Indicative Conditionals*

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0.   Introduction

If Jones bet on the Czech team to win the Gold, he won.

Candidate Analyses:

a.	material conditional	(untenable)
b.	(variably) strict conditional	(inadequate)
c.	epistemic conditional	Stalnaker (1975), Kratzer (1978; 1986), Warmbrod (1983), Pendlebury (1989), Lowe (1991), McCawley (1996), etc.
d.	conditional belief/ subjective probability	Adams (1975), Gibbard (1981), Edgington (1986; 1995)

Arguments:[1]

The Gibbard Phenomenon
Ridicule of Epistemic Analysis
Judgments and Statements about the Probability of Conditionals

Outline of this Talk:

1. The Gibbard Phenomenon
2. The Choice
3. The Derivation of the Epistemic Analysis
4. Comparison
5. Conditional Uncertainty

[6. The Logic of Indicative Conditionals
   (includes stuff about the dynamics of quantification)]

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[1]These arguments have already been answered by Kratzer   (1986), but her paper suffers both from not having been read much and from being very terse. I will attempt to spell out in more detail how one should respond to the arguments.

1. The Gibbard Phenomenon[2]

> M, at a peep-hole, is spying on three hit-men, Tom, Dick and Harry, and their boss. M hopes to discover who will receive the order to kill. M sees Tom leave the room. He then hears the boss give the order. M thinks (and could easily assert)
>
> If he didn't tell Harry, he told Dick (not Tom)
>
> Another spy, N, at a different peep-hole with a different view, saw Dick leave the room by a different door. He too heard the boss give the order. N thinks (and could easily assert)
>
> If he didn't tell Harry, he told Tom (not Dick)
>
> Each has adequate grounds for his conditional belief. The only relevant information that each would like but does not have - that the boss told Harry - would not refute their conditionals, but would render them useless: we have no use for "If he didn't tell Harry " thoughts when we are sure that he did tell Harry.

One argument from this is directed against truth-values for such conditionals.

- Not both true: because from a single perspective *if p, q* and *if p, not q* are taken to be incompatible.
- Not both false: because neither speaker commits an error.
- Not one true, and the other false: because there is no reason to prefer one conditional over the other.
- Furthermore, when all the facts are in, both conditionals seem useless.
- Therefore: perhaps, best not to attribute truth at all.

Edgington puts the argument as follows:

> [No] case can be made for saying one is right and the other wrong. Neither makes any mistake: no case can be made for saying both their judgments are false. So: their judgments can't both be true, and can't both be false, nor can it be that just one of them is false. Truth and falsity are not suitable terms of assessment, in such cases.
> (Edgington 1997: p. 107)

But: Gibbard and Stalnaker (1984) admit another possibility: both conditionals may be true (when said and when said by their actual speaker) because such conditionals are context-dependent on the speaker's belief system. This gives up on objectivity (but in a certain sense only: the truth-conditions depend on the speaker's beliefs; still objective in the sense that such conditionals are objectively true or false, no matter who does the assessing, depending on the actual state of the speaker's knowledge).

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[2]The argument I am about to discuss is due to Allan Gibbard (1981: 226-232). There are some flaws in his original example, which have led some people (Pendlebury 1989) to be less than convinced of the reality of the phenomenon. Examples that show the phenomenon clearly can be found in Warmbrod (1981; 1983) and in Edgington (1995; 1997). The example I use is one from Edgington.

2.   The Choice

The choice between the epistemic analysis of indicative conditionals and the analysis of them as mere expressions of conditional beliefs or subjective conditional probabilities has not so far been addressed in any detail. The rejection of the epistemic analysis may often be fed by two long-standing undercurrents:

- The view (coming out of ordinary language philosophy) that truth-conditional semantics is not applicable to many expressions that have something other than straightforward assertoric force.

  But: See Lewis (1972; 1979) for the suggestion that one can have a truth-conditional semantics and still account for various kinds of speech act effects.

- A deep suspicion that appeals to context-dependency are illegitimate and merely serve to insulate an analysis from counter-argumentation. Pragmatics as a "wastebasket".

  But: Substantive and formally explicit analyses of various kinds of context-dependency are now readily available. Not an insulation strategy but a well-understood tool in the analysis of natural language.

I haven't found any explicit passages that voice the first of these worries, but the prejudice against context-dependency may come out of passages like these:

> Stalnaker (1984: 111) admits the possibility of treating indicative conditionals as expressing context-dependent propositions, but says that "the propositions will be highly context-dependent. To play their methodological role, open conditionals must be too closely tied to the epistemic states of the agents who utter them for those conditionals to express propositions which could be separated from the contexts in which they are accepted".

> Gibbard (1981: 234) says that the context-dependent account will only work "at the cost of such radical dependency o[n] the utterer's epistemic state".

> Edgington (1995: 307f) dismisses the context-dependent analysis as not really salvaging the view that conditionals have truth-conditions: "This is neat, but it does require radical context-dependence of conditional propositions. […] I don't wish to deny that there is such a thing as context dependence. But to appeal to it to such an extent might be thought to vitiate the point of the appellation 'true'. […] this provides further reason to doubt that such 'truth conditions' deserve their name".

I will argue that even though under the epistemic analysis the truth-conditions given to indicative conditionals are highly radically context-dependent, there are plenty of reasons to prefer this analysis to others, in particular one that denies that they have any truth-conditions at all. The primary argument for the epistemic analysis comes from the fact that it allows a treatment of indicative conditionals as part of a general compositional theory of modal and conditional statements in natural language.

3.   The Derivation of the Epistemic Analysis

- Modal statements are analyzed as quantifying over possible worlds.

- Necessity modals: universal quantification
- Possibility modals: existential quantification

- Different kinds of modality due to two elements of context-dependency (Kratzer):

    - Various kinds of domains of worlds
        - epistemic (worlds compatible with everything that is known)
        - circumstantial (worlds compatible with certain facts)

    - Various orderings on the domain of worlds
        - similarity to actual world
        - moral perfection
        - stereotypicality

- For the interpretation of any given occurrence of a modal operator with respect to an evaluation world, a domain needs to be assigned to this world (by a "modal base" function) and the domain needs to be ordered depending on what ordering is assigned to the evaluation world (by an "ordering source" function).

- *If*-Clauses in general are devices to restrict various kinds of operators

    - Adverbs of Quantification (Lewis 1975)
    - Determiners (Kratzer 1986, Heim, von Fintel 1998b)
    - Modals (Kratzer 1978; 1981; 1991), among them epistemic modals:

        If John's light is on, he must be home

- An *if*-clause in a structure that does not contain an overt operator, induces the presence of a <u>covert</u> operator. Apart from a covert generic/habitual operator (whose existence is independently known), such *if*-clauses apparently can also combine with a covert epistemic modal (Kratzer 1978). These two readings are also known as multi-case conditionals vs. one-case conditionals (Kadmon 1987).

        If John stays late at work, he has no dinner.
        If John's light is on, he is home.

- The covert epistemic modal is also useful for the analysis of sentences like

        As far as I know, John is home.

- *If*-clauses can also combine with whatever operator is responsible for subjunctive/"counterfactual" conditionals.
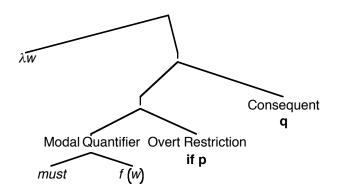
        If John's light had been on, he would have been home.

- Arguably, the meaning difference induced by subjunctive marking is simply a presupposition that the domain of quantification is not included in the common ground of the current conversation (Stalnaker 1975, von Fintel 1998a). In simple cases this means the conditional antecedent is contrary-to-(assumed)-fact, but other cases show the superiority of the Stalnaker idea.

    Other differences between indicative and subjunctive conditionals are hopefully then just a matter of what kinds of context-dependent resolutions of domain of quantification and ordering of worlds naturally go with a signal that the domain is

entirely inside the common ground or reaches beyond it.

- Like many or all natural language quantifiers, the modals restricted by *if*-clauses carry an "existence presupposition" with respect to their domain. Here, this will mean that there is a presupposition that there are worlds in the domain in which the antecedent proposition (the one expressed by the *if*-clause) is true.

We end up with the following illustrative analysis for an epistemically read indicative conditional (ignoring the ordering of the domain):

```
λw
                                              Consequent
                                                  q
        Modal Quantifier   Overt Restriction
                                  if p
          must        f (w)
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Here, covert material is marked by italics, overt material by boldface.

Semantically, the modal takes as its first argument a domain of worlds, which results from applying the modal base function *f* to the evaluation world *w*. The second argument is the proposition expressed by the *if*-clause, the third argument is the proposition expressed by the consequent clause.

Depending on what we end up doing about the effect of the ordering of the domain, we can either say that the modal ends up making a claim about all the *p*-worlds in *f(w)* or that a particular subset of the *p*-worlds is selected from *f(w)*. Let us assume the former here (this makes the conditional a strict conditional, which with some bells and whistles is argued to be correct in von Fintel 1997).

The indicative marking indicates that in the current context **c** with speaker **s** and utterance time **t**, for all worlds **w** in the common ground of **c**, *f*(**w**) is included in the common ground.

The modal has an existence presupposition with respect to its entire restriction, i.e. $f(w)! \cap p$, in essence: there have to be accessible *p*-worlds.

Together with the indicative presupposition, we obtain the presupposition that *p* is compatible with the common ground of the context. This means that epistemic indicative conditionals are unusable when their antecedent is incompatible with the common ground.

[For more on these presuppositional computations, see von Fintel 1998a.]

One particularly common use of this sentence would be one where the context **c** resolves the modal base function *f* to be an epistemic one which assigns to any world *w* the set of worlds which are <u>compatible with everything that is known in *w*</u>.

In such a case, this conditional would express the proposition that is true in any world *w* iff every *p*-world compatible with what is known in *w* is a *q*-world.

4.   Comparison

While there are important differences, which will become relevant soon, under this analysis there is near synonymy between the following conditionals:

> If he didn't tell Harry, he told Tom (not Dick).
> If he didn't tell Harry, he must have Told Tom (not Dick).
> Given what I know, if he didn't tell Harry, he told Tom (not Dick).
> Given what I know, if he didn't tell Harry, he must have told Tom (not Dick).

The Gibbard phenomenon is explained as a case where the epistemic claim is about the speaker's knowledge state; and since the different speakers in the scenario do have different knowledge states, they can truthfully utter different (even contradictory) conditionals.

The main advantage of the epistemic analysis versus the non-propositional analysis lies in the principled way the availability of epistemic conditional is derived. Such uses of conditionals fit into a general unified theory of conditionals. This is not obviously so in the case of the non-propositional analysis.

Does this settle the issue? Are there any other considerations? (Apart from the considerations about Conditional Uncertainty, which we'll discuss soon).

It might be suggested (and has been by proponents of the material conditional analysis) that a speaker-centric analysis (whether the epistemic one or the radically non-propositional analysis) suffers from being too subjective. As Lewis (Lewis 1976: 138) argues:

> "presumably our indicative conditional has a fixed interpretation, the 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?"

I don't think there's much to worry about here.

(i)   Disagreements do not <u>have to be</u> about the truth-conditional content of an assertion. They can just as easily be about the truth of the beliefs that underlie the claim. Grice (and Stalnaker building on Grice) present just such a case using a disjunctive assertion. Two different speakers disagree about an election:

> A: Either X or Y will win.
> B: Either Y or Z will win.

The speakers disagree. But their disagreement may well continue even after the election in which Y wins, which in a way proves both of them right (both their disjunctive assertions are "verified" in a simple sense by what happens). What prompted their different assertions were different assumptions about the electoral system, the mood of the electorate, etc.

(ii) Cases where epistemic conditionals are intended as statements only about the speaker's state of knowledge are not in fact the only way epistemic conditionals can be read. Note the deliberate vagueness in the way I described the epistemic modal base function: it assigns to the evaluation world *w* the set of worlds <u>compatible with everything that is known in *w*</u>.

In recent work on epistemic modality, Keith DeRose (1991) has argued that epistemic modal statements are "flexible" with respect to whose the relevant "knower". These statements are not invariably about the current information state of the speaker. This flexibility was already discussed to some extent by Teller (1972).

DeRose presents an example that shows that at least two kinds of epistemic claims exist: ones that report on the knowledge of the speaker and a group containing her, and ones that claim something about what is known or even knowable by anyone relevant. Here is his example:

There is a suspicion that John may have cancer. A test has been performed, the doctors know the outcome, Mary, John's wife, and John won't know until after the weekend is over. Bill, John's brother, asks Mary whether it is true that John has cancer. Mary can say two things:

> It is possible that John has cancer. He has some of the symptoms. But it's by no means certain that he's got it. They've run a test on him which may rule cancer out, but they won't tell us the results of the test until Monday.

> I don't know whether it is possible that John has cancer; only the doctors know. We'll find out Monday when the results of the test are revealed.

It seems that Mary is justified in answering in the first way even though she cannot be sure that the possibility of cancer hasn't been ruled out. Similarly, in the Gibbard example above. The speakers there cannot be sure that the possibility of the boss not having told Harry hasn't been ruled out. In fact, they know it has either been ruled out or established as true.

(iii) Since we have been using the notion of <u>knowledge</u> rather than mere belief, a further element of objectivity is introduced into the seemingly radically subjective epistemic analysis. A speaker may be in error about which of his beliefs are actual pieces of knowledge. And hence, even epistemic statements that refer only to the speaker's knowledge can turn out to be false.

Warmbrod (1983) has argued that epistemic conditionals therefore give rise to Gettier scenarios.

> Smith knows that Kramer made a bet on a certain coin toss. Smith has no information about whether Kramer bet heads or tails. However, an informant whom Smith has good reason to trust has told him that the *outcome* was heads. But suppose that on this occasion the informant was lying. The outcome was really tails. Imagine, that Kramer bet tails and therefore won.
>
> Now, consider the following indicative conditional and its correspondent disjunction:
>
> > *If Kramer bet heads, he won.*
> >
> > *Kramer bet tails or he won.*
>
> Since Smith has good evidence that the outcome was heads, he is justified in believing and asserting both the conditional and the disjunction.
>
> But it seems that in this scenario, the conditional is false while the disjunction is true.

5.   Conditional Uncertainty

Edgington's main argument against truth-conditions is this:

> 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. … [I]f a theory states an equivalence between items of belief to which competent users stably, incorrigibly and unhesitatingly take different attitudes (and their practice serves them well), then, on the face of it, the theory is wrong. (Edgington 1995: 260)

To see this argument at work, let's use it against the epistemic analysis of indicative conditionals. Here's how it would go (applying Edgington's strategy):

> I am quite sure that it isn't true that in <u>all</u> worlds compatible with my knowledge in which the coin was tossed ten times, the coin landed heads at least once.
>
> But I am nevertheless almost certain that if the coin was tossed ten times, it landed heads at least once.

So, the epistemic analysis is wrong.

This argument becomes even more powerful when we take into consideration the many triviality results reached by Lewis and other workers. There is in fact no proposition assignable to *if p, q* that has the property that its probability of truth is identical to the conditional probability of *q* given *p*.

So, how can we go on in the face of this consideration? Let's look at the argument again:

a. If a structure α occurring on its own expresses a proposition p, then structures like *It's quite probable that α* will talk about the subjective probability of the truth of the proposition p.

b. It is intuitively obvious that for any plausible candidate proposition that might be expressed by *if p, q*, it is clearly false that *It's quite probable that if p, q* talks about the subjective probability of the truth of that proposition.

c. In fact, it has been proved that there can't be any proposition whose probability is denoted by *the probability that if p, q*. (Assuming the latter is reliably read as denoting the conditional probability of *q* given *p*.)

d. Hence, *if p, q* does not express a proposition, even when it occurs on its own.

The fallacy in this argument lies in the principle in (a). Adding a probability operator to a structure will not leave the structure untouched. This is not quite as much of a compositionality problem as it may be. It is more of an issue of parsing and of when the grammar will introduce covert operators.

Under the Lewis/Kratzer analysis of *if*-clauses as restrictive devices it is expected that *if*-clauses can restrict probability operators. In structures where the probability operator is the only overt operator, there may be a strong preference for reading an *if*-clause as restricting that operator instead of any covert operator, which may in other cases be posited quite naturally.

The logical form is something like this:

[probability [if p]] [q]

There is no conditional *if p, q* embedded under the probability operator. No arguments about the meaning of conditionals can be based on these cases.

We can in general observe that the addition of a probability operator on top of many kinds of expressions changes their interpretation. In essence, the higher operator sucks material into its restriction. Here are some examples where a given structure is interpreted one way when it stands on its own and quite a different way when embedded under a probability operator.

a. On a given day, the Red Sox win.
a'. The probability that on a given day, the Red Sox win …

b. A randomly tossed coin comes up heads.
b'. The probability that a randomly tossed coin comes up heads …

c. A child in Emma's class is blonde.
c'. The probability that a child in Emma's class is blonde …

d. I hate a dog.
d'. The probability that I hate a dog …

Would anyone seriously contemplate the possibility that (c) can't express the simple existential proposition that it is normally taken to express, just because the same words do not contribute the same overall meaning when they occur under a probability operator?

When we do want to make sure that we are getting at the probability of a conditional proposition there are (imperfect) ways of ensuring that. Adding overt operators into the lower conditional like *invariably, certainly, must* will do the trick.

Compare for example

If the coin was tossed ten times, it landed heads at least once.
It's quite probable that if the coin was tossed ten times, it landed heads at least once.

If the coin was tossed ten times, it must have landed heads at least once.
It's quite probable that if the coin was tossed ten times, it must have landed heads at least once.

Conclusion

In the face of the Gibbard phenomenon, two candidate analyses of indicative conditionals survive. The epistemic proposition analysis is superior to the subjective probability/conditional belief non-propositional analysis, because it comes out of a unified approach to modal and conditional semantics. There is no argument against truth-conditions for indicative conditionals from conditional uncertainty, contrary to Edgington.

The way is open to explore the logic of indicative conditionals as epistemically modalized quantifications over possible worlds. The full version of this paper will contain a concluding section which applies the results in von Fintel (1997) to indicative conditionals.

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