Andreea Nicolae (Harvard University) **Sunday 12:00**

An alternative account of the distribution of NPIs in interrogatives

THE PROBLEM Despite much research on the NPI front, their behavior in questions remains puzzling. Many recent theories, building on Ladusaw's original insight, have developed an alternative–based approach whereby their distribution, a requirement to be in a downward entailing (DE) context, follows from the way their alternatives are "exhaustified," without having to stipulate a licensing-by-DE condition. In fact, Guerzoni&Sharvit (2007) show that when it comes to the distribution of NPIs in questions, DE-ness cannot be a factor, and claim instead that the crucial factor is strength. While NPIs are always acceptable in direct questions (modulo some intervention facts), matters are more complicated in embedded questions: *wonder* verbs always allow NPIs, *surprise* verbs never allow NPIs, and *know* verbs have an intermediate status.

(1) a. Mary *wonders* which students brought **anything** to the party.
 b. %Mary *knows* which students brought **anything** to the party.
 c. *It *surprised* Mary which students brought **anything** to the party.

Noting that the NPI's acceptability correlates with whether the embedded question is interpreted as weakly (WE) or strongly (SE) exhaustive — *wonder* embeds SE questions, *surprise* embeds only WE questions, while *know* arguably admits both — G&S draw the generalizations that NPIs are only admissible in embedded questions that receive a SE interpretation. Summing up, the situation is the following. We have a promising theory of NPIs, a good generalization about their distribution in questions, and a theory of WE versus SE questions, but we don't know how these come together, and in particular how the generalization may follow given what we know about the distribution of NPIs in non–interrogative contexts. Armed with a principled theory that can compositionally derive the difference between WE and SE questions (George 2011), we are now in a good position to tackle the puzzle of NPIs in questions. The present paper addresses these questions and argues for a principled way of deriving the distribution of NPIs without relying on the notion of strength.

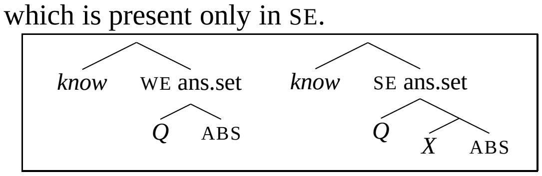
NPIS Following Krifka (1995) and Chierchia (2004), a.o., I assume that NPIs like *any* are minimally different from plain indefinites. Specifically, they are existential quantifiers, $\exists x \in D[P(x)]$, which additionally activate subdomain alternatives: $\{\exists x \in D'[P(x)] | D' \subseteq D\}$. Alternatives need to be exhaustified, that is, factored into meaning, and this is done via a covert alternative–sensitive operator **O**, akin to *only*.

(2) $\mathbf{O}(\mathscr{A}lt(p))(p)(w) = p(w) \wedge \forall q \in \mathscr{A}lt(p)\ [p \not\subseteq q \rightarrow \neg q(w)]$

The role of **O** is to negate any non–entailed alternatives. NPIs are fine in DE contexts since the alternatives are entailed by the assertion, rendering **O** vacuous. They are ruled out in non-DE because the alternatives are not entailed and negating them, as imposed by **O**, contradicts the assertion. In this system, the notion of NPI–licensing boils down to an interaction between the alternatives being activated and the method by which we "use up" these alternatives, via a mechanism of exhaustification that we have reasons to believe is independently active in grammar (e.g. when deriving scalar implicatures).

EMBEDDED QUESTIONS George (2011) takes questions to be built out of abstracts (containing the *wh* word), a question operator *Q*, and a strengthening operator *X* which is present only in SE.

(3) a. $Q = \lambda\alpha.\lambda p.\ \exists\beta\ [p = \alpha(\beta) \wedge p_{w_0}]$
 b. $X = \lambda P_{\langle e,st\rangle}.\lambda\gamma_{\langle e,t\rangle}.\lambda w.\ [\gamma = \lambda x.P(x)(w)]$
 c. ABS $= \lambda x.\lambda w.[x\ ate_w]$



(4) a. WE answer set $= \{p\!: \exists x\ [p = (\lambda w.\ [x\ ate_w]) \wedge p_{w_0}]\}$
 $= \{\lambda w.\text{Mary } ate_w,\ \lambda w.\text{Bill } ate_w,\ \lambda w.\text{Mary\&Bill } ate_w\}$
 b. SE answer set $= \{p\!: \exists X\ (p = \lambda w.\ (X = \lambda x.\ ate_w(x)) \wedge p_{w_0})\}$
 $= \{\lambda w.\ [\lambda x.\ ate_{w_0}(x)] = [\lambda x.\ ate_w(x)]\ \}$

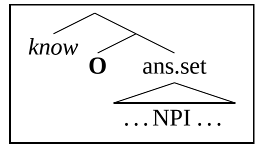
Note that the SE answer set is a singleton containing the proposition that is true in a world *w* if the set of eaters in the actual world, $\lambda x.\ ate_{w_0}(x)$ (=X), is the same as the set of eaters in *w*.

THE PROPOSAL I propose we integrate the Krifka-Chierchia idea that NPIs activate subdomain alternatives and George's account of embedded questions by claiming that whenever the abstract contains an NPI ('who ate anything'), the alternatives to the answer set in (5a) are as in (5b).

(5) a. $\textsc{we.ans} = \{\lambda w.\exists y{\in}D[\text{M ate}_w\ y],\ \lambda w.\exists y{\in}D[\text{B ate}_w\ y],\ \lambda w.\exists y{\in}D[\text{M+B ate}_w\ y]\}$

b. $\mathscr{A}lt(\textsc{we.ans}) = \left\{ \begin{pmatrix} \lambda w.\exists y{\in}D'[\text{M ate}_w\ y] \\ \lambda w.\exists y{\in}D''[\text{M ate}_w\ y] \\ \cdots \end{pmatrix}, \begin{pmatrix} \lambda w.\exists y{\in}D'[\text{B ate}_w\ y] \\ \lambda w.\exists y{\in}D''[\text{B ate}_w\ y] \\ \cdots \end{pmatrix}, (\ \cdots\cdots\ ) \right\}$

Alternatives require exhaustification. I take **O** to adjoin above the *Q* operator and apply point-wise to each proposition in the answer set. Thus every proposition in (5a) is exhaustified with respect to its alternatives in (5b). For each of them the NPI occurs in a non–DE context, so exhaustification will lead to a contradiction for each of the proposition in the answer set since the alternatives are not entailed and must be negated, shown in (6).



(6) $\mathbf{O}(\mathscr{A}lt(\text{p}))(\text{p})(\text{w}) = \exists y{\in}D\ [\text{M ate}_w\ y] \wedge \forall D'{\subseteq}D\ (\neg\exists y{\in}D'\ [\text{M ate}_w\ y]) = \bot$

The unacceptability of NPIs in WE questions falls out right away thus since the exhaustified answer set is going to contain only contradictions. Turning now to SE questions that contain an NPI, given George's semantics in (7), this system predicts NPIs to be ruled out here as well. As it is, the NPI winds up in a non–monotonic context; none of its alternatives are entailed so exhaustification amounts to their negation.

(7) $\textsc{se.ans} = \{\lambda w.\ \forall x[\exists y{\in}D\ (x\ \text{ate}_{w_0}\ y) \longleftrightarrow \exists y{\in}D\ (x\ \text{ate}_w\ y)]\}$

Like before, this leads to a contradiction. Note, however, that this is contrary to the empirical data. I propose next an arguably minor amendment to George's theory which will prove to be sufficient to account for the distribution of NPIs in SE questions.

AMENDING THE SE ANSWER Intuitively, I argue that instead of an answer like (7), which says that "M&B ate something and nobody else did," we actually have the minimally different and arguably just as appropriate answer: "Only M&B ate anything." Both answers would convey the same information, that nobody other than M&B ate anything, so we don't lose anything by making this switch. Formally, the only difference lies in whether we assert or presuppose the existence part, with the new version in (8a) presupposing it (everything before the period is presupposed). This switch is encoded in the semantics of *X*, as in (8b).

(8) a. $\textsc{se.ans} = \{\lambda w{:}\ \forall x[\exists y{\in}D(x\ \text{ate}_{w_0}\ y) \rightarrow \exists y{\in}D(x\ \text{ate}_w\ y)]\mathbf{.}\ \forall x[\exists y{\in}D(x\ \text{ate}_w\ y) \rightarrow \exists y{\in}D(x\ \text{ate}_{w_0}\ y)]\}$

b. $X = \lambda P_{\langle e,st\rangle}.\lambda\gamma_{\langle e,t\rangle}.\lambda w{:}\ [\gamma \subseteq \lambda x.P(x)(w)].\ [\gamma \supseteq \lambda x.P(x)(w)]$

Presuppositional propositions are exhaustified only with respect to the alternatives of the assertive component, repeated in (9a). Every alternative in the set in (9b) can be shown to be Strawson entailed by the assertion, so exhaustification, as defined in (2), will be vacuous since $\forall q{\in}\ \mathscr{A}lt(\text{p})\ (\text{p} \rightarrow \text{q})$. Note that given this change, we now essentially have the same scenario as with NPI licensing in the scope of *only*.

(9) a. $\text{p} = \lambda w.\forall x[\exists y{\in}D(x\ \text{ate}_w\ y) \rightarrow \exists y{\in}D(x\ \text{ate}_{w_0}\ y)]$

b. $\mathscr{A}lt(\text{p}) = \{\text{q}{:}\ \forall D'{\subseteq}D\ \text{q} = \lambda w.\forall x[\exists y{\in}D'(x\ \text{ate}_w\ y) \rightarrow \exists y{\in}D'(x\ \text{ate}_{w_0}\ y)]\}$

NPIs can thus survive in propositions like (8) since their alternatives can be exhaustified contradition-free. In other words, exhaustifying an NPI in a SE question will simply return the answer set.

CONCLUSION What I have shown is that a simple extension of the Krifka, Chierchia, et.al. line can straightforwardly explain the generalization regarding the distribution of NPIs in interrogatives. Furthermore, a main advantage of this proposal is showing how we can derive this without having to stipulate anything about the strength of questions. The emerging picture is that not only is it the case that DE–ness is not a factor in non–interrogatives and strength not a factor in interrogatives, but that in fact all occurrences of NPIs can be accounted for in an arguably elegant way by simply looking at the interaction between their alternatives and how the grammar uses up these alternatives across different environments. This analysis can also account for the intervention facts observed with NPIs in questions.

Chierchia 2004, 'Scalar implicatures, polarity phenomena, and the s/s interface'. George 2011, 'Question embedding and the semantics of answers'. Guerzoni&Sharvit 2007, 'A question of strength: On NPIs in interrogative clauses'. Krifka 1995, 'The semantics and pragmatics of polarity items'.