

# Priming from Music to Language: Effects of Number Marking on the Priming of Relative Clause Attachment in Spanish

Mythili Menon and Elsi Kaiser

Department of Linguistics, University of Southern California, Los Angeles, USA mythilim@usc.edu

## 1. Introduction

- Language and music share a number of characteristics (e.g. Besson and Schön 2001; Maess et al. 2001, Patel 2003, Patel 2008, Koelsch 2005, Koelsch 2009).

### How similar are they?

- Language & music have shared representations** (Evidence from neuro-imaging and syntactic unexpectedness violations, Koelsch 2000, Patel 2003, Patel 2008)
- Language & music have different representations** (Musical deficits and amusics, Peretz and Colheart 2003, Peretz 2006)
- If music and language have shared representations, we expect priming from music to language.
- Menon & Kaiser (2013):** Can dependencies in musical primes influence participants' production of relative clauses (RCs) with low attachment (LA) vs. high attachment (HA)?
- We found priming from music to language:
  - Overall LA bias weakens significantly after a musical high attachment prime.
  - See van de Cavey & Hartsuiker (2011) for work on Dutch

## 2. Research Questions

- (a) Does primability of a language depend on attachment bias?  
(b) Does potential priming effects interact with the singular/plural distinction on nouns? (cf. Fernández and Sainz, 2004 for Spanish)

- Menon and Kaiser (2013) tested RC attachment in **English**, which has a default Low Attachment bias.
- Researchers disagree on whether Spanish RCs have default high or low attachment (e.g. Carreiras et al 2001, Cuetos and Mitchell 1988).
- Effect of number?** Fernández & Sainz 2004 suggest that whether nouns are singular or plural influences attachment patterns:
  - Bob saw the **cousins** of the **boy** who... [**Plural+Sing**] => LA
  - Bob saw the **cousin** of the **boys** who... [**Sing+Plural**] => unclear?

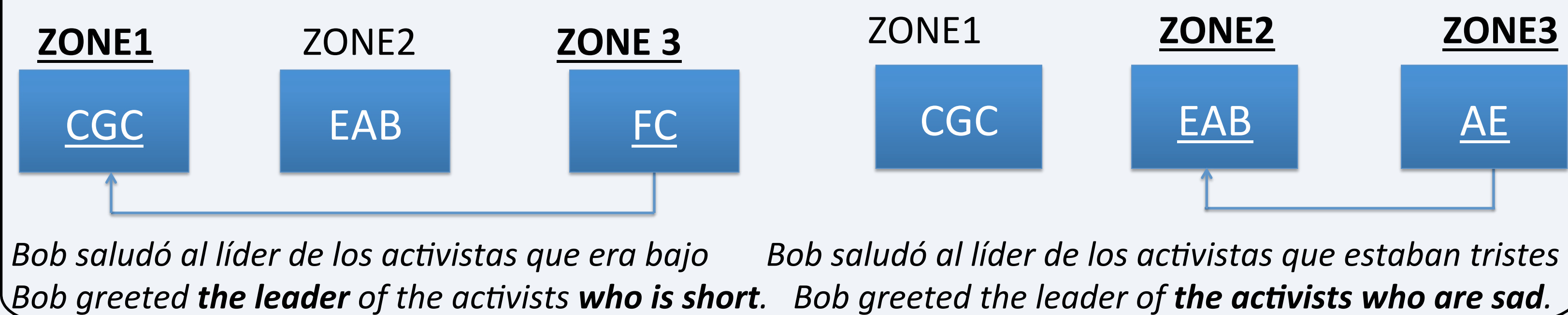
## 3. Our Study

- Participants (n= 20) listened to and rated a musical prime or filler (**music task, how melodious?**) and completed an ambiguous relative clause fragment in Spanish (**language task**)
- Targets:** 30 ambiguous RC fragments, nouns differed in number
- Primes:** 30 musical primes in 5 conditions.
- Fillers:** 60 language fillers and 60 musical fillers.
- Bob saludó al **líder** de los **activistas** que...
- 'Bob greeted the leader of the activists who...' (**N1Sing+N2Plural**)
- Tina conoció a los **jardineros** del **millonario** que ...
- 'Tina knew the gardeners of the millionaire who...' (**N1Plural+N2Sing**)
- Does continuation modify the complex NP (e.g. *leader of the activists*; HA) or the lower NP (e.g. *activists*; LA)?

## 4. Prime conditions

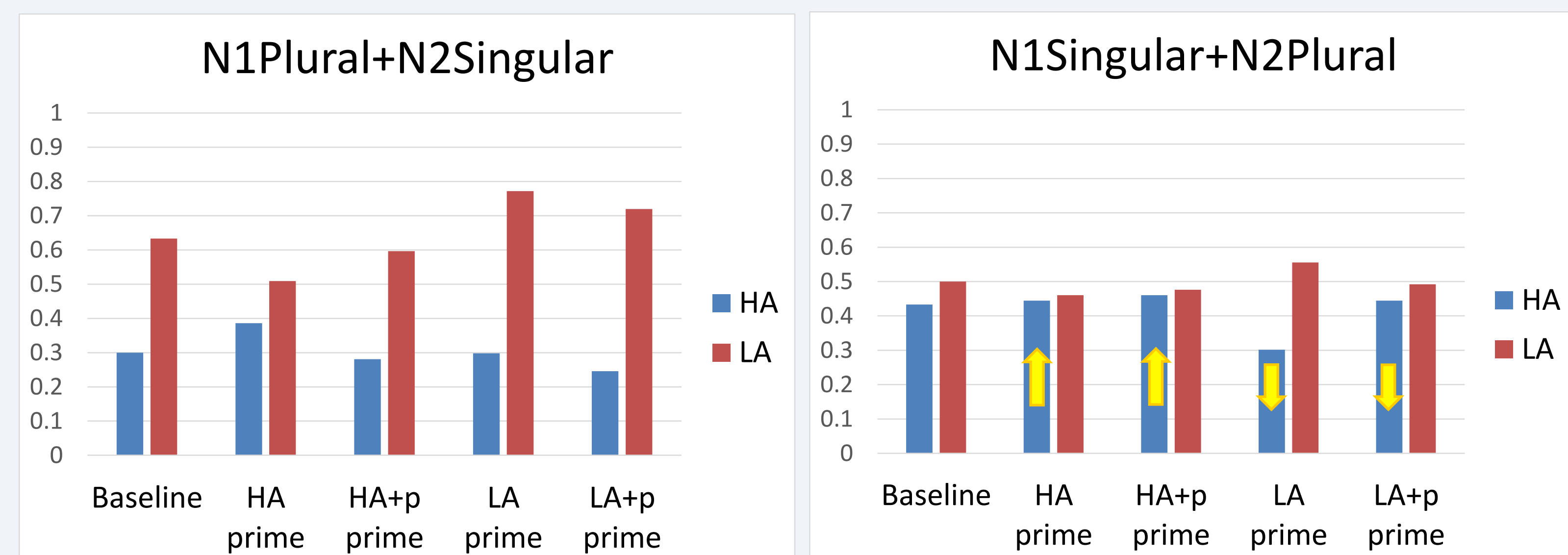
- Musical primes use the Circle of Fifths. Sequences of 8 notes created using a piano on Mac's Garage Band.

CONDITION	EXAMPLE
High Attachment (HA)	GCGBF#EGC
Low Attachment (LA)	DADC#BF#C#F#
High Attachment + pause (HA+P)	CGCEBE [pause] FC
Low Attachment + pause (LA+P)	ADAC#G#F# [pause] C#G#
Baseline (Base)	FCFCFCFC



## 5. Results

Significant effect of target type, Plural+Sing vs. Singular+Plural ( $p < .05$ ) on participants' attachment choices.



### Plural+Sing

- Overall LA bias in baseline condition; fits with Fernández & Sainz (2004)
- No significant priming (no effect of attachment height or pause, no interaction) => perhaps due to a ceiling effect: All conditions have more LA than HA completions

### Sing+Plural:

- No clear attachment biases in baseline condition, similar to Fernández & Sainz 2004
- Priming from music:** The rate of HA continuations is significantly greater after high-attachment primes than low-attachment primes ( $p < .05$ ). No effect of pause and no interaction.

## 6. Discussion

- Our *baseline results* support Fernández & Sainz (2004)'s finding that the singular/plural distinction influences RC attachment.
- Our results in the *priming conditions* suggest that explicitly musical stimuli can activate abstract representations that overlap with the syntactic representations of language, but that cross-domain priming effects are modulated by the singular/plural status of the nouns and the associated RC attachment biases.
- A pause after the second noun does not significantly boost the HA bias after HA primes (cf. Fodor'98), suggesting that rhythmic cues may not be needed for priming => what matters is the structure of the harmonic domains. (Hints of numerical effects of pause with LA primes?)

**Selected References** Fernández, E.M & Sainz, J. (2004). Early preferences in RC attachment in Spanish. Poster presented at AMLaP, France. || Menon, M. & Kaiser, E. (2013). Consequences of 'music to one's ears': Structural Integration Priming from Music to Language. Poster presented at 26<sup>th</sup> Annual CUNY Conference on Human Sentence Processing || Van de Cavey, J. (2012). Are syntactic processes in language and music domain specific? Unpublished thesis. University of Ghent. ||

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