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Developmental Differences in Inference Generation and Text Processing in Reading Comprehension of Typically Developing Readers

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Abstract

Reading comprehension refers to the ability to process a complex verbal message, such as a text, which comprises different ideas that are connected to each other in a coherent manner. The comprehension of a text mainly involves the processing of various ideas and the connections between them. However, it also includes basic reading skills such as word decoding, morphological abilities, vocabulary, the ability to reconstruct and produce information from the text, the ability to seek information in the text, and the ability to learn from it and deduce to other texts. Reading comprehension skill is essential to the student's actual functioning at school, considering the fact that the majority of the material in different subjects is taught by using the written texts. With this comprehension the student can expand his knowledge and can understand the material which is taught at his own age level.

The ability to infer is now identified as an essential academic ability in reading comprehension tasks. Making inferences allows us to understand the text on a deeper level, and remember it later on, and has an important role in creating and identifying the connections between the different events in the text. It is known that reading comprehension abilities get better with age, and prior studies that tested the ability to make inferences at various ages found that there are inferences that are developed at early stages and others, the more complex ones, are developed later on. These studies used offline measurements after reading and a think-aloud procedure. These methodologies involve verbal skills, memory and oral expression abilities, and occasionally it's diverted by the way different judges encode the performance. Thus, although these methodologies are informative in studying inferences, they do not study comprehension processes that take place throughout reading.

The present study examined reading comprehension ability among 107 readers, from the 4^{th} grade to the 11^{th} grade, with normal reading abilities and with no ADHD. The study aimed to examine the ability to generate inferences and process textual information at different

stages of development. Specifically, this study explored the development of “online” processing of inferential and textual information by normal children and adolescents, using the 'probing' paradigm that examines the immediate and spontaneous activation of information by readers during reading. The participants in this study were asked to name, as quickly as possible, textual and inferred word-probes, which were presented in three positions within short narratives. Inference probes examined the activation of predictive and bridging inferences, and text probes examined the retention, suppression and reactivation of critical words in the text for inferencing. Naming times to probes were measured using a special Voice Key microphone that measures the time that passes from the moment the word is presented to the moment the participant begins to read it.

The results of this study showed that readers, in all age groups, generated predictive inferences only after the intervening sentence, when the inference became less relevant, presumably because they were slower in representing and maintaining the textual predictive information in working memory. Furthermore, it was found that the readers in all ages successfully retained the text after the predictive sentence. However, there was a difference in the retention of the texts between the groups after the intervening sentence. The older readers were able to suppress irrelevant information that was presented after the predictive sentence. This information was not necessary for understanding of the intervening sentence. The young readers continued to retain this information, although it wasn't necessary. These findings suggest that the ability to filter irrelevant information from the text gets better as we get older.

In addition, although no differences found between the groups in answering most of the questions after reading, young readers had specific difficulty in answering the bridging questions. Moreover, readers in all ages answered more accurately textual questions in than inferential ones, yet, response times to inferential questions was shorter than to textual ones. Regarding the association between reading abilities and working memory and the development

of inferencing and textual processing abilities, no correlation was found between inferences and the capacity of working memory. These findings suggest that normal readers make inferences and process the text in a simple automatic manner which does not require working memory resources. These findings have important implications on the development of intervention programs, especially for the young readers, which will focus on training inferencing and integrative skills.