TASK-EVOKED PUPILLARY RESPONSES (TEPR) IN SPANISH-ENGLISH BILINGUALS’ PROCESSING OF RELATIVE CLAUSES

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Introduction

Pupillometry is used to test for *processing asymmetry* in subject versus object relative clauses in bilinguals’ first-learned language. Task-evoked pupillary responses (TEPR) reflect unconscious attentional or computational demands (e.g., Kahneman & Beatty, 1966)

- Object relative clauses are more difficult to process than subject relative clauses in both Spanish and English (e.g., Betancourt, Carreiras, & Sturt, 2009)
- TEPR is a sensitive measure of this relative clause processing asymmetry in monolinguals (Just & Carpenter, 1993; Piquado, Isaacsowitz, & Wingoefeld, 2010)
- We extend these findings to investigate bilingual processing.
- Our bilingual groups differ in life-time exposure, but not current use of their first learned languages.

Research Questions

During processing of the first-learned language, Spanish:
1. Are task-evoked pupillary responses which indicate processing difficulty greater for object-relatives than subject-relatives in late bilinguals?
2. Do heritage speakers process object-relatives and subject-relatives differently when compared to late bilinguals?

Design & Methods

Participants

Two groups of Spanish-English bilinguals, proficient in both languages.

- LB - Spanish-English Late Bilinguals (n=17)
- HS - Heritage Speakers of Spanish (n=26)

Stimuli

Subject-relative clause (Subj RC, n=15)

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<tr>
<th>Subject-relative clause (Subj RC, n=15)</th>
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<tbody>
<tr>
<td>Jorge vió la película que ganó el premio</td>
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<td><em>El periódico publicó la noticia que el redactor escribió.</em></td>
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<th>Object-relative clause (Obj RC, n=25)</th>
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<td>Jorge vió la película que ganó el premio</td>
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Procedure

- All stimuli presented auditorily as natural running speech
- Eye movements & pupil diameter for each eye recorded with Tobii TX300 at 60Hz
- Comprehension Q following 40% of trials (no metalinguistic task)
- Fillers were grammatical and ungrammatical sentences (n=110)

Summary of results

- All 4 DV had same significance results in linear mixed modeling.
- LB had increased pupil dilation while processing Obj RCs compared to Subj RCs
- HS have a similar TEPR to both Obj and Subj RCs
- Correlations between four DVs indicate HS reach maximum dilation earlier than LB

Discussion

- Both groups performed at ceiling on a comprehension test of Subj and Obj RCs (Madsen, 2018)
- TEPR observed in this study is an index of successful processing.
- TEPR is a sensitive index of the RC processing asymmetry for bilinguals as well as monolinguals.
- LB have increased processing asymmetry, HS do not.
- HS reach maxima early in both conditions
- Efficient language processors do not necessarily have asymmetry as indexed by TEPR (e.g., Ahern & Beatty, 1979; Piquado, Isaacsowitz, & Wingoefeld, 2010)
- This suggests that HS, while showing overall effortful processing, are efficiently processing the more difficult Obj RCs.
- HS efficient processing may be related to life-time bilingual experience.
- This unique HS processing could be related to either their language processing in general or it may be a feature of processing in their non-dominant language.
- Further work will test for RC asymmetry in same groups in English (HS's dominant language, LB's non-dominant language) to tease apart these possibilities.

References & Acknowledgements


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