Towards an explanatory account of conditional perfection

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March 14, 2014

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- Inferred causation
  a. After a large meal, we slept soundly.
  b. $\rightsquigarrow$ As a result of having had a large meal, we slept soundly.

Conditional perfection

Conditional perfection is associated with a "tendency to 'perfect conditionals to biconditionals'" (attr. to L. Karttunen):

Example (1)

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(1)a is claimed to imply the truth of (1)b and thus to give rise to the "perfected" (1)c, when utterance and implication are taken together.

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- Perfection seems to be a "good move" in practical or conversational reasoning (although not formally) – so it's something like a "linguistically available" pattern of reasoning
- It's related to both the "logical form" of the utterance (a conditional) as well as to its illocutionary force

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Unfortunately, there is no stated consensus on what the right contextual factors are, and there is also more active disagreement on *how* the inference is actually derived (more later).

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Central claim: Statements of the form "if p, q" are interpreted as biconditional when the can be understood as asserted in response to a polar (yes/no) question on their consequent.

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- Where and why do the theoretical accounts disagree?
- "Integration" of the accounts is needed; Groenendijk & Stokhof's exhaustive interpretation provides the necessary link
- Conclusions: a new (clearer?) way of looking at GCIs and "default" or conventionalized implicatures

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Mostly predictive conditionals are perfectible: promises, threats, warnings, recommendations, (some) commands, and some counterfactuals.

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Recommendations

(5) If you want to save energy, turn off the computer when you're not using it. [van Canegem-Ardijns & van Belle 2008]

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- But again:
  - A: Isn't this cactus an *Astrophytum*?
  - B: If this cactus grows native to Idaho, then it's not an *Astrophytum*.

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- The inference must be "relevant":
  - A: What will you give me for mowing the lawn?
  - B: If you mow the lawn, I'll give you five dollars.
- The inference is also defeasible:
  - A: Did the plane arrive early?
  - B: If Mary is in the lobby, the plane must have arrived early. But I don't know otherwise.

Theoretical approach: GCI theory

GCIs are "default" implicatures, which "capture our intuitions about preferred or normal interpretations." Levinson 2000 bases them on three broad "heuristics" for communicative behavior:

- Q-principle: communicate as much information as possible (with respect to situational need)
- I-principle: do not communicate extraneous or unnecessary information
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Conditional perfection seems to meet the criteria: but should it be treated as a Q- or an I-implicature?

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So, the hearer will always select biconditionality (when it is available).

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BUT: where does the availability of the biconditional interpretation come from in the first place? Why is (1) interpretable as a biconditional at all?

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b. **Some** of the guests are leaving.
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Naively, the Horn scale for conditionals would be $\{\text{IFF} > \text{IF}\}$. But this would derive exactly the wrong inference!

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Atlas & Levinson (1981), Matsumoto (1995) and others provide various arguments that this cannot be a Horn scale for conditionals.

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- Horn 2000, von Fintel 2001:

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Central problem:
Perfection as an I-implicature fails to be explanatory, but perfection as a Q-implicature is too weak. We need both!

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- (This intuition is repeated all over the literature . . . but)

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Exhaustive interpretation is modeled as a formal operation on a question-predicate R and a term (subsentential) answer F:

$$\text{exh} = \lambda F.\lambda R[F(R) \wedge \neg\exists R' : [F(R') \wedge R \neq R' \wedge \forall x[R'(x) \rightarrow R(x)]]]$$

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- R = "in-the-garden", F = "Mary"
- *Mary* is a member of the set picked out by "in-the-garden"
- There is no proper subset of "in-the-garden" containing Mary
- "in-the-garden" is a singleton set; Mary is the only person in the garden (applying *exh* is like applying "only")

Exhaustive interpretation and perfection

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(10) A: Does John walk? $R = \text{walk}(j)$
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- If $\text{walk}(m) = 0$, $\text{walk}(j)$ could be 0 or 1. But if $\text{walk}(j) = 1$, then any $S' = 0$ will satisfy the second conjunct since $0 \neq 1$ and $0 \rightarrow 1$.
- *exh* demands that when "Mary walks" is true, so is "John walks," and when "Mary walks" is false, so is "John walks."

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Von Fintel wanted to apply exhaustivity to the following exchange:

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In Groenendijk & Stokhof's example, however, A asks a yes or no question about q and is (somewhat unexpectedly) given a conditional in response. The calculation on the previous slide shows that biconditionality is a result of seeking yes/no exhaustivity on a conditional.

(12) A: Will Robin come to the party?
B: If there is vegetarian food.

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- The biconditional is therefore made "relevant"
- The speaker can cancel the inference (by rejecting the assumption that she has complete information)

Exhaustivity captures all of these.

Some further examples

(13) A: Will John be replaced?
B: If he quits, he'll be replaced.

(14) A: Are you going to kill me?
B: If you don't give me your wallet, I'll kill you.

(15) A: Should I give my cat Petboost?
B: If you love your cat, you should give him Petboost.

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Similarly, if one simply wants a means of achieving the consequent:

(17) A: How can I get Robin to come to the party?/
B: If there's vegetarian food, he'll come.

Non-perfectible conditionals again

Epistemic conditionals are usually about providing the reasoning from premise to conclusion, not about whether or not the consequent is true:

(18) A: Mary just called from the lobby.
B: If she's in the lobby, the plane must have arrived early.

Non-perfectible conditionals again

Epistemic conditionals are usually about providing the reasoning from premise to conclusion, not about whether or not the consequent is true:

(18) A: Mary just called from the lobby.
B: If she's in the lobby, the plane must have arrived early.

Speech act conditionals are about grounding the offer/act:

(19) A: I haven't eaten since lunchtime.
B: If you're hungry, there are biscuits in the cupboard.

It's precisely when we suspend these "normal" uses in order to answer a polar question on q that we get perfected readings.

Updating our conditional semantics

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Given a context C, and an accessibility relation S:

$$\text{If } P, Q := \forall[W^{C,S} \cap P][Q]$$

where $W^{C,S}$ is the set of worlds most S-accessible in C

This is essentially the Lewis-Kratzer conditional; it only applies to "bare" conditionals. The accessibility relation can vary according to conditional type.

Updating exhaustivity

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- A model (possible world) v is more minimal than w with respect to a predicate P just in case the set picked out by P in v is a proper subset of the set picked out by P in w.
- Dynamically: let's call a world w an information state, and let $w[\phi]$ be the set of information states that a proposition ϕ maps w to. This context update allows us to accommodate the selection of an appropriate accessibility relation.

Updating exhaustivity

For a question-predicate R, and a term-answer F in state W:

$$\text{exh}^W(F, R) := \{i \in W[F(R)] | \neg\exists i' \in W[F(R)] : i' <_R i\}$$

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- So, if w has P, it also has Q, and is minimal. There can be no $v <_Q w$ any such v must also have P, and therefore Q by selection, so $v = w$
- If w does not have P, it cannot have Q either. If it did, we could find $v <_Q w$ by choosing v to have neither P nor Q, and w would not be minimal.

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This is a different way of looking at default implicatures than standard GCI theory; exhaustivity manages the "conflict" between Q and I. The idea is that default inferences are about interpreting conversational contributions as meeting the contextually-developed discursive needs – that is, about finding informational equilibria, rather than acting on heuristics.

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- Instead of lumping GCIs together via the heuristics, it may be possible to classify them according to models (like circumscription) of common-sense reasoning patterns
- Defaults need not be automatic in Levinson's sense; they can incur cost (Noveck, et al 2011)

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- . . . and develop an account of conventionalized inferences based on (natural) reasoning strategies?
- What other practical reasoning principles might guide default interpretations?

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