Conditionals, Predicates and Probability

Abstract

Ernest Adams has claimed that a probabilistic account of validity gives the best account of our intuitive judgements about the validity of arguments. In particular, he claims, it has the best hope of accounting for our judgements about many arguments involving conditionals. Most of the examples in the literature on this topic have been arguments framed in the language of propositional logic. I show that once we consider arguments involving predicates and involving identity, Adams's strategy is less successful.

Keywords: Adams's Thesis, conditionals, probability, validity.

Some natural language arguments involving conditionals strike us as good, while others do not. For example, instances of *modus ponens* are usually accepted as good arguments, whereas instances of the paradoxes of material implication are generally not. One task of a theory of conditionals is to explain this pattern of acceptance and rejection. One popular solution to this problem, advocated by Ernest Adams (1965, 1996, 1998) is in terms of probability. Good arguments are, roughly, those which are probability preserving. Eliminating the 'roughness' requires stating precisely what we mean here by 'probability', and what we mean by 'preserving'. There are many ways of doing so which generate plausible verdicts concerning arguments in propositional logic. That is, once it is said what is meant by 'probability preserving' here, it turns out that the good arguments in propositional logic are all and only those which are probability preserving. However, when we turn to predicate logic the picture is not so rosy. Many good arguments do not preserve probability in any of the senses described in the literature. So there can be no explanation of goodness in terms of probability preservation.

1. Varieties of Adams's Thesis

Adams's Thesis is a claim about the probability of indicative conditionals: that the probabilities of conditionals are conditional probabilities. It was advanced independently in Adams (1965), Jeffrey (1964) and Ellis (1973), and still seems intuitively right, even to some of us who know it must be wrong. Representing 'If A, B' as $A \rightarrow B$, this version of the thesis holds that for all A, B:

(A1) $\quad Pr(A \rightarrow B) = Pr(B \mid A)$

As with so many other intuitively plausible formal theories, accepting this thesis leads to paradox. Lewis (1976) showed that any probability function *Pr* satisfying (A1) would be trivial in the sense that the domain of the function could not contain three possible but pairwise incompatible sentences. Adams avoids the problem by (a) denying that the probability on the left-hand side is a 'probability of truth' and (b) denying that (A1) holds for embedded conditionals. One other approach is to hold that $Pr(B \mid A)$ gives, in some sense, the assertibility of $A \rightarrow B$. Letting $Ass(C)$ be a measure of the assertibility of C, the next version of the thesis is (A2).

(A2) $\quad Ass(A \rightarrow B) = Pr(B \mid A)$

While many theorists hold (A2), there are a wide variety of motivations for it, and to some extent a variety of interpretations of it. Lewis (1976) for example, argues that while $A \rightarrow B$ is true whenever $A \supset B$ is true, that is, whenever A is false or B true, (A2) holds for traditional Gricean reasons. Anyone who knew B was true would know that $A \rightarrow B$ was true, but saying it would needlessly breach the maxims 'Assert the stronger' and 'Be brief'. Hence her audience would infer that she had some other reason for saying $A \rightarrow B$, and a natural conclusion is that $Pr(B \mid A)$ is high. Jackson (1979, 1987) argues that these two maxims cannot bear the weight Lewis places on them, and provides a different defence of (A2). Like Lewis, he holds that $A \rightarrow B$ is true whenever $A \supset B$ is true, but takes an utterance of $A \rightarrow B$ to conventionally implicate that we can remain confident that $A \supset B$ is true upon learning that A. Without this indication, *modus ponens* would be rendered impotent. Taking an epistemic reading of the probability in (A2), this indication just means that $Pr(B \mid A)$ is high. Finally, (A2) is held by a string of theorists, from Adams himself, through Appiah (1985) to Edgington (1995) who deny that indicatives have truth conditions. For these theorists, (A2) is a piece of data to be used in explaining other phenomena, not something which needs explaining in terms of truth conditions and Gricean implications.

This tradition links to an important theory of what we have been calling 'good arguments'. We are taking the intuitive classification of arguments into the good and the bad as a given, so a few words may be in order as to which intuition we are appealing. Instances of *modus ponens* are not generally regarded as valid because they are endorsed by some formal logic or other. Rather, it is a constraint on those formal logic that they validate *modus ponens*, if they are to have any claim to be theories about our concept of entailment. Similarly, arguments of the form *Some Fs are Gs* so *All Fs are Gs* are regarded as bad not because formal logic tells us so. Rather, it is a criterion of adequacy on a formal logic that it not endorse this inference. The judgments we take for granted are, as Austin put it, the first word when it comes to validity. Validity rather than soundness because it is not even an intuition that all instances of *modus ponens* are sound. Formal logics compete to be the last word. Sometimes there is an ocean of difference between the two. Lewis and Jackson, for instance, endorse the validity of the argument *p* so *If q, p*. For example, *I will teach two classes tomorrow*, so *If I die before I wake, I will teach two classes tomorrow*. Routley *et al* (1982) list fifteen other intuitively bad argument forms that are counted as valid by Lewis and Jackson's theory.

One attempt to reconcile theory and practice is by appeal to the concept of assertibility. Good arguments are those which invariably preserve assertibility. The most important statement of this position is in Stalnaker (1975). He says that an inference is good just in case, "in every context in which the premises could be appropriately asserted or supposed, it is impossible for anyone to accept the premises without committing himself to the conclusion" (1975: 65).

This account of good arguments, broadly construed, seems to follow directly from a basic principle of Gricean semantics. The principle is that linguistic competence requires knowledge of assertibility conditions, but not of truth conditions. The negative part of this is trivial to prove. Grice (1989: Ch. 1) showed that the 'A-philosophers', the ordinary language philosophers predominant in post-war Oxford, were systematically mistaken about the truth conditions of various English sentences. But claiming that Austin, Ryle, Strawson and so on were not competent speakers of English stretches credibility to breaking point. Knock-down arguments for the positive part are a little harder to come by. Here's three inconclusive reasons for believing it. First, intuitions about assertibility are generally taken as data points, something in need of explanation by a complete semantic and pragmatic theory, but if competent speakers could be systematically mistaken about what is assertible, this would be an unnecessary burden. Secondly, a broad mutual knowledge of assertibility conditions seems necessary and sufficient for (generally successful) communication between speakers, and that seems necessary and sufficient for linguistic competence. Thirdly, competence had better require some knowledge about the language, and if it is neither truth conditions nor assertibility conditions, it is hard to see what it will be. So this account of good arguments has some theoretical motivation, or at least an impeccable heritage.

Unfortunately the concept of assertibility here is too unclear for this account to be considered complete. There are clear cases of conditionals $A \rightarrow B$ which could not, all things considered, be asserted in a particular context despite $Pr(B \mid A)$ being arbitrarily high. It would be inappropriate to say in a silent reading room, "If Al Gore wins the 2000 election, he will become the next U.S. President," despite the high probability of consequent given antecedent. Jackson (1987: 10) responds to these examples by distinguishing between sentences that can be asserted all things considered, these are assert*a*ble, and sentences whose contents accurately represent the world, these are assert*i*ble. More generally, he says that a sentence is assertible iff it is assertable, or fails to be assertable merely because of local, highly contextual factors. There are two problems with this account. The first is that it fails to be clear. The second is that, to the extent that it is clear, it makes false predictions. To appreciate the first, try to determine whether on this recipe sentences with false conversational implicata are unassertible, or merely unassertable. The second problem is borne out by examples of morally permissible lying. There are cases when it is, all things considered, appropriate to utter *S*, even though *S* is known to be false. In these cases *S* will be assertable, because it is an appropriate utterance, but not assertible, for the sentence does not accurately represent the world. But if assertability equals assertibility plus something, this would be impossible, for nothing could be assertable without being assertible. So the account must be amended. The appropriate amendment is in Jackson (1998).

> I now think that we should simply observe that indicative conditionals *seem* to have a probability of truth given by the probability of their consequents given their antecedents – call this, their *intuitive probability* – and that this intuitive probability plays for indicative conditionals the role that (subjective) probability of truth typically plays elsewhere in governing assertion. In other words, intuitive probability is defined functionally: it is that property of indicative conditionals that plays the role that subjective probability plays for sentences like 'Grass is green' (Jackson 1998: 53-4, emphasis in original).

There is a misstep in the last line; a bare plural generic like 'Grass is green' is most definitely not a simple sentence, whatever sentences do turn out to be simple. Some, but not all, of the difficulties attending a sufficient analysis of such sentences are discussed in von Fintel (1997). But we can easily find genuinely simple sentences (say 'Socrates is wise') to fill that role in Jackson's theory. Adams's Thesis can now be restated as two claims.

(A3) Conditional probability plays the same role in determining proper assertion for conditionals as simple probability plays for simple sentences. Following Jackson, call whatever plays this functional role for a given sentence its intuitive probability.

(A4) This role is an important one; in particular a good argument is one which preserves intuitive probability.

Adams arrives at these claims directly, because he thinks we can preserve the claim that probabilities of conditionals are conditional probabilities if we are more liberal in understanding what probabilities are. Given this understanding, he thinks intuitive probabilities really are probabilities. Others, including Jackson, arrive at them indirectly, by going via a detailed theory of proper assertion. Either way, they appear to be important and interesting claims. It would be nice to know if they are true.

This paper shows that (A3) and (A4) cannot be true together. So, we take it, Adams's Thesis is false. We make no stand on whether (A3) alone may be true; the arguments in this paper do not tell one way or the other.

Before the refutation begins, it is worthwhile to remember how well Adams's Thesis does at explaining intuitions about several arguments. Given some minor assumptions about disjunctions, the thesis correctly classifies the first two arguments as good, and the latter six as bad.

Modus Ponens:	A; If A, B ∴ B
Conditional Disjunctive Syllogism:	A or B ∴ If not-A, B
Paradox of Material Implication I:	B ∴ If A, B
Paradox of Material Implication II:	not-A ∴ If A, B
Paradox of Material Implication III:	not-(If A, B) ∴ A and not-B
Modus Tollens:	not-B; If A, B ∴ not-A
Hypothetical Syllogism:	If B, C; If A, B ∴ If A, C
Contraposition:	If A, B ∴ If not-B, not-A

Adams (1998: 113-133) provides proofs of most of these, the rest are left as an exercise for the interested reader. Adams also provides a counterexample for each sequent he classifies as bad. So, for instance, he claims the argument *If the sun rises tomorrow, it will warm up* ∴ *If it doesn't warm up tomorrow, the sun will not rise* is a counterexample to contraposition, so we should be pleased that the probabilistic account classifies it as a bad argument form. One could quibble about the examples, but it seems that as long as the arguments are framed entirely in the language of propositional logic, Adams's Thesis explains our intuitions about the goodness of the various argument forms. When we expand the language to include the predicate calculus, Adams's Thesis does not do as well.

2. The Counter-Examples

All frogs are green. So if Kermit is a frog, Kermit is green. This seems like a good argument. More generally, any argument of the form in (1) seems good.

(1) All Fs are Gs; so if Fa, Ga.

Here is another good argument, one given as a paradigm of a good argument in Jackson (1987: 6). "Cain and Abel were born on different days of the week. So if Cain was born on Tuesday, Abel was not". More generally, any argument of the form in (2) seems good.

(2) $f(a) \neq f(b)$; so if $f(a) = x$, $f(b) \neq x$.

However, neither of these arguments are probability preserving according to Adams's Thesis. To see this for (1), consider any probability function *Pr* satisfying the following constraints:

Pr(*b* is the only *F*, and it is *G*) = 0.33

Pr(*b* and *c* are the only *F*s, and they are both *G*) = 0.33

Pr(*b*, *c* and *d* are the only *F*s, and they are all *G*) = 0.33

Pr(*a* is *F* and it is not-*G*) = 0.01

According to such functions, *Pr*(All *F*s are *G*s) = 0.99, but $Pr(Ga \mid Fa) = 0$. Hence the argument is not probability preserving. A similar example disposes of (2).

$Pr(f(a) = 2 \text{ and } f(b) = 4) = 0.33$

$Pr(f(a) = 3 \text{ and } f(b) = 9) = 0.33$

$Pr(f(a) = 4 \text{ and } f(b) = 16) = 0.33$

$Pr(f(a) = 1 \text{ and } f(b) = 1) = 0.01$

Again, $Pr(f(a) \neq f(b)) = 0.99$, but $Pr(f(b) \neq 1 \mid f(a) = 1) = 0$. So several good arguments in predicate logic do not preserve probability in the sense of Adams's Thesis. Hence it cannot be that arguments in general strike us as good because they preserve probability in this sense.

3. Barker's Objections

A similar, but distinct, objection to Adams's Thesis has been raised by Barker (1997). However there is a response to Barker's argument open to the devotee of Adams's Thesis which does not work as a response to this argument. Barker's argument turns on the fact that we can be in a position to assert each of (3) and (4).

(3) All *F*s that are *G*s are *I*s

(4) All *F*s that are *H*s are not-*I*s

Let J be the predicate 'is an F and a G'. In Barker's example it is defined such that being a J entails, but is not entailed by, being an F and a G, but nothing turns on this variation. The crucial point is that (3) and (4) support, respectively, (5) and (6), so when we know (3) and (4) we can assert (5) and (6).

(5) If this F is a J, it is an I.

(6) If this F is a J, it is not an I.

Hence there are circumstances when we can properly assert two conditionals with the same antecedent and contradictory consequents. Barker notes that this raises difficulties for a wide range of theories about conditionals. The problem for Adams's Thesis is that it is a theorem of the probability calculus that $Pr(q \mid p) + Pr(\neg q \mid p) = 1$. Hence it cannot be that the conditional probabilities relevant to the assertibility of (5) and (6) are each high, so according to Adams's Thesis it is impossible that each is assertible. But this is inconsistent with the clear intuition that they are each assertible, so Adams's Thesis is refuted.

The problem is that the theorem that Barker relies on does admit of exceptions. Whenever p is inconsistent, $Pr(A \mid p)$ is undefined, though it may be convenient to stipulate that it equals one. This would allow us to keep the theorem that whenever B entails C, $Pr(C \mid B)$ equals one. Adams (1965) indicated that he thought this was the appropriate stipulation to make for the application of his thesis to conditionals. So when p is inconsistent, we will not have $Pr(q \mid p) + Pr(\neg q \mid p) = 1$, so Barker's argument will not go through.

This might all seem a little beside the point, for the conditionals Barker uses have consistent premises. However, what matters for the assertibility of a conditional $p \to q$ is not the value of $Pr(q \mid p)$ in a vacuum; rather it is $Pr(q \mid p \wedge e)$, where e is the background evidence. This is just as should be expected given the functionalist explanation of Adams's Thesis that we adopted in section one. When we say that a simple sentence is assertible just when it is probable, we mean that it is assertible when its probability relevant to the background evidence is high. Whenever $p \wedge e$ is inconsistent we have $Pr(A \mid p \wedge e)$, for any proposition A, so $p \to A$ will be assertible. In particular, this shows that Adams's Thesis predicts $p \to q$ and $p \to \neg q$ will be assertible when p is inconsistent with the background evidence. But this is just the case in Barker's example, so he has not produced a counter-example to Adams's Thesis.

The same reply will not work to the argument here. In no case was a conditional whose premise is inconsistent with the background evidence used. We did discuss conditionals whose antecedent is very improbable given the background evidence, but that does not mean that the standard rules of probability do not apply. Indeed, this can hardly be considered an unfair move by proponents of Adams's Thesis, since they use antecedents with similarly low probabilities in order to explain why the paradoxes of material implication are not good arguments. The rest of the paper looks at different objections which might be raised to this argument.

4. Impossible Antecedents

Some speakers do not classify all instances of (1) and (2) as good arguments, so those speakers might be underwhelmed by my claims. Two responses. First, these speakers may be confusing a judgment about the intuitive soundness of an argument with a judgment about its intuitive validity. When this confusion is cleared, it is recognised that all instances of (1) and (2) are good, so my argument succeeds. Secondly, even if there are genuine counter-examples here, and these speakers are not confused, there is an important distinction between the cases where (1) and (2) seem dubious and the cases which are relied upon here. The only cases which seem odd are cases where the antecedent of the conditional in the conclusion are ruled out by what is known in the context, and such cases are not used here.

Adams himself is one of the speakers who thinks there are counter-examples to (1). He thinks (7) should not count as a good argument (Adams 1998: 289).

(7) Everyone who was at the party is a student. So if the Chancellor was at the party, the Chancellor is a student.

We think this argument is fine for two reasons. First, it seems it can be used in a valid chain of reasoning. Consider someone who wanted to show that the Chancellor wasn't at the party, given that everyone at the party was a student. There are several chains of reasoning she could use; here are two.

(a) Everyone who was at the party is a student. So no one who isn't a student was at the party. The Chancellor isn't a student. So the Chancellor wasn't at the party.

(b) Everyone who was at the party is a student. So if the Chancellor was at the party, the Chancellor is a student. But the Chancellor isn't a student. So the Chancellor wasn't at the party.

To our ears (b) is unduly circuitous reasoning, but it isn't invalid. Every one of the steps seem fine. And the first step is the argument (7). So (7) is a good argument. Second reason. One other thing good arguments seem to preserve, alongside assertibility, is commitment, in the sense of Brandom (1994). If we commit ourselves to *p*, then we commit ourselves to whatever follows from it by a good argument. This is another reason for feeling uncomfortable with the paradoxes of material implication. Someone who commits themselves to *Al Gore will be the next President* does not thereby commit themselves to *If Al Gore is killed tomorrow, he will be the next President*. However someone who does assert *Everyone who was at the party was a student* does seem to commit themselves to *If the Chancellor was at the party, the Chancellor is a student*. The fact that they are unlikely to ever use this conditional in a *modus ponens* argument does not eliminate their commitment to it.

So there are two reasons for thinking (7) is a good argument. But these reasons aren't conclusive, and we want to accommodate the reader who still feels it is bad. There is always something wrong with asserting a conditional whose antecedent is incompatible with the background common knowledge. When we say $A \rightarrow B$, we at least implicate (and perhaps assert) that it is not settled that $\neg A$. It might be settled for one party in the conversation, as when we make *modus tollens* arguments, but it is not settled for all. This is why it is almost always improper to say *A, but if not-A, B*. Dudman (1994) gives as a nice example of this effect **Grannie won, but if she lost she was furious*.[1] The only times this form is acceptable is when

[1] It would be nice to have an explanation of why this sounds even worse when we replace 'but' by 'and'. Surely there is no contrast between Grannie's winning and her being furious if she loses.

the conditional implicitly retracts some of the original commitment to the first conjunct. *Freddy will pass the exam. If he doesn't I'm a very poor judge of character* is acceptable for this reason.[2]

This gives us a clue as to the problem with (7). The conclusion implicates or entails the possibility of the Chancellor being a student. This is not something assumed in the background, indeed it is something which is probably assumed in the background to be false. And it is not something which is supported by the premise. So the conclusion involves a commitment absent from the premise. This might explain what appears to be wrong with the argument.

As further evidence for this diagnosis, note that we don't get the same effect when the antecedent is merely improbable. Jack and Jill are out hunting, and spot a creature moving in the bushes. They agree it is almost certainly a fox, but that there is a slim possibility that it is a dog. Jill says *All dogs react to this whistle. So if that's a dog, it will react to this whistle*. This seems perfectly acceptable reasoning on Jill's part. When the antecedent of the conclusion is highly improbable, but not ruled out altogether, (1) sounds like a perfectly valid form of argument. So even if we are inclined to take (7) to be a bad argument, we should still accept that the following principle, called (Poss) for possibility, is correct.

(Poss) Instances of (1) and (2) are good arguments in all contexts except those where the antecedent of the concluding conditional is taken to be impossible.

The examples given above shows not just that Adams's Thesis is incompatible with the goodness of (1) and (2), it is incompatible with (Poss). In the first example, the antecedent of the conclusion, *Fa*, had a probability of 0.01. That is, it was highly improbable, rather than contextually impossible. As Jack and Jill showed us, instances of (1) are good in such contexts. But as we saw above, they are not probability preserving, in the sense Adams's Thesis requires. So appeal to exotic examples like (7) will not rescue Adams's Thesis.

[2] I am grateful to John Hawthorne for pointing out this class of examples.

5. *Changing the sense of Preservation*

Adams (1996) identifies four senses in which arguments can be probability preserving. The first is certainty preservation; whenever the premises have probability one, so does the conclusion. The second is high probability preservation, which was described in section one. The third is positive probability preservation; whenever the premises all have positive probability, so does the conclusion. The fourth is minimum probability preservation; the probability of the conclusion is no less than the probability of any of the premises. We have focussed on high probability preservation, and it might be thought in doing so we have been unfair to proponents of Adams's Thesis. Perhaps if we change the relevant sense of preservation, we can avoid the objection.

We have focussed on high probability preservation for two reasons. The first is purely the purely pragmatic one that this sense has been most widely discussed, so counter-examples to it are of interest independently of what we have to say about the other senses. The second reason is more theoretical, and considerably more important. High probability preservation is the only kind of preservation which could be of any help in an analysis of good arguments.

As noted at the start, the paradoxes of material implication, such as $B \therefore A \to B$ are not good arguments. However these satisfy Adams's first sense of probability preservation; whenever the premise is certain, so is the conclusion. On the other hand, the two premise argument $A, B \therefore A \wedge B$ is a good argument. But this only satisfies the first two of Adams's four senses of probability preservation. Hence the only sense of probability preservation which rejects $B \therefore A \to B$ but accepts $A, B \therefore A \wedge B$ is Adams's second sense, high probability preservation. So that is the only sense that could be relevant to an analysis of good arguments.

The same point can be put another way. The only sense in which (1) and (2) are probability preserving is Adams's first sense, as the above examples show. Hence if we are to say that they are probability preserving, we must say that the paradoxes of material implication are probability preserving. Hence probability preservation can have little to say about our concept of goodness, which distinguishes between the paradoxes on the one hand, and (1) and (2) on the other.

6. Re-analysing the Premises

My argument assumes that the premises in (1) and (2) are 'simple'. That is, it assumes that the relevant probability is the probability of their truth, as it is for atomic propositions, rather than some more complicated function. So, it might be objected, all we have shown is that proponents of Adams's Thesis need to tell a slightly more sophisticated story about the probability of universals and identity statements.[3] The objection would work were there a suitably sophisticated theory consistent with the data. As we'll see, however, there is no such theory.

Since (1) is a good argument, if it is to be probability preserving the probability (in the relevant sense) of All *F*s are *G*s will have to be at most the minimum value of $Pr(Fx \mid Gx)$ for x in the domain of quantification. Now what should be the probability, in this sense, of Not all *F*s are *G*s? If we are to be talking about anything like classical probability, it will have to be one minus the probability of All *F*s are *G*s. Any other answer will be too *ad hoc* to be plausible. But this answer, despite being the only plausible answer, cannot be correct. The difficulty is that (8) is a good argument.

(8) Not all *F*s are *G*s; so Some *F*s are not-*G*s.

Hence the probability of Some *F*s are not-*G*s will be the *maximum* value of $Pr(Fx \mid \neg Gx)$ for x in the domain of quantification. So in the first example in section 2, the probability of Some *F*s are not-*G*s will be 1. This is somewhat absurd. No one who believed the probabilities really were as set out in that example would say "Some *F*s are not-*G*s", yet according to this version of Adams's Thesis, that should have probability 1. Similar problems face anyone trying to explain away (2) by this approach. So we can conclude that Adams's Thesis cannot be saved by re-analysing the premises.

[3] This objection was suggested by Lloyd Humberstone.

7. Gricean Implicata

Sometimes intuitions about goodness differ from theories about validity because of intuitions about pragmatic features. That is, we say arguments are good whenever they preserve something like Gricean assertability. If there are circumstances when it is possible to properly assert the premises but not to properly assert the conclusion, the argument will not seem good. As noted in section one, this is the explanation given in Lewis (1976) for why the paradoxes of material implication are not good arguments.

It might be objected that we have failed to take such matters into consideration. That is, (1) and (2) might seem to be good not because they are probability preserving, but because they are assertability preserving. This is perhaps a more sophisticated version of the objection in the previous section. Just as the complete Gricean story about conditionals tells us that they can only be asserted when Adams's Thesis is true, the complete Gricean story about universals and identity statements will tell us that they can only be asserted when the conditionals which 'follow' from them can be.

This objection does, we believe, dispose of some counter-examples to Adams's Thesis, but not the counter-examples here. Let's say we had attempted to show Adams's Thesis failed because of the following probability function Pr_1:

Pr_1(*b* is the only *F* and it is *G*) = 0.99

Pr_1(*a* and *b* are the only *F*s and *a* is not-*G*) = 0.01

Now it is true that the intuitive probability of All *F*s are *G*s is high while that of $Fa \rightarrow Ga$ is low. However there is more to the story in this case. Someone who thought these were the probabilities could not properly assert "All *F*s are *G*s". The reason is that two stronger sentences concerning the same subject, "The only *F* is *G*" and "The only *F*, namely *b*, is *G*" which have the same probability. It is a conversational maxim that speakers should not assert weaker sentences when there are stronger sentences available. But if "All *F*s are *G*s" is probable enough to be asserted, so are these two stronger sentences, so one of them should be asserted. Hence this example does not refute Adams's Thesis, because we can explain why the argument does not seem good.

The same explanation does not work for the arguments we have presented. It is true that in the example we gave there is a stronger sentence which is equally probable concerning the same subject matter, namely, “At most *b*, *c* and *d* are *F*s, and they are all *G*s”. However just as there is a good Gricean reason why this should be asserted instead of “All *F*s are *G*s”, there is an equally good Gricean reason why the shorter sentence should be asserted. It is just that the shorter sentence is shorter, and there is a conversational maxim enjoining brevity. If you don’t agree that the Gricean reasons balance in this case, simply increase the number of objects which are possibly *F* and *G* so that the reformulation is sufficiently long that considerations of strength and brevity do balance out. In sum, for the objection to work there needs to be an explanation of why “All *F*s are *G*s” is not properly assertable in the circumstances we described. We doubt such an explanation is possible, but if it is, it looks simple to modify the example so that the explanation will fail.

8. Conclusion

Adams’s Thesis was intended to explain, *inter alia*, our patterns of acceptance and rejection of arguments involving conditionals. While it does an excellent job when the arguments are in propositional logic, it fails for some very simple cases of predicate logic. Hence some other explanation is needed for the predicate case. Further, since probability preservation does not guarantee goodness for predicate logic arguments, it seems that it merely correlates with, rather than explains, goodness for propositional logic arguments.[4]

---

[4] Thanks to Stephen Barker, John Hawthorne, Lloyd Humberstone, Simon Keller, Europa Malynicz, Tom McKay and Graham Oppy for helpful discussions of the issues in this paper.

References

Adams, Ernest (1965) “The Logic of Conditionals” *Inquiry* 8: 166-97.

Adams, Ernest (1996) “Four Probability Preserving Properties of Inferences” *Journal of Philosophical Logic* 25: 1-24.

Adams, Ernest (1998) *A Primer on Probability Logic*. Stanford: CSLI.

Appiah, Anthony (1985) *Assertion and Conditionals*. Cambridge: Cambridge University Press.

Barker, Stephen (1997) “Material Implication and General Indicative Conditionals” *Philosophical Quarterly* 47: 195-211.

Brandom, Robert (1994) *Making It Explicit*. Cambridge, MA: Harvard University Press.

Dudman, V. H. (1994) “Against the Indicative” *Australasian Journal of Philosophy* 72: 17-26.

Edgington, Dorothy (1995) “On Conditionals” *Mind* 104: 235-329.

von Fintel, K. (1997) “Bare Plurals, Bare Conditionals and *Only*” *Journal of Semantics* 14: 1-56.

Grice, H. Paul (1989) *Studies in the Way of Words*. Cambridge, MA: Harvard University Press.

Jackson, Frank (1979) “On Assertion and Indicative Conditionals” *Philosophical Review* 88: 565-89.

Jackson, Frank (1987) *Conditionals*. Oxford: Blackwell.

Jackson, Frank (1998) “Postscript on Truth Conditions and Assertibility” in his *Mind Method and Conditionals*. London: Routledge, pp 51-4.

Jeffrey, Richard (1964) “If” (abstract) *Journal of Philosophy* 61: 702-3.

Lewis, David (1976) “Probabilities of Conditionals and Conditional Probabilities” *Philosophical Review* 85: 297-315.

Routley, Richard, Val Plumwood, Robert Meyer and Ross Brady (1982) *Relevant Logics and Their Rivals*. Atascadero, CA: Ridgeview.

Stalnaker, Robert (1970) “Probability and Conditionals” *Philosophy of Science* 37: 64-80.

Stalnaker, Robert (1975) “Indicative Conditionals” *Philosophia* 5: 269-86. Reprinted in his *Context and Content*. Oxford: Oxford University Press, 1999, pp 63-77, references to reprint.