

## Exploiting a P300-BCI speller for language skills potentiation

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An extensive literature demonstrated that non-invasive Brain-Computer Interfaces (BCI) through overt and covert manipulation of specific brain signals enable alternative ways of communication in highly disabled individuals with neurodegenerative disorders. In particular, EEG-BCI spellers allow patients with severe loss of motor control and language abilities to by-pass the dysfunctional neuromuscular pathways and to exploit an effective route replacement for verbal communication (Rezeika et al. 2018). Moreover, recent studies demonstrated that an auditory BCI, besides supporting language communication, can boost language skills in aphasic patients with language production and comprehension impairment after stroke (Kleih et al. 2016, Musso et al. 2022). Building on this evidence, we envisaged the exploitation of a standard “row and column” BCI (Farwell & Donchin 1988) for enhancing language abilities in both normal readers and individuals with dyslexia. We here hypothesized that an extensive use of a visual P300-BCI speller would strength visuo-linguistic and visuospatial attentional processes concurrently leading to reading improvement. We first tested our hypothesis on normal readers (BCI-L) that underwent a 4-days training with a visual EEG-BCI speller and a pre-/post-BCI reading task, in relation to 2 control groups, one undergoing a BCI training with a non-linguistic visual interface (BCI-NL), and one undergoing pre-/post reading task only (no-BCI). Language skills were assessed through a pseudo-words reading task based on the Reicher-Wheeler paradigm. Our preliminary results indicate a reduction of RT and increase of accuracy in the pseudo-words reading task in both BCI-L and no-BCI groups, but the effects appear larger in the BCI-L group.

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No

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No

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**Session Classification:** Lunch & poster 1