

Wednesday, November 8, 2017
8:00 a.m. - 11:30 a.m.

PC3 The Role of Speech in Reading

Chair: Margie B. Gillis, Ed.D.

The symposium includes four presentations that will begin with a consideration of the speech- and auditory-related neural pathways involved in reading and conclude with practical discussions of speech-to-print instruction, including research with speech-to-print materials for instruction and remediation.

The First 500 Ms in Visual Word Recognition: Who Is Talking to Whom?

Piers Cornelissen, Ph.D.

The ability to fluently and, seemingly effortlessly, read words is one of few uniquely special human attributes, but one which has assumed inordinate significance because of its role in modern society. Visual word recognition results from a dynamic interplay between multiple nodes in a distributed cortical and sub-cortical network. To fully understand how it is achieved, we need to identify not only the necessary and sufficient complement of nodes that comprise this network, but also how information flows through the nodes over time. Of particular interest are those parts of the network that support phonological access during visual word recognition. Our recent magnetoencephalography (MEG) studies of visual word recognition and reading have revealed neural activity in the speech-production area of the brain (i.e. Broca's area), which occurs surprisingly quickly – within 100ms of the visual presentation of a written word. When we see a written word, the typical reading brain seems to show surprisingly rapid and dense interconnectivity between vision, language, and speech brain areas more or less right off the bat. Therefore, we need to discuss what implications these neurobiological data may have for reading instruction and intervention.

Timing of Brain Responses to Speech Sounds in Infancy: Predicting Language and Reading Skills

Dennis L. Molfese, Ph.D.

Victoria J. Molfese, Ph.D.

There is ample evidence that the brains of newborn infants who are later identified as dyslexic differ at birth from those of infants who are typically developing. These brain-processing differences reflect sensitivity to differences between speech sounds, differences in the speed at which these sounds are processed, and the brain organization underlying the perception of speech sounds. While infants at birth cannot discriminate all speech sounds, there is evidence in the early months that brain processing of differences between more and more of the speech sounds becomes faster and processing time shorter. However, the brain processing of infants at risk for developing dyslexia reflects slower responses to speech sounds and less efficient brain processing that requires more brain areas to process the speech sounds than compared to infants who are not at risk. This slower processing and use of more brain areas slows down the processing of speech sounds, making it more difficult to discriminate between speech sounds occurring in the words that infants and young children are typically exposed to in their environments.

What Is Speech-To-Print Instruction?

Jeannine Herron, Ph.D.

Margie Gillis, Ed.D.

Young students with letter-sound knowledge, phonemic awareness, and the ability to blend sounds to read words will have greater success learning to read than those who don't possess those prerequisite skills. "The process of learning to read must be understood as a reorganization of the management of oral speech, its transformation from an automatic process (dealing with whole words) to a voluntary, consciously regulated process (segmenting words into individual sounds) which then becomes automatic with practice." (D.B.Elkonin) Dr. Herron discusses this quote from Elkonin and what is meant by speech-to-print instruction. She describes the NICHD-funded development of speech-to-print software and research conducted by Dr. Joseph Torgesen using this software with at-risk first-graders. Dr. Gillis describes NICHD-funded research using speech-to-print apps with preschool students and the results of the study that demonstrated that foundational preliteracy skills can be acquired in playful and interactive ways using iPad technology. Instructional implications based on these results are also shared.

Research to Practice— How the Phonology of Speech Is Foundational for Instant Word Recognition

David A. Kilpatrick, Ph.D.

Reading instruction tends to focus on helping children learn to read new and unfamiliar words. Yet skilled readers already know all or most of the words that they read because of their large and continuously expanding sight vocabulary. How does this happen? Recent advances in understanding orthographic learning has provided important answers. This presentation demonstrates the central role of the phonology of spoken language in the storage of written words for later instantaneous retrieval. The importance of the phonology of speech in reading is not restricted to the phonetic decoding of unfamiliar words. Rather, it is central to the process of making letter strings (printed words) instantly familiar to readers and is thus a key ingredient in reading fluency. The skills needed for this process are also described and specific details provided about how to foster these skills through explicit instructional techniques.

Discloser: Margie Gillis, Piers Cornelissen, Dennis L. Molfese, Victoria J. Molfese, Jeannine Herron, and David A. Kilpatrick have no relevant financial or nonfinancial relationships to disclose.