

An Empirical Investigation into Binding-Theoretic Reconstruction Effects in Restrictive Relative Clauses of German

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Introduction

- Our overall aim:
A conclusive and empirically sound analysis of restrictive relative clauses (RRCs)
- One of the major issues to be resolved:
Binding-theoretic reconstruction effects
- A fundamental challenge in this endeavor:
It is not quite clear what data actually have to be modeled by the grammar, as grammaticality judgments on RRCs exhibiting reconstruction effects are rather controversial.

Modification, Raising & Matching I

As Donati and Cecchetto (2011:519) observe:

“Although relative constructions have been systematically investigated for 40 years in the generative tradition, the debate on their correct analysis is still very much open.”

One issue involved: How is the head of the RC (here: 'book') in a sentence like

Bill bought [the **book** (that) John likes]

syntactically represented? (cf. Bhatt 2002; the following structures have been simplified)

Modification, Raising & Matching II

- head-external in (1): Modification Analysis (Chomsky 1977, Montague 1974...)

(1) [the **book_k** [_{RC} OP_k John likes t_k]]

- head raising in (2): Raising Analysis (Brame 1968, Schachter 1973, Kayne 1994...)

(2) [the **book_k** [_{RC} John likes t_k]]

- hybrid in (3): Matching Analysis (Chomsky 1965, Sauerland 1998...)

(3) [the **book** [_{RC} **book_k** John likes t_k]]

Modification, Raising & Matching III

Modification, Raising, and Matching in direct comparison:

	basic head position	connectivity	head info inside RC
Modification	RC external	co-indexation	index of the head
Raising	RC internal	movement	head itself
Matching	RC external & internal	matching under identity	copy of the head

Binding-theoretic Reconstruction I

How to discriminate between the various analyses (cf. Weibelhuth, Bargmann, Götze, to appear)?

- Discriminative factors are, among others, reconstruction effects:

- idiom-theoretic reconstruction

(4) The **headway** [_{RC} that we made **t_{headway}**] was satisfactory.

(Brame 1968, Schachter 1973)

[not tackled in this talk]

- **binding-theoretic reconstruction**

Binding-theoretic Reconstruction II

What is a binding-theoretic reconstruction effect?

The German NP/DP in (5) contains an RRC exhibiting such an effect:

- (5) das [Gerücht über sich_i], das Peter_i nicht ertragen kann
the rumor about self which Peter not bear can
'the rumor about himself_i; that Peter_i cannot bear'

Salzmann (2006:ex. 262b)

If we adopt Principle A of the Binding Theory (Chomsky 1981), *sich* in the head of the RRC in (5) must be c-commanded by *Peter* and, therefore, represented within the RRC.

A widely adopted way to achieve this is to syntactically reconstruct the head back into the RRC.

The Data Problem I

- “[T]he data seems to be murky” (Bhatt 2002:85).
- “There seems to be some interesting speaker variation concerning variable binding in relative clauses” (Sauerland 2003:fn.2).
- “The preceding subsections have shown that the Condition C facts are extremely delicate, often leading to conflicting judgments. Pending further descriptive work, any evaluation of these approaches will have to assume a particular empirical basis which might not do justice to all of them” (Salzmann 2006:73).

The Data Problem II

- The judgments given in the literature all seem to be based on the introspective verdict of the individual author only.
- No attempt has been made to investigate reconstruction data under controlled conditions.

In order to expand this highly limited empirical foundation and disentangle the factors involved in reconstruction effects in German RRCs, we designed controlled experiments.

Experiment 1

Experiment 1:

- paper-and-pencil questionnaire
- 2AFC interpretation task
- acceptability judgment on a 7-point Likert scale

This looked as follows:

Diejenigen Schlagzeilen über sich, die Christian Wulff nicht gerne liest, lösen stets auch in der Bevölkerung Unbehagen aus.

Die Schlagzeilen sind über Christian Wulff jemand anderen

(sehr schlecht) 1 2 3 4 5 6 7 (sehr gut)

Experiment 1: Design

Dependent Variables:

- mean relative frequencies of coreference decisions
- mean acceptability judgment

Design: 2×3 :

TYPE OF ANTECEDENT (negative quantifier vs. proper name)
×
TYPE OF PRONOUN (reflexive vs. personal vs. possessive).

Experiment 1: Materials

(6) = abridged (slashed) version of the 6 conditions (a-f) with one particular item

i. = negative quantifier with reflexive_a/personal_b/possessive_c pronoun

ii. = proper name with reflexive_d/personal_e/possessive_f pronoun

(6)

- i. Diejenigen Geschichten über [sich_a/ihn_b/seine_c Beziehung zu Ministranten], die kein katholischer Pfarrer hören mag, kursieren in der Regel am längsten in der Gemeinde.
'Those stories about himself/him/his relation to acolytes that no Catholic minister likes to hear, usually circulate the longest in the parish.'
- ii. Diejenigen Geschichten über [sich_d/ihn_e/seine_f Beziehung zu Ministranten], die Pfarrer Huber nicht hören mag, kursieren in der Regel am längsten in der Gemeinde.
'Those stories about himself/him/his relation to acolytes that Minister Huber doesn't like to hear, usually circulate the longest in the parish.'

The possessive pronoun and the negative quantifier condition were included for exploratory reasons only.

Experiment 1: Materials

- 24 items were interspersed with 64 fillers and assigned to 6 lists.
- The 6 lists were assigned to participants according to a Latin Square.
- 6 additional lists were constructed by inverting the presentation order of the 88 items.
- The resulting factor `ORDER` was included in the analysis to check for ordering effects (there was no main effect of `ORDER`, nor any interaction with our experimental factors).
- The decision-cum-rating task was performed by 58 native speakers of German.

Experiment 1: Predictions

- Reconstruction of the head of the RC predicts a difference between the reflexive and the pronoun condition: if the RC head reconstructs, participants should choose the bound interpretation more often in the case of reflexive pronouns (Principle A), and the unbound interpretation more often in the case of personal pronouns (Principle B).
- Acceptability judgments are predicted to be affected both by the type of pronoun (reflexive vs. personal) and the interpretation chosen by the participant. That is, if the bound interpretation is chosen, ratings should be higher for reflexive than for personal pronouns, and vice versa for the free/unbound interpretation.
- In addition, we predicted binding to apply more frequently in the negative quantifier condition than in the proper name condition.

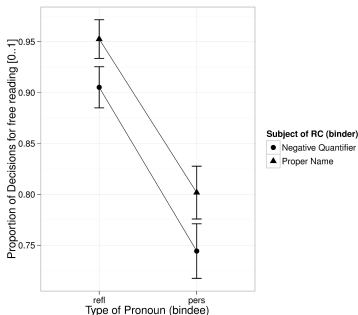
Experiment 1: Results I

	condition	% bound reading	(SD)	mean rating	(SD)
a	NegQ/refl	.91	(.29)	5.24	(1.54)
b	NegQ/pers	.74	(.44)	5.09	(1.52)
c	NegQ/poss	.76	(.43)	5.41	(1.38)
d	PN/refl	.95	(.21)	5.72	(1.36)
e	PN/pers	.80	(.40)	5.48	(1.41)
f	PN/poss	.65	(.48)	5.63	(1.32)

Descriptives for frequency of bound readings and for judgment means

Experiment 1: Results II

In line with our predictions:

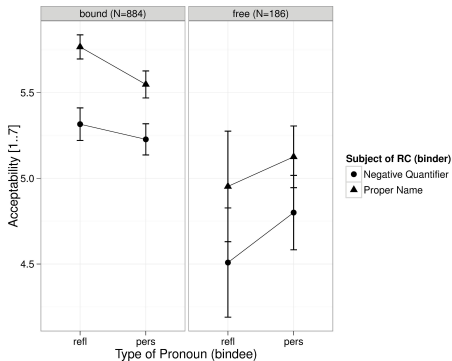


Significant main effect of pronoun type on decisions: bound reading more frequently chosen with reflexive pronouns (93% overall) vs. with personal pronouns (77%; $z = 7.04$, $p < .001$).

Experiment 1: Results III

Also in line with our predictions:

- Bound reading: RC heads with reflexive pronouns judged as significantly more acceptable than RC heads with personal pronouns
- Free reading: RC heads with personal pronouns judged as more acceptable than RC heads with reflexive pronouns (effect n.s.)



Experiment 1: Results IV

Not in line with our predictions:

- Negative Quantifiers induce *fewer* bound readings than Proper Names
- High proportion of bound readings for personal pronouns (77% overall)

Interim Conclusion

- High proportion of bound interpretations of reflexive pronouns (i.e., connectivity effects) speak *in favor of* reconstruction. Ratings show the same pattern.
- But: exceedingly high proportion of bound interpretations of personal pronouns (i.e., Principle B violations) could be taken to speak *against* reconstruction.

Additional Evidence: Experiment 2

To further elucidate the high proportion of bound personal pronouns, we carried out three additional experiments:

Experiment 2: binding possibilities in canonical structures (binder precedes bindee):

- *Sample item:* Pfarrer Huber mag die anrühigen Geschichten über [sich_a/ihn_b] einfach nicht mehr hören.
'Minister Huber doesn't want to hear those objectionable stories about himself/him.'
- *Method:* Online decision-cum-rating, as in Experiment 1; 12 items, 36 fillers
- *Result:* reflexive pronouns interpreted as bound in 98% of cases; personal pronouns in 52%.

Additional Evidence: Experiment 3

Experiment 3: binding possibilities in the presence of an alternative, non-local antecedent for the personal pronoun

- *Sample item:* Über Pfarrer Braun und Pfarrer Huber kursieren derzeit unglaublich obszöne Geschichten. Pfarrer Braun hat gestern deswegen im Pfarramt angerufen. Diejenigen Geschichten über [sich_a/ihn_b], die Pfarrer Huber nicht hören mag, irritieren auch die Gemeinde sehr.
'There are incredibly obscene stories circulating about Minister Braun and Minister Huber. On account of this, Minister Braun phoned the parish office yesterday. Those stories about himself/him that Minister Huber doesn't want to hear about are also irritating the community quite a lot.'
- *Method:* Online decision-cum-rating task ('Are the stories about [Braun_{nonlocal}/Huber_{local}] – yes/no); 12 items, 36 fillers
- *Result:* reflexive pronouns are interpreted as coreferential with *local* antecedent (Huber) in 79% of cases; but personal pronouns in 62%! Furthermore, reflexive pronouns are interpreted as coreferential with *nonlocal* antecedent (Braun) in 42% of cases, personal pronouns in 75%.

Additional Evidence: Experiment 4

Experiment 4: binding possibilities in structures with local, but (possibly) non-accessible antecedent

- *Sample item:* Die seltsamen Geschichten über [sich_a/ihn_b], die Hans laut Peter gestern auf der Party erzählt hat, sind alle erfunden.
'The stories about himself/him that Hans according to Peter has recounted yesterday at the party, are all invented.'
- Decision-cum-rating task as in Experiment 1; 12 items, 140 fillers
- *Result:* reflexive pronouns interpreted as bound in 89% of cases; personal pronouns in 56%.

What do our data tell us about reconstruction? I

Pro

- Reflexives in the RC head are reliably interpreted as bound (Exp1)
⇒ reconstruction of RC head
- Providing a nonlocal antecedent reduces proportions of bound personal pronouns from ~ 75 to $\sim 50\%$ (Exps 3 and 4)

Con

- Exceedingly high proportion of personal pronouns interpreted as bound (Exp1)
⇒ **no** reconstruction of RC head, **or** Principle B violation on independent grounds
- Providing a nonlocal antecedent still renders the interpretation of the personal pronoun as bound possible in 62% of cases (Exp3), and

What do our data tell us about reconstruction? II

An argument against the counterargument

- The arguments *contra* reconstruction can be diminished by the data from Experiment 2: Principle B is violated even in canonical structures (cf. also Jeff Runner's work on picture NPs etc.). It may well be that personal pronouns are a bad test case for reconstruction in the structures we looked at (anaphoric element embedded in NPs/PPs)

What do our data tell us about reconstruction? III

Our current proposal

- Reconstruction is *optional*: while reconstruction **must be possible** for reflexive pronouns, it **must not be necessary** for personal pronouns
- This permits the reflexive pronoun to be bound under reconstruction and the pronoun to remain free when reconstruction does not apply.
- We are still a long way from having compelling evidence for this. But we'll keep looking for it.

What do our data tell us about reconstruction? IV

Thank You!

And thanks also to Simon Stephan for his help with carrying out the experiments!

References I

- Bhatt, R. (2002). The raising analysis of relative clauses: Evidence from adjectival modification. *Natural Language Semantics*, 40:43–90.
- Brame, M. K. (1968). A new analysis of the relative clause: Evidence for an interpretative theory. unpublished manuscript, MIT.
- Chomsky, N. (1965). *Aspects of the Theory of Syntax*. mp, Cambridge.
- Chomsky, N. (1977). On wh-movement. In Culicover, P. W., Wasow, T., and Akmajian, A., editors, *Formal syntax*, pages 71–132. Academic Press, New York, NY.
- Chomsky, N. (1981). *Lectures on Government and Binding*. Foris, Dordrecht.
- Donati, C. and Cecchetto, C. (2011). Relabelling heads: A unified account for relativization structures. *Linguistic Inquiry*, 42:519–560.

References II

- Kayne, R. S. (1994). *The Antisymmetry of Syntax*. MIT Press, Cambridge, MA.
- Montague, R. (1974). English as a formal language. In Thomason, R. H., editor, *Formal Philosophy: Selected Papers of Richard Montague*, pages 188 – 226. Yale University Press, New Haven. originally published in 1970.
- Salzmann, M. (2006). *Resumptive Prolepsis. A Study of Indirect A'-Dependencies*. LOT, Utrecht.
- Sauerland, U. (1998). *The Meaning of Chains*. PhD thesis, MIT. Distributed by MIT Working Papers in Linguistics.
- Sauerland, U. (2003). Unpronounced heads in relative clauses. In Schwabe, K. and Winkler, S., editors, *The Interfaces: Deriving and Interpreting Omitted Structures*, pages 205–226. John Benjamins, Amsterdam/Philadelphia.
- Schachter, P. (1973). Focus and relativization. *Language*, 49(1):19–46.