Computer-Based Speech Perception Training for a Preschooler with Hearing Aids

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Introduction

- Need for speech perception training.

- Make sense of the auditory information.

- Discriminate the acoustic features of suprasegmentals, vowels, and consonants to perceive speech.
A few studies have investigated the use of daily computer-based speech perception training to improve speech perception (Kosky & Boothroyd, 2001; Zwolan, McDonald, Connor, & Kileny, 2000; and Rhody, 2004).

This study systematically evaluated the effectiveness of a computer-based program on the speech perception abilities of a preschool child fit with hearing aids.
Participant

- 4-year-old female with a moderate sloping to severe sensorineural hearing loss, bilaterally
- Identified with hearing loss at age 3
- Mild hearing loss with binaural amplification
- Enrolled in a multi-age total communication classroom
- Nonverbal performance IQ: above average
Research Design

- A single-subject multibaseline across behaviors was used.

- Three speech perception skills were measured:
  - syllable discrimination
  - consonant phoneme discrimination
  - vowel discrimination
Dependent Variable-Daily Probe Measure

- Three pictures (one target, two foils) were placed in front of the participant, and she pointed to the picture that represented the auditory signal presented.

- Once treatment started, the targeted skill, syllable discrimination or consonant discrimination, was measured daily, while the untargeted skill, vowel discrimination, was measured weekly.

- 20% of the daily measures were scored by a graduate clinician as well as the student investigator. Interjudge reliability was 100%.
Dependent Variable—Pre- and Post-Treatment Test

- *Speech Perception Instructional Curriculum and Evaluation (SPICE)*
  - Criterion-referenced checklist of auditory skills

- *Central Institute for the Deaf’s (CID) Phonetic Inventory*
  - Speech production inventory of vowels, diphthongs, and initial consonants.
Independent Variable-Computer Program

- *Listen-Hear* (Avaaz Corp.):
  Normal Hierarchy of Speech
  Sound Acquisition

- Sequence of module sections:
  - Syllable discrimination
  - Consonants discrimination
  - Vowel discrimination
Independent Variable-
Computer Program

That's not it.
1. **Syllable Discrimination**
   - Baseline Mean: 47.14%
   - Training Mean: 81.43%
   - Maintenance Mean: 95%

2. **Consonant Discrimination**
   - Baseline Mean: 45.33%
   - Training Mean: 59.09%

3. **Vowel Discrimination**
   - Baseline Mean: 72%
Percent of Skills Acquired on the *Speech Perception Instructional Curriculum and Evaluation*

![Bar chart showing percent of skills acquired in Suprasegmental Perception and Vowel and Consonant Perception before and after treatment.](image-url)
Percent of Phonemes Acquired on the Central Institute for the Deaf Phonetic Inventory
Discussion

- Speech perception improved.
  - Syllable discrimination daily training probe
  - *SPICE*
- Articulation skills have improved.
  - *CID’s Phonetic Inventory*
- Viable alternative to traditional speech perception training
Impressions of the Computer Program

- Easy to administer
- Used male and female voices
- Small number of words
- Vocabulary
- Field size
- Negative reinforcement animations
Future Research

- Replication
- Wider variety of ages, hearing losses, and cognitive levels
- Effects on language
Questions???