

Conditionals: between language and reasoning

Class 14: some ideas for the final essay

February 16, 2018

Puzzles around CEM

$$(CEM) \quad (A > C) \vee (A > \neg C)$$

We saw in class 5 that there are good arguments in favor of CEM, having to do with counterfactuals under negation and with scope.

For instance, CEM entails that $\neg(A > C) \models A > \neg C$, which explains why, intuitively, (1) seem to entail (2)

- (1) I doubt that if Hiro had come we would have solved the puzzle.
 $B\neg(H > P)$
- (2) I believe that if Hiro had come we would not have solved the puzzle.
 $B(H > \neg P)$

However, validating CEM poses a number of challenges.

Topic 1: CEM and hypothetical contexts

- ▶ In the last part of the course we saw a number of approaches which describe explicitly how to generate a hypothetical context $f(w, \varphi)$
- ▶ A counterfactual $\varphi > \psi$ is true if ψ is true in all worlds in $f(w, \varphi)$.
- ▶ These approaches do not validate CEM.
- ▶ Can we modify these approaches so as to get CEM without spoiling their attractive features?
- ▶ An option is to invoke a homogeneity presupposition:
is this option empirically adequate? What are its repercussions?

References

- ▶ von Stechow (1997). Bare plurals, bare conditionals, and *only*.
- ▶ von Stechow and Iatridou (2002). If and When If-Clauses Can Restrict Quantifiers.
- ▶ Schlenker (2004). Conditionals and definite descriptions.
- ▶ Santorio (2017). Conditional Excluded Middle in Informational Semantics.
- ▶ Santorio (2018). Alternatives and Truthmakers in Conditional Semantics.

Topic 2: CEM and modal contradictions

- ▶ Instances of $(A > \neg C) \wedge (A > \diamond C)$ sound contradictory:

(3) ??If Hiro had come, we would not have solved the puzzle;
but if he had come we might have solve the puzzle.

- ▶ This supports the following principle:

$$(IMC) \quad (A > \neg C) \wedge (A > \diamond C) \models \perp$$

- ▶ However, given a classical consequence relation, CEM and IMC jointly imply modal collapse:

$$A > \diamond C \equiv A > C$$

- ▶ How can we get out of this problem?

References

- ▶ Santorio (2017). Conditional Excluded Middle in Informational Semantics.

Topic 3: CEM and *only*

- (4) a. John goes out only if it is sunny.
b. \rightsquigarrow If John goes out, it is sunny.
- (5) a. John would have gone out only if it had been sunny.
b. $\overset{??}{\rightsquigarrow}$ If John had gone out, it would have been sunny.

- ▶ How can we predict the inference from (4-a) to (4-b) based on the meanings of conditionals and the meaning of *only*?
- ▶ How about the inference from (5-a) to (5-b)?
What accounts for the difference with the indicative case?

References

- ▶ von Stechow (1997). Bare plurals, bare conditionals, and *only*.

Counterfactuals in discourse

As we saw in Class 9, counterfactuals are sensitive to the possibilities that are brought up not just by the antecedent, but also by the preceding discourse.

For instance:

- (6) If the US threw its nuclear weapons into the sea tomorrow, there would be war. But if all nuclear powers threw their nuclear weapons into the sea, there would be peace.
- (7) #If all nuclear powers threw their nuclear weapons into the sea tomorrow, there would be peace. But if the US threw its nuclear weapons into the sea, there would be war.

We saw how von Stechow implemented a dynamic version of minimal change semantics that accounts for these observations.

Topic: dynamifying causal theories

Can we implement a dynamic version of the approaches that we saw in the second part of the course so as to account for von Fintel's observations, and the order effects observed in CZC's two switches paper, while retaining the benefits of causal-model-based theories?

References:

- ▶ von Fintel (2001). Counterfactuals in a dynamic context.
- ▶ Lin (2017). Eliminating similarity in dynamic approaches to counterfactuals. NYU manuscript.

Counterfactuals and probabilities

- ▶ Imagine we have an urn with black and white marbles. I draw black.

(8) If I had drawn a different marble, I'd probably have drawn white.

- ▶ How can we interpret probabilistic conditionals like (8)?
- ▶ What exactly are the probabilities that are at stake here?
(notice that the relevant events are known to be false)
- ▶ What about plain counterfactuals like (9):

(9) If I had drawn a different marble, I would have drawn white.

- ▶ Here, the consequent is not entailed by the hypothetical context:
is the counterfactual false? Does it lack a truth-value?
- ▶ Are these options compatible with (9) having high probability?
- ▶ Or, rather, do counterfactuals only have probabilities and no truth-values?

- ▶ If counterfactuals have no truth-values, how can we make sense of statements involving quantifiers, like (10)?

(10) Nobody would have passed the exam if they had goofed off.

- ▶ Normally, a quantifier like *nobody* is taken to operate on a property $P(x)$.
- ▶ But if counterfactuals don't have truth-values, how do we get a property out of "x would have passed the exam if x had goofed off"?

References:

- ▶ Lassiter (2017). Complex antecedents and probabilities in causal counterfactuals.
- ▶ Leitgeb (2012). A probabilistic semantics for counterfactuals (two parts).

Causal modeling semantics and arbitrary antecedents

As we saw, causal model semantics offers a simple and powerful framework to interpret counterfactuals and make natural truth-value predictions.

In its original version, this framework is limited to special antecedents, but various proposals have been put forward to extend this to arbitrary antecedents.

Topic 1: comparison

- ▶ How do these proposals relate to each other?
- ▶ What are the key theoretical differences?
- ▶ Where do they make different empirical predictions?

Topic 2: logical investigation

- ▶ What is the conditional logic that arises from (one of) these approaches?
- ▶ How does it differ from the logic of minimal change semantics?
- ▶ How do these differences bear on the empirical adequacy of these theories?

Task 3: extension

- ▶ The semantics of Briggs can deal only with propositional operators. Can it be extended to deal with quantifiers?
- ▶ Can background semantics be adapted to account for Briggs's counterexample to counterfactual modus ponens?

References:

- ▶ Causal approaches:
 - ▶ CZC (2018). Two switches in the theory of counterfactuals.
 - ▶ Briggs (2012). Interventionist counterfactuals.
 - ▶ Schulz (2011). If you had wiggled A, B would have changed.
 - ▶ Kaufmann (2013). Causal premise semantics.
 - ▶ Santorio (2018). Interventions in premise semantics.
- ▶ Conditional logic:
 - ▶ Krauss, Lehmann and Magidor (1990). Nonmonotonic Reasoning, Preferential Models and Cumulative Logics.

Epistemic/backtracking counterfactuals

Normally, counterfactuals are forward-looking: the consequent concerns variables which are causally downstream from those manipulated by the assumption.

(11) If switch A was down, the light would be off.

But this is not always the case, especially in the presence of epistemic marking.

(12) If the light was off, then either switch A or switch B would be down.

(13) If the light was off, that would mean that either switch A or switch B is down.

Notice in some cases the epistemic marking is necessary.

Context: candidate walking out of a job interview, looking sad.

(14) ??If he had come out smiling, the interview would have gone well.

(15) If he had come out smiling, that would have meant that the interview went well.

Topic 1: epistemic readings

The true readings of such counterfactuals seem epistemic rather than causal. How should we account for them? What is the role of the *mean that* construction?

It is also claimed that counterfactuals can allow for an interpretation which first “backtracks” from the assumption to its plausible causes, and then infers the effects of those causes. This is called a backtracking interpretation.

An example from Downing via Lewis (1979):

- ▶ Jim and Jack quarreled yesterday, and Jack is still hopping mad.
- ▶ We conclude that if Jim asked Jack for help today, Jack would not help.
- ▶ But wait: Jim is a prideful fellow. He never would ask for help after such a quarrel;
- ▶ if Jim were to ask Jack for help today, there would have to have been no quarrel yesterday.
- ▶ In that case Jack would be his usual generous self.
- ▶ So if Jim asked Jack for help today, Jack would help him after all.

But notice that backtracking interpretation are often implausible.

Context: today.

- (16) What if I had gone to the beach today? Well, I only go to the beach when it is sunny and warm. So if I had gone to the beach, that would mean that today it was sunny and warm. So, if I had gone to the beach today, I would have gotten a suntan.

Topic 2: backtracking readings

When/to what extent are backtracking interpretations available?

To the extent that they are, how should they be modeled?

References

- ▶ Rips & Edwards (2013). Inference and Explanation in Counterfactual Reasoning.
- ▶ Dehghani, Iliev & Kaufmann (2012). Causal explanation and fact mutability in counterfactual reasoning.
- ▶ Gerstenberg, Bechlivanidis & Lagnado (2013). Back on track: Backtracking in counterfactual reasoning.
- ▶ Khoo (2016). Backtracking Counterfactuals Revisited.

Counterfactuals and semantic alternatives

As we saw in the course, various authors have proposed that some antecedents, e.g. disjunctive antecedents, introduce multiple counterfactual assumptions.

Topic: comparison

- ▶ What is the source of these multiple possibilities?
Is it grammatical, as in inquisitive semantics, or ontological, as in truth-maker semantics, or lexical, as in Santorio (2018)?
- ▶ For instance, the following inference is predicted to be valid in truth-maker semantics and Santorio's approach, but not in inquisitive semantics.

- (17) a. If you had come last week we could have gone out for dinner.
b. So, if you had come last Tuesday we could have gone out for dinner.

Topic: what is inquisitive?

- ▶ Besides disjunction and questions, what gives rise to inquisitiveness?
Do indefinites like **some**, **any**, **a**, **two**?

References

- ▶ van Rooij (2006), Free choice counterfactual donkeys.
- ▶ Alonso-Ovalle (2009). Counterfactuals, correlatives, and disjunction.
- ▶ Fine (2012). Counterfactuals without possible worlds.
- ▶ Ciardelli (2016). Lifting conditionals to inquisitive semantics.
- ▶ Santorio (2018). Alternatives and truthmakers in conditional semantics.

Even if

In conditional antecedents it is often natural to use the particle **even**:

(18) Even if rifleman A had not fired, the prisoner would have died.

Of course, **even** can be used in many other contexts as well:

(19) Even Alice liked the movie.

Topic: **even** in conditionals

What is the role of **even** in conditional antecedents?

Can we predict its effect based on a general account of the meaning of **even**?

References:

- ▶ General literature on *even*:
 - ▶ Horn (1969). A presuppositional analysis of *only* and *even*.
 - ▶ Karttunen & Peters (1979). Conventional implicature.
 - ▶ Greenberg (2016). A novel problem for the likelihood-based semantics of *even*.
- ▶ Literature on *even if*:
 - ▶ Bennett (1982). *Even if*.
 - ▶ Lycan (1991). *Even* and *Even if*.
 - ▶ Moreno-Rios et. al. (2018). Inferences from semifactual 'even if' conditionals