The bilingual’s mental grammar system: Language-specific syntax is shared by both languages
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MOTIVATION
- Lexical knowledge in the native language can be modified by acquiring lexical knowledge of a second language (e.g., Malt et al., 2015). Does the same plasticity show at the sentence level?
- Does learning a novel grammatical construction in a second language allow the user to apply the new construction when using their first language?
- Current study: Spanish-English bilinguals listened to ungrammatical sentences in Spanish equivalent to grammatical sentences in English.
- Corresponds with findings from Portuguese-English bilinguals (Fernandez & Souza, 2016).

METHODS
Stimuli
- Causative (experimental)
  - Los maestros trotaron a los niños alrededor del patio durante el recreo.
  - The teachers jogged the kids around the playground during recess.
- Pseudo-causative (ungrammatical control)
  - Los maestros sudaron a los niños alrededor del patio durante el recreo.
  - The teachers sweated the kids around the playground during recess.
- Transitive (grammatical control)
  - Los maestros persiguieron a los niños alrededor del patio durante el recreo.
  - The teachers chased the kids around the playground during recess.

Participants
- Early bilinguals: 10
- Late bilinguals: 9
- Gender: Early bilinguals: 4F, 6M; Late bilinguals: 4F, 5M
- Mean Age of English Acquisition (range): Early bilinguals: 23.2 (18-28); Late bilinguals: 27.8 (21-36)
- Spanish proficiency (mean self-rating 1-7): Early bilinguals: 6.1 (SD 0.8); Late bilinguals: 6.6 (SD 0.4)
- English proficiency (mean self-rating 1-7): Early bilinguals: 6.6 (SD 0.5); Late bilinguals: 5.0 (SD 1.5)

Procedure
- All sentences and instructions in Spanish
- Auditory presentation over speakers
- ITI = 1000 ms
- Direct object article
- Direct object noun

Task
- Naturalness judgment
- Scale: 1 (totally unnatural) to 5 (totally natural)

Data Acquisition
- EEG data collected from 128-channel electrode caps (EGI, Inc.)
- Sampling rate: 250 Hz
- Filter: 0.3–70 Hz (online), 0.3–30 Hz (offline)
- Reference: Cz (online), average reference (offline)

RESULTS

DISCUSSION
- Early and late bilinguals showed different response patterns to Causative and Pseudo-causative sentences.
- Early bilinguals have more difficulty processing the Pseudo-causative sentences than Transitives and Casuatives starting after the onset of the direct object article. An N400 effect can be seen for Pseudo-causatives at Centro-Parietal sites but not for Casuatives. Casuatives seem to be processed without much difficulty, similar to Transitive sentences. This suggests that early bilinguals process Casuatives similar to grammatical sentences by utilizing their English grammar knowledge.
- Late bilinguals show greater differences between Causative and Pseudo-causative sentences after the onset of the direct object noun rather than the article. Pseudo-causatives show more positive responses and Casuatives show more negative responses compared to Transitives at Centro-Parietal sites. At Left Anterior sites, Pseudo-causatives appear to evoke a Left Anterior Negativity (LAN) while Causatives do not. These findings may reflect different methods for processing these two sentence types by late bilinguals.
- Does learning a novel grammatical construction in a second language allow the user to apply the new construction when using their first language? YES!

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[Diagram showing ERP Summary with bolded differences between groups in the Late Bilinguals and Early Bilinguals]