

Technology-Assisted Language Intervention for Children who are Deaf or Hard-of-Hearing

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Abstract

The long term objective of this research is to facilitate language development and subsequent communication and social functioning of young children who are deaf or hard-of-hearing (DHH). Despite early identification and intervention, hearing loss continues to have a life-long impact on independent functioning among children who are deaf or hard-of-hearing (DHH)¹. Based on recent findings, many of these children are at risk of language delay, showing delays in “performance on grammatical, lexical, and phonological abilities,”² and they tend not to use sentence context in their perception of spoken language.³ Children who are DHH also demonstrate significant delays in pragmatic language skills.¹ There is a lack of evidenced-based practice regarding language interventions for this population. Augmentative and alternative communication (AAC) is an evidence-based approach that targets core communication deficits in children with complex communication needs.⁴ Research has suggested that children who are DHH would likely benefit from interventions that directly teach language structures.² We proposed to combine augmentative and alternative communication (AAC) strategies with up-to-date and socially acceptable technology (i.e., iPads®) to enhance language development in children who are DHH who continue to display clinically significant gaps in language. This pilot study focuses on the feasibility of such an intervention and the effectiveness of the intervention on language development.

Aim

Our long-term hypothesis is that given the presenting age and language skills of the child, the technology-assisted language intervention (TALI) will have stronger effects than standard therapy for children who are DHH. Our hypothesis focused on this pilot study is that the TALI will improve language development over time.

Augmentative and alternative communication as a model for language learning

AAC will be implemented as a strategy to target language acquisition through building vocabulary, grammar, and social language skills. While AAC strategies are frequently used with other populations, this technology has not been tested nor widely accepted as a means of language learning for children who are DHH, creating a gap in evidence-based intervention for language development in this population of children.

Method

The study will examine 10 children who are DHH in a single-case experimental design who participate in the TALI. Outcomes will be assessed pre- and post-intervention via

assessment with the Preschool Language Scale (PLS-5) or the Oral and Written Language Scales II (OWLS). The TALI will use the same cycle that is currently used clinically for AAC therapy at our medical facility. There will be a 24 week intervention: 6 weeks therapy with SLP trained in AAC, 6 weeks at home, 6 weeks of therapy with SLP, and 6 weeks at home. During these sessions, the SLP will explain individualized goals to target as well as train the parent and the child (participant) in using the device. The 6 week intervals at home include only participants and families and are designed for continuing therapy in a self-directed manner.

Children will receive a tablet (iPad®) which will include and be locked into the TouchChat HD AAC with WordPower application.

TouchChat HD – AAC with WordPower (by Silver Kite) is a full featured language system with QWERTY keyboard with word prediction. It is set to the highest level (linguistically and motorically) so the child can access the vocabulary and linguistic functions necessary for growth. Communication partners use the device as part of a shared learning experience to model language, learn and explore the language system.

Inclusion criteria

Children who participated in a study on language and cognitive abilities will be recruited to participate in the TALI study.

The following inclusion criteria will apply:

- Permanent bilateral hearing loss (of any degree)
- Nonverbal IQ >40
- Language delay as measured by standardized language assessments
- Ages 5-10 years (children were enrolled in original study age 3-6 years)

The following exclusion criteria will apply:

- Children with developmental disabilities or syndromes that directly impact communication (such as autism spectrum disorders)
- Children with significant motor impairments
- Children with a nonverbal IQ <40
- Children with unilateral hearing loss

Although AAC is often used among children with significant motor impairment, this study is focused on using AAC technology for language learning among children who are DHH without motor impairments.

Results

Frequency of tablet use will be monitored on the tablet via the iKeyMonitor software application, assessing the duration and number of times a child engages the TALI at home. Language samples will periodically be taken and analyzed for mean length of utterance, use of various morphemes, and overall language complexity to assess linguistic productivity using Systematic Analysis of Language Transcripts (SALT) software. At the end of the intervention cycle, we will ask families for open-ended

feedback on the use of the device. At the end of the 24 weeks, participants will receive a standardized language assessment to assess progress.

Conclusion

At the conclusion of this study, the data will be used to design a large scale trial. It is our hope that this pilot study will reveal that technology-assisted language intervention is beneficial for children who are DHH and that we will be able to utilize this information in comparing TALI to traditional therapy methods.

References

1. Yoshinaga-Itano, Christine. The missing link in language learning of children who are deaf or hard of hearing: Pragmatics. *Cochlear Implants International*. 2015; 16(S1):S53-S54.
2. Nittrouer S, Sansom E, Low K, Rice C, Caldwell-Tarr A. Language Structures Used by Kindergarteners With Cochlear Implants: relationship to Phonological Awareness, Lexical Knowledge and Hearing Loss. *Ear & Hearing*. 2014;35:506-518.
3. Conway CM, Deocampo JA, Walk AM, Anaya EM, Pisoni DB. Deaf Children With Cochlear Implants Do Not Appear to Use Sentence Context to Help Recognize Spoken Words. *Journal of Speech, Language, and Hearing Research*. Dec 2014; 57:2174-2190.
4. Kent-Walsh J, Binger C. Fundamentals of the ImPAACT Program. *Perspectives on Augmentative and Alternative Communication* (ASHA Special Interest Group 12). April 2013;22(1):51-61.



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Program Planner/Instructional Personnel's Name: Jareen Meinzen-Derr

Course Title: Technology-Assisted Language Intervention for Children who are Deaf

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