To parse or not to parse: symmetric filtering in negated conjunctions

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Intro: We present experimental evidence for symmetric filtering of presuppositions in conjunctions inside conditionals (typically predicted to be asymmetric) in case the presuppositional conjunct is negated. Such a pattern is predicted by a parsing-based approach like *Limited Symmetry* (Kalomoiros 2021), but not by traditional accounts that are constituent-based.

Constituent Approaches: A key characteristic of standard approaches to presupposition projection is that projection is calculated recursively on the constituent structure of a sentence. For instance, on dynamic accounts (Heim 1983 a.o.), the rule for a conjunction $(p\ and\ q)$ is to 'update the context C with p, $C + p$, and then update the result with q, $(C + p) + q$'. This rule updates constituent-by-constituent, requiring each context to be updated to entail any presuppositions of the constituent that is under update. Such constituent-based mechanism can be combined with an order constraint (requiring update to proceed from left to right), resulting in asymmetric filtering across connectives; alternatively, update can be unordered, allowing symmetric filtering across the board (Schlenker 2009, Rothschild 2012). Thus, either all filtering is asymmetric, with symmetry perhaps being available at a cost, or all filtering is symmetric by default. However, recent experimental work points to the conclusion that conjunctions are categorically asymmetric (Mandelkern et al 2020), but disjunctions are symmetric with regard to projection (Kalomoiros & Schwarz 2021).

Limited Symmetry: A system that derives symmetry for disjunction but asymmetry for conjunction through a single mechanism is *Limited Symmetry* (Kalomoiros 2021). This is a parsing-based system which makes distinct predictions from constituent-based systems. Consider a language $\mathcal{L}$:

(1) $\phi := p_i \mid p'_j p_k \mid (not\ \phi) \mid (\phi\ and\ \phi) \mid (\phi\ or\ \phi) \mid (if\ \phi.\ \phi)$ ($i, j, k \in \mathbb{N}$; indices omitted below)

$p'p$ represents a statement that presupposes p' and asserts p; it is interpreted as conjunction: $w \models p'p$ iff $w \models p'$ and $w \models p$. There are two core ideas: **i)** sentences are parsed from left to right, symbol by symbol, against a context C. Hence $(p'p\ and\ q)$ is associated with a parsing list `[(,(p'p,(p'p and, (p'p and q, (p'p and q)]`. Note how this gives us access to non-constituent elements like `(p'p and`. At every parsing point t_i on this list, the parser attempts to compute the sets of worlds where the sentence is True or False for every possible continuation d ($\mathbb{T}$/$\mathbb{F}$). **ii)** We assume that for every $\mathcal{L}$-sentence S we have access to a [-presup] version of S, where all the primed bits have been removed; e.g. [-presup]($p'p$) = p. If at a parsing point t, $\mathbb{T}$/$\mathbb{F}$ can be computed, then the following presupposition constraint must be respected: Given a sentence S and parsing point t_i, all the worlds in $\mathbb{T}$/$\mathbb{F}$ at t_i must be worlds in the $\mathbb{T}$/$\mathbb{F}$ computed at the corresponding parsing point t'_i for [-presup](S). If this fails, it leads to infelicity. **This constraint is a subsethood condition amounting to the standard condition requiring presuppositions not to introduce new info**.

Negated Conjunction: Consider now a sentence of the form $(if\ ((not\ p'p)\ and\ q).\ r)$, where $q \models p'$. Assume a material implication semantics for conditionals. On a constituent-based approach that proceeds from left to right, presuppositions project from the negation, a first conjunct and the antecedent of a conditional, so such approaches predict projection, requiring the global context to entail the presupposition p'. Applying *Limited Symmetry*, we reason as follows: No $\mathbb{F}$ set of worlds can be computed before we have parsed the whole conditional. But at parsing point `(if (not p'p) and`, we already know that the entire conditional is True in all worlds $\mathbb{T} = \{w | p'(w) = 1\ and\ p(w) = 1\}$. The corresponding parsing point for the [-presup] version of this sentence is `(if(not p) and`. At this parsing point, $\mathbb{T} = \{w | p(w) = 1\}$. Thus, $\mathbb{T}_{[+presup]} \subseteq \mathbb{T}_{[-presup]}$, so the presupposition constraint is respected. The parse moves on. At parsing point `(if((not p'p) and q`, $\mathbb{T}_{[+presup]} = \{w | (p'(w) = 1\ and\ p(w) = 1)\ or\ q(w) = 0\} \subseteq \mathbb{T}_{[-presup]} = \{w | p(w) = 1\ or\ q(w) = 0\}$.

Again the presupposition constraint is respected. We omit the computation for the parsing step where the entire sentence is parsed (it's lengthy), but no violations of our constraint turn up. So, this is a case where *Limited Symmetry* predicts filtering of a presupposition, whereas mainstream approaches predict projection. Crucially, once the negation is gone (i.e. $(if\ (p'p\ and\ q.\ r))$, *Limited Symmetry* predicts projection (same as constituent approaches). To tease the two approaches apart, we designed an experiment contrasting $(if\ ((not\ p'p)\ and\ q).\ r)$ and $(if\ (p'p\ and\ q.\ r)$.

Design: We selected 6 triggers (*again, stop, continue, find out, happy, aware*), which we presented in the following two conditions: **i)** A negated conjunction inside the scope of a conditional (NegConj); **ii)** A non-negated conjunction inside the scope of a conditional (SimpleConj). Both of these conditions were presented in Support (S) and Explicit Ignorance (EI) contexts. Overall then, there were four conditions: {EI/S}NegConj, {EI/S}SimpleConj:

(2) **Contexts:** Sue likes to keep close tabs on her husband, Donald. One day I saw a ticket from the Berlin opera in Donald's office …
…I don't know whether Donald ever visited Germany, so I thought: (EI)
…I know that he visited Germany recently, so I thought: (S)

(3) If Sue didn't find out that Donald visited Germany and he visited Berlin, then that would be very strange. (NegConj)
If Sue found out that Donald visited Germany and he visited Berlin, then she must know about the opera ticket. (SimpleConj)

Predictions: *Limited Symmetry* predicts that negated conjunction conditionals should be equally felicitous in S and EI contexts, since the presupposition is supported by the context in the former case, and filtered in the latter case. Simple conjunctions should be less felicitous in an EI context than in a S context, since the projecting presupposition clashes with the EI context. Overall, an interaction is predicted: the difference in acceptability between EI vs S contexts (Context type) should be greater for SimpleConj compared to NegConj (Conjunction type). No such interaction is predicted by mainstream approaches: EISimpleConj and EINegConj should be equally degraded.

Participants & Procedure: 163 participants (all native English speakers) were recruited from our university's subject pool. Each participant saw three items (from three distinct triggers) in each condition in a Latin square design. There were also 12 fillers (24 items in total, randomised). Participants had to indicate on a 9-point scale how felicitous a sentence was in the given context.

Results: Our results are strikingly in line with the *Limited Symmetry* predictions (Fig 1). We tested for the relevant differences by fitting linear mixed-effects regressions. First, there is a significant difference between EISimpleConj and SSimpleConj ($p < 0.05$). At the same time, there is no significant difference between EINegConj and SNegConj. This leads to a significant interaction between Conjunction type and Context type: the difference in acceptability between EI and S contexts is significantly larger ($p < 0.05$) for SimpleConj.

Discussion: These results run counter to predictions of standard theories of projection. But a potential worry is that the felicity of EINegConj is due to special availability of a mechanism like local accommodation under negation. To control for this, we re-run the experiment, adding two local accommodation conditions (LocAcc): a conditional containing a negated presupposition in the antecedent, in an EI context vs an *S* context. Preliminary results (N = 172) show that the felicity difference is larger for LocAcc than for NegConj. This suggests that the felicity increase in EINegConj is not due to a local accommodation-like mechanism. Nevertheless, the re-run of the experiment replicates the interaction for Conjunction

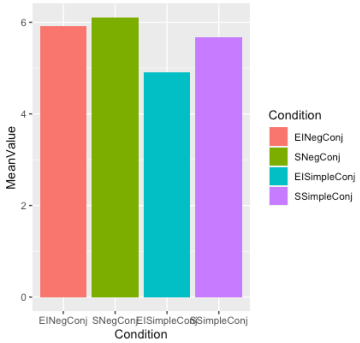

Figure 1: Mean acceptability

type vs Context type only for a subclass of triggers (more details in the presentation). This creates further questions, but reinforces the idea that at least some triggers behave as *Limited Symmetry* predicts.

Selected Ref: Deriving the (a)-symmetries of presupposition projection. Forthcoming in NELS 52.