Error Analysis of Initial Sound Segmentation in Children with Hearing Loss

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Abstract

Purpose: Despite technological advances in amplification, average reading levels for children with hearing loss have not increased in the past several decades. Phonological processing deficits may contribute to poor reading outcomes. The purpose of this poster is to present the types of errors children with hearing loss make in initial sound segmentation.

Method: Two preschool children participated in individual initial sound segmentation intervention in this multiple probe design single subject study. Assessment occurred at the beginning of each session.

Results: Children’s errors shifted from whole word to single sound responses during intervention. Participants exhibited different types of errors.

Conclusions: Error analysis of responses of children with hearing loss can provide insight into their ability to segment initial sounds and inform intervention targets.

Background Information

Children with hearing loss show delays in developing spoken language and in acquiring preliteracy skills that profoundly impede reading development. The average 18-year-old with severe hearing loss reads on a fourth grade level (Paul, 2009). Despite technological advances in amplification (e.g., cochlear implants), the average reading level for this population has not increased in the past several decades (Trybus & Karchmer, 1977; Paul, 2009). The National Reading Panel (2000) identified phonemic awareness instruction as a key component of early literacy instruction. The development of phonological awareness in children with hearing loss seems to follow the same sequence of development as in children with typical hearing (James et al., 2005). However, children with hearing loss tend to perform more poorly than children with typical hearing on phonological awareness tasks (Most, Aram, & Andorn, 2006).

The purpose of this poster is to present the types of errors children with hearing loss made in initial sound segmentation.

Method

Participants were two four-year-old children with hearing loss (CHILD1 and CHILD2). Participants used amplification, spoke English as their native language, had normal cognition, passed an articulation screening, and did not use manual communication.

Children individually participated in initial sound segmentation intervention and assessment in this single subject design. Growth in initial sound segmentation skill was reported in Werfel and Schuele (2010). In addition to measuring growth in initial sound segmentation skill in response to intervention, the types of errors that children with hearing loss made over time are of interest. An error analysis coding scheme was developed to allow for analysis of error responses. Errors were graphed by assessment session and total number of errors in each category were calculated for each child for analysis.

Error Analysis by Session

Results and Discussion

CHILD1 had 1031 total errors. The majority of CHILD1’s errors were responses that were not the target sound of the word but one of the sounds taught in intervention (n = 794). The next most common error was providing a whole word that was not the target word (n = 254). Less common errors included providing a phrase (n = 28) or a sound not taught in intervention but assessed in the study (n = 27). CHILD1 almost never repeated the target word (n = 8), responded with a sound not assessed or taught in the study (n = 7), responded with a letter name (n = 2) or responded with a group of sounds that was not a whole word (n = 3).

CHILD2 had 1067 total errors. The majority of CHILD2’s errors were responses that were not the target sound of the word but were one of the sounds taught in intervention (n = 599). The next most common error was repeating the target word (n = 228). Less common errors included responding with a sound not taught in intervention but assessed in the study (n = 53), a sound not taught or assessed (n = 86), a whole word that was not the target word (n = 41), or a phrase (n = 3). CHILD2 almost never responded with a letter name (n = 4) or provided no response (n = 3).

Both participants’ errors changed over the course of the study. At the beginning of the study, their errors consisted mostly of whole word responses and changed to providing a sound response when initial sound segmentation skill increased.

Both participants made a shift from holistic to incremental analysis of the sounds in words early in intervention. However the specific pattern of errors differed for the two participants. Thus, error analysis of responses of children with hearing loss can provide insight into their individual paths of development and inform intervention targets for individual children.

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Selected References
