Versatile presuppositions in counterfactual conditionals[1]

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May 25, 2023

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[1] I wanted to thank Kai von Fintel who helped and encouraged me regarding that project. It is still far from perfect and I think I have to get more familiar with the (huge) literature on that topic. Anyway, all mistakes or imprecisions are mine.

The puzzle

O-marked and X-marked conditionals

(1) a. If it **is** raining outside, then Sally **is** inside.

b. If **was** raining outside, then Sally **would be** inside.

- **Semantically**, (1a) and (1b) seem to convey different meanings: (1a) talks about the actual world while (1b) seems to talk about (more or less plausible) possible worlds.
- **Morphosyntactically**, (1a) uses the present indicative while (1b) uses the simple past and an extra modal auxiliary in the consequent (*woll*) [Iatridou, 2000].
- Following [von Fintel and Iatridou, 2023] we call this *morphosyntactic* marking O-marking in the case of (1a) and X-marking in the case of (1b).
- Other languages may use other strategies to X-mark, among which special tense, mood, aspect, or special independent markers.

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The counterfactual inference

(1b) If **was** raining outside, then Sally **would be** inside.

- Roughly, (1b) implies that the closest possible worlds in which it is raining outside are such that Sally is inside.
- But it also conveys something more, namely that it is actually not raining outside. Some evidence that this is not part of the core meaning of (1b):

(2) a. It's not the case that if it was raining outside, Sally would be inside.
$\rightsquigarrow$ Not raining.

b. Perhaps if it was raining outside, then Sally would be inside.
$\rightsquigarrow$ Not raining.

c. Is it true that if it was raining outside, then Sally would be inside?
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d. (1b) –Hey, wait a minute! I did not know it wasn't raining outside!

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The nature of the CI

- The tests in (2) suggest that the CI is a presupposition. But why would X-marking (whose realization is variable across languages) be the trigger for such an inference? What is the role of the competing O-marked conditional?Also, why does the CI disappear in sentences like (3) – dubbed Anderson Conditionals [Anderson, 1951]?

(3) If Jones had taken arsenic, he would have shown the same symptoms he is actually showing.

- In this talk, we want to better understand the source of the CI, by relating the use of X-marked conditionals to the QUD:
  - We show that the inference pattern of a conditional depends on *how* it answers a given QUD.
  - We relate this observation to a constraint stated by Heim about the use of presuppositions in answers to questions.
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What kind of questions can X-marked conditionals answer?

- A conditional *If P then Q* can answer differ kinds of questions:
  - Is "If P then Q" true?
  - Under what conditions is Q true?
  - Is Q true?
  - Is P true?
- In this talk, we focus on the last three possibilities (but somewhat conflate the second and third). For instance, we assume that (1b), repeated below, can answer the QUDs in (4) and (5).

(1b) If **was** raining outside, then Sally **would be** inside.

(4) Is it raining outside?

(5) Is Sally inside? (More generally: what about Sally?)

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Given a QUD, what is the conveyed answer?

(6) QUD: Is it raining outside?
If **was** raining outside, then Sally **would be** inside.
Conveyed answer: It is not raining outside, *because Sally is not inside*.

(7) QUD: What about Sally?
If **was** raining outside, then Sally **would be** inside.
Conveyed answer (weak): Sally would be inside if it was raining but it's not, draw your own conclusions.
Conveyed answer (strong): Sally is not inside.

- How exactly is the answer to the QUD conveyed in each case?

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Given a QUD, how do presuppositions pattern?

- We saw before that the CI patterns like a presupposition. What happens if we precisely control the QUD?

(6) A: Is it raining outside?
B: If **was** raining outside, then Sally **would be** inside.
C: Hey wait a minute! I did not know it wasn't raining outside! ✗
C: Hey wait a minute! I did not know Sally wasn't inside! ✓

(7) A: What about Sally?
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The problem with CIs answering the QUD

- The previous pattern makes sense, given the following constraint (Heim, lecture notes, 2015):

Heim's constraint on answering the QUD

Questions cannot be answered by an accommodated presupposition.

- The following example is taken from [Aravind et al., 2022] to illustrate this point in the general case:

(8) *Context: A is visiting a dog shelter and is particularly interested in adopting a Labrador.*
A: Can I adopt the Labrador?

a. B: Someone from NY just adopted the Lab.
No presupposition.

b. # B: It is someone from NY who just adopted the Lab.
⇝ Someone adopted the Labrador.

- But it also means that if the QUD targets the antecedent of an X-marked conditional, the answer should not be conveyed by the CI!
- How do we derive the answer without directly presupposing it?

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Overview of the analysis

- We want to argue that the CI is "versatile" in that it can target either the antecedent of the consequent of the X-marked conditional, depending on the QUD:
  - If the QUD targets the consequent, then the CI targets the antecedent (as previously assumed).
  - If the QUD targets the antecedent, then the CI is derived from the consequent (novelty).
- The proper answer to the QUD is derived *via* reasoning:
  - If the QUD was targeting the consequent, the answer is either conditionalized or presented as a strengthened ("perfected") *modus ponens* argument.
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Some background

The CI as a special kind of Presupposed Implicature

- The nature of the CI is actually debated:
  - **Implicature** [Iatridou, 2000, Ippolito, 2003] : supported by the fact that it can be cancelled and reinforced in specific contexts: cf. the Anderson case (3) but also (9) below:

(9) From [Iatridou, 2000], building on [Stalnaker, 1975]:
If the butler **had done** it, we would have found blood on the kitchen knife. The knife was clean; therefore, **the butler did not do it**.

  - **Presupposition** [von Fintel, 1998, Karawani, 2014] : supported by the classic projection tests and the *Hey, wait a minute!* test.
  - **Anti-presupposition** ([Leahy, 2011, Leahy, 2018], building on [Heim, 1991, Sauerland, 2003, Percus and Ueyama, 2006] a.o.): may allow to account for the mixed behavior of the CI.
- Here we want to suggest that the CI is instead a **Presupposed Implicature** [Bassi et al., 2021],[1] **but derived from the *presupposition* of the competing O-marked conditional**.

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(9) From [Iatridou, 2000], building on [Stalnaker, 1975]:
If the butler **had done** it, we would have found blood on the kitchen knife. The knife was clean; therefore, **the butler did not do it**.

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The CI as a special kind of Presupposed Implicature

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A typology of implicatures

- We want to assume that the CI is similar to a Presupposed Implicature in that it puts its inferences in the background of the conversation...
- But that the source of the implicature (the competing meaning) is also presuppositional, making the CI close to an Anti-presupposition.

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Presupposed Implicatures [Bassi et al., 2021]

- A Presupposed Implicature (computed *via* the operator PEx), is just like an implicature computed *via* Exh [Fox, 2007, Chierchia et al., 2012], except that the extra inferences it creates are treated as non-at-issue.
- If A denotes a (precomputed) set of excludable alternatives:

Exh vs. PEx

$$\mathrm{Exh}(p, A) = \begin{bmatrix} \text{Presup. :} & \\ \text{At-issue :} & p \wedge \neg A \end{bmatrix} \qquad \mathrm{PEx}(p, A) = \begin{bmatrix} \text{Presup. :} & \neg A \\ \text{At-issue :} & p \end{bmatrix}$$

- In conditionals, **we assume the implicature resides in the comparison between X-marking and O-marking**.
- PEx inherits the ability to be inserted locally; this, plus the fact that both clauses of an X-marked conditional are X-marked, implies that **both the antecedent and the consequent can be PExed**.

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Anti-presuppositions [Sauerland, 2003, Sauerland et al., 2005, Percus and Ueyama, 2006]

- Anti-presuppositions are *implicatures* derived from the presupposition of a competing utterance, and based on the principle *Maximize Presupposition!* [Heim, 1991]

Maximize Presupposition!

If Φ and Ψ are contextually equivalent alternatives, and the presuppositions of Φ are stronger than those of Ψ and are met in the context of utterance c, then one must use Φ.

- Based on that principle, we can derive the negation of the presupposition of any salient competitor, based on the fact that the competitor was not used: that is an anti-presupposition.

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"Cling" an X-marked clause

- We assume an X-marked clause competes with its O-marked counterpart, and that **the latter presupposes that the proposition denoted by the clause is epistemically possible** [Leahy, 2011]:

$$\text{ALT}(X(P)) = \{X(P), O(P)\} = \left\{ \begin{bmatrix} \text{Presup.} : \\ \text{At-issue} : \lambda w.\ p(w) \end{bmatrix}, \begin{bmatrix} \text{Presup.} : \Diamond_{\mathcal{E}} P \\ \text{At-issue} : \lambda w.\ p(w) \end{bmatrix} \right\}$$

- CIing an X-marked proposition then leads to the local inference:

$$\text{CI}(X(P), \text{ALT}(X(P))) = \begin{bmatrix} \text{Presup.} & : \neg\Diamond_{\mathcal{E}} P \\ \text{At-issue} & : \lambda w.\ p(w) \end{bmatrix}$$

- This clause can then serve as the argument of a modal operator to form the whole conditional (we assume the presupposition projects):

$$M(X(P), X(Q)) = M\left(\begin{bmatrix} \text{Presup.} & : \neg\Diamond_{\mathcal{E}} P \\ \text{At-issue} & : \lambda w.\ p(w) \end{bmatrix}, \begin{bmatrix} \text{Presup.} & : \\ \text{At-issue} & : \lambda w.\ q(w) \end{bmatrix} \right)$$

$$= \begin{bmatrix} \text{Presup.} & : \neg\Diamond_{\mathcal{E}} P \\ \text{At-issue} & : \forall w \in \mathcal{R}(w_0) : p(w).\ q(w) \end{bmatrix}$$

Analysis

Antecedent-related QUD, consequent-related CI

- Let us take for granted that CIs pertaining to the QUD are not derived.

(6) A: Is it raining outside?
B: If **was** raining outside, then Sally **would be** inside.

$$\mathrm{CI}(X(\text{inside}), \mathrm{ALT}(X(\text{inside}))) = \begin{bmatrix} \text{P} : \neg\Diamond_{\mathcal{E}}\text{inside} \\ \text{A-I} : \lambda w.\ \text{inside}(w) \end{bmatrix}$$

$$M(CI(X(\text{rain})), X(\text{inside})) = M\left(\begin{bmatrix} \text{P} : \\ \text{A-I} : \lambda w.\ \text{rain}(w) \end{bmatrix}, \begin{bmatrix} \text{P} : \neg\Diamond_{\mathcal{E}}\text{inside} \\ \text{A-I} : \lambda w.\ \text{inside}(w) \end{bmatrix}\right)$$

$$= \begin{bmatrix} \text{P} : \neg\Diamond_{\mathcal{E}}\text{inside} \\ \text{A-I} : \forall w \in \mathcal{R}(w_0) : \text{rain}(w).\ \text{inside}(w) \end{bmatrix}$$

- The presupposition states that no plausible world is s.t. Sally is inside; since plausible worlds form a subset of $\mathcal{R}(w_0)$, the at-issue content leads to conclude that no plausible world is a raining world.
- Crucially, this fact is obtained *via* reasoning (*modus tollens*), it is not a presupposition.

Consequent-related QUD, antecedent-related CI

(7) A: What about Sally?
B: If **was** raining outside, then Sally **would be** inside.

$$\mathrm{CI}(X(\text{rain}), \mathrm{ALT}(X(\text{rain}))) = \begin{bmatrix} \text{P} : \neg\Diamond_{\mathcal{E}}\text{rain} \\ \text{A-I} : \lambda w.\ \text{rain}(w) \end{bmatrix}$$

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- In that case, the answer to the QUD is less clear:
  - Strictly speaking, the answer is *conditional*: it's not raining outside, but if it was, then for sure Sally would be inside.
  - However, if we consider conditional perfection (strengthening to a biconditional see e.g. [Cariani and Rips,]), we can conclude that Sally is not inside.

Discussion

Back to Heim's constraint

- Recall Heim's constraint prevents questions from being answered *via* accommodated presuppositions.
- What happens to CIs targeting the QUD-answering clause of the conditional? For now, we have just assumed they were not derived... but if they were, they would lead X-marked conditionals to be as odd as (8b).
- We think the solution may come from the fact that **the computation of CIs is only sensitive to *relevant* alternatives...**

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Using Heim's constraint against Heim's constraint

- Let us consider the clause C (e.g. *if it was raining*) which pertains to the QUD (e.g. *is it raining?*) within an X-marked conditional. We want the CI derived form this clause to be blocked.
- Let us consider the O-marked alternative to this clause (e.g. *if it is raining*); **because the O-marked competitor brings an answer to the QUD as a presupposition ($\Diamond_{\mathcal{E}}$rain), it also violates Heim's constraint**!
- We think this might be a legit reason for **not considering this O-marked competitor when attempting to compute a CI on the X-marked counterpart**.
- This captures why the CI is not derived in the clause pertaining to the QUD, and why X-marked conditionals do *not* violate Heim's constraint.
- Under this line of analysis, **it's crucial that the O-marked competitor carries a *presupposition***, and that the CI operates on those.

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The case of Anderson Conditionals

- Let us now go back to one of our original puzzles: Anderson Conditionals

(3) If Jones had taken arsenic, he would have shown the same symptoms he is actually showing.

- What kind of question can such a conditional answer?
  - It can definitely answer a question like *What did Jones take?*
  - But it can definitely not answer a question like *what kind of symptoms do Jones have?*, because the consequent already implies (*via* a relative) that the symptoms are known.
- Granted that the QUD is addressed by the antecedent, we predict that the CI should be derived in the consequent.
  - So let us consider the O-marked alternative to check if it is relevant: *Jones shows the same symptoms he is actually showing*. This is definitely redundant.[2]
  - As a result, no CI is derived and the inference that Jones did not take arsenic cannot be derived!

[2] This observation is not new; it was already used (though within a broader context) by [Leahy, 2011].

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- We modeled the CI using a variant of PEx **operating on the presuppositional content instead of the at-issue content** of the competing expression.
- This further suggests that implicatures and presuppositions are not parallel kinds of inferences, but rather that **implicatures are an overarching reasoning process whose inputs *and* outputs can be presuppositional**.
- A weakness of the analysis might be that the answer to the QUD, if not directly presupposed, it still derived *via* indirect reasoning. **Why should this be ok, and not presupposition?**
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- A weakness of the analysis might be that the answer to the QUD, if not directly presupposed, it still derived *via* indirect reasoning. **Why should this be ok, and not presupposition?**
- For future work: what about desire attitudes and weak necessity modals, which exhibit the same kind of X-marking as conditionals?

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Thank you !

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