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What cognitive mechanisms impact language comprehension in individuals with aphasia?

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Introduction

There is converging evidence that there are cognitive nonlinguistic deficits in aphasia and that these cognitive nonlinguistic deficits tend to exacerbate the language impairment of persons with aphasia. For instance, concurrent memory load or on-going interference (even when it is non-linguistic in nature) strongly affects accuracy and speed of linguistic processing in aphasia (Murray, 1999). Generally, the more attention is required to perform a language task, the harder it becomes for individuals with aphasia (Hula & McNeil, 2008). Further, reduced memory capacity negatively impacts language comprehension in aphasia (Wright & Fergadiotos, 2012). Still much remains unknown about joint impact of various cognitive mechanisms or their differential influence on language processing depending on the type of aphasia. The goal of the present study was to investigate the simultaneous influence of different cognitive mechanisms (memory, attention, speed of processing) on auditory language comprehension in individuals with fluent and non-fluent aphasia.

Method

34 native speakers of Russian with aphasia following left hemisphere CVA (15 with non-fluent aphasia, 19 with fluent aphasia) participated. Six tasks targeting cognitive processing (working memory, short term memory, sustained attention, attention focus switching, speed of processing) and a test of auditory language comprehension in – Quantitative Assessment of Speech in Aphasia (QASA; Tsvetkova et al., 1981) – were administrated.

Results and discussion

No significant differences on cognitive tasks were observed between the two aphasia groups. To determine how cognitive factors jointly impact language comprehension multiple linear regression with auditory comprehension score on the QASA as the dependent variable was conducted separately for fluent and non-fluent aphasia.

For individuals with non-fluent aphasia working memory span, sustained attention, efficiency of attention switching, and speed of processing each made a unique and a significant contribution to language comprehension. While for fluent aphasia only speed of processing had an impact.

Our results are compatible with numerous non-linguistic interpretations of non-fluent (agrammatic) aphasia, where overall sluggishness and decreased rate of information processing, along with

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reduced processing capacity are postulated to play a pivotal role in the observed language deficits. While in fluent aphasia a lexical-semantic deficit is considered to be of central importance with concomitant cognitive deficits having only a secondary role.

References

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