**Feature Story**

**Study Shows Variety of Approaches Help Children Overcome Auditory Processing and Language Problems**

by Linda Joy

For children who struggle to learn language, the choice between various interventions may matter less than the intensity and format of the intervention, a new NIDCD-sponsored study suggests. The study, led by Ronald B. Gillam, Ph.D., of Utah State University is [online](http://jslhr.asha.org/cgi/content/abstract/51/1/97)in the February 2008 *Journal of Speech, Language, and Hearing Research.*

The study compared four intervention strategies in children who have unusual difficulty understanding and using language, and found that all four methods resulted in significant, long-term improvements in the children’s language abilities. The aim of the study was to assess whether children who used commercially available language software program Fast ForWord-Language had greater improvement in language skills than children using other methods. This program was specifically designed to improve auditory processing deficits which may underlie some language impairments. Children who have auditory processing deficits can jumble the order of sounds that are heard in close sequence. Researchers believe that this deficit can interfere with vocabulary and grammar development.

“These results show that any of a number of intensive educational approaches can make a tremendous difference for children whose language and auditory processing skills are lagging,” says NIDCD director James F. Battey, Jr., M.D., Ph.D. “Even play with peers seemed to support the improvements the children in this study made.”

“We had a very positive outcome,” says Dr. Gillam. “Our results tell us that a variety of intensive interventions that we can provide kids will improve auditory processing and language learning.”

While most children are chattering easily by the time they are toddlers, about seven percent struggle to speak, read, and understand language despite having adequate hearing, intelligence, and motor skills. Children with language impairment have trouble learning language or expressing their thoughts through language. They often have difficulty learning new vocabulary words or sentence structures, comprehending what’s said to them, holding conversations, or telling stories. These children tend to perform poorly on measures of auditory processing and standardized tests of language development. Many of these children are hindered academically throughout their formal education, explains Dr. Gillam.

To address auditory processing problems, a different group of language researchers developed the computer software package called Fast ForWord-Language several years ago. The program uses slow and exaggerated speech to improve a child’s ability to process spoken language. As children advance through the program, subsequent language exercises use gradually faster and less exaggerated speech.

Dr. Gillam’s team designed a study that would compare Fast ForWord-Language to three other interventions. He and colleagues at the University of Kansas, the University of Texas at Austin, and the University of Texas at Dallas enrolled 216 children in the trial. All were between ages six and nine and had been diagnosed with language impairment.

The children, from Northeast Kansas, Central Texas, or North Texas, were randomly assigned to receive one of four possible interventions. In addition to Fast ForWord-Language, the trial included another computer-assisted language intervention, an individual language intervention with a speech-language pathologist, and a nonlanguage academic enrichment intervention that focused only on math, science, and geography.

The other computer-assisted language intervention, which used Earobics and Laureate Learning Systems software, differed from Fast ForWord-Language in not using slow or exaggerated speech. Groups of children worked on the computer intervention exercises at their own pace wearing headphones and supervised by a speech-language pathologist.

Children assigned to the individual language intervention worked one-on-one with a speech-language pathologist for the duration of the trial. In their sessions, the children read picture books that contained a variety of age-appropriate vocabulary words.

In the academic enrichment intervention, children worked on educational computer games designed to teach math, science, and geography. This intervention was delivered in the same way as the language-focused computer interventions. It served as a comparison group against which the researchers could measure the results of the language interventions.

All of the interventions were delivered in an intensive, six-week, summer program that also included day camp activities such as arts and crafts, outdoor games, board games, and snack time. The children attended the program five days per week for three and a half hours per day. They practiced their assigned interventions for an hour and forty minutes each day. The children took a standard language test—the Comprehensive Test of Spoken Language—and completed a variety of auditory processing measures at the beginning and end of the program as well as three and six months afterward. The children in all four groups demonstrated statistically significant improvement on the auditory processing measures and the language measures immediately after their six-week program.

The children showed even greater improvement when their language skills were tested again six months later. Even a subgroup of children with very poor auditory processing skills made improvements on the auditory processing tasks and the language measures. About 74 percent of children in the Fast ForWord-Language group made large improvements on the language measures. Sixty-three percent of children in the computer-assisted language intervention group made large improvements. Of those who worked with a speech-language pathologist, 80 percent made large gains, and in the general academic enrichment group, almost 69 percent made large gains. These gains are much larger than the improvements that have been reported in long-term studies of children who have received language therapy in public school settings.

The researchers were surprised that such a large percentage of the children who worked on the math, science, and geography computer games improved their auditory processing and language skills. They speculate that all the children may have benefited from the opportunities to listen carefully, to decide on an appropriate response based on what they heard, and to practice language skills with each other. The recreation and play time built into each day of the six-week program gave the children the chance to form friendships with peers who were functioning at similar language levels.

The intensive delivery of the interventions—500 minutes per week—may also have benefited kids in every intervention group. In comparison, school systems typically offer speech-language pathology services to students with language impairment for 30 minutes twice per week.

“I urge speech-language pathologists to engage children with auditory processing problems and language impairments in activities in which they have to listen carefully, attend closely, and respond quickly, and to do it in an intense manner,” says Dr. Gillam. “And clinicians should provide children with ample opportunity to converse, socialize, and interact with kids at their same developmental level.”

The language intervention trial was also supported by a grant from the National Institute of Child Health and Human Development to the Kansas Mental Retardation and Developmental Disabilities Research Center at the University of Kansas.