

Neg-Raising and the interpretation of adjectival modifiers

‘Low’ Readings of Relative Clauses: In recent work on relative clauses (Bhatt 2002, Hulsey & Sauerland 2002), it has been proposed that the ‘low’ readings of certain nominal modifiers exemplified in (1) constitute an argument for the raising analysis of relative clauses according to which the head of the relative clause can be generated internal to the relative clause.

- (1) (This is) the longest/only/first book that John said that Tolstoy wrote.
- a. (This is) the longest book that John ever said that Tolstoy wrote.
high reading: the longest in the set $\{x : \text{book}(x) \wedge \text{John said} [\text{that Tolstoy wrote } x]\}$
 - b. (This is) the longest book that John said that Tolstoy ever wrote.
low reading: the x such that $[\text{John said} [\text{that } x \text{ was the longest in the set } \{x : \text{book}(x) \wedge \text{Tolstoy wrote } x\}]]$

The correlation between the location of NPIs and the readings available is taken to provide additional support for the LF-reconstruction of the adjectival modifier into the relative clause.

The role of Neg-Raising: Heycock (2003) argues that the existence of low readings like the ones in (1b) does not argue for the raising analysis of relative clauses. Her argument is based in part on the distribution of low readings - low readings seem to be available only when the embedding predicate is a Neg-Raising predicate.

- (2) a. Non Neg-Raising Predicates: *know, manage, possible, certain, necessary* etc.
 No low reading: the first book that we know she wrote
 (\neq the book that we know was the first one she wrote)
- b. Neg-Raising Predicates: *think, want, likely, ought to* etc.
 Low reading available: the only people he wanted to insult
 (= the people s.t. he wanted to insult only them)
- (Heycock also needs to assume that *say*, traditionally treated as a non-NR predicate, has a NR variant.)

Heycock takes the low reading to follow from a combination of a negative implicature generated by the superlative/ordinal modifier and the Neg-Raising semantics of the embedding predicate. While Heycock does not provide a formal analysis of Neg-Raising, she outlines the steps such an analysis would take.

- (3) The negative implicatures of superlatives:
- a. Superlative: *Anna Karenina* is the longest book that Tolstoy wrote.
 - b. Negative Implicature: \neg [Tolstoy wrote a book longer than *Anna Karenina*]

In this analysis, the superlative generates a negative implicature where negation takes scope over the embedding predicate of the relative clause (the ‘high’ reading, (4a)) and when the embedding predicate is a Neg-Raising predicate, an additional reading where negation only takes scope over the embedded predicate is generated (the ‘low’ reading, (4b)).

- (4) *Anna Karenina* is the longest book that Jennifer thinks that Tolstoy wrote.
- a. ‘High’: \neg [Jennifer thinks that Tolstoy wrote a book longer than *Anna Karenina*]
 - b. ‘Low’: Jennifer thinks \neg [Tolstoy wrote a book longer than *Anna Karenina*]

Why reconstruction of the head is still needed: We show that while Heycock has identified an important constraint on the availability of ‘low’ readings, a proper analysis of the facts in (1) still needs to assume reconstruction of the head NP into the scope of the embedding predicate. In fact, it seems to us that even Heycock’s proposal assumes that the nominal head (and associated adjectival modifiers) can reconstruct. This can be seen in (4), where Heycock places the NP head (*book*) and the associated comparative AP (*longer than AK*) in the scope of *think*.

A specialized syntactic (or semantic) operation of reconstruction is needed to put the nominal head in the scope of the embedding predicate. To see this point, let us assume the following semantics for superlatives.

- (5) a. $\llbracket [-est] \rrbracket = \lambda P_{det} \lambda x \exists d [P(x, d) \wedge \neg \exists y [y \neq x \wedge \exists d' [d' > d \wedge P(y, d')]]]$
- b. (Anna Karenina is) the longest book that Tolstoy wrote
 LF: the $\llbracket [-est] \rrbracket \lambda d \lambda x [\text{book}(x) \wedge \text{long}(x, d) \wedge \text{wrote}(\text{tolstoy}, x)]$
 the $\llbracket \lambda x \exists d [P(x, d) \wedge \neg \exists y [y \neq x \wedge \exists d' [d' > d \wedge P(y, d')]] \rrbracket$
 where $P = \lambda d \lambda x [\text{book}(x) \wedge \text{long}(x, d) \wedge \text{wrote}(\text{tolstoy}, x)]$

c. Paraphrase of the negative implicature/entailment:

$\neg\exists x[x \neq \text{AK} \wedge x \text{ is a book and } x \text{ is longer than AK and Tolstoy wrote } x]$
 (There is no x s.t. x is a book longer than AK and Tolstoy wrote x .)

(5) already reveals that the negative implicature contributed by the superlative does not directly negate the predicate of the relative clause. Applying the above semantics to an example where the relative clause contains an intensional embedding verb further reveals that the comparison and the nominal head are both out of the scope of the embedding predicate.

(6) *Anna Karenina* is the longest book that Jennifer thinks that Tolstoy wrote.

a. the $[\lambda x\exists d[P(x, d) \wedge \neg\exists y[y \neq x \wedge \exists d'[d' > d \wedge P(y, d')]]]$
 where $P = \lambda d\lambda x [\text{book}(x) \wedge \text{long}(x, d) \wedge \text{thinks}(\text{jennifer, wrote}(\text{tolstoy}, x))]$

b. Paraphrase of the negative implicature/entailment:

$\neg\exists x[x \neq \text{AK} \wedge x \text{ is a book and } x \text{ is longer than AK and Jennifer thinks that Tolstoy wrote } x]$
 (There is no x s.t. x is a book longer than AK and Jennifer thinks Tolstoy wrote x .)

Neg-Raising alone will not take us from the negative implicature in (6b) to the ‘low’ reading indicated in (4b). Neg-Raising can at best make an embedded negation reading available (‘at best’ because it is not clear that the negation is in the right place to trigger Neg-Raising), but it is clear that some other mechanism is needed to bring the head of the relative clause in the scope of the embedding predicate. Basically the head of the relative clause needs to be reconstructed into the scope of the embedding predicate - this could be achieved by syntactic or semantic reconstruction. Once we assume reconstruction of the head of the relative clause into its relative clause-internal position, we also get the negation in a place where it directly negates the predicate in the relative clause, and thus is in the right place to trigger Neg-Raising.

Neg-Raising and NPI-licensing: There is a correlation between the surface position of an NPI and the interpretation available - if there is an NPI in the embedding clause in the relative clause, only a high reading is available, and if the NPI is in the embedded clause, only the low reading is available (cf. 1). Bhatt (2002) attempts to make this correlation follow from his proposal concerning reconstruction of the NP head and in particular the adjectival NPI-licensor (*-est, only, ordinals*) to the clause where the NPI appears. However, he has to stipulate that the adjectival NPI-licensor can only license NPIs in its own clause. Heycock relates the NPI-licensing in (1) to the negative implicature generated by the adjectival licensor and the Neg-Raising nature of the embedding predicate. According to Heycock, an NPI in the embedded clause is licensed only if Neg-Raising applies and an implicature where the negation is in the scope of the embedding predicate becomes available. Her proposal is attractive, but it runs into the problems faced by analyses that attempt to use implicatures to license NPIs. For one, it is not able to explain why a high reading is blocked when an NPI appears in an embedded clause.

(7) a. John doesn’t think that Tolstoy wrote any novels in Russian.

(Negation on *think* can license an NPI in the complement CP of *think*.)

b. *Anna Karenina* is the longest book that John thinks that Tolstoy ever wrote.

(High Reading is unavailable, Only Low Reading)

c. $\neg\exists x[x \text{ is a book longer than AK} \wedge \text{John thinks Tolstoy wrote } x]$ (Negative Implicature, without any Neg-Raising)

Given that the negation in (7a) is able to license an NPI in the embedded complement CP, the inability of the negation in the negative implicature to not be able to do the same is unexpected. We could stipulate that the negation in a negative implicature is special and can only do clausemate licensing of NPIs, but that brings us back to the locality stipulation in Bhatt (2002).

Conclusion: We conclude therefore that (i) while Neg-Raising plays a role in the derivation of the low readings in (1a), it does not actually account for the correlations found between NPI-licensing and high/low readings, and (ii) reconstruction of the NP head into the scope of the embedding predicate is still required to derive the low readings. In our paper, we will further address whether it is just the NP-head that reconstructs, or whether we also need to reconstruct the associated superlative operator. In particular, we will evaluate a proposal that brings together elements of Bhatt (2002)’s and Heycock (2003)’s proposals where the AP/NP head of the relative clause reconstructs into the relative clause for the ‘low’ reading, but the superlative *-est* does not.