

Effect of Age of Exposure on On-line Processing of Temporarily Ambiguous Relative Clauses

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Investigating the processing of structurally ambiguous sentences has proven resourceful in understanding the human parser. In particular, the resolution of globally and temporarily ambiguous relative clauses (RC) preceded by a complex noun phrase (NP) has been found to differ cross-linguistically. For example, in the sentence “Someone shot [the servant]_{NP1} of [the actress]_{NP2} [who was on the balcony]_{RC}” the ambiguous RC can modify either NP₁ (high attachment) or NP₂ (low attachment). English monolinguals show a bias toward low attachment, whereas Spanish monolinguals exhibit high attachment preferences (Cuetos & Mitchell, 1988). Psycholinguistic studies examining various combinations of L1/L2 present mixed findings on whether highly proficient L2 speakers are able to acquire native-like attachment preferences for ambiguous RCs (e.g. Dussias, 2003; Dussias & Sagarra, 2007). Recent work on heritage speakers using self-paced reading reported mixed results on the attachment preference of these bilinguals in Spanish (Jegerski, et al. 2016, Jegerski 2018). While highly proficient heritage speakers, despite extensive exposure to English as their L2, showed monolingual-like attachment preference in Spanish, less proficient heritage speakers did not reveal any particular attachment bias.

This study further investigates the attachment resolution of temporarily ambiguous RCs in Spanish and English by heritage speakers (HS, N=42) and adult L2 learners of Spanish (N=43) using eye-tracking. Specifically, we explore whether different cues to gender (i.e., semantic or grammatical) can differentially affect online sensitivity to native-like attachment preferences. To do so, the two stimuli NPs were of different social genders, and the disambiguating region either encoded grammatical (Ex. 1-2) or stereotypical semantic gender (Ex. 3-4). The study was comprised of 32 experimental sentences (8 of each condition type), and 64 distractors, all followed by a comprehension question that served to ascertain that participants paid attention as they read the sentences (see examples).

Using linear mixed-effects models we analyzed the critical disambiguating region and an immediately following spillover region. Results from participants reading Spanish sentences revealed that without considering the type of disambiguating cue in the analyses, age of exposure did not lead to any group differences ($b=-27.14$, $t=-1.13$). However, earlier exposure to Spanish led to greater sensitivity to grammatical gender (Ex 1) ($b= 87.99$, $t= 3.45$). The spill-over region further revealed that earlier exposure to Spanish led to greater sensitivity to grammatical gender. In addition, more proficient bilinguals, regardless of their language background, demonstrated a monolingual-like tendency in Spanish ($b=-3.33$, $t=-1.55$), while bilinguals at lower proficiency levels demonstrated English like attachment resolution, only for semantic disambiguating factors. Critically, a follow-up norming survey was conducted to investigate the strength of the association between the disambiguating factors (grammatical vs. semantics) with their masculine and feminine human referents. Incorporating survey results into a new regression model revealed that as the association became stronger, early measures demonstrated processing difficulties for high attachment ($b=118.46$, $t=2.91$) (Fig. 1). This observation suggests that participants’ base line was low attachment, and forcing high attachment caused longer gaze duration.

These findings shed some light on the on-going debate of input exposure as a key factor determining successful L2 acquisition and processing, and sensitivity to structural vs. lexicosemantic information in L2. Findings from the present study suggest that attachment preferences are not as apparent or categorical as the prior literature has assumed, and that large-scale generalizations need to take a more fine-grained approach in investigating the RC attachment preferences of bilinguals.

Examples

1: NP1 attachment, grammatical gender

(1) La policía ayer detuvo a la hermana del portero que estuvo acusada de robo.
The police yesterday arrested the sister of the porter_{MASC} who was accused_{FEM} of robbery.

2: NP2 attachment, grammatical gender

(2) La policía ayer detuvo al hermano de la portera que estuvo acusada de robo.
The police yesterday arrested the brother of the porter_{FEM} who was accused_{FEM} of robbery.

3: NP1 attachment, semantic gender

(3) El detective interrogó a la amiga del estudiante que tuvo un aborto en Irlanda.
The detective interrogated the girlfriend of the student_{MASC} who had miscarried in Ireland.

4: NP2 attachment, semantic gender

(4) El detective interrogó al amigo de la estudiante que tuvo un aborto en Irlanda.
The detective interrogated the girlfriend of the student_{FEM} who had miscarried in Ireland.

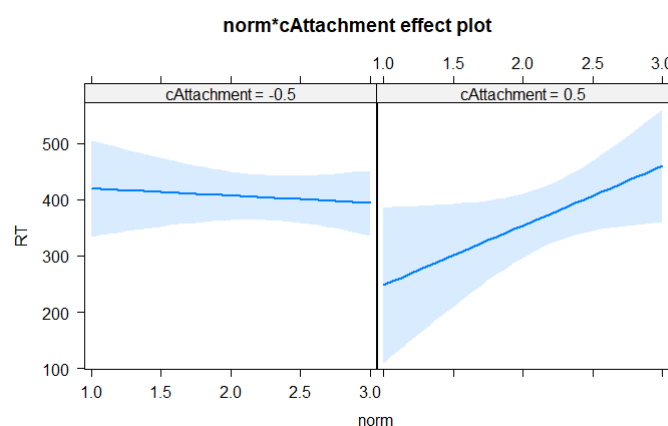


Figure 1 - Interaction of attachment and norm for the gaze duration reading time of critical Region; -0.5=Low attachment, 0.5=High attachment

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