

Using a tablet-based task to investigate aspects of non-verbal cognition and its neural correlates in primary progressive aphasia

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Prior research has revealed distinctive patterns of impaired language abilities across the three main variants of primary progressive aphasia (PPA): semantic (svPPA), logopenic (lvPPA), and non-fluent (nfvPPA). By contrast, little is known about whether, and to what extent, non-verbal cognitive abilities (executive functioning (EF) and speed of processing) are impacted in PPA patients at behavioral and neural levels.

Our task of interest was Match: a modified tablet-version version of the Digit Symbol Coding task, designed to measure EF and processing speed. First, we examined whether performance on Match distinguishes PPA patients (n = 61) from healthy controls (HC). Second, we analyzed if performance on Match is differentially affected in the three PPA variants. Finally, performance on Match was related to grey and white matter volume loss.

Overall, PPA patients performed significantly worse on Match than HC. This effect was primarily driven by lvPPA and nfvPPA patients. Worse performance on Match across PPA patients was associated with reduced grey matter volume in the left middle frontal gyrus, superior parietal lobule, and precuneus; and white matter volume in the left parietal lobule. These three grey matter regions were functionally connected in HC.

We revealed differential profiles of cognitive performance across the three PPA variants using the tablet-based Match task. In addition, our neuroimaging findings not only confirm the importance of a network of dorsal fronto-parietal regions for EF and processing speed, but also explain why performance on Match was found to be relatively spared in svPPA compared to nfvPPA and lvPPA.

Conflicts of interest

N/A