

Conditionals, Truth and Objectivity

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In Section 1 I briefly sketch three kinds of theory of conditionals, and show that the third (the Suppositional Theory) avoids problems facing the other two. There emerges a version of the result that on the Suppositional Theory, conditionals cannot be understood in terms of truth conditions. In Section 2 I explore the suggestion that nevertheless some truth values for conditionals are compatible with the Suppositional Theory. In Section 3 I argue that there can be such things as objectively correct conditional judgements, despite their lack of truth values.

1. Three Theories of Conditionals

1.1 Preliminaries

I shall focus on what are normally called indicative conditional statements and the conditional beliefs they express. This class may be delimited, at least roughly, as follows. Take a sentence in the indicative mood, suitable for making a statement: ‘Mary cooked the dinner’, ‘We’ll be home by ten’. Add a conditional clause to it, at the beginning or end: ‘If Tom didn’t cook the dinner, Mary cooked it’, ‘We’ll be home by ten if the train is on time’; and you have a sentence suitable for making a conditional statement. I do not discuss here so-called counterfactual or subjunctive conditionals like ‘We would have been home by ten if the train had been on time’. (These are briefly discussed in Section 3.3.) Nor will I discuss conditional speech acts other than statements: conditional commands, questions, promises, offers, bets etc.; or conditional propositional attitudes other than beliefs--

conditional desires, hopes, fears, etc.. It is a constraint on a good theory of indicative conditional statements that it extend naturally and satisfactorily to these other speech acts: a conditional clause, ‘If he phones’, plays the same role in ‘If he phones, Mary will be pleased’, ‘If he phones, what shall I say?’, and ‘If he phones, hang up immediately’. (I discuss this in Edgington, 2001, section 5.) It is also a constraint on a good theory of indicative conditionals that it can be embedded in a larger theory which will explain the ease of transition from typical future-looking indicative conditionals to counterfactuals. I say ‘Don’t go in there: if you go in you will get hurt’. You look sceptical but stay outside, when there is a loud crash as the ceiling collapses. ‘You see’, I say, ‘if you had gone in you would have got hurt. *I told you so.*’ Our theories must not exaggerate the difference between indicatives and counterfactuals. But the indicatives need to be understood first, I think, before we see how to transform them into counterfactuals.

I do take my two opening examples to be of a single semantic kind. Each concerns a plain indicative statement, one about the past, one about the future, to which a conditional clause is attached. Some philosophers and linguists treat them as of different kinds¹. As will emerge in Section 3, while I think there are epistemic differences between conditionals about the past and typical ones about the future, resting on metaphysical asymmetries, there is no need to postulate a semantic difference. The arguments in this section are meant to apply indifferently to both kinds of example.

So: we have a systematic device for constructing conditional sentences out of two sentences or sentence-like clauses, the antecedent and the consequent, *A* and *C*; for instance

¹ Dudman (1984a, 1984b, 1988) has done most to promote this view. See also Gibbard (1981, pp. 222-6), Haegeman (2003), Smiley (1984), Bennett (1988), Mellor (1993) and Woods (1997). Bennett (1995, 2003) recanted and returned to the traditional view. Jackson (1990) also argues for the traditional view.

‘If Ann went to Paris, Charles went to Paris’. At least at a first approximation, if you understand any conditional, you understand every conditional whose constituents you understand. How does the conditional construction work?

1.2 Truth Conditions: Theories 1 and 2

It is natural to think our project is to give the truth conditions of ‘If A , C ’ in terms of the truth conditions for A and C . Our first two theories adopt this approach. They give truth conditions of different kinds. Theory 1 (T1) gives simple, extensional, truth-functional truth conditions for ‘If A , C ’. In the modern era, the theory stems from Frege’s *Begriffsschrift* (1879), and eventually found its way into every logic textbook. We all learn it in our philosophical infancy. An indicative conditional is true iff it is not the case that it has both a true antecedent and a false consequent. ‘If A , C ’ is thus logically equivalent to ‘not (A & not C)’ and to ‘not A , or C ’ (where ‘not’, ‘and’ and ‘or’ are construed in the usual truth-functional way). See Fig. 1, column (i). Sometimes the equivalences are easier to grasp and argue about when a negated proposition occurs in the conditional: according to T1, ‘not (A & C)’ is equivalent to ‘If A , not C ’; and ‘ A or C ’ is equivalent to ‘If not A , C ’. The truth-functional truth conditions of these last two are represented in Fig. 1, columns (ii) and (iii).²

²Amongst the philosophers who advocate the truth-functional truth conditions for indicative conditionals are Frank Jackson (1987) and David Lewis (1986, pp. 152-156).

Truth-functional interpretation

	<i>A</i>	<i>C</i>	(i) If <i>A</i> , <i>C</i>	(ii) If not <i>A</i> , <i>C</i>	(iii) If <i>A</i> , not <i>C</i>
1.	T	T	T	T	F
2.	T	F	F	T	T
3.	F	T	T	T	T
4.	F	F	T	F	T

Non-truth-functional interpretation

	<i>A</i>	<i>C</i>	(iv) If <i>A</i> , <i>C</i>	(v) If not <i>A</i> , <i>C</i>	(vi) If <i>A</i> , not <i>C</i>
1.	T	T	T	T/F	F
2.	T	F	F	T/F	T
3.	F	T	T/F	T	T/F
4.	F	F	T/F	F	T/F

Fig. 1

The four rows represent four exclusive and exhaustive possible ways the world might be.

According to T1, if the world is the second way, the conditional ‘If *A*, *C*’ is false;

otherwise, it is true. We shall return shortly to the pros and cons of this theory.

Theory 2 (T2) is really a family of theories with a common consequence with which we shall be concerned. Truth conditions are given in some form or other: ‘If *A*, *C*’ is true iff ... *A* ... *C* But they are not truth-functional. In particular, when *A* is false, ‘If *A*, *C*’ may be either true or false. For instance, I say ‘If you touch that wire, you will get an

electric shock'. You don't touch it (and you don't get a shock). Was my conditional remark true or false? It depends--on whether the wire was alive or dead, whether you are insulated, etc.. One theory of this type is Stalnaker's (1968): consider a possible situation in which you touch the wire and which otherwise differs minimally from the actual situation. The conditional is true iff you get a shock in that possible situation. That is, 'If A , C ' is true iff C is true in the situation in which A is true which differs minimally from the actual situation.

The above example concerned the non-truth-functionality of line 4. Here is one for line 3. As a matter of fact, Sue is lecturing just now, and nothing untoward happened on her way to work. For many antecedents, A , 'If A , Sue is lecturing just now' is true. But not for all. 'If Sue had a heart attack on her way to work, she is lecturing just now' will come out false, on Stalnaker's truth conditions.

The theories agree on line 2: if A is true and C is false, 'If A , C ' is false. It would be very counterintuitive to deny this: to hold that it could be the case that A is true, C is false, yet 'If A , C ' is true. For to deny it would be to deny that one could safely argue from the truth of A and 'If A , C ' to the truth of C : to deny the validity of modus ponens.

Line 1 is less obvious. Some T2 theories deny that the truth of A and of C is sufficient for the truth of 'If A , C '. For that doesn't guarantee the right sort of 'connection' between A and C , they say. (See, for example, Pendlebury (1989), Read (1995)). On the other side, the thought is quite compelling that if you say 'If A , C ', and it turns out that A and that C , you were right, even if you were lucky to be right. Stalnaker's T2 theory agrees with T1 on line 1. This debate won't concern my arguments here. I have depicted a T2 theory of the Stalnaker kind in Fig. 1. We now look at some arguments about the relative merits of T1 and T2.

1.3 An argument against T2, for T1.

Suppose there are two balls in a bag, labelled x and y . All you know about their colour is that at least one of them is red. That's enough to know that if x isn't red, y is red. Or alternatively: all you know about their colour is that they are not both red. That's enough for you to conclude that if x is red, y is not. Similarly, if all you know concerning the truth of two propositions, A and C , is that at least one of them is true, that's enough to know that if A is not true, C is true. And, if all you know is that they are not both true, that's enough to know that if A is true, C is not.

T1 gets these facts right. Look at column (ii). Eliminate line 4 and line 4 only. (That represents your knowledge that at least one of them is true, and that you know nothing stronger than this.) You have eliminated the only possibility in which 'If not A , C ' is false. You know enough to know that 'If not A , C ' is true.

T2 gets this wrong. Look at column (v). Eliminate line 4 and line 4 only, and some possibility of falsehood remains in other cases which have not been ruled out. By eliminating just line 4, you do not ipso facto rule out these further possibilities, incompatible with line 4, in which 'If not A , C ' is false.

The same point can be made with negated conjunctions. And the same argument renders compelling the thought that if we eliminate *just* (A & not C), nothing stronger, then we have sufficient reason to believe that if A , C . Thus, if the sum total of my relevant information is that it's not the case that both A is true and C is false, I can eliminate line 2 and line 2 only from the list of possibilities. Intuitively, that is enough to conclude that if A is true, C is true. T1 agrees, because 'If A , C ' is true at the lines other than line 2. T2 does not agree; for, in this state of information, A may be false--line 3 or line 4 may be the

possibility that obtains, and lines 3 and 4 are compatible with the falsity of 'If *A*, *C*'.

1.4 An argument against T1, for T2.

According to T1, 'not *A*' entails 'If *A*, *C*' for any *C*. Faced directly with that fact, it might be argued to be a mere oddity, rather than a fatal objection. For, arguably, we have no interest in or use for indicative conditionals whose antecedents we know to be false. Armed with the information that Harry didn't do it, we lose all interest in what is true if Harry did it. So this might be thought to be a rather uninteresting quirk which we can live with.

But a consequence of that entailment is fatal: all conditionals with unlikely antecedents are likely to be true! Suppose you think, but are not sure, that not *A*. You think it's about 90% likely that not *A*. Then, according to T1, you think it's about 90% likely that a sufficient condition for the truth of 'If *A*, *C*' obtains, for any *C*. No one can shrug off as unimportant the serious assessment of conditionals whose antecedents we think are unlikely to be true. We think *A* *may* be true, and it may be important to consider what will happen if *A* is true. 'I don't think Fred has forgotten the meeting, but if he has, he will be at home right now'. Not 'if he has, he'll be on the moon right now'. 'I think I won't need to get in touch, but if I do, I'll need a phone number'; not 'If I do, I'll manage by telepathy'. In other words, we accept some and reject other indicative conditionals whose antecedents we consider unlikely to be true. And this is crucial to our need to assess the likely consequences of unlikely possibilities. T1 cannot accommodate this fact. I think it unlikely that the Tories will win. I also think it unlikely that if they win, they will nationalise the banks. According to T1, I have inconsistent opinions. No one considers these to be inconsistent opinions.

1.5 T3: The Suppositional Theory

This theory does not address the question of truth conditions for conditionals, but instead gives an account of the thought process by which we assess conditionals. To assess a conditional, it says, you *suppose* (assume, for the sake of argument) that the antecedent is true, and consider what you think about the consequent, under that supposition. The origins of this theory are found in a much-quoted remark by F. P. Ramsey:

If two people are arguing ‘If p , will q ?’ and are both in doubt as to p , they are adding p hypothetically to their stock of knowledge, and arguing on that basis about q ; ... they are fixing their degrees of belief in q given p (1929, in 1990, p. 155).

Return to Fig. 1. Consider only the two left-hand columns. To suppose that A is to suppose that line 1 or line 2 is the way things actually are--hypothetically to eliminate lines 3 and 4 in which A is false. Then we ask: on the assumption that A is true, is it ($A \& C$), or ($A \& \text{not } C$)? We might be sure. We might not be sure. Suppose I think ($A \& C$) is about ten times more likely than ($A \& \text{not } C$). That is to think that it is about 10 to 1 that C if A .

The most developed version of the suppositional theory takes uncertain judgements seriously, and the fact that uncertainty comes in degrees. I shall make some comments about this:

First, the *raison d'être* of indicative conditionals depends on the fact that we are uncertain of many things. God doesn't have any use for thoughts of the ‘If Harry didn't do it ...’ or ‘If it rains tomorrow ...’ kind.

Secondly, often the following is the case. You ask some expert's opinion about whether if A , C . The answers ‘definitely, yes’ or ‘definitely, no’ are not forthcoming; but

the answers you get are still of value. You ask your doctor, ‘Will I survive if I have the operation?’ and ‘Will I be cured if I have the operation?’. You may be told, ‘It’s very likely that you will survive if you have the operation. It’s only about 50-50 that you will be cured if you have the operation--but it’s your best chance of a cure’. You ask your real estate agent, ‘Will my house sell within a month if I put it on the market at [such-and-such] price?’ Again, he will typically be unable to give you a definite yes-or-no answer.

If the truth conditions of conditionals were settled, we could relegate the question of uncertain conditional judgements to a general theory of uncertainty about the truth of propositions. Let other philosophers do that: it is not a topic which has anything specifically to do with conditionals. But, we have seen, the truth conditions of conditionals are problematic and controversial. So it is worth reflecting on what we can say directly about uncertain conditional judgements, and what consequences we can derive from that.

Once the question is posed that way, the answer is staring us in the face. A conditional concept--the concept of conditional probability--is what we need to measure the degree to which our conditional judgements are close to certain. It is what Ramsey meant by the quoted sentence above: ‘They are fixing their degrees of belief in q given p ’. The concept of conditional probability had played a central role in all applications of the notion of probability, since the eighteenth century. Ramsey had argued a few years earlier that one application of probability theory is to give the logic of partial belief (see Ramsey, 1926).

We shall now see what light our innocuous-seeming suppositional theory sheds on our earlier dilemmas concerning T1 and T2.

1.6 Comparison of T3 with T1 and T2

The argument against T2, and for T1, concerned this question:

Question 1. Suppose you have ruled out ($A \ \& \ \text{not } C$), but nothing stronger:
returning to Fig. 1, you have ruled out line 2 of the truth table, and line 2 only. Is
that enough for you to conclude that if A , C ?

Intuition says yes. T1 says yes, for ‘If A , C ’ is true in all the possibilities except at line 2.
T2 says no, because ‘If A , C ’ may be false at lines 3 and 4, which have not been ruled out.
T3 says yes. Suppose A --i.e., suppose that line 1 or line 2 obtains. But line 2 has been ruled
out. Hence line 1 obtains. That is, in this state of information, supposing that A is true, C is
true.

The argument against T1, and for T2, concerned the following question:

Question 2. Suppose you think it likely, but not certain, that A is false. That is, you
think it likely, but not certain, that line 3 or line 4 obtains. Must you then think it
likely that if A , C , for any C ?

Intuition says no--thinking it likely that A is false, I may or may not think that if A is true,
 C is true. T1 answers yes, because, for any C , ‘If A , C ’ is true on both line 3 and line 4: ‘If
 A , C ’ is inevitably true if A is false, I think it likely that A is false, hence likely that ‘If A ,
 C ’ is true. T2 says no. ‘If A , C ’ may be false when A is false, so thinking it likely that A is
false does not constrain me to think that ‘If A , C ’ is likely to be true. T3 answers no: that I
think it likely that not A , leaves it open how I distribute my probabilities between ($A \ \& \ C$)
and ($A \ \& \ \text{not } C$). For instance, suppose I think it only about 10% likely that Sue will be
offered the job. Supposing that she is offered it, I think it’s only about 10% likely that she

will decline. My degrees of confidence are distributed thus: Not offered: 90%. Offered and accepts: 9%. Offered and declines: 1%. Thus I have a low degree of confidence in the conditional 'If she's offered the job she will decline', despite my having a low degree of confidence in the antecedent.

So T3 is incompatible with T1--they answer question 2 differently; and incompatible with T2--they answer question 1 differently. It is incompatible with the idea that conditionals are to be understood in terms of truth conditions at all! To see this more clearly: suppose a conditional, 'If A , C ', expresses a proposition, $A * C$, with truth conditions. Then your degree of belief in the conditional should be your degree of belief in the truth of $A * C$. Now either $A * C$ is entailed by 'not (A & not C)', or it is not. If it is, it is true whenever 'not A ' is true, and hence cannot be improbable when 'not A ' is probable. Thus it cannot agree with T3's answer to Question 2. On the other hand, if $A * C$ is not entailed by 'not (A & not C)', it may be false when 'not (A & not C)' is true, and hence certainty that not (A & not C) (in the absence of certainty that not A) is insufficient for certainty that $A * C$. It cannot agree with T3's answer to Question 1.

And T3 gives the intuitively correct answer to both questions.

Although T1 and T3 agree in their answer to Question 1, they do so for different reasons. T3 answers 'yes' not because some proposition is true whenever A is false, but because C is true in all the possibilities that matter for the assessment of 'If A , C ': the A -possibilities. And although T2 and T3 agree in their answer to Question 2, they do so for different reasons. T3 answers 'yes' not because some proposition may be false when A is false, but because the fact that most of my probability goes to $\neg A$ is irrelevant to whether most of the probability that goes to A , goes to $A \& \neg C$ rather than $A \& C$.)

We have reached an important result (first proved, in a different way, by David

Lewis (1976)). It was Ernest Adams who, first in two papers (1965, 1966), and then in a book (1975), provided us with a well-motivated logic of conditionals construed as in T3-- who put enough flesh on its bones for it to merit the title 'theory', one might say.

Stalnaker's theory (1968, 1970) was originally an attempt to marry T2 and T3: to provide truth conditions, the probability of whose obtaining (always, necessarily) equals the conditional probability of consequent given antecedent. Lewis showed that this could not be done: there is no proposition ($A * C$) the probability of whose truth (always, necessarily) equals the probability of C on the assumption that A .

Inevitably, there is much more to be said and argued about.³ But I shall move on.

2. Do conditional judgements never have truth values?

There are two kinds of case about which it might be held that there is no fact of the matter whether p . First, it might be held that a whole area of discourse, to which p belongs, is not properly construed as fact-stating. It serves some other function. There is nothing defective about it: it is just that the point of such utterances is not to state facts. This view has been held of moral or more generally normative discourse: what is expressed is not a belief but something more like a desire. Perhaps the discourse is to be construed more along the lines

³ The most obvious omission here is discussion of the pragmatic defences of T1 (Grice, 1989, Jackson, 1987) and T2 (Stalnaker, 1975). Grice and Jackson, in different ways, argue that although the conditional is true whenever its antecedent is false, it is not assertible on the ground that its antecedent is false. Stalnaker argues that although the inference 'A or C; so if not A, C' is invalid, the conclusion is true whenever the premise is assertible. He does so by making the proposition expressed by a conditional sentence depend on the epistemic state of the speaker. I argue against these defences of T1 and T2 in Edgington (2001, Sections 2.4, 4.1 and 4.2; 1995, Sections 2.5, 9.1 and 9.3). **NB The argument of this section appears, with accompanying material on validity, compounds of conditionals, other conditional speech acts, and the pragmatic defences of truth**

of imperatives than statements. (I am of course not taking sides, merely giving an example of a position.)

The other kind of case is where a type of discourse is factual--its purpose is to state facts--but some particular statements may fail to be either true or false for some reason. 'The sofa is red' is a statement suitable for truth or falsity, but if the sofa is borderline-red, it might be held that there is no fact of the matter whether it is red. Likewise, 'John's children are asleep' is a factual statement but some hold that it lacks a truth value if John has no children. And Goldbach's conjecture purports to state a mathematical fact, but, according to the intuitionist, it will lack a truth value, if there is, in principle, no way of establishing or refuting it.

The case of conditionals, according to the Suppositional Theory, must be construed as of the first kind. Believing that if A , C is not taking the attitude of belief to a proposition, $A * C$; it is believing that C , under the supposition that A . It was not obvious that the latter doesn't reduce to the former--that there is not some proposition which, necessarily, you believe to just the extent that you believe C under the supposition that A . (Stalnaker's early work (1968, 1970) was an attempt to find such a proposition.) But it turned out that there is no such proposition.

If you have a high degree of belief in a proposition, A , then (pragmatic niceties aside) you are in a position to assert A : to commit yourself to A . If you have a high degree of belief in C on the supposition that A , then you are in a position to assert C , conditional upon A --to commit yourself to C conditionally upon A , to make a conditional assertion. And that is not to make a plain, categorical assertion that something is the case.

Still, the relation between conditional and factual discourse is close: there are logical

conditions, in Edgington (2001), which is readily available on internet.

relations between your conditional beliefs and your unconditional beliefs--lots of them, the most basic of which are that it would be inconsistent to believe both that if A , C and that $A \& \neg C$, or to believe $A \& C$ and disbelieve that if A , C . A conditional belief is equivalent to a certain relation obtaining between your unconditional beliefs. And the difference between conditional and unconditional beliefs and assertions is easy to miss and easy to ignore, particularly as there is nothing to stop us using 'belief' and 'assertion' in a wide sense to cover both the conditional and unconditional variety (as I did for 'believe' a few sentences back).

One could take the purist hard line and insist that, by the lights of the Suppositional Theory, truth and falsity are simply inapplicable to conditional judgements, *tout court*. Or one could try to take a softer line, try to clash less with intuition, and see to what extent, if any, talk of truth values for conditionals can be tolerated by the Suppositional Theory. I turn to that question.

First, it would be ridiculous for a Suppositional Theorist to get shirty about people saying 'that's true' or 'what she said was true', simply to express agreement or to endorse someone's conditional assertion (and analogously for 'that's false').

Second, I can't see any harm in calling 'true' those conditionals to which all right-minded people, whatever their state of information, give conditional probability 1, that is all (or to play safe, all which are fairly simple) such that you can rule out a priori that $A \& \neg C$ without ruling out that A , (and equally, calling 'false' all those conditionals to which all right-minded people, whatever their state of information, give conditional probability 0).

Thirdly, I want to discuss whether conditionals can be given truth values when their antecedents are true. Note that the difficulties for T1 and T2, raised in Section 1, all

concern what we should say about the truth value of a conditional when its antecedent is false. If we make it always true when its antecedent is false, as T1 does, we get one problem. If we make it sometimes true and sometimes false when its antecedent is false, as T2 does, we have another problem. No problems arose in connection with the first two lines of the truth table.

If I assert that if A , C --make a conditional assertion of C on condition that A , and it turns out that $A \& \neg C$, I was wrong, even if I was unlucky to be wrong. If I assert that if A , C , and it turns out that $A \& C$, I was right, even if I was lucky to be right. It seems quite natural to say that the conditional assertions (and the conditional beliefs that they express) themselves are false and true respectively in these two cases. Let's investigate that. Not to beg the question at the outset, I shall italicise the words 'true' and 'false' when used in this way of conditional judgements.

The equivalence principles are violated. 'If A , C ' is *true* iff $A \& C$. But $A \& C$ is not equivalent to if A , C . The following is not contradictory: of a climber who is a little late in returning, I say 'I don't think he fell and hurt himself; but it's quite likely that, if he fell, he hurt himself'. 'If A , C ' is *false* iff $A \& \neg C$. But only on the truth-functional account is ' $A \& \neg C$ ' equivalent to 'It is not the case that if A , C '. For the rest of us, a conditional may be worthy of complete rejection or denial, without its being *false*; for instance, of an unseen geometric figure, I say 'it is not the case that if it's a pentagon it has six sides', but don't assert 'It's a pentagon and it doesn't have six sides'; for it may not be a pentagon.

In asserting or believing a conditional, we do not aim at its being *true*: to assert it is not to assert that it is *true*, to believe it is not to believe that it is *true*, to think it probable is not to think it is probably *true*. It is no fault at all in a conditional assertion or belief that it is not *true*. I say 'If you touch the wire you will get a shock'. My overall objective in

saying this is to get you not to touch it, and if I succeed, my conditional will have a false antecedent, hence will not be *true*. Nor is it necessarily a merit in a conditional that it be not *false*. There are plenty of daft conditionals which are no less daft for having a false antecedent.

But we can say this: to assert a conditional is to assert that it is *true* on condition that it has a *truth* value. To believe a conditional is to believe that it is *true* on the supposition that it has a *truth* value. It has a *truth* value iff its antecedent is true. This is just the suppositional theory, restated: to believe it, is to believe that *A&C* is true on the supposition that *A* is.

Now take ordinary factual discourse, which is presupposed to be such that the propositions asserted have truth values. As it is taken for granted that such a statement has a truth value, to assert it is to say that it is true; to believe it is to believe that it is true; to think it probable is to think it probably true. That is, the notion of *truth* for conditionals generalises to cover factual discourse as well, and so is not ad hoc. This proposal does link up with the ordinary notion of truth, and I think we may drop the italics.

It is also interesting to connect the notion of a supposition used in the Suppositional Theory with that of a presupposition. It is a familiar thought that in much of our ordinary factual discourse, what we say rests on presuppositions of various kinds, and there is the view that such discourse lacks a truth value when the presuppositions fail. Consider Strawson's 'John's children are asleep', when it turns out that John doesn't have any children; 'His wife was wearing blue' when it wasn't his wife; or 'When John arrives, we'll have tea'--and John doesn't arrive. (Of course, when a presupposition fails, something has gone wrong, hence the contrary inclination to call the statements false.) Not to be rash in your presuppositions, you can bring them up front, and turn them into

suppositions instead: ‘John’s children, if he has any, were asleep (for the house was very quiet)’, ‘His wife (if that was his wife) was wearing blue’, ‘If and when John arrives, we’ll have tea’.

I don’t think this ‘true/false/neither’ approach does any serious theoretical work like giving us an account of validity or explaining compounds of conditionals. (This has been tried, but with counterintuitive results.) But it does vindicate the idea that you can be right by luck, and wrong by bad luck: you can guess or bet that if A , C , and get it right or wrong if it turns out that $A \& C$ or $A \& \neg C$. It also fits the ideas about objectivity which I explore in the next section.

I recently commented on some experimental work on conditionals by David Over and Jonathan Evans (forthcoming in *Mind and Language*, October 2003). Most of their experiments concerned cards in a pack from which one was to be drawn at random. There were four kinds of card, e.g. yellow with triangle, yellow with circle, green with triangle, green with circle.⁴ Participants were given the proportions of the different kinds of card. They were then asked ‘How likely is it that the following claims are true?’ ‘If a yellow card is drawn it will have a circle on it’, etc.. The authors were surprised to discover that large numbers of participants consistently answered with the probability of the conjunction, $A \& C$. In one experiment, with 80 participants, 40 answered according to the conditional probability of C on A , and 32 answered according to the probability of $A \& C$.

When I asked why they had the word ‘true’ there in the question, the authors said it

⁴Other experiments dealt with more real-life examples--conditionals like ‘If global warming increases, London will be flooded’. The participants began by giving subjective probabilities summing to 100% for the four possibilities concerning antecedent and consequent, and were then asked questions about conditionals. The results were much the same as in the card examples.

was because part of the object of the exercise was to test the material-implication theory (which is live and well in the psychological literature due to the influence of Johnson-Laird), and they wanted to avoid any suggestion that their question was loaded in favour of the conditional-probability reading, or that it was ambiguous between that reading and the reading as a question about the probability of the truth of a proposition. (The material-implication theory fared very badly in their tests.)

Now I suggest that their question was ambiguous: there are two distinct reasonable ways of interpreting it. You can place no weight on the word 'true'--interpret the question as asking how likely are the following claims: 'If it is yellow it has a circle', etc.. Thus interpreted, an answer in terms of conditional probability is reasonable: if almost all the yellow cards have circles, the claim is very probable, etc..

Alternatively, the presence of the word 'true' in the question might trigger a thought process somewhat like the following. You've been given all the relevant data you could possibly have: a card is to be drawn at random, there are four kinds of card, and you've been given, in effect, the probabilities of the four possible outcomes. You have been asked how likely it is that the conditional is true, so presumably it is possibly true. In which of the possibilities is 'If it's yellow it has a circle' true? Well, if it turns out that a yellow card with a circle is drawn, the conditional was true. Anyone who had guessed, bet or predicted that if a yellow card is drawn, it will have a circle, has turned out to be right. In none of the other outcomes is that so. So the conditional is true only if the first possibility obtains. This seems to me to be cogent thinking, given the question asked.

Thus, it seems to me that the 40 who gave the conditional probability, ignoring the word 'true' in the question, and moving straight to 'How likely is that C if A ?' are behaving permissibly; and the 32 who gave the probability of ' $A \& C$ '--focusing on the only possible

outcome in which, if it obtained, we could say that the conditional was true--are also behaving permissibly. They are interpreting the question differently. (I am sure that the latter group don't go through life thinking that conditionals are equivalent to conjunctions.)

3. Objectivity without truth?

3.1 For ease of exposition, I put aside the restoration of truth values when *A* is true. They will come back into the story. For some philosophers, the take-home message of the arguments against truth conditions or truth values for indicative conditionals is this: there are no objectively right or wrong opinions about indicative conditionals. For they merely express and reflect relations between the beliefs of the particular speaker/thinker. Two people in different epistemic situations can legitimately come to divergent conclusions about whether if *A*, *C*, without either of them being mistaken in any way. A powerful argument of Allan Gibbard's (1980, pp. 231-2), which I discuss below, has prompted that conclusion.

But it is hard to accept that for all those traditionally classified as indicative conditional judgements, there is no objectively correct opinion, depending on how the world is. I say 'If you touch the wire, you will get a shock' or 'If you eat those, you will be ill' or 'If you take this, your headache will go' or 'If it rains heavily tonight, the river will burst its banks'. I seem to be saying something objective about which I can be right or wrong, independently of the truth value of the antecedent. This led some to reclassify, and claim that these latter future-looking 'will'-conditionals really belong with the so-called subjunctive 'would'-conditionals, for which a separate story has to be told, perhaps on Stalnaker's or Lewis's lines. (See Gibbard, *op. cit.*, Bennett 1988, Woods 1997. V. H. Dudman's syntactic observations were an additional spur to this reclassification. See note 1,

Section 1, for further references.)

I don't think there is a case for splitting the traditional class of indicative conditionals and giving a different semantic treatment to each subdivision. (I do, however, think we do well to pay attention to the close link between 'wills' and 'woulds'.) In the above examples, we have a plain indicative statement (in these cases about the future) to which a conditional clause is attached. Each is assessed according to the Suppositional Theory: suppose that the antecedent is true, and assess the consequent under that supposition. The future-looking ones are often uncertain judgements--about whether you will recover if you have the operation, etc.. Uncertain conditional judgements are not to be construed as uncertainty about the obtaining of some truth conditions.

But there often is something objective to aim for in one's future-looking conditional judgements. For there may be such a thing as the objective chance of *C* given *A*, which it is often the business of scientists or statisticians to estimate, and which is the best degree of belief to have in *C* if *A*. It may be 1 or 0, or it may be in between. I hope to explain why all the objectivity we need for conditional judgements comes from the notion of objective chance; and to do so in a way that explains how and why there is no objectively correct opinion for some conditional judgements. The framework also explains the easy transition from future-looking 'will' conditionals to counterfactuals. And it explains the attraction of allowing truth values when the antecedent is true.

I am to shake the bag, dip my hand in and pick a ball. 90% of the red balls have a black spot. There is a correct degree of confidence to have in the judgement that if I pick a red ball, it will have a black spot. A dog almost always, but not quite always, attacks and bites when strangers approach. We can detect no relevant difference between the cases in which it does and the few cases in which it does not: it appears to be a matter of chance.

You are correct to have a high degree of confidence that if you approach, it will bite. I am wrong if I mistake its gentle sibling for the vicious dog, or if I base my judgement on my highly untypical experience of its behaviour.

The concept of objective chance gets a purchase when, at least apparently, like causes do not always have like effects; and moreover, in a class of apparently relevantly similar cases, the proportions of the various sorts of outcome are relatively stable, although these proportions are generated in an apparently random way. The strongest notion of objective chance applies only if we remove ‘apparently’ from the above: relevantly similar cases can have different outcomes. That may well be how the world is. But even if it isn’t, there will be many subjects on which the best information we can get is best modelled in terms of chance: medicine, crop yields, etc. as well as radioactive decay. I do not mean to be appealing to anything esoteric, but to something that we all understand when we read that, e.g., eating garlic reduces one’s chance of heart disease, or that the chance of rain in the morning is low. Philosophers may have different accounts of it, about which I hope to remain fairly neutral. Those who would explain it away need some surrogate for it.

Chances change with time. This is well illustrated by David Lewis’s (1986, p. 91) example of someone going through a maze at constant speed, using a random device to choose his path when he comes to a fork. At any point, we can calculate the chance that he will be at the centre at noon. This can vary as he takes unlucky or lucky turns, until noon (at the latest), when it becomes 1 or 0, and remains 1 or 0 forevermore. The chances play themselves out, and finally settle down to 1 or 0. A past event may *have had* a chance of not coming about. But it happened, and has no present chance of not happening. All propositions concerning the past have present chances of 1 or 0 of being true. Their chances have become isomorphic to their truth values.

Conditional chances also change with time. The doctors can be right to think, on Monday, that the chance of recovery is high if they operate on the patient on Friday. But things can happen between Monday and Friday to change that conditional chance. If they do operate, again, the conditional chance will settle down to 1 or 0, depending on what happens. Suppose they don't operate: the chance that they operate on Friday settles down to 0. Thereafter, although we can speak of the chance there *was* that the patient *would* recover, had they operated on Friday, there is no longer such a thing as a present conditional chance of recovery given that they operated on Friday. Conditional chances exist only when the chance of the antecedent is non-zero, just as conditional epistemic probabilities exist only if the epistemic probability of the antecedent is non-zero. Think of it this way: in estimating the present conditional chance of C given A , you restrict your attention to the present real A -possibilities, and ask, relative to those, what the chance is of C . There is no such thing if there are no present real A -possibilities. There's no such thing as the objective chance of getting a black spot, given that you pick a red ball, if there are no red balls in the bag.

The present objective chance of C given A exists only if the present objective chance of A is non-zero. If A is false and concerns the past, then its present objective chance is zero. Then objectivity goes by the board. That, to my mind, is the lesson of Gibbard's argument.

3.2 The Gibbard argument against truth values, which wipes out objectivity along with truth, goes like this. First, if two statements are compatible, so that they can both be true, a person may consistently believe both simultaneously. For consistent A , and any C , no one accepts both 'If A , C ' and 'If A , $\neg C$ ' simultaneously (except perhaps by oversight): rather,

to accept 'If A , C ' is to reject 'If A , $\neg C$ '. Therefore, 'If A , C ' and 'If A , $\neg C$ ' cannot both be true. But second, we can find cases like this: one person, X , accepts 'If A , C ', for completely adequate reasons, while another, Y , accepts 'If A , $\neg C$ ' for completely adequate reasons. In a good Gibbard case, there is perfect symmetry between X 's reasons and Y 's: 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 judgements are false. So: their judgements 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.

Here is a Gibbard case: two spies, X and Y , from different vantage points, are peeping into a room which initially contains the Mafia chief and three underlings, A , B and C . X sees B leave the room (Y does not see this). Y sees C leave the room by a different door (X does not see this). Both X and Y then hear Chief give instructions to some one person in the room. 'If he didn't tell A , he told C (not B)' says X . 'If he didn't tell A , he told B (not C)' says Y .

Here's another: in a game, all red square cards are worth ten points. X caught a glimpse as Z picked a card and saw that it was red. 'If Z picked a square card, it's worth 10 points', thinks X . All large square cards are worth nothing. (Hence, there are no large red square cards.) Y , seeing it bulging up Z 's sleeve, knows that the card Z picked is large. 'If Z picked a square card, it's worth nothing (not ten points)', thinks Y .

A Gibbard case requires both parties to have completely adequate information for their two conditionals. For there is nothing surprising in two people having imperfect evidence for two conflicting things, such that they would correct to a better opinion if they learned more. In these cases, the only relevant further information they could acquire is sufficient to rule out the antecedent, in which case each conditional becomes useless.

A Gibbard case also requires that there is information presently available which is sufficient to rule out the antecedent, but neither person has it all: if they were to pool their information, they would know that the antecedent is false.

If the antecedent, at the time in question, were to have a non-zero chance of being true, there would not be information presently available adequate to rule it out. Hence, in a Gibbard case, the antecedent has zero chance of being true. There is no objective chance of C given A --no objectively correct opinion.

But X and Y don't know this. For all they know, A may be true, in which case its present chance of being true is 1 (as it concerns the past) in which case either 'If A , C ' or 'If A , $\neg C$ ' has a present chance of 1 of being true. And they rationally come to their opposing conclusions: if there is an objective chance of C given A , it is 1; if there is such a chance of C given A , it is zero.

Our indicative conditionals about the past are always, in principle, liable to the Gibbard phenomenon. They arise out of our own idiosyncratic mixtures of knowledge and ignorance. There is no 'ideal perspective' on the past which would have any use for them. If we knew all we needed to know, we wouldn't need 'If Mary didn't cook the dinner ...' sorts of thought, because we would know whether or not she did.

There are future-looking Gibbard cases. Here is one. There are two vaccines, A and B , against a disease D . Neither is completely effective against the disease. Everyone who has A and gets D , gets a side effect S . Everyone who has B and gets D , doesn't get S . Having both vaccines is completely effective against the disease: no one who has both gets the disease. These facts are known. X knows that Jones has had A , and thinks 'If Jones gets the disease, he will get S '. Y knows that Jones has had B , and thinks 'If Jones gets the disease, he will not get S '.

Jonathan Bennett (2003 section 21) has a nice example with the same structure:

Top Gate holds water in a lake behind a dam; a channel running down from it splits into two distributaries, one (blockable by East Gate) running eastwards and one (blockable by West Gate) running westwards. The gates are connected as follows: if east lever is down, opening Top Gate will open East Gate so that the water will run eastwards; and if west lever is down, opening Top Gate will open West Gate so that the water will run westwards. On the rare occasions when both levers are down, Top Gate cannot be opened because the machinery cannot move three gates at once.

Wesla knows that west lever is down, and thinks ‘If Top Gate opens all the water will run westwards’; Esther knows that east lever is down, and thinks ‘If Top Gate opens, all the water will run eastwards’.

In these cases too, the present chance that the antecedent is true is zero: Jones has had both vaccines which guarantees he won’t get the disease; both levers are down which guarantees that Top Gate won’t open. The antecedents are, at the time in question, causally impossible, though this is not known to the speakers. There is no objectively correct opinion to be had.

Suppose we change the vaccine story slightly: it is possible, but highly unlikely that you get the disease if you have both vaccines; it is very uncommon to have both vaccines; if you have both and are unlucky enough to get the disease, there’s a 60% chance of getting *S*. It remains the case that if you have just *A* and get the disease, you get *S*, and if you have just *B* and get the disease, you don’t get *S*. *X* and *Y* express the same opinions as before.

Now, though both are reasonable, neither has the right opinion. If they knew that Jones had

both vaccines, they would correct their previous opinions, and agree that it's 60% likely that Jones will get *S* if he gets the disease.

There is an 'ideal perspective' with respect to the future for the assessment of conditionals: not a God-like perspective from which the future is known before it comes about, but one in which someone knows all they need to know about the available facts, the laws and the chances.

I agree with this remark of Lewis's (1986, p. 124): 'no genuine law ever could have had any chance of not holding'. If *L* is a law of nature then, at all times, the chance that *L* is true is 1. It follows that if *A* 'physically entails' *C* (to borrow a phrase from Stephen Schiffer's chapter on conditionals) then the conditional chance of *C* given *A* is 1-- provided that it exists, that is, provided that the chance of *A* is non-zero. The knowledge involved in the forward-looking Gibbard cases could have the status of laws: 'Anyone who has *A* and gets the disease, gets *S*; anyone who has *B* and gets the disease, does not get *S*'.⁵ But they go wobbly when the chance of the antecedent is zero. And there will be Gibbard-cases which concern the past involving laws. Borrowing an example of Schiffer's, suppose it is a law that eating salmonella-infected poultry makes one ill. Nevertheless I can rightly say with complete confidence 'If I ate salmonella-infected poultry, it didn't make me ill'; while someone else is completely justified in thinking 'If she ate salmonella-infected poultry, it made her ill.'

3.3 Take a statement about the future which has a non-extreme chance of being true, e.g. 'The coin (which I am about to toss) will land heads'. This chance later 'collapses' to 1 or 0, depending on whether it is true or false that it lands heads. Take a conditional statement

about the future for which there is a non-extreme conditional chance, e.g. ‘If she tosses it, it will land heads’. This chance later collapses to 1 or 0, or goes out of existence, according to whether I toss it and it lands heads, I toss it and it doesn’t, or I don’t toss it. (Similarly for ‘It will rain in the morning’ and ‘The patient will recover if we operate on Friday’.) While the earlier chances can change with time, the final values remain fixed. This helps explain and vindicate the ‘true/false/neither’ verdict for indicative conditionals, by analogy with the ‘true/false’ verdict for an unconditional statement. When the chances settle down to their final states, they become isomorphic to truth values.

When a conditional chance has gone out of existence, we still may be interested in the chance there *was* that *C would* have happened, if *A* had happened: ‘If we had operated, it’s very unlikely that she would have survived’, say the doctors, after their decision not to operate. The judgement that some observed fact *was* likely to happen, given a certain hypothesis, and unlikely to happen, given another, are important ingredients in empirical reasoning. Our counterfactual conditional judgements typically aim at these past conditional chances. This explains the easy transition from forward-looking indicatives to counterfactuals: ‘If you touch that, you’ll get a shock’; ‘If you had touched it, you would have got a shock’. ‘It’s likely that if you pick a red ball, it will have a black spot’; ‘It’s likely that if you had picked a red ball, it would have had a black spot.’ For these, the intermediate chances don’t collapse, but endure as the final values. I don’t see how God can do better than to think that there was a 90% chance of a black spot, had you picked a red ball.

If we are estimating what the conditional chances were at an earlier time, the question arises, which earlier time? For the chances can vary with time. The answer would

⁵ I gave an example with this structure using the gas laws (1991, pp. 206-7).

seem to be: around the latest time before the chance of A collapsed to 0--this is the default, unless there are specific indications that you are speaking about an earlier time. On Monday, the chance of survival given the operation on Friday was high, but it changed, and this is not the time-reference of the doctors' judgement that she wouldn't have survived, had they operated.

(When you think there was a non-zero chance of A at a past time t but in fact there was not, then, it seems to me, we get Gibbard cases for counterfactuals. Go back to the first vaccine story, in which X and Y had unassailable but opposite opinions. Jones is now run over by a bus and killed. X : 'If Jones hadn't been run over and killed, and had gone on to get the disease, he would have got S '. Y : 'If Jones hadn't been run over and killed, and had gone on to get the disease, he would not have got S '. If X and Y then come to learn that Jones had both vaccines, and hence could not have got the disease, they both agree that the question what would have happened if he had got the disease does not arise.)

There are wrinkles. (There always are.) It is not correct to say that the ultimate value for the counterfactual is always the chance, at the relevant earlier time, that C given A . This is the topic of another paper of mine (forthcoming; topic of a session of a seminar at NYU in 2001). We allow the value to be updated by events which happen after the antecedent time, but before the consequent time, and are causally independent of the antecedent. Thus, if the tossing is causally independent of my betting, and I don't bet, and the coin lands heads, we accept 'If I had bet on heads I would have won'. But the chance of winning given that I bet on heads, when I still had a chance to bet, was just $1/2$. And although beforehand there is a good sense in which the right opinion to have that I will win if I bet is $1/2$, I think we also allow, in a slightly Pickwickian sense, that if someone said 'If you bet on heads you will win', I don't bet, and it lands heads, they were right. (I argue in

the other paper that this way of evaluating counterfactuals serves the inferential purposes to which they are put.) Still, there is a final value for the counterfactual, which will not always be 1 or 0, which is settled at the latest at the consequent time.

Here is another puzzle, which I shall approach somewhat indirectly. Suppose you don't know the chance of A . It depends on whether X or Y . As X and Y are exclusive and exhaustive possibilities, Y is in effect $\neg X$. You don't know whether X or Y , but you have a probability (maybe a chance) for them. You proceed as follows:

$$(1) p(A) = p(A \& X) + p(A \& Y) = p(A|X).p(X) + p(A|Y).p(Y);$$

a well-known and well-used formula. For instance, it's 50-50 that bag X or bag Y is in front of you (the bag was selected by a chance procedure). In bag X , 90% of the balls are red. In bag Y , 10% of the balls are red. How likely is it that you will pick a red ball? $(90\% \times 50\%) + (10\% \times 50\%) = 50\%$ (of course).

Now, you don't know the chance of C if A . It depends on whether X or Y . For instance, again it's 50-50 whether bag X or bag Y is in front of you. In bag X , 90% of the red balls have black spots. In bag Y , 10% of the red balls have black spots. How likely is it that if you pick a red ball, it will have a black spot? 50%? That would be right if we could derive this formula:

$$(2) p(C|A) = p(C|A \& X).p(X) + p(C|A \& Y).p(Y).$$

But wait! These bags, X and Y , are the same bags as before. There's a far higher proportion

of red balls in X than in Y . So if I pick a red ball, that makes it likely that it's bag X , in which case it is likely to have a black spot. So it's well above 50% that if I pick a red ball, it will have a black spot.

In fact, we can't derive (2). Instead we can derive

$$(3) p(C|A) = p(C|A\&X).p(X|A) + p(C|A\&Y).p(Y|A)$$

[Derivation:

$$\begin{aligned} p(C|A) &= \frac{p(C\&A)}{p(A)} = \frac{p(C\&A\&X) + p(C\&A\&Y)}{p(A)} \\ &= \frac{p(C\&A\&X) \cdot p(A\&X)}{p(A\&X) \cdot p(A)} + \frac{p(C\&A\&Y) \cdot p(A\&Y)}{p(A\&Y) \cdot p(A)} \end{aligned}$$

which equals the above formula.]

It works out that it is 82% likely that if you pick a red ball it will have a black spot [(90% × 90%) + (10% × 10%)]. Evaluating $p(C|A)$ according to the laws of conditional and unconditional probability requires you to go in for this 'back-tracking' form of reasoning. And properly so: if you are to bet on black spot given red ball, you are likely to do best by estimating the probabilities as above.

But now consider the counterfactual: if you had picked a red ball, it would have had a black spot. How likely is that? Orthodoxy has it that we backtrack as little as possible with counterfactuals. And I have said that, when there is no explicit indication to the contrary, the chances in play are those at about the latest time when there is still a chance of picking a red ball, i.e. when it is already fixed whether bag X or bag Y is in front of you,

each with chance 1 or 0, you just don't know which. Suppose you had picked a red ball. Then it's 50-50 that you're in a world with a 90% chance or a 10% chance of a black spot. So the answer is 50%. So this may be a way in which indicatives and counterfactuals can come apart.

The example is not frightfully interesting, intrinsically, but it connects with a host of puzzle cases which are. And one puzzle is: if the non-back-tracking evaluation is available for the counterfactual, why isn't it available for the indicative too? For instance, the statistician Ronald Fisher had a fantasy that smoking doesn't cause cancer, but there is a genetic trait which presupposes one both to smoke and to get cancer. Is it more likely that she will get cancer if she smokes than if she does not? The back-tracking way: if she smokes, that is a sign that she has the genetic trait, which makes it more likely that she will get cancer. The non-back-tracking way: it's already fixed whether she has the genetic trait, so, in her present situation, it is no more likely that she will get cancer if she smokes than if she doesn't. I have not got to the bottom of this phenomenon and raise it in the hope of some help!

3.4 These remarks on objective chance are not intended to supplement the account of the nature of conditional belief of assertion--of what one is doing when one says or thinks that C if A . One is not saying or thinking that there is a high objective chance that C given A (which is true iff there is a high objective conditional chance that C given A). I have tried to argue that there is an objective domain of facts which bear on the epistemology of conditional belief; explain why sometimes there is an optimal conditional belief to have; explain why sometimes there can be no-fault disagreement; explain the close connection between forward-looking indicatives and counterfactuals; and explain how the final, lasting

values of the objective chances of the relevant propositions, when the chances have played themselves out, provide a basis for saying that 'If A , C ' is true if $A \& C$, false if $A \& \neg C$, neither true nor false if $\neg A$.

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