

## Relative clause attachment preferences and the role of complementizer in Slovenian

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Cross-linguistic variation in attachment preferences in relative clauses (1), in particular, with respect to attaching a relative clause either to a local (low-attachment, LA) or a non-local (high-attachment, HA) head noun, present a well known and widely investigated challenge to the universality of parsing principles such as Late Closure (Frazier 1978). At the same time, reduced relative clauses, best known in the psycholinguistic literature on garden-path effects, have received relatively little attention in the context of investigations of attachment preferences. Comparison between full and reduced relatives across languages as well as within a single language is beneficial in a number of respects that can highlight the core properties of the human syntactic parser.

The present study investigates the attachment preferences in full as opposed to reduced relative clauses in Slovenian. Our main objectives were 1) to establish the pattern of attachment preferences for this language in both off-line and online experimental tasks; 2) to re-examine the role of the complementizer in determining the attachment site, in light of recent theories that treat it as a significant factor in attachment preferences; and 3) to evaluate the recent proposal that the choice of a non-local noun in HA languages may be due to a syntactic confound, a “pseudorelative” construction whose syntactic properties resemble that of a small clause (see below).

Experiment 1 is an offline study intended to establish the pattern of attachment preferences in Slovenian full relatives. We used the methodology of untimed questionnaire similar to the one used, e.g. in Sekerina (1997) for Russian. Subjects (N=99, all native speakers of Slovenian), were presented sentences like (2) where both attachment possibilities are grammatically available, followed by two unambiguous partial paraphrases corresponding to HA and LA of the relative clause. Subjects had to evaluate the availability of both interpretations for the sentence on a scale from 0-3, with 0 representing the unavailability of an interpretation, and 3 the most readily available interpretation. 8 target sentences were randomly mixed with 16 filler ambiguous sentences. **Results:** by comparing the mean scores, we found a robust preference for HA over LA (means: HA=2.39, LA=1.83;  $t(196)=8.17$ ,  $p < 0.0001$ ,  $t(14) = 4.29$ ,  $p < 0.0001$ ). This places Slovenian on a par with other HA languages such as Spanish, Russian, and Croatian.

**Prediction 1:** Hemforth et al (2000) attribute a key role in determining the attachment site to the complementizer. They report that in German, RCs as in (3a) are resolved toward HA, while in their counterparts involving a prepositional phrase as in (3b), LA is preferred. On the basis of this finding, Hemforth et al. propose the anaphoric resolution hypothesis, according to which the presence of a relative pronoun initiates a search for an appropriate discourse referent to which the pronoun points, which is usually the non-local noun due to its high prominence. This account predicts, among other things, that *reduced relative clauses, with the relative pronoun absent, should behave similarly to constructions with PPs, i.e. elicit LA*, in accord with Late Closure.

**Prediction 2:** Grillo and Costa (2013) argue that in the languages and structures with HA preference, a parser can be “garden-path” led into analyzing a relative clause as a string-identical construction called “pseudorelative” (4). In particular, both kinds of clauses involve the same complementizer roughly meaning “that”. These authors argue that once this confound is controlled for, the LA predicted by the likes of Late Closure, reemerges. This claim can be directly tested on Slovenian, which uses the invariant relative complementizer “ki” designated for full relative clauses only, hence relative clauses in this language can never be mistaken for any alternative construction. Grillo and Costa’s account predicts, all else equal, that *full relative clauses in Slovenian should tend to LA, in the absence of the confound*. Experiments 2 and 3 test these two predictions for Slovenian.

Experiment 2 is an online 2x2 study crossing factors Complementizerhood (yes, no) and Attachment (high, low). 20 target items (preceded by 4 practice sentences) were tested in the versions that included either a full (+comp) or reduced (-comp) relative clause, avoiding potential morphological disambiguation cues. Subjects (N=37, different from Exp.1) read the sentences in the self-paced mode. Each target sentence was followed by a question highlighting either the HA or LA reading of the respective clause, yielding the total of 4 conditions (see (5)). Subjects were told to respond to the question as fast as possible (cutoff at 5 sec). Positive responses and response times were recorded. The target items were interspersed with 50 filler items, each followed by a comprehension question. Only subjects showing at least 80% accuracy rate on filler

comprehension questions were retained. Results: 1) Subjects interpreted target sentences with either HA or LA option essentially at chance level (51% and 48% positive responses for full relatives, and 56% and 43% for reduced relatives, respectively); 2) The presence of complementizer did not affect the attachment preference (no interaction: Pearson  $\chi^2(1) = 1.393$ , NS); 3) rANOVA conducted on response times showed both the main effect of Complementizerhood ( $F(1, 184)=5.53$ ,  $p=0.02$ ) and the main effect of Attachment ( $F(1, 184)=28.8$ ,  $p<0.0001$ ), but no interaction between them ( $F(1, 184)=0.23$ , NS), consistent with 2).

This experiment registered sensitivity to global ambiguity, but not initial preference for one or the other attachment option. To address the preference issue, Experiment 3 was conducted under the same evaluation methodology used in Experiment 1, with a crucial difference: each target item was tested in two conditions: one involving a full, the other a reduced relative clause, counterbalanced in the usual way. 12 target items were supplemented with 24 filler items, constituting overall 36 test items. Results: Subjects' (N=48, different from Exp1. and Exp.2) evaluation judgments show a clear preference for HA over LA in both full relatives (means: HA=2.46, LA=1.27;  $t(567)=13.32$ ,  $p < 0.0001$ ) and reduced relatives (means: HA=2.43, LA=1.29;  $t(572)=12.88$ ,  $p < 0.0001$ ).

Overall, our results a) establish Slovenian as a HA language; b) argue against the "pseudorelative" hypothesis; c) argue against the hypotheses that associate the attachment preference with the formal/semantic properties of the complementizer. In contrast, they are compatible with the proposals that account for HA in terms unrelated to complementizerhood (e.g. Implicit Prosody, Fodor 2002). To the extent that a reduced relative clause is a shorter version of the corresponding full relative, our results also show that the length of attachment may not necessarily be among the decisive factors for attachment preferences.

- (1) Someone shot the servant of the actress who was standing on the balcony.
- (2) Znanec od sodelavca, ki stanuje v sosednji ulici, je izgubil službo. /Slovenian/  
 acquaintance of colleague who lives in neighbouring street is lost job  
 "An/The acquaintance of a/the colleague who lives in the next street lost his job."  
 a. Sodelavčev znanec, ki stanuje v sosednji ulici, je izgubil službo. (0-3)  
 colleague's acquaintance who lives in neighbouring street is lost job  
 b. Znanec od tistega sodelavca, ki stanuje v sosednji ulici, je izgubil službo. (0-3)  
 acquaintance of this colleague, who lives in neighbouring street, is lost job
- (3) a. The daughter of the teacher who came from Germany met John.  
 b. The daughter of the teacher from Germany met John.
- (4) Ho visto Gianni che correva (lit. "I saw John that ran") /Italian/
- (5) Target: Prijatelja od sodelavca, {ki je bil pozvan / pozvanega} na sodišče, ne mara nihče. /Slov./  
 friend of colleague who is been called / called to court, not likes nobody  
 "Nobody likes the friend of the colleague who was summoned / summoned to the court."

Question: Ali je bil {prijatelj od sodelavca / sodelavec} pozvan na sodišče?

Q is been friend of colleague / colleague called to court

"Was the friend of the colleague / the colleague summoned to the court?"

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