

This is a repository copy of *Canonicity effects are modulatedby matrix verb type*.

White Rose Research Online URL for this paper:
<https://eprints.whiterose.ac.uk/132873/>

Version: Published Version

Conference or Workshop Item:

Grillo, Nino orcid.org/0000-0002-8224-365X, Habboub, Sally and Lungu, Oana (2015) *Canonicity effects are modulatedby matrix verb type*. In: 28th CUNY Conference on Human Sentence Processing, 19-21 Mar 2015.

Reuse

Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

LOCALITY

Subject Relative Clauses (SRC) are easier to process than Object Relatives Clauses (ORC) [King & Just 1991; Gibson 1998; Gordon et al. 2001; Van Dyke & Lewis 2003; Lewis & Vasishth 2005; Lewis et al. 2006; Hale 2006; Kwon et al. 2013, among many others].

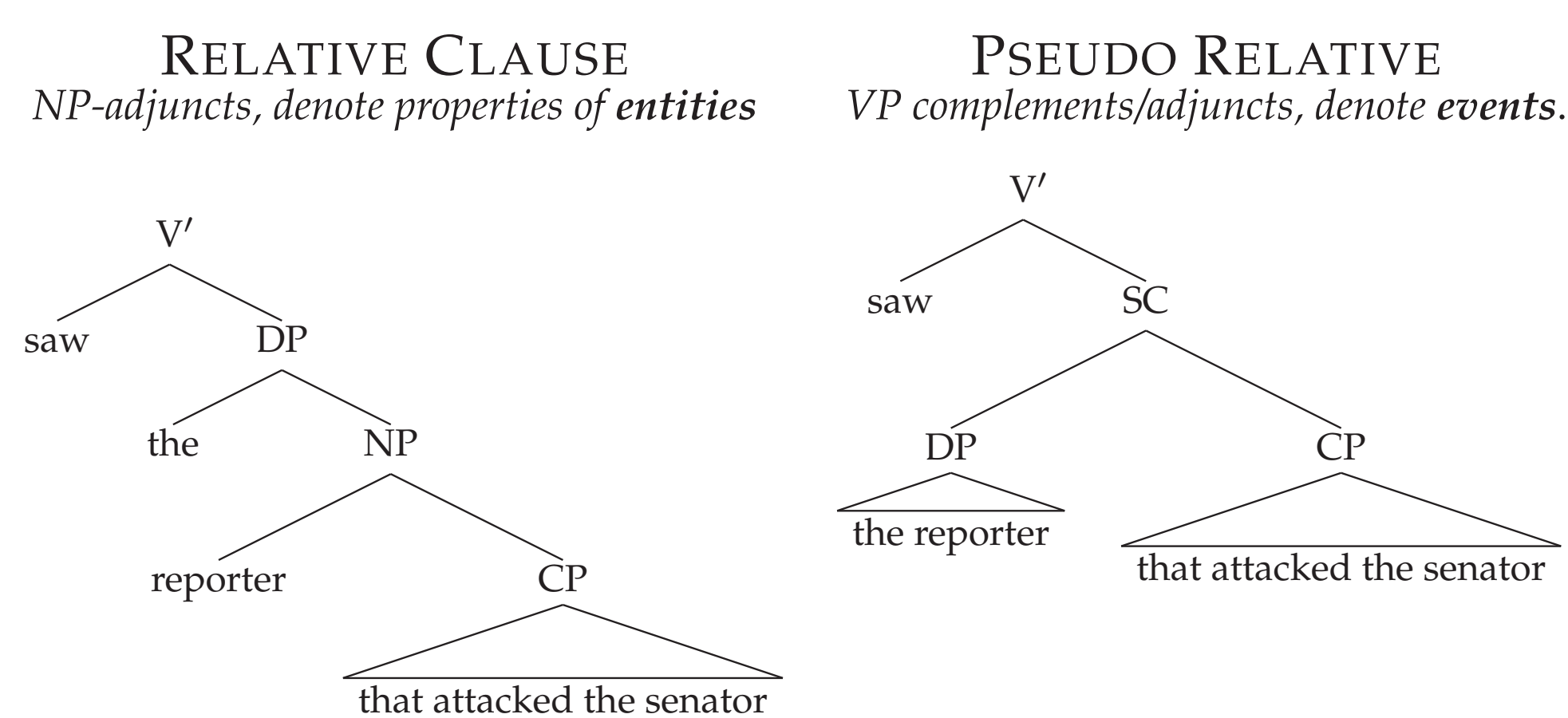
- (1) a. John criticized the reporter that *e* attacked the senator.
b. John criticized the reporter that the senator attacked *e*.

- Several factors have been shown to modulate locality effects (*Person, Number, Animacy* and *Referentiality*, a.o.)
- Present work focuses on effects of Matrix Verb type and availability of Pseudo Relative interpretation.

(PSEUDO)RELATIVES

- Verbs differ in their ability to select for different types of complements:
 - Across languages **stative verbs** typically only select for nominal complements.
 - **Perceptual verbs**, however, select for a number of clausal complements besides nominal complements.
- Number and Type of clausal complements varies across languages.
- In French, but not in English, Subject RCs under perceptual verbs can also be interpreted as Pseudo Relative (PRs) (2).

- (2) Jean a vu [_{PR} le journaliste qui attaqua le sénateur.]
John has seen the reporter that attacked the senator.
'John saw the reporter that attacked the senator.'



RC semantics:
∃e [see(e) & EXPERIENCER(e)(John) & THEME(the unique reporter that attacked the senator)(e)]

PR semantics:
∃e ∃e' [see(e) & EXPERIENCER(e)(John) & attack(e') & AGENT(e')(the reporter) & THEME(e')(the senator)]

PR-FIRST HYPOTHESIS

- (Grillo & Costa 2014): When PRs are available, everything else being equal (e.g. lexical, contextual and prosodic factors), they will be preferred over RCs.
 - Rationale 1: PRs have impoverished structures (Cinque 1992),
 - Rationale 2: PRs introduce information relevant to the main assertion of the sentence (Frazier 1990)
 - Rationale 3: PRs are supported by simpler contextual representations than those required by RCs (Crain & Steedman 1985; Altmann & Steedman 1988).

- PRs (but not RCs) are only selected by a restricted set of predicates, e.g. perceptual (*see, hear*) but not stative predicates (*live with*).

- (3) Jean a critiqué le journaliste qui attaqua le sénateur.
John has criticized the reporter that attacked the senator.
'John criticized the reporter that attacked the senator.' **RC only**

- Grillo et al. (2014a,b): Manipulating PR-availability through Matrix Verb Type strongly impacts Relative Clause Attachment, indirectly supporting *PR-first*
- Grillo et al. (2015) Embedded clauses under perceptual verbs judged *more acceptable* and *read faster* when followed by PR-compatible than RC-only continuation.
- Today: Interaction of PR-availability and Locality.

DISCUSSION

- We contrasted the processing of right branching SRCs and ORCs in the environment of perceptual and stative verbs across a PR (French) and a nonPR (English) language.
- Verb Type had a strong, but different, effect in PR languages (e.g., French) vs. non-PR languages (e.g., English): comprehension of RCs is worse under perceptual verbs, unless a PR analysis is made available (SRCs in French).
- This supports our hypothesis that a clausal complement analysis should be preferred by the parser in these environments.
- Consequences for Sentence to Picture Matching Task, a PR-compatible environment (ask us).
- Asymmetry online vs. offline results.
 - Effect obscured by strength of Locality effect?
 - Alternatively: The parser might sometimes interpret the RC as a Center Embedded subject modifier:

- (5) John saw [_{SC} [_{DP} the boy [_{CP} that the girl kissed]] running]

- This parse, only available at the earliest stages of processing, disappears when the sentence is over, creating confusion which ultimately leads to worse performance in non PR environments

EXPERIMENT 1 & 2

Goal: Assess effects of PR-availability on Locality in a PR-language.

Means: We compared subject-object relatives introduced by PR-compatible and RC-only verbs.

- The PR/RC ambiguity is limited to Subject RCs (4)

- (4) Le président a vu le journaliste que le sénateur attaqua.
The president has seen the reporter that the senator attacked.
'The president saw the reporter that the senator attacked.' **RC only**

Prediction: Stronger effects of Locality in PR-compatible environments.

Method: Self-paced Reading followed by comprehension question.

Participants: 56 French native speakers

Design: 2x2 crossing *Verb Type*(PR-verbs vs. non-PR-verbs) and *Locality* (Subject vs. Object RCs). 24 sets of target sentences (4 versions each), 48 unrelated fillers.

- | | |
|--|---------|
| A. <i>PR predicate / Subject</i> | PR/RC |
| Sarah a aperçu le policier qui tabassait le chauffeur en pleine rue. | |
| B. <i>PR predicate / Object</i> | RC-only |
| Sarah a aperçu le policier que le chauffeur tabassait en pleine rue. | |
| C. <i>RC-only predicate / Subject</i> | RC-only |
| Sarah est divorcée du policier qui tabassait le chauffeur en pleine rue. | |
| D. <i>RC-only predicate / Object</i> | RC-only |
| Sarah est divorcée du policier que le chauffeur tabassait en pleine rue. | |

RESULTS FRENCH

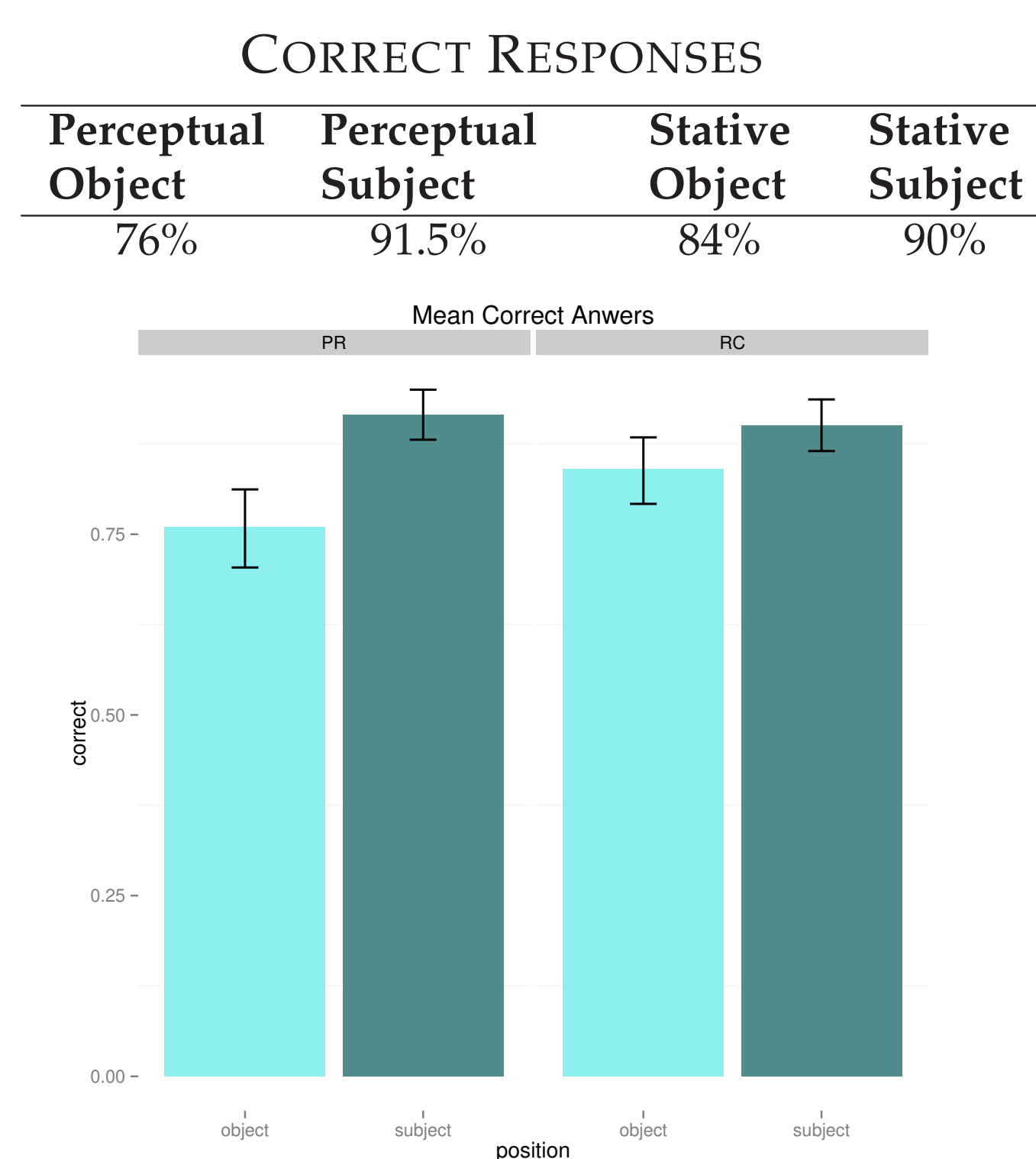


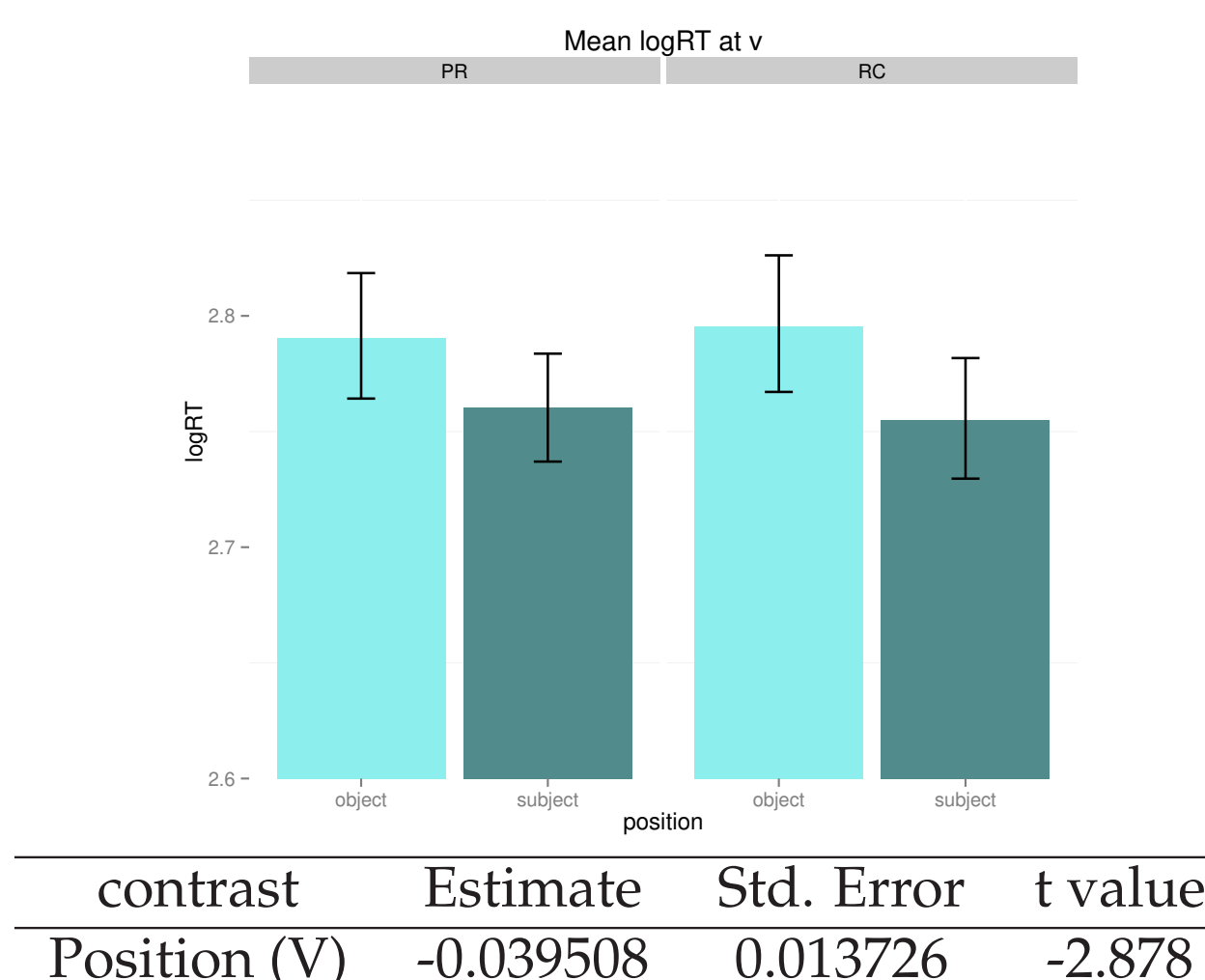
Table 1: Results of linear mixed model fit for Attachment Preferences in Experiment 1. Items and participants were crossed random factors.

contrast	coefficient	SE	z-value	p-value
Locality	0.8980	0.1949	4.608	4.06e-06 ***
Vtype*Locality	-0.7591	0.3872	-1.960	0.0499 *

Interaction:				
contrast	coefficient	SE	z-value	p-value
Locality(PR/RC)	1.3728	0.4708	2.916	0.00355 **
Locality (RC-only)	0.4413	0.4350	1.014	0.31
V-Type(SRC)	-0.4938	0.4665	-1.059	0.29
V-Type(ORC)	0.5573	0.2511	2.219	0.0265 *

- Locality effects not significant in RC-only environments.
- Lower accuracy for ORCs in PR-compatible than RC-only environments.

FRENCH: READING TIMES AT EMBEDDED VERB



Main effect of Locality: Faster RTs for SRCs than ORCs
No effect of V-Type, no effects at other positions.

REFERENCES

- [1] Altmann & Steedman. 1988. Interaction with context during human sentence processing. *Cognition*, 30.
- [2] Cinque. 1992. The Pseudo-Relative and Acc-ing constructions after verbs of perception. *University of Venice WPIL*.
- [3] Crain & Steedman. 1985. On not being led up to garden path: The use of context by the psychological parser. In Dowty, Karttunen & Zwicky (eds.) *Natural language processing: Psychological, computational, and theoretical perspectives*.
- [4] Cuetos & Mitchell. 1988. Cross-linguistic differences in parsing. *Cognition*, 30.
- [5] Frazier 1990. Parsing modifiers. special purpose routines in the human sentence processing mechanism? In Balota & and d'Arcais (eds.) *Comprehension Processes in Reading*.
- [6] Gibson. 1998. Linguistic complexity: locality of syntactic dependencies. *Cognition*, 68.
- [7] Gordon, Hendrick & Johnson. 2001. Memory interference during language processing. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 27.
- [8] Grillo & Costa. 2014. A novel argument for the universality of parsing principles. *Cognition*, 133.
- [9] Grillo, Costa, Fernandes & Santi. 2014b. Highs and Lows in English Attachment *AMLaP*

ACKNOWLEDGEMENTS

- We thank Andrea Santi for helpful comments and suggestions.
- We are grateful to the Laboratoire de Linguistique de Nantes (LLING) for enabling us to collect the French data.
- This research is part of the project 'Syntactic and lexical factors in processing complex

Goal: Assess whether verb distinction alone can alternatively account for prior results by testing a non-PR language, English.

- Grillo et al. (2014) show PR-first generalizes to a preference for eventive over entity complements, including Small Clauses over NPs in English.

Prediction: Higher complexity of both Subject and Object RCs under *perceptual* than under *stative* verbs in English.

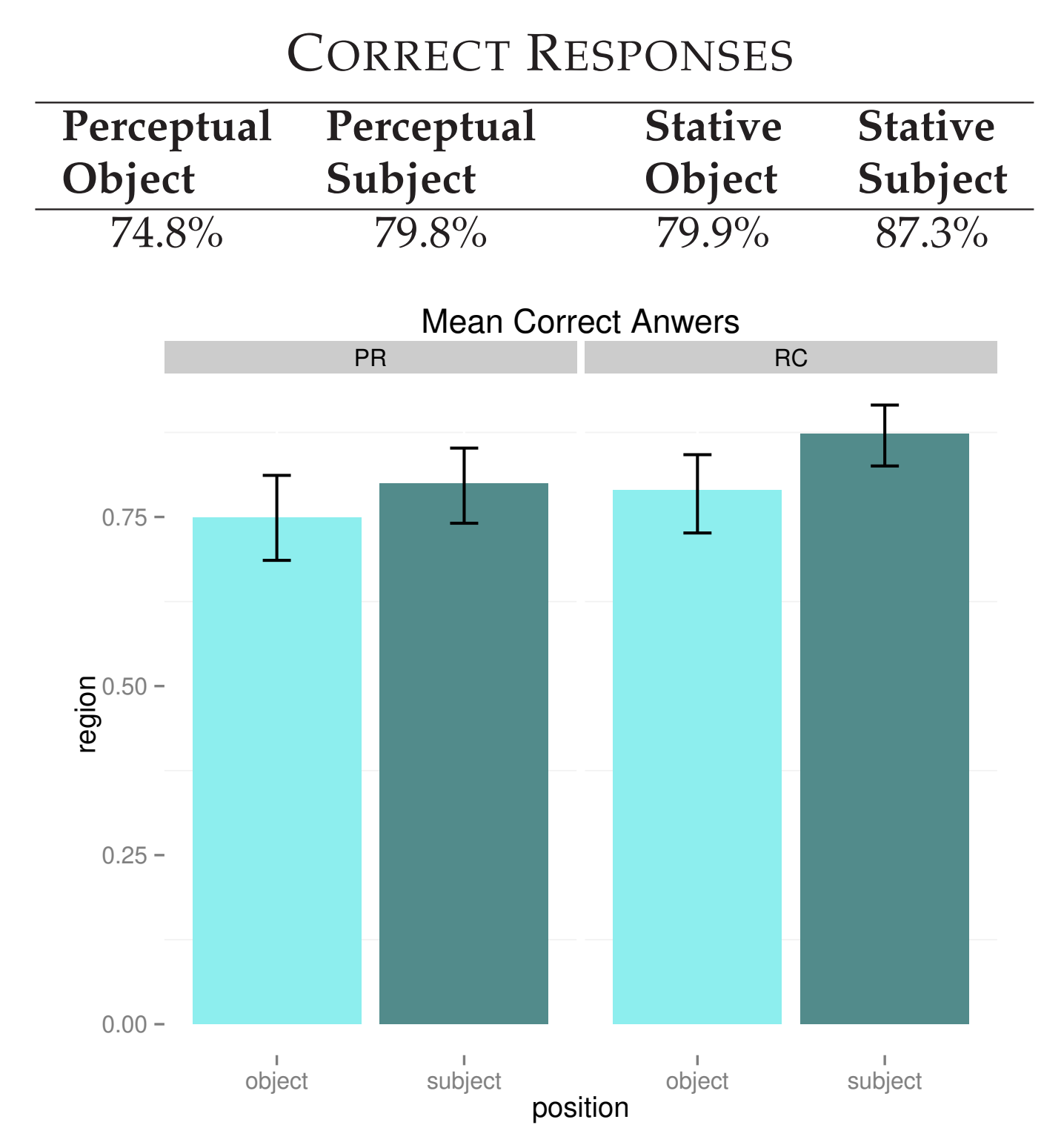
Method, Procedure and Design: Same as French

Participants: 36 English native speakers.

Stimuli

- | | |
|--|---------|
| A. <i>SC-predicate / Subject</i> | RC-only |
| Sarah saw the policeman who was beating the driver in the street. | |
| B. <i>SC-predicate / Object</i> | RC-only |
| Sarah saw the policeman who the driver was beating in the street. | |
| C. <i>RC-only predicate / Subject</i> | RC-only |
| Sarah is divorced from the policeman who was beating the driver in the street. | |
| D. <i>RC-only predicate / Object</i> | RC-only |
| Sarah is divorced from the policeman who the driver was beating in the street. | |

RESULTS ENGLISH

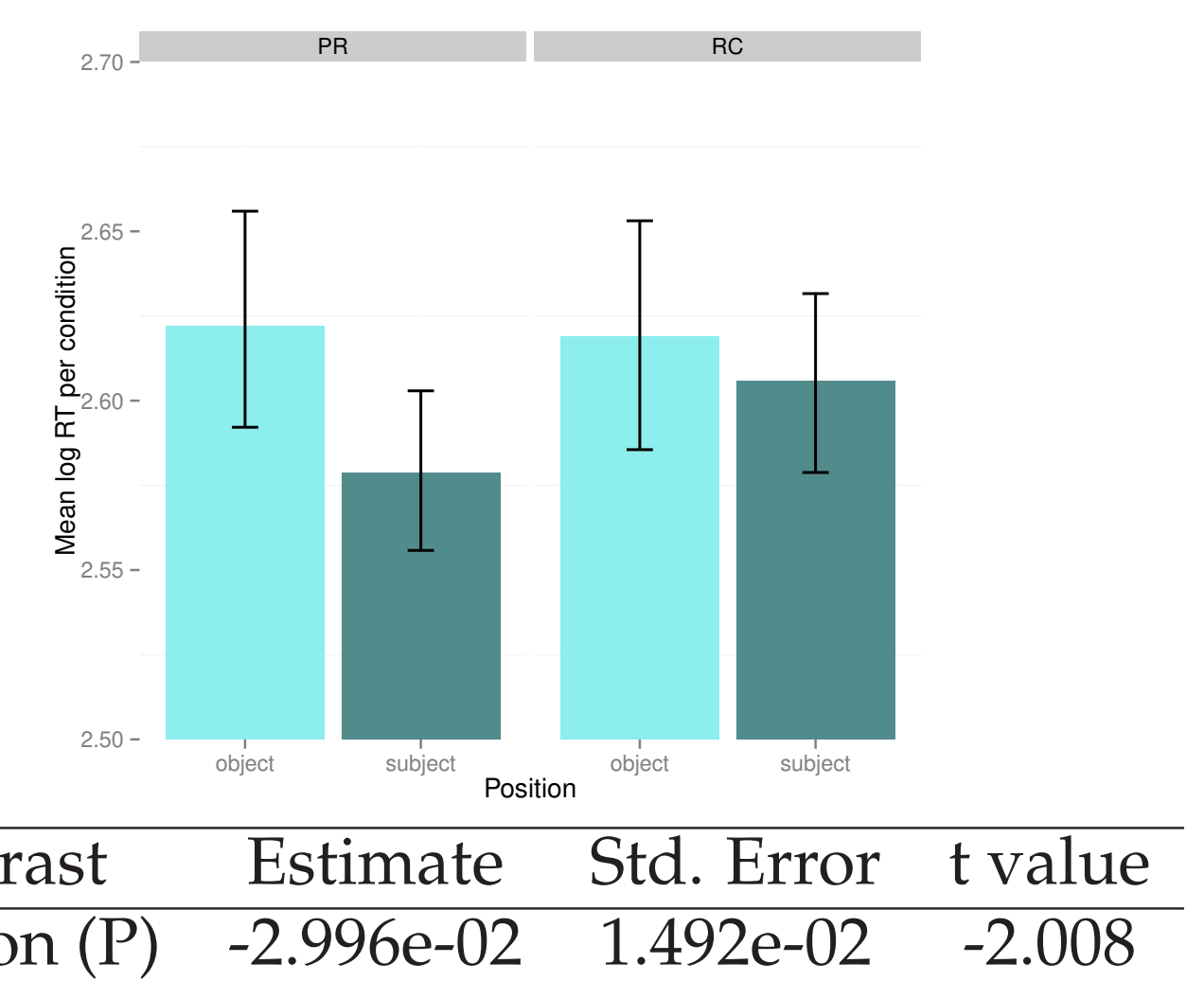


contrast	coefficient	SE	z-value	p-value
V-Type	0.4093	0.1912	2.141	0.03231 *
position	0.5121	0.1921	2.666	0.00769 **

- Main effects of *V-type* and *Position*:

- Better performance with RC-Only than SC-Compatible Verbs.
- Better performance with SRC than ORC across V-Type.

ENGLISH: READING TIMES AT PREPOSITION



- No effects at Embedded Verb
- Main effect of Position at PP (one region downstream from embedded V): faster RTs for SRCs than ORCs.
- No effect of V-Type, no effects at other positions.

ity' (PTDC/CLE-LIN/114212/2009) and the project 'Crosslinguistic and Crosspopulation Acquisition of Dependencies' (PTDC/MHC-LIN/4812-2012) funded by the Fundação para a Ciência e a Tecnologia.