Kratzer on Conditionals
Conditionals Seminar
Loewer and Stanley

> The history of the conditional is the story of a syntactic mistake. There is no two-place "if…then" connective in the logical forms for natural languages.
> -Angelika Kratzer, "Conditionals"

Background to "Conditionals"

A. Lewis on Adverbs of Quantification
B. Kratzer on Modals

Part I. Lewis on Adverbs of Quantification

Examples of adverbs of quantification: "always", "usually", "sometimes".

(1) The fog usually lifts before noon here.
(2) Caeser seldom awoke before dawn.
(3) Riders on the thirteenth avenue line seldom find seats.
(4) A quadratic equation seldom has more than two solutions.

Quantifiers over times? No, because examples (2) and (3). Quantifiers over events? No, because example (4).

(Note that contemporary semanticists do not think of events as necessarily spatio-temporally located).

Lewis's theory: They are quantification over cases (n-tuples). This is wrong, as we shall see later.

Adverbs of quantification are unselective binders of variables; they bind all variables in their scope.

(5) Always, p divides the product of m and n only if some factor of p divides m and the quotient of p by that factor divides n.

Here, "always" binds multiple variables in its scope.

Always Φ is true iff Φ is true under every admissible assignment of values to all variables free in Φ.

The proportion problem (due to Irene Heim):

(6) A farmer who owns a donkey usually beats it.

Restriction by If-Clauses

(7) Always, if x is a man, if y is a donkey, and if x owns y, x beats y now and then.

A case here is a triple: a value for x, a value for y, and a time-coordinate (longest stretches seem called fore, perhaps years). The admissible cases are those that satisfy the three if-clauses. That is, they are triples of a man, a donkey, and a time such that the man owns the donkey at the time. (7) is true iff the modified sentence 'x beats y now and then' is true for all admissible cases. Likewise [for "sometimes, usually, often".]

It may happen that every free variable of the modified sentence is restricted by an if-clause of its own, as in
(31) Usually, if x is a man, if y is a donkey, and if z is a dog, y weighs less than x but more than z.
But in general, it is best to think of the if-clauses as restricting whole cases, not particular participants therein.

It makes no difference if we compress several if-clauses into one by means of conjunction or relative clauses [this will be relevant when we discuss Kratzer]

We have a three-part construction: the adverb of quantification, the if-clauses (zero or more of them), and the modified sentence. Schematically, for the case of a single if-clause:

(38) Always (sometimes, usually) + if Ψ + Φ

So, in "Adverbs of Quantification", Lewis argues that conditionals containing adverbs of quantification are not really conditionals. Rather, they are quantificational constructions, headed by the adverb of quantification. The antecedent is a restrictor on the quantifier.

The contribution Kratzer makes is to argue that all apparent conditionals are in fact quantificational constructions, where the quantifier is often a modal term such as "must". Where there is no explicit quantifier, it is implicitly present.

Part II. Krazter on Modals

Let 'f(w)' denote a function that, given a world, yields a set of propositions. It might yield the set of propositions known in that world, or it might yield the set of propositions known by the participants in some particular conversation in that world.

Simple necessity: A proposition is a simple necessity in a world w with respect to the conversational background f if and only if it follows from f(w).

Simple possibility: A proposition is a simple possibility in a world w with respect to the conversational background f if and only if it is compatible with f(w).

Let α be "necessarily β", where β expresses the proposition q.

(i) A proposition is expressed by the utterance of α only if there is one and only one conversational background for this utterance.
(ii) If a proposition p is expressed by the utterance of α, and if f is the conversational background for this utterance, then p is that proposition which is true in exactly those worlds w of W such that q is a simple necessity in w with respect to f.

Different kinds of conversational backgrounds: in view of facts of such and such kind ("realistic conversational background"), in view of what is the case ("totally realistic conversational background"), in view of what is known ("Epistemic conversational background"), in view of what is command ("deontic conversational background").

Ordering sources: These are partial orderings on sets of worlds, established by what Kratzer calls an "ideal". If the ideal is (say) those worlds in which everyone has the career they ought to have (I'm using sets of worlds as ideals rather than sets of propositions), then worlds are ordered in terms of how close they are to these worlds.

Ordering sources are needed principally for comparative possibility. But they are also used for conditionals with modals in their consequents. We won't get into these complications today.

Let's turn now to Kratzer's classic paper "Conditionals".

"The recent history of semantics can be seen as a history of the gradual decline of the material conditional."

Generalized Quantifier Theory; Lewis on Adverbs of Quantification

Solving Grice's Paradox (from Grice, "Indicative Conditionals"):

> Yog and Zog play chess according to normal rules, but with the special conditions that Yog has white 9 times out of 10 and that there are no draws. Up to now, there have been a hundred games. When Yog had white, he won 80 out of 90. And when he had black, he lost 10 out of 10. Suppose Yog and Zog played one of the hundred games last night and we don't yet know what its outcome was. In such a situation we might utter (24) or (25):
>
> (24) If Yog had white, there is a probability of 8/9 that he won.
> (25) If Yog lost, there is a probability of ½ that he had black.
>
> Both utterances would be true in the situation described…

(26) 8/9 probably [If Yog had white, then Yog won]
(27) ½ probably [If Yog lost, Yog had black]

But given the rules of chess, “if Yog had white, then Yog won” and “If Yog lost, Yog had black” are contra-positives of one another. If the material conditional analysis were true, the two embedded conditionals are equivalent. But then how could they have different probabilities?

Kratzer’s theory solves Grice’s paradox. (24) and (25) involve modalities with distinct restrictors. The conditional in (24) involves a restriction to cases in which Yog is playing a game with white. The conditional in (25) involves a restriction to games in which Yog lost. The proportion of total games in which Yog has white to games in which Yog had white and won is 8/9. The proposition of games in which Yog lost in which he had black is ½. So Kratzer’s theory easily accommodates Grice’s paradox.

Simple indicative conditionals, for Kratzer, are implicitly modalized: usually, the modal is an epistemic modal.

(1) If my hen has laid eggs today, then the Cologne cathedral will collapse tomorrow.
(2) [Must: my hen has laid eggs] The Cologne cathedral will collapse tomorrow.

Then, we apply Kratzer’s theory of modals. (1) is then true iff the Cologne cathedral will collapse tomorrow is true in all worlds consistent with what I know in which my hen has laid eggs.

Epistemic modals are context-sensitive, relative to a person’s evidence:

> Suppose a man is approaching both of us. You are standing over there. I am further away. I can only see the bare outlines of this man. In view of <u>my</u> evidence, the person approaching may be Fred. You know better. In view of <u>your</u> evidence, it cannot possibly be Fred, it must be Martin. If this is so, my utterance of (33) and your utterance of (34) will both be true:
>
> (33) The person approaching might be Fred.
> (34) The person approaching cannot be Fred.
>
> Had <u>I</u> uttered (34) and <u>you</u> (33), both our utterances would have been false. The modals in the two sentences, then, behave like true indexicals. Certain bare indicative conditionals show strikingly similar properties as show by [Gibbard’s Sly Pete example]

Discussion of Sly Pete (a topic to which we will return).