

Prediction and attraction effects in aging bilinguals

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Background: Predictive processing is central to efficient sentence comprehension [1], yet in aging its function is shaped by the balance between cumulative language experience and domain-general cognitive changes [2]. Older adults have repeatedly shown reduced sensitivity to morphosyntactic violations (Figure 2A) and increased susceptibility to agreement attraction errors during comprehension (Figure 2B) (e.g., **The key to the cabinets were...*) [3, 4]. These effects are linked to declines in maintaining morphosyntactic feature expectations and inhibitory control. However, how lifelong bilingual experience interacts with age to shape morphosyntactic prediction and interference susceptibility remains underexplored [5], especially in language pairs involving sustained, active use of both languages across the lifespan, such as Catalan and Spanish. Here, we test whether extensive bilingual experience mitigates age-related prediction declines and attraction susceptibility. Building on research highlighting cognitive control as a potential moderator of bilingual processing outcomes [5], we propose that lifelong balanced Catalan–Spanish bilingualism supports predictive maintenance and reduces agreement attraction effects in older age.

Method: reading task in Spanish. The target sample ($n = 120$) is based on an *a priori* G*Power calculation ($f = 0.25$; power = 0.80). Materials (60 experimental sentences) crossed in four conditions Grammaticality (grammatical vs. ungrammatical subject–verb number agreement) with Attractor Number (singular vs. plural) (see examples 1-4), controlling for subject–verb distance and lexical factors. Accuracy and reaction times will index sensitivity to agreement violations and attraction effects. In addition, a comprehensive cognitive-linguistic battery assessed working memory (RSPAN; Keep Track), cognitive control (Stroop), and lifetime language experience (BEST and reading habits). The study, including hypotheses and planned analyses, was preregistered on the Open Science Framework (OSF), ensuring transparency. This design allows us to evaluate how individual differences in executive control and experience relate to predictive processing and interference control in bilinguals across the lifespan.

Expected results: (G)LMMs will assess accuracy and reaction times as functions of age, grammaticality, attractor condition, and individual difference measures. We predict that bilinguals' accuracy and speed will improve or remain stable with age, reflecting experience-related maintenance of predictive processes despite normative cognitive aging (Prediction 1: see Figure 3A) [5]. Crucially, we expect attenuated agreement attraction effects (e.g., **El pastel con los dibujos nunca *ganaron [...]* "The cake-MASC.SING with the designs MASC.PL never won V° PL[...] "as correct) in older bilinguals compared to patterns reported for monolingual older adults [3, 4] (Prediction 2; see Figure 3B), with attraction magnitude modulated more by interference control than by age per se. Such results would indicate that bilingual experience can bolster morphosyntactic prediction and reduce susceptibility to interference, offering novel insights for bilingual cognition and aging. Together, these findings would support the view that aging is not solely characterized by decline, but also by experience-driven adaptations, with lifelong bilingualism contributing to the preservation of morphosyntactic prediction in sentence comprehension. Moreover, by examining a regional language pair (Catalan and Spanish), this study contributes to the workshop's emphasis on diverse and non-standard language contexts, expanding current models of bilingual processing beyond dominant language pairs. It is not mandatory to have all these sections.

(1) Grammatical-Mismatch (Plural subject-Singular attractor-Plural verb; PSP):

Los pasteles_{PL} con el dibujo_{SG} nunca ganaron_{PL} un premio de repostería [...]

(2) Grammatical-Match (PPP):

Los pasteles_{PL} con los dibujo_{PL} nunca ganaron_{PL} un premio de repostería [...]

(3) Ungrammatical-Mismatch (SSP):

**El pastel_{SG} con el dibujo_{SG} nunca ganaron_{PL} un premio de repostería [...]*

(4) Ungrammatical-Match (SPP):

**El pastel_{SG} con los dibujo_{PL} nunca ganaron_{PL} un premio de repostería [...]*

The cake(s)_{MASC.SG./PL.} with the design(s)_{MASC.SG./PL.} never won_{V°PL} a price bakery due to quality dough.

Gloss: The cake with the designs never won a bakery price due to its dough quality.

References

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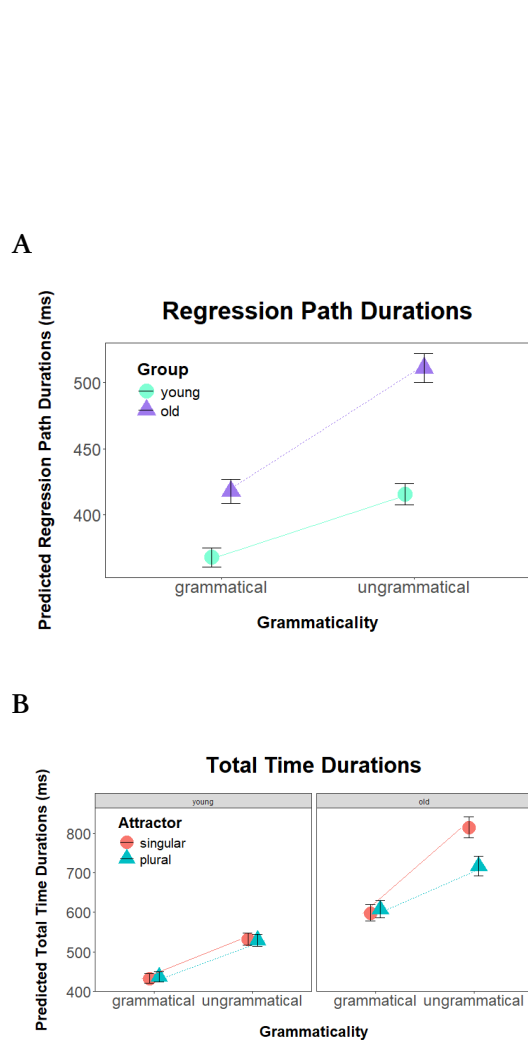


Figure 1: Previous findings from [4] using the same stimuli in an eye-tracking study with monolinguals showing: A) Larger grammaticality effects for OAs than YAs. B) Larger agreement attraction effects for OAs in the ungrammatical mismatch (SPP) condition.

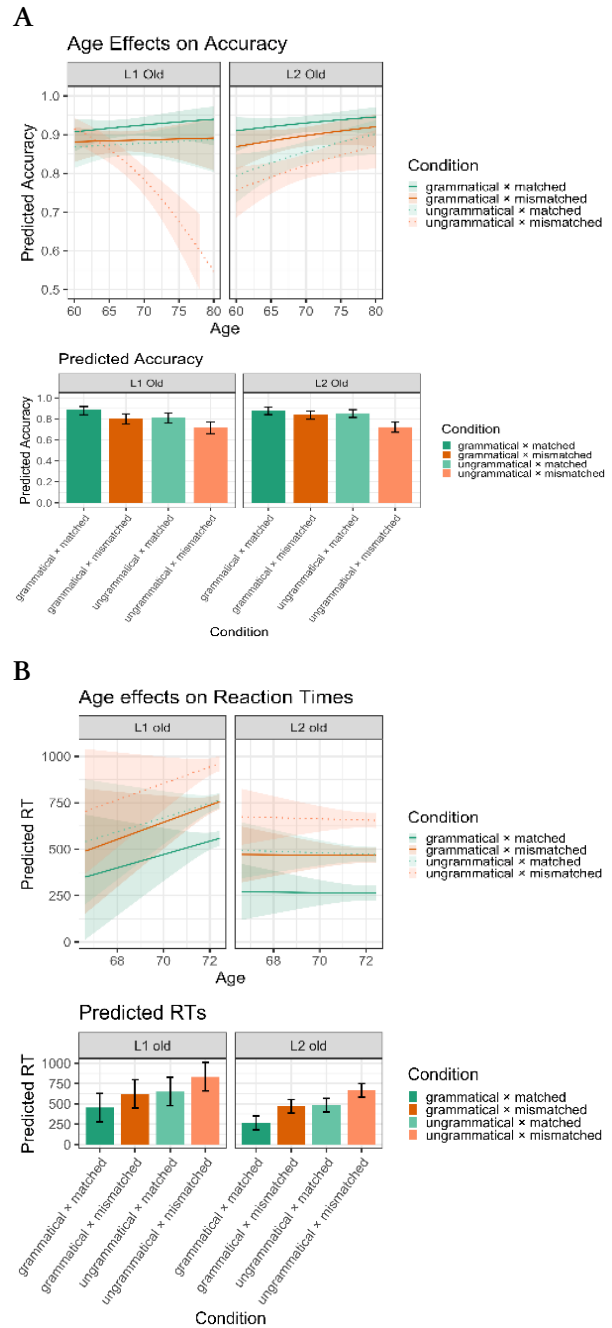


Figure 2: Predicted values for older participants based on [5] production study: A) Accuracy rates across L1 and L2 older participants. B) Predicted RTs across L1 and L2 older participants.