

Moody conditionals:  
Hamburgers, switches, and the tragic death  
of an American president

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# 1 Introduction

“What ... is a conditional? Before passing on to the usual display of paradigmatic (non-)inferences, let us reflect more deeply. Our intuitions come in various kinds, and it is important to consider the more volatile ones first, concerning the *kind* of notion that we are after, before these are drowned in a list of very specific desiderata. Only in the light of such background intuitions, one can take a proper look at more concrete claims of validity or invalidity of conditional inferences.” (van Benthem [vB 1984, p. 309])

For all the outstanding formal work that he did, Johan van Benthem has always been interested in understanding the fundamental connections as well as the residual intuitive differences between different areas of application of the science of logic. He urges on us to give intuitions a proper hearing and turn them, whenever possible, into principles of various generality that may serve as guides to the conduct of more specialized logical research. In this note I shall begin to take Johan’s admonition quoted above seriously.

Unfortunately, I did not do so in my earlier work on conditionals (Rott [R 1986, R 1989, R 1991, R 1997]), and I now think that these logical studies capture only some very limited aspects of the use of conditionals in natural language. It is even difficult to call these earlier proposals idealizations, but there is at least both a historical explanation and a systematic reason for my failing to pay attention to important intuitive distinctions. The historical explanation is that my papers were written under the influence of writers like Stalnaker [S 1975] and Gärdenfors [G1979] who intended to apply their (and, to some extent, David Lewis’s) analyses to both counterfactuals and ‘open’ conditionals. The systematic reason for aiming at a general, unified analysis of conditionals is that on the hypothesis that semantics can be designed compositionally, it seems straightforward that the *if-then* construction should have a unique meaning, and that any differences in meanings between concrete conditionals should be explained by other lexical items or syntactical features of them – such as, most prominently, their grammatical mood.

Stimulated by a number of discussions led, and presentations given, at the University of Amsterdam, I discuss two rules of thumb that are very well-known in the literature on conditionals, and I sketch an argument to the effect that only an integration of temporal reasoning into hypothetical reasoning will help us to understand how the distinctions made become relevant for the interpretation of conditionals.

## 2 The acceptance status of the antecedent

There is a strong feeling that indicative and subjunctive conditionals differ precisely with respect to the attitude taken by the speaker to the antecedent (and possibly also to the consequent) of the conditional.

*Rule 1.* Indicative conditionals are “open” conditionals; they express that the agent (thinks that he) is ignorant about the truth value of the antecedent. Subjunctive conditionals are “belief-contravening” conditionals (or “counterfactuals”); they express that the agent (thinks that he) knows that the antecedent is false.

More often than one would expect is the acceptance status of the antecedent not quite clear. This is not a failure of introspection, nor is it a case of vagueness regarding the concept of belief. Consider the following variant of Adams’s [A 1970] famous example:<sup>1</sup>

- (1) If Oswald had not killed Kennedy, then Kennedy would have left Dallas unhurt.

It seems that a rational subject can perfectly well accept this conditional, and at the same time accept

- (2) If Oswald did not kill Kennedy, then someone else did.

If the agent is prepared to accept both of these conditionals simultaneously, does she believe that Oswald killed Kennedy, or doesn’t she? We should note that in (2) there is quite some temptation to improve the formulation by saying “If Oswald *really* didn’t kill Kennedy . . .” in the antecedent, or to formulate the consequent with a modalizing “. . . then someone else *must have* killed him.” It seems that she does believe (weakly or firmly) that Oswald killed Kennedy, but she is at the same time ready to admit that there might be some way of falsifying this belief and to accept relevant evidence to the contrary. This is a sound, fallibilistic attitude towards one’s own beliefs, and a type of attitude that reasonable people do and should take to most of their beliefs.

Thus, although Rule 1 has a strong initial plausibility, it cannot explain away<sup>2</sup> the difference between indicative and subjunctive conditionals

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<sup>1</sup>The same kind of example can actually be found in Ramsey [R 1931, p. 249].

<sup>2</sup>As I tried to do in Rott [R 1986, p. 357]; footnote 18 of that paper alleviates the harshness of my suggestion there.

by stipulating that if people were sufficiently clear about the acceptance status of the antecedents, they could never face the difficulty represented by seemingly incompatible conditionals like (1) and (2). There is more to this example than just the difference between “open” and “belief-contravening” antecedents.

### 3 Ontic and epistemic conditionals

The following example is due to Hansson [H1989]. Suppose that one Sunday night you approach a small town of which you know that it has exactly two snackbars. Just before entering the town you meet a man eating a hamburger. You have good reason to accept the following indicative conditional:

- (3) If snackbar  $A$  is closed, then snackbar  $B$  is open.

Suppose now that after entering the town, you see that  $A$  is in fact open. If the difference between indicative and subjunctive conditionals lay only in the acceptance status of the antecedent, we could change the grammatical mood and keep the conditional. But would we really accept the corresponding subjunctive conditional

- (4) If snackbar  $A$  were closed, then snackbar  $B$  would be open.

It seems clear to me that it is *not* justified to accept this conditional.<sup>3</sup> The holders of the two snackbars may well decide on their opening hours entirely independently, so there is no reason to believe that  $A$ 's being closed makes it any more probable that  $B$  is open. What is the topic here is a *counterfactual scenario*: What would have happened if the holder of  $A$  had not decided to open his snackbar on that Sunday night.<sup>4</sup>

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<sup>3</sup>It is less clear for the variant

If snackbar  $A$  would have been closed, then snackbar  $B$  would have been open.

because the past tense in this sentence may be interpreted as referring to the previous doxastic state.

<sup>4</sup>I think that the rejection of the subjunctive conditional (4) is not at all sensitive to whether you have seen that  $B$  is in fact closed. The only thing needed for my point is that you have *not* seen that  $B$  is open. — Would you still accept (3) after having “seen” that (4) is open? What you do see is actually only that snackbar  $A$  is lit and that there are several people in it. So although it does not look like that, it is possible that these people are just cleaning  $A$ , or they are shooting a film in this snackbar. You should be ready

The example confirms authors who have held that grammatical mood tells us something about whether a conditional is concerned with learning (changes of beliefs about the real world) or with hypothetical courses of events in the real world. This motivates us to formulate the following default rule:

*Rule 2.* Indicative conditionals are usually to be interpreted as doxastic conditionals. Subjunctive conditionals are usually to be interpreted as ontic conditionals.<sup>5</sup>

Another example, used in a recent talk by Tor Sandqvist in order to show that a consistent revision (an addition of information that involves no correction of an error) may lose accepted conditionals, illustrates the force of Rule 2. Consider a big switch with three positions, *L* (“left”), *C* (“center”), and *R* (“right”). First, suppose that some person tells you that the switch is not in position *R*. So you accept

(5) If the switch is not in position *C*, then it is in position *L*.

Then you are allowed to have a look at the leftmost part of the switch, and you see that it is not in position *L*. This observation is completely consistent with all your previous beliefs. Since you (hopefully) trust your own eyes more than the person that has informed you about the switch’s not being in position *R*, you now accept:

(6) If the switch is not in position *C*, then it is in position *R*.

Notice that the indicative mood is used in (6); the corresponding subjunctive conditional would not be acceptable. This conditional does not provide us with information about what the world is or would be like – the fact that the switch is not in position *C* would not *cause* its being in position *R*. It rather tells us something about the way we would revise our belief upon learning that, contrary to our current beliefs, the switch is not in position *C*. We do believe that the switch is in position *C*, but (6) reflects

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to potentially learn that *A* is not open after all. In our story which is due to Hansson, you would still keep (3). In the variation of the story described in Rott [R 1991] where the evidential role of the hamburger is replaced by a shimmering light perceived from a distance, you would lose (3) – even though the new observation that *A* is open does not contradict any of your previous beliefs.

<sup>5</sup>The distinction between doxastic (or “epistemic”) and ontic conditionals is due to Lindström and Rabinowicz [LR 1995, Section 2].

that our evidence against its being in position  $R$  is weaker than our evidence against its being in position  $L$ . Sandqvist's example thus shows that there are cases in which Rule 2 overrides Rule 1.

The very formulation of the two rules leaves us with a puzzle. The acceptance status of the antecedent appears to be independent of the ontic or epistemic content of a conditional. If that is true, the rules stated cannot both be correct.

There are, indeed, also exceptions to Rule 2. First, in accordance with Rule 1, conditionals with antecedents about future events, whether epistemic or ontological, are mostly indicative conditionals. For conditionals about the future it is hard to pinpoint a substantial difference between epistemic and ontic readings. The future is open, we possess no direct knowledge of it. So, isn't the only epistemic handle for evaluating conditionals about the future our knowledge of the laws of nature? And it is exactly the same laws of nature that are used to flesh out subjunctive what-would-have-happened-if stories.<sup>6</sup>

Other exceptions to Rule 2 are provided by subjunctives used in reductio arguments (or arguments that come very close to reductio arguments): "if it was [really] true that Oswald did not kill Kennedy, then we would all have been fooled for decades" or "if it [really] were the case that Oswald did not kill Kennedy, then we all would have been fooled for decades". When the consequent (typically phrased in the subjunctive mood) is supposed to be an absurd proposition, then the reductio is successful and the falsity of the antecedent is taken to be established. This is clearly epistemic reasoning, the subjunctive mood just indicates that the antecedent is ultimately – after successful completion of the reductio argument – considered to be very unlikely. Notice that the truth predicate (or the similar phrase "it is the case that") is not redundant in this example, but does an important job in facilitating substantially the interpretation of the subjunctive conditional as an epistemic one.

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<sup>6</sup>Sometimes subjunctive conditionals about the future serve as stylistic variants of their indicative counterparts, especially if the antecedent event is suggested to be unlikely: "if he won the competition tomorrow, his career would be irresistible". In some aspects the future is even *completely* determined by the past (e.g., the birthdays to come next week, cf. Jackson [J1987, p. 66]), and conditionals dealing with such aspects of the future behave like ordinary conditionals about the past.

## 4 Time matters

In this section I will confine myself to conditionals whose antecedents and consequents refer to events in space and time. Nothing will be said about conditionals dealing with mathematics, logics, rules of games, etc.

I submit that time is extremely important if we want to understand the difference in evaluating ontic and epistemic conditionals. (We are talking about acceptance conditions now; I will neglect the much disputed question whether either kind of conditionals possess truth values.) Let us take for granted that conditionals are evaluated by reasoning “under” the assumption of the antecedent. The essential question then is: How to accommodate one’s current beliefs to the event described in the antecedent  $A$ ?

A good approximation of the right answer seems to me this:

In evaluating an ontic conditional, one goes back to the time of the assumed antecedent event  $A$  and makes minimal adjustments of its past so as to smoothly accommodate  $A$ . But then is *completely* free to change the actual course of events after  $A$  has taken place as is required by the laws of nature and/or the most plausible trajectory resulting from the intervention of  $A$ . It is very common that the endpoint of the hypothetical trajectory deviates drastically from the present state of the actual world.

In evaluating an epistemic conditional, one goes back to the time of the assumed antecedent event  $A$  and makes minimal adjustments of its past and its future so as to smoothly accommodate  $A$ . One is free to change the actual course of events after  $A$  has taken place as much as is required, but one has to maintain those parts of the future of  $A$  of the truth of which one has comparatively good evidence. The endpoint of the trajectory is supposed to satisfy everything we think we know of the present state of the world.

Like in the case of epistemic conditionals, it is possible that different agents accept ontic conditionals with the same antecedent and contradictory consequents without one of them being necessarily false. Other than in the case of epistemic conditionals, this is not due to the agents’ beliefs and the available evidence for them. The ambiguity is rather due in the different ways of accommodation that are possible to manipulate the true history of the world before  $A$  so as to make  $A$  smoothly happen. David Lewis [L 1979] has given a good discussion of what sort of considerations are involved in

minimizing the changes of one history into another. Lewis, however, did not underscore the fundamental differences between the “value” of particular facts before the time at which  $A$  is assumed to occur and the particular facts after that time; this difference has been emphasized by Davis [D 1979].

## 5 One loose end, out of many

I have not mentioned another rule of thumb that has enjoyed some support in the recent literature. Drawing on the distinction of “revisions” and “updates” as it was introduced by Katsuno and Mendelzon [KM 1991], we can formulate:

*Rule 3.* Indicative conditionals are usually to be evaluated with the help of revisions. Subjunctive conditionals are usually to be interpreted with the help of updates.

It seems that this rule is rather closely related to Rule 2, but this – like many other things – remains to be investigated in future work.

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