

# FM for children with dyslexia

Phonak Field Study News

## Study shows improved brain physiology and reading performance

In a study published in the September 4, 2012 edition of the Proceedings of the National Academy of Sciences, the Auditory Neuroscience Lab at Northwestern University directed by Professor Nina Kraus reported improved brain physiology and reading performance in dyslexic children who wore Phonak EduLink FM receivers.

In the study, students attending Chicago-area schools serving children with reading impairments were tested on brain function, reading, and phonological awareness before the start of the school year. Then, during the course of the school year, half of these children wore Phonak EduLink receivers tuned to the teacher's voice, half did not. At the end of the school year:

- EduLink users' reading skills improved significantly more than their non-EduLink-using peers (Figure 1).
- Brain function also improved. In particular, EduLink users exhibited less variability in their response to a speech syllable at the end of the school year. When a sound is heard, a sequence of neurons fires. Using electrodes placed on the scalp, it is possible to measure this neural electrical activity. The pattern of neural firing, in theory, should be identical every time an identical sound is heard. However, this is never quite the case. But, a more consistent neural response is indicative of better auditory processing - a root of successful reading. Following a year of EduLink use, children had more consistent brain responses to a speech sound (Figure 2).
- Initial variability in brain function was predictive of reading improvements: children with the least stable brain responses at the beginning of the school year tended to be the ones whose reading skills improved the most.

It is important to note that the reading and neural consistency measures were obtained without EduLinks, indicating that the amplification and clarity they provide are more than in-the-moment advantages. Rather, their use, probably through mechanisms of enhanced attention to relevant sounds, fundamentally alters the basic functioning of the auditory system.

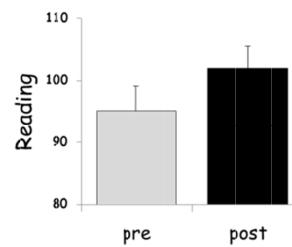


Fig 1. Phonological awareness (CTOPP phonological awareness cluster) improved significantly after FM system use for one year ( $p<0.001$ ).

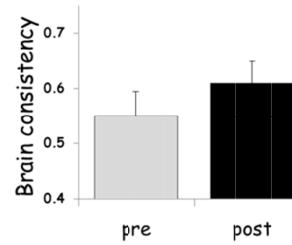


Fig 2. After FM system use for one school year, children with dyslexia had more consistent speech-evoked brainstem responses, particularly for the response to the consonant transition ( $p<0.05$ ).

### References

Jane Hornickel, Steven G. Zecker, Ann R. Bradlow, Nina Kraus. 2012. Assistive listening devices drive neuroplasticity in children with dyslexia. *Proceedings of the National Academy of Sciences* doi: 10.1073/pnas.1206628109.

For more information, please contact Hans Mülder at [hans.mulder@phonak.com](mailto:hans.mulder@phonak.com)

#### Product Note

The Phonak EduLink FM receiver has been replaced by Phonak iSense (see [www.isense.phonak.com](http://www.isense.phonak.com))