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# Commentary on: Andrei Moldovan's "Denying the antecedent and conditional perfection again"

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Moldovan's paper discusses a model called the "Horn scale," which is intended to illuminate the way that Gricean implicature may perfect a conditional statement, "if p, q," into a biconditional statement, "if and only if p, then q." He addresses various objections to this scale. I find his replies to these objections quite reasonable, although sometimes I find the objections themselves obscure.

My feeling, when I look at the Horn Scale, is that the objections he is considering are just the tip of the iceberg: that a lot more objections will come from where those objections are coming from.

The reason is that I am reminded of my undergraduate days at Wayne State. I was known in the department as a great counterexampler: people would give me a definition; I would give a counterexample. I was able to do this because I knew Nelson Goodman's Secret: namely, that analytic philosophers have two different notions of logical form: the narrow official notion and the secret robust notion. The official notion does not allow us to distinguish between disjunctive and non-disjunctive propositions, negative and positive propositions, relational properties and non-relational ones, and implicational propositions and non-implicational ones; any given proposition can be written in so many different forms. But we secretly believe—though claiming not to—in a more robust concept, one that allows us to make all of these distinctions.

So, when we give a definition, our definition presupposes the robust concept. So it is easy for someone—me—to do a few truth table manipulations and give a counterexample—a Goodman grue-bleen type example—that cannot be answered except by confessing you accept the robust concept.

Moldovan's problems are already of this sort to a large extent, and when I look at Horn's Scale, I expect many more such problems to start popping off the wallpaper!

Now Horn's Scale supposes we are in a situation where someone wants information about the conditions x such that if x then q, the conditions which imply q.

So if there is just one, we say, "if p then q"; if there are two, we say, "if p then q, and "if r then q." If there are three, we say, "if p then q," "if r then q," and "if s then q." And so forth.

So if we say “if p then q” and *stop*, we are implying that there is no further r we need to mention and, thus we are implying that if p then q, and *only* if p then q. Similarly, if we say “if p then q,” and “if r then q,” and “if s then q,” and *stop*, we are implying that there is no further t we need to mention, and that q is true *only* if (p or r or s).

And that is the Horn Scale.

When I look at this scale, my first thought is that in standard logic, the question “How many antecedents imply q?” makes no more sense than the question in geometry, “How many parts does a line have?”

More specifically, the division into levels presupposes at least a concept of non-disjunctive antecedents. For otherwise, any content on one level can be restated at any other level. For instance, if we have the third level: if p then q, if r then q, and if s then q, we can move this to the second as: if p then q, and if (r or s) then q or we can move to the first as if (p or r or s) then q. Conversely, if we start at the first level with if p then q, this becomes the second level if (p and r) then q, and if (p and not r) then q. And also at the third level, if p r then q, if p s not r then q, and if p not s not r then q. So the various levels are melted together.

Now I do not know whether this is important. Moldovan actually uses this disjunctive trick to reduce the question, “When is one required to add a conditional and move from level n to level n+1?” to the question, “When is one required to move from level 1 to level 2?” He does so by reducing level n to level 1, and thus level n+1 to level 2!

Let us turn to this just mentioned question: “When is one supposed to add a conditional and move up a level?” Now Moldovan, and other writers he discusses, say that if one has if p q on the first level, one has to move up if there is an r *different from p* that implies q. That is not accurate.

What is important, given that if r then q, is not that r is *different* from p, but that r implying q is *additional information* beyond p implying q. For instance, if p does not entail s, then the conjunction p.s is a different proposition from p, but we do not have to move up from *if p then q* to say *if p then q and if p.s then q*. If we know that p implies q, we already know that p.s implies q. AS another example, if the conditional *if p then q* is interesting, q is a different proposition from p, but we do not have to move up a level to say that *if p then q and if q then q*. For “if q then q” is not informative.

So the condition is that r is such that *if p then q* does not obviously entail *if r then q*, though the latter is true. Otherwise put, r implies q, but r does not obviously entail p, or q, or the disjunction (p∨q). Let me state this at the third level. We have: if p then q, if r then q, and if s then q. Now if it is true that if t then q, do we need to move up to the fourth level. Not if the conditional *if t then q* is obviously entailed by the three conditionals we already have. Or, otherwise put, not if r obviously entails p, or entails r, or s, or q, or the disjunction of the four.

Now, this clarification of what we might call “the rule of ascent” turns out to be useful in solving my difficulty about the second objection in Moldovan’s paper. Objection 2 makes no sense; it involves an absurd claim. But the answer to it is quite good, and I feel there must have been a good objection that that answer is

answering. My difficulty is: What *was* that good objection, and how was it mangled into the actual objection?

The actual objection says, wrongly, that it is possible for  $p$  to be a sufficient condition for  $q$ , and the *only* sufficient condition for  $q$ , and yet not a necessary condition for  $q$ . This is wrong because if  $p$  is sufficient and not necessary, then  $(q \bullet \sim p)$  will be another sufficient condition. The objection goes on to give an example, but in the example,  $p$  is *not* the only sufficient condition, rather, *all* conditions are sufficient! Clearly something is wrong.

The *answer* to the objection is good though. We need, in our Horn scale, a *zero* level, when  $q$  is self evident. In Moldovan's example, "it's raining" is a sufficient condition for " $2+2=4$ ." But so is everything else. And the conditional "if it's raining then  $2+2=4$ " does not give us interesting information. No other antecedent offers information either, since  $2+2=4$  is self evident. We are at the zero level.

Now I reconstruct how Moldovan got into trouble. He asked "What about the conditional, 'if it's raining,  $2+2=4$ '?" He imagined himself at the first level considering whether he had to move to the second. He sees he does not have to move to the second level and *concludes* that there is no *other* sufficient condition for  $2+2=4$ . The truth is there is no other condition that is *interestingly* sufficient, but then the one he is looking at is not interesting either. He wonders why then is his  $p$  not equivalent to his  $q$ . In the past, whenever there was no need to move up, there was equivalence! He then realizes that he is not really at the first level at all; he is really at zero.

In talking about the Horn scale, we should avoid counterfactuals. A subjunctive conditional "if  $p$  were true,  $q$  would be true" *grammatically* implicatures its own perfection without needing the Horn scale.

This is because, when we say, "if  $p$  were true," we implicature that  $p$  is not true, and when we say " $q$  would be true," we implicature that  $q$  also is not true. So, if not  $p$  then (still) not  $q$ .

However, a counterfactual in the technical sense—I mean a Stalnaker conditional or a Lewis conditional or the like—has the property that, in standard cases, if  $p$  counterfactual  $q$ , then there are an infinite number of  $x$ 's, such that  $p \bullet x$  counterfactual  $q$ , and these counterfactuals are all *independently* true, thus exploding the Horn scale for counterfactuals in this technical sense.

Define a standard Stalnaker model as one that has an infinite number of possible worlds. So the language contains an infinite number of atomic propositions (letters), and each world is characterized by which are true in that world and which are false. Now one world is the actual world and nearest to itself. There is then a second nearest world, a third, a fourth, and so on to infinity.

But  $p$  counterfactual  $q$  (or " $p > q$ ") is true if and only if either  $p$  is impossible (I exclude this case), or  $q$  is true in the nearest world that has  $p$  true. Suppose then that  $p$  counterfactual  $q$ . Take any atom that is not involved in  $p$ 's formulation or  $q$ 's formulation (there are an infinite number of such atoms). Then if  $a$  is true in the nearest  $p$  world,  $(p \bullet a) > q$ . If  $a$  is false there,  $(p \bullet \sim a) > q$ . These counterfactuals are all logically independent.

This is a theorem (I have just proven it) about the Stalnaker logic. But Stalnaker models are also among the Lewis models, the Pollack models, etc. So this result holds generally for standard counterfactual logics. They all admit models that explode the Horn scale.

I also want to remark on Objection 4. I do not think Moldovan's reply really gets everything that that objection is trying to bring up. Sometimes there is a very long sequence of antecedents  $p, r, s, t, u, v, \dots$  such that each successive antecedent is less probable to be true than the previous one. In such a case,  $v$  is very probably false, and the implication of if  $v$  then  $q$  is probably true independently of  $q$  merely because of  $v$ 's probable falsehood, and the information about  $q$  contained in that conditional is very very small and it is very likely that  $q$  is true if and only if one of the previous antecedents is true. I think it is then a judgment call for me how far along I have to go on that sequence. I do not have to, so to speak, strain every gnat by citing all the antecedents in this sequence.

Let me give an example of this. John secretly writes on a piece of paper, "Either I will pass physics or they are going to pass gun control within a week or the Martians have secretly taken over the world." I peek and see what John has written. I doubt very much that John will pass physics, I think it very very unlikely that gun control will pass within the week, and I think it *extremely* fanciful to think the Martians have conquered the world (but it *is not* absolutely impossible).

You ask me what John has written. I refuse to answer that question, but I agree to discuss what conditions would imply that he has written something true.

So I might say, reflecting that he is not going to pass physics, "He *has not* written something true. What he has written is false."

Or I might say, "If—which is unlikely—he passes physics, then he has written something true." Here I imply that if he does not pass physics, he has written something false.

Or I might relent a bit and say, "Well, if either he passes physics, which is unlikely, or if they really *do* pass gun control within the week, which is extremely unlikely, then he has written something true." I *could*, but I do not have to, mention all three conditions.

Moreover, if I say "He has written something true if the Martians have secretly conquered the world," this *might* be misunderstood as a sarcastic way of saying what he has written *is not* true. Even if it is not misunderstood that way, you are likely to think that anything would be true if the Martians have taken over the world (because the Martians *have not* taken over), and thus find my statement uninformative about the content of his writing.