Cognitive and Neural Processes in Reading Comprehension

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Researchers have established the importance of single word reading to reading comprehension. However, deficits in word reading do not fully explain deficits in reading comprehension, especially for older children, indicating that other sources of comprehension failure need to be investigated. This is particularly illustrated by the existence of a significant number of children (approximately 3%), predominantly ten years of age and older, who are poor comprehenders, but nevertheless attain scores within the normal range on conventional measures of single word reading, which typically measure accuracy only.

In this proposal, we will use both behavioral and neuroimaging methodologies to examine the source of comprehension failure for these types of poor readers and, more generally, examine other sources of comprehension failure across reader types / ranges of reading ability. Poor comprehenders who attain normal single word reading accuracy scores may have deficits in reading comprehension because of poor fluency of word reading; poor fluency may result in a "bottleneck" that impedes comprehension. Deficits in other skills, beyond the word-level (i.e., accuracy and fluency of word reading), may also contribute to impaired reading comprehension. Other skills that have been found to influence reading comprehension include vocabulary, syntax, visual and verbal working memory, ability to make inferences, and planning /organization/monitoring, which could be conceptualized as falling within the overlapping domains of language and executive function.

In this proposal, we will compare poor comprehenders with normal single word reading accuracy scores to children with traditional reading disabilities (i.e., who have poor single word reading accuracy) as well as to children who are normal readers. We will use functional neuroimaging to examine patterns of activation between these groups during single word reading, working memory for words, and sentence comprehension in conjunction with behavioral measures of fluency, language, and executive function. Understanding the behavioral characteristics critical for and the neurological circuits associated with skilled and impaired reading comprehension, as well as their integration, will advance knowledge about poor comprehenders with normal single word reading accuracy scores as well as, in general, processes critical for reading comprehension in children.

Publications

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