

BACKGROUND

- Similar constructions in the two languages have overlapping representations for bilinguals (e.g., Hartsuiker et al., 2004), but are language-specific constructions also shared?
- The current study investigates whether a verb argument structure pattern that exists in only one language (second-learned language) can be applied to verbs in the native language.
- Spanish speakers who learned English in childhood (before age 9) listened to ungrammatical sentences in Spanish equivalent to grammatical sentences in English (lexical causatives).
- If language-specific constructions are shared, we expect to see a reduced N400 and P600 to lexical causatives, which are grammatical in English but not Spanish, compared to pseudo-causatives, which are ungrammatical in both languages.

Research Question

Can Spanish-English bilinguals use syntactic structures in English to interpret never-before-heard sentences that are ungrammatical for Spanish monolinguals?

METHODS

Stimuli

- **Causative** (n = 60)
Los maestros trotaron a los niños alrededor del patio durante el recreo.
[The teachers jogged the kids around the playground during recess.]
- **Pseudo-causative** (n = 60)
Los maestros sudaron a los niños alrededor del patio durante el recreo.
[The teachers sweated the kids around the playground during recess.]
- **Intransitive** (n = 60)
En el parque trotaron los niños alrededor del patio sin supervisión.
[At the park jogged the kids around the playground without supervision.]
- **Transitive** (n = 60)
Los maestros persiguieron a los niños alrededor del patio durante el recreo.
[The teachers chased the kids around the playground during recess.]
- **Fillers** (n = 120)

	Grammatical in Spanish	Grammatical in English
Causative	✗	✓
Pseudo-causative	✗	✗
Intransitive	✓	✗
Transitive	✓	✓
Fillers	✓	✓

Participants

- 5 Spanish-English bilinguals
- Ages: 18-28 years (m=23.2)
- Age of acquisition (years)
 - Spanish: 0-2 (m = 0.6)
 - English: 2-8 (m = 4.8)
- Language proficiency (mean self-rating)
 - Spanish: 6.26/7.00
 - English: 6.04/7.00

Procedure

- All sentences and instructions in Spanish
- Auditory presentation over speakers
- ITI = 1000 ms

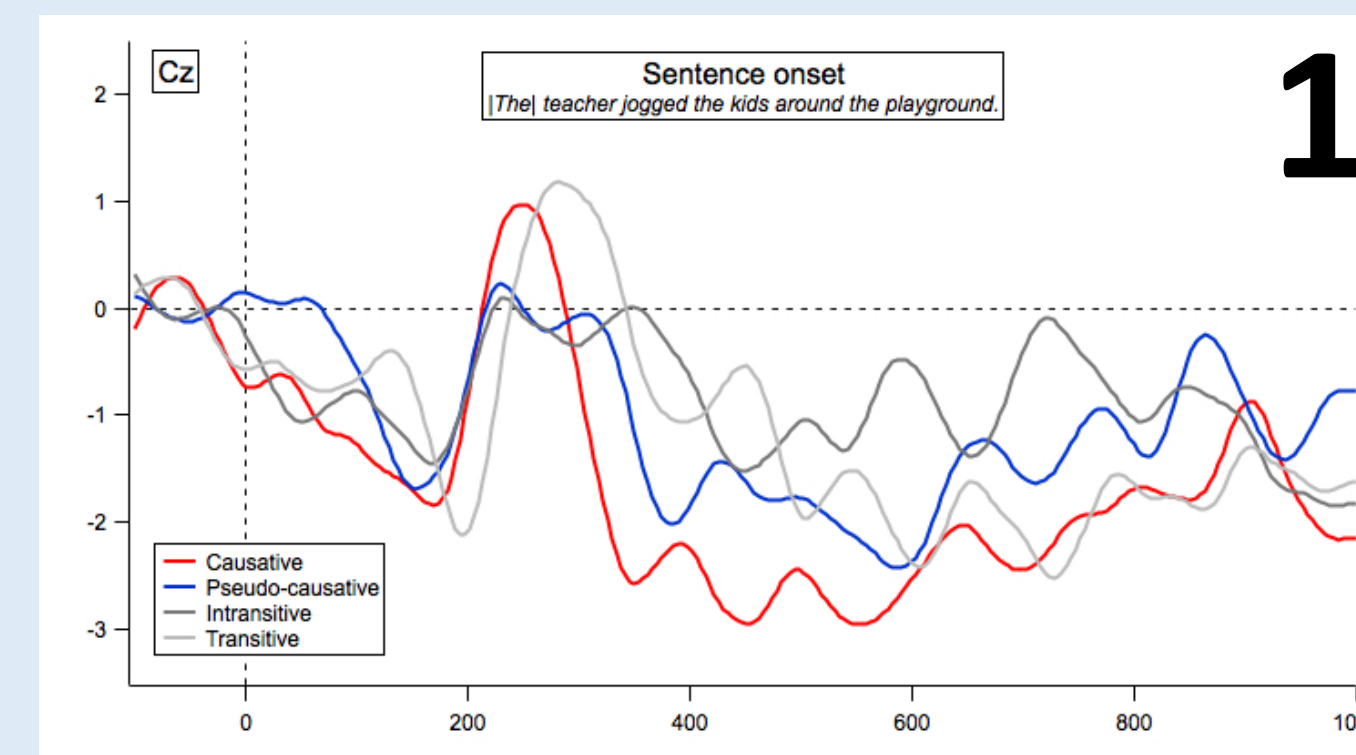
Task

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

Data Acquisition

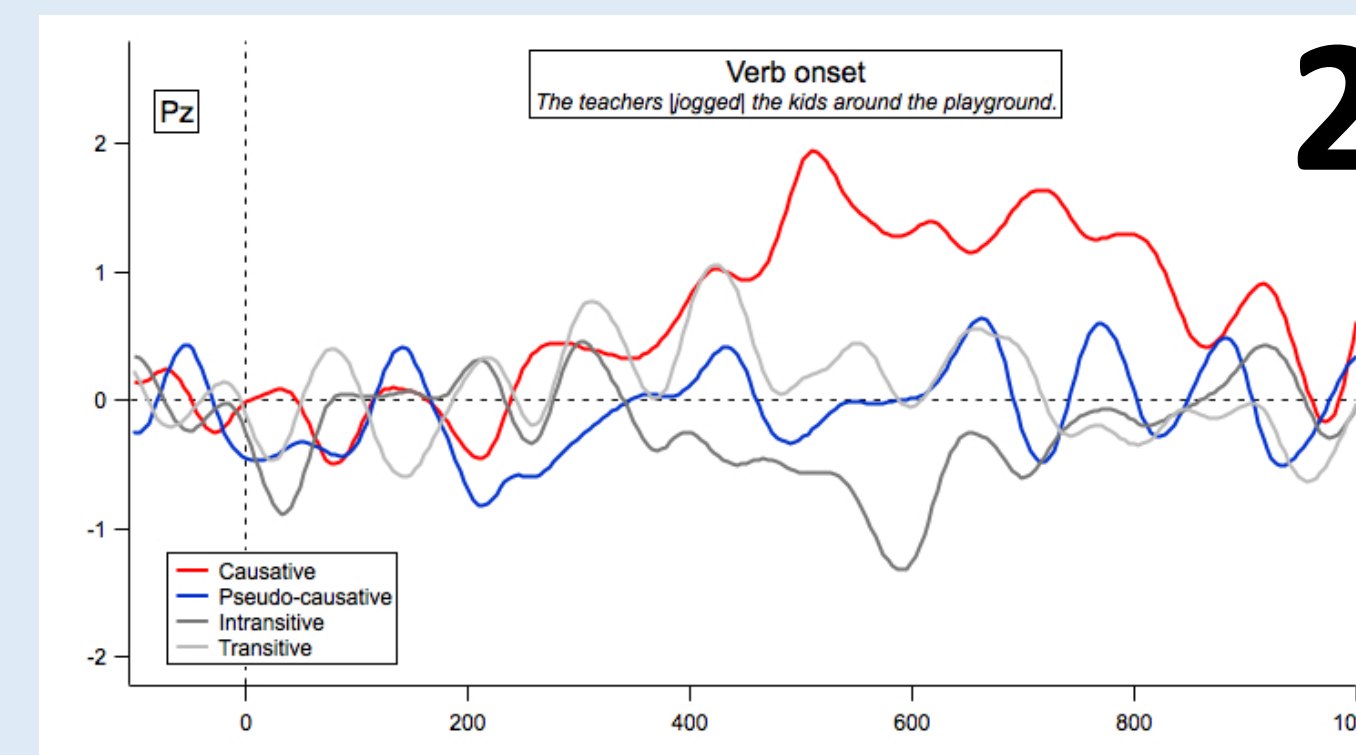
- EEG data collected from 128-channel electrode cap (EGI, Inc.)
- Sampling rate: 250 Hz
- Filter: 0.3-70 Hz (online), 0.3-30 Hz (offline)
- Reference: Cz (online), average reference (offline)
- EEG segmented at a) sentence onset, b) verb onset, c) onset of the direct object article, d) onset of the direct object noun, and e) onset of the preposition
(a) The teachers (b) jogged (c) the (d) kids (e) around the playground during recess.

RESULTS



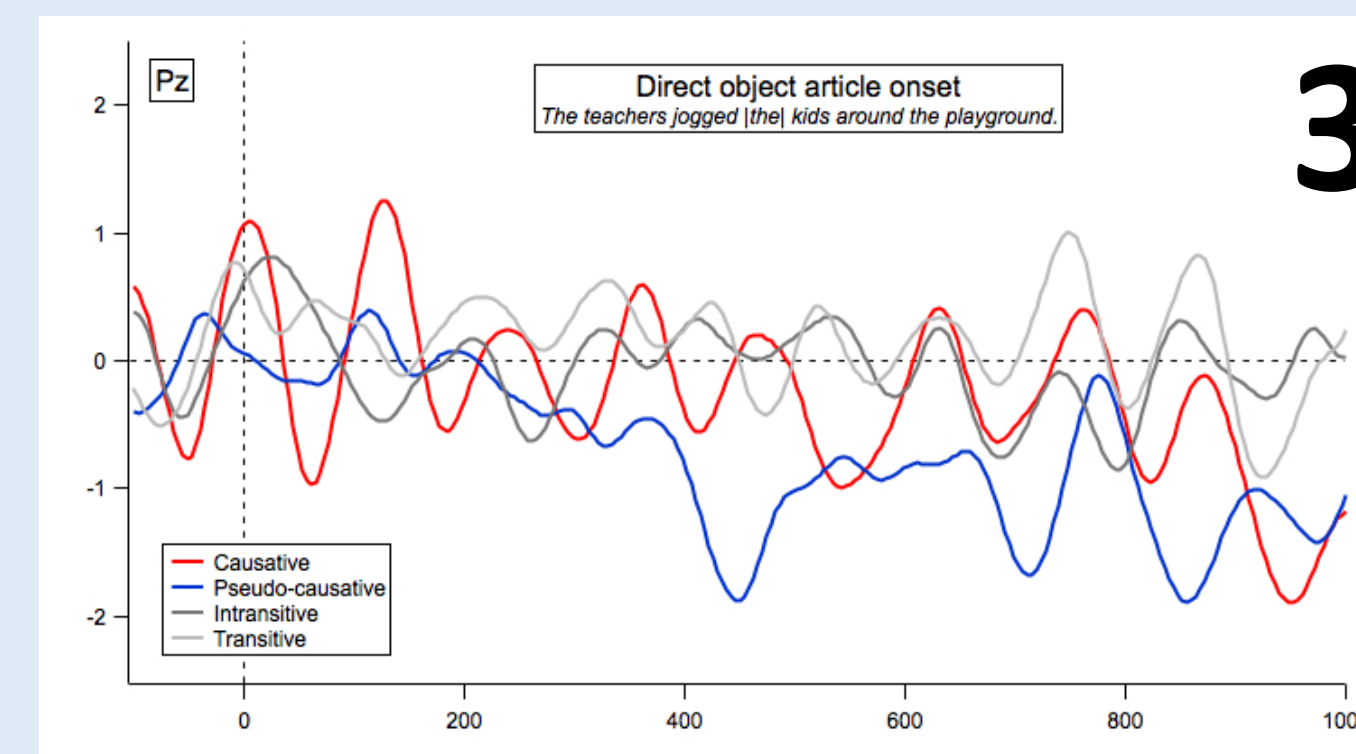
Sentence onset

Clear obligatory responses such as N200 and P300 to sentence onset, indicating good signal/noise ratio



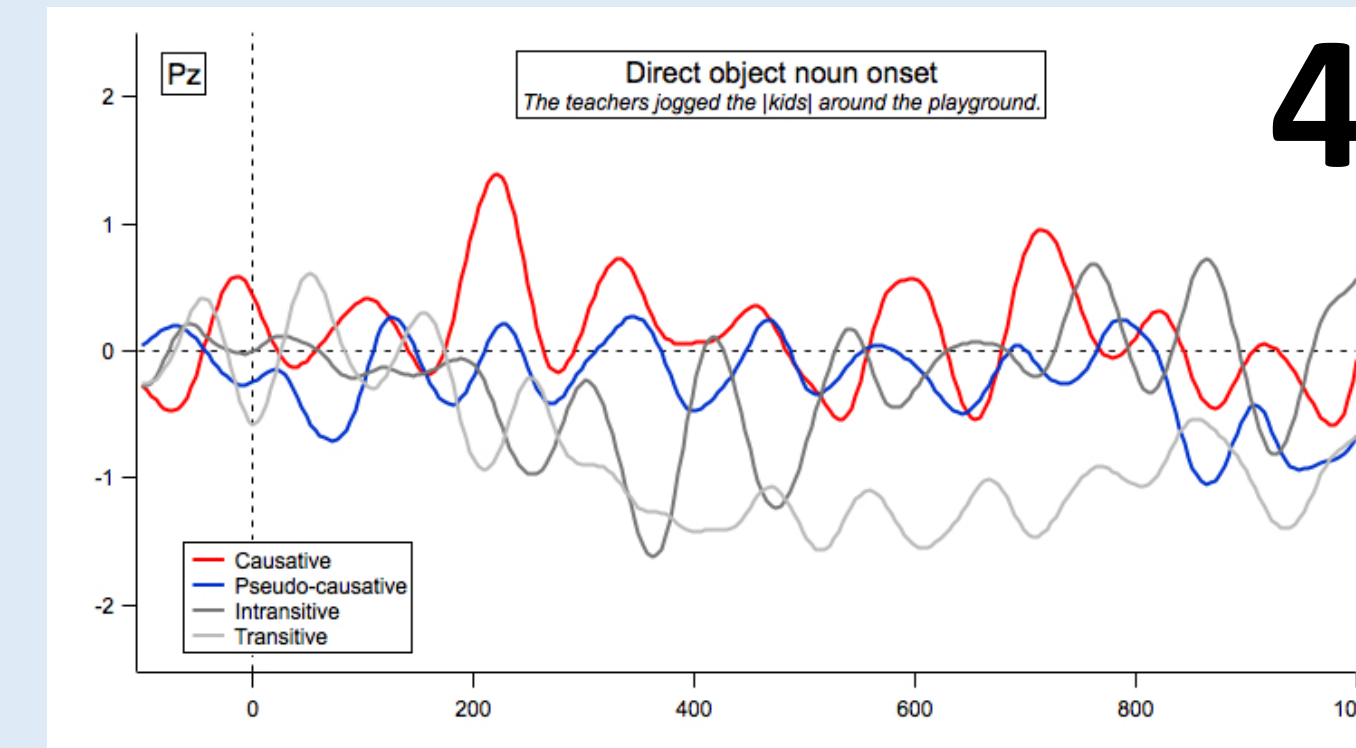
Verb onset

Causative shows a long positive wave after 250 ms



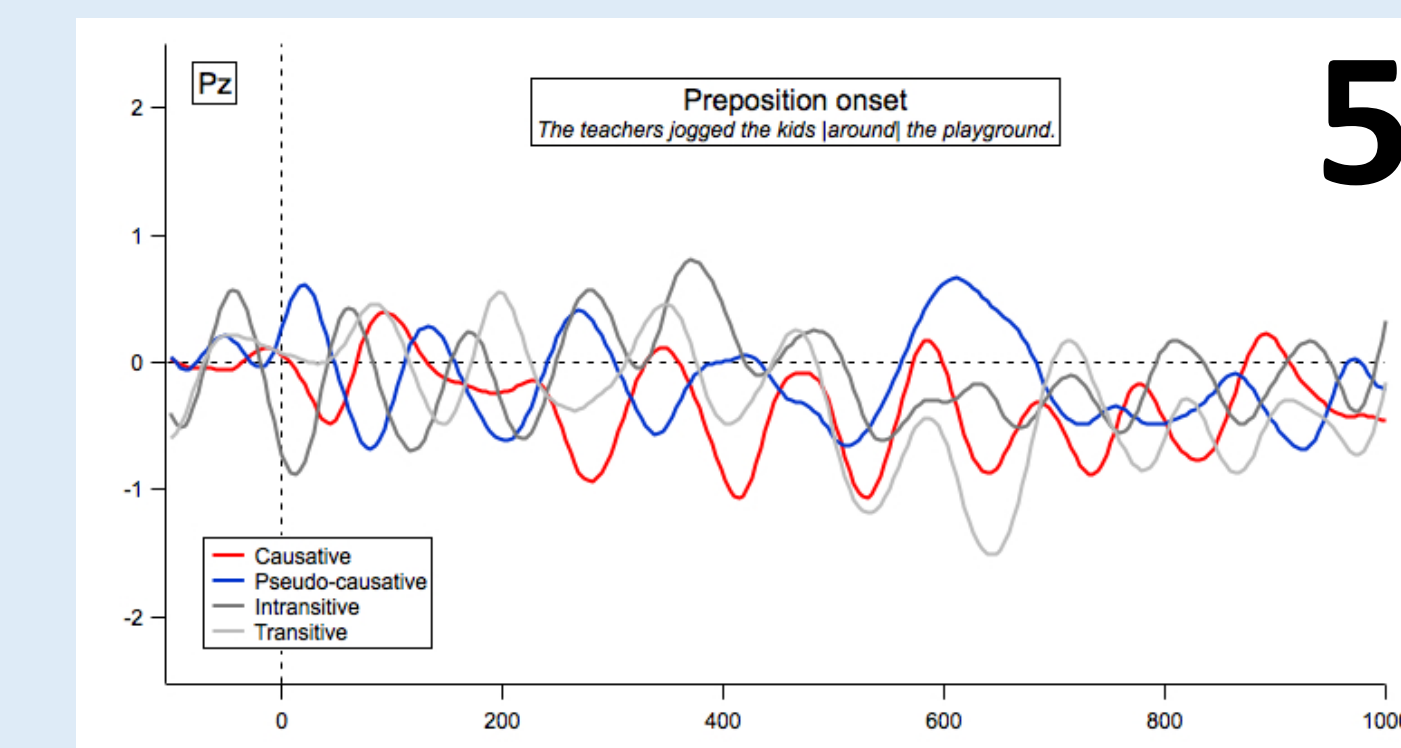
Direct object article onset

N400 for Pseudo-causative, but not Causative



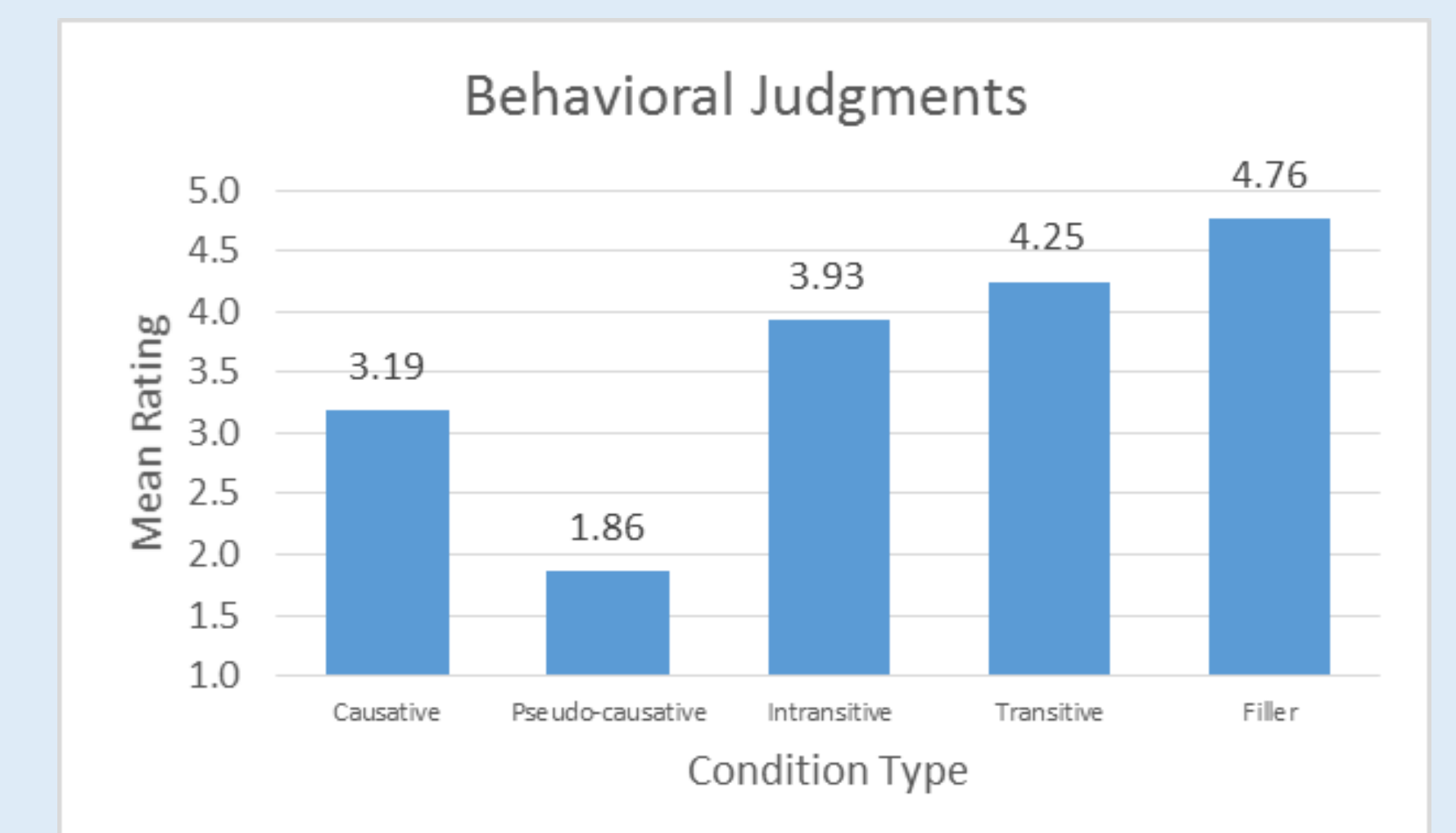
Direct object noun onset

No clear distinction between Causative and Pseudo-causative



Preposition onset

All conditions similar, suggesting no processing differences in this time frame



Behavioral judgments

Causatives were rated higher than Pseudo-causatives but lower than the three grammatical sentence types

DISCUSSION

- If the Spanish-English bilinguals processed both the Causative and Pseudo-causative sentences as ungrammatical constructions, we would expect an N400 followed by a P600 for both constructions elicited by the onset of the direct object.
- A clear N400 was found for the Pseudo-causative condition, but not for the Causative condition, while no P600 effect was observed for either condition. Instead, Causatives showed a similar pattern to the grammatical control conditions.
- The findings suggest that Spanish-English bilinguals are able to assign an interpretation to the direct object within the Causative sentence context, utilizing their English knowledge of the verb argument structure of these verbs to do so. The pattern of behavioral judgments supports this interpretation.
- **This is evidence that bilinguals have shared syntactic representations even for language-specific structures and can make use of all syntactic constructions in their mental grammar in order to interpret never-before-heard sentences.**

ACKNOWLEDGMENTS

Funding provided by a National Science Foundation Dissertation Improvement Grant (BCS-1528458), the Mario Capelloni Dissertation Fellowship from the CUNY Graduate Center, a Doctoral Student Research Grant from the CUNY Graduate Center, and an Undergraduate Research and Mentoring Education grant from Queens College (CUNY) to E. Higby

We thank Emily Zane, Yan Yu, Monica Wagner, Erika Varela, and Gabriel Campoverde for help with experimental design, data collection, and analysis.

Neurobiology of Language Conference, Chicago, IL, October 17, 2015 | Contact: evehigby@gmail.com