Presupposed free choice and the theory of scalar implicatures

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Exclusivity and ignorance Disjunctive sentences like (1) have long been observed to give rise to two types of implicatures: an exclusivity implicature, (1a), and an ignorance implicature, (1b). There are broadly two main approaches to implicatures. The first is the 'Neo-Gricean' approach and builds on Grice's (1975) original characterisation of implicatures as inferences arising from the hearer's reasoning about what the speaker said and could have said instead (a.o., Horn 1972, Gazdar 1979, Sauerland 2004). This approach provides a unified analysis of the inferences in (1) as implicatures in this sense. The second, often referred to as the 'Grammatical' approach, argues instead that implicatures arise from the compositional calculation of meaning (a.o., Fox 2007, Chierchia et al. 2012, Bar-Lev and Fox 2017). A common implementation of this approach involves a covert exhaustivity operator in the syntax, the meaning of which gives rise to the exclusivity implicature in (1a). Some versions of this approach maintains that ignorance implicatures like (1b) arise through pragmatic reasoning (e.g., Fox 2007), while others derive them in the grammar as well by making use of an additional epistemic operator (e.g., Meyer 2013, Buccola and Haida 2018).

(1) Olivia took Logic or Algebra.

a. ⇝ *Olivia didn't take both Logic and Algebra* EXCLUSIVITY

b. ⇝ *The speaker doesn't know which of the two classes Olivia took* IGNORANCE

Free choice A second well-known observation is that disjunctions in the scope of possibility modals give rise to another inference called 'free choice' (a.o., Kamp 1974), henceforth FC, (2). A prominent approach to FC inferences also treats them as implicatures (a.o., Fox 2007, Klinedinst 2007, Bar-Lev and Fox 2017). However, Fox (2007) observes that deriving free choice is challenging for the pragmatic approach, while it can be accounted for under the grammatical approach. Based on this, he concludes that, to the extent that it is treated as an implicature, free choice constitutes an argument in favor of the grammatical approach.[1]

(2) Olivia can take Logic or Algebra.

⇝ *Olivia can take Logic and she can take Algebra* FREE CHOICE

Presupposed exclusivity and ignorance Recent work has investigated cases similar to (1) where an implicature appears to be computed at the presuppositional but not at the assertion level. For instance, it has been observed that a sentence like (3) has a reading on which an exclusivity implicature only appears at the presuppositional level. Under this reading, (3) conveys that, according to Noah, it is not true that Olivia took either class, (3a), while suggesting that she took one or the other but not both, (3b).

(3) Noah is unaware that Olivia took Logic or Algebra.

a. Noah doesn't believe that Olivia took Logic or Algebra ASSERTION

b. ⇝ *Olivia didn't take both Logic and Algebra* PRESUPPOSED EXCLUSIVITY

c. ⇝ *The speaker doesn't know which of the two classes Olivia took* PRESUPPOSED IGNORANCE

Gajewski and Sharvit (2012) take (3) to be evidence that implicatures can arise at the presuppositional level and propose a unified grammatical account to assertion-based and 'presupposed' implicatures. Spector and Sudo (2017) challenge this proposal based on the observation that (3) also gives rise to ignorance inferences analog to (1b) at the presuppositional level, (3c). Based on this, Spector and Sudo (2017) propose a hybrid account relying on two distinct scalar strengthening mechanisms: they adopt a grammatical theory of implicatures for deriving implicatures at the assertion level but posit an independent pragmatic principle along the lines of *Maximize Presupposition!* for deriving implicatures at the presuppositional level. The interplay between these mechanisms accounts for the cases above and related data.

[1] Two kinds of responses have been given to Fox's argument. The first is to argue that FC inferences are not implicatures. And indeed their status remains highly controversial in the current literature (see Bar-Lev 2018, Goldstein 2018, Aloni 2016 for discussion). The second is to argue that the pragmatic approach can after all derive free choice as an implicature (Franke 2011; but see Katzir & Fox 2019 for critical discussion). Both these directions can in principle extend to our extension of Fox's argument to the presuppositional level below. We first focus on the consequences of the presuppositional data for an implicature approach to free choice, and we then discuss these two directions and their consequences for these data.

Presupposed free choice We add to this background the novel observation that FC inferences also arise at the presuppositional level: a sentence like (4) has a reading conveying that Noah doesn't believe that Olivia can take either class, (4a), while suggesting that she has free choice between the two, (4b). Thus, in parallel to (3b), the FC inference in (4b) only appears at the presuppositional level. We show that deriving (4b) is challenging for Spector and Sudo (2017) in two ways. First, deriving it with the pragmatic side of their system is challenging for the same reasons deriving regular FC inferences is challenging for a pragmatic approach to assertion-based implicatures. In this respect, our dialectic closely follows that of Fox 2007: we argue against a pragmatic approach to *presupposed* implicatures on the ground that it is not able to account for *presupposed* free choice.[2] Second, we show that having the latter arise from their exhaustivity operator would over-generate for cases similar to (3).[3] The present data also reveal a systematic parallelism between the assertion and presuppositional levels in terms of exclusivity, ignorance, and free choice. We argue that a grammatical theory of implicatures where meaning strengthening operates in the same way at both levels can account for that parallelism and provide a unified analysis of those inferences.

(4) Noah is unaware that Olivia can take Logic or Algebra.

a. Noah doesn't believe that Olivia can take either class. ASSERTION

b. $\rightsquigarrow$ *Olivia can take Logic and she can take Algebra* PRESUPPOSED FC

The ingredients of a unified approach We follow previous work that extend the working of the exhaustivity operator to presuppositional alternatives (ALT^{prs}) (Gajewski and Sharvit 2012, Magri 2009, Marty 2017). In addition, we assume the notions of innocent exclusion and inclusion, and we extend them to presuppositional alternatives (cf. Marty 2017, Bar-Lev and Fox 2017). Restricting our attention to the working of EXH on presuppositional alternatives, EXH^{prs} is defined as follows:

(5) $[\![\text{EXH}^{prs}\ \phi_p]\!] = \lambda w : p(w) \wedge \forall \phi_q \in \text{IE}^{prs}(\phi_p)[\neg q(w)] \wedge \forall \phi_r \in \text{II}^{prs}(\phi_p)[r(w)]\ .\ [\![\phi_p]\!](w)$

a. $\text{ALT}^{prs}(\phi_p) = \{\phi_q :\ [\![\phi_p]\!] \not\subseteq [\![\phi_q]\!] \wedge ([\![\phi_p]\!] \cap q) \subseteq [\![\phi_q]\!]\}$

b. $\text{IE}^{prs}(\phi_p) = \bigcap \left\{ S \subseteq \text{ALT}^{prs}(\phi_p) \;\middle|\; \begin{array}{l} S \text{ is a maximal subset of } \text{ALT}^{prs}(\phi_p) \text{ s.t.} \\ \{\neg q : \phi_q \in S\} \cup \{\phi_p\} \text{ is consistent} \end{array} \right\}$

c. $\text{II}^{prs}(\phi_p) = \bigcap \left\{ S' \subseteq \text{ALT}^{prs}(\phi_p) \;\middle|\; \begin{array}{l} S' \text{ is a maximal subset of } \text{ALT}^{prs}(\phi_p) \text{ s.t.} \\ \{r : \phi_r \in S'\} \cup \{\neg q : \phi_q \in \text{IE}^{prs}(\phi_p)\} \cup \{p\} \text{ is consistent} \end{array} \right\}$

These ingredients allow us to account for PRESUPPOSED FC: since (6) presupposes the truth of the presuppositions of its II^{prs} alternatives, it presupposes that Olivia can take Logic and that she can take Algebra. PRESUPPOSED EXCLUSIVITY also follows since (6) also presupposes the falsity of the presuppositions of its IE^{prs} alternatives, that is Olivia cannot take both Logic and Algebra.

(6) EXH^{prs} [Noah is unaware that Olivia can take Logic or Algebra]

a. $\text{IE}^{prs} = \{$Noah is unaware that Olivia can take Logic and Algebra$\}$

b. $\text{II}^{prs} = \{$Noah is unaware that Olivia can take Logic, Noah is unaware that Olivia can take Algebra$\}$

Finally, we combine the account above with a grammatical approach to ignorance implicatures à la Meyer (2013) and we extend it to presuppositions by defining the matrix K operator as in (7): asserting a sentence conveys that the speaker believes that sentence and presupposes that she believes its presuppositions. The interaction between EXH^{prs} and K derives PRESUPPOSED IGNORANCE: (8) presupposes that it's not true that the speaker believes that Olivia took Algebra and it's not true that she believes that Olivia took logic.

(7) $[\![K_{spk}\ \phi_p]\!] = \lambda w : \forall w' \in Dox_{spk,w}[p(w')]\ .\ \forall w' \in Dox_{spk,w}[[\![\phi_p]\!](w')]$

(8) EXH^{prs} [K_{spk} [Noah is unaware that Olivia took Logic or Algebra]]

Selected references: Bar-Lev & Fox 2017 *Universal Free Choice and Innocent Inclusion* · Fox 2007 *Free choice and the theory of scalar implicatures* · Spector & Sudo 2017 *Presupposed ignorance and exhaustification.*

[2] We will also show that a parallel challenge arises with the recent pragmatic Logical Integrity approach by Anvari 2018.

[3] In particular, it would now predict a sentence like *Noah is unaware that Olivia passed some of the exams* to assert that Noah doesn't believe that Olivia passed any of the exams while presupposing that she passed all of them. In turn, this predicts that this sentence should be felicitous in a context in which it is common knowledge that Olivia passed all of the exams, contrary to facts.