

Universally local attachment: new evidence from Prepositional Infinitive Constructions

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Outline

- Asymmetries of attachment preferences for Relative Clauses (across languages and structures),
- Previously unnoticed grammatical distinction: the availability of Pseudo-Relatives,
- Hypothesis: once PRs are ruled out, Local Attachment is Universal,
- Results from 3 novel experiments and from previous work support the hypothesis,
- Concluding remarks

Asymmetries in RCs Attachment

Variation in attachment preferences with Relative Clauses (RCs)
across languages, Cuetos & Mitchell (1988)

- (1) a. Someone shot the maid₁ of the actress₂ that
was₂ standing on the balcony
- b. Algúien disparó contra la criada₁ de la actriz₂ que
estava₁ en el balcón

Asymmetries in RC Attachment

Several factors have been shown to influence attachment, including lexical, prosodic and syntactic.

We aim at explaining the residual asymmetries still observable across languages once these factors are controlled for.

Asymmetries in attachment preference

- These findings at odds with uniform LOCAL / low attachment preference found for other structures in the same languages (e.g. PPs) i.e. strength of local attachment (Phillips & Gibson, 1997).
- They lead to question the universality of parsing principles, in particular of *Right Association* (Kimball, 1973) / *Late Closure* (Frazier, 1978) / *Recency* (Gibson, 1991) / *Merge Right* (Phillips, 1996);
- They pose serious problems to theories of acquisition and processing (Fodor, 1998a,b);

RCs Attachment Preference

- Several accounts have been proposed to explain these variations, e.g. the *Tuning Hypothesis* (Brysbaert & Mitchell, 1996), *Construal* (Gilboy et al., 1995; Frazier & Clifton, 1996), *Predicate Proximity* (Gibson et al., 1996), *Anaphoric Binding* (Hemforth et al., 1998, 2000b,a; Konieczny & Hemforth, 2000), *Implicit Prosody* (Fodor, 1998a,b) we will not discuss them here (see Fernández, 2003; Augurzky, 2005, for discussion).
- Our main goal is to show the relevance of a previously unnoticed grammatical factor, which might be held responsible for attachment asymmetries both within and across languages.

The role of Pseudo Relatives

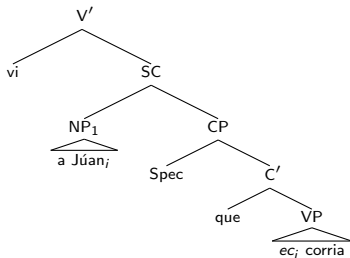
Grillo & Costa (2012) show that previous work on RC attachment has overlooked the role of Pseudo Relatives:

In some languages (e.g. Spanish) but not in others (e.g. English) the relevant string can be also read as a Pseudo Relative Small Clause:

- (2) Ayer vi [_{SC} a Juán que tocaba la guitarra]
*Yesterday I saw [_{SC} John that played the guitar]
Yesterday I saw [_{SC} John playing the guitar]

Pseudo Relatives

- (3) a. ✓Vi a Juan que corría / J'ai vu Jean qui courait / Ho visto Gianni che correva
*I saw John that ran
→I saw John running



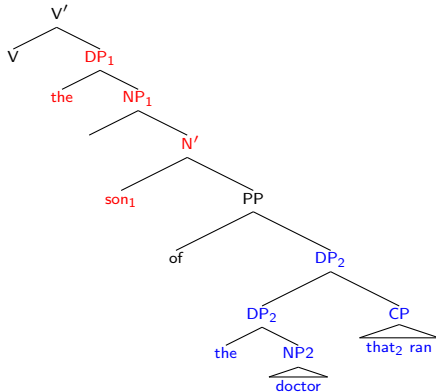
A few distinctions between PR and RCs

Property	RCs	PRs
Refers to individuals	✓	✗
Available w. objects	✓	✗
Available w. Rel. Pronouns	✓	✗
NP modifier	✓	✗
Available w. Proper Names	✗	✓
Available in SC environments	✗	✓
VP modifier	✗	✓
Aspectual restrictions	✗	✓
Refers to propositions	✗	✓

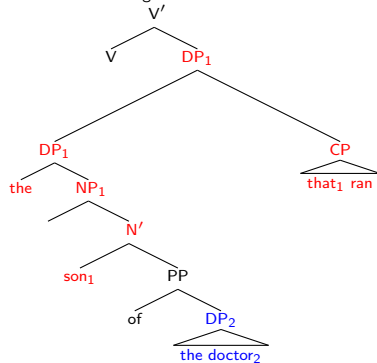
Table : RCs and PRs

a fundamental distinction

a. Low Attachment

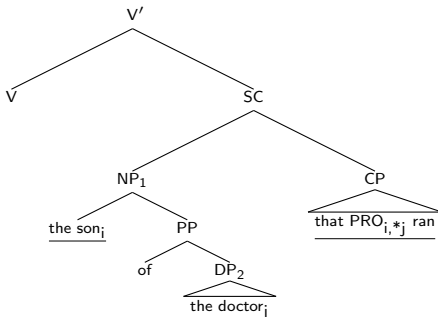


b. High Attachment



PR reading, illusion of High Attachment

(4)



→ WITH PRs AND SCs , DP2 IS NOT AN ACCESSIBLE SUBJECT
→ V TAKES SC, AND NOT DP AS COMPLEMENT.

Variable Syntax, Uniform Parsing

Grillo & Costa (2012) propose the following generalization:

- (5) Once other known factors are taken into account (e.g. lexical, prosodic etc.):
- A. Low Attachment preference is observed, across languages and structures, with genuine restrictive RCs, i.e. when PRs are not available.
 - B. High Attachment preference is observed in languages and structures which allow for a PR reading.
 - C. High Attachment with *Acc-ing* construction in English (*I saw the son of the doctor running*) and Prepositional Infinitive Constructions (PIC) in Portuguese (*vi o filho do medico a correr*), i.e. string ambiguous between reduced RCs and correlates of PR.

Variation Across Languages

Language	Attachment	PRs
English	Low	X
Romanian	Low	X
Basque	Low	X
Chinese	Low	X
German*	Low	X
Russian*	High	X
Spanish	High	✓
Dutch	High	✓
Italian	High	✓
Bulgarian	High	✓
French	High	✓
Serbo-Croatian	High	✓
Japanese	High	✓
Korean	High	✓
Greek	High	✓
Portuguese	High	✓*

Table : Attachment Preferences and PR availability

Variation Across Structures

- (6) SUBJECTS (Hemforth et al., unpublished)
- a. The maid₁ of the actress₂ that was₂ on the balcony is blonde
 - b. La criada₁ de la actríz₂ que estava₂ en el balcón es rubia

Variation Across Structures

- (7) NOMINALS Gibson et al. (1996)
- a. The lamp₁ near the painting₂ of the house₃
that was₃ damaged by the flood
- b. la lámpara₁ cerca de la pintura₂ de la casa₂
que fué₃ dañada en la inundación

Variation Across Structures

- (8) P TYPE (De Vincenzi & Job, 1993)
- a. Qualcuno ha sparato alla governante₁ con l'attrice₂
che stava₂ seduta in balcone
 - b. Someone shot the maid₁ with the actress₂
(that was) sitting₂ on the balcony

Variation Across Structures

(9) RELATIVE PRONOUNS (Fernández, 2003)

Vi al hijo₁ del medico₂ el cual₂ estaba en el balcón

I saw the son₁ of the doctor₂

who[rel pron]₂ was on the balcony

A previous study in Italian

Previous findings in Italian have shown HA preference *in offline studies*

In a previous experiment in Italian we demonstrated a fundamental role of PR availability in attachment:

- A. LA preference with genuine RCs
- B. HA preference with ambiguous RC / PR sentences.

Previous findings in Portuguese

Tendency to attach High in Portuguese (Miyamoto, 1999, 2005; Ribeiro, 1998; Maia & Maia, 2001; Maia et al., 2004, 2006; Lourenço-Gomes, 2005; Lourenço-Gomes et al., 2011, a.o.)

See Maia et al. (2006) for an overview

PRs in European Portuguese

PRs are allowed in EP universally in some contexts (10-a),
Regional and individual variation apply in other contexts (10-b)
Not allowed in as many contexts as in e.g. Italian (10-c):

- (10)
- a. Eis o João que chega
Ecco Gianni che arriva
*There's John that arrives
There's John arriving
 - b. Vejo o João que fuma
Vedo Gianni che fuma
*I see your son that smokes
I see your son smoking
 - c. ??A foto do João que fuma é muito fixe
La foto di Gianni che fuma e' molto bella
*The picture of John that smokes is very beautiful
The picture of John smoking is very beautiful

Experiment 1: Materials and Design

- Questionnaire, PC running *Linger* (Doug Rodhe, <http://tedlab.mit.edu/dr/Linger>).
- *Participants*: (n=20) EP Speakers.
- *Materials and Design*: 2x2 crossing *type*(SC and noSC) and *position* (Right Branching vs. Center Embedding);
- 24 sets of target sentences (4 versions each), 80 fillers; materials and questions.

Experiment 1: Stimuli

- | | |
|---|---------|
| A. <i>PR, Right Branching</i> | PR & RC |
| O João viu o filho do medico que estava a correr
John saw the son of the doctor (that was) running | |
| B. <i>noPR, Center Embedding</i> | RC only |
| A foto do filho do medico que estava a correr é muito linda
The picture of the son of the doctor that was running is very nice | |
| C. <i>noSC, Right Branching</i> | RC only |
| O João vive com o filho do medico que estava a correr
John lives with the son of the doctor that was running | |
| D. <i>noSC, Center Embedding</i> | RC only |
| A moto do filho do medico que estava a correr é muito linda
The bike of the son of the doctor that was running is very nice | |

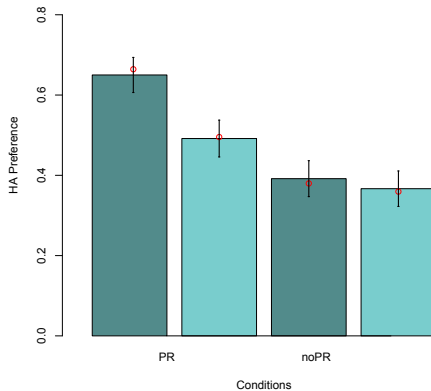
- A. O FILHO CORRE
B. O MEDICO CORRE

Experiment 1: Results

% HA, Experiment 1		
	Object	Subject
PR	60.0%	46.6%
no PR	32.5%	34.1%

Table : Percentage of High Attachment Preferences

Results



Experiment 1: Analysis

Data were fit with with mixed effects logistic regression using the `lmer()` function of the *lme4* package (Bates, Maechler, Bolker, 2011) of the R analysis program (R core development team).

Main Model

fixed factors: *type*, *position* and *type*position*,

random effects: *subject*, *item*

random slopes included for both fixed effects and their interaction.

Analysis

- Significant effect of *type* (coefficient = 1.2543, SE = 0.2876, z-score = 4.361, $p < .001$).
- Significant interaction *type*position* (coefficient = -1.2610, SE = 0.6357, z-score = -1.984, $p < 0.5$).

Analysis

Additional analyses, separating position and type (with random slopes for both fixed effects), show :

- significant effect of *type* for the object position (coefficient = 1.9860, SE = 0.5749, z-score = 3.454, $p < .001$), with > HA for SC than noSC.
- significant effect of *position* for PR type (coefficient = -1.1534, SE = 0.4955, z-score = -2.328, $p < .05$), with >HA for object than subject;
- marginally significant effect of type for the subject position, (z score = 1.955, $p < .1$), with >HA for PR than noPR.

Analysis

- Low Attachment preference in all conditions in which RC is only possible reading and PRs are not available;
- High attachment preference is observed only in condition A, i.e. when PRs are available.

Comments

As predicted, LA was found in all RC only conditions
HA was found only in condition A, in which PRs were allowed

Languages differ in allowing PRs in “picture of” NPs, OK in Italian, *Spanish / Catalan (see Rafel, 1999, p.56 for discussion).

Portuguese matches Spanish in this respect, but PICs allow testing nominals in EP.

PICs and SCs

- (11)
- a. Complement small clauses:
EP: Não suporto o João e o Mário a fumar.
I can't stand João and Mário smoking

 - b. Adjunct small clauses predicated of a subject:
EP: O João deixou a sala a beber.
João left the room drunk

 - c. Small clauses in absolute with contexts:
EP: Com o Joo a fumar, no podemos partir.
With João smoking, we can't leave.

PICs and SCs

- (12)
- a. Progressive interpretation in existential constructions:
EP: Há alguém a fumar.
There's someone smoking
 - b. Mad Men Magazine contexts.
EP: O Mário a fumar?! É impossível!
Mario smoking?! Impossible!
 - c. Coordination between Small Clause and relative clause:
EP: Vi o Mário bêbedo e a fumar.
I saw Mario drunk and smoking

PICs and SCs in NPs

PIC, like Italian PRs can also appear with NPs that can introduce events:

- (13) A foto do João a correr é muito fixe
The picture of John running is very cool

Conclusion: PICs are the Portuguese correlate of Italian PRs.

Beyond PR: SCs and attachment

Same method, procedure and (adapted) stimuli from previous experiment, 20 Portuguese native speakers participated in the experiment.

With PIC, we expect High Attachment to emerge also in subject position, but ONLY with “*picture of- NPs*”, i.e. NPs that can select for events

Importantly, this change makes SC reading available in condition B.

Experiment 2: Stimuli

(14) Stimuli

- a. *SC / RC, Right Branching*
O João viu o filho do medico a correr
John saw the son of the doctor running
- b. *SC /RC, Center Embedding*
A foto do filho do medico a correr é muito linda
The picture of the son of the doctor running is very nice
- c. *RC only, Right Branching*
O João vive com o filho do medico a correr
John lives with the son of the doctor running
- d. *RC only, Center Embedding*
A moto do filho do medico a correr é muito linda
The motorbike of the son of the doctor running is very nice

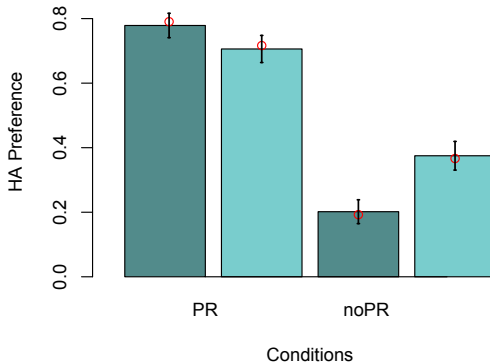
A. O FILHO CORRE
B. O MEDICO CORRE

Experiment 2: Results

% HA, Experiment 2		
	Object	Subject
PR	77.8%	70.5%
no PR	20.1%	37.5%

Table : Percentage of High Attachment Preferences

Results



Experiment 2: Analysis

- Significant effect of *type* (coefficient = 2.3851, SE = 0.2944, z-score = 8.102, $p < .001$). $>HA$ in *PR* than *noPR*
- Significant interaction *type*position* (coefficient = -1.2284, SE = 0.4615, z-score = -2.662, $p < .01$).

Analysis

Separate analyses for the two factors were conducted showing:

- significant effect of position for the noPR condition only
(coefficient= 0.9070, SE = 0.3203, z-score = 2.832, $p < .01$):
> HA preference in subject than object, and no effects of
position for the PR condition.
- Significant type*position interaction (t value = -2.05):
> High Attachment for RB than CE

Analysis

- Strong preference for Low Attachment when only RC reading is available;
- Very strong High Attachment preference is observed when SC reading is available, in both subject and object position.

A Pilot study in Spanish

We conducted a Pilot Study (N=7) in Spanish using a translation of the stimuli of experiment 1.

% HA, Pilot Spanish		
	Object	Subject
PR	45.2%	28.5%
no PR	16.3%	27.5%

Table : Percentage of High Attachment Preferences

The preliminary results show the predicted tendency also in Spanish
Analysis shows similar results as Portuguese experiment
We are now improving the stimuli and will start final test soon.

Comments and Conclusions

- We have shown, on the basis of both previous and original results that PRs availability modulates attachment both across languages and syntactic structures.
- Speakers of those languages that allow for PRs in the relevant contexts have been reported to prefer High Attachment, while speakers of languages that disallow PRs in those same contexts prefer Low Attachment.

Comments and Conclusions

- Moreover, within the same language, whenever PRs are not available, uniform Low Attachment preference emerges.
- On these bases we have argued that once PRs are taken into the equation, the Universality of Parsing principles of locality can be stated once again.

Thank you!



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