Conditionals, Part II: Philosophical Logic.

Lecture II, *Triviality and Non-Propositional Accounts*, 17th October

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Last week, we discussed a particularly influential idea about the probability of indicative conditionals, The Equation: $\Pr(p \to q) = \Pr(q \mid p)$. It's a compelling thesis, but there are a significant number of arguments against it—so-called *triviality results*. These were first introduced in (Lewis, 1976).

1. ***A Simple Triviality Result***

1.1. Here's a simple triviality argument from (Blackburn, 1986).

1. $\Pr(p \to q) = \Pr((p \to q) \wedge q) + \Pr((p \to q) \wedge \neg q)$ — Addition Theorem
2. (a) $\Pr((p \to q) \mid q) \times \Pr(q) = \Pr((p \to q) \wedge q)$ — Ratio Formula
   (b) $\Pr((p \to q) \mid \neg q) \times \Pr(\neg q) = \Pr((p \to q) \wedge \neg q)$
3. $\Pr(p \to q) = \Pr((p \to q) \mid q) \times \Pr(q) + \Pr((p \to q) \mid \neg q) \times \Pr(\neg q)$ — From (1) and (2)
4. (a) $\Pr(q \to (p \to q)) = \Pr((p \wedge q) \to q)$
   (b) $\Pr(\neg q \to (p \to q)) = \Pr((p \wedge \neg q) \to q)$ — $\Pr(A) = \Pr(B)$, for logically equiv. A, B
5. (a) $\Pr(p \to q \mid q) = \Pr(q \mid p \wedge q)$ — From (4)(a), (4)(b), & The Equation
   (b) $\Pr(p \to q \mid \neg q) = \Pr(q \mid p \wedge \neg q)$
6. $\Pr(p \to q) = \Pr(q \mid p \wedge q) \times \Pr(q) + \Pr(q \mid p \wedge \neg q) \times \Pr(\neg q)$ — From (3), (5)(a), and (5)(b)
7. $\Pr(p \to q) = \Pr(p \wedge q)/\Pr(p \wedge q) \times \Pr(q) +$
   $\Pr((p \wedge \neg q) \wedge q)/\Pr(p \wedge \neg q) \times \Pr(\neg q)$ — Ratio Formula
8. $\Pr(p \to q) = 1 \times \Pr(q) + 0 \times \Pr(\neg q)$. Thus: $\Pr(p \to q) = \Pr(q)$ — From (7)

1.2. The conclusion is truly absurd: in many cases, the probability of a conditional $p \to q$ diverges from simply q. Yet the reasoning was relatively straightforward: (1)–(3) and (6)–(8) follow from basic probability theory combined with basic arithmetical reasoning.

1.3. Some reject The Equation in response to (1)–(8) and block the inference from (4) to (5). This is non-ideal. The Equation is well-motivated. Others deny that $\Pr(A \to (B \to C)) = \Pr((A \wedge B) \to C))$ by denying that $\ulcorner A \to (B \to C)\urcorner$ and $\ulcorner (A \wedge B) \to C)\urcorner$ are logically equivalent. Note that if this equivalence holds, then $A \to (B \to A)$ is a tautology and yet, A should not always warrant 'If B, then A' (Adams, 1975: 33).

2. ***Non-Propositional Accounts of Conditionals***

2.1. Some respond to (1)–(8) by denying that conditionals express propositions. That is, deny that conditionals have truth conditions at all. This is the response we'll look at for the rest of the lecture. Variations of this idea are defended in (Edgington, 1995), as well as in (Gibbard, 1981), and (Bennett, 2003).

There are independent grounds for thinking that conditionals do not express propositions. One argument relies on 'Sly Pete' examples, sometimes known as 'Stand off' cases, from Gibbard.

Sly Pete: A hand of poker is being played, and everyone but Pete and one other player have folded. Two onlookers, A and B, leave the room, and later each sees one player leave the gaming room. A sees Pete without the scowl that he always has after calling and losing, and concludes that *if Pete called, he* *won*; B sees Pete's opponent with more money than he owned when B left the room, and concludes that *if Pete called, he lost.*

It is uncontroversial that both conditionals cannot be true: generally, $\neg((p \rightarrow q) \wedge (p \rightarrow \neg q))$. Could one be true and the other false? This is hard to maintain. Both A and B plausibly inferred their respective conditional from facts they were very confident in. How are we to distinguish A from B in this way? Similar reasons count against the conditionals both being false: where precisely does the inference go wrong?

2.2. Edgington (1995) gives another argument for conditionals not having truth conditions. Truth conditional accounts propose a claim of the form 'If A, then B' iff $A * B$, where $A * B$ is some statement involving A and B. Edgington notes that in many optimal cases, we can be relatively certain of 'if A, then B' but very uncertain of $A * B$, for some proposed $A * B$. This, according to Edgington, is strong evidence *against* the proposal.

3. ***Against Non-Propositional Accounts of Conditionals***

3.1. The standard way of developing the view that conditionals do not express propositions does not reject The Equation or the general idea that we can assign probabilities to conditionals. But how, then, do we interpret the 'probability' here? One idea is to interpret the probability here as a measure for assertability. That is, the degree of assertability of $p \rightarrow q$ is equal to the conditional assertability of q given p. Note that interpreting the probability as assertability is not universal. For instance, Edgington (1995) takes the probability to be a measure in the degree of belief, not the *assertability*.

3.2. But how do either of these approaches block the triviality result precisely? After all, $\Pr(p \rightarrow q) = \Pr(q)$ is absurd, regardless of the interpretation of the probability—both the degree of assertability and belief in $p \rightarrow q$ is not generally just the degree of assertability or belief in q. As Lewis (1976: 141) notes:

> Merely to deny that probabilities of conditionals are probabilities of truth, while retaining all the standard laws of probability..., would not yet make it safe to revive the thesis that probabilities of conditionals are conditional probabilities. It was not the connection between truth and probability that led to my triviality results, but only the application of standard probability theory to the probabilities of conditionals...

The idea: by denying that conditionals express propositions, we deny that we can arbitrarily embed conditionals in truth-functional contexts. We don't claim that the axioms of probability don't hold *contra* Lewis—only they hold for all appropriate instances. However, some conditional compounds are not appropriate:

> ... the difficulty in attaching probabilities to compounds of conditionals arises with almost the simplest of such compounds, namely those of the form $p((A \rightarrow B) \wedge B)$ and $p((A \rightarrow B) \wedge \neg B)$ ... regard the inapplicability of probability to compounds of conditionals as a fundamental limitation of probability. (Adams, 1975: 35)

3.3. One problem with this is that there is still a conceptual difficulty in understanding how we are supposed to believe conditionals, if they do not express propositions. One answer to this is found in (Mellor, 1995). To believe $p \rightarrow q$ is just to be disposed to (unconditionally) believe q, if you were to believe p. One problem with *this* arises from conditionals like 'If Reagan is a KGB spy, no one will ever believe it.'

3.4. Another problem with these accounts is a parallel of the Frege-Geach Problem for moral expressivism—the view that moral statements don't express propositions, but express non-propositional content like, e.g., approval or disapproval. That is, conditionals often appear in logically complex sentences and it is difficult to see how those complex sentences make sense, if conditionals do not express propositions. For instance:

($\wedge$) Pete will come to the party, if John is there but I don't like John.

($\vee$) If Pete comes, John will come, or if Pete comes, John will not come; it doesn't matter.

($\forall$) Anyone who resides in the UK for more than 183 days is tax resident in the UK.

Read: $\forall x$(If x resides for more than 183 days, x is tax resident in the UK)

A related point: one of the classic examples of a valid argument form is *modus ponens*, one third of which involves a conditional. If conditionals do not express propositions, we have to think that we systematically reason using not only a falsehood, but something which can never be true or false.

References

Adams, Ernest (1975). *The Logic of Conditionals: An Application of Probability to Deductive Logic*.

Bennett, Jonathan (2003). *Philosophical Guide to Conditionals*. Oxford, GB: Oxford University Press UK.

Blackburn, Simon (1986). How Can We Tell Whether a Commitment has a Truth Condition. In: *Meaning and Interpretation*. Ed. by Charles Travis. Blackwell, 201–232.

Edgington, Dorothy (1995). On Conditionals. *Mind* 104, 235–329. DOI: 10.1093/mind/104.414.235.

Gibbard, Allan (1981). Two Recent Theories of Conditionals. In: *Ifs*. Ed. by William Harper, Robert C. Stalnaker, and Glenn Pearce. Reidel, 211–247.

Lewis, David (1976). Probabilities of Conditionals and Conditional Probabilities. *Philosophical Review* 85, 297–315. DOI: 10.2307/2184279.