Training the Brain: A New Program for Struggling Students

By Martha S. Burns, PhD, ccc-slp

For years, parents, teachers and health professionals have sought ways to help struggling students master the skills necessary to succeed in school. Often, these children's parents express frustration because they believe their child is "bright." In some cases, the cause of a child's difficulty may be identified as a Learning Disability, or is associated with the challenge of learning English as a second language. But often, the reason a child is not reaching academic expectations is not clear. Educators and health professionals alike may be at a loss to explain why a student is having trouble learning to read or master other aspects of the general curriculum.

A few years ago, two research teams joined forces to develop a new method to reach children who must struggle to learn. One group of researchers at Rutgers University had spent decades studying children who had trouble developing oral language skills (Tallal & Piercy, 1973). These researchers discovered that many children who are exceptionally bright in some areas of learning struggle in other areas because they process information differently. Just as some adults are good visual learners and others are good at physical learning, they found some children have a great deal of difficulty learning by listening to speech. These children may be very skilled musically, physically or visually, but when they have to learn from what others tell them, they process a little too slowly to keep up. Because so much early learning is accomplished through listening, these children are at a disadvantage. Sometimes teachers remark that the child has "poor listening skills." A parent may say the child seems to "tune out" at times. It is understandable that if a child has trouble listening, he or she will miss a great deal of what is "taught," especially in the early years of school. The researchers found that some of these children "fall through the cracks" because they may appear to be unmotivated or to have attentional difficulties. To some adults, "poor listening skills" may seem indistinguishable from "not trying."

The other research team was at the University of California at San Francisco. They had spent decades studying the ways the brain changes with certain types of learning. This group of neuroscientists was interested in developing techniques that could train a child's brain to make learning easier. Michael Merzenich, the lead researcher in that center, was struck by the findings from Rutgers and believed, from his earlier research, that children could be trained to process auditory information differently. Dr. Merzenich and a colleague, William Jenkins, had found that the brain of a child or adult is actually plastic and can change processing speed and skill through very structured skill training. What was most exciting is that the neuroscientists found that these changes could occur after relatively short periods of intensive training — 6 to 8 weeks. Thus, a child who prefers to learn visually could be trained to become a rapid auditory learner as well (Merzenich et al., 1996).

The programs these researchers developed are the FAST FORWORD family of programs. There are four programs that provide varying levels of language, reading and learning skills necessary for success in school. In just 4 years since their introduction, over 100,000 children nationwide have successfully completed one or more of the Fast ForWord programs. The programs are unique in that they are intensive (100 minutes/five days a week) and train fundamental listening, language and reading skills. They literally address the cause of academic difficulties so that children process information faster and more easily.

Early controlled research studies of Fast ForWord programs indicated that children make one-and-one-half years' growth in language and processing skills after 6 weeks of training. Research conducted since the early studies corroborated those findings in a variety of settings, with thousands of children.

Elise Temple and her colleagues at Stanford University have conducted the most exciting new independent research with this program showing actual changes in the brain after completion of the program. The first research conducted at Stanford studied three adults with a history of reading difficulties who underwent brain imaging before and after using the Fast

ForWord language program. Although the adults no longer complained of reading problems, they had struggled with learning how to read in school. Nonetheless, on tasks that required listening to rapid changes in sound, their brains looked very different from adults without a history of reading problems. After completing the Fast ForWord language program, two out of three of the adults showed brain changes, so that they resembled the brains of adults who never had reading problems (Temple et al., 2000).

In a second study, the same Stanford research team investigated whether children with reading problems would show the same brain changes after completing the Fast ForWord program. They summarized their results as follows: the children with reading problems "improved on real word reading and non-word decoding ($p<0.0006$ and $p<0.0003$). There was no change in scores in 12 normal matched reading controls who were tested twice. Increased neural activity in dyslexic children after remediation was seen bilaterally in a number of regions (which showed no change in the 12 controls), which included left interior frontal and left-temporo-parietal language regions. Increased activity in dyslexic children in response to remediation was also observed in right hemisphere regions, including the frontal insula, auditory cortex, and middle temporal gyrus. These results show that specific remediation can affect both the behavior and neural response of dyslexic children" (Temple et al., 2001).

For many parents and teachers nationwide, the Fast ForWord programs have changed the lives of children who otherwise would not have been able to reach their potential in school. However, health professionals are often unsure of which children might benefit from the intensive Fast ForWord training programs. Research conducted by school systems has shown that children who are struggling with academics and show the following characteristics are excellent candidates for the programs:

- Known Learning Disability or Dyslexia
- Repeated problems following oral directions
- Problems learning to "sound out" words
- Problems with rhyming or identifying letters that go with sounds
- Struggle with mathematical word problems
- Often "tune out" during classroom activities without known emotional problems
- Slow or "tortured" oral readers
- Often ask "what did you say?" or frequently misunderstand others
- History of speech or language problems
- English as a second language
- Identified as having Central Auditory Processing Disorders or Auditory Processing Disorders

If an educator or health professional suspects that a child might benefit from the Fast ForWord family of programs, there are two routes that can be followed. First, many schools and school districts nationwide have adopted the Fast ForWord programs though site licenses and offer the program to children identified by the school. The other option would be to contact a speech–language pathologist or learning center in the area that provides the Fast ForWord program on a tutorial after-school or summer basis. Often, those clinics or centers have group treatment programs where several children can participate in the Fast ForWord program for the short time required (usually 6 to 8 weeks), either in a laboratory setting or in their home using their own computer. Because of the short duration of the program it is easily adaptable around extracurricular activities and school vacation schedules.

For more information about the Fast ForWord programs, visit the Web site at www.scientificlearning.com or call (888) 665-9707. Dr. Martha Burns can be reached by e-mail at mburns@scilearn.com.

ABOUT THE AUTHOR

Martha S. Burns, PhD is an Adjunct Associate Professor at Northwestern University in Evanston, Illinois. She is also Senior Clinical Specialist for Scientific Learning Corporation.

REFERENCES

Merzenich, M.M. et al. (1996). Temporal processing deficits of language-learning impaired children ameliorated by training. *Science, 271*, 77-81.

Tallal, P. & Piercy, M. (1973). Defects of non-verbal auditory perception in children with developmental aphasia. *Nature, 241*, 468-469.

Tallal, P. et al. (1996). Language comprehension in language-learning impaired children improved with acoustically modified speech. *Science, 271*, 81-84.

Temple, E., Poldrack, R.A., Protopapas, A., Nagarajan, S., Salz, T., Tallal, P., Merzenich, M.M., & Gabrieli, J.D.E. (2000). Disruption of the neural response to rapid acoustic stimuli in dyslexia: evidence from functional MRI. *Proceedings of the National Academy of Sciences,* December 2000.

Temple, E., Poldrack, R.A., Deutsch, G.K., Salidis, J., Tallal, P., Merzenich, M.M., & Gabrieli, J.D.E. (2001). Dyslexic Children Show Neural and Behavioral Effects of Remediation: Evidence from fMRI. SFN abstracts, 2001.