

Non-Restrictive Relative Clauses in Construction Based HPSG

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This paper presents an account of English non-restrictive (or ‘appositive’) relative clauses (NRCs) in the framework of ‘construction based’ HPSG. Specifically, it presents an extension of the account of restrictive relative clause (RRC) constructions presented in Sag (1997) to NRCs.¹

1 The Phenomenon: NRCs and RRCs

Though superficially similar, NRCs as in (1) differ from RRCs as in (2) in a number of ways.

- (1) Kim has (exactly) three pets, which a neighbour looks after. #The others fend for themselves.
- (2) Kim has (exactly) three pets which a neighbour looks after. The others fend for themselves.

In speech, NRCs are set off prosodically (by commas in writing). As regards internal structure, NRCs are always finite and +WH (hence they do not permit *that* or zero relative pronouns, cf. (20)).

RRCs are interpreted intersectively, restricting the denotation of the preceding nominal, which is presumably why NRCs, but not RRCs, are compatible with proper nouns, cf (3b). The intersective interpretation often introduces an implicit ‘contrast set’, which can be accessed subsequently by anaphors like *the others*. This is not possible with an NRC, where there is a ‘totality’ interpretation — (1) suggests that the neighbour looks after *all* of Kim’s pets. This is similar to normal pronominal anaphora (cf. *Kim has three pets. A neighbour looks after them.*), and suggests that NRCs, unlike RRCs, involve genuine anaphora. As one would expect given this, NRCs can have a wide range of antecedents (whereas RRCs can only modify nominals).

- (3) a. Kim, who has three pets, lives round the corner.
b. *Kim who has three pets lives round the corner.
- (4) Kim was a fool/really nice/in a bad mood, which I didn’t think she would be. (NP/AP/PP)

Semantically, NRCs appear to be interpreted with ‘wide scope’, non-compositionally. For example, they are interpreted outside the scope of sentential negation and propositional verbs — the NRC in (6) is interpreted, like all NRCs, as an *assertion*, and the NRC in (5) is an assertion of the speaker’s, and does not attribute to Kim a belief about linguists using the IPA. Similarly, they cannot contain ‘externally licensed’ Negative Polarity Items (cf. removing the comma from (7)/(8) produces RRCs with narrow scope interpretations, which will allow NPIs). Notice that ‘wide scope’ here means *maximally* wide scope, for example (8) shows the NRC is outside the scope of the interrogative.

- (5) Kim believed that linguists, who use the IPA, are clever.
- (6) Sandy wasn’t hit by the car, which was reversing too quickly.
- (7) *No one, who had anything to drink, suffered ill effects.
- (8) *Did Sam interview a witness, who saw anything incriminating?

But it is not simply a matter of NRCs having wide scope, because (despite frequent claims to the contrary) they can appear in the scope of quantifiers. Sells (1985) pointed out examples like (9), with an indefinite in the scope of *every*, and NRCs can occur with any quantifier — (10) summarizes some examples.

- (9) Every chess set comes with a spare pawn_i, which_i you will find taped to the top of the box.
- (10) Many/Most/Few/No/At least ten candidates_i, all/some of whom_i I have contacted personally, have agreed to attend the meeting.

¹Space precludes a systematic review of non-HPSG literature, but it should be noted that analyses have often involved radical innovations. I am not aware of HPSG work on this or related constructions, apart from Holler (2003)’s account of German non-integrated Wh-clauses, which is framed in on the non-construction based approach of Pollard and Sag (1994).

On the other hand, contrary to what Sells implies, these are not examples of narrow scope either. Consider (11). The indefinite *a spare pawn* is in the scope of *every* and *Sam believes*. Since the NRC is associated with the indefinite, it must be in the scope of *every*, but it is not in the scope of *Sam believes* — the NRC reports a belief of Kim’s, it is not about Sam’s beliefs about Kim’s belief.

- (11) Sam believes every chess set comes with a spare pawn, which Kim believes is usually taped to the top of the box.

Similarly, if NRCs had narrow scope, associating an NRC with an NPI licensing quantifier should allow NPIs, but it does not:

- (12) a. No candidate, some of whom I have (*ever) contacted personally, has yet replied.
 b. No candidate who I have (ever) contacted personally has yet replied.

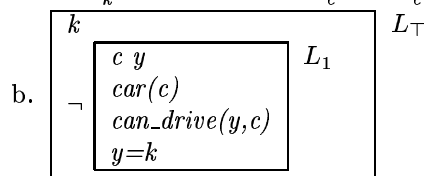
Nevertheless, Sells’ central insight about these examples seems to hold: there is a parallel between NRCs and discourse anaphora, in that both can involve some kind of ‘modal subordination’ or ‘accommodation’. For example, the same modification to a bad case of discourse anaphora like (13a) (here choice of irrealis tense) which makes (13b) acceptable, also works for an NRC, turning (14a) into (14b).

- (13) a. *Kim doesn’t own a car_i. It_i is blue.
 b. Kim doesn’t own a car_i. She wouldn’t be able to drive it_i anyway.
- (14) a. *Kim doesn’t own a car_i, which_i is blue.
 b. Kim doesn’t own a car_i, which she wouldn’t be able to drive anyway.

This insight provides a way of giving a DRT-based semantics for NRCs that accounts for the semantic differences between NRCs and RRCs and resolves the apparent narrow/wide scope paradox.

First, consider the interpretation of an example involving an RRC such as (15a). The narrow scope and intersective semantics arise because the DRS conditions from the RRC and the noun *car* appear in the same box, in the scope of negation. Consistent with most analyses (including, e.g. Pollard and Sag (1994)) I assume that the grammar co-indexes *car* and the relative pronoun (which therefore contributes neither a discourse variable nor conditions).

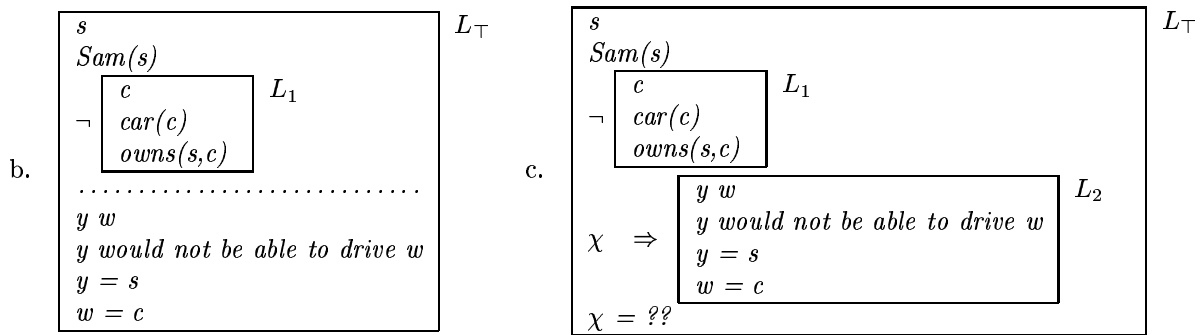
- (15) a. Kim_k doesn’t own a car_c which_c she_y can drive.



Now consider an example with an NRC such as (14a) or (14b). Suppose that, as in (16b), the content of the NRC goes into the ‘top box’ (this content is shown for readability below a dotted line), and the relative pronoun (*qua* anaphor) introduces a discourse variable (*w*), and a condition (*w=c*) associating it with its antecedent. This condition is problematic, because the discourse variable *c* was introduced in a subordinate DRS, and is not accessible to this condition: (16a) is *improper*, hence the difficulty with (14a). We can explain why (14b) is not problematic if we assume that an accommodation process occurs (cf van der Sandt (1992)), whereby the content of the NRC appears as the consequent of a conditional, whose antecedent χ can be thought of as a kind of anaphor. See (16c). If χ is resolved as (17a), then the accessibility requirements are satisfied, and (14b) is interpreted unproblematically as meaning (17b).

In this way, an NRC can appear to have wide scope and simultaneously be in the scope of its antecedent. Notice that no novel theoretical apparatus is involved: ‘top level’ attachment is independently required for the interpretation of proper names; accommodation is required for ordinary anaphora, as in (13b).

- (16) a. Sam_s doesn’t own a car_c, which_w she_y wouldn’t be able to drive (anyway).

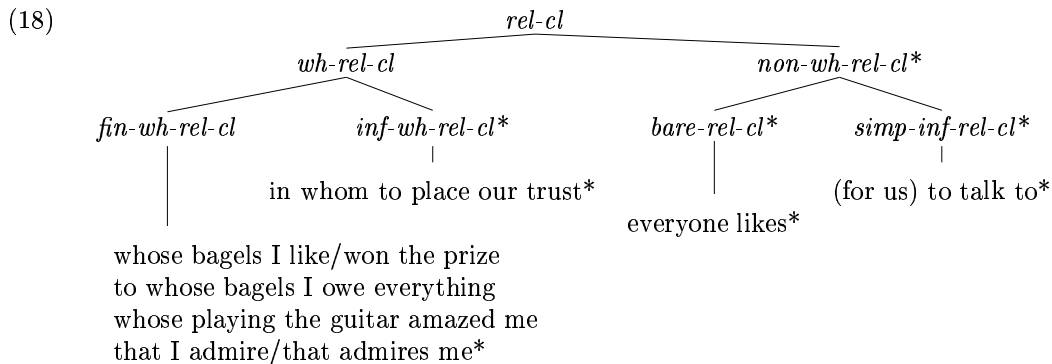


(17) a. $\chi = \begin{matrix} x & v \\ \text{car}(x) \\ \text{owns}(v, x) \\ v = s \end{matrix}$

b. Sam doesn't own car. If she owned a car_x she wouldn't be able to drive it_x (anyway).

2 HPSG Analysis

Sag (1997) does not discuss NRCs, but provides a syntactic classification of RRCs as in (18).² I have marked subtypes which cannot function as NRCs with “*”. Constraints associated with the types in this hierarchy interact with other constraints to produce structures like (21).



There is good motivation for assuming the same basic structure for NRCs (replacing N' with XP). For example, NRCs form constituents with their antecedents, as witness their behaviour with respect to topicalization (as well as passivization, cleft formation, coordination, etc, etc):

(19) (I don't often see Kim, but) [Sandy, who I'm sure you remember,]_i I see regularly Δ_i .

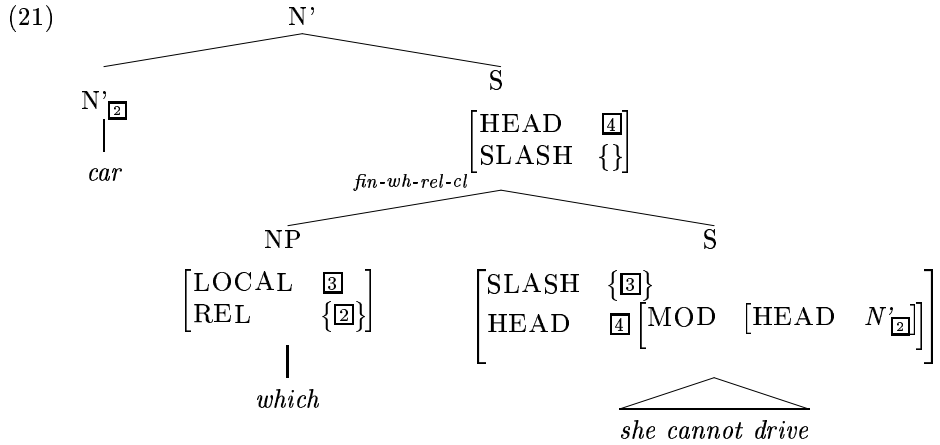
Extending this to a full treatment of NRCs involves:

- adding an appropriate semantics (for both NRCs and RRCs);
- dealing with the fact that NRCs can modify phrases other than N', cf (4);
- excluding *inf-wh-rel-cl*, subtypes of *non-wh-rel-cl*, and NRCs introduced by *that* as NRCs:

- (20) a. *Kim, in whom to place our trust, has just left. (*inf-wh-rel-cl*)
 b. *Kim, everyone likes, has just left. (*bare-rel-cl*)
 c. *Kim, to talk to, has just left. (*simp-inf-rel-cl*)
 d. *Kim, that I admire/that admires me, has just left.

²*relc* is a subset of *clause*, hence of *phrase*, and *sign*. There are three simplifications here: (a) I ignore reduced relatives (*red-rel-cl*, e.g. *overlooking the park*); (b) given the treatment of extraction in Bouma et al. (2001) there is no need for the distinction Sag makes between subtypes of *wh-rel-cl* involving subject and non-subject extraction; (c) Sag treats *wh-rel-cl*s as modifying NPs, while only *non-wh-rel-cl*s modify N' (nothing here hangs on this).

At first blush, it may seem this would involve the introduction of subtypes of *fin-wh-rel-cl*. But this is unattractive, since it would involve duplicating the distinctive properties of RRCs at various places in the hierarchy. Fortunately, a more radical approach seems possible.



First, consider the semantics. Deriving the kind of non-compositional semantics described above poses a problem for the framework of Pollard and Sag (1994), where the Semantics Principle operates *compositionally*. Notice that neither of the two ‘semi-compositional’ devices, Q-Storage and BACKGROUND projection, can be used. The latter is inappropriate because the content of NRCs is *asserted*, not presupposed (e.g. it cannot be canceled). The former would not guarantee maximally wide scope, since it would, wrongly, allow NRCs to scope in among other scope bearing items, such as quantifiers. However, an MRS (Bouma et al., 2001) or UDRT (Frank and Reyle, 1995) based account is straightforward.

In these approaches, DRS conditions are associated with *labels* — intuitively, conditions with the same label belong to the same DRS box (cf. the examples above, which have labels on the boxes). Embedding relations between boxes are represented as relations between labels. The intersective interpretation of an RRC arises because the label on conditions of the nominal is identified with the label on the conditions in the RRC. A wide scope interpretation arises if the conditions on the NRC are assigned the label on the top box (L_{\top}). To a first approximation, a treatment of NRCs then requires ‘top-level’, ‘global scope’ combination, in addition to intersective combination (used for intersective adjectives and RRCs) and scopal combination (for adjectives like *alleged*, and scopal adverbs like *probably*), which are used elsewhere in the grammar.³

Now suppose we assume that any relative may function either restrictively or non-restrictively, expressed as the constraint in (22a). Suppose also that we remove the HEAD | MOD | HEAD *noun* requirement that Sag associates with *rel-cl*. Relatives will in principle then be allowed to modify anything. (22b) restores the restriction on RRCs to modifying nouns, (22c) restricts NRCs to modifying XPs (it could also assign ‘comma intonation’ via a restriction on the PHON attribute).

- (22) a. *rel-cl* \rightarrow (*intersective-semantics* \vee *global-scope-semantics*)
 b. (*rel-cl* \wedge *intersective-semantics*) \rightarrow [HEAD | MOD | HEAD *noun*]
 c. (*rel-cl* \wedge *global-scope-semantics*) \rightarrow [HEAD | MOD | HEAD [COMPS <>]]

Excluding bare (*bare-rel-cl*) and non-finite relative clauses (*inf-wh-rel-cl* and *simp-inf-rel-cl*) can be achieved straightforwardly by limiting NRCs to *fin-head-filler-phrases* (which Sag introduces as the meet of *hd-filler-ph* and (24)). (Though is presumably this is a reflection of more abstract principles, e.g. the finiteness restriction on NRCs is surely related to the fact that they are interpreted as *assertions*).

³That is, in MRS terms, the value of CONTENT|HOOK|LABEL on an RRC is identified with CONTENT|HOOK|LABEL of the head N', with NRCs it is identified with CONTENT|HOOK|GTOP.

(23) $(rel-cl \wedge global-scope-semantics) \rightarrow fin-head-filler-phrase$

(24) $\left[HD-DTR \left[\begin{array}{l} HEAD \\ \text{SUBJ} \end{array} \begin{array}{l} \text{verb} \\ \langle \rangle \end{array} \left[\begin{array}{l} VFORM \\ \end{array} \begin{array}{l} fn \\ \end{array} \right] \right] \right]$

The exclusion of NRC *that*-relatives requires a little more work. It is normally assumed that REL values are sets of indices, reentrant with the CONTENT|INDEX values of relative pronouns. Suppose, however that they are sets of *npros* — that is, intuitively, CONTENT values: indices with associated RESTR(ictions), just like QUE values, which perform a similar function in interrogatives. Recall the assumption above that relative pronouns in RRCs contribute nothing to the semantics (i.e. they have no role other than ensuring correct variable binding), whereas relative pronouns in NRCs are genuine anaphoric pronouns, which contribute at least a condition of the form $x=y$. This can be expressed as (26) and (27). The exclusion of *that* from NRCs will follow from the assumption that it has empty RESTR, expressing the fact that it is not a genuine (anaphoric) pronoun. Conversely, the impossibility of contrast in (25), which is often taken to reflect a difference in pied-piping in NRCs and RRCs, could be explained if determiner *which* has a non-empty RESTR.

- (25) a. *Kim refused a drink of beer which beverage she never touches.
 b. Kim refused a drink of beer, which beverage she never touches.

(26) $(rel-cl \wedge global-scope-semantics) \rightarrow [NON-HD-DTR | REL \{ [RESTR ne-set] \}]$

(27) $(rel-cl \wedge intersective-semantics) \rightarrow [NON-HD-DTR | REL \{ [RESTR e-set] \}]$

3 Conclusion

This paper has shown how, despite the differences between the constructions, an existing account of English RRCs can be extended to give an account of NRCs. The analysis exploits a variety of devices in a novel way, but (modification of REL values apart) it has employed only existing, independently motivated, structures, features, and types — a significant result considering the radical innovations that have sometimes been thought necessary.

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