

Challenges for Existing Theories of Conditionals

Conditionals: Meaning and Applications

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1 Concessive conditionals

- The phenomenon
- Diagnostics
- Interlude: the semantics of *even*
- Scalar: *even if*
- Alternative and universal: Rawlins

2 Conditional Perfection

- The phenomenon
- Background
- Is it even real?
- Routes to full perfection
- Evidence, and open issues

3 Conditionals across languages

- The antecedent: what is an *if*-clause?
- The operator: what does the antecedent restrict?
- Remoteness: X-marking
- Taking stock

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Three ways of not caring about the antecedent

- (1)
 - a. Even if it rains, we'll play. SCALAR
 - b. Whether or not it rains, we'll play. ALTERNATIVE
 - c. No matter what the weather is, we'll play. UNIVERSAL

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All three share a signature effect:

Antecedent irrelevance

The consequent is asserted to hold **regardless of** how the antecedent turns out.

The tripartition is König's (1986); see Haspelmath and König (1998) for the European survey and Bossuyt (2023) for a global sample.

Why they are a problem

A plain conditional *restricts*: (Kratzer 1986, 2012)

Restrictor analysis

if $A, C = \forall w \in f(\llbracket A \rrbracket, w_0), w \in \llbracket C \rrbracket$

Why they are a problem

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if A , $C = \forall w \in f(\llbracket A \rrbracket, w_0), w \in \llbracket C \rrbracket$

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$\text{if } A, C = \forall w \in f(\llbracket A \rrbracket, w_0), w \in \llbracket C \rrbracket$

So *if* A , C says nothing about $\neg A$ -worlds. But concessive conditionals seem to say something about **all** the worlds:

- (2) Whether or not it rains, we'll play.
 $\rightsquigarrow$ We'll play.

Where does the extra strength come from, given the same *if*?

The marking is not accidental

Concessive conditionals are built from a small, recurring inventory:

- **scalar**: additive/scalar particle + conditional

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Disjunction, *wh*, and *even* keep showing up.
Any account should explain why.

(Haspelmath and König 1998, Rawlins 2013, Szabolcsi 2019)

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Although is factive; *even if* is not.

- (3)
- a. Although it's raining, we're playing. $\models$ it's raining
 - b. Even if it's raining, we're playing. $\not\models$ it's raining

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- (3) a. Although it's raining, we're playing. $\models$ it's raining
- b. Even if it's raining, we're playing. $\not\models$ it's raining

And *even if* keeps the conditional's modal flexibility:

- (4) a. Even if it **had** rained, we would have played. counterfactual ✓
- b. ✗ Although it had rained, we would have played.

Concessives frequently *derive* historically from concessive conditionals (König 1986): German *obwohl* < *ob wohl*, English *albeit* < *al be it*.

Not plain conditionals either

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1. No *then*

- (5)
- a. If it rains, then we'll play indoors.
 - b. ✗ Even if it rains, **then** we'll play.
 - c. ✗ Whatever the weather, **then** we'll play.

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2. Consequent entailment

- (6) a. Whether or not it rains, we'll play. $\models$ we'll play
- b. If it rains, we'll play. $\not\models$ we'll play

The *then*-test is from Iatridou (1993); the entailment test structures Rawlins (2013).

The consequent-entailment problem

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Universal and alternative CCs entail their consequent. Scalar ones do so **only sometimes** — the observation is Pollock's (1976), the name Lycan's (1991).

- (7)
- a. Even if we leave now, we'll miss the train. $\rightsquigarrow$ we'll miss the train ✓
 - b. Even if it rains, the match will go ahead. $\rightsquigarrow$ the match will go ahead ✓
 - c. Even if John comes, Mary will leave — but she may stay if he doesn't. no entailment

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The problem

A **single** compositional entry for *even if* must deliver the entailment in some cases and withhold it in others.

(Bennett 1982, Lycan 1991, Barker 1994, Lycan 2001, Bennett 2003)

Two families of response

- **Pragmatic:** the entailment is a defeasible inference from the scalar presupposition plus context.

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Both need an answer to: **what does *even* attach to?**

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The standard entry

(Horn 1969, Karttunen and Peters 1979, Kay 1990)

$\llbracket \text{even} \rrbracket(C)(p)$ is defined only if

- (i) **scalar**: p is less likely than every $q \in C \setminus \{p\}$;
- (ii) **existential**: some $q \in C \setminus \{p\}$ is true.

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Even is truth-conditionally vacuous. So everything turns on:

What is p , and what is C ?

C is the focus value of the prejacent (Rooth 1985, 1992).

The scale reverses under negation

- (8)
- a. John read even [Chapter **Ten**]_F. Ch. 10 is the *hardest* — least likely
 - b. John didn't read even [Chapter **One**]_F. Ch. 1 is the *easiest* — most likely

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The puzzle

Either English has **two** *evens*, or it has one whose **scope** varies.

These are the “PPI *even*” and “NPI *even*” of the literature.

Reading 1: two lexical items

Rooth (1985): alongside plain *even*, an even_{NPI} with the scalar presupposition **reversed** (*p* more likely than every *q*), licensed only in downward-entailing environments.

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The crosslinguistic argument

Many languages **lexicalise** the two separately:

	scalar	NPI
German	<i>sogar</i>	<i>auch nur</i>
Dutch	<i>zelfs</i>	<i>ook maar</i>
Greek	<i>akomi ke</i>	<i>oute, esto</i>

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If English *even* were a single scope-taking item, why do these languages need two words?
(Rullmann 1997, Giannakidou 2007)

Reading 2: one *even*, wide scope

Karttunen and Peters (1979): *even* scopes **above** negation. The reversal is then an illusion.

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John didn't read Chapter One **is** the least likely of these. ✓

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The reductive payoff (Lahiri 1998, Crnič 2011)

NPI-hood is **derived**: with a minimal-element focus, plain *even*'s presupposition is contradictory in upward-entailing contexts and satisfiable only in DE ones. No second lexical entry.

See also Wilkinson (1996) and Guerzoni (2003).

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- (9) No one who had even [a **little**]_F sense would have signed.

Where the debate bites

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Scope theory

Economical: one lexical entry.

But needs covert movement where the syntax resists it.

Ambiguity theory

Descriptively safe: no covert movement.

But posits a homophony that English alone tolerates.

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This is the *even if* question in miniature

Conditional antecedents are downward-entailing, so *even* in an *if*-clause sits in exactly the licensing environment from the last section:

- (10) If you even [**touch**]_F that vase, I'll scream. touching is *minimal*, not unlikely

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So the question “can *even* escape the antecedent?” is not special to concessive conditionals. It is the scope question again:

- | | |
|--|---------------------------|
| <i>even</i> scopes out | ⇒ Bennett (1982) |
| <i>even</i> stays in, associating with focus | ⇒ Guerzoni and Lim (2007) |

Bennett: *even* scopes over the conditional

$$\text{EVEN}_C[\text{if } A, Q] \quad C = \{\text{if } A', Q : A' \in \text{Alt}(A)\}$$

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Consequence

If $\text{Alt}(A) = \{A, \neg A\}$, assertion + existential presupposition $\Rightarrow$ *if* A , Q
and *if* $\neg A$, $Q \Rightarrow Q$.

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So the entailment is there when the focus alternatives **exhaust** the modal base, and absent otherwise.

Guerzoni and Lim (2007) make that consequence the whole story, using Rooth-style association with focus.

- (11) a. Even if it rains_F, we'll play. Alt = {rain, ¬rain} — exhaustive ⇒ entailment
 b. Even if **John**_F comes, Mary will leave. Alt = {John comes, Bill comes, ...} — not exhaustive ⇒ none

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No ambiguity in *even if*, no extra pragmatic principle. The variability is **focus** variability, which is independently motivated.

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Related: Crnić (2011) on the distribution of *even* and its NPI uses.

Testing the explanation

If the account is right, manipulating focus should switch the entailment on and off with the words held fixed.

- (12)
- a. Even if she pays in **cash**_F, I won't sell.
 - b. Even if **she**_F pays in cash, I won't sell.

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$$\llbracket \text{whether or not it rains} \rrbracket^{\text{alt}} = \{\text{rain}, \neg\text{rain}\}$$

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Interrogative and *wh*-adjuncts contribute exactly the denotations independently needed for questions.

Pointwise restriction plus universal closure

Restriction applies **pointwise** to each alternative, giving a set of conditionals:

$$\{ \forall w \in f(w_0) \cap A_i : w \in \llbracket C \rrbracket \mid A_i \in \llbracket \text{adjunct} \rrbracket^{\text{alt}} \}$$

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A universal closure operator then requires **all** of them to hold:

Unconditional

Whether or not A, C is true iff if A then C and if $\neg A$ then C.

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This is Simplification of Disjunctive Antecedents built into the composition, rather than derived.

Where the entailment comes from

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So consequent entailment is **derived**, not stipulated — and it is predicted to disappear exactly when exhaustivity fails. (Bledin 2018)

A payoff: the *then*-facts

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Same explanation covers the resistance of unconditionals to *only if*, *if and only if*, and biscuit readings.

Unifying the three types?

Szabolcsi (2019): unconditionals and free choice are the same phenomenon.

- Both involve alternative-generating indefinites/*wh*-items.
- Both produce apparent universal force from a non-universal source.
- Both are sensitive to exhaustification.

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One recipe: the antecedent supplies a set of alternatives; strength comes from how much of the modal base they cover.

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- They are neither concessives (not factive) nor plain conditionals (no *then*, consequent entailment).
- The best accounts keep ***if* constant** and locate the difference in the antecedent: scalar alternatives for *even if*, Hamblin alternatives for *whether/wh*.
- Consequent entailment is then **derived** from exhaustivity — which predicts the cases where it fails.

- 1 Does *even if* A, C entail C ? What would settle it?

Questions

- 1 Does *even if A, C* entail *C*? What would settle it?
- 2 Why is $\times$ *Whether or not it rains, then we'll play bad*, but *Even if it rains, we'll still play fine*?

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- ② Why is $\times$ *Whether or not it rains, then we'll play bad*, but *Even if it rains, we'll still play fine*?
- ③ Do concessive conditionals validate Modus Ponens? (Bledin 2018)
- ④ Can Rawlins' analysis be run over a **counterfactual** modal base?

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- 2 Conditional Perfection
 - The phenomenon
 - Background
 - Is it even real?
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 - The antecedent: what is an *if*-clause?
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Geis and Zwicky (1971) observe that conditionals often convey more than they say.

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An invited inference

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(13) If you mow the lawn, I'll give you five dollars.

This seems to convey:

(14) If you **don't** mow the lawn, I **won't** give you five dollars.

The antecedent is heard as not merely **sufficient** but also **necessary** for the consequent.

Conditional perfection

Definition (Conditional Perfection)

An utterance of *if* p , q conveys *if* $\neg p$, $\neg q$, and hence q *if and only if* p .

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Geis & Zwicky's other cases:

- (15)
- a. If John leans out of that window any further, he'll fall.
 - b. If you disturb me tonight, I won't let you go to the movies tomorrow.
 - c. If you heat iron in a fire, it turns red.

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Also called *conditional strengthening* (von Stechow 2001) or *biconditional strengthening*.

Why first-years should care

- A textbook case for the **semantics/pragmatics interface**: an inference nobody wants in the truth conditions, and nobody can quite derive outside them.

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 - Denying the Antecedent: $\text{if } p, q; \neg p \therefore \neg q$

Under perfection these are not fallacies at all (Cariani and Rips 2023).

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- It is a live testing ground for **alternatives**: which ones, and who computes them?

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Take an *if*-clause to restrict a (usually covert) universal quantifier over worlds or situations (Kratzer 1986, 2012).

Restrictor semantics

if p , q is true at s iff $\forall w' \in R(w), w' \in p \rightarrow w' \in q$

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Perfection says: **all and only** the relevant p -situations are q -situations.

Nothing in the semantics gives us the “only”. Whatever perfection is, it is not entailed.

Mill, a century before Grice:

If I say to any one, “I saw some of your children today”, he might be justified in inferring that I did not see them all, not because the words mean it, but because, if I had seen them all, it is most likely that I should have said so.

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Implicature, briefly

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Quantity reasoning (Gamut 1991, pp. 205–206)

S uses A correctly only if, for every B that entails A and is not equivalent to it, either S does not believe B , or B is not relevant.

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Note this is neutral on what the speaker *should* have said instead.

The shape of the problem

To get perfection as a quantity implicature we need:

- ① **Alternatives**: what stronger statement was the speaker not making?

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Every account we will see is a different answer to (1), (2), or both.

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Early critics produced conditionals with no whiff of perfection (Lilje 1972, Boër and Lycan 1973):

- (16)
- a. If it doesn't say 'Goodyear', it isn't Polyglas.
 - b. If this cactus grows native to Idaho, then it's not an *Astrophytum*.
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Fine — perfection was never claimed for *all* conditionals.

The original cases are shaky too

von Fintel (2001), following Lilje (1972): a wealthy aunt says to a C-average student

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Likewise for the lawn: the addressee can perfectly well ask whether cleaning the garage would also earn the \$5.

A weaker inference that is robust

Von Fintel's proposal: the alternative is *q no matter what*.

Unconditionals

q no matter what is true at w iff $\forall r \forall w' \in R(w), w' \in r \rightarrow w' \in q$

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So the reliable implicature is only that ***q is not unconditionally true*** — the \$5 are not free for the taking.

Horn (2000) and (on van der Auwera's reconstruction) Ducrot thought this scale delivers perfection. It does not: “*p* is not the only sufficient condition” $\neq$ “*p* is necessary”.

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Cornulier: a presumption of exhaustivity

de Cornulier (1983) on a sign in a bus:

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Alternatives: *if* $p \vee r$, q , which entails *if* p , q by downward monotonicity of the restrictor.

Negating all of them (for r not entailing p) **does** give perfection.

Van der Auwera: a conjunctive scale

van der Auwera (1997a,b) reconstructs this as a Horn scale:

if p, q **and** *if r, q* **and** *if s, q*
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- The alternatives are **more complex** than what was said — brevity could explain the choice (Atlas and Levinson 1981).

Reply: Matsumoto (1995) argues the complexity condition is not real; what matters is a *monotonicity* condition, which independently blocks the bad scale $\langle \textit{if}, \textit{iff} \rangle$.

Groenendijk and Stokhof (1984): answers are read exhaustively, as if containing a silent *only*.

Hypothesis (QUD account)

*Perfection arises when if p , q answers a question calling for an **exhaustive list of sufficient conditions for q** .*

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This turns Cornulier's “the situation suggests. . .” into something predictive: it tells us **where perfection should be absent**.

A typology of non-perfection

- ① **Polar conditional questions.** Exhaustivity applies vacuously to *yes*.

(19) Q: Will you give me \$5 if I mow the lawn?

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- ② **Consequent-focused questions.** The question asks what follows from *p*.

(20) A: John is in Amherst today.

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- ③ **Mention-some questions.** A partial answer suffices.

(21) Q: How can I earn five dollars?

A: I'll give you \$5 if you mow the lawn. (no perfection)

Perfection is only as strong as the domain the question sets up.

- (22) Q: Will you be upset if I call you at home tonight?
 A: I'll be upset if you call me after midnight.

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Conveys: calling before midnight won't upset her **qua timing**.

Does *not* convey: nothing else in the call could upset her.

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Does *not* convey: nothing else in the call could upset her.

So “perfection” is really exhaustivity over a contextually restricted set of antecedents — a point worth remembering when designing stimuli.

Herburger: exhaustify in the grammar

Herburger (2015) takes the silent *only* literally.

The Whole Truth theory

A sentence *S* is silently conjoined with an **unpronounced** *only S*, yielding *S and only S* — “the truth and the whole truth”.

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Cf. grammatical exhaustification more generally (Chierchia 2013); and Herburger (2019) on *only if* and bare conditionals in downward-entailing environments.

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Cf. grammatical exhaustification more generally (Chierchia 2013); and Herburger (2019) on *only if* and bare conditionals in downward-entailing environments.

Cost: without a theory of when the silent *only* is licensed, the account is hard to falsify.

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Manipulating the QUD experimentally

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- Measure: endorsement of MP, MT, AC, DA.

Result

A mere **demand** for exhaustivity did not produce perfection (Exps. 1–3, 5, 7). Only when the speaker **explicitly marked** the answer as exhaustive (“... and that’s the only way”) did AC and DA endorsements rise (Exps. 4, 6).

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- Or: the manipulation asked about what the **statement** implied rather than what the **speaker** meant.

Note also that promises and threats seem to perfect by default — which is why Cariani & Rips deliberately avoided them. Cf. Van Canegem-Ardijns and Van Belle (2008), Farr (2011) on focus.

Liu and colleagues: the QUD account, retested

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- Two experiments manipulating whether the QUD targets the antecedent or the consequent.

Result

Some support for the QUD account, but not decisive. What also matters is the **structure of the alternative causes** — e.g. whether an external variable could independently bring q about.

Iatridou: *then* is not vacuous

Iatridou (1993) asks what English *then* contributes. Her evidence is where it **cannot** appear.

- (23)
- a. If it rains, then we'll play football. ✓
 - b. If you are thirsty, (#then) there is a beer in the fridge.
 - c. Even if I were the richest linguist on earth, (#then) I still couldn't afford this house.

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The presupposition of *then* (Iatridou 1993, p. 182)

if p, then q presupposes that at least some $\neg p$ cases are $\neg q$ cases. Bare *if p, q* carries no such presupposition.

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if p, then q presupposes that at least some $\neg p$ cases are $\neg q$ cases. Bare *if p, q* carries no such presupposition.

In both bad cases *q* holds in the $\neg p$ cases too, so the presupposition clashes.

Then conventionalises half of perfection

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A converging proposal appears in von Stechow (1994). The biscuit data have since been contested with corpus examples (Csipak 2016), e.g. *If you are hungry then there is a Sainsbury's just behind the main complex.*

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- CP-favouring factors are **cumulative**: the more of them hold, the stronger the inference. Perfection is gradient, not a switch.
- Open problem they raise: **cataphoric** uses of German $dann_F$, where the presupposition seems not to fire.

Wimmer and Liu (2025) compare English/German with **Mandarin Chinese**, asking which grammatical factors favour or disfavour a biconditional reading.

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Perfection across languages, and across connectives

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Moral: even *only if* does not simply encode the perfected meaning. Whatever perfection is, the lexicon is not doing it for us.

The probabilistic turn

Recent work models perfection as one output of rational communication under uncertainty, rather than as a scale.

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Attraction: gradience falls out for free. Perfection is a matter of degree, which the scalar story never predicted.

Open questions

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- Cross-linguistic: Wimmer & Liu have started this; how far do the grammatical factors generalise beyond English, German and Mandarin?
- Is “perfection” one phenomenon, or a family that a single label has been obscuring for fifty years?

- Geis & Zwicky's inference is **real but rarer than advertised**: what conditionals reliably convey is that the consequent is not true unconditionally, not that the antecedent is necessary.
- Full perfection needs **exhaustivity over antecedent alternatives** — supplied by a question, by covert *only*, or by probabilistic reasoning about dependence. The experimental record suggests a mere demand for exhaustivity is not enough; explicit marking is.

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Today

The standard architecture is a bundle of separable claims. Which of them are **universal**, and which are **parameters** that languages set differently?

- The interest of the crosslinguistic record is that the architecture makes typological predictions — and it is not obvious in advance which ones it gets right.

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Each is a place where languages could, in principle, differ.

Two things to watch for

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See Comrie (1986), Bhatt and Pancheva (2006) and von Stechow (2011) for surveys.

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A negative universal

Hypothesis (Robust, though hard to prove)

No language has been described as having a lexical item that is a truth-functional binary connective meaning $\supset$.

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*No language has been described as having a lexical item that is a **truth-functional binary connective** meaning $\supset$.*

- Compare: *and* and *or* have plausible connective sources everywhere.
- Antecedent markers, by contrast, are recruited from a small and recurring set of **non-connective** sources.

Where antecedent markers come from

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Notice what is *not* on the list: nothing from the vocabulary of truth-functional connection.

Haiman's generalisation

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But

In several Chadic languages and in Banda Linda, conditionals pattern with **focus**, not topic. The generalisation is a strong tendency, not a universal.

- (24)
- a. Hindi–Urdu correlative: *jo ... vo* (which girl... that one...)
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 - Bhatt and Pancheva (2006): *if*-clauses are **free relatives of possible worlds**, with clause-internal operator movement to SpecCP and a definite-description interpretation.
 - Schlenker (2004): antecedents are **definite descriptions of worlds**; *if* is the world-level counterpart of *the*.

The proform is overt more often than you'd think

- (25) English *then*, German *dann*, Hebrew *az*, Hindi–Urdu *to*,
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Payoff

Convergent morphology is evidence for the restrictor architecture: what languages keep reaching for to build antecedents is the vocabulary of **reference and topicality**, not the vocabulary of **connection**.

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The covert-modal problem

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- But ‘bare’ consequents with no modal exponent are also common. The covert modal is not straightforwardly confirmed by the record.

When *if*-clauses can't restrict

von Fintel and Iatridou (2002)

If-clauses restrict adverbs of quantification only under restricted conditions. In many languages, an *if*-clause cannot restrict a quantificational adverb when a modal intervenes.

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Cf. Rothschild (2021) and Ciardelli (2022) on how to keep the restrictor view without covert modals.

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The strongest crosslinguistic generalisation we have

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- Attested in English, Greek, Hebrew, Hindi–Urdu, Turkish, Russian, Palestinian Arabic, Zulu, ...
- von Stechow and Iatridou (2023) call this class of morphology **X-marking** (vs. plain **O-marking**), deliberately neutral between ‘subjunctive’, ‘fake past’, ‘modal past’.

Fake past, fake imperfective

- (27) If he **took** the syrup, he **would** get better. (no past time reference)
- (28) Greek: *an eperne to siropi, tha ginotan kala*
if take.IMPF.PST.3SG the syrup, FUT become.IMPF.PST.3SG well (Iatridou 2000)

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- So we have **two** exponents, both semantically displaced from their ordinary use.

Variation within the generalisation

- **Which** exponent: past alone (Russian), past + imperfective (Greek, Hindi–Urdu), dedicated mood (Hungarian, Spanish subjunctive).

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So

The universal is not ‘counterfactuality is past’. It is: counterfactual meaning is almost always **compositionally derived** from independently-motivated TAM material.

Why this matters for the semantics

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The theoretical moral

The indicative/counterfactual divide is **not** a divide between two conditional operators. It is a difference in how the domain is restricted — exactly what the restrictor architecture predicts.

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Varies

- Which resource builds the restrictor (topic / correlative / question / conjunction / ‘when’)
- Whether the operator is overt
- Which and how many X-marks
- Whether the proform is obligatory

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- It is close to **silent** on the questions philosophers care most about: which similarity relation, whether conditionals have truth conditions, how probability enters.
- Morphology tells you what the grammar is assembling. It does not tell you what the assembled thing means.

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- 2 What would count as a genuine counterexample to Kratzer's thesis? Is it falsifiable by typology at all?

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- 3 Anderson conditionals: is the variation semantic, or a difference in what competing forms are available?

- Languages build conditional antecedents out of **topics, correlatives, questions and conjunctions** — never out of a truth-functional connective. That convergence is the best crosslinguistic argument for the restrictor architecture.
- Counterfactuality is almost never a **primitive**: it is assembled from past and imperfective morphology, which is why the indicative/counterfactual divide should not be modelled as two different conditional operators.



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