PRIMING SCALAR INFERENCES

BACKGROUND: How is the disambiguation of a sentence affected by other structurally similar sentences in the context? Most experimental work tries to eliminate this effect by including a substantial number of fillers in the experiment. Recently, however, Chemla & Bott (2015), following Raffray and Pickering (2010), report an effect they attribute to "representational priming" – i.e. they show that the interpretation of scopally ambiguous sentences ("Every boy climbed a tree") can be primed by context. Specifically, they argue based on experimental data that if subjects are taught to accept a particular disambiguation, say a narrow-scope universal reading, target items involving similar ambiguities will tend to be disambiguated in favor of the same interpretation, namely the narrow-scope universal reading. Crucially, they argue that what is being primed is a certain representation (a narrow-scope universal reading, be it the surface scope or the inverse scope reading) rather than a certain operation; e.g. being primed to disambiguate in favor of an inverse-scope reading will not make subjects more likely to later on disambiguate in favor of inverse-scope readings. In this paper we present new experimental data from the domain of scalar implicatures arguing for yet another type of priming.

EXPERIMENT: We tested the effect of priming on the interpretation of a disjunction $a \vee b$, specifically on the necessity of the exclusive interpretation $\neg(a \wedge b)$. Our test used items such as (1): (1a) contains a plain *or*, (1b) the polysynthetic disjunction *either – or*, and (1c) involves the explicit exclusion *or but not both*.

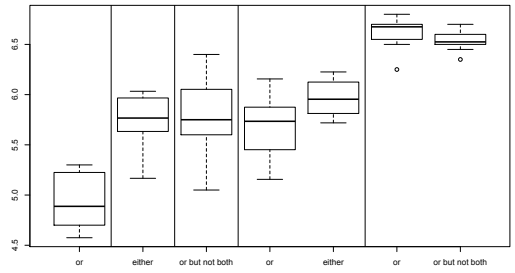
(1) a. Bill gave Mary flowers or chocolate for her birthday.
    b. Bill gave Mary either flowers or chocolate for her birthday.
    c. Bill gave Mary flowers or chocolate for her birthday, but not both.

First we confirmed experimentally that both the polysynthetic disjunction and the explicit exclusion trigger an exclusive implicature more strongly than plain disjunction in a between-subjects test. On Mechanical Turk, participants were shown two sentences, one from (1) followed by (2), and were asked to rate on a scale of 1-7, ranging from never to always, whether (1) suggests (2). This involved three separate experiments: (i) 10 *or→not both* items and 20 fillers, (ii) 10 *either or→not both* items and 20 fillers, (iii) 10 *or but not both→not both* items and 20 fillers.

(2) Bill didn't give Mary both flowers and chocolate.

Then we tested the effect of priming in two further experiments using the same items: (iv) 10 *or→not both* items, 10 *either or→not both* items and 10 fillers, and (v) 10 *or→not both* items, 10 *or but not both→not both* items and 10 fillers.

RESULTS: The results of the five experiments are represented in box plots in the figure below (the results of each test are separated by a vertical line). The results of (i) through (iii) confirm that indeed the exclusive inference is more readily available with polysynthetic disjunction or an explicit exclusion phrase. The results from experiments (iv) and (v) show that there is a significant effect of priming on the interpretation of plain *or* by both polysynthetic disjunction and by an explicit exclusion phrase. In pairwise comparison, the differences between plain *or* in (i), plain *or* in (iv), and plain *or* in (v) are all significant.



THREE LEVELS OF EXCLUSIVITY: We assume an exhaustificaiton-based analysis for the interpretation of disjunction. Following Chierchia et al. (2012), we argue that scalar implicatures are the result of a syntactic ambiguity resolution in favor of an LF which contains a covert exhaustifier $\mathcal{E}xh$.

(3) $\mathcal{E}xh(p) = p \wedge \forall q \in \mathscr{A}lt(p))[p \not\subseteq q \rightarrow \neg q]$

Following Spector (2014), we claim that polysynthetic disjunctions like *either – or* obligatorily exhaustify the conjunctive alternative, while plain disjunctions like *or* only do so optionally. In other words, *either – or* can only be associated with the LF in (4b), while plain *or* can be associated with either (4a) or (4b).

(4) a. $[p \vee q]$
b. $\mathcal{E}xh[p \vee q]$

We furthermore adopt the proposal in Meyer (2014) where it's claimed that assertively used sentences contain a covert doxastic operator, call it $\Box$, which adjoins at the matrix level at LF:

(5) $[\![\Box_x \text{p}]\!] = \lambda w.\forall w' \in \text{Dox}(x)(w) : p(w')$
$w' \in \text{Dox}(x)(w)$ iff given the beliefs of x in w, w' could be the actual world.

What this means then is that *either or* is also ambiguous, between the following two LFs. Observe that only (6b) delivers the SI "not both", as the derived inference in (6a) is arguably too weak to be detected. In other words, *either – or* is itself ambiguous between an inclusive and an exclusive interpretation.

(6) a. $\mathcal{E}xh[\Box[p \vee q]] = \Box[p \vee q] \wedge (\Diamond\neg[p \wedge q])$
b. $\Box[\mathcal{E}xh[p \vee q]] = \Box[p \vee q] \wedge (\Box\neg[p \wedge q])$

Under this approach, *or* can be said to be associated with three distinct LFs, two containing the exhaustifier, (6a) and (6b), and one without the exhaustifier, (7). In other words, of the three possible disambiguations, only one will be akin to an exclusive interpretation.

(7) $\Box[p \vee q]$

PRIMING: Consider first the results of experiment (iv): the presence of *either – or* trials primes the exclusive interpretation of plain *or* items. In this case, the priming effect follows from the assumption that the representations in (6) of the *either – or* items prime the same representations for the plain *or* items. Crucially, however, the representation in (7) is still accessible for *or*, albeit to a much lesser extent than in isolation, given that statistical analysis (mixed-model effects) shows the difference between *or* and *either – or* in experiment (iv) to be significant. Turning to experiment (v), the priming effect of the *or but not both* items is unexpected: the representation of a *or but not both* item is shown in (8). A representation that doesn't contain *Exh* is not ruled out by the continuation *but not both*, and perhaps it is even favored since if *Exh* were present, the continuation *but not both* would be redundant.

(8) $\Box[(p \vee q) \wedge \neg(p \wedge q)]$

Given the representation above for *or but not both*, if structural priming applied we would expect it to trigger the non-exclusive interpretation of plain *or*, contrary to fact. Namely, we would disambiguate in favor of the LF without $\mathcal{E}xh$, (7). We conclude then that structural priming is weaker than Chemla & Bott assume. To explain the priming effect of *or but not both*, we propose instead that the principle in (9), *Priming by Equivalence*, applies.

(9) *Priming by Equivalence*: The accessibility of representation α increases whenever a sentence representation β was recently under consideration such that α' is equivalent to β where α' derives from α via a replacement of non-logical lexical material in α.

In other words, the representation in (8) of *or but not both* primes the representation in (6b) of plain *or* by virtue of the fact that they qualify as equivalent given the conditions above.