Lesson 6 - Discrimination between words which differ in the frequency characteristics of consonants and vowels.

Practice items: Feet - Feet
Boat - Sheet

List 1: High frequency consonant and high frequency vowel
(Vs.)
Low frequency consonant and low frequency vowel

- | | | |
|-----|-------|-------|
| 1) | Sit | Nose |
| 2) | See | See |
| 3) | Book | Book |
| 4) | Tea | Ball |
| 5) | Three | Three |
| 6) | Fish | Nose |
| 7) | Moon | Moon |
| 8) | Zip | Pond |
| 9) | Deer | Deer |
| 10) | Broom | Broom |
| 11) | Fell | Put |
| 12) | Note | Thick |

List 2 : Low frequency consonant and high frequency vowel
(Vs.)
High frequency consonant and low frequency vowel

- | | | |
|----|------|---------|
| 1) | Bee | Bee |
| 2) | Food | - Food |
| 3) | Nib | - Floor |

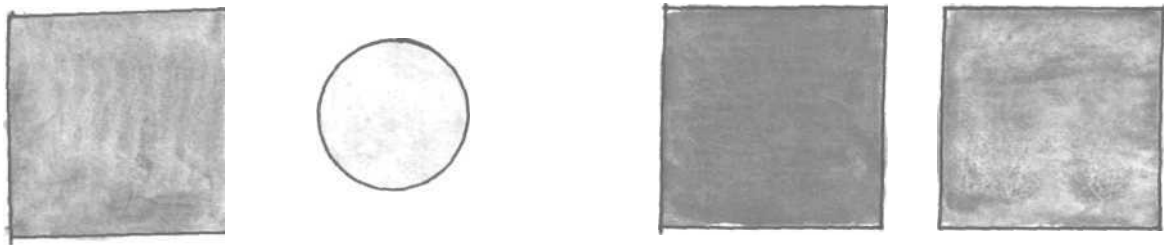
- | | | | |
|-----|-------|---|------|
| 4) | Two | - | Two |
| 5) | Juice | | Bee |
| 6) | Bin | | Bin |
| 7) | Zoo | | Nib |
| 8) | Bean | - | Door |
| 9) | Shoe | | Shoe |
| 10) | Men | — | Men |
| 11) | Bell | - | Zoo |
| 12) | Food | - | Knee |

List 3 : Low frequency consonant and low frequency vowel
(Vs.)
Mid frequency consonant and low frequency vowel

- 1) Moon - Cold
- 2) Crow - Crow
- 3) Book - Book
- 4) Goat - Boat
- 5) Board - Cook
- 6) Comb - Comb
- 7) Road - Note
- 8) Broom - Broom
- 9) Cot - Pot
- 10) Ball-Ball
- 11) Boat - Coat
- 12) Cook - Cook

Procedure to carry out the activity

Materials required: (i) For carrying out the activity, four pictures as given below (two being same and the other two being different) can be used.



(ii) For scoring, stickers can be utilized.

Instructions to the clinician

Take two sets of pictures in which one set has two similar looking pictures and the other set has two different looking pictures.

Present the pair of words from list 1. Give a gap of around 2-3 seconds between the presentation of the words within the pair. If the pair of words are same, then the child has to show the set with similar pictures. If the words are different, the child has to show the set with different pictures. Once list 1 is over, move to the second list and then to the third list in a similar fashion.

Instruction to the child

There are 2 sets of pictures. I will say two words. Listen to me carefully. If the words are same show the set with similar pictures, otherwise, show the set with different pictures.

E.g. 1: Clinician says "Feet - Feet".

The child has to show the set with similar pictures.

E.g. 2: Clinician says "Boat - Sheet".

The child has to show the set with different pictures.

Scoring system and reinforcement

Every time the child responds correctly, draw one star on the child's notebook. For each list, maximum score which will be obtained is 12. If the number of stars are 10 and above, three stickers of cartoon characters are given and if it is between 8-10, two stickers are given. If it is less than 8, only one sticker is given. If the score is less than 8, further training in this lesson is recommended.

Lesson 7 - Discrimination between words which differ in the frequency characteristics of vowels

Practice Items. Boat - Beat
See - See

List 1 - Low frequency vowel (Vs.) High frequency vowel

- | | |
|----------|-------|
| 1) Book | Book |
| 2) Hat | Hit |
| 3) Sweet | Sweet |
| 4) Men | Man |
| 5) Mat | Meet |
| 6) Shoe | Shoe |
| 7) Bat | Bit |
| 8) Wheel | Wheel |

List 2 - Mid frequency vowel (Vs.) High frequency vowel

- | | |
|----------|-------|
| 1) Mad | Mad |
| 2) Cat | Kit |
| 3) Sleep | Sleep |
| 4) Bad | Bed |
| 5) Sat | Sit |
| 6) Car | Car |
| 7) Pin | Pan |
| 8) Pin | Pin |

List 3 - Mid frequency vowel (Vs.) Low frequency vowel

- | | | |
|----|------|-------|
| 1) | Bad | Bad |
| 2) | Hot | Hat |
| 3) | Bat | Boat |
| 4) | Good | Good |
| 5) | Far | Four |
| 6) | Car | Car |
| 7) | Bad | Board |
| 8) | Boat | Boat |

List 4 - Low frequency vowel (Vs.) Low frequency vowel

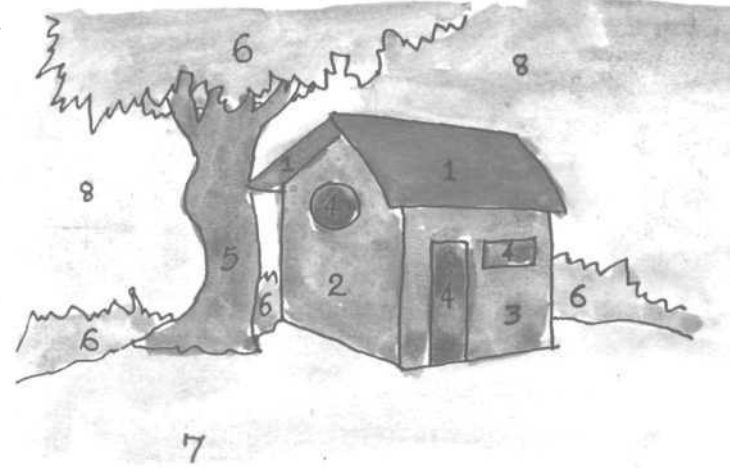
- | | | |
|----|------|--------|
| 1) | Boot | Boat |
| 2) | Food | Food |
| 3) | Cake | Cook |
| 4) | Bold | Bold |
| 5) | Ball | Bell |
| 6) | Book | Book |
| 7) | Well | - Wall |
| 8) | Ball | Ball |

List 5 - High frequency vowel (Vs.) High frequency vowel

- | | | |
|----|-------|---------|
| 1) | Sit | Seat |
| 2) | Wheel | - Wheel |
| 3) | Bit | Beat |
| 4) | Pin | Pin |
| 5) | Sing | Sing |
| 6) | Wheel | - Wall |
| 7) | Head | - Head |
| 8) | Hit | Heat |

Procedure to carry out the activity

- Materials required: (i) For carrying out the activity, three scales in which two are of same length and one with different length may be used,
(ii) For reinforcement, the following picture and colour pens can be used.



Instructions to the clinician

Place three scales in front of the child. Say the first word from the pair. Give a gap of around 3-4 seconds and then say the next word from the pair. If both the words are same, then the child has to show two scales of same length. Otherwise, the child has to show two scales of different length. Present the pair of words in the order given in the list. A similar activity is to be done for the subsequent lists also.

Instruction to the child

There are three scales in front of you. Two scales are of same length and one is of different length. Listen to me carefully, if both the words are same, then show two scales which are of same length, otherwise, show two scales which are of different lengths.

E.g.. 1: Clinician says "See - See".

The child has to show two scales of same length.

E.g.. 2: Clinician says "Boat - Beat".

The child has to show two scales of different lengths.

Scoring system and reinforcement

Every time the child responds correctly, allow the child to colour one part in the picture. The maximum score the child can score is 8 in each list. If the child responds correctly for all the pairs in a list, he can complete the picture and take the picture. If the score is less than 6/8 in each list, further training is required.

Lesson 8 - Discrimination between words which differ in the frequency characteristics of consonants.

Practice Items: Bat - Fat
Cat - Cat

List 1: High frequency consonant (Vs.) Low frequency consonant

- 1) Hot - Hot
- 2) Fan - Man
- 3) Nib - Nib
- 4) Mad - Dad
- 5) Chips - Chips
- 6) Fall - Ball
- 7) Hit - Bit
- 8) Mat - Mat

List 2 : Mid frequency consonant (Vs.) Low frequency consonant

- 1) Call - Ball
- 2) Key - Key
- 3) Best - Guest
- 4) Red - Bed
- 5) Ball - Ball
- 6) Comb - Comb
- 7) Key - Bee
- 8) Bun - Bun

List 3: High frequency consonant (Vs.) Mid frequency consonant

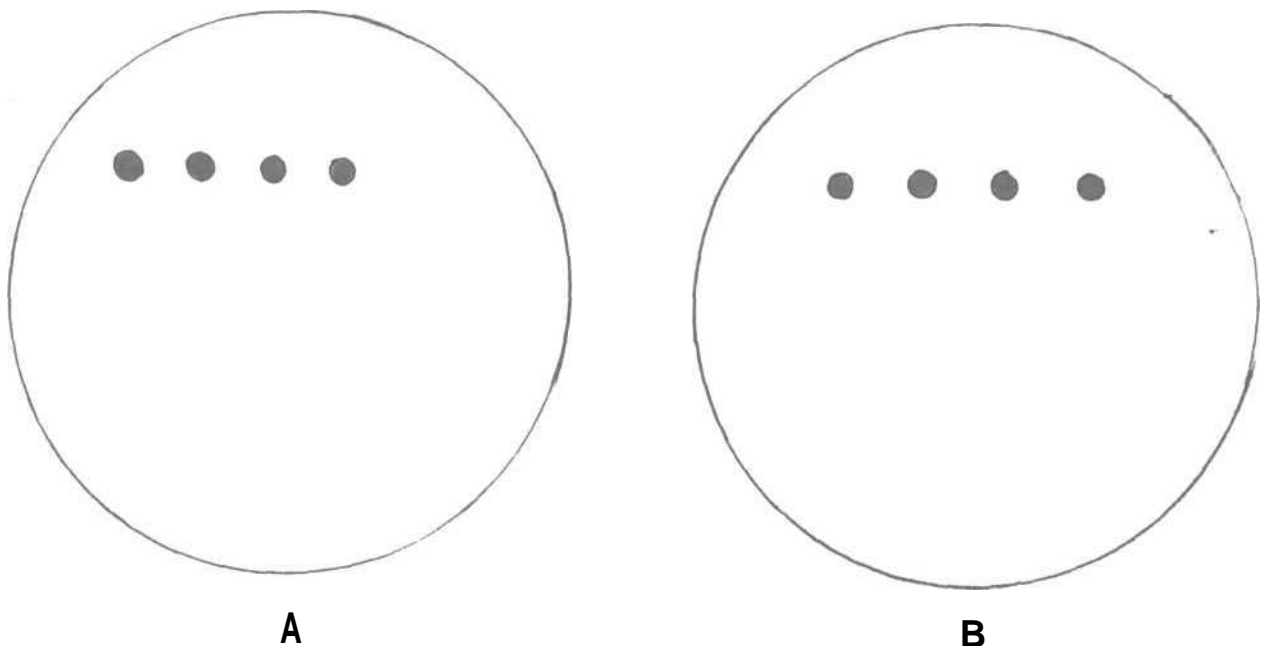
- | | | | |
|----|-------|---|-------|
| 1) | Fat | | Rat |
| 2) | Cook | - | Hook |
| 3) | Feet | | Feet |
| 4) | Rock | | Rock |
| 5) | Red | | Head |
| 6) | Gum | - | Gum |
| 7) | Got | | Hot |
| 8) | Shirt | | Shirt |

Procedure to carry out the activity

- Materials required: (i) For carrying out the activity, one sheet of paper and two sets of bindis of different colours can be used,
(ii) For scoring and reinforcement, star stickers can be used.

Instructions to the clinician

Place the paper in front of the child, on the table, with the following figure in which one row of bindis are already present.



While presenting each pair of words, say the first word, give a gap of around 3-4 seconds and then say the next word. If both the words are same, then the child has to stick two red colour bindis in circle A. Otherwise, he has to stick one red and one green bindi in circle B (as shown in the figure). After the response, the next word pair has to be presented. Present the word pairs in the same order as given in the list. Once, list 1 is completed, move to the subsequent lists in a similar fashion.

Instruction to the child

Listen to both the words correctly. If both the words are same, stick two red bindis in circle A. If the pair of words are different then stick one green and one red bindi in circle B.

E.g.. 1: Clinician says "Bat - Fat".

The child has to stick one green and one red bindi in circle B.

E.g.. 2: Clinician says "Cat - Cat".

The child has to stick two red bindis in circle A.

Scoring and reinforcement

Every time the child responds correctly, give one star sticker to the child. These star stickers will be given to the child as reinforcement at the end of the activity. The maximum score which can be obtained by the child is 8 in each list. If the score is less than 6/8, the child needs further training in this lesson.

SECTION III: IDENTIFICATION

The aim of this section is to make the child identify the verbal stimuli presented.

Lesson 9 - Identification of simple words which differ in frequency characteristics

Practice items: Sheep

Man

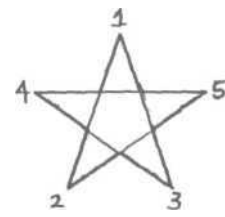
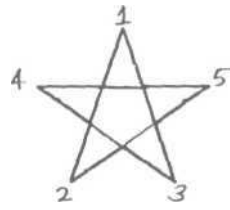
List

- 1) Mango
- 2) Rose
- 3) Hat
- 4) Moon
- 5) King
- 6) Leaf
- 7) Goat
- 8) Book
- 9) Fox
- 10) Bag
- 11) Comb
- 12) Socks
- 13) Broom
- 14) Clock
- 15) Chilly

Procedure to carry out the activity

Materials required: (i) For carrying out the activity, pictures of the words given in the list may be used.

(ii) For scoring and reinforcement, the following pictures and stickers can be used.



Instructions to the clinician

Keep all the pictures in front of the child on the table. Do not give visual cues while saying the words. Once the child responds by pointing to the picture which represents the said word on repeats the word, say the next one.

Instruction to the child

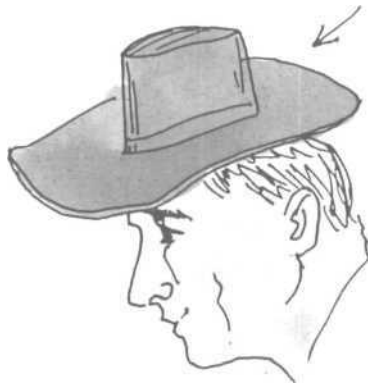
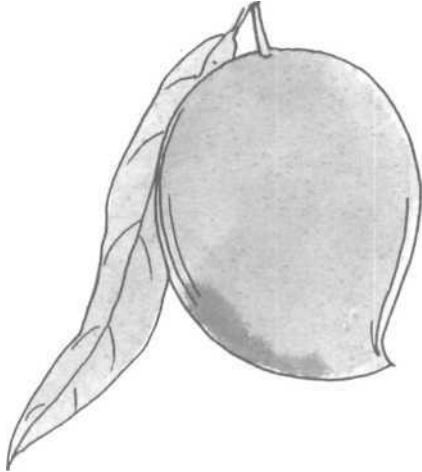
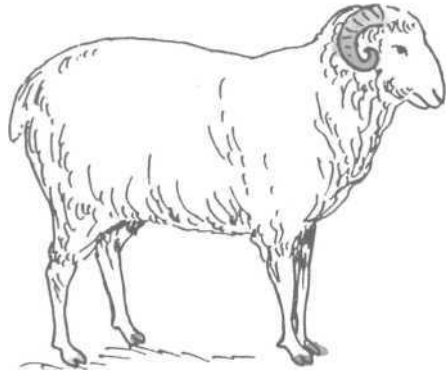
Listen to the word which I say and point to the picture of that word.

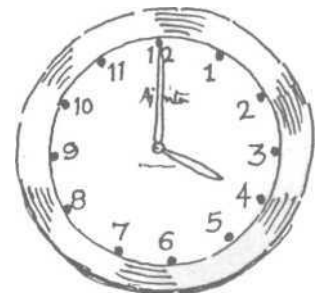
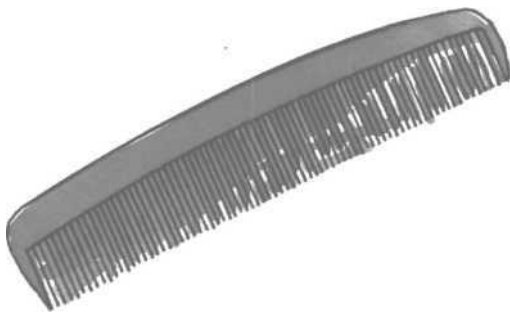
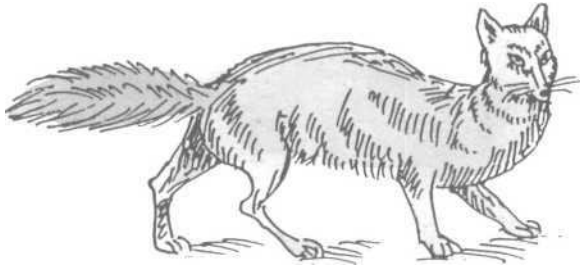
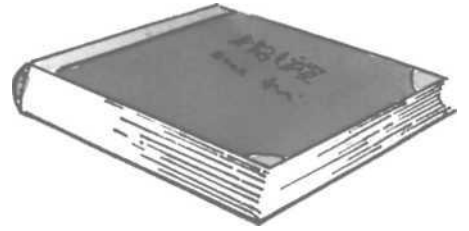
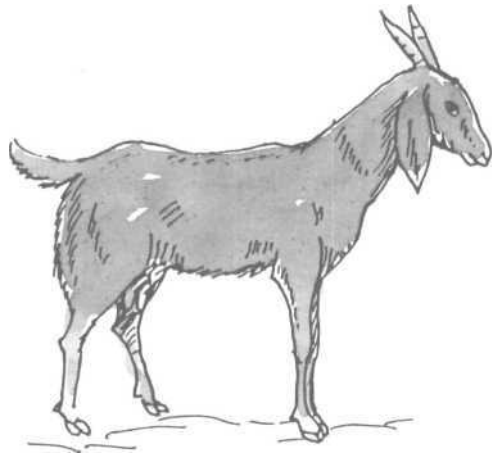
E.g.: Clinician says "Sheep".

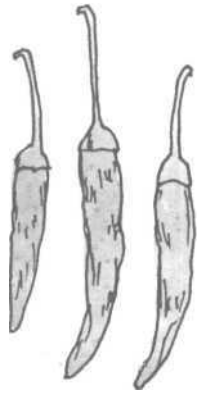
The child has to point to the picture of "Sheep".

Scoring system and reinforcement

Have three dot-dot pictures of stars. There will be five dots in each star. Every time the child responds correctly, join the dots progressively. One star is complete when the child responds to five items in the list. Give one sticker as reinforcement when the child completes one star. The maximum score which can be obtained is 15. The next lesson may be taken up if the scores are greater than or equal to 12/15.







Lesson 10 - Identification of minimal pairs which differs in the frequency characteristics of vowels.

Practice items: Wheel - Wall

List

- | | | |
|----------|---|-------|
| 1) Ball | - | Bell |
| 2) Boat | - | Boot |
| 3) Two | - | Tea |
| 4) Fat | - | Feet |
| 5) Pen | | Pin |
| 6) Net | - | Note |
| 7) Race | - | Rose |
| 8) Hot | - | Hat |
| 9) Bed | - | Board |
| 10) Pen | - | Pan |
| 11) Cook | - | Coke |
| 12) Tin | - | Ten |

Procedure to carry out the activity

- Materials required: (i) For carrying out the activity, pictures of the words given in the list may be used.
- (ii) For scoring and reinforcement, an abacus and balloons **can be** used.

Instructions to the clinician

Keep twelve pictures representing the first six items, on the table, in front of the child. While presenting the pair of words, say the first word, give a gap of around 3-4 seconds and then say the second word of the pair. The child has to respond by pointing to the pictures which represents the words said or repeat the words. Once the child

responds, say the next pair of words. Do not give visual cues while presenting the pair of words. Similarly, carry out the activity with next twelve pictures. The number of pictures presented each time can be varied according to the abilities of each child.

Instruction to the child

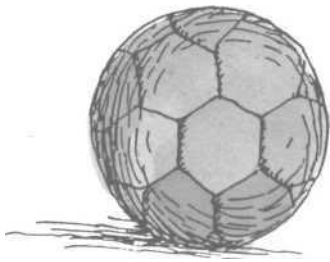
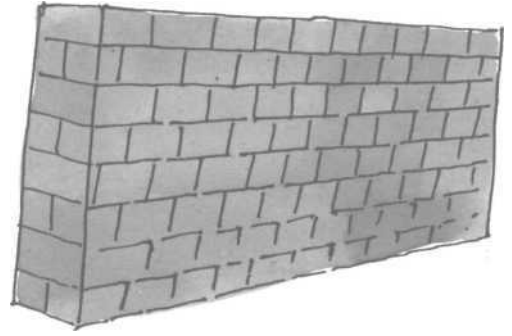
Listen to me carefully. I will say two words. You have to identify the words by repeating the words or pointing to the pictures which represents the words.

E.g. Clinical says "Wheel - Wall".

The child has to point first to the picture of a "Wheel" and then to the picture of a "Wall" or repeat "Wheel" first and then "Wall".

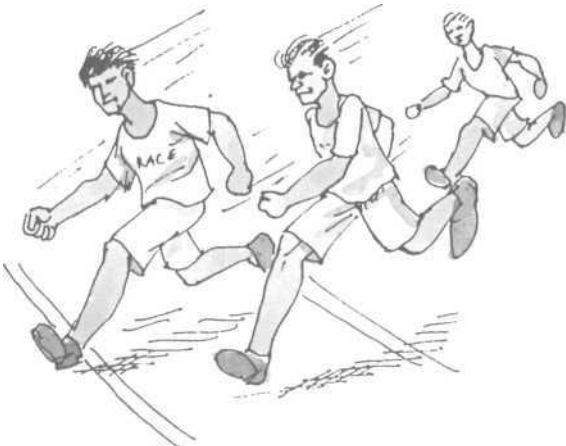
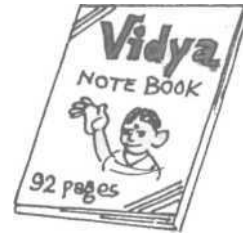
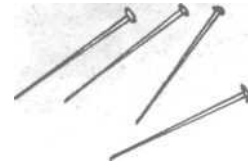
Scoring system and reinforcement

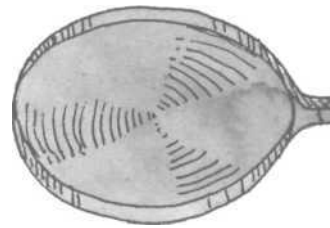
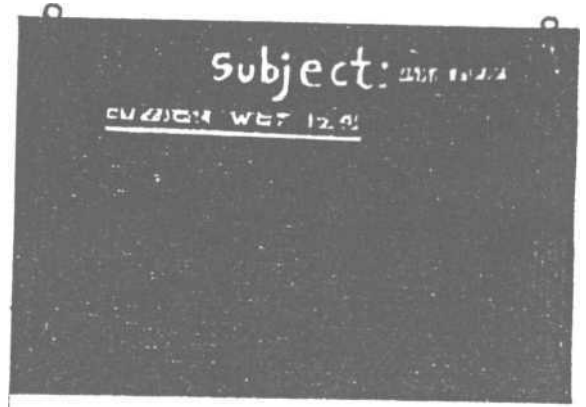
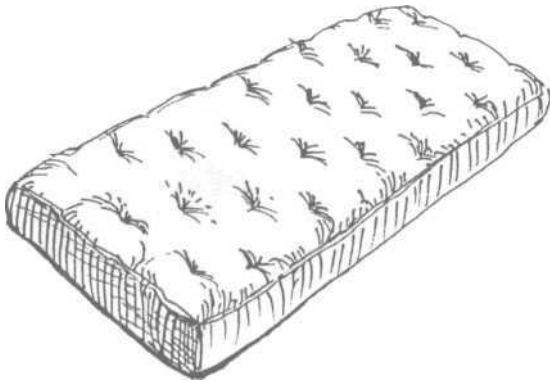
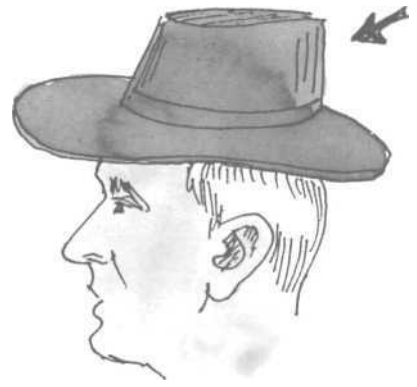
Place the abacus in front of the child. When the child responds correctly, move one of the beads from one side to the other. Give the child one balloon when twelve beads in a row are moved to the other side. The maximum score which can be obtained is 24 i.e., twenty four beads have to be moved to the other side of the abacus. The clinician can take up the next lesson if the score is greater than 20/24.



2









10

Lesson 11 - Identification of pair of words which differ in the frequency characteristics of consonants.

Practice items : Goat - Boat

List

- | | | |
|-----|--------|---------|
| 1) | Moon | Spoon |
| 2) | Date | Gate |
| 3) | Kite | Bite |
| 4) | Jeep | Sleep |
| 5) | Wheel | Kneel |
| 6) | Thread | Bread |
| 7) | Write | Fight |
| 8) | Book | Cook |
| 9) | Door | - Floor |
| 10) | Honey | Money |
| 11) | Mat | Bat |
| 12) | Note | Boat |
| 13) | Sun | Run |
| 14) | Jeep | Sheep |
| 15) | Bed | Red |

Procedure to carry out the activity

Materials required: (i) For carrying out the activity, the pictures of the words given in the list may be utilized,

(ii) For scoring and reinforcement, have the following cards.

Grade
A+

Grade
A

Grade
B

Grade
C

Grade
D

Instructions to the clinician

Place the first sixteen pictures of the word pairs in the list, on the table. These pictures are randomly placed. Present the word pairs in the order given in the list. Say the first word of the pair, give a gap of around 3-4 seconds and then present the second word of the pair. The child has to respond by pointing to the pictures which represents the word named or repeat the words. Once the child responds, say the next pair. Similarly, place the next fourteen pictures on the table and carry out the activity. The number of pictures presented each time can be varied according to the abilities of each child.

Instruction to the child

Listen to me carefully. I will say two words. You have to point to the pictures of the words that I say or repeat the words.

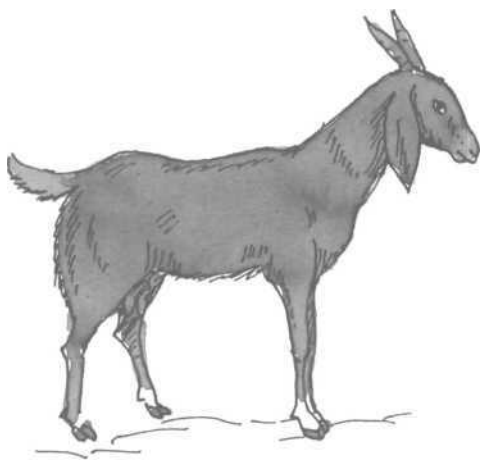
E.g.: Clinician says "Goat - Boat".

The child has to point to the picture representing "Goat" first and then to the word which represents the word "Boat" or repeat the word "Goat" first, and then the word "Boat".

Scoring system and reinforcement

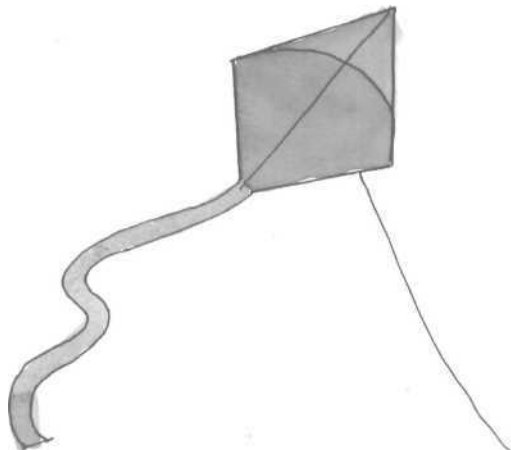
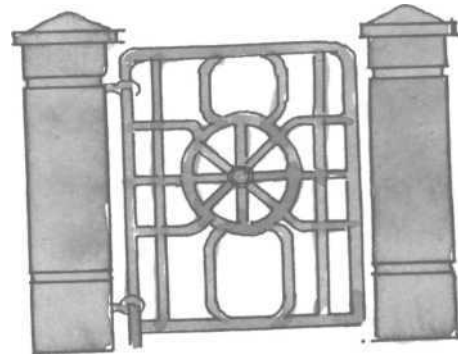
Every time the child responds correctly by pointing to the correct picture, make a note of it. At the end, give grades to the child, as given below, based on the number of correct responses. The maximum score which can be obtained is 30. If the child gets D, the child has to be trained further on this task.

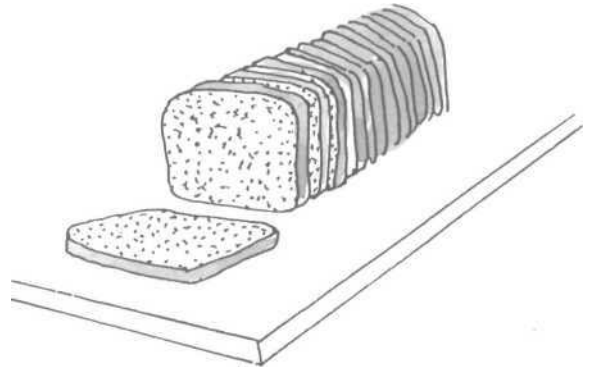
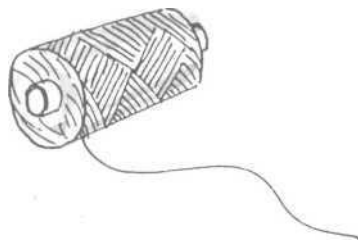
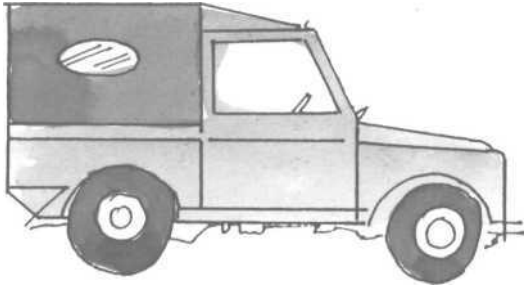
		<u>Scores</u>
Grade A+	Excellent	: 30
Grade A	Superior	25-29
Grade B	Very good	21-24
Grade C	Good	: 15-20
Grade D	Poor	<15

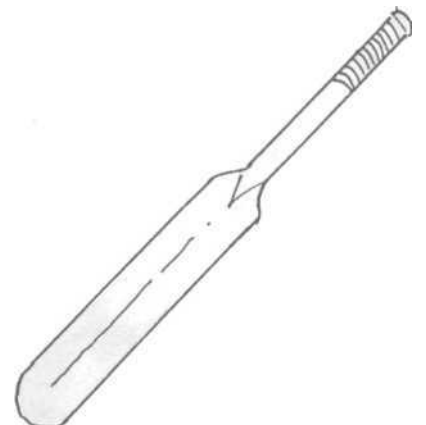
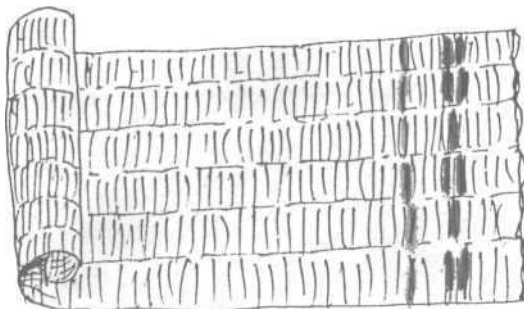
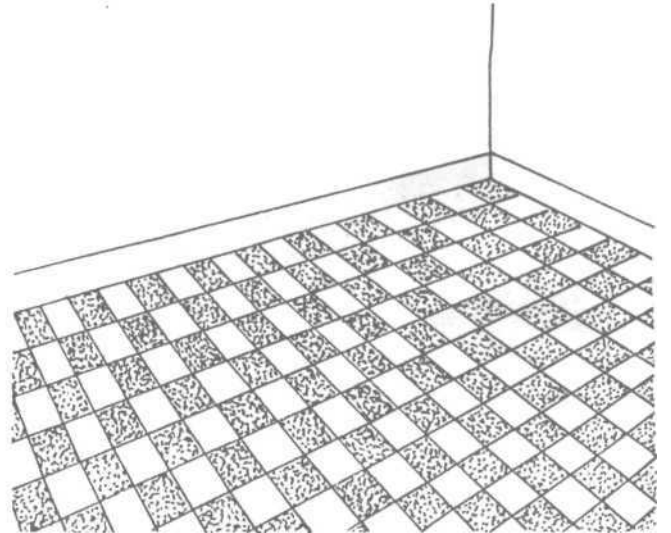
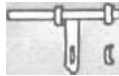


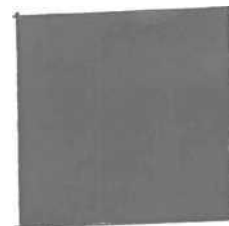
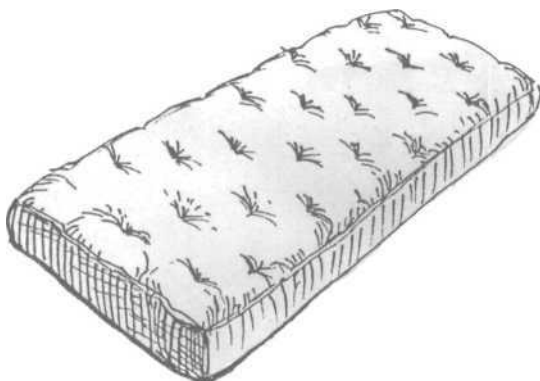
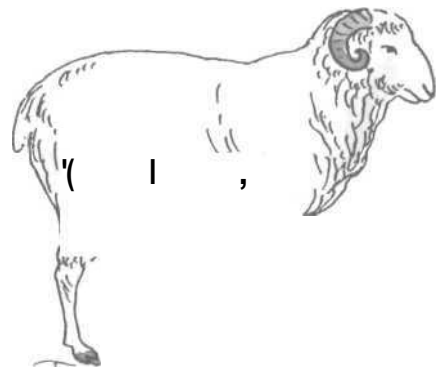
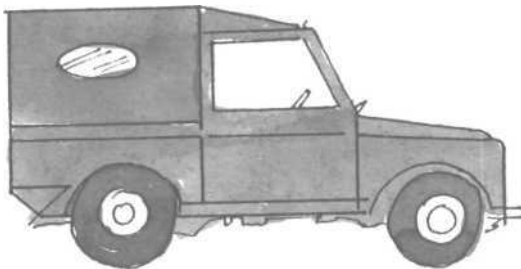
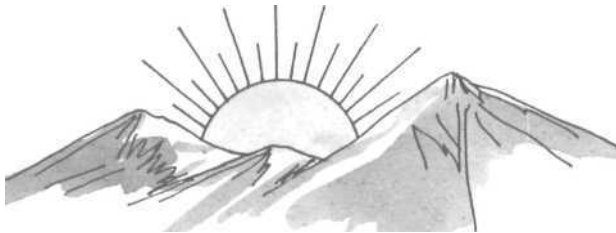
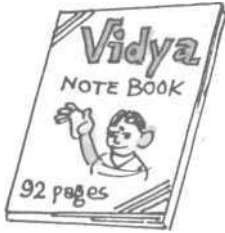
BANGALORE PRESS

	SUN	4	11	18	25	
	MON	5	12	19	26	
	TUE	6	13	20	27	
	WED	7	14	21	28	
	THU	1	8	15	22	29
	FRI	2	9	16	23	30
	SAT	3	10	17	24	31









Lesson 12 - Identification of key words in a sentence context which differ in the frequency characteristics.

Practice items. He is sleeping.

He is eating.

List /; Identification of key word with low frequency consonant
(Vs.)

Identification of key word with high frequency consonant

- 1) She bought a dress.
She bought a bat
- 2) He ate a sweet.
He ate a banana.
- 3) He is riding a scooter.
He is riding a bicycle.
- 4) He is sleeping on the bed.
He is sleeping on the floor.
- 5) She is wearing a saree.
She is wearing a pant.
- 6) She is smiling.
She is praying.
- 7) She is drinking juice.
She is drinking milk.
- 8) Sapna is stitching a shirt.
Sapna is stitching a bag.
- 9) He hurt his nose.
He hurt his hand.
- 10) The flower is on the table.
The book is on the table.

List 2 : Identification of key word with low frequency consonant
(Vs.)

Identification of key word with low frequency consonant

- 1) The boy is bathing.
The boy is brushing.
- 2) The man is cutting the wood.
The man is cutting the paper.
- 3) He is playing with the ball.
He is playing with the bat
- 4) She is eating papaya.
She is eating banana.
- 5) He is wearing a blue shirt.
He is wearing a black shirt.
- 6) She bought a mat.
She bought a brush.
- 7) Mother gave Ramu a book.
Mother gave Ramu a bag.
- 8) The dog is chasing the boy.
The dog is chasing the man.
- 9) The teacher is writing on the board.
The teacher is writing on the book.
- 10) He saw the match in the TV.
He saw the whale in the TV.

List 3 : Identification of key word with high frequency consonant
(Vs.)

Identification of key word with high frequency consonant

- 1) He is standing.
He is sitting.
- 2) He is drinking juice.
He is drinking tea.
- 3) The pencil is long.
The pencil is short.
- 4) She drew a house.
She drew a sun.
- 5) He is sleeping on the floor.
He is jumping on the floor.
- 6) He got hurt on the head.
He got hurt on the foot.
- 7) He switched on the fan.
He switched on the light.
- 8) She went to the zoo on a holiday.
She went to the shop on a holiday.
- 9) The lotus is pink in colour.
The dress is pink in colour.
- 10) He left the key on the table.
He left the key on the chair.

Procedure to carry out the activity

Materials required: (i) For carrying out the activity, it is suggested to use the pictures of the sentences given in the lists,
(ii) For scoring and reinforcement, toffees may be used.

Instructions to the clinician

Place ten pictures representing the first five pairs of sentences on the table, in front of the child. While presenting the pair of sentences, say the first sentence, give a gap of around 3-4 seconds and then say the second sentence of the pair. The child has to respond by pointing to the pictures which represent the sentences. Once the child responds say the next pair of sentences. Do not give visual cues while presenting the pair of sentences. Similarly carry out the activity with next ten pictures representing the remaining sentences. The same activity has to be done for all the three lists.

Instruction to the child

Listen to me carefully. I will say two sentences. You have to identify the sentences by pointing to the pictures which represent the sentences.

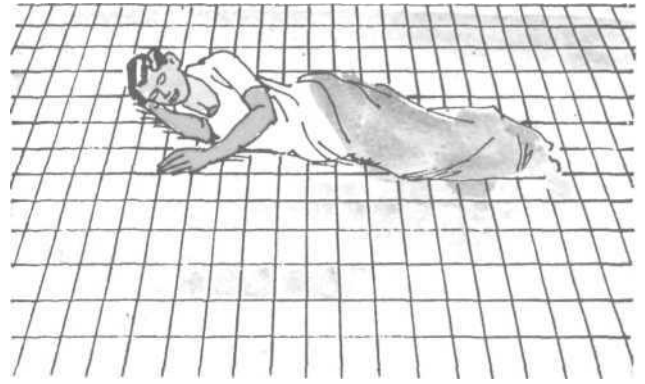
E.g.: Clinician says "She bought a bag - She bought a book".

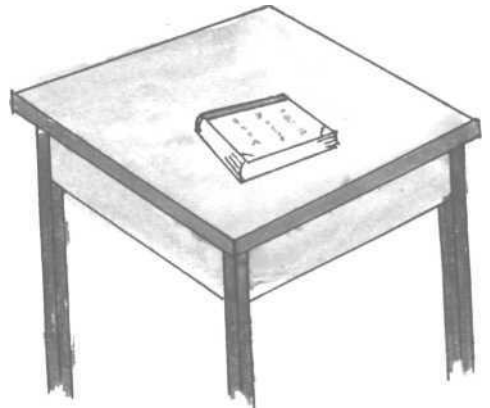
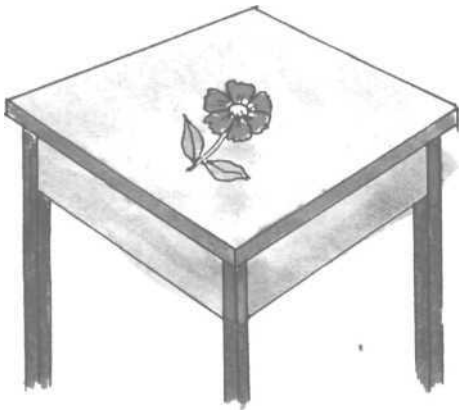
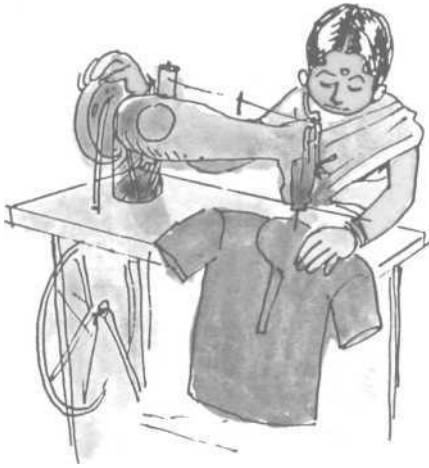
The child has to point first to the picture representing "She bought a bag" and then to the picture representing "She bought a book".

Scoring system and reinforcement

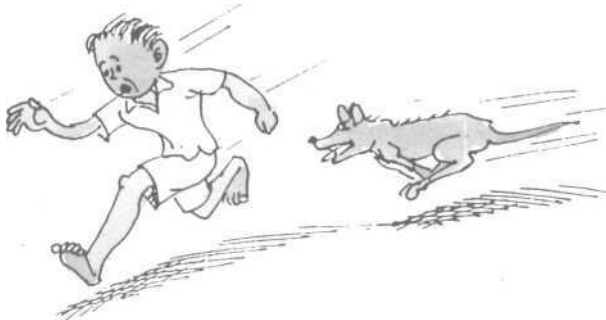
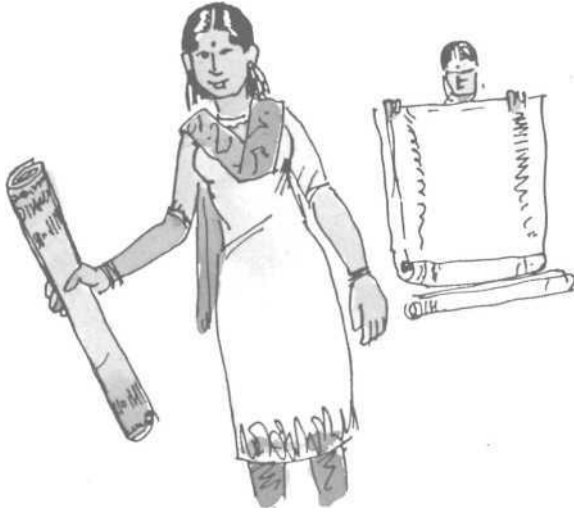
Every time the child responds correctly by pointing to the correct picture, make a note of it. At the end of every ten correct responses give a toffee to the child as a reinforcement. The maximum score which can be obtained is 20 in each list. Children who score below 16 on any lists, require further training on the activity.





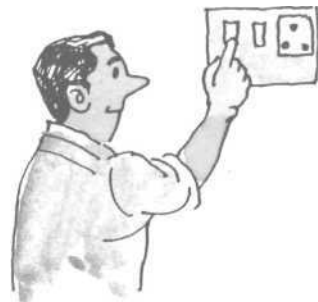
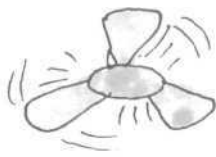
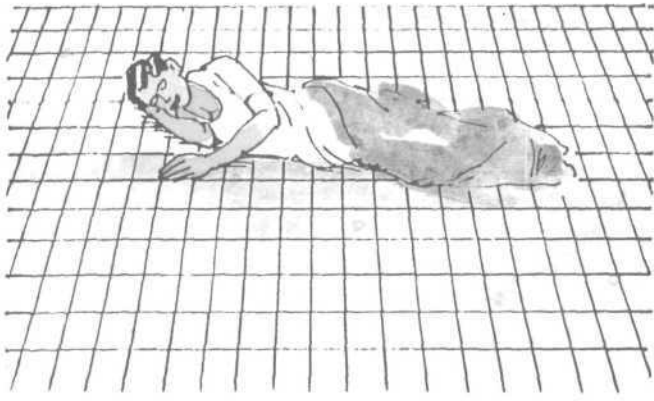






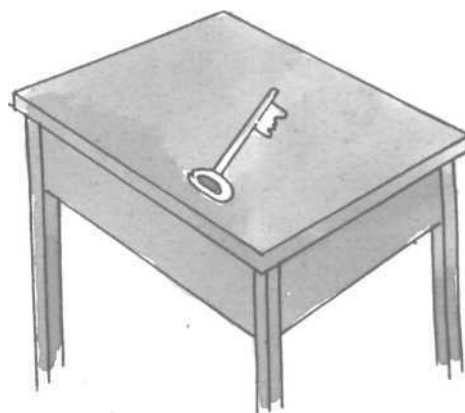
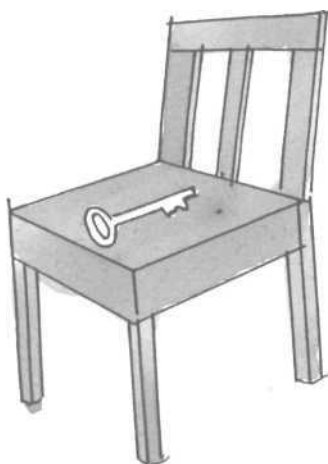






ZOO





v

SECTION IV: COMPREHENSION

The aim of this section is to make the child understand the spoken verbal stimuli and carry out an appropriate activity.

Lesson 13 - Comprehension of related questions.

List 1

A crow was very thirsty. It searched for water everywhere. At last it saw a pot of water near a well. It looked inside the pot. There was very little water in it. The crow thought of a plan. It picked up some stones and put them one-by-one into the pot. The water came up. The crow drank the water and flew away.

Practice item: Which was the bird in this story? (Crow)

Questions:

- 1) What was the crow searching for?
- 2) Where did the crow find the water?
- 3) Where was the pot?
- 4) What did the crow put inside the pot?
- 5) How much water was there in the pot?

List 2

A lion was sleeping under a tree. A mouse jumped on the lion. The lion got angry and said "I will kill you". The mouse got frightened and said "Please let me go. I will help you some day". Then the lion said, "Ok, I will let you go". One day a hunter spread a net to catch the lion. The lion was caught in the net. The mouse seeing the lion caught in the net came and helped it. The mouse cut the net with its teeth. The lion was set free.

Practice item. Who was sleeping? (Lion)

Questions.

- 1) Who jumped on the lion?
- 2) What was the lion doing?

- 3) Who said "I will kill you"?
- 4) Who spread a net to catch the lion?
- 5) Where was the lion sleeping?

List 3

One day a hunter wanted to catch some birds. He spread a net and sprinkled seeds on it. The birds came to eat the seeds. They were caught in the net. They thought of a plan to escape from the hunter. They flew together carrying the net. They flew to a field with the net. There a mouse came and cut the net. Thus the birds escaped.

Practice item: What came to eat the seeds?

Questions:

- 1) Who wanted to catch the birds?
- 2) What did the hunter spread on the net?
- 3) What did the birds do to escape from the hunter?
- 4) What helped the birds to escape?
- 5) What did the mouse do?

List 4

There were four cows. They were good friends. Every day they used to eat together in a field. One day a lion came to kill the cows. Together, the cows chased the lion. The lion got scared and ran away. One day the cows fought with each other. They started eating separately in different places. The lion came again and killed the cows one-by-one.

Practice item: Who were friends?

Questions:

- 1) How many cows were there?
- 2) Who came to eat the cows?
- 3) Why did the lion come to the field?
- 4) What did the lion do when the cows chased it?
- 5) Who fought with each other?

Procedure to carry out the activity

Materials required: (i) For carrying out the activity, picture series of the four stories are to be used.

(ii) For scoring and reinforcement, colour beads and bowl may be used.

Instructions to the clinician

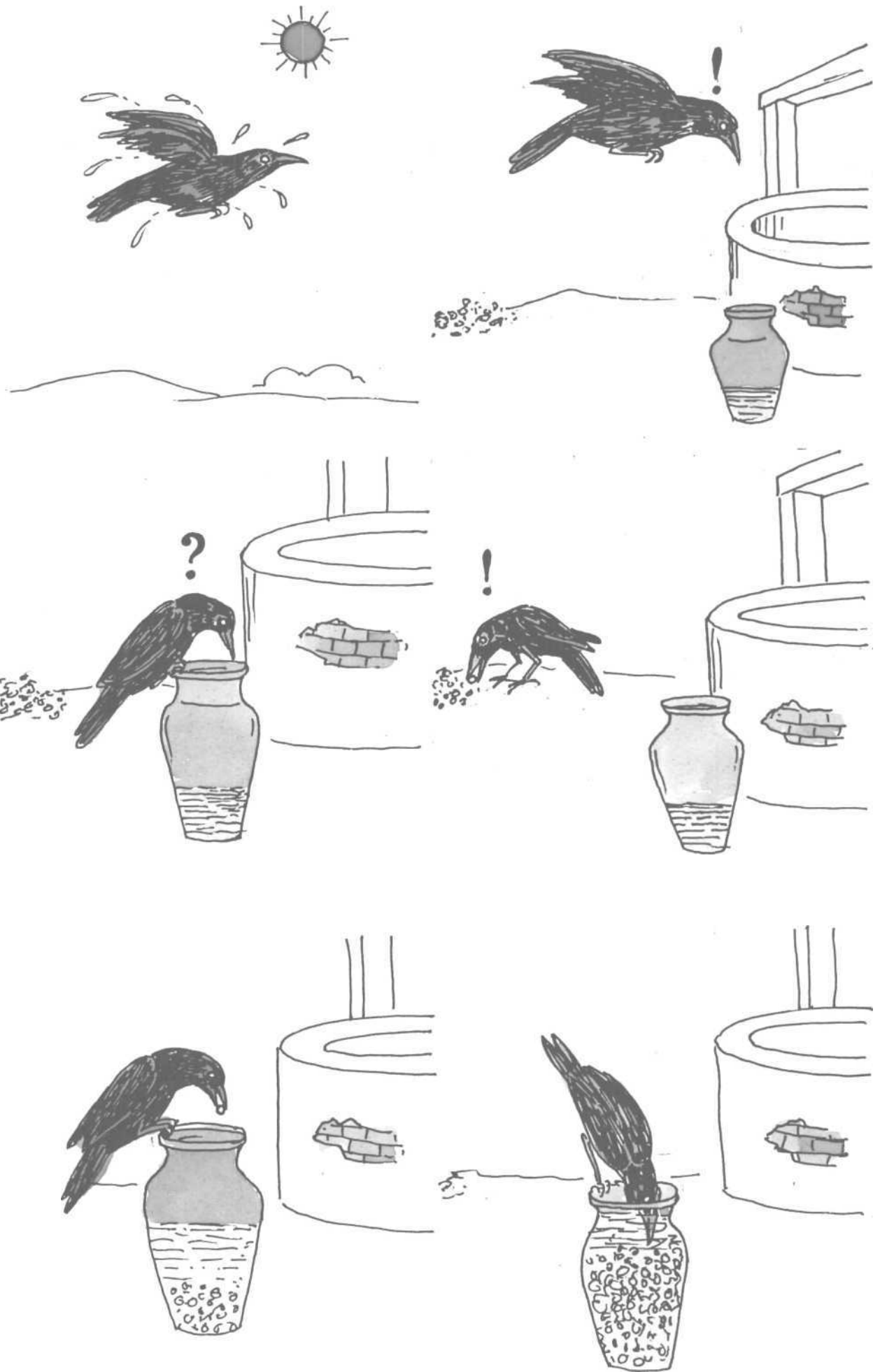
Tell the story to the child. Let him watch you if required. If the child has difficulty in comprehending the story keep the picture series in front of the child. At the end of the story, ask the questions given above in the same order. Do not give visual clues while asking the questions. If the child does not answer the question first time, repeat the question. If he does not answer after the repetition, the therapist answers the question. The same procedure is done for all the lists one after the other.

Instruction to the child:

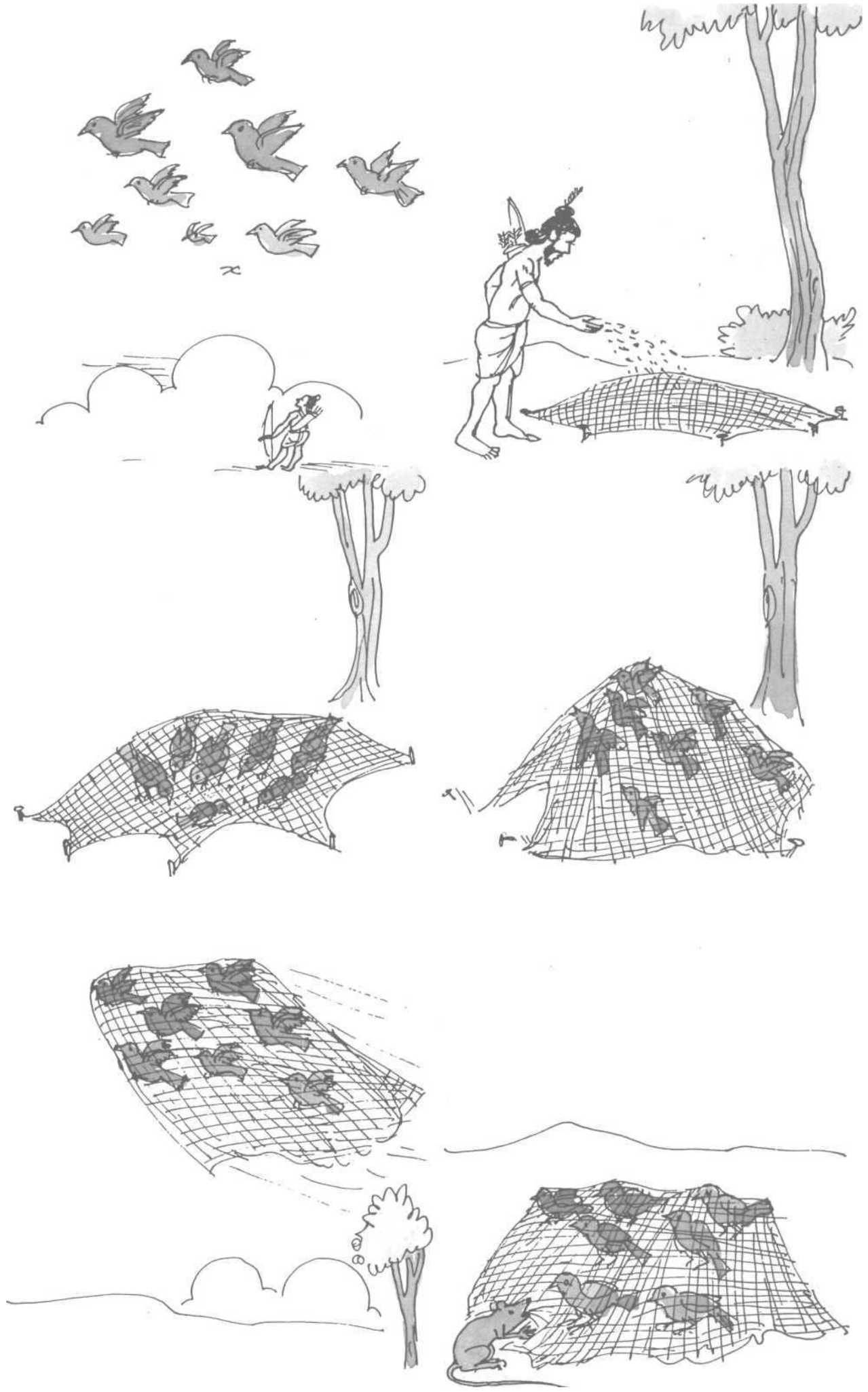
Listen to the story carefully which I will tell you. I will keep the pictures representing the story on the table. Once I finish telling the story, I will ask you questions related to the story. You have to answer the question.

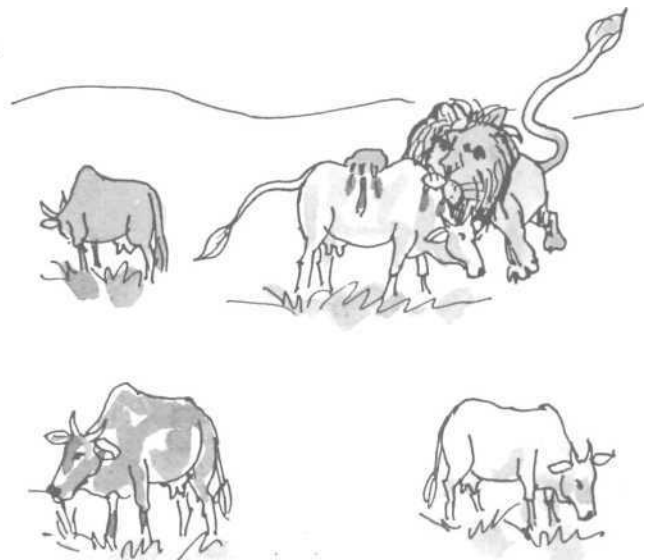
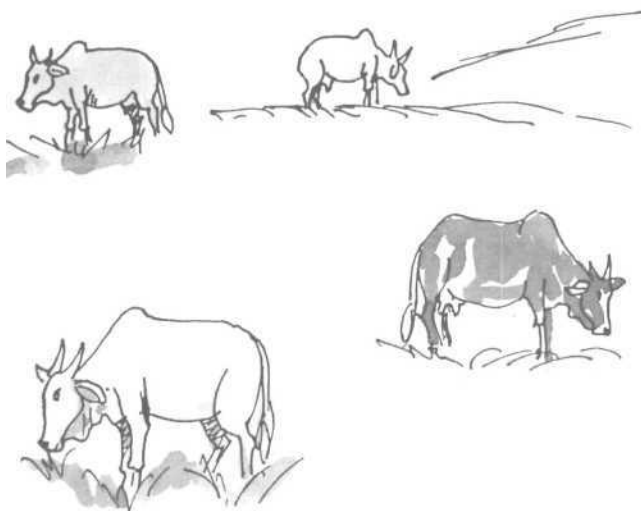
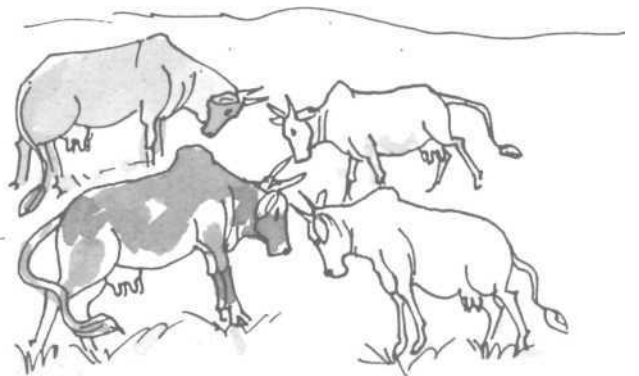
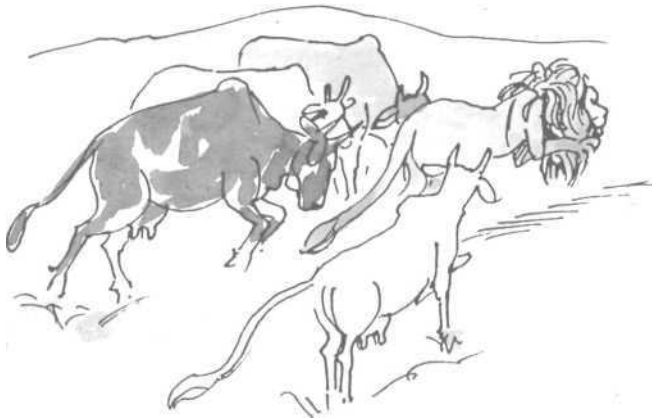
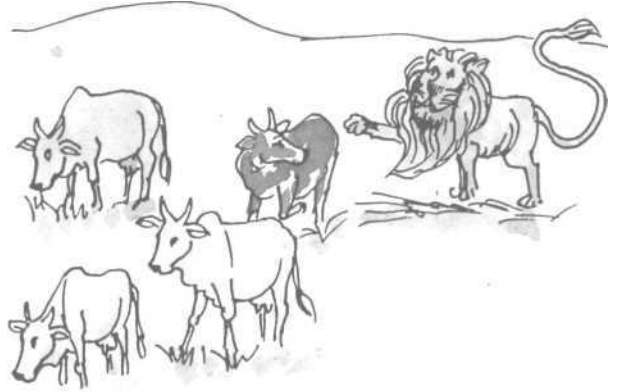
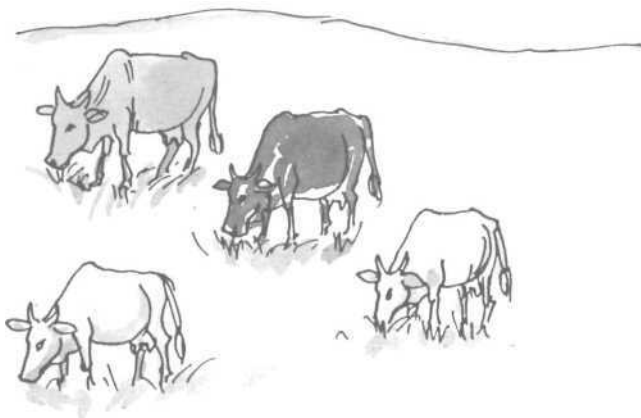
Scoring system and reinforcement:

Whenever the child responds correctly, put a bead into the bowl. If the child gets greater than or equal to 3/5 in a list give him or her a golden star. If the number of beads is less than three, the activity has to be carried out again.









Lesson 14 - Comprehension of commands.

Practice items: Close your eyes and say "hello".

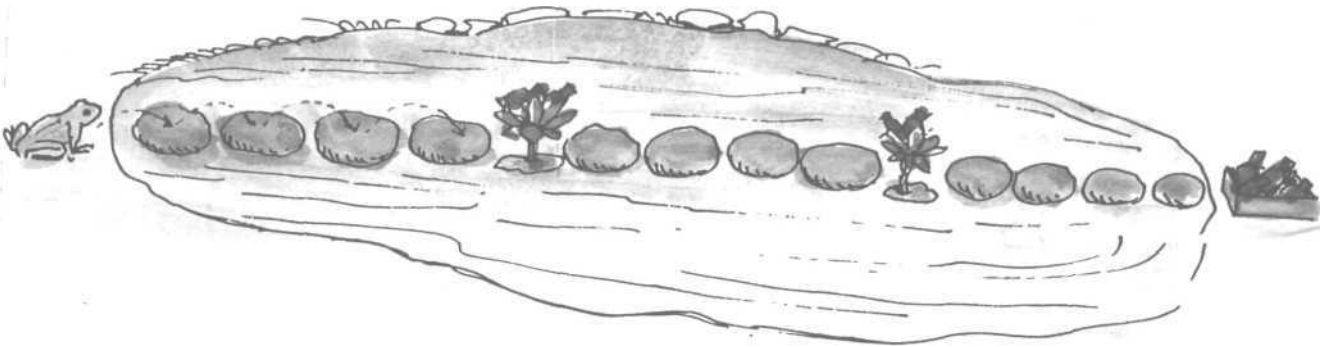
Shake your hands.

List

- 1) Close your eyes.
- 2) Walk backward.
- 3) Clap your hands.
- 4) Wipe your mouth.
- 5) Stamp your feet.
- 6) Point to your nose.
- 7) Open your mouth and say "aah".
- 8) Turn back and run.
- 9) Jump forwards and touch your feet.
- 10) Bend down and rub your nose.
- 11) Stand straight and sing a song.
- 12) Wash your face and sit on the chair.

Procedure to carry out the activity

Materials required: (i) For scoring and reinforcement, have a picture of a pond as given below, a toy frog and toffees.



Instructions to the clinician

Present each command, one at a time. The child has **to respond to the command** by carrying out the activity. Once the child has responded present the next command.

Instruction to the child

Listen to the command which I give you and then carry out the command.

E.g.: Clinician says "Shake your hands".

The child has to shake his hands.

Scoring system and reinforcement

Keep the following picture of a pond with twelve stones on the way. After every four stones, a lotus with a toffee in it is placed. A toy frog is kept on one end of the pond and box of toffees on the other end. For every correct response the frog will jump from one stone to another. After every four correct response the child will get a toffee and at the end if he correctly carried out all twelve items, he gets a box of toffee as reinforcement. If the score is greater than 10/12, the next lesson can be taken up.

Lesson 15 - Comprehension of unrelated questions.

Practice items: Where does a man live? (house, ocean, sky, forest),

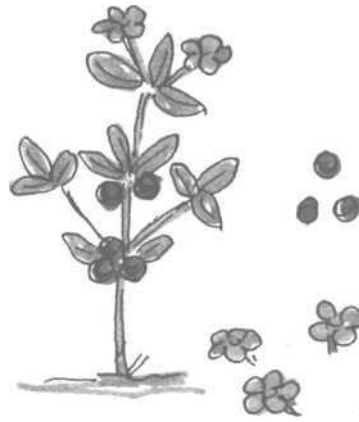
List

- 1) What is the colour of an apple?
(red, blue, yellow, black)
- 2) How many fingers are there in one hand?
(one, five, four, three)
- 3) Which vehicle flies in the sky?
(bus, scooter, helicopter, jeep)
- 4) Which body part is used to see?
(eye, ear, nose, mouth)
- 5) Which flower grows in water?
(rose, lotus, jasmine, daisy)
- 6) Which one lives in water?
(fish, dog, cat, rat)
- 7) What is the colour of the sky?
(yellow, blue, red, brown)
- 8) Which object is used to write?
(hammer, pen, eraser, sharpener)
- 9) Which object is used to climb up?
(ladder, car, floor, door)
- 10) Which object is used to cook?
(gas stove, fridge, TV, radio)

Procedure to carry out the activity

Materials required: (i) For carrying out the activity, the pictures of all the items given as choice are to be used.

(ii) For scoring and reinforcement, a picture of a plant and paper flowers and fruits, as given below, are to be utilized.



Instructions to the clinician

Make some ten colourful flowers and fruits with paper. Say the first question without giving the multiple choices. If the child responds correctly by saying the correct answer, move to next question. Otherwise repeat the question once again showing the pictures of the four multiple choices. Once the child answers the question and points to the correct picture, move to the next question.

Instruction to the child

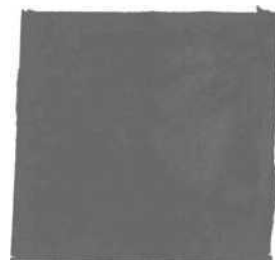
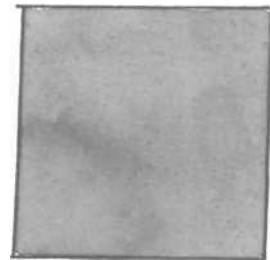
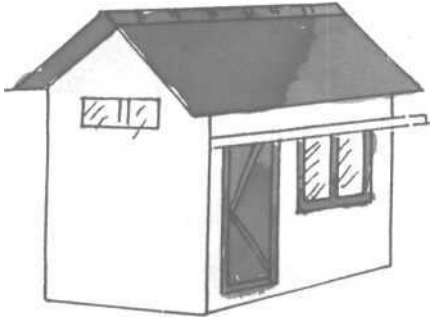
Listen to the question carefully which I ask and then you have to answer the question. If you cannot, I will give you four choices. You have to select the right answer from the four choices and give the correct picture to me.

E.g.: Clinician says "Where does a man live?"

The child has to answer "House" or give the picture of house to the clinician.

Scoring system and reinforcement

If the child responds correctly when the pictures of the four choices are not given, he can stick a fruit on the plant. If the child answers correctly only when the four choices are given, he can stick a flower on the plant. He will get golden star for each fruit and silver star for each flower. The maximum number of stars he can collect is 10, for this lesson.



1

5

4

3

