If

The Biggest Little Word

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Epigraph

The word *if*, just two tiny letters
Says so much for something so small
The biggest little word in existence;
Never answers, just questions us all

If regrets were gold, I'd be rich as a queen
If teardrops were diamonds, how my face would gleam
If I'd loved you better, I wouldn't be lonely
If only, if only, if only

Dolly Parton, *If Only*

- Warm-Up: The Fuss over Little Words (*)
- The Story of *If*

* Perhaps superfluous in a city where the noted semanticist William Jefferson Clinton staked his career on what the meaning of *is* is

Ockham: *Only*

After cataloguing various 'improper' sense of *only*, those which are taken with restricted scope ('no more than [within a fixed domain]') as opposed to the purely exclusive 'proper' sense, Ockham (1980:137) remarks that

> *These are the senses, then, in which the exclusive expression can be taken improperly. And perhaps there are still other senses in which it can be taken improperly. But since they are not as widely used as the ones we have dealt with, I will leave them to the specialists.*

Larry Horn: "A glorious picture indeed: monasteries crammed to the spires with specialists on *only*, laboring away on the fine points of the semantics of exclusive propositions. Those were the days!" (Horn 1996: 26-27)

Browning's Grammarian

So, with the throttling hands of death at strife,
Ground he at grammar;
Still, thro' the rattle, parts of speech were rife:
While he could stammer
He settled oti's business — let it be! —
Properly based oun —
Gave us the doctrine of the enclitic de,
Dead from the waist down.

Robert Browning: "A Grammarian's Funeral'

Bertrand Russell

. . . in this chapter we shall consider the word "the" in the singular, and in the next chapter we shall consider the word "the" in the plural. It may be thought excessive to devote two chapters to one word, but to the philosophical mathematician it is a word of very great importances: like Browning's grammarian with the enclitic de, I would give the doctrine of this word if I were "dead from the waist down" and not merely in prison.

Bertrand Russell: 1919, *Introduction to Mathematical Philosophy*

The Greeks on *If*

According to Sextus Empiricus, the Alexandrian poet Callimachus reported that the Greek philosophers' debate about the semantics of the little word *if* had gotten out of hand:

> *Even the crows on the roof-tops are cawing about which conditionals are true.*

It finally became too much for Cicero, who complained in his *Academica*:

> *In this very thing, which the dialecticians teach among the elements of their art, how one ought to judge whether an argument be true or false which is connected in this manner, 'If it is day, it shines', how great a contest there is;—Diodorus has one opinion, Philo another, Chrysippus a third. Need I say more?*

What's The Fuss?

- Semanticists: Little words provide the "logical" backbone of the language
- Morphologists/Syntacticians: Little words provide the "structural" glue of the language

(see my 1995 paper "The Formal Semantics of Grammaticalization" (NELS 25.2))

The Story of *If*

- A Beautiful Vision (includes an astonishing claim about *if*)
- A Disturbance (includes a second astonishing claim about *if*)
- Arguments & Responses
- A Nasty Problem & The Escape

Division of Labor

- Philosophers give us answers to the deep questions (What do sentences mean? Even: What do such-and-such sentences mean?)

- Linguists and Psychologists work on how things are implemented (in grammar, in the mind) and how they work in detail (How do such-and-such sentences come to mean what they mean compositionally? How do speakers know what they mean?)

- Add to that: Logicians whose study of the formal behavior of artificial, stipulated languages has given us plenty of tools for the analysis of actual, naturally grown languages

If and Possible Worlds

(1)   If the butler hadn't killed Poirot, the gardener would have.

(1) is true in a world w just in case the worlds w' in which the butler didn't kill Poirot (but that are otherwise as much like w as possible) are all worlds in which the gardener killed Poirot.

[Stalnaker 1968, Lewis 1973]

(2)   If the butler didn't kill Poirot, the gardener did.

Indicative conditionals have the same basic truth-conditions as counterfactuals, except that they are more constrained by what is conversationally presupposed (here: the evidence we have about the time and circumstances of the murder).

[Stalnaker 1975]

The Question of Compositionality

Question: How do conditionals come to mean what they mean?
  Answer: *If* doesn't mean anything!

Huh?

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

"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* . . . [. . .]. It serves
merely to mark an argument-place in a polyadic construction."
(Lewis "Adverbs of Quantification", 1975)

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.

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
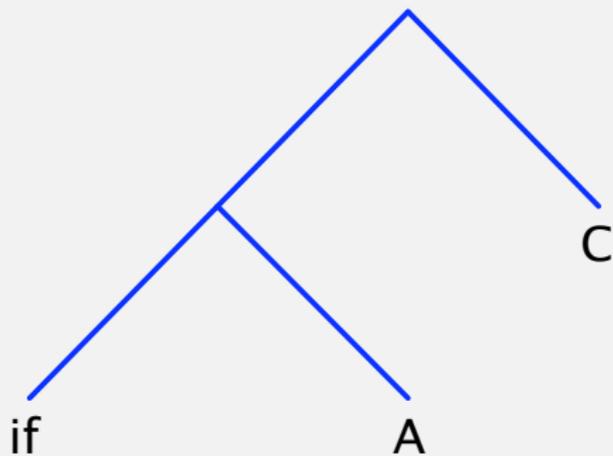
After Lewis, Kratzer, Heim

Operator

if   A

C
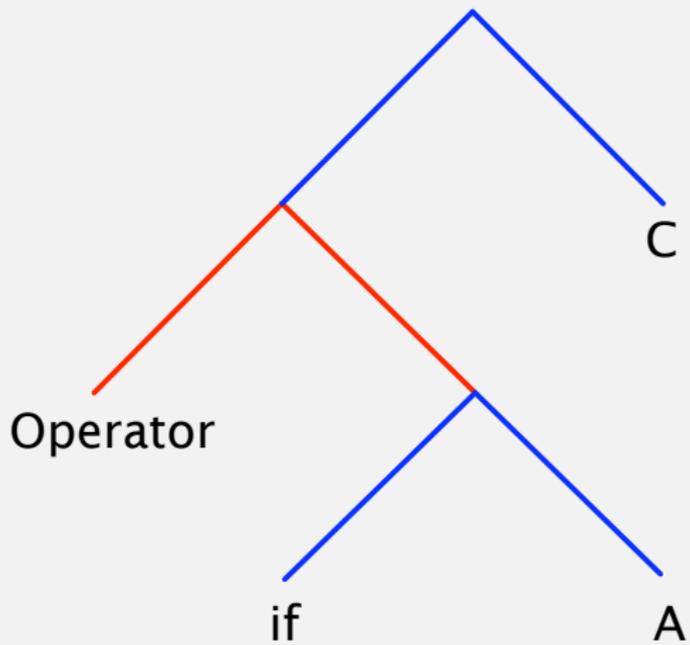
'If' Restricting Various Operators

(4) If John committed this murder, he **ought** to be in jail.
   if restricts *ought*

(5) If we are on Rte. 195, we **must/might** be in Mansfield.
   if restricts epistemic *must/might*

(6) If it rains tomorrow, the game **will** be cancelled.
   if restricts future modal *will*

(7) 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

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

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

Kratzer:

- covert operator restricted by *if*-clause
- covert frequency adverb in (8) ($\approx$ "always")
- covert epistemic necessity modal in (9) ($\approx$ "must")

Needed: A Theory of Epistemic Modals

If bare indicative conditionals like

??   If John was here on time, he left Cambridge at noon.

involve a covert epistemic necessity modal, then to understand
them we need to understand epistemic modals.

The Meaning of Epistemic Modals

Hintikka-style semantics:

must ϕ is true at world w iff ϕ is true at every world compatible with

- what is known at w
- the evidence available at w
- the information at hand at w

Notes:

- Kratzer has a more detailed development of Hintikka's semantics (adding a measure of ranking of the indices), which we will not discuss today.
- there are some other components of meaning (evidentiality in particular), but this will do for now.

Contextual Variability/Flexibility

Hacking, Teller, DeRose: Flexibility of the Relevant Knower(s)

- solipsistic: *must* ϕ = "as far as **I** know, must ϕ"
- group: *must* ϕ = "as far as **we** know, must ϕ"

The Working Assumption

Run-of-the-mill indicative conditionals à la

??   If John was here on time, he left Cambridge at noon.

involve

- an *if*-clause restricting
- a covert epistemic necessity modal
- which will show the usual contextual flexibility

A Disturbance in the Force

- Linguists work with the assumption that a particular kind of possible worlds semantics for indicative conditionals is correct
- Philosophers have withdrawn their assent and have become convinced that indicatives are extra-ordinary creatures

The Extra-Ordinary Claim

NTV (**N**o **T**ruth **V**alue): Indicative conditionals (*If A, C*) are not sentences that are asserted to express propositions with an ordinary truth-conditional content. Instead:

- They express (rather than assert) a high conditional probability of *C given A*. Or:
- They serve to make a conditional assertion of C under the supposition that A.

Ridicule?

Lycan:

- "The claim that ordinary conditional sentences lack truth-values is grossly implausible on linguistic grounds."
- "The linguist would think you were crazy."
- "Yet according to NTV, indicatives not only differ in meaning from the corresponding subjunctives, they do not even have anything like the same *kind* of meaning that subjunctives do. Tell that to a linguist and s/he will laugh in your face. (I have done that experiment.)"

To find out why NTV proponents make their astonishing claim, I turned to Jonathan Bennett's book as my guide.

I will address two of the arguments that he discusses:

- The Complaint about Discourse
- The Compelling Intuition about the Probability of Conditionals

Gibbard: Subjectivity
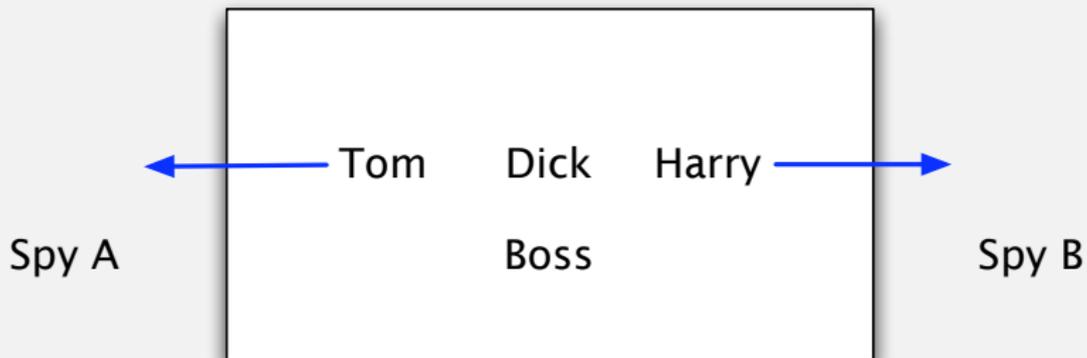
Spy A: *If he didn't tell Dick, he told Harry.*
Spy B: *If he didn't tell Dick, he told Tom.*

Lewis in "Probabilities of Conditionals ..." (1976):

> Presumably our indicative conditional has a fixed
> interpretation, for speakers with different beliefs, and for
> one speaker before and after a change in his beliefs. Else
> how are disagreements about a conditional possible, or
> changes of mind?

"Your assertion of *If A, C* was not a report on your state of mind because neither you nor I treated it in that manner. [. . .] When I asked 'Are you sure?' and you said 'Yes, fairly sure', you were not assuring me that your probability for C given A was high; rather, you were expressing confidence in that high conditional probability."

"[M]any indicative conditionals have a subjective element to them, yet they are not devices whereby the speaker reports some fact about himself. The only other way to accommodate this subjectivity is to suppose that in an indicative conditional the speaker expresses but does not report a fact about his own state of mind. In the absence of anything else he could be reporting, the conclusion is that indicative conditionals are not reports at all; that is, they are not propositions with truth values."

The Traffic Problem

- If indicatives were epistemic conditionals, they would be reports about the speaker's state of mind.
- Indicative conditionals are not treated intersubjectively as reports about the speaker's state of mind.
- So, the epistemic theory is wrong.

Explicit self-reports are often not treated as such, either:

(10)   A: I believe it is raining.
        B: No, it's not.
        B': ??No, you don't.

(11)   A: I believe it is raining.
        B: Are you sure?

Second Line of Defense

According to the epistemic analysis, these indicatives are not in fact reports on the speaker's belief state but claims about what follows from the evidence available to the speaker together with the assumption that the antecedent is true.

So, when you asked "Are you sure?", you asked whether I am sure that the evidence available to me is such that with the addition of the antecedent it entails the consequent.

Third Line of Defense

According to the epistemic analysis, these indicatives are — in the right context, perhaps even preferably — interpreted as about the evidence available to not just the speaker but to a group, a community of investigators.

(12)   A: Yuck.
        B: Are you sure?

It appears that true expressives (here an expression — not an assertion — of disgust) are treated in discourse as entirely subjective. So, NTV in fact might not predict correctly that conditionals are felt to be more objective.

Jackson on the Compelling Intuition
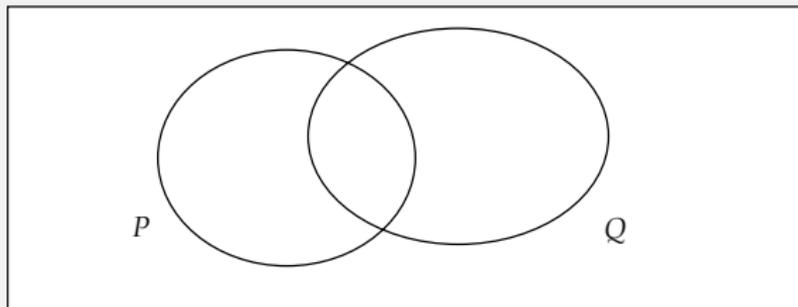
"I ask you the following question, If you throw a dart at the board, how likely is it to land in the area marked Q if it lands in the area marked P? It is compelling that the answer to this question is nothing other than how likely the dart is to land in the intersection of P and Q given it lands in 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)

The Compelling Intuition

The probability of a conditional is the conditional probability.

The Trouble with the Compelling Intuition

Lewis and successors:

- There is no (sane) way to give truth-conditions to $A \rightarrow C$ such that the probability of those truth-conditions being satisfied = the conditional probability of C given A.

Jackson 2006:

- There is no such-and-such conditions associated with $A \rightarrow C$ (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 C given A.

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."

When we ask

(13)   What is the probability that C, if A?

(14)   How likely is it that C, if A?

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

Instead, the *if*-clause does its usual job. It restricts an operator, here: the probability operator. What does a restricted probability operator express? Conditional probability.

In fact, that is precisely what Lewis said, in a paper that only linguists seem to have read:

"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."

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

(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".

Cross-Speaker Cases

How can the restrictor-operator relation be established in cases like the following?

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

[von Fintel, Colloquium at UMass, December 2003. The point was also raised at a conference on conditionals at UConn in April 2006 by Brian Weatherson.]

The Problem

- In such dialogues, a propositional anaphor (*so*, *that*) appears to refer back to the conditional in the other speaker's utterance.

- Nevertheless: the second utterance is not interpreted as involving a conditional (with its own operator from the first speaker's utterance) embedded underneath the operator introduced by the second speaker.

- Instead: *probably so* is interpreted as the simple claim that the conditional probability of A given C is reasonably high.

- This is mysterious from the perspective of the Lewis/Kratzer/Heim account, since there are no simple conditional propositions in that account, which could travel between speakers as seems to happen here.

At one time, I thought the way out was to say that:

- The anaphors (*so*, *that*) stand in for just the consequent, and
- there is a covert anaphor (somehow part of the operators *probably* and *unlikely*) that refers back to the antecedent.
- Something similar certainly happens with quantificational cases like this one:

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

  where inside the quantifier we have the anaphor *them* (or in fact, a covert anaphor) that refers to the set of students, and then we have the VP anaphor *do* or null complement anaphor to refer to the property *smokes*.

Not the Way Out

Unfortunately, that won't carry over. Consider:

(23)   A: If he didn't tell Harry, he told Tom.
        B: He probably told Tom.
        B': It's very unlikely that he told Tom.

These cannot be interpreted as involving implicit conditionalization to the antecedent introduced by A. Since the story we just tried relies on the possibility of implicit conditionalization, it has to be wrong.

Belnap's Alternative

Lewis in his "Adverbs of Quantification" noted that there was an alternative to the syntactic restrictor analysis:

- Belnap's meaning for conditionals: *if A, C* is true if *A* and *C* are true, false if *A* is true but *C* is false, and has no truth-value if *A* is false
- Embedding operators are restricted to quantify over worlds where the embedded proposition has a truth-value
- This mimics the syntactic restrictor account while still treating *if A, C* as a constituent with a meaning.
- Lewis dismissed this account because he found the price "exorbitant".

With the Belnap/Lewis trick, we can analyze our dialogue as follows:

A: *If he didn't tell Harry, he told Tom.*
   must (if he didn't tell Harry, he told Tom)
   in all worlds compatible with the evidence where the
   embedded conditional has a truth-value (i.e. where he didn't
   tell Harry), he told Tom

B: *Probably so.*
   probably (if he didn't tell Harry, he told Tom)
   in most worlds compatible with the evidence where the
   embedded conditional has a truth-value (i.e. where he didn't
   tell Harry), he told Tom

- 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.)

- 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 A, C* presupposes that *A* is true. So, we need a new technical system that distinguishes presuppositions from Belnap-partiality.

Summary

- We have come a long way since the crows in Alexandria and Athens were commenting on the semantics of conditionals.
- We have seen two astonishing claims (*if* has no meaning but is a syntactic marker, conditionals have no truth-conditions).
- I have argued that both claims are wrong but that something in the neighborhood is true.
- We need the three-valued Belnap-conditional together with the embedding operators identified by Lewis/Kratzer/Heim.
- The resulting theory is novel and needs to be worked out.
- It is not a theory that the crows knew about.

What Else Do Semanticists Work on When They Work on
Conditionals?

- Cross-linguistic investigation
- Tense & Aspect and the "Indicative/subjunctive" connection
- Negative Polarity Items
- Complex Conditionals: *unless*, *only if*, *even if*
- Even more complex conditionals: *If you want to go to Harlem, you ought to take the A train* (von Fintel & Iatridou)
- etc.