

## Grammatical coactivation in sentence processing of English-French bilinguals

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### Abstract

Bilingual language representations, specifically grammatical representations (e.g., whether two grammars are separated or shared), deserve exploration from both production and comprehension perspectives (Indefrey, 2018). In production, the shared-syntax argument has support from studies of cross-linguistic structural priming (e.g., Hartsuiker et al., 2004; Loebell & Bock, 2003). However, more research needs to be conducted from the lesser-explored comprehension side, which has led to contradictory findings (Declerck et al., 2020). The current study aims to further investigate the behavioural patterns of bilingual grammatical coactivation in comprehension, taking into account age of immersion (AoI) and manner of acquisition (MoA), which could significantly affect the performance of bilinguals who reside in areas with frequent bilingual contact (Sabourin et al., 2016).

Specifically, we tested 114 native speakers of English: 84 English-French bilinguals (53 early and 31 late learners of French) and 30 English monolingual speakers. All participants reside in the Ottawa-Gatineau area. They were tested on a grammatical maze task—a self-regulated reading paradigm—with English stimuli, categorized according to the opposing English (1a) and French (1b) rules of adverb placement into two counterbalanced conditions:

- 1a. John often watches TV at home. (preverbal adverb)
- 1b. \*John watches often TV at home. (postverbal adverb)

Results of ANOVAs and post-hoc tests revealed significant between-condition and between-group differences. All participants showed significantly shorter reaction times for the preverbal condition. Early bilinguals showed overall longer reaction times than monolinguals and late bilinguals. Most importantly, there was a significant interaction of group and condition: early bilinguals with an AoI earlier than 7 tend to have a smaller between-condition difference (143ms,  $p < .001$ ) than late bilinguals (208ms,  $p < .001$ ) and monolingual participants (208ms,  $p < .001$ ), while the latter two groups did not differ from each other. This suggests that early bilinguals seem to be more accepting of the ungrammatical postverbal structure when it is used in English but that they also appear to have longer overall processing times for both structures than late bilinguals and monolinguals. The interaction effect between MoA and condition was also significant, suggesting that bilinguals with a more naturalistic acquisition of French would need less effort to process the French rule of adverb placement in an English sentence. Although neither AoI nor MoA revealed a significant continuous effect on the postverbal condition in the results of the mixed-effect models, the post hoc trend of AoI in the preverbal condition was significant ( $\beta = -17.4$ ,  $SE = 7.69$ ,  $df = 83.9$ ,  $p = .031$ ). This is argued as a continuum effect: the earlier one is immersed in French, the higher the cost of processing an English sentence with a preverbal adverb (which goes against French grammatical rules). We argue that earlier immersion or more naturalistic immersion to second or less-dominant language would increase the chances of co-activation (and competition) between the two grammars of early bilingual speakers. Future steps will include investigation based on other languages (e.g., French or Chinese native speakers) and EEG data (e.g., ERPs, oscillations, etc.).

## References

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