

Negative inversion and Horn-clauses

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Negative Inversion (NI), as in (1a), and its embedded version where subject-auxiliary inversion is licensed not by a negative quantifier in Spec,CP, but rather by an NPI in Spec,CP that in turn is licensed by a negated Neg-raising predicate (the so-called Horn-clauses, Horn 1972), as in (1b), have never received a semantic explanation. The most prominent syntactic account of (1) by Collins and Postal 2014 has been heavily criticized by Horn 2014; Zeijlstra 2017, a.o.

- (1) a. Nowhere did he mention my book (NI)
 b. I don't think that anywhere did he mention my book (Horn-clause)

We put forward the first (to our knowledge) semantic account of NI and Horn-clauses, which (i) explains their distribution, (ii) is compatible with a semantic/pragmatic approach to Neg-raising, and (iii) is immune to the criticisms raised against Collins and Postal 2014.

Background: Collins and Postal 2014, et seq. For Collins and Postal 2014, 2018a, the existence of Horn-clauses provides the strongest evidence for a syntactic approach to Neg-raising, as only under such an approach can the negation in the main clause have appeared in Spec,CP at an earlier stage of the derivation, as in (2) (where $\langle \dots \rangle$ denotes a lower copy).

- (2) I do NEG think [$\langle \text{NEG} \rangle$ anywhere] did he mention my book $\langle \text{NEG anywhere} \rangle$

Collins and Postal's proposal straightforwardly accounts for the contrast between (1b) and (3): as *claim* and *regret* are not Neg-raising predicates, syntactic NEG-movement is impossible in (3).

- (3) a. *I didn't regret that anywhere did he mention my book
 b. *I didn't claim that anywhere did he mention my book

Criticism The first serious problem for Collins and Postal's analysis is that it cannot exclude universal quantifiers from appearing in Horn-clauses. Collins and Postal (2014, 142-3) provide convincing arguments for treating NI and Horn-clauses uniformly. However, whereas (4a) is fully acceptable, (4b) is not. The structure in (4c) that derives (4b) should, in principle, be possible in Collins and Postal's system.

- (4) a. Not everywhere did he mention my book
 b. *I don't think that everywhere did he mention my book
 c. I do NEG think that [$\langle \text{NEG} \rangle$ everywhere] did he mention my book $\langle \text{NEG everywhere} \rangle$

The only solution that Collins and Postal can offer to rule out (4c) is to postulate a condition that bans negated non-existentials from triggering Horn-clauses (cf. Collins and Postal 2014).

The second serious problem for Collins and Postal 2014 is that the set of negative predicates that can license Horn-clauses is not restricted to Neg-raising predicates. For starters, Horn (2014) points out that non-factive *know*, *be aware*, and some other predicates, which he dubs Cloud of Unknowing (CoU), license Horn clauses, (5).

- (5) I *(don't) know that ever before had all three boys napped simultaneously (CoU)

The problem is that in (5) there is no semantic reflection of negation in the embedded clause, i.e. (5) lacks a Neg-raising reading. To resolve this, Collins and Postal (2018b) stipulate that CoU predicates cannot be outscoped by a raised negation. Thus, the underlying structure of (5) must contain two additional negations, one of which is raised into the matrix clause:

- (6) [I do NEG₁ know NEG₂ [$\langle \text{NEG}_2 \rangle$ that NEG₃ ever before had all three boys napped simultaneously]]

Furthermore, the same problem as with CoU predicates arises with many other predicates, like *accept*, *provide evidence*, namely these predicates are non-Neg-raisers, but when negated, they can license subject-auxiliary inversion with an NPI in Spec,CP, (7).

- (7) I *(didn't) accept that any of those problems had she ever really solved

For (7), Collins and Postal (2014) argue that here the NPI *any of those problems* takes matrix scope and therefore, examples like (7) are different from real Horn-clauses. However, the claim that *any of those problems* in (7) takes matrix scope is false. If it were the case, (7) should be felicitous in a scenario where we know that Mary solved some problems, but we don't know which ones (e.g., when solving some problems is a requirement for passing a test, and we only know that Mary passed the test).

In sum, Collins and Postal's proposal suffers from several problems. It both overgenerates and undergenerates. Nevertheless, as of date, no existing alternative account for NI and Horn-clauses has been proposed that does not require movement of negation.

Proposal We propose a semantic account of NI and Horn-clauses that is compatible with the semantic/pragmatic approach to Neg-raising (Bartsch, 1973; Gajewski, 2005, a.o.). We capitalize on the intuition that NI and Horn-clauses involve emphatic assertion. To capture this, we propose that Pol(arity)-head in a clause with subject-auxiliary inversion comes with *emph*-feature that is checked by EmphAssert operator in (8) proposed by Krifka (1995) for emphatic NPIs. Unlike NPIs, Pol_{emph} does not activate its own alternatives, but depends on the focused element in Spec,CP. (1a) and (1b) have the LFs in (9a) and (9b) respectively (where $_D$ marks domain alternatives as standard in the literature on NPIs, e.g. Chierchia 2013).

(8) $\text{EmphAssert}(\langle p, \text{Alt}(p) \rangle, c) = \{w \in c \mid w \in p \wedge \neg \exists q \in \text{Alt}(p) : w \in q \wedge c \cap q \subset c \cap p\}$
(EmphAssert asserts the prejacent p and negates all stronger alternatives to p)

- (9) a. [EmphAssert [not [anywhere_D [1 [Pol_{emph} he mentioned my book t_1]]]]]
b. [EmphAssert [not [I think [anywhere_D [1 [Pol_{emph} he mentioned my book t_1]]]]]]

The LFs in (9) correctly predict that Pol_{emph} has the distribution of weak NPIs like *any*, *ever* (i.e. **Somewhere did he mention my book* is ungrammatical for the same reason **I have ever read 'War and Peace'* is - application of EmphAssert leads to contradiction). Our proposal straightforwardly accounts for the contrast in (4) as a case of intervention following Chierchia's (2004) idea that indirect, (10b), but not direct, (10a), implicatures disrupt downward-entailing environment necessary for licensing NPIs.

- (10) a. Not every student has ever read a book about linguistics
b. *Mary didn't give everyone anything

Our proposal doesn't depend on the Neg-raising property of embedding predicates, thus, in principle any non-factive predicate should be able to embed a Horn-clause, including CoU and *accept*-type predicates. (That factivity is an intervener for NPI-licensing is argued for in Chierchia 2013; Horn 2014.) *Regret* and other adversatives are Strawson downward entailing (von Stechow 1999), therefore their negation creates upward monotonicity unsuitable for NPI-licensing, (11), which explains the ungrammaticality of (3a).

- (11) *I don't regret that he mentioned my book anywhere

For communication verbs like *claim*, *say*, *shout*, we propose following Krifka 1995 that they are quotational and hence require an illocutionary operator in the embedded position. Krifka (1995) proposes that (12a) is deviant because its structure in (12b), with the embedded EmphAssert, leads to contradiction. In his system, *Mary didn't say that John had any problems* is acceptable because *say* is ambiguous between a quotational and neutral information-reporting readings. As Horn-clauses are obligatorily emphatic (contain Pol_{emph}), they are deviant under *say*, as well (i.e. no neutral information-reporting construal is available), which explains (3b).

- (12) a. *Mary didn't shout that John had any problems
b. Assert[Mary didn't shout that EmphAssert[John had any problems]]

Conclusion Horn-clauses is one of the thorniest problems in the study of negation. Their existence has been argued by Collins and Postal (2014, 2018a) to be the strongest argument in favour of the syntactic approach to Neg-raising. We showed that Horn-clauses and Negative Inversion not only can be explained without appeal to syntactic Neg-raising using independently existing semantic mechanisms for NPI-licensing and intervention effects, but also such a semantic account avoids multiple problems faced by Collins and Postal's system.

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