



Ambiguous relative clause attachment and language mode in bilingual Spanish-English speakers



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Introduction

(1) “The journalist interviewed the [NP1 daughter [PP of the [NP2 colonel [RC that had the accident.]]]]”

An ambiguous relative clause refers to a phrase that consists of a complex noun phrase, or phrase that consists of two noun phrases (NP), and a relative clause (RC) that acts as the description for **one of the two noun phrases** in the complex noun phrase. Such that there is reasonable ambiguity in the interpretation of the phrase, that can be attributed to **which of two noun phrases** (NP1 OR NP2) **is modified by the relative clause** (Cuetos & Don C. , 1988). For example, in sentence (1) (above), the ambiguity in the sentence can be attributed to the inquiry of which person, the “daughter” or the “colonel,” had the accident. The interpretation can be distinguished as either, “high attachment preference,” where the first noun, “daughter,” is modified, and “low attachment preference,” where the second noun, “colonel” is modified (Cuetos & Don C. , 1988).

Abstract

The purpose of this project is to examine the relationship between ambiguous relative clause attachment and language mode in bilingual Spanish-English speakers. Many single language studies have indicated that particular languages, like English (Cuetos & Don C. , 1988), Spanish (Carreiras & Clifton, 1993), and Greek (Papadopoulou & Clahsen, 2003), the users of these languages are more likely to use specific attachment preferences. For example, English is typically low attachment, while Spanish and Greek is usually high attachment. This can be typically attributed in single language studies to the variance in cross-lingually(Grillo & Costa, 2014). However, more recent Bilingual studies have introduced new uninvestigated elements, like code-switching, that suggest that there are more factors at play(Couto & Gullberg, M., 2019). Overall, this project aims to examine these factors as it relates to the interpretation of the ambiguous relative clause, by Spanish-English Bilinguals.

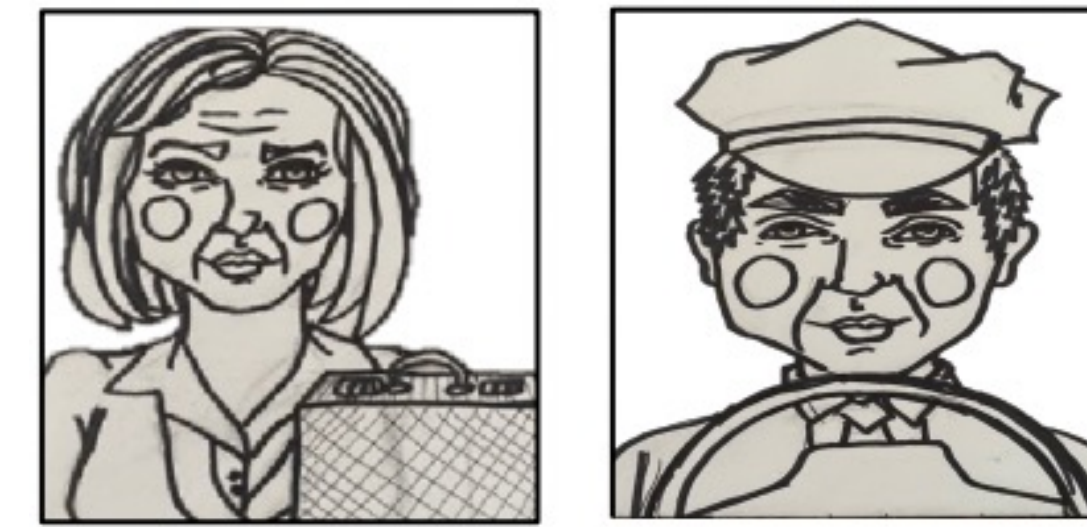
Methods

Over the course of two sessions, participants completed several tasks and questionnaires, including 3 versions of an eye-tracking task, as well as a running span task and AX-CPT task, used to measure individual cognitive differences.

• **Eye Tracking Software and Task:** Participants listened to three versions of a series of recorded ambiguous relative clauses (Monolingual Spanish and English and Spanish-English Code Switching), for every recording there was two-character images, a description, and a question of which character a certain description applies to.

• I.e., in the code-switching Spanish English version, we might hear:

“Alguien trabajó con el **conductor** de la **abogada** (Someone worked with the **driver** of the **lawyer**...) that was by the elevator.
¿Quién estaba (Who was...) by the elevator?”



• **Running Span Task:** In order to measure working memory capacity, the participants will listen to several long string of letters and after every string they will be asked to recall the last 6 they heard(Bunting, Cowan, & Sauls, 2006).

• I.e., QOCASBYCIWMACTEMGLADNOR ; LADNOR

• **AX:CPT Task:** In order to measure inhibitory control, or the resolution of inward competing conflict(), participants are shown several series of letters and asked to indicate when the series begins with A- and ends with -X.

• Example: APDERSX

• Nonexample: ASEFNOB

References:

Grillo, N., & Costa, J. (2014). A novel argument for the universality of parsing principles. *Cognition*, 133(1), 156–187. <https://doi.org/10.1016/j.cognition.2014.05.019>

Bunting, M., Cowan, N., & Scott Sauls, J. (2006). How does running memory span work? *Quarterly Journal of Experimental Psychology*, 59(10), 1691–1700. <https://doi.org/10.1080/17470210600848402>

Cuetos, F., & Don C. , M. (1988). Cross-linguistic differences in parsing: Restrictions on the use of the late closure strategy in Spanish. *Cognition*, 30(1), 73–105. [https://doi.org/10.1016/0010-0277\(88\)90004-2](https://doi.org/10.1016/0010-0277(88)90004-2)

Carreiras, M., & Clifton, C. (1993). Relative clause interpretation preferences in Spanish and English. *Language and Speech*, 36(4), 353–372. <https://doi.org/10.1177/002383099303600401>

Papadopoulou, D., & Clahsen, H. (2003). Parsing strategies in L1 and L2 sentence processing. *Studies in Second Language Acquisition*, 25(4), 501–528. <https://doi.org/10.1017/s0272263103000214>

Parafita Couto, M. C., & Gullberg, M. (2019). Code-switching within the noun phrase: Evidence from three corpora. *International Journal of Bilingualism*, 23(2), 695–714. <https://doi.org/10.1177/1367006917729543>

James AN, Fraundorf SH, Lee EK, Watson DG. Individual differences in syntactic processing: Is there evidence for reader-text interactions? *J Mem Lang*. 2018 Oct;102:155-181. doi: 10.1016/j.jml.2018.05.006. Epub 2018 Jun 27. PMID: 30713367; PMCID: PMC6350810.

Kane, M. J., Conway, A. R., Hambrick, D. Z., & Engle, R. W. (2008). Variation in working memory capacity as variation in executive attention and Control. *Variation in Working Memory*, 21–48. <https://doi.org/10.1093/acprof:oso/9780195168648.003.0002>

Expected Results

Currently, the project is in the early stages of organizing data for the sake of later data analysis. However, based on the methods we are using there are some results that we expect to see once data analysis is complete.

Studies on the subject have indicated that low and high attachment have differences in cognitive demand(James AN. et. a., 2018), such that:

- **Running Span and Eye Tracking Tasks:** Participants with higher working memory are more likely to have high attachment preferences due to higher cognitive demand(Kane, et. al., 2008).
- **Running Span and AX-CPT Tasks:** Cognitive control plays a significant role in codeswitching and language adaptations (Kane, et. al., 2008), such that we expect to see that in individuals that have higher inhibitory control are more adaptive to language switching or codeswitching in the Eye-Tracking Tasks.

Future Considerations

This research is significant to future literature in this field because it demonstrates that by considering language activation, can broaden the established predictions about ambiguous relative clause attachment of established models of sentence processing. Furthermore, these findings create a cause for a comprehensive discussion of the structural nature of code-switching. Besides just examining the lexicon used in code-switching, we also must address the interactions between language systems. In a more general sense, this project provides a more thorough and detailed account of the mechanisms behind processing ambiguity, codeswitching, and language in general. It is also important to address this research’s interdisciplinary approach, which draws from both linguistic and psycholinguistics methodologies. This approach allows for broader implications to be drawn.

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