



## Brief article

## Highs and Lows in English Attachment

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## ABSTRACT

Grillo and Costa (2014) claim that Relative-Clause attachment ambiguity resolution is largely dependent on whether or not a Pseudo-Relative interpretation is available. Data from Italian, and other languages allowing Pseudo-Relatives, support this hypothesis. Pseudo-Relative availability, however, covaries with the semantics of the main predicate (e.g., perceptual vs. stative). Experiment 1 assesses whether this predicate distinction alone can account for prior attachment results by testing it with a language that disallows Pseudo-Relatives (i.e. English). Low Attachment was found independent of Predicate-Type. Predicate-Type did however have a minor modulatory role. Experiment 2 shows that English, traditionally classified as a Low Attachment language, can demonstrate High Attachment with sentences globally ambiguous between a Small-Clause and a reduced Relative-Clause interpretation. These results support a grammatical account of previous effects and provide novel evidence for the parser's preference of a Small-Clause over a Restrictive interpretation, crosslinguistically.

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## 1. Introduction

The primary goal of psycholinguistics is to build a universal model of language processing in which crosslinguistic variation is grounded in language specific grammatical properties. Crosslinguistic variation in parsing preferences that does not stem from a grammatical distinction poses challenges to theories of parsing (Fodor, 1998a, 1998b). Indeed, the language dependent preference for either high or low attachment of the Relative Clause (RC) in (1) (first observed by Cuetos & Mitchell, 1988 and replicated by many others)<sup>1</sup> has generated extensive investigation, given there was no known grammatical distinction until recent work by Grillo (2012) and Grillo and Costa (2014). Speakers of English show an overall Low Attachment (LA) preference (i.e., attaching to *the actress* in (1)), while speakers of Spanish, i.e., demonstrate a High Attachment (HA) preference (attaching to *the maid* in (1)).

- (1) a. John saw [<sub>DP1</sub> the [<sub>NP1</sub> maid<sub>1</sub> of [<sub>DP2</sub> the [<sub>NP2</sub>actress<sub>2</sub> [<sub>CP</sub> that was<sub>2</sub> standing on the balcony]]]]]
- b. Juan vio [<sub>DP1</sub> la [<sub>NP1</sub>criada<sub>1</sub> de [<sub>DP2</sub> la [<sub>NP2</sub> actriz<sub>2</sub>] [<sub>CP</sub> que estaba<sub>1</sub> en el balcón]]]]]

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<sup>1</sup> See Fernández (2003) for discussion of this vast literature.

Several earlier accounts for these results have captured some essential aspect of the phenomenon but not its entirety. Previous accounts include (i) assuming modification by RCs, and other non-primary relations, being parsed using a variety of non-structural principles (Gilboy, Sopena, Clifton, & Frazier, 1995); (ii) differences in frequency of exposure to HA vs. LA structures (Mitchell & Cuetos, 1991); (iii) parametrization of parsing principles (Gibson, Pearlmutter, Canseco-Gonzalez, & Hickok, 1996), (iv) crosslinguistic differences in prosody (Fodor, 2002); and (v) crosslinguistic differences in the relativizing element (Hemforth, Konieczny, Scheepers, & Strube, 1998). In more recent work, Hemforth et al. (in press) argues that crosslinguistic differences are more limited in scope than initially presumed and are largely based on independent grammatical properties of the languages under scrutiny. Similarly, Grillo (2012) and Grillo and Costa (2014) discuss a particular crosslinguistic grammatical variable that could explain the remaining variability: Pseudo-Relative (PR) availability.

Grillo (2012) and Grillo and Costa (2014) identified a grammatical confound in the RC attachment literature: an asymmetric availability of Pseudo-Relatives (PR) across languages and structures. The PR is string identical to an RC, but the two differ from each other structurally and interpretively. RCs (1) modify Noun-Phrases (NPs) and denote properties of entities, while PRs (2-a) are either complements or adjuncts of Verb-Phrases (VPs) and denote events, much like the English eventive Small-Clause

(SC) in (2-b), which is the closest English translation of (2-a) and should not be confused with the string-identical (reduced-)RC interpretation.

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- (2) a. Juan vio [<sub>PR</sub> [<sub>DP</sub> la criada<sub>1</sub> de la actriz<sub>2</sub>] [<sub>CP</sub> que<sub>1/\*2</sub> estaba<sub>1/\*2</sub> en el balcón]]  
 b. John saw [<sub>SC</sub> [<sub>DP</sub> the maid<sub>1</sub> of the actress<sub>2</sub>] [<sub>VP</sub> standing<sub>1/\*2</sub> on the balcony]].
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The relevance of PRs for RC-attachment comes from the fact that the PR reading is incompatible with LA: the highest NP is the only accessible subject for the embedded verb in this structure. Grillo & Costa observe a tight correspondence between PR-availability and attachment preference where HA is observed when PRs are available and LA when only RCs are available. To explain this pattern, they propose that, all else being equal, PRs are preferred by the parser over RCs for their simpler structure and interpretive properties. This proposal, dubbed the *PR-first Hypothesis* is supported by the reanalysis of previous findings and by novel results from languages that allow PRs (see below).

After providing a detailed overview of the *PR-first Hypothesis* and the data that support it we present two experiments testing a non PR-language, English, in order to: (1) determine whether these earlier results can alternatively be explained by the pragmatics of the predicates that allow PRs and, after failing to support such a pragmatic account, (2) test the generalizability and crosslinguistic nature of the grammatical claims made by *PR-first* in turning English, typically a LA language, into a HA language through SC-availability (grammatically similar to PRs).

### 1.1. *PR-first hypothesis*

Grillo (2012) and Grillo and Costa (2014) build on the observation that PRs are both structurally and interpretively simpler than RCs. Structurally, PRs (being SCs) have an impoverished internal structure when compared to RCs: e.g. Tense is anaphoric in PRs but deictic in RCs. Interpretively, PRs provide information relevant to the matrix event (i.e. what is perceived), and are thus preferred following *Relativized Relevance* (Frazier, 1990; Traxler & Frazier, 2008). Moreover, PRs carry fewer unsupported presuppositions than RCs, as they do not require a contrast set (Altmann & Steedman, 1988; Crain & Steedman, 1985).

On the basis of these observations, Grillo and Costa propose the *PR-first Hypothesis*, which states that PRs should be preferred by the parser over RCs. Given that HA is obligatory with PRs, we should expect to observe HA to be more frequent in languages and structures that allow PRs and LA with unambiguous RC readings.<sup>2</sup>

Support for these predictions comes from both reanalysis of previous results from the literature, which shows an almost perfect correspondence between PR-availability and attachment preferences, and novel experimental results which directly manipulated PR-availability in a number of PR-languages including Italian (Grillo & Costa, 2014), French (Grillo, Hemforth, Pozniak, & Santi, 2015), Greek (Grillo & Spathas, 2014) and European Portuguese (Fernandes, 2012; Grillo, Fernandes, & Costa, 2012; Grillo, Tomaz, Lourenço Gomes, & Santi, 2013; Tomaz, Lourenço Gomes, Santi, & Grillo, 2014). PR-availability depends on a number of factors, but only a well-known restriction on the properties of the matrix verb is relevant to this paper (for full discussion see Cinque, 1992).

Like eventive SCs in English, PRs denote events and need licensing via predicates that can take events as their complements, e.g. (semi)perceptual predicates, both verbal (*see*, *hear*) and nominal:

(*picture of*). Stative/relational predicates (*work for*), and entity-denoting nominals (*house of*), can only select for entities/NPs, and thus do not license PRs or eventive SCs, but are perfectly acceptable with RC-modified NPs.

In an offline questionnaire in Italian, Grillo and Costa compared attachment preferences in minimal pairs of sentences. The sentences contained either a PR-compatible verb, being ambiguous between a PR/RC interpretation (3-a), or a stative verb and only permitting an RC interpretation (3-b).

Contrary to (3-b), (3-a) is ambiguous between a PR-reading, in which the whole clause denotes the direct perception of an event (*the grandma screaming*) and the RC reading, in which the matrix clause denotes the perception of an individual (*the grandma*) and the embedded clause denotes a modifier of either of the two NPs (*the unique grandma/girl that screamed*).

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### (3) Example stimuli from Experiment II (Grillo and Costa, 2014)

- a. PR/RC CONDITION  
 Maria ha sentito la nonna della ragazza che gridava.  
*M. heard the grandma of the girl that was screaming.*
- b. RC-ONLY CONDITION  
 Maria lavora con la nonna della ragazza che gridava.  
*M. works with the grandma of the girl that was screaming.*
- 

In line with the predictions of *PR-first*, the results show a strong preference for HA in the ambiguous PR/RC condition (78.6% HA) and a strong LA preference with unambiguous RCs (24.2% HA).

In this paper, we explore an alternative explanation for this result. The effects described above could equally be due to the predicate semantics, which covaries with PR-availability. Event-taking “PR-predicates” may simply favour HA for reasons other than PR-availability, namely plausibility. Consider the extreme case of the PR-predicate ‘*interrupt*’ in “*John interrupted the maid of the actress that was talking*”. This sentence has a clear HA bias as the person interrupted (NP1) was reasonably also the person who was talking. A similar account could in principle explain the reported HA-bias with other PR-predicates like perceptual verbs. Modulation of RC-attachment through pragmatics was demonstrated by Gilboy et al. (1995). More specific effects of matrix verb type in RC-attachment have recently been observed by Rohde, Levy, and Kehler (2011), who showed that implicit causality verbs strongly influence RC-attachment: higher proportions of HA were observed with ‘*detest*’ as a matrix verb in the following contrast: *John detests/babysits the children of the musician who ...* when the RC provided an explanation for the state of affair described in the matrix clause. Taken together, these results justify testing an alternative, pragmatic account.

Importantly, a semantic/pragmatic account of the effect of Verb-Type observed by Grillo and Costa would predict the manipulation of perceptual vs. stative verbs to produce the same attachment distinction in English as has been observed in PR-languages. This was tested in Experiment 1.

## 2. Experiment 1: Verb-type effects

30 monolingual British English speakers participated in a timed questionnaire after giving their informed consent.

**Materials and design.** 24 sets of target sentences (4) were constructed, in a 2(*Predicate-Type*: SC-compatible vs. RC-only) \* 2(*Environment*: Verbal vs. Nominal) Latin-square design with 70 unrelated fillers. The complex NP + RC was kept identical across conditions. Sentences in the verbal condition are translated from

<sup>2</sup> Provided that other factors (e.g. prosody, referentiality) are controlled for.

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