

## AUDITORY DISCRIMINATION TRAINING IN ARTICULATION THERAPY—A PILOT STUDY\*

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It has long been believed that articulation errors are the result of faulty discrimination and that discrimination training is a pre-requisite for the correct production of the desired sound. Auditory training has been considered as the first step in the correction of defective sounds Van Riper and Irwin (1958), Van Riper (1939), Berry and Eisensohn (1956), Kronval *et al*, (1954). However this stand is not universal. Winitz (1969) suggests that while phonemic distinction can be learned before articulatory productions, articulatory experience will affect later discrimination. He concludes that sound discrimination learning is necessary but not a sufficient condition for sound learning (Winitz 1965). Contrary to this Ladefoged (1967), Backus and Beasley (1951) and Kumudavalli (1973) have questioned the importance of discrimination training in the learning of articulation.

Ladefoged believes that the ability to produce difference between sounds often comes before the ability to hear the differences. According to him correct articulation can be achieved through understanding of the articulation involved but it is often achieved by the trial and error accompanied by the reinforcement for correct responses and it almost invariably preceds perception. This lends support to the motor theory of speech perception suggested by Liberman and others (1969 a, b) according to which in the course of his experience a speaker (and listener) learns to correct speech sounds—with their appropriate articulations. In times these articulatory movements and sensory feed-back (or, more likely, the corresponding neurological processes), become part of the perceiving process mediating between acoustic stimulus and its ultimate perception. Our experience with the deafness has shewn that articulation can be acquired without

- formal training in auditory discrimination. However, a pilot study was undertaken to find out whether articulation improvement can be achieved without training in auditory discrimination in normally hearing subjects also. Such a study it was felt would test the statemet of Perkins (1977) who says that if speech is perceived, by decoding how it was produced, then the; most productive route to correcting defective speech would not be through ear training—the traditional approach.

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The subject was 12 year old boy studying in VIII standard in a Kannada medium school. He was diagnosed as having mis-articulations of retroflex and mild stuttering.

### Methodology

1. *Pre-evaluation:* In the first stage no therapy was given. Fifty non-sense words and fifty meaningful words with the retroflex sounds and their cognate alveolars were dictated to him. One of the authors of this paper presented the words in dictation. As a control on her articulation a normal listener/speaker, a student of speech pathology also took dictation.

A recording was also made of the case reading the fifty non sense words and the fifty meaningful words. A portable Bush Cassette Recorder was used for the recording.

The case returned to school without any therapy. He came back for therapy after a lapse of five months. The case had not received any therapy in the meanwhile and this period served as a control for the therapy session.

2. *Pre-therapy evaluation:* The case was recorded reading the same material as in the pre-evaluation.

(Several things went wrong with the tape recorder and recording was completed only after several attempts)

Dictation of the same material was again given to the case and to two normal listeners. One of the normals had studied Hindi as second language and the other had Telugu as mother tongue but had studied Kannada as second language. Neither of these two was the control for the first session.

### Therapy

A Grason Stadler Record player-cum-Auditory Trainer was used during therapy but for a different purpose than what it is intended for. The therapy consisted of eleven sessions of 30-45 minutes each.

The therapy was so planned that the case would get no ear training. He was also deprived of any auditory feed back of his own speech. The therapist gave no auditory clues for the sounds to be articulated. Articulation therapy was restricted to the ಣ / ನ (n-n) and ಳ / ಳ (l-l) contrasts. Phonetic placement and reinforcement for positive changes were the techniques used. The case was asked not to practice at home.

Masking noise was given to both the ears to avoid any auditory feed-back. A record of wind noise was used as the noise source and this was fed to both the ears via the head phones of the auditory trainer. The intensity of the noise could be varied. Though the intensity could not be quantified it was seen to that the noise level was adequate to mask the speech of others and his own feed-back.

The noise was always kept at a level at which the case reported he could not hear himself. Sortie test instructions were given and he did not hear them because of the masking effect.

Therapy instructions were given through the headphones without the noise and the noise was turned on before the case responded to them. The therapist refrained from masking the retroflex sounds under therapy in isolation or in words as models. Whatever retroflex sounds were—perhaps there in running speech, (therapy instructions) were the only retroflex sounds the case heard during the therapy session. Therapy instructions used only visual and orthographic clues. *l* and *ʃ* and *ʒ* and *n* were written in Kannada as stimuli to elicit the sounds. Phonetic placement descriptions were given. Silent articulatory movements were demonstrated and analogy with hands was used to remind him of retroflexion. The mirror was used in therapy. Whenever the case articulated correctly or even when he approached correct articulation he was reinforced by smiles, pats, plus marks on paper and by the therapist saying good and very good. These were not heard but the case could see the approval in the mirror.

Therapy proceeded from isolation to syllables in contrast. Later on it was extended to words in contrast (with alveolar and retroflex sounds) such as ಅನ್ನ-ಅಣ್ಣ, ಕಲ್ಲು-ಕಳ್ಳು (Kallu-KaZ/u).

3. *Post-therapy evaluation'*- After having therapy for 11 sessions, the case was dictated to the lists of meaningful and nonsense words along with a normal listener. At this point again he was recorded reading the same material.

After a lapse of one week he was again dictated to, along with all the normal listeners who were used as controls before.

The recordings were presented before four judges (All of them have knowledge of Speech Pathology) and they were asked to notice the differences in case's speech between Pre-evaluation, Pre-therapy and Post-therapy evaluations. However the judges found evaluating the tapes very difficult as the speech was too fast.

His speech was re-evaluated by the same Speech Pathologist who examined him, when he reported to the Institute for the first time.

## RESULTS AND DISCUSSION

The diagnostic comments made by the Speech Pathologists before and after the experiment are given in Table 1.

TABLE 1	
Before	After
Misarticulation of retroflex sounds	Inconsistent—other sounds are normal
• SP/SW—as-in Saraswathy, tr/Chatri, sh/Bus stop, dh. Sometimes distorted d/t kidaki (inconsistent)	Articulation of , "Ksh" as in Lakshmi is consistent
Misarticulates more in spontaneous running speech	

It is evident by this that the case had learnt to articulate the retroflex sounds correctly. The mis-articulations seen on re-evaluation were distortions of the alveolar sounds on which the case tended to use retroflexion. It is interesting to note that while therapy was provided only on two of the retroflex sounds *n* and *l*, the case showed an improvement on the other retroflex sounds also. He only showed an occasional over compensation of retroflexing alveolar sounds. Follow-up enquiries at home also indicated that the child's articulation had improved. The tape recordings were not analysed as the judges were not confident of their response validity.

This shows that articulation improvement could be achieved even when all auditory stimulations or auditory feed-back were withheld during therapy. Ear training does not seem to be necessary for articulation improvement.

Table-2 shows the discrimination scores of the cases compared to the normals at various stages during and after the experiment.

When more than one normal was used as control the poorest normal scores have been taken (however the differences among the normals was generally small).

TABLE 2. Showing the discrimination scores of the cases compared to the normals at various stages of the experiment.

Sample	Case		Normal		Difference	
	S	N.S.	S	N.S.	S	N.S.
1. Pre-evaluation. 10-5-75	40	18	49	48	9	30
2. Pre-Therapy 9-10-75	38	25	49	44.5	11	19.5
3. Post-Therapy 2-11-75	37	31.5	44	29.5	7	-2
4. Follow-up	41	39	50	49	9	10

It is interesting to see that the case generally did better on the meaningful words than on the nonsense syllables. Knowledge of the word and redundancy available in speech permitted better performance even in the absence of good discrimination. It is apparent from the table-2 that the case's discrimination scores improved consistently through therapy. It may be also noted that even when the normals had difficulty with the discrimination task, the case performed comparatively well.

The duration between the test is also interesting. Five months elapsed between the pre-evaluation and pre-therapy evaluation. The time gap between pre-therapy evaluation and post-therapy evaluation was 23 days only, the follow-up evaluation was done four days after the post-therapy evaluation.

It may be seen that there was an improvement in the discrimination scores between pre-evaluation and pre-therapy evaluations. This may be due to a number of factors.

1. Spontaneous improvement over time.
2. Better understanding of the task involved,

*Or*

3. The fact that he was exposed to the lists a few times in the attempts of recordings.

However, it is noted that the case improved in discrimination at a much faster rate during and after the therapy. This improvement may be attributable to the improvement in articulation. The conclusions of this pilot study indicate that ear training is not essential for articulation therapy.

Discrimination improvement followed articulation improvement lending some support to the motor theory of speech perception. However, a detailed study in this approach and a larger number of subjects would be necessary before the results are generalised to all the cases.

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