11th International Symposium of Psycholinguistics, March 20th - 23rd, 2013 - Canary Islands, Spain

A look into the Early Bilingual's Processor: Evidence from relative clause attachment

Shane Ebert, Jeanne Heil, Bryan Koronkiewicz, Sergio E. Ramos, Daniel Vergara-González, & Luis López
Bilingualism Research Laboratory - University of Illinois at Chicago

Introduction

Relative clauses can have either High (H) or Low (L) attachment in syntactically ambiguous sentences:

(1) Julie ran into the professor of the student that lives near campus.
a. ...into [$_{DP}$ [**the professor** of [$_{DP}$ **the student**]]$_i$ [**that lives near campus**]$_i$] **H**
b. ...into [$_{DP}$ **the professor** of [$_{DP}$ **the student**]$_i$ [**that lives near campus**]$_i$] **L**

Different languages show different attachment preferences
- Native monolingual English speakers = L (Frazier 1978)
- Native monolingual Spanish speakers = H (Cuetos & Mitchell 1988)

What determines the preference strategy for a language? Is the preference determined by the grammar of the language?

Early bilingual speakers of two languages that have conflicting preferences can provide new insight
- Possibility 1: Prefer L for one language (i.e. English), H for the other (i.e. Spanish)
- Possibility 2: Prefer L for both
- Possibility 3: Prefer H for both
- Possibility 4: No preference based on language

This study looks at early Spanish/English bilinguals (AoA ≤ 6) and compares their preference of relative clause attachment in both languages to those of monolingual speakers

Background

Much variation has been found in the study of late bilinguals' attachment preferences
- Bilinguals show no preference for attachment strategy (Fernández 1999; Papadopoulou & Clahsen 2003)
- Bilinguals will choose one attachment strategy for both languages
  - Language of immersion (Dussias 2003; Dussias & Sagarra 2007)
  - Dominant language (Fernández 2003)
- Highly proficient bilinguals may process like native speakers of the L2 (Jegerski 2010)

These previous studies looked at late bilinguals (non-native processing)
- AoA ≤ 10 (Fernández 1999; Fernández 2003); AoA ≤ 12 (Papadopoulou & Clahsen 2003; Jegerski 2010)
- Assuming that the processor grows with the language, late bilinguals have developed one processor when they begin to develop the other

Little work on early bilinguals (native processing)
- Do early bilinguals develop two processors (Possibility 1) or just one (Possibilities 2-4)?

Methodology

Participants

10 early Spanish/English bilinguals (AoA ≤ 6)
- Mean age 19.6; living in Chicago (born in Spanish-speaking households)

11 monolingual English speakers
- Mean age 26.2; living in Chicago (exposure to any foreign language ≤ 4 years)

Stimuli

Two translationally-equivalent sets of 128 unambiguous sentences with relative clause attachment
- One plural DP and one singular DP to force attachment via verb agreement
  - Departure from previous studies that focus on gender agreement in adjectives
  - Needed to be testable in English
- 64 lexical pairs of H and L attachment (balanced for ordering of plural and singular DPs)
- Regions 2 through 4 controlled for number of syllables and frequency (Fernández 2003)

	1	2	3	4	
(2) a.	I ran into \\	**the professor** of **the students** \\	that **lives** \\	near the university.	**H**
b.	I ran into \\	**the professor** of **the students** \\	that **live** \\	near the university.	**L**

Task

Self-paced reading task presented on a computer via OpenSesame software
- Non-cumulative moving window procedure
- Binary choice comprehension question (i.e. 'Who lives near the university?')
- Higher reading times in the critical region (3) or the spillover region (4) for either H or L stimuli would indicate an attachment preference for the opposite (due to reanalysis)

Data Analysis

Analysis by Region (1, 2, 3, 4) and Speaker/Language (Bilingual Span., Bilingual Eng., Monolingual Eng.)
- One-way Repeated Measures ANOVA with factor Attachment (H, L) and dependent variable Residual Reading Times

Results

Table 1

Speaker	Language	Type	Region 1 AVG	Region 1 SD	Region 2 AVG	Region 2 SD	Region 3 AVG	Region 3 SD	Region 4 AVG	Region 4 SD
Bilingual	Spanish	H	**-193.8**	(563.4)	285.8	(795.9)	-86.8	(331.3)	-54.6	(416.7)
		L	**-279.3**	(532.6)	227.6	(726.2)	-91.6	(308.6)	-26.7	(425.6)
Bilingual	English	H	-163.0	(553.9)	86.9	(668.7)	-44.2	(346.6)	56.7	(502.0)
		L	-221.9	(498.6)	144.5	(711.7)	-55.2	(335.4)	74.7	(513.1)
Monoligual	English	H	-34.7	(759.9)	**88.9**	(758.3)	-41.3	(340.1)	-18.9	(595.2)
		L	29.5	(749.2)	**-13.2**	(577.2)	-29.9	(335.8)	38.6	(565.5)

Chart 1

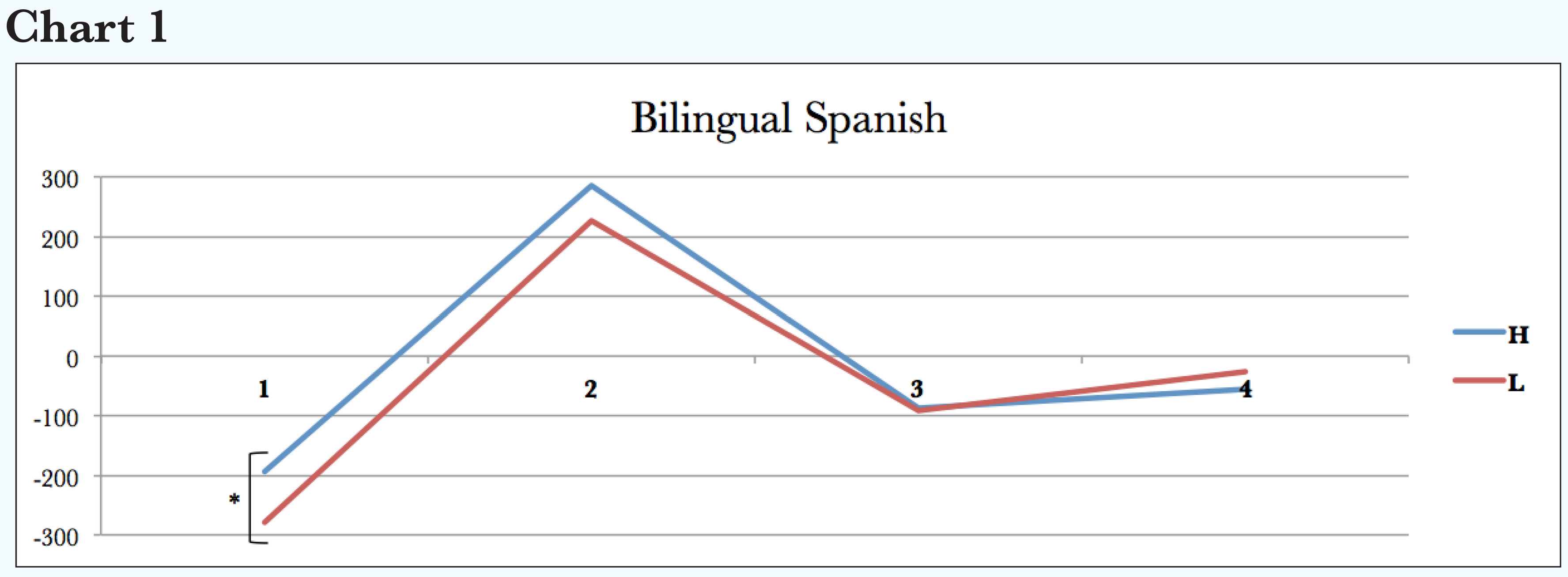


Chart 2

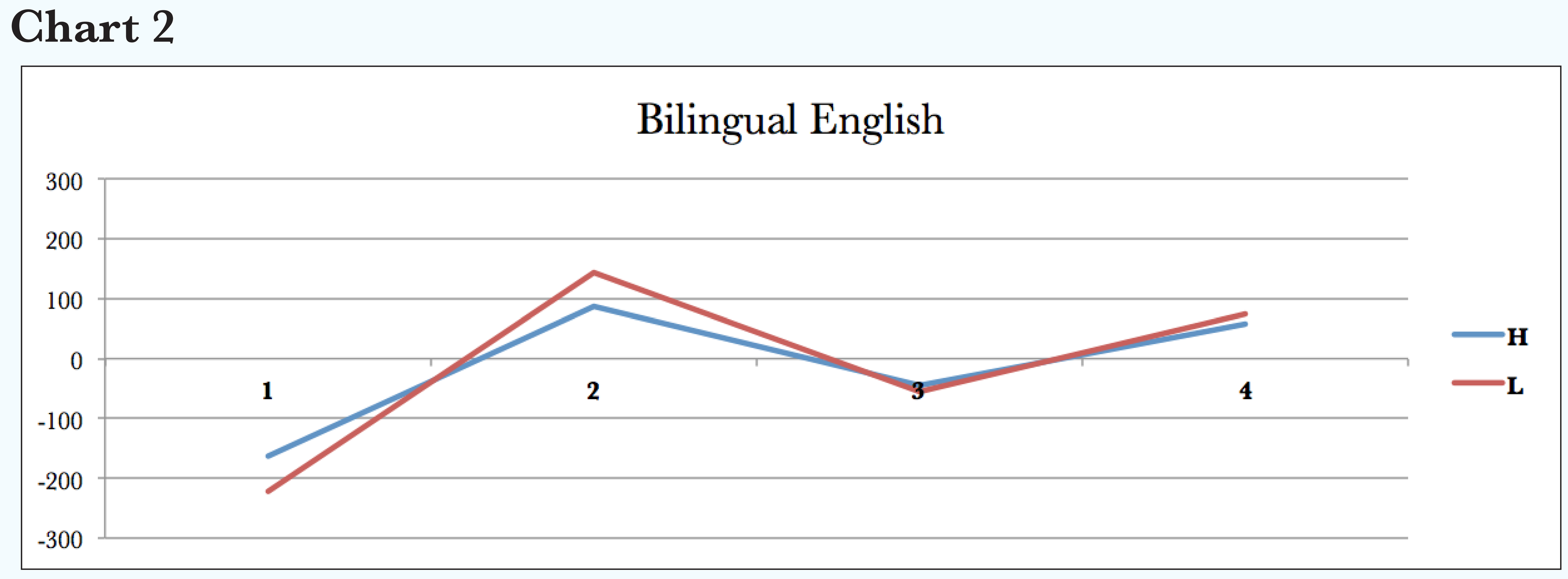
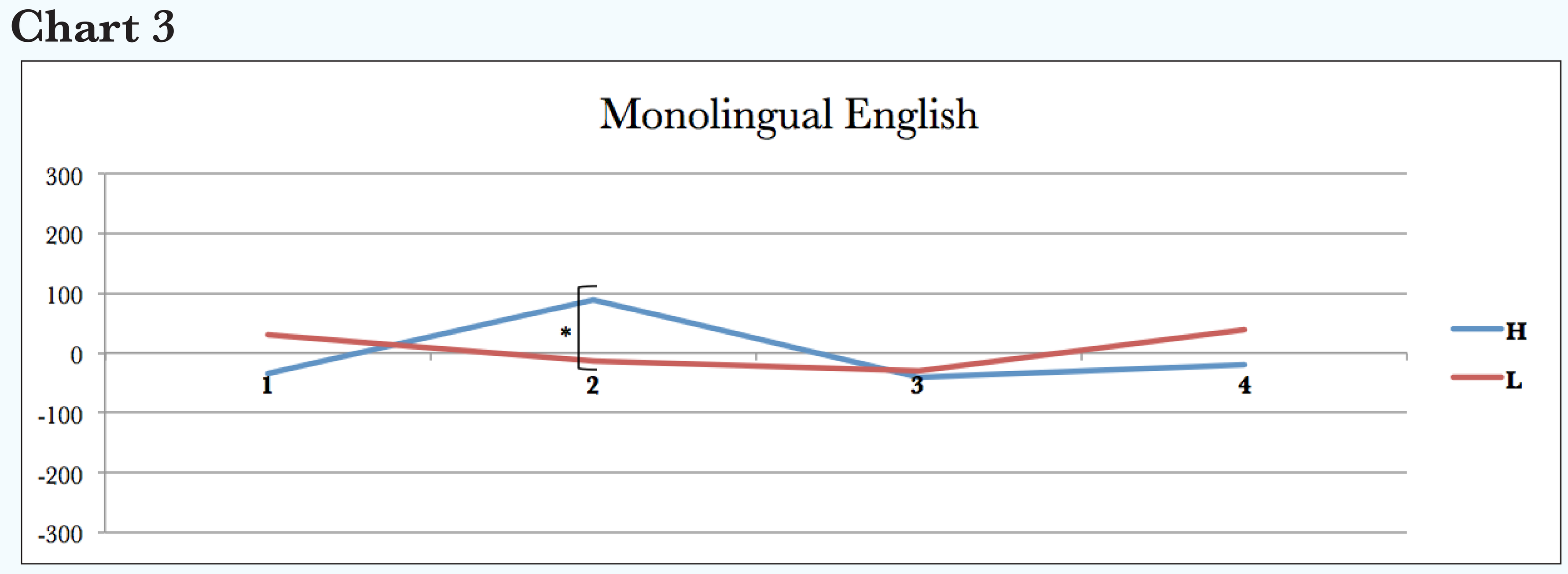


Chart 3



Conclusions & Outlook

No significant difference in time was found between the stimuli types (H/L) for any speaker (bilingual or monolingual) in either language in the critical or spillover regions
- Option 1: Perhaps number does not trigger reanalysis
- Option 2: Perhaps verb morphology in English does not trigger reanalysis

Still need to test Spanish monolinguals
- If there is no significant difference for these individuals, then that would support Option 1
- If there is a significant difference for these individuals, then that would support Option 2
  - Why would they differ from bilinguals in Spanish?
  - Perhaps a question of English dominance (Fernández 2003) or language of immersion (Dussias 2003; Dussias & Sagarra 2007) for our bilingual speakers

References

Cuetos, F., & Mitchell, D. C. (1988). Cross-linguistic differences in parsing: Restrictions on the use of the Late Closure strategy in Spanish. Cognition,30(1), 73-105.

Dussias, P. E. (2003). Syntactic ambiguity resolution in L2 learners. Studies in Second Language Acquisition, 25(4), 529-557.

Dussias, P. E., & Sagarra, N. (2007). The effect of exposure on syntactic parsing in Spanish-English bilinguals. Bilingualism language and cognition,10(1), 101.

Fernández, E. M. (1999). Processing strategies in second language acquisition: Some preliminary results. In E.C. Klein & G. Martohardjono (eds.), The development of second language grammars: A generative approach. Amsterdam: John Benjamins Publishers, 217-239.

Fernández, E. M. (2003). Bilingual sentence processing: Relative clause attachment in English and Spanish (No. 29). John Benjamins Publishing Company.

Frazier, L. (1978). On comprehending sentences: Syntactic parsing strategies. Unpublished doctoral dissertation, University of Connecticut, Storrs.

Jegerski, J. (2010). Ultimate Attainment in Second Language Acquistion: Near-Native Sentence Processing in Spanish. ProQuest LLC. 789 East Eisenhower Parkway, PO Box 1346, Ann Arbor, MI 48106.

Acknowledgements

Special thanks to the members and the research assistants of the UIC Bilingualism Research Laboratory, Kara Morgan-Short, Bernie Issa, UIC School of Literatures, Cultural Studies, & Linguistics, and UIC College of Liberal Arts & Sciences