

Research In Focus: A Weekly Digest of New Research from the NIDILRR Community

A Novel Technology-Based Intervention May Reduce the Language-Learning Gap for Children Who are Deaf or Hard of Hearing

A study funded by the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR).

Children who are deaf or hard of hearing (DHH) can face challenges in language learning. Research suggests that children who are DHH have improved language development when their needs are identified early in infancy and they access early intervention services. Early intervention services and therapy guide families in understanding how to promote language development in their child. However, language deficits may remain an ongoing challenge for children. While hearing technology can help children access sound, it is not the same as in hearing children. For children whose families are wanting their child to develop spoken language, one approach that has shown some promise to address these challenges is the use of augmentative and alternative communication (AAC). AAC technology in combination with language learning software and with the guidance of a speech-language pathologist may help children who are DHH improve their speech production, language growth, and communication skills. In a recent NIDILRR-funded study, researchers looked at potential benefits of an AAC technology, the technology-assisted language intervention (TALI) coupled with speech therapy in children who were DHH with language delays. The researchers wanted to see whether these children would show more improvement in language skills compared to their peers who only had traditional speech therapy.

Researchers at the project on [Improving Outcomes Using Aided Augmentative and Alternative Communication for Children who are Deaf or Hard of Hearing](#) enrolled 42 children who were DHH in the study. The children were between the ages of 3 and 12, had at least mild hearing loss in both ears, demonstrated language delays in previous assessments, and used spoken English as their primary language. The children were randomly assigned to one of two groups: The TALI group, and a comparison group. The children and parents in the TALI group met with a speech/language pathologist (SLP) once a week for 6 weeks for an hour-long therapy session. During the session, the SLP used an iPad with AAC and language learning software which offered visual and audio support to demonstrate and repeat language concepts. The SLP used the combined software and AAC to encourage the child to build and practice longer and more complex messages. This was followed by 6 weeks when the child used the same technology at home to practice on their own. They then repeated the same process of 6 weeks of weekly hour-long therapy with the SLP, followed by another 6 self-guided weeks at home for a total of 24 weeks. The children in the comparison group received weekly, hour-long SLP therapy sessions over a total of 24 weeks. The sessions targeted language and communication by speech-language pathologists with expertise in supporting language in children who are DHH, but without the support of AAC.

Before the first therapy sessions, researchers tested the children's language skills, including their ability to understand and express themselves through spoken language. They also recorded 20-minute language samples on audio or video as the child played or spoke with an SLP. Additional language samples were recorded every 6 weeks for the TALI group and every 12 weeks for the comparison group. The researchers analyzed these recorded samples to find the average number of morphemes (the smallest meaningful piece of a word) a child used, the average number of words they used in a turn of conversation, and the number of different words they used in the sample. Finally, researchers tested the language skills of children in both groups again after 24 weeks.

When the researchers compared progress of the TALI and comparison groups between the baseline and final assessments, the children in the TALI group made greater progress than those in the comparison group in the average number of morphemes, the average number of words used in a turn of conversation, and the number of different words used in a session. The children in the TALI group also showed greater improvement in their ability to understand and express themselves in spoken language as evaluated on standardized testing.

The authors noted that this study did not compare results between age groups within the TALI or comparison groups and suggested that future research may help determine at what age the TALI may be most effective. The authors also suggested that it may be beneficial to include a larger sample as well as more diverse populations of children and settings in future research.

The results of this study suggest that the TALI may have potential to narrow the language learning gap for children who are DHH. The visual and audio cues, repetition, and consistent modeling for verbalization that AAC offers may help children build the skills they need to be independent communicators--which may positively impact social, behavioral, academic, and employment outcomes as they progress through life.

[To Learn More](#)

The [Rehabilitation Engineering Research Center on Alternative and Augmentative Communication \(AAC\)](#) conducts several research and development projects on AAC, including natural language processing and computer-mediation, to support effective communication for children and adults with limited access to language.

Research In Focus examined the use of AAC to help children with autism develop language skills in [Animation May Help Children with Autism Spectrum Disorders Learn to Use Symbol-Based Communication Devices](#) and [Digital Books with Dynamic Text May Show Promise to Help Young Children with Autism Spectrum Disorders Learn Sight Words](#).

To Learn More About this Study

Meinzen-Derr, J., et al (2021) [A technology-assisted language intervention for children who are deaf or hard of hearing: A randomized clinical trial](#). Pediatrics, 2021. This article is available from the NARIC collection under Accession Number J85652.

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NARIC operates under a contract from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR), Administration for Community Living, Department of Health and Human Services, contract #GS-06F-0726Z.