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Abstract

Purpose:

Despite recognition of the underlying phonological impairment observed in the logopenic and nonfluent variants of primary progressive aphasia (PPA), there is relatively little treatment research directed toward strengthening phonological skills. In this study, we focused on remediating phonological deficits in logopenic and nonfluent PPA. Specifically, we hypothesized that behavioral intervention intended to strengthen phonological manipulation skills and sound–letter correspondences—coupled with transcranial direct current stimulation (tDCS)—would improve language abilities, especially in the written modality.

Method:

Twelve individuals with logopenic or nonfluent variants of PPA and 24 neurotypical adults completed neuropsychological assessment that documented spoken and written language deficits in those with PPA. Phonological skills were consistently impaired in relation to other language processes. Following a double-blind, crossover design, six individuals with PPA were randomized to receive active tDCS with phonological intervention during the first treatment phase, and after a 2-month break, they received a second phase of behavioral intervention paired with sham tDCS. The other six individuals were randomized to receive sham first and active tDCS second. Language skills were evaluated before and after each treatment phase and 2 months after the intervention.

Results:

Both treatment groups (tDCS-first and sham-first) made significant improvement in phonological transcoding skills in response to behavioral intervention, but those who received active tDCS first showed stronger gains in phonological manipulation ability. This group also showed positive changes in written narratives, which contained more grammatical sentences with increased meaningful content and more accurate spelling.

Conclusions:

These data provide compelling evidence supporting an approach that targets phonological deficits in logopenic and nonfluent PPA. Specifically, we found that improved phonological skills resulted in better functional communication ability (text-level writing) relevant to everyday life. Positive outcomes were strongest when tDCS was combined with behavioral treatment from the beginning, suggesting that this

combination may potentiate positive changes that extend beyond the initial stimulation period.