conditional sentences

and

causal reasoning

seminar 1: 3 challenges for the new framework

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Course Plan

**Conditional Sentences and Causal Reasoning**

**Lecture 1:** The logic of conditionals: The standard view

**Tutorial 1:** Challenges for the similarity approach

**Lecture 2:** Bayes Nets and Causal Bayes Nets

**Tutorial 2:** Counterfactuals as Interventions

**Seminar 1 (Practicum, part 1):** 3 challenges for the framework
(I will first introduce the challenges individually, then you can choose and work in groups on one of them for 40 minutes)

**Seminar 2:** The relation between the similarity approach and the causal approach

**Seminar 3:** Using Logic Programming to model causal inferences

**Seminar 4 (Practicum, part 2):** presentations and discussion
(each group will shortly present their ideas, we will discuss them and I will comment on the state of the arts on each of the challenges)
3 challenges

Plan today

- indicative vs. subjunctive conditionals
- a linguistic challenge: fake tense
- Simpson’s paradox

GROUP WORK

Last session tomorrow

- discuss your thoughts
- “the state of arts”
indicative vs. subjunctive
indicative vs. subjunctive conditionals

(6) If Peter left in time, he will be in Amsterdam this evening.
(7) If Peter left in time, he would be in Amsterdam this evening.
(8) If Peter had left in time, he would have been in Amsterdam this evening.
indicative vs. subjunctive conditionals

(6) If Peter left in time, he will be in Amsterdam this evening.  ➡ indicative conditional

(7) If Peter left in time, he would be in Amsterdam this evening.  ➡ simple past subjunctive

(8) If Peter had left in time, he would have been in Amsterdam this evening.  ➡ double past subjunctive
Adam’s (1975) Kennedy example

(1) If Oswald had not killed Kennedy, then someone else would have.

(2) If Oswald did not kill Kennedy, then someone else did.
“Therefore there really are two different sorts of conditional; not a single conditional that can appear as indicative or as counterfactual depending on the speaker's opinion about the truth of the antecedent.”

–David Lewis
“Some philosophers believe that the only difference between indicatives and counterfactuals is that each is used in different circumstances. At the level of semantics, both express the same `connection' between the antecedent and the consequent. It would seem that anyone subscribing to this position is committed to the following:
An agent who is ignorant about the truth value of \( A \), but entitled to entertain the indicative conditional

\[ \text{If } A; \ C, \]

will later, after learning that \( A \) is in fact false, be entitled to entertain the counterfactual

\[ \text{If } A \text{ had been the case, } C \text{ would have been the case.} \]

–Frank Veltman
Veltman’s (2005) duchess example

The duchess has been murdered, and you are supposed to find the murderer. At some point only the butler and the gardener are left as suspects. At this point you believe

(2) If the butler did not kill her, the gardener did.

Still, somewhat later after you found out convincing evidence showing that the butler did it, and that the gardener had nothing to do with it you get in a state, in which you will reject the sentence

(3) If the butler had not killed her, the gardener would have.
“How can you get from a state in which you believe

(12) If the butler did not kill her, somebody else did.

to a state in which you believe

(13) If the butler had not killed her, she would still be alive.

rather than

(14) If the butler had not killed her, somebody else would have done it.”

—Frank Veltman
“Revising ones beliefs by $A$ is not making the counterfactual assumption if $A$ had been the case.

When you believe that $A$ is true and you try to imagine what would have been the case if $A$ had been false, you have to change your cognitive state, but it is not the kind of change you would have to make if you were to discover that $A$ is in fact false. It is not a correction.”

—Frank Veltman
The Challenge:
Should we go for a uniform analysis of conditionals or propose two different operators?
In either case, how would the resulting analysis deal with the Kennedy example?
Can you model both readings using Pearl’s approach to conditionals?
a linguistic challenge: Fake Tense
tense
Simple Past  (Kamp & Reyle)

(1) I turned off the stove.

presupposition: \( t < u \).

assertion: I turned off the stove at \( t \) in \( w_0 \).
Present Perfect (Iatridou et al. 2002)

(2) I have visited Cape Cod three times since 1990.

There is a time span $t$
- the right boundary of $t$ is $u$
- the left boundary is (some time in) 1990
- there are three visits to Cape Cod in $t$ at $w_0$
Past Perfect (Iatridou et al. 2002)

(3) When we met, I had visited Cape Cod two times.

presupposition: \( t' < u \).

There is a time span \( t \)
- the right boundary of \( t \) is \( t' \)
- there are two visits to Cape Cod in \( t \) at \( w_0 \)
tense

• **Simple Past**: reference to past events
• **Present Perfect**: locating something in the past relative to the utterance time
• **Past Perfect**: double past shift; locating something in the past of some given past time
fake tense
Fake Tense

In English subjunctive conditionals the Simple Past, and also the Past Perfect appear not to be interpreted as semantic past tense or past perfect.

(6) If Peter left in time, he will be in Amsterdam this evening.  ➡️ indicative conditional
(7) If Peter left in time, he would be in Amsterdam this evening.  ➡️ simple past subjunctive
(8) If Peter had left in time, he would have been in Amsterdam this evening.  ➡️ double past subjunctive
Fake Tense
In English subjunctive conditionals the Simple Past, and also the Past Perfect appear not to be interpreted as semantic past tense or past perfect.

Fake Tense occurs in other contexts as well

(9) I wished I owned a car.
(10) He behaves like he was sick.
(11) Suppose she failed the test.
(12) It’s time we left.
Fake Tense

In English subjunctive conditionals the Simple Past, and also the Past Perfect appear not to be interpreted as semantic past tense or past perfect.

- Fake Tense occurs in other contexts as well.
- It occurs in various languages from different language families.

English, French, Latin, Classic Greek, Russian, and Old Irish (Indo-European), Cree (Algonquian), Tonga and Haya (Bantu), Chipewyan (Athabascan), Garo (Tibeto Burman), Nitinaht (Wakashan), and Proto-Uto-Aztecan (in the reconstruction of Steele). [James 1982]
Fake Tense
In English subjunctive conditionals the Simple Past, and also the Past Perfect appear not to be interpreted as semantic past tense or past perfect.

- Fake Tense occurs in other contexts as well.
- It occurs in various languages from different language families.
- Fake Tense is something a tense language can develop diachronically.
fake tense

related observations
Simple past subjunctives about the present CAN be counterfactual, but they don’t need to.

(13) If I were you, I wouldn’t do that.

Double past subjunctives about the present or the future MUST be counterfactual.

(14) I might have to cancel my trip to Paris, which is a pity, because *if I had been in Paris next week, we could have met.

The counterfactuality cannot be cancelled.
fake tense

double past subjunctives can have counterfactual presuppositions.

(15) Last year, John died. If he had run the Boston marathon next spring, he would have won.

Simple past subjunctives can’t.

(16) Last year, John died. *If he ran the Boston marathon next spring, he would win.
The Challenge:
Why should the semantics of subjunctive conditionals involve a Past Tense?
What's its contribution?
What about the Perfect?
Simpson's paradox
Simpson’s paradox

example
Data of patients’ gender and their status after taking or not taking the drug C is listed as follows

- Male patients take drug C: 30 in total; recovered 18
- Male patients do not take drug: 10 in total; recovered 7
- Female patients take drug C: 10 in total; recovered 2
- Female patients do not take drug C: 30 in total; recovered 9
Simpson’s paradox

example
Data of patients’ gender and their status after taking or not taking the drug C is listed as follows

- Male patients take drug C: 30 in total; recovered 18
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The paradox
if some action is optimal in a number of particular cases, it should still be optimal if you generalise over the cases
- sure thing principle (Savage 1954)

- male patient: don’t give the treatment
- female patient: don’t give the treatment
- overall: give the treatment
Simpson’s paradox

**The Challenge:**
How can we explain the paradox (and the incorrect intuitions)?
What should be advised as best action in this case?
What about the following set of data?
Simpson’s paradox

example
Data of patients’ blood pressure and their status after taking or not taking the drug C is listed as follows

- patients with low blood pressure take drug C: 30 in total; recovered 18
- patients with low blood pressure do not take drug: 10 in total; recovered 7
- patients with high blood pressure take drug C: 10 in total; recovered 2
- patients with high blood pressure do not take drug C: 30 in total; recovered 9
solve a challenge!

form small groups
pick a challenge
come up with a solution
1. **indicative vs. subjunctive conditionals:**
Should we go for a uniform analysis of conditionals or propose two different operators?
In either case, how would the resulting analysis deal with the Kennedy example?
Can you model both readings using Pearl’s approach to conditionals? Is this an adequate account of the distinction between both conditionals?

2. **Fake Tense:**
Why should the semantics of subjunctive conditionals involve a Past Tense?
What’s its contribution (or is it really just fake)?
What about the Perfect in double past subjunctives?

3. **Simpson’s Paradox:**
How can we explain the paradox (and the incorrect intuitions)?
What should be advised as best action in this case?
What about the second set of data?