



Auditory processing disorder management/intervention

What is done now?

Overview of selected procedures

Useful, practical, easily applied

Vocabulary building

Contextual cues aid word understanding

Choose words in consultation with classroom teachers

Teacher selects words from future lessons

Builds self-esteem because child knows the words when discussed in class

Vocabulary building is similar to auditory closure – filling in missing information

Auditory memory enhancement (AME)

Memory is a problem in children with APD

Informal auditory training techniques

Can tap multiple processes

Should be done several times a week, both at home and at school



Summary: What I and some others think will work well

(in common with most education and psychotherapeutic approaches)

Ask for evidence!

(from Musiek, JAAA, 1999)

Management of Developmental APD

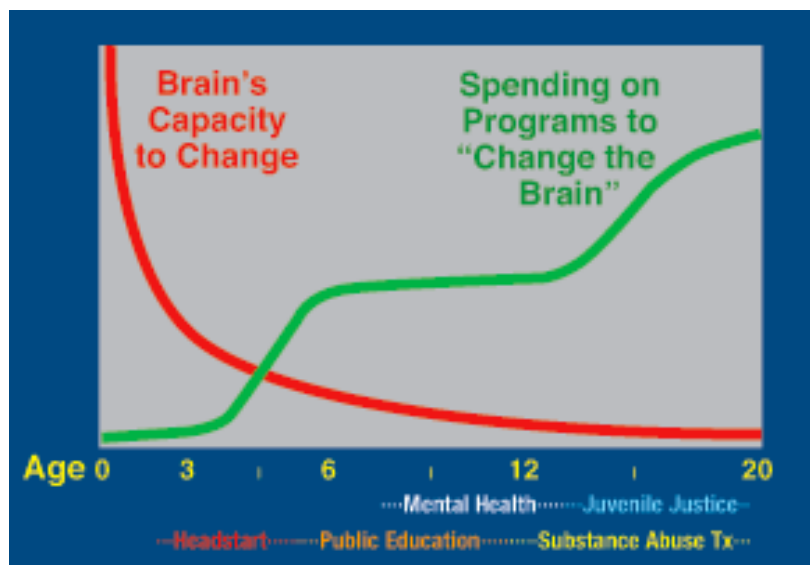
- Prevention:
- Social awareness
 - Early education
 - Physiological screen* EEG/MRI early detection of hearing loss
 - Behavioral screen* Eye tracking to detect hearing loss
 - Genetic screen* Early detection of molecular factors
- Early intervention: *Reading with children J.S. Hutton et al. Pediatrics, 2015
- Rehabilitation:
- Communication strategies Speech-reading, seating, architecture.
Neuman et al., Ear Hear., 2010
 - *Communication ('FM') device Johnston et al. IJA, 2009
 - *Auditory training

Reading with children: improves everything?



Books From Birth AAP Literacy Recommendations (2014)

Shared reading “**stimulates optimal patterns of brain development** and strengthens parent-child relationships at a critical time in child development, which, in turn, **builds language, literacy, and social-emotional skills that last a lifetime.**”



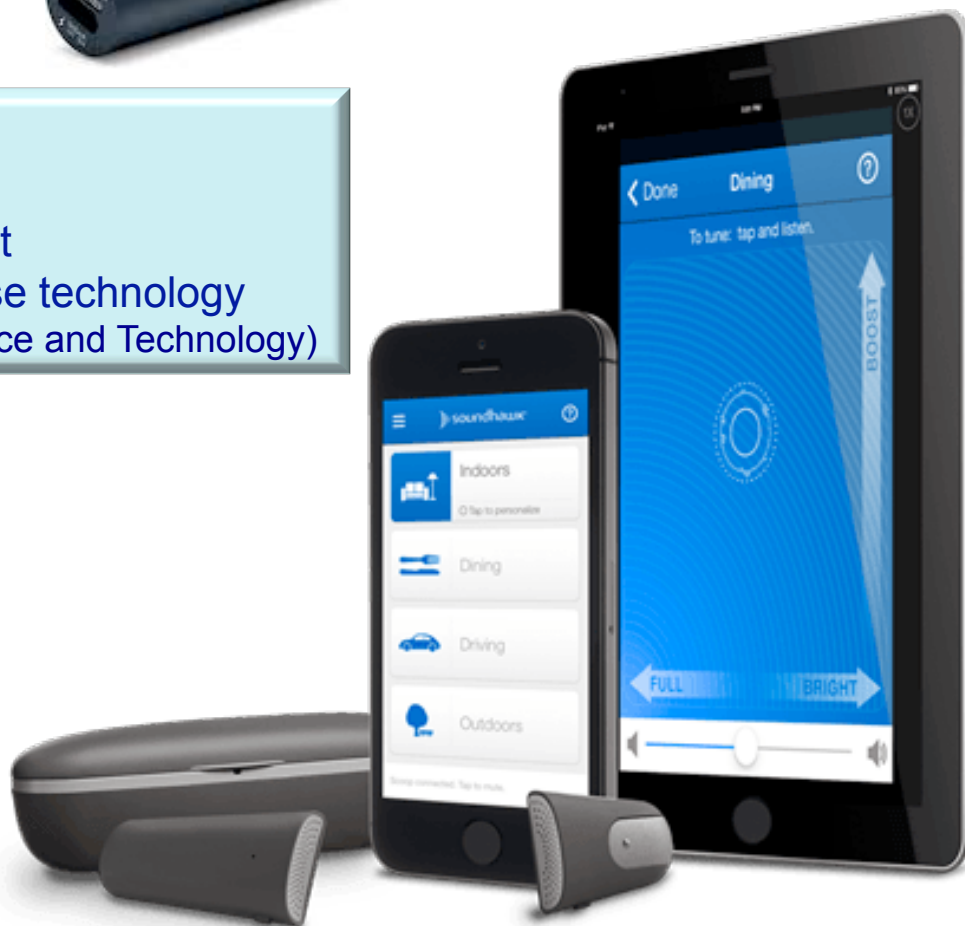
(thanks to John S. Hutton, MD)

Communication devices improve hearing

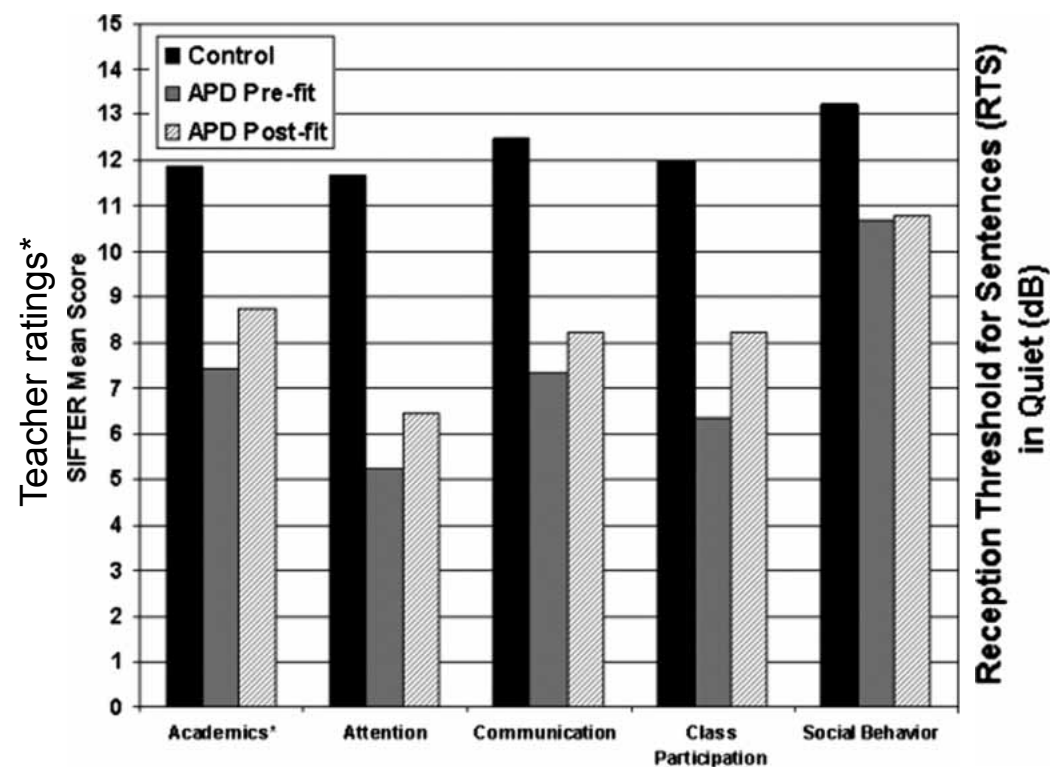


Prices high and access complex:

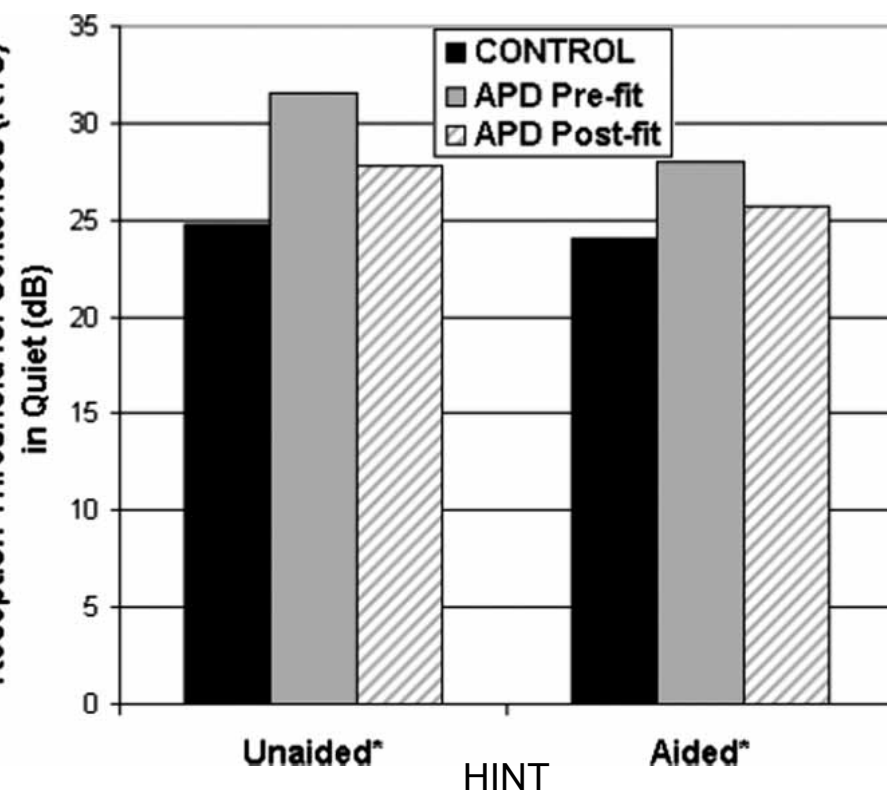
- Reduce the overall costs of technologies
 - Stimulate innovation and tech development
 - Increase number of people with HL who use technology
- (Christine Cassel, MD, President's Council on Science and Technology)



Communication devices – lasting benefit?



*Also used LIFE self-report measure

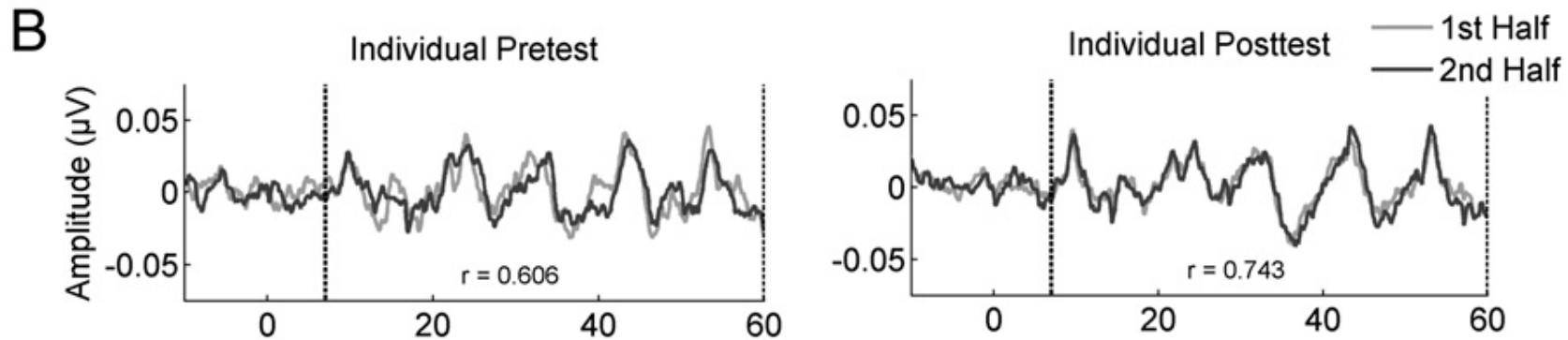


- 10 normal hearing children with APD
- All used Edulink for an academic year
- Edulink improved some teacher ratings but not SRT
- Note, no Control before/after data (test-retest effect?)

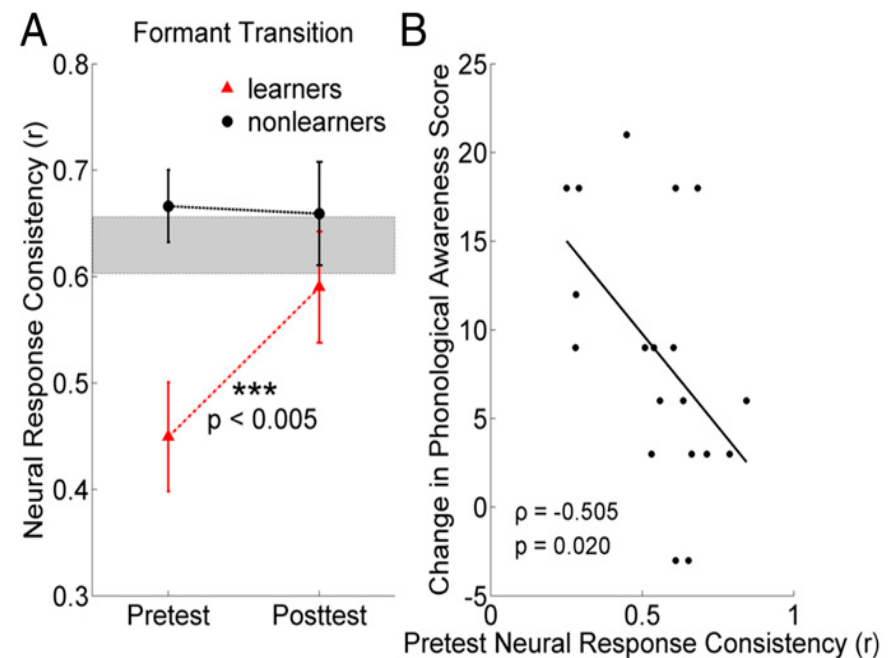
“Multiple benefits of personal FM system use by children with auditory processing disorder (APD)”

(from Johnston et al., IJA, 2009)

Communication devices improve reading and language

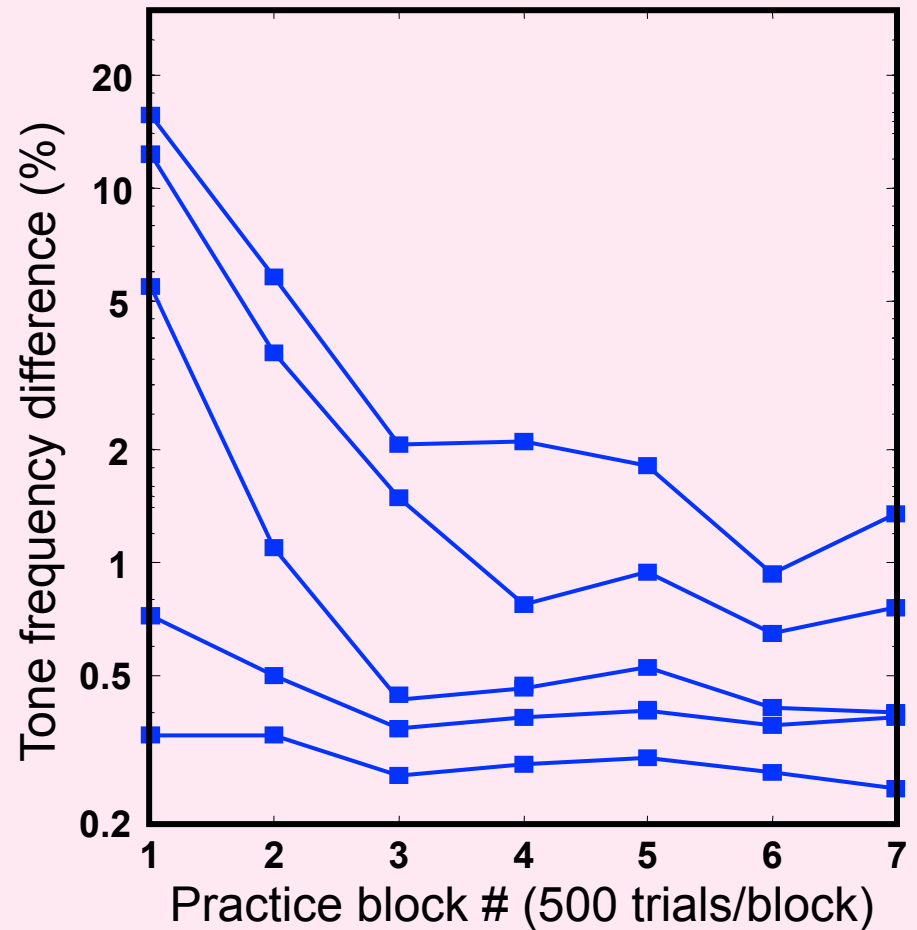
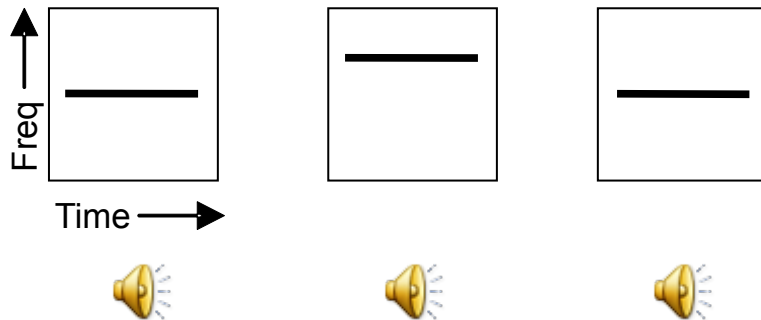
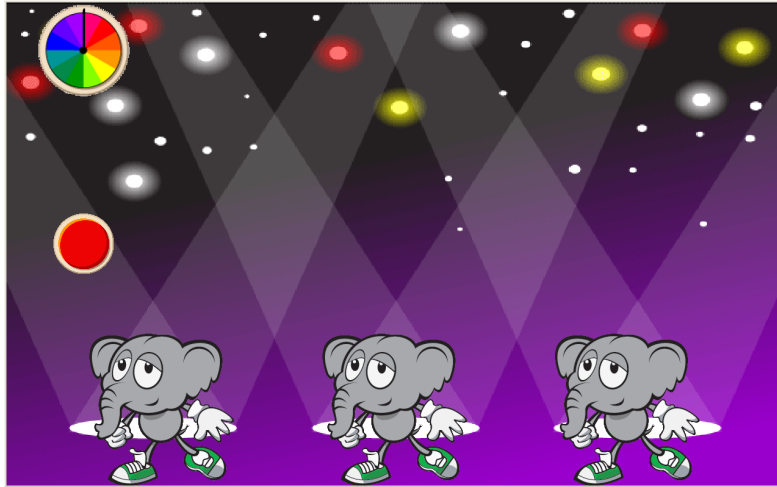


- 38 normal hearing children with dyslexia
- 19 used Edulink for an academic year
- Edulink improved reading and phonology







(from Hornickel et al., PNAS, 2012)

Auditory training improves hearing

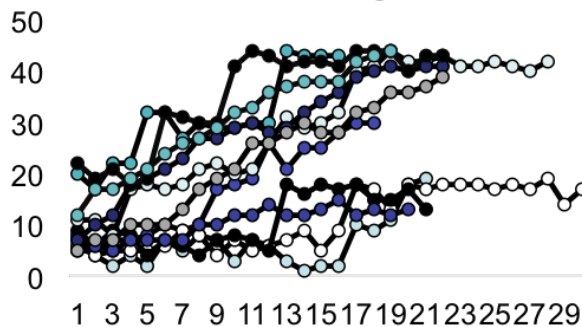


Auditory and cognitive training study

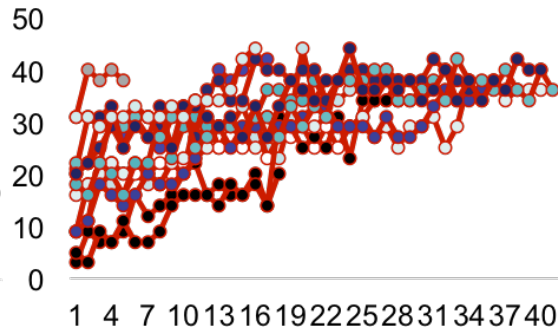
Attention	Memory	Auditory	Placebo
			
Sustained Selective (dichotic) Visual	Working Non-verbal Short-term	Speech in noise Backward masking Frequency discrimination	Drawing and painting on-line activities

- 58 typically developing children (5-8 y.o.)
- Trained on 1 of 5 tasks for 12 weeks (45 mins/week)

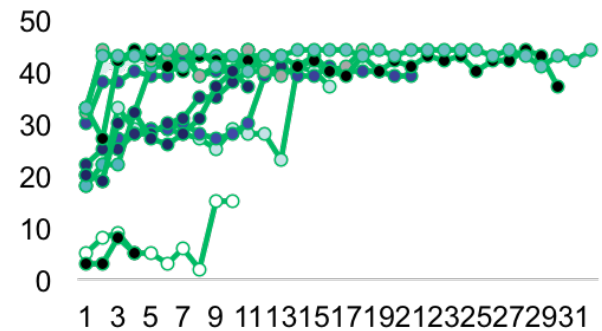
LEVEL ATTENTION



MEMORY

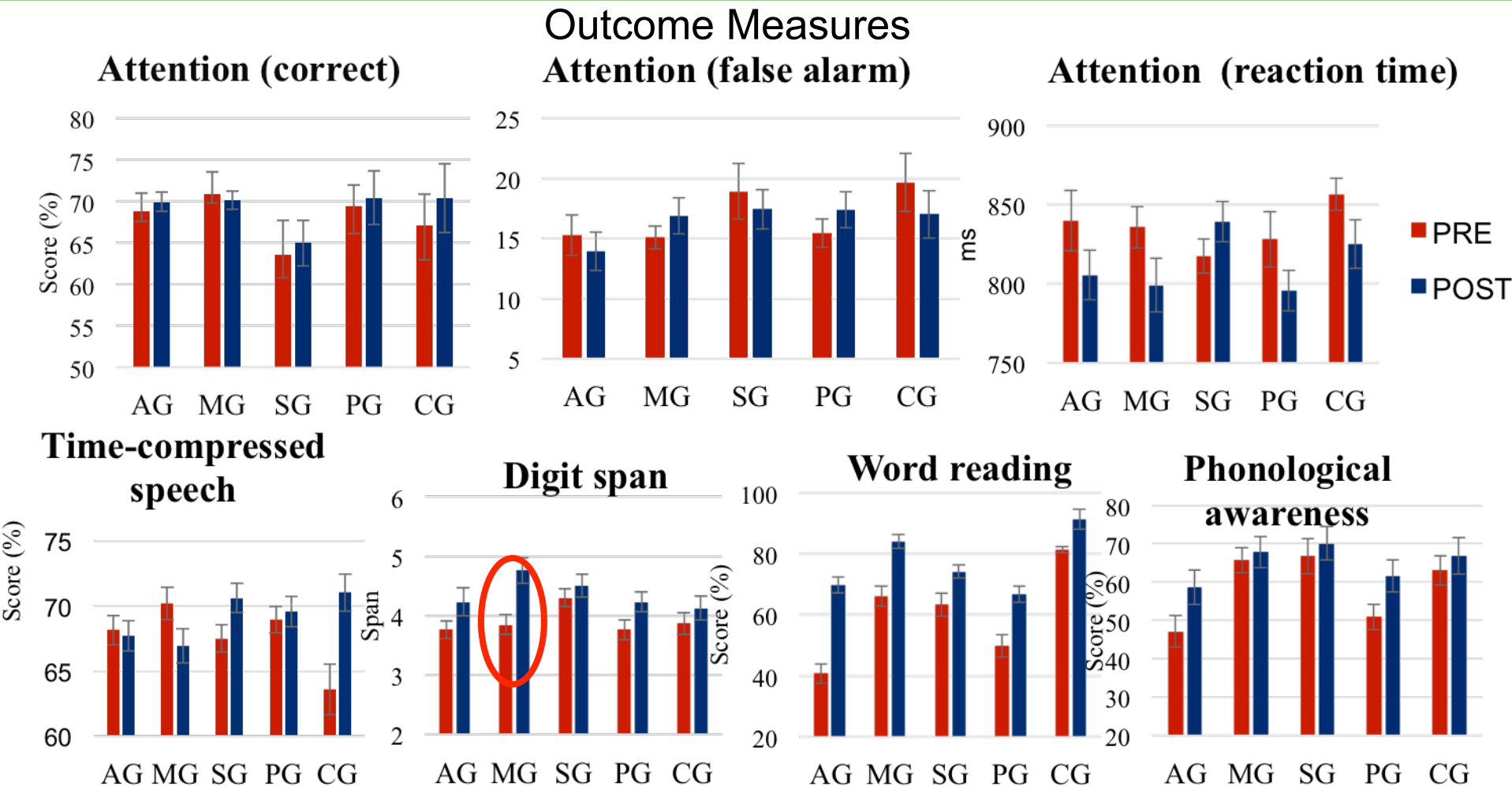


AUDITORY



BLOCKS

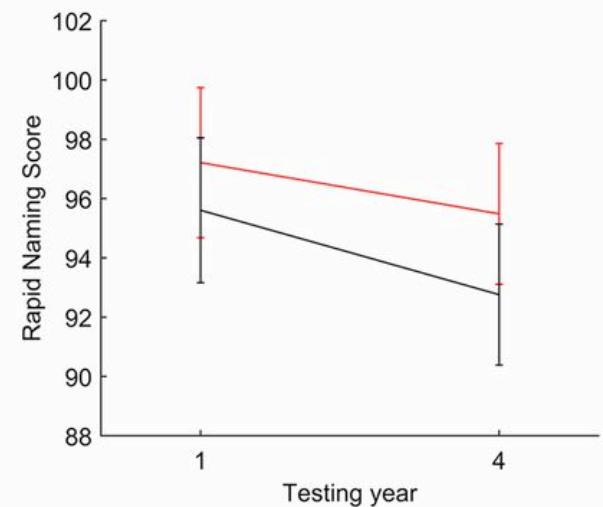
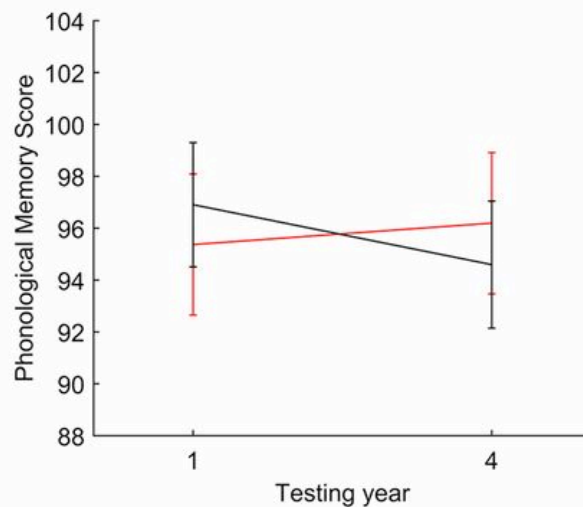
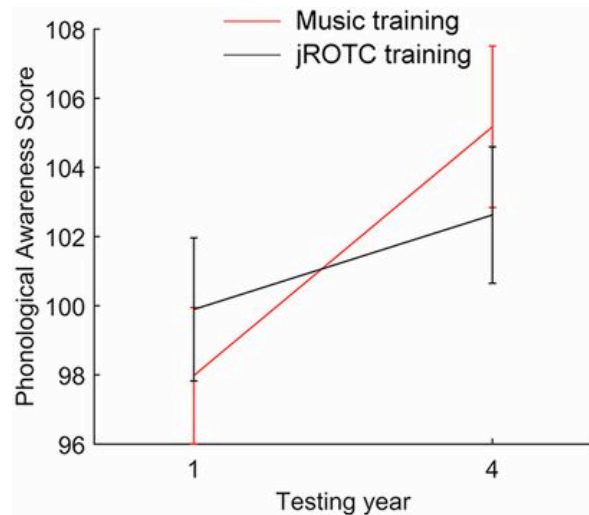
Limited generalization of training



AG – Attention, MG – Memory, SG – Sensory (auditory), PG – Placebo, CG - Control

- Improved on 1 of 5 cognitive tasks (Digit span) re Control groups
- Did not improve on phonology or reading

Long-term training: music



(data from Tierney, Krizman, Kraus, PNAS, 2015)

Long-term training: exercise

“Prospective epidemiological studies provide evidence for physical activity (PA) to be associated with a modest reduction in relative risk of cognitive decline”



“modest support for the effect of PA on preserving and even enhancing cognitive vitality and the associated neural circuitry in older adults . . . The literature on children and young adults, however, is in need of well-powered randomized controlled trials.”

Summary

- There are currently few clear guidelines for the management of APD in children. Almost all interventions lack good evidence.
- Dialogic reading with children has well-recognized benefits
- Wireless communication devices (e.g. FM) offer increased signal/noise ratio. Benefits after removal of device seem modest
- Auditory and cognitive computer training show promise, but may require unrealistic levels of practice
- Music, language learning and physical exercise are all well supported but, again, practice is critical
- In the future, prevention and early intervention should assume a research and clinical priority