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# On the interaction of adjectival modifiers and relative clauses

Caroline Heycock (heycock@ling.ed.ac.uk)

*School of Philosophy, Psychology and Language Sciences*

*University of Edinburgh*

*AFB George Square*

*Edinburgh EH8 9LL, Scotland*

*Telephone: +44 131 650 3952*

*Fax: +44 131 650 3962*

**Abstract.** This paper addresses data concerning the interpretation of adjectives such as *first*, *last* and *only* when they modify the head of a relative clause, as discussed by Bhatt in volume 10 of this journal. The “low” readings for these modifiers are shown to be much more restricted in their distribution than is predicted by the reconstruction analysis; if these interpretations are derived by allowing the head NP+modifier to be interpreted in the position of the “gap” in the relative clause this results in considerable overgeneration. A generalization is proposed for the distribution of the available readings, and it is argued that the phenomenon of Neg-Raising is implicated in their interpretation.

**Keywords:** relative clauses, reconstruction, superlatives, negative polarity



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## 1. Introduction

In the recent literature on relative clauses, it has been claimed that empirical evidence of various kinds supports a “raising/promotion” analysis in the tradition of Schachter, 1973, Vergnaud, 1973, Åfarli, 1994, Kayne, 1994, Bianchi, 1995, 1999, 2000, for either some or all relatives: that is, an analysis in which the NP is merged in some position internal to the relative clause.

(1) [DP the [NP book ]<sub>i</sub> [ which t<sub>i</sub> ]<sub>j</sub> [ he wrote t<sub>j</sub> ]]

This is in contrast to a “head external” analysis in which the NP originates outside the relative clause, and what moves is a (null or overt) relative operator:

(2) [DP the [NP book ] [ which ]<sub>i</sub> [he wrote t<sub>i</sub> ]]

Some of the arguments for a raising/promotion analysis are based on general theoretical positions which are largely independent of facts about relative clauses. (In particular, if all adjunction is to the left, as proposed in Kayne, 1994, Chomsky, 1995, then the kind of analysis in (2), in which the relative clause is a right-adjunct, is ruled out in principle.) Other arguments however have been based on particular facts about relative clauses. This paper is concerned with one of the most recent arguments of this latter type: the argument

from the interpretation of nominal modifiers, as described and analysed in Bhatt, 2002, and subsequently reanalysed in Hulsey and Sauerland, 2004.

Bhatt's central new empirical point is that adjectival modifiers of the head NP of a relative clause can be interpreted within the scope of a propositional attitude verb. The modifiers with which he is most concerned are **superlatives**, the ordinals **first** and **last**, and **only**. He exemplifies the core empirical distinction with (3) and (4) (his (20) and (21)):

- (3) the first book that John said Tolstoy had written

*'High' reading:*

In 1990, John said that Tolstoy had written *Anna Karenina*; in 1991 John said that Tolstoy had written *War and Peace*. Hence the NP is *Anna Karenina*.

(I.e., order of *saying* matters, order of *writing* is irrelevant.)

*'Low' reading:*

John said that the first book that Tolstoy had written was *War and Peace*. Hence the NP is *War and Peace*.

(I.e. order of *writing* matters, order of *saying* is irrelevant.)

- (4) a. the only book that John said that Tolstoy had written.

*'High' reading:*

x is the only book about which John said that Tolstoy had written

x

*'Low' reading:*

What John said can be paraphrased as 'x is the only book that Tolstoy wrote'

- b. the longest book that John said that Tolstoy had written.

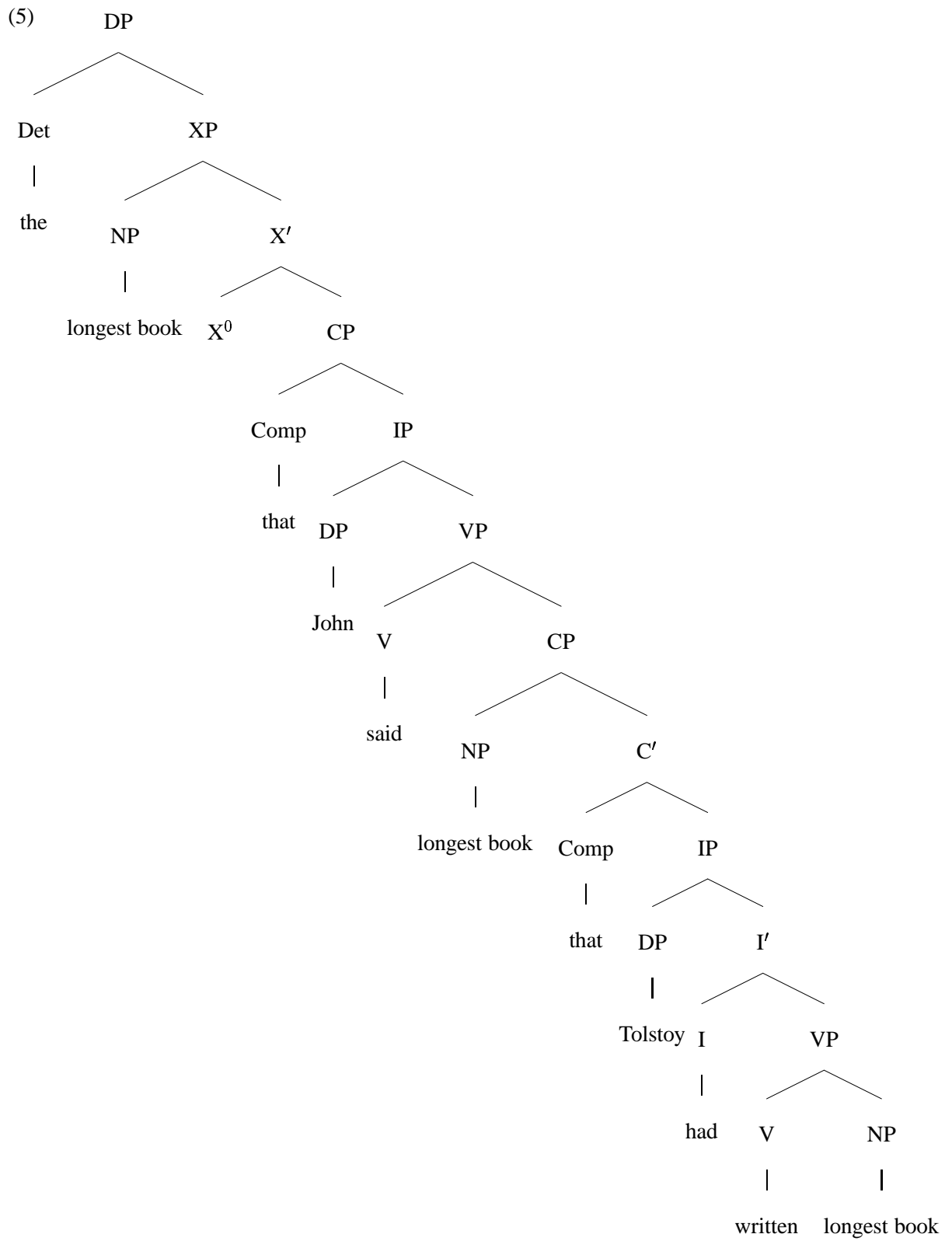
*'High' reading:*

x is the longest book out of the books about which John said that Tolstoy had written them

*'Low' reading:*

What John said can be paraphrased as 'x is the longest book that Tolstoy wrote'

The basis of Bhatt's explanation for the existence of these different readings is an analysis of relative clauses in which the head NP and its modifiers originate within the relative clause (in the position of the "gap"); subsequently this constituent moves from this position to a position to the left of the clause. Crucially, this movement results in a chain of copies, and "we have the option of deciding which copy of the head NP to interpret." I will not go into the details of the derivation here; the essential point is that subsequent LF processes have access to a representation along the lines of (5).



Low and intermediate readings are the result of interpreting copies other than the highest one in the chain.

Bhatt (2002) and Hulsey and Sauerland (2004) differ in their analysis of the low readings, but in both cases it is either asserted or assumed that these readings are generally available, and that they must be accounted for by some type of reconstruction into the relative (where “reconstruction” is a (now misleading) term for the interpretation of a low copy within the chain formed by movement). In this paper I will argue, however, that a slightly more extensive look at the interpretation of adjectival modifiers shows that the facts cited in these papers are not representative, and that the shape of the phenomenon is significantly different. In particular, I will argue that the apparent low readings are a special case, which arises in the main from a widespread tendency to interpret negation with a lower scope than the structure warrants (the phenomenon of “Neg-Raising”).

## **2. Some cases to set aside: nonsuperlative adjectival modifiers**

First let us delimit a little more closely the type of data that are at issue. In Bhatt, 2002, p. 71, it is claimed that “high and low readings are available with numeral modifiers when they occur with *the*, with numeral-like uses of *few/many* when they occur with *the*, and with adjectives in general.” Since

Bhatt's article does not discuss scope with respect to quantifiers in the relative clause, we take it that these high and low readings concern the relative scope of these items and propositional attitude verbs, the type of example discussed in his article.

Bhatt states in a footnote, however, that “evaluative” adjectives probably do not generate high and low readings by virtue of reconstruction; his inclusion of “adjectives in general” in the list of modifiers showing “low” readings is an inadvertent holdover from an earlier draft (personal communication). I believe that the conclusion drawn in the footnote that such cases have to be excluded from consideration is correct. As Bhatt says, in (6) (his (i), footnote 18) it is possible to ascribe the judgment that the books are wonderful to either the speaker or to Siouxsie, but the apparent low reading (ascription of the judgment to Siouxsie) does not require the relative clause. This can be seen, for example, in (7).

(6) the wonderful books that Siouxsie said that Lydia had written

(7) Siouxsie was always going on about the books that Lydia had written.

But I've read those wonderful books and they're complete rubbish.

As far as I can tell this pattern is in fact found with all adjectives, not only obviously evaluative ones like *wonderful*. That is, the comments above hold equally for *green*, *tall*, *French*, or *thousand-page*. Hulsey and Sauerland, 2004



do not share Bhatt's qualms about attributing the acceptability of (8) (their (41)) to the possibility of syntactic reconstruction into the relative.

(8) The thousand page book John believes he bought turned out to be a DVD.

Their response to the objection that similar readings arise in the absence of a relative is that the same is true for superlatives, citing (9) (their (46)) as an example.

(9) Siouxi was always going on about the new Tolstoy book she bought and that it's the longest by Tolstoy. But I've read that longest book and it's a lot shorter than *War and Peace*.

To the extent that (9) is acceptable, it does seem to me that it should be classed with (6), (7), and (8). But I would still argue that these cases, at least initially, should be considered separately from Bhatt's main cases: the superlatives, numerals, and *only* that do not require the "scare quote" intonation characteristic of examples like these last ones. Apart from the intonational difference, the main reason for considering such cases separately is that the kind of reading observed in an example like (6) does not appear to be subject to any of the locality effects that affect the other low readings. Thus, as will be discussed in more detail in the next section, Bhatt observes that intervening negation blocks the low interpretation of e.g. *first*:

- (10) This is the first book that John didn't say that Antonia wrote.  $\neq$   
 This is the book that John didn't say that Antonia wrote first.

The low reading of *expensive*, on the other hand, seems available to exactly the same extent in (11a) and (11b) (with intervening negation):

- (11) a. The expensive car that his wife thought he wanted to buy to  
 keep up with the neighbours was actually a Ford Mondeo.  
 b. The expensive car that his wife didn't think he should buy was  
 actually a Ford Mondeo.

Similarly, Hulsev and Sauerland argue that low readings are blocked by ex-traposition of the relative; (12) is their (19).

- (12) \*I read the first novel last night that John said Tolstoy ever wrote.

I do not however detect any significant difference between the available readings of (13a) and (13b) (in both cases the low reading has to be forced by scare quote intonation):

- (13) a. Last night I read the awful novel that Mary thought Hugh wrote  
 and thought it was actually quite good.  
 b. I read the awful novel last night that Mary thought Hugh wrote  
 and thought it was actually quite good.

If this type of reading is to be captured in the same way as the low readings discussed by Bhatt, the empirical basis of Hulsey and Sauerland's own account seems to be removed. I therefore conclude that, at least as an interim strategy, we should assume that these readings for non-superlative adjectives should be set aside as a separate phenomenon.

### 3. Reconstruction and Neg-Raising

If we thus set aside the existence of a distinct low reading for “adjectives in general,” there remain the cases of superlatives, numeral modifiers, *only*, and ordinals. With respect to ordinals, the only examples actually discussed are *first* and *last*, which are both ordinals and superlatives. For the moment I will follow Bhatt in concentrating on superlatives (including the superlative ordinals *first* and *last*) and *only*.

#### 3.1. RESTRICTIONS ON RECONSTRUCTED READINGS: INTERVENTION

##### EFFECT I

Bhatt points out a sharp and striking restriction on low/reconstructed readings for these modifiers: they are blocked by intervening negation. Thus he observes that (14a,b) (his (30a), (31a)) do not have a low reading:

- (14) a. This is the first book that John didn't say that Antonia wrote.  $\neq$   
           This is the book that John didn't say that Antonia wrote first.
- b. This is the first book that John denied that Antonia wrote.  $\neq$   
           This is the book that John denied that Antonia wrote first.

This effect Bhatt relates to the well-known pattern concerning “amount quantification” (Cinque, 1989, 1990, Kroch, 1998, Rizzi, 1990, Dobrovie-Sorin, 1992, Szabolcsi and Zwarts, 1992, Heycock, 1995, Beck, 1996, etc). As illustrated in (15)–(16), one reading for questioned amount QPs is blocked by intervening negation (including negative verbs such as *doubt* or *deny*):

- (15) How many articles does the editor want to have in this volume?
- a. for which  $n$  the editor wants to have  $n$ -many articles in this  
           volume  
           *(consistent with the editor not having considered any particular  
           articles yet)*
- b. for which  $n$  there are  $n$ -many articles that the editor wants to  
           have in this volume  
           *(the editor has articles that s/he wants to publish in this volume;  
           how many are there?)*
- (16) How many articles does the editor not want to have in this volume?

- a. ~~for which  $n$  the editor does not want to have  $n$  many articles in this volume~~
- b. for which  $n$  there are  $n$ -many articles that the editor does not want to have in this volume

Bhatt himself points out in a footnote that it is not clear why an intervention effect of this kind should show up for the low reading of relatives; but it seems reasonable to take the effect as arising only (but not always) when there is a derivation involving movement+“reconstruction.” And indeed Bhatt cites this intervention effect as further support for “[the] proposal that the derivation of ‘low’ readings involves A’ movement and reconstruction.”

The first thing to note about this intervention effect is that it is restricted to the low reading for adjectival modifiers and is not reproduced with respect to the interpretation of idioms or the binding of reflexive pronouns, other phenomena argued to depend on reconstruction and hence on the raising analysis. So, for example, downward-entailing *few* creates an intervention effect for “amount quantification,” as illustrated in (17):

(17) How much do those/\*few people weigh?

And it also blocks the low reading of *first*:

- (18) That is the first book that few people said she read.  $\neq$   
 That is the book that few people said she read before she read the others.

But it allows the idiom *make headway* (cf the discussion in Hulsey and Sauerland, 2004 around their example of this idiom):

- (19) That is the kind of headway that few people can make.

Similarly, negation (including the negative verb *deny*), does not prevent a reflexive in the head NP from being bound by an element within the relative:

- (20) a. Mary saw the picture of himself<sub>i</sub> that John<sub>i</sub> didn't show his mother.  
 b. The picture of himself<sub>i</sub> that every boy<sub>i</sub> denied keeping was always discovered eventually in some drawer.

It is quite unclear how this distinction could be implemented. In an example like (21) the modifier *only* is prevented from reconstructing, while the NP including the anaphor must.

- (21) This is the only picture of himself<sub>i</sub> that Mary didn't think John<sub>i</sub> should show to his mother.

Conversely, in Bhatt's analysis the presence of *ever* in the lowest clause in (22a) forces reconstruction to that clause (the facts concerning *ever* will be

discussed in more detail below); but the binding of the reflexive by the subject of the higher clause is no less possible than it is in (22b):

- (22) a. The is the only picture of himself<sub>i</sub> that Bill<sub>i</sub> thought Mary would ever buy.  
 b. The is the only picture of himself<sub>i</sub> that Bill<sub>i</sub> thought Mary would buy.

Even worse, in (23) the anaphor is itself contained in a modifier:

- (23) This is the only man taller than himself<sub>i</sub> that Mary didn't think John<sub>i</sub> had picked a fight with.

One could perhaps escape the acutest form of the problem (that represented by (21)–(23)) by arguing that anaphor binding in these cases might be licensed in ways other than reconstruction (a possibility that Bhatt, but not Hulse & Sauerland, concedes, for reasons other than those given here); though that would amount to substituting the argument in favour of the raising analysis from the low reading for modifiers for the argument from anaphor binding, rather than adding to it.

The main point here, however, is that low readings for the relevant modifiers are blocked in a much wider range of cases than just those involving negation.<sup>1</sup>

- (24) a. [They have been arguing for ages over the order in which to publish the various submissions, but at last . . . ] This is the first article that they have (finally) decided to publish.  $\neq$   
This is the article that they have (finally) decided to publish before publishing all the other articles.
- b. This is the first book that we mistakenly thought that Antonia had written.  $\neq$   
This is the book that we mistakenly thought that Antonia had written before writing all the other books.
- c. This is the first book that they agreed/ conceded/ proved that Antonia wrote.  $\neq$   
This is the book that they agreed/ conceded/ proved that Antonia wrote before she wrote all the other books.
- (25) a. [Finally they got him to agree that he would not publish all his books but would limit himself to one:] This is the only book that the banned author was willing to publish  $\neq$   
This is the  $x$  s.t. the author was willing for  $x$  to be the only book that he would publish.
- b. This is the only book that I mistakenly/foolishly thought that he had written.  $\neq$



This is the  $x$  s.t. I mistakenly/foolishly thought that  $x$  was the only book that he had written.

- c. This is the only book that they agreed/ conceded/ proved that he wrote.  $\neq$

This is the  $x$  s.t. they agreed/ conceded/ proved  $x$  was the only book that he wrote.

Notice that none of the embedding predicates in the examples above blocks the relevant kind of amount reading (the (b) paraphrases below):

- (26) How many articles did they decide/are they willing to publish?
- a. for which  $n$ : there are  $n$ -many articles that they decided/are willing to publish
  - b. for which  $n$ : they decided/are willing to publish  $n$ -many articles
- (27) How many books did you mistakenly think that Antonia had written?
- a. for which  $n$ : there are  $n$ -many books that you mistakenly thought that Antonia had written
  - b. for which  $n$ : you mistakenly thought that Antonia had written  $n$ -many books
- (28) How many books did they agree/concede/prove that Antonia was planning to write?

- a. for which  $n$ : there are  $n$ -many books that they agreed/ conceded/ proved that Antonia was planning to write
- b. for which  $n$ : they agreed/ conceded/ proved that Antonia was planning to write  $n$ -many books.

It seems, then, that there is no reason to attribute the missing readings in (14) to the “inner island” effect of negation evidenced in amount quantification; these are in fact just one subcase of a much more general prohibition. But now this leaves us with the problem of how to characterise the pattern of interpretations.

### 3.2. NEGATIVE ENTAILMENTS

A clue to what is going on here is the observation that all the best cases of modifiers with low readings (superlatives, including *first* and *last*, and *only*) license Negative Polarity Items (NPIs), a fact pointed out in Bhatt’s article. It is argued in Giannakidou, 1997, following Linebarger, 1980, 1987, that they do this by virtue of establishing a nonveridical context because of the negative entailment that they generate.<sup>2</sup> Thus (29) can be decomposed as in (30a), where  $g$  and  $k$  are degrees,  $g > k$ , and the sentence has the negative entailment in (30c) (Giannakidou, 1997, p. 126).

(29) *Anna Karenina* is the longest book that Tolstoy wrote.

- (30) a. *Anna Karenina* is *g* long.  
 b. All books *x* other than *Anna Karenina* that Tolstoy wrote are such that there is a degree *k* such that the degree of *x*'s length does not exceed *k*  
 c.  $\neg$  [Tolstoy wrote a book other than *Anna Karenina* *g* long]

My claim is that the low reading of modifiers is the result of interpreting the negation in the entailment with lower scope:

- (31) *Anna Karenina* is the longest book that Jennifer thinks Tolstoy wrote.  
 a.  $\neg$  [Jennifer thinks Tolstoy wrote a book other than *Anna Karenina* *g* long]  
     “*High*” reading  
 b. Jennifer thinks  $\neg$  [Tolstoy wrote a book other than *Anna Karenina* *g* long]  
     “*Low*” reading

That is to say, within the entailment we find the phenomenon referred to as “Neg-Raising.”

I will assume the account of “Neg-Raising” (NR) in Horn, 1989 as a *short-circuited implicature*. Horn gives an analysis of why only certain classes of predicates allow this implicature. I will not go into his analysis here in detail; the crucial point for my purposes is that the generalisations that he establishes

for NR also characterise the distribution of high and low readings for the modifiers we are interested in.

Thus, **Factives** block NR (Horn, 1978, pp. 192ff, Horn, 1989, p. 323),

(32) They didn't know that he had arrived.

*has no interpretation as*

~~They knew that he hadn't arrived.~~

and they also block low readings for modifiers:

(33) the only book that I know she likes

~~the book that I know is the only one that she likes.~~

Equally, **Implicatives** (predicates whose complements are entailed rather than presupposed) like *manage to* also block NR, in contrast to nonimplicatives like *want to* (Horn, 1978, p. 192, Horn, 1989, p. 324).

(34) a. He didn't manage to steal his sister's books.

~~He managed not to steal his sister's books.~~

b. He didn't want to read his sister's books.

He wanted not to read his sister's books.

Equally, implicatives block low readings for modifiers. Thus (35a) can have the reading (35c), as well as (35b), but (36a) only allows the reading in (36b):

(35) a. Those are the only people that he wanted to insult.

- b. Those are the people s.t. he only wanted to insult them.
  - c. Those are the people s.t. he wanted to insult only them.
- (36)
- a. Those are the only people that he managed to insult.
  - b. Those are the people s.t. he only managed to insult them.
  - c. ~~Those are the people s.t. he managed to insult only them (he successfully avoided insulting others).~~

**Weak** epistemic operators like *be possible*, and **strong** operators like *be certain* block NR, while operators with a midscalar value like *be likely*, *probable* allow it (Horn, 1978, pp. 193ff, Horn, 1989, pp. 324ff).

- (37)
- a. It wasn't possible for him to talk to me.  
~~It was possible for him not to talk to me.~~
  - b. It isn't certain that he is here.  
~~It is certain that he is not here.~~
  - c. It isn't likely/probable that they will come.  
It's likely/probable that they won't come.

And the same pattern shows up in the readings of relative clauses:

- (38)
- a. That is the only water that it is possible for him to drink.
  - b. This is the water s.t. it is not possible for him to drink anything other than that water (picky guy that he is).

- c. ~~This is the water s.t. it is possible for him not to drink anything other than that water (t.e.c.t.o.t.a.l.l.e.r. t.h.a.t. h.e. i.s.).~~
- (39) a. This is the only book that it is certain that he wrote.  
 b. This is the book s.t. it is not certain that he wrote any book other than that.  
 c. ~~This is the book s.t. it is certain that he did not write any book other than that.~~
- (40) a. This is the only book that it's likely that he wrote.  
 b. This is the book s.t. it is not likely that he wrote any book other than that.  
 c. This is the book s.t. it is likely that he didn't write any book other than that.

And the same is true of the deontic operators *can/could* (weak), *need, be necessary* (strong), versus *should, ought to* (midscalar) (Horn, 1978, pp. 193ff, 198ff, Horn, 1989, pp. 324ff):

- (41) a. That is the only offence that he could / needed to claim to have committed.  
 b. That is the offence s.t. he could not / did not need to claim that he had committed an offence other than that.

- c. ~~That is the offence s.t. he could/needed to claim not to have committed an offence other than that.~~
- (42) a. That is the only offence that should claim to have committed.
- b. That is the offence s.t. he should not claim to have committed an offence other than that.
- c. That is the offence s.t. he should claim not to have committed an offence other than that.

The predicates in (24) and (25) also block NR, as can easily be verified. To take just one example, it was noted by Veloudis (1982) that VP-adverbs block NR, as shown in (43):

- (43) a. I'm so relieved! For a moment I didn't think that you loved me.
- b. #I'm so relieved! For a moment I didn't mistakenly think that you loved me.

—and we have seen in (25b), repeated here, that VP-adverbs also block the low reading of modifiers in relatives:

- (25) b. This is the only book that I mistakenly/foolishly thought that he had written.  $\neq$
- This is the  $x$  s.t. I mistakenly/foolishly thought that  $x$  was the only book that he had written.

Notice that while factives also produce intervention effects for amount quantification, and hence would block the low reading also on Bhatt's account, this is not true of the cases in (41), any more than the cases in (24) and (25); it is perfectly possible to get the "nonreferential" reading of the amount quantifier in (44).

- (44) How much do I need to (say that I) weigh in order to be allowed to compete?

Our conclusion is that the distribution of the low readings of modifiers in all these cases is predicted extremely well by the hypothesis that it is due to the kind of implicature documented for Neg-Raising. An account in terms of the Intervention Effects produced by "inner islands," besides its weakness as an explanation, fails to capture the distribution of these readings.

There is however one conspicuous case where our account as it stands makes the wrong prediction. Bhatt's original examples of low readings all involve the verb *say*. But, like other true verbs of communication, *say* only marginally allows NR, as shown by the comparison of (45a) with (45b), for example:<sup>3</sup>

- (45) a. I didn't think he was here.  
I thought he wasn't here.
- b. I didn't say he was here.  
~~I said he wasn't here.~~



Thus my analysis incorrectly predicts that the low reading should be blocked with such verbs of communication. However, there is an alternative reason for the possibility of the low reading with *say*, namely that *X says* may be interpreted as a type of *evidential*.<sup>4</sup> Thus (46a) is interpreted exactly as (46b):

- (46) a. This is the only book that John said Tolstoy wrote.  
 b. This is the only book that Tolstoy wrote, according to John.

Support for this comes from the fact that the availability of the low reading is greatly reduced if material is added which forces a reading of *say* as a true verb of communication:

- (47) a. This is the only book that John said to me that Tolstoy wrote.  
 b. This is the only book that John said on that occasion that Tolstoy wrote.

It should also be noted that a similar phenomenon can be observed outside relative clauses when adverbial *only* is used, which does not behave exactly like explicit negation in this regard. Thus, (48) seems a perfectly coherent exchange, since B's answer can be taken as B' (the low reading for *only*):

- (48) A: So I have two Porsches.  
 B: That's not what I heard yesterday. Your husband only said you had one!

B': That's not what I heard yesterday. Your husband said you had only one!

This contrasts with the non-NR behaviour of *say* with explicit negation, as in (49), and instead seems closer to an example with NR *think*, as in (50).

(49) A: So I have two Porsches.

B: # That's not what I heard yesterday: your husband didn't say you had more than one!

B': ~~That's not what I heard yesterday. Your husband said you didn't have more than one!~~

(50) A: So I have two Porsches.

B: That's not what I thought. I didn't think you had more than one!

B': That's not what I thought. I thought you didn't have more than one!

Similarly, (51a) seems to license the low reading in (51b), in a way that contrasts with the similar example with explicit negation in (52), but is parallel to the example with NR *think* in (53):

(51) a. He only said you should have one ice-cream.

b. He said you should only have one ice-cream.

(52) a. He didn't say you should have more than one ice-cream.

b. ~~He said you shouldn't have more than one ice-cream.~~

- (53) a. I don't think you should have more than one ice-cream.  
 b. I think you shouldn't have more than one ice-cream.

### 3.3. THE LICENSING OF THE NEGATIVE POLARITY ITEM "EVER" & INTERVENTION EFFECT II

We have seen from examples like (43) that VP-adverbs block NR (and hence, under our account, the low reading of modifiers). This blocking effect of adverbial modification extends immediately to the effect of *ever* in a "high" position in the relative clause. Bhatt points out that (54) (his (27b)) has only the high reading for *only*:

- (54) the only book that John ever said that Tolstoy wrote

Now we can see that this is just a special case of the blocking effect of adverbs on the "Neg-Raised" reading, showing up equally in (24b), (25b), or (55):<sup>5</sup>

- (55) the only book that John frequently said/thought that Tolstoy wrote  $\neq$   
 the  $x$  s.t. John frequently said/thought that  $x$  is the only book that  
 Tolstoy wrote

Bhatt's own account of the behaviour of *ever* is that it must be licensed by *only* occurring in the same clause; hence in (54) *only* has to be interpreted in

the higher clause in order for *ever* to be licensed. On his account this is also why (56) has only the ‘low’ reading:

(56) the only book that John said that Tolstoy had ever written

Besides its failure to extend to (55), this account has the problem that it relies on the requirement that *ever* can only be licensed by a clause-mate. It has been argued in the literature (see for example Zwarts, 1998, Giannakidou, 1997) that NPIs fall into two classes, *strong*, and *weak*; the latter having a wider range of licensors, and also allowing “long-distance” licensing. *Ever* appears to fall squarely in the class of weak NPIs: it is licensed in questions, the antecedent of conditionals, the restrictions of universal quantifiers, free relatives, *too*-clauses, sentence-comparatives, superlatives, monotone decreasing quantifiers, and negative predicates.<sup>6</sup> It is thus expected that it should not require a clause-mate licensor, and indeed this is the case (note that for this kind of long-distance licensing of *ever* it is not necessary that the embedding verb be a NR predicate; thanks to an anonymous NLS reviewer for pointing this out):

(57) I am not arguing that he had ever been to Mali.

Bhatt recognises that long-distance licensing for *ever* is attested, but speculates that the difference may be in the licensors, and that “ordinals, nominal *only*, superlatives” may only be able to license an NPI in the same clause.

This is a reasonable speculation, but without independent confirmation the account of the behaviour of *ever* in relatives remains circular: the distribution of *ever* in relative clauses is explained in terms of a locality condition which is motivated only by the distribution of *ever* in relative clauses.

There are two ways to provide independent evidence for this account, however. One is to consider licensors such as *every*, which should not (by hypothesis) reconstruct into the relative clause at all, and to see where they license NPIs such as *ever*. The other is to look at the distribution of *ever* in noun complement clauses.

The first thing that we observe is that a “clause-mate” condition is not quite the right way to state the locality principle, since *every* can license *ever* within the relative clause (into which it is not supposed to reconstruct); and, equally, ordinals, nominal *only*, and superlatives can license *ever* within their complement clause:

- (58) Every book that he ever wrote began with the same sentence.
- (59) a. This was the first indication that she would ever succeed.  
 b. This is the only proof that he ever intended to leave.  
 c. This is the best indication that he was ever here.

This is in contrast to the kind of strong NPIs Giannakidou discusses for Greek (*tipota* is a weak NPI when unstressed, but strong when stressed):

- (60) o monos anthropos pu ipe tipota/\*TIPOTA  
 the only person that said anything/anything  
 the only person that said anything

But it might be that licensing is possible across a single clause boundary only; this would still provide evidence for “reconstruction” of the licensing *only* or superlative. I think that Bhatt is correct that it is much harder to find long-distance licensing for *ever* by elements other than negation in the relative clause. This may be because, as stated earlier, *only* and the superlatives license NPIs *indirectly*, by virtue of a negative entailment. Nevertheless, long-distance licensing, even in these cases, does seem to be marginally possible.

- (61) I have bought every book that I think I will ever need.
- (62) a. This was the first indication that they thought she would ever succeed.
- b. This is the only proof that they think I will ever be good enough.

But the use of an implicative or factive verb, for example, or the inclusion of an intervening VP-adverb, blocks the occurrence of the NPI:

- (63) \*I have read every book that they know/proved/stupidly say he ever wrote.
- (64) \*This was the first indication that they knew/had proved/stupidly said she would ever succeed.

Although the NPIs seems to me to be somewhat better generally in the relatives (when there is a suitable NR-licensing predicate) than in the noun complement clauses, for reasons that remain unclear, the pattern here seems to be remarkably similar to the relatives considered by Bhatt. But in the cases we are considering now there is no available analysis in terms of “reconstruction.” Instead it appears that NPI licensing by these NP-internal elements is indeed restricted in comparison to licensing by *not* but that it is allowed by the possibility of an entailment where negation is low, just as we saw in the last section.

Finally, there is one piece of evidence concerning NPI licensing that is not only unexplained by the raising/reconstruction analysis, but constitutes evidence against it. Linebarger (1987) proposes a minimality requirement on polarity licensing that ensures no other logical operator can intervene between a polarity item and a licensing negation. I will not go into Linebarger’s analysis here, or the various proposals that have been made to improve on it (e.g. Jackson, 1995); the relevant point is just to observe the intervention effect that is caused by, for example, the universal quantifier in (65b):<sup>7</sup>

- (65) a. I didn’t think that John had ever been there.  
 b. \*I didn’t think that everyone had ever been there.

Note that the same intervention effect arises when the licenser is *only*:

- (66) a. I only think that one person here has ever been there.

- b. \*I only think that everyone in one department has ever been there.

And it also shows up in the relative clauses that we have been considering:

- (67) a. That is the only book that I think John has ever read.  
 b. \*That is the only book that everyone thinks John has ever read.

But observe that if *only* has to reconstruct down into the lowest clause in order to license *ever* in (67a,b), there should be no intervention effect in (67b), as *only* would be lower than the quantifier.<sup>8</sup>

Thus the facts about NPI licensing are not only unexplained by the lowering analysis; they constitute evidence against it.

#### 4. Some loose ends

##### 4.1. NUMERALS

So far we have not discussed numerals such as *two*, *three*, or *few*. I do not know how to evaluate the claim that there is a distinct low reading for numerals in examples like (68):

- (68) the two books that John said that Tolstoy had finished



It is certainly true that such an example is interpreted differently from an example like (69), in that (68) is compatible with John specifically saying that Tolstoy had finished two books, while (69) is not—at least, not in the first context that comes to mind:

(69) two books that John said that Tolstoy had finished

But it is not clear that reconstruction is needed to explain this difference. If reference is made to all the members of a group that is familiar and salient to speaker and hearer, then in most contexts the definite determiner is felicitous, and its absence dispreferred. So if John has just said “Tolstoy finished two books, and only two,” subsequent reference is likely to be with the definite determiner. But this is just the same pattern that we find in examples like (70) and (71)

(70) A: In Michelle’s opinion, Pushkin wrote five good poems.

B: Yes, I know. \*(The) five she mentioned are my favourites too.

B’: Three she mentioned are my favourites too.

(71) A: Yesterday, Michelle baked 5 different cakes.

B: Yes, I know. \*(The) five cakes she baked were fantastic.

B’: Yes, I know. Three (cakes she baked) were delicious, but the other two were a bit overdone.

It is therefore not clear to me that numerals show anything about reconstruction.<sup>9</sup>

*Few* is a more interesting case, as here there appears to be a real possibility for distinguishable high and low interpretations. What we find is that again the low interpretation is available just when the predicates are of the type that allow Neg Raising, as in (72), contrasting with e.g. (73):<sup>10</sup>

- (72) a. Those are the few books that I think she has read.  
       b. Those are the few books that she is likely to read.
- (73) Those were the few crimes that #the defence/the prosecution were able to prove that the defendant had committed.

*Compare:*

The defence/#the prosecution were able to prove that the defendant had committed few crimes.

#### 4.2. ORDINALS, OR: WHICH CAME FIRST, AD OR BC? (BE CAREFUL)

I have argued that the low reading of the ordinals *first* and *last* is attributable to a low reading for the negative in the entailment that they generate by virtue of being superlatives. But this account will not extend to the possibility of interpreting (74a) with the low reading paraphrased in (74b):

- (74) a. the twentieth mistake that I think she made  
       b. the mistake that I think she made after she made nineteen others

Ordinals (including *first* and *last*) are like comparatives and superlatives in that they involve a degree property but different from them in how much of the property they specify; instead a suitable property with a temporal or locative argument must somehow be determined from the context. Thus if you are told that Jennifer is the tallest of Jennifer, Laura, and Helen, it makes no sense to ask “tallest with respect to what?” But if you are told that she was the first, you precisely do need to determine what the relevant property is.

Bhatt does not discuss the derivation of these examples in detail, but his account appears to make the assumption that an embedded predicate (like *make* in (74a)) provides the property against which the ordinal is evaluated *iff* the ordinal is reconstructed back down and adjoins to the clause containing that predicate. For example, by virtue of interpreting the lowest copy of the NP *first book* in (75a), the result is a representation along the lines of (75b), paraphrased in (75c) (note that the paraphrase still involves a relative with *first* as an adjectival modifier).

- (75) a. the first book that John said that Tolstoy wrote  
 b. the  $\lambda x$  [that John said *first*[book  $x$ ] that [Tolstoy wrote  $x$ ]  
 c. the  $x$  s.t. John said that  $x$  is the first book that Tolstoy wrote

Examples with more embedding can have intermediate readings if intermediate copies are interpreted, so one LF for (76a) (Bhatt’s (28)) is (76b):

- (76) a. the first book that John said that Dan told Mary that Antonia wrote
- b. the  $\lambda x$  [that John said *first*[book  $x$ ] that [Dan told Mary [that Antonia wrote  $x$ ]]]
- c. the  $x$  s.t. John said that the first book that Dan told Mary that Antonia wrote was  $x$  (on the higher reading of this *first*)

What these representations assume (this is clear from the text), but do not really make explicit, is that by virtue of the copy of *first book* being adjoined to a clause, the property with the temporal argument is determined by the verb in that clause. So in (75) it is the order of writing that matters, in (76) it is the order of Dan telling Mary.

The problem here is that while Bhatt is certainly correct that material from the relative clause must somehow be able to provide the relevant property, wholesale reconstruction of the ordinal below the propositional attitude verb does not give quite the right reading. Consider the example in (77):

- (77) the second mammal that we know emerged from the water.

There is a reading for the relative (the most salient one) where *second* is interpreted relative to times at which other mammals emerged from the water: that is order of emerging matters, not order of knowing. This appears to correspond to Bhatt's low reading:

(78) the  $x$  s.t. we know *second*[mammal, $x$ ] that  $x$  emerged from the water

But this possibility would actually be blocked on Bhatt's account, as *know* is a factive and thus acts as an intervenor (compare (33) above). And indeed this representation is not quite right in any case, because (77) does not have a meaning where the assertion that this mammal emerged from the water before all other mammals is within the scope of *know*. (77) is perfectly compatible with a situation in which we do *not* know that that this was the second mammal to reach dry land; a better paraphrase is (79):

(79) the mammal  $x$  such that we know  $x$  emerged from the water, and it was the second mammal to do so, as far as we know

That is to say, in a scenario where there are 3 mammals, A, B, and C, about which we are sure that A and B emerged from the water, and in that order, while we do not know whether or not C emerged from the water at all, B can accurately be described by (77), but not by (78). Thus it seems that we must be able to use material from the embedded clause to construct the relevant property without "reconstructing" the NP down into the scope of *know*. In this paper I will not attempt an analysis of what constrains possible scales for ordinals, and the extent to which these might be determined syntactically or otherwise; I confine myself to noting that the evidence above suggests that it cannot be reconstruction of the ordinal.

## 5. Conclusion

I have argued that the central cases of low readings for adjectival modifiers of a noun that is further modified by a relative clause occur with modifiers that generate negative entailments. These entailments may further license the “short-circuited implicatures” referred to as Neg Raising (Horn, 1989), and it is this phenomenon which is responsible for the low interpretations. Unquestionably many mysteries remain (how Neg Raising should be formalised is a notoriously difficult problem), but at the least this view models with some accuracy the otherwise surprisingly limited distribution of these readings.

In Bhatt, 2002 it is argued that the low readings are the result of reconstruction of the noun and the modifier into the relative clause, and hence that they constitute evidence for the “raising analysis” of relative clauses. If I am correct, such reconstruction overgenerates massively. This does not necessarily entail that the raising analysis of relative clauses is wrong, however: in particular, it is possible that some kind of reconstruction is necessary as a part of the process that generates the readings discussed in this paper. Working out this or other possibilities remains for future work.

### Notes

<sup>1</sup> The adverb *finally* is included in (24a) because this clarifies the relevant readings; it is in parentheses because, as we will see, adverbs themselves prevent the low reading. In my judgement the low reading is absent with or without the adverbial in (24a), even though the readings may be harder to distinguish.

<sup>2</sup> Giannakidou refers to this as a conventional implicature rather than an entailment, but I am not sure why.

It should be observed that this account is only an approximation; as pointed out in Horn, 1995, the scalar adverb *almost* has a negative entailment but fails to license NPIs, while *barely* has no such entailment but does license them.

<sup>3</sup> It is pointed out in Horn, 1978, pp. 205–206 that instances of *say* that “admit of judgmental rather than communicative readings” may trigger NR.

<sup>4</sup> Thanks to Manfred Krifka for suggesting this possibility.

<sup>5</sup> An anonymous reviewer points out that the NPI *anyone* also blocks the low reading, which is absent for example in (i):

(i) the only book that anyone said that Tolstoy wrote

This behaviour is however common to other quantifiers, as discussed at the end of this section:

(i) the only book that everyone said that Tolstoy wrote

<sup>6</sup> In this it patterns together with *any*; the only environments in which *any* can occur from which *ever* is banned appear to be those in which *any* has a free choice interpretation (e.g. in subjunctives, imperatives, with the future tense or modals).

<sup>7</sup> I am grateful to Klaus von Heusinger for suggesting that I look at these cases.

<sup>8</sup> Note that quantifiers such as *everyone* do not cause an “intervention effect” for amount quantification:

(80) How much did everyone think he weighed?

<sup>9</sup> I limit myself here, as Bhatt does, to a discussion of the scope of numerals with respect to propositional attitude verbs. The question of scope interaction of numerals with respect to quantifiers is discussed in Alexopoulou and Heycock (2002).

<sup>10</sup> This is true even when the relative appears to be able to get the “degree” reading which Grosu and Landman (1998) (and others following them) argue necessarily involves interpretation of the low copy inside the relative:

(81) The defendant was relieved at the few crimes that the prosecution/#defence were able to prove that he had committed.

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## References

- Áfarli, T.: 1994, 'A Promotion Analysis of Restrictive Relative Clauses'. *Linguistic Review* **11.1**, 81–100.
- Alexopoulou, T. and C. Heycock: 2002, 'Quantifier scope in relative clauses and definiteness effects'. In: C. Beyssade et al. (eds.): *Empirical Issues in Formal Syntax and Semantics*, Vol. 3. pp. 81–96, Presses de l'Université de Paris-Sorbonne.
- Beck, S.: 1996, 'Wh-Constructions and Transparent Logical Form'. Ph.D. thesis, Universität Tübingen.
- Bhatt, R.: 2002, 'The Raising Analysis of Relative Clauses: Evidence from Adjectival Modification'. *Natural Language Semantics* **10**, 43–90.
- Bianchi, V.: 1995, 'Consequences of Antisymmetry for the Syntax of Headed Relative Clauses'. Ph.D. thesis, Scuola Normale Superiore, Pisa.
- Bianchi, V.: 1999, *Consequences of Antisymmetry: Headed Relative Clauses*, Vol. 46 of *Studies in Generative Grammar*. Berlin: Mouton de Gruyter.
- Bianchi, V.: 2000, 'The Raising Analysis of Relative Clauses: A Reply to Borsley'. *Linguistic Inquiry* **31**(1), 123–140.
- Chomsky, N.: 1995, 'Bare Phrase Structure'. In: G. Webelhuth (ed.): *Government and Binding Theory and the Minimalist Program*. Oxford: Blackwell, Chapt. 8, pp. 383–439.
- Cinque, G.: 1989, 'Long Wh-Movement and Referentiality'. Paper presented at the Second Princeton Workshop on Comparative Grammar.
- Cinque, G.: 1990, *Types of A<sup>1</sup>-Dependencies*, Vol. 17 of *Linguistic Inquiry Monographs*. Cambridge, Mass.: MIT Press.
- Dobrovie-Sorin, C.: 1992, *The Syntax of Romanian: Comparative Studies in Romance*. Dordrecht: Foris.

- Giannakidou, A.: 1997, 'The Landscape of Polarity Items'. Ph.D. thesis, University of Groningen.
- Grosu, A. and F. Landman: 1998, 'Strange Relatives of the Third Kind'. *Natural Language Semantics* **6.2**, 125–170.
- Heycock, C.: 1995, 'Asymmetries in Reconstruction'. *Linguistic Inquiry* **26.4**, 547–570.
- Horn, L.: 1978, 'Remarks on Neg-raising'. In: P. Cole (ed.): *Pragmatics*, Vol. 9 of *Syntax and Semantics*. New York: Academic Press.
- Horn, L.: 1989, *A Natural History of Negation*. Chicago: Chicago University Press.
- Horn, L.: 1995, 'Negative Polarity and the Dynamics of Vertical Inference'. In: D. Forget, P. Hirschbühler, F. Martineau, and M.-L. Rivero (eds.): *Negation and Polarity: Syntax and Semantics*. Amsterdam/Philadelphia: John Benjamins, pp. 157–182.
- Hulsey, S. and U. Sauerland: 2004, 'Sorting out Relative Clauses'. Ms, MIT and Universität Tübingen/University of Connecticut, 3rd draft, March 2004.
- Jackson, E.: 1995, 'Weak and Strong Polarity Items: Licensing and Intervention'. *Linguistic Analysis* **25**, 181–208.
- Kayne, R.: 1994, *The Antisymmetry of Syntax*. Cambridge, Mass.: MIT Press.
- Kroch, A.: 1998, 'Amount quantification, referentiality, and long wh-movement'. (Originally circulated in 1989).
- Linebarger, M.: 1980, 'The Grammar of Negative Polarity'. Ph.D. thesis, MIT.
- Linebarger, M.: 1987, 'Negative polarity and grammatical representation'. *Linguistics and Philosophy* **10**, 325–387.
- Rizzi, L.: 1990, *Relativized Minimality*, Vol. 16 of *Linguistic Inquiry Monograph*. Cambridge, Mass.: MIT Press.
- Schachter, P.: 1973, 'Focus and Relativization'. *Language* (49.1), 19–46.
- Szabolcsi, A. and F. Zwarts: 1992, 'Weak Islands and an Algebraic Semantics for Scope Taking'. *Natural Language Semantics* **2**, 1–50.

Veloudis, J.: 1982, 'Negation in Modern Greek'. Ph.D. thesis, University of Reading.

Vergnaud, J.-R.: 1973, 'French Relative Clauses'. Ph.D. thesis, MIT.

Zwarts, F.: 1998, 'Three types of polarity'. In: F. Hamm and E. Hinrichs (eds.): *Plural quantification*. Dordrecht: Kluwer, pp. 177–238.