# What Could a Hyperintensional Theory of Counterfactuals Take into Account?

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TIL and Counterfactuals – Workshop

Bratislava – March 12, 2024

# What to expect?

- A modest proposal of (some) theoretical desiderata
  - The theory of counterfactuals (TC) should explain the meaning and truth-conditions of some unproblematic statements in natural language, as well as explain why some inferences are valid and others are not.
  - The TC should also reflect the key themes that have emerged in the discussion on counterfactuals so far.
  - Setting priorities among problems.

# Why counterfactuals and whyTIL (or HyperIS)?

- Counterfactuals
  - Causation, laws of nature, explanation, the definition of knowledge and other epistemic notions (safety, sensitivity), identity, free will, confirmation, decision theory, dispositions, ...
- TIL or HyperIS
  - A great number of applications given a fine-grained tools
  - A work already done wrt counterfactuals:
    - Tichý (1976; 1978; 1984); Duží, Jespersen, Materna (2010); Gahér (2018; 2022)
  - Still, there seems to be further work to be done...

# Plan

1. Introduction
2. Truth-conditions
3. Goodman's problem
4. Inferences
5. Typicality
6. Probability and modality
7. Tasks

# 1. Introduction

(1) If the match had been struck, it would have lighted.

(G1) If A had been the case, B would have been the case.

(G2) If A were the case, B would be the case.

(G) $A < B$

(T) $A < B$ is true relative to class C of auxiliary indicative premises iff the members of C are true and B is a logical consequence of $C \cup \{A\}$. (Tichý 1984, p. 165)

# 1. Introduction

Tichý:

"The implication function < [in counterfactuals, LB] … takes couples of propositions to truth-values, hence the correct analysis of the implication of *A* and *B* is λwλt. *A* < *B*… ." (ibid., 169)

$A, B \rightarrow_{v} o_{\tau\omega} \quad < \rightarrow (o(o_{\tau\omega})(o_{\tau\omega}))$

"… parts of the construction *A* are often tacitly understood rather than explicitly spelled out in the antecedent of the conditional sentence." (ibid., 170)

# 1. Introduction

## Duží, Jespersen, Materna (2010):

"A counterfactual sentence expresses a construction of the form: $\lambda w \lambda t\ [A < B]$" where w, t can occur free in the construction A and/or B in the construction B $(A, B/*_1 \rightarrow_v o_{\tau\omega})$ and the implication function $<$ is of type $(o\ o_{\tau\omega}\ o_{\tau\omega})$ taking a pair of propositions to a truth-value. This function takes the value **T** if in all the world-time couples in which the proposition v-constructed by A is true it holds that also the consequent proposition v-constructed by B is true." (415)

Arguments of $<$ can be constructed by open propositional constructions or picked out by a propositional office.

# 2. Truth-conditions

- The definition abstract from counterfactuals with impossible antecedents.
- A room for precision?
  - If antecedent A of A < B is not fully specified, we cannot be sure, that A entails B (or that the resulting truth-value of a counterfactual is Truth).
  - Recall Tichý's informal definition (1984, 165) mentioning a class C of auxiliary premises.
  - $A < B$ is true with respect to *C* iff …
  - Suggestion: $</*_1 \rightarrow (o(o_{\tau\omega})(o_{\tau\omega}o_{\tau\omega}))$      or: $</*_1 \rightarrow (o(o_{\tau\omega})(o\ o_{\tau\omega}))$

# 2. Truth-conditions

- Which counterfactuals are true and which false?
  - Validity is not sufficient – the proposition v-construed by (an auxiliary complex propositional construction) C could be false but still A and C would entail B.
  - Soundness cannot be (in general) a necessary condition – the proposition v-constructed by A is – in genuine counterfactual conditionals – actually false. Since A is not true, a fortiori, A and C cannot be true.
  - So, in contrary-to-fact conditionals, at most C can be true.
    - That's a good reason to explicitly add (construction) C to the analysis of the truth-conditions. Otherwise, if we were to work only with (construction) A the explicit part of which (i.e. the main part) would be false and other – tacitly presupposed – parts true, the whole (conjunctive) proposition v-constructed by A would be false.

# 3. Goodman's problem

- Goodman (1947): A counterfactual $A < B$ is true iff B is entailed by A in conjunction with a set S of true sentences such that each member of S is *cotenable* with A.
- $s1 \in S$ is cotenable with A iff $\neg(A < \neg s1)$
- Dorn (2020, 14): "We cannot determine the truth of a counterfactual without determining which actual truths are cotenable with the antecedent A. Yet we cannot determine which actual truths are cotenable with the antecedent A without considering another counterfactual, and so on."

# 3. Goodman's problem

- Tichý's (1984, 170) solution:

  "If this analysis is right, Goodman's problem is solved in a very prosaic way indeed: the range of truths which can be legitimately added to the stated antecedent of a conditional is tacitly (and mostly indirectly) circumscribed by the **speaker** (bold-LB)."

  - First, taking "speaker" on board seems to infuse semantics by pragmatics.
  - Second, what if the speaker systematically fails in adding just the right propositions to the antecedent?

# 4. Inferences

- Contraposition:

(I1) If John had made a mistake, it would not have been a big mistake.

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If John had made a big mistake, he would not have made a mistake.

- Non-monotonicity

(I2) If I had struck this match, it would have lit.

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If I had struck this match and done so in a room without the oxygen, it would have lit.

# 4. Inferences

- Non-monotonicity (continued) – Dorn (2020, 159-160)

  GC1: At 8:28 somebody looks at a clock to see what time it is. The clock is broken; it stopped exactly 24 hrs previously. The subject believes, on the basis of the clock's reading, that it is 8:28.

  If subject S were in GC1, S wouldn't know what time it is.

  GC2: Assume the story of GC1. Moreover, S knows that the clock has stopped exactly twenty-four hours previously.

  Now: If subject S were in GC2, S would know what time it is.

# 4. Inferences

- Transitivity (Stalnaker 1968)

  If G. E. Hoover were today a communist, then he would be a traitor.

  If G. E. Hoover had been born a Russian, then he would today be a communist.

  If G. E. Hoover had been born a Russian, then he would be a traitor.

# 5. Typicality

- Example:

  You can’t leave children alone.

  (2) If the children were left alone, they would quarrel.

  - We don’t want to say that particular children are always quarreling when left alone. We only assume that typically, on many occasions, they quarrel when they are left alone.
- Typicality could be incorporated into the HyperIS of counterfactuals.

# 6. Probability and modality

- If I were to toss a fair coin, it would land heads.
- If I were to toss a fair coin, it would land tails.
  - Alan Hájek points out that "might not" undermines "would".
  - So, both counterfactuals come out false.
  - In that case:

    $\vDash (A < B) \text{ or } (A < \neg B)$    Conditional excluded middle

  does not hold.
- What about "could/might", "should" and their negations?

# 7. Tasks

- We could/should delineate a set of tasks worth of further study.
- We could/should prioritize them.
- Types of tasks:
  - Refinement of definitions
  - Revision theory meets TIL
  - Accounting for (in)validity of inferences
  - Impossible antecedents – a great work already done
  - Other kinds of counterfactuals: typicality, probability and modality
  - Application, e.g. bridges to linguistics (F. Gahér: different types of conditions)

# Thank you!

This work has been supported by projects APVV-21-0405 and VEGA 1/0557/23.

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