

# Language context modulates brain response to lexical stimuli in bilinguals: an electrical neuroimaging study (preliminary results)

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**Introduction:** The Orthographic Depth Hypothesis (Katz & Feldman, 1992) postulates an assembled reading strategy for shallow orthographies (e.g. German), i.e. the consistent grapheme to phoneme correspondence favors encoding via non-lexical pathways and an addressed reading strategy in deep orthographies (e.g. French), i.e. the inconsistent grapheme to phoneme correspondence favors lexical pathways. According to the Dual Route Cascade Model [Coltheart et al., 2001], differences in reading strategies should manifest after lexical/ letters analysis, when phonological codes have to be retrieved for word recognition. Recently, studies have brought evidences supporting a modulation of brain response by orthographic depth in mono- and bilinguals. However, these studies applied between language or subjects designs or altered stimuli within one language, making it difficult to isolate the effect of orthography. To address this issue, we apply a within subject oddball paradigm with identical stimuli embed in languages differentiating in orthographic depth.

**Method:** 14 right-handed highly equi-proficient French-German bilinguals took part in the study. The task was to read aloud a set of pseudowords presented in two separated language contexts, i.e. pseudowords were once presented among German and once among French words. Pseudowords were matched for their lexical distance to German and French. To control for comparable language context, words were matched across languages. Scalp potential field maps were measured using high density 128-channel electroencephalography.

**Results:** Most prominent topographic visual-evoked potential differences occurred 220-260ms after stimulus onset, indicating distinct brain networks engaged in reading during this time window.

**Conclusion:** Differences in pseudoword reading across languages occur after time window implicated in letter/lexical analysis and before time window implicated in semantic processes. We propose that in French context, reading pseudowords does not activate the routine lexical pathways and switching to the non-lexical route is necessary. In contrast, reading in a German context favors non-lexical route processing which fits pseudoword reading. Thus, the differences found might reflect the attempt to apply addressing reading in French but not in German context. These results support the Orthographic Depth Hypothesis and provide evidence for different reading strategies as a function of linguistic constrains.