

Type of bilingualism conditions individual differences in the oscillatory dynamics of inhibitory control

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The present study uses EEG time-frequency representations (TFRs) with a Flanker task to investigate if and how individual differences in bilingual language experience modulate neurocognitive outcomes (oscillatory dynamics) in two bilingual group types: late bilinguals (L2 learners) and early bilinguals (heritage speakers – HSs). TFRs were computed for both incongruent and congruent trials. Difference between the two (Flanker effect vis-à-vis cognitive interference) was then (1) compared between the HSs and the L2 learners, (2) modeled as a function of individual differences with bilingual experience within each group separately and (3) probed for its potential (a)symmetry between brain and behavior data. No differences were found at the behavioral and neural levels for the between-group comparisons. However, oscillatory dynamics (mainly theta increase and alpha suppression) of inhibition and cognitive control were found to be modulated by individual differences in bilingual language experience, albeit distinctly within each bilingual group. While the results indicate adaptations towards differential brain recruitment in line with bilingual language experience variation overall, this does not manifest uniformly. Rather, earlier versus later onset to bilingualism—the bilingual type—seems to constitute an independent qualifier to how individual differences play out.