

Hedging Your Ifs and Vice Versa

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Our Starting Point

Simple conditionals are epistemic conditionals.

(1) If he didn't tell Harry, he told Tom.

Makes a claim about the state of the evidence available.

Implementations

- if as an epistemic operator (+ some dynamicness, cf. Gillies)
- if **restricting** a covert epistemic operator (Kratzer)
- if expresses a 3-valued connective (+ epistemic usage conditions, cf. Huitink)
- ...

One Challenge

Tug of war between subjectivity and objectivity (cf. Gibbard's Riverboat Puzzle)

Solution based on our "Might Made Right" being developed in our "The Subjectivity of Conditionals in a New Light"

Edgington's Stress Test

“Any theory of conditionals has consequences for less-than-certain judgements. Something is proposed of the form: If A, B is true iff $A*B$. If a clear-headed person, free from confusions of a logical, linguistic or referential sort, can be nearly sure that $A*B$ yet far from sure that if A, B, or vice versa, then this is strong evidence against the proposal.” (Edgington 1995/2007)

A Plethora of Hedges

- It's X-probable that if p, q
- It's likely that if p, q
- I guess/suppose that if p, q
- It's plausible that if p, q
- It might be that if p, q
- I'm not sure that if p, q
- I doubt that if p, q

Do these hedged conditionals have the meanings predicted by the epistemic account?

The Compelling Intuition

Hedged conditionals express conditional hedges

- (2) a. HEDGE(if p, q) =
 b. HEDGE_p(q)

Special Case: probability of a conditional = conditional probability.

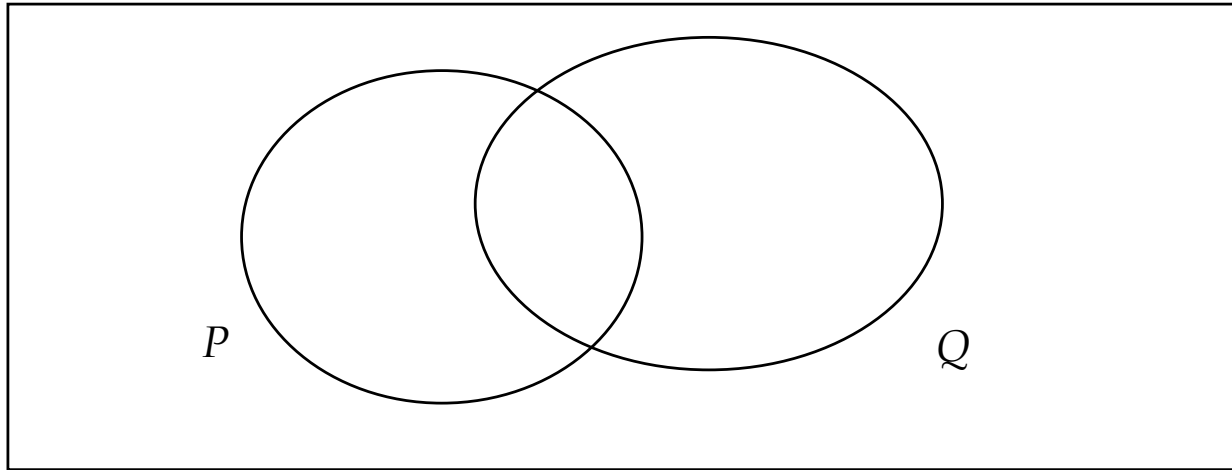
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Jackson on the Compelling Intuition



“I ask you the following question, If you throw a dart at the board, how likely is it to land in the area marked Q if it lands in the area marked P ? It is **compelling** that the answer to this question is nothing other than how likely the dart is to land in the intersection of P and Q given it lands in P , which equals the probability of its landing in the intersection of P and Q as a fraction of the probability of its landing in P .” (Jackson “Indicative Conditionals Revisited”, March 27, 2006)

Compelling Across the Board

- (3)
 - a. Maybe if he didn't tell Harry, he told Tom. =
 - b. Maybe he told Tom (given he didn't tell Harry).

- (4)
 - a. Presumably if it's raining, it's cold. =
 - b. Presumably it's cold (given it's raining).

The Trouble(s) with the Compelling Intuition

(Under plausible assumptions) it seems there is no (good) way to give truth-conditions to if p, q such that hedging of those truth-conditions being satisfied = hedging-within-p that q.

For Instance: May

(Under plausible assumptions) insisting that $\text{MAY}(\text{if } p, q) = \text{MAY}_p(q)$ trivializes hedges.

For Instance: *Probably*

Lewis and successors:

- There is no (sane) way to give truth-conditions to if p, q such that the probability of those truth-conditions being satisfied = the conditional probability of q given p.

Jackson 2006:

- There are no such-and-such conditions associated with if p, q (not its assertibility conditions, not its acceptability conditions, nothing) such that the probability of those such-and-such conditions being satisfied = the conditional probability of q given p.

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Jackson's Despair

Jackson 2006: The Compelling Intuition is a mistake. The probability of a conditional is not the conditional probability.

“Our usage of the indicative conditional construction is governed by a mistaken intuition [...]. We [...] wrongly think and speak as if the indicative conditional in fact has truth conditions such that its probability is the conditional probability of its consequent given its antecedent.”

A Special Reading

Can a hedged conditional ever be interpreted in the predicted complex-nested fashion?

- (5) It is almost certainly false that if the die comes up even, it will be a six – since it almost certainly is a fair die.

The Lewis-Kratzer Way Out

When we ask

- (6) What is the probability that q , if p ?
- (7) How likely is it that q , if p ?

we are not asking what the probability of an indicative / epistemic conditional is.

Instead, the if-clause restricts the probability operator.

What does a restricted probability operator express? Conditional probability.

Lewis

“The if of our restrictive if-clauses should not be regarded as a sentential connective. It has no meaning apart from the adverb it restricts. The if in *always if* ..., ..., *sometimes if* ..., ..., and the rest is on a par with the non-connective and in *between ... and* ..., with the non-connective or in *whether ... or* ..., or **with the non-connective if in *the probability that ... if* ...**. It serves merely to mark an argument-place in a polyadic construction.”

Lewis on Adverbs of Quantification

- (8) This dog almost always/usually/sometimes/never bites if he is approached.

Kratzer's Thesis

Lewis wasn't just right about adverbial quantification. His analysis is right about other occurrences of if.

“The history of the conditional is the story of a syntactic mistake. There is no two-place if ... then connective in the logical forms of natural languages. If-clauses are devices for restricting the domains of various operators.” (Kratzer “Conditionals”, 1986)

In other words: there are no conditionals, just constructions involving an if-clause and an operator that the if-clause restricts.

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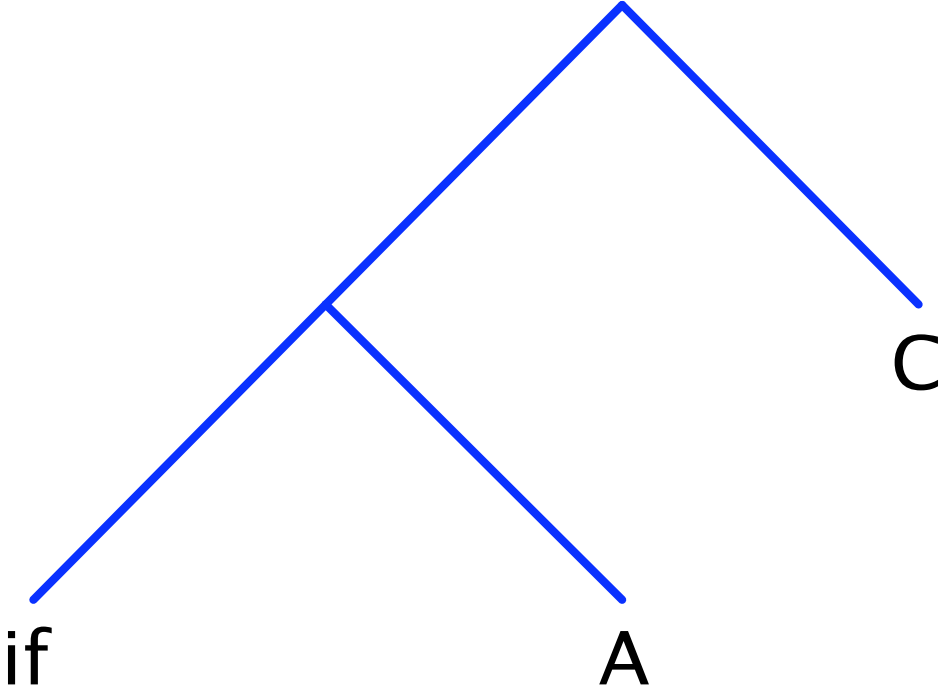
Tripartite Structures

Heim's dissertation:

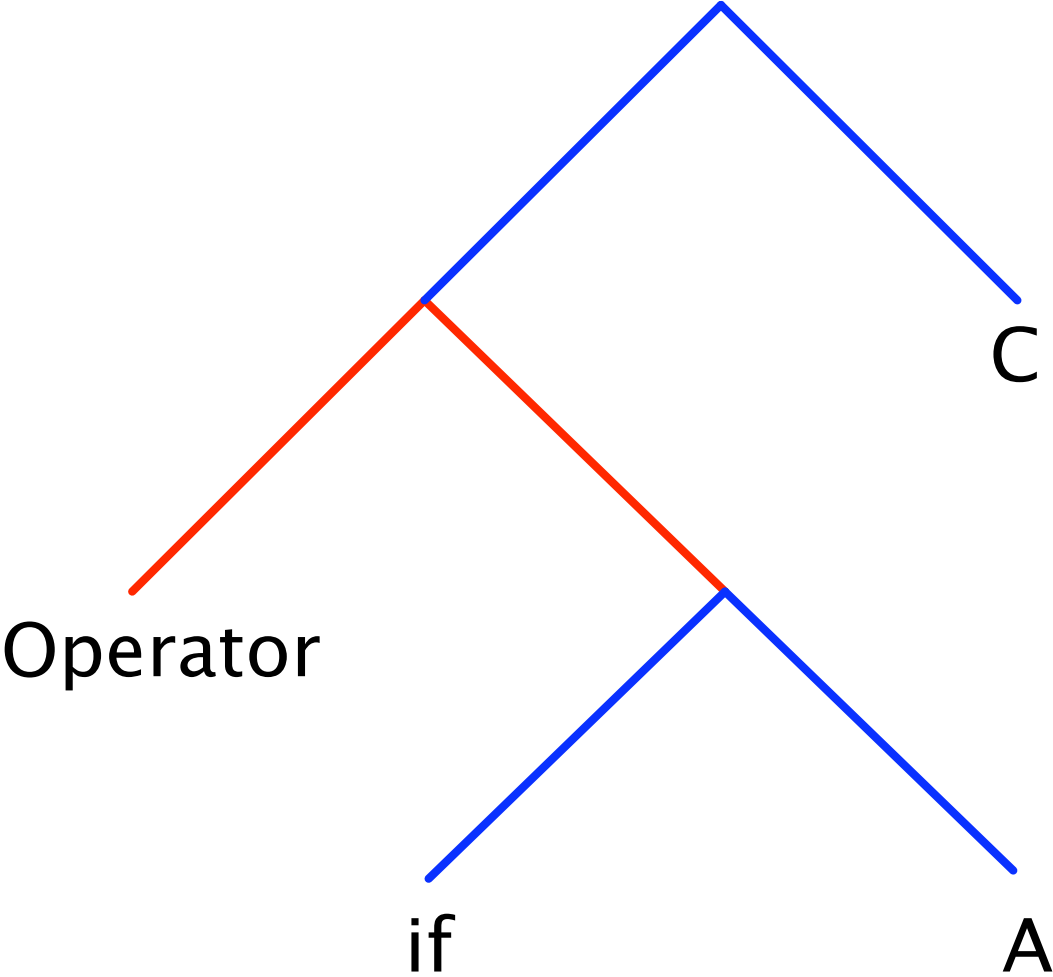
Quantifier/Operator [Restriction] [(Nuclear) Scope]

Heim achieved a solution to the problem of donkey anaphora, which ensured that the Lewis/Kratzer/Heim view of the partition of “conditionals” into Operator + if-clause + consequent became the received view in linguistic semantics.

Before Lewis, Kratzer, Heim



After Lewis, Kratzer, Heim



'If' Restricting Various Operators

- (9) If John committed this murder, he **ought** to be in jail.
if restricts ought
- (10) If we are on Rte. 195, we **must/might** be in Mansfield.
if restricts epistemic must/might
- (11) If it rains tomorrow, the game **will** be cancelled.
if restricts future modal will
- (12) If it had rained, the game **would** have been cancelled.
if restricts subjunctive modal would—probably not quite right

Research Strategy

This picture entails that studying a particular kind of conditionals has to start with the study of the particular kind of operator that the if-clause is restricting.

- Want to study “predictive” conditionals? Study the future will modal!
- Want to study deontic conditionals? Study the modal ought!
- etc.

Bare Conditionals

(13) If this dog is approached, he bites.

(14) If John was here on time, he left Cambridge at noon.

Kratzer:

- covert operator restricted by if-clause
- covert frequency adverb in (13) (\approx “always”)
- covert epistemic necessity modal in (14) (\approx “must”)

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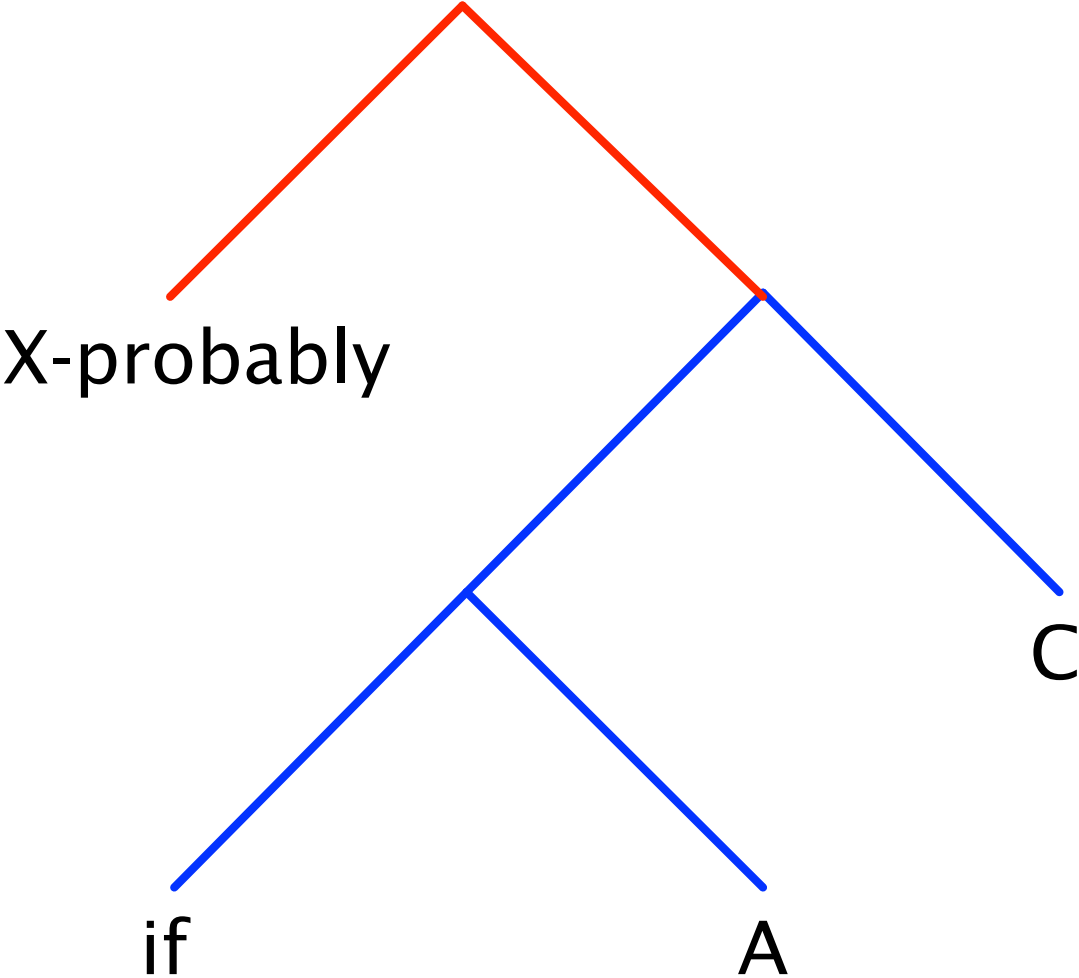
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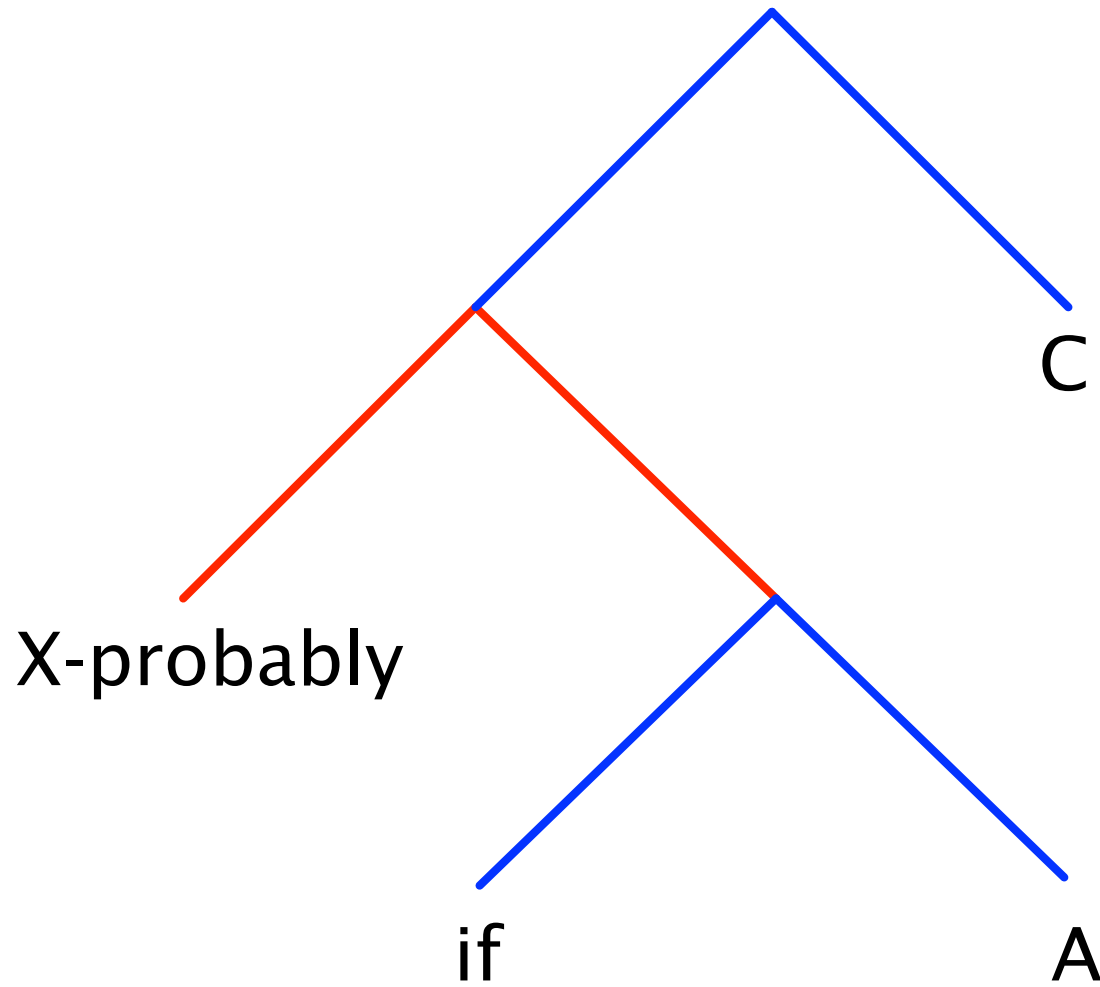
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Back to our Problem(s)

Instead of



we are actually dealing with



Similar Cases

A surface string can receive one parse when occurring on its own and a very different one when occurring embedded:

- (15)
 - a. A randomly tossed coin comes up heads.
 - b. The probability that a randomly tossed coin comes up heads is fifty-fifty.
- (16)
 - a. ?On a given day, the Red Sox win.
 - b. The probability that on a given day the Red Sox win is about 60%.
- (17)
 - a. This dog bites if he is approached.
 - b. This dog quite often bites if he is approached.
 - c. It almost never happens that this dog bites if he is approached.

Why This Interpretation?

There are three reasons why structures where a conditional apparently occurs under a probability expression are (almost) always parsed not as involving an embedded conditional with a covert operator but as having the if-clause restrict the probability operator:

- positing covert operator is a last resort strategy
- the probability operator would like to be restricted
- epistemic modals resist embedding under probability operators

Resisting Embedding

- (18)
- a. If she threw an even number, it must have been a six.
 - b. ?The probability that if she threw an even number it must have been a six is

Objection

If the following two structures do not share a constituent corresponding to the “conditional”, then how come they are felt to be talking about the same thing?

- (19)
- a. If she is not in her office, she must be at home.
 - b. Actually, it is not very likely that she is at home if she is not in her office.

Reply

Because they both talk about possible scenarios in which she is not in her office. Compare:

- (20) a. Every student smokes.
- b. Actually, very few students smoke.

Both of these make quantificational claims about students and thus talk about the same thing, without sharing a mythical constituent “students smoke”.

Dynamics Way Out

The restricting behavior can be mimicked if the meaning of the conditional is dynamic: if the context in which the consequent is evaluated is a derived context in which the antecedent holds.

But to get the facts right, we have to narrowscope our hedges.

- (21) a. HEDGE that q, if p =
 b. (if p, HEDGE q)

The Cross-Speaker Problem

- (22) A: If he didn't tell Harry, he told Tom.
B: Probably so.
B': That's very unlikely.

A Way Out?

- (23) A: Every student smokes.
 B: Most (of them) (do).

But Wait

Kratzer 2010:

- (24) If a wolf entered the house, he must have eaten grandma, since she was bedridden. He might have eaten the girl with the red cap, too. In fact, *that's rather likely*. The poor thing wouldn't have been able to defend herself.

Not the Way Out

(25) A: If he didn't tell Harry, he told Tom.

B: I'm not sure that's true.

A: No, really. I know he told one of them.

(26) A: If he didn't tell Harry, he told Tom.

B: I'm not sure (it's true that) he told Tom.

A: Me either./??No, really. I know he told one of them.

Still Not the Way Out

- (27) A: If he didn't tell Harry, he told Tom.
B: That may be true./That's plausible./I guess that's true.
A: No, really. I know he told one of them.
- (28) A: If he didn't tell Harry, he told Tom.
B: Maybe (it's true that) he told Tom./It's plausible that he told Tom./I guess it's true he told Tom.
A: ??No, really. I know he told one of them.
- (29) A: If he didn't tell Harry, he told Tom.
B₁: I doubt that's true.
B₂: I doubt (it's true that) he told Tom.

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Wrinkle Under Modals

- (30) A: If he didn't tell Harry, he told Tom.
B: It's rather unlikely that he would have told Tom.

Belnap's Alternative

Belnap's meaning for conditionals: if p, q is true if p and q are true, false if p is true but q is false, and has no truth-value if p is false.

Embedding operators are restricted to quantify over worlds where the embedded proposition has a truth-value.

Escape?

If he didn't tell Harry, he told Tom.

must (if he didn't tell Harry, he told Tom)

Probably so.

probably (if he didn't tell Harry, he told Tom)

The Belnapian's To Do List

- Can Belnap's conditional stand on its own, or does it always require an operator to embed it? (If yes, then we would mimic the restrictor analysis very closely.)
- The most plausible thing to say for entailment is that it goes by Strawson Entailment—and that is completely implausible for conditionals.

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The Belnapian's To Do List (Part 2)

- Partial propositions of the kind that the Belnap-conditional expresses are usually used to model presuppositions. But here, we absolutely do not want to say that if p, q presupposes that p is true. So, we need a new technical system that distinguishes presuppositions from Belnap-partiality.

Other options

- Despair
- Copy + Reparse
- Belnap on demand

Belnap On Demand: Technical Issue?

Not at all. It's easy to recover Belnapian propositions from CCPs.

- Insist on compatibility presupposition for CCP of a conditional to be defined.
- Then strip CCP of its dynamic parts.

Then we just restrict operators accordingly.

Belnap On Demand: WTF Issue?

Why on earth would the language sometimes want CCPs and sometimes want Belnap propositions?

But, assuming there's some reason for it, it does skirt the ugly features of the pure Belnap conditional.