Philosophy 240: Symbolic Logic Fall 2009 Mondays, Wednesdays, Fridays: 9am - 9:50am Hamilton College Russell Marcus rmarcus1@hamilton.edu

Addendum to Class 4 - September 4

There were (at least) two questions asked in class last Friday to which I wanted to say a bit more. Alex asked about when extra-logical considerations were supposed to make a difference to our logic. Todd asked about the sentence 'If you run a red light, then you break the law', in a world in which running red lights is not illegal.

These two questions are related, since, if the condition of Todd's question (that we are living in a different world) affected our analysis of the conditional, then we would have a case where contingent facts about our world made a difference in our logic.

Let's distinguish between two types of conditional statements:

A **dependent conditional** has a connection (perhaps causal, but not necessarily) between its antecedent and consequent.

1-4 are all dependent conditionals.

- 1. If it is raining, then I will get wet.
- 2. If I run a red light, then I break the law.
- 3. If the car is running, then it has fuel in the tank.
- 4. If I were to jump out of the window right now, I would fall to the ground.

An **independent conditional** lacks the connection we find in a dependent conditional

5-8 are independent conditionals.

- 5. If 2+2=4, then cats are animals.
- 6. If 2+2=4, then cats are robots.
- 7. If pigs fly, then Utica near Rome.
- 8. If pigs fly, then Utica is the capital of Canada.

One advantage of the material interpretation of the conditional is that it can handle independent as well as dependent conditionals.

It returns a truth value for any conditional combination of propositions.

This makes it an awkward representation of some dependent conditionals, but it allows us to maintain the truth functionality of our logic: that the truth value of any complex sentence is completely dependent on the truth value of its component parts.

Imagine you were using logic to program a computer, or a robot.

We want the program not to stall, on an empty truth value, but for it to have rules for how to proceed in any case.

When we consider Fisher's red light example, in our world, the material interpretation is best for the dependent conditionals, like those above.

Even when the antecedents are false, the connections, the conditionals, remain true.

And, there are no other truth-functional options, as we saw.

Philosophy 240: Symbolic Logic, Prof. Marcus; More on Conditionals, page 2

Let's look at the effects of the material interpretation on independent conditionals. Since 2+2=4 is true and 'cats are animals' is true, sentence 5 is true. Since 2+2=4 is true and 'cats are robots' is false, sentence 6 is false. Since 'pigs fly' is false, sentences 7 and 8 are true. Notice that sentences 7 and 8 are like my examples F and G from last time:

F: If I were to jump out of the window right now, I would fall to the ground.

G: If I were to jump out of the window right now, I would fly to the moon.

The question we might want to ask is whether these the appropriate truth values.

First, it doesn't really matter.

Independent conditionals are logically possible, but deviant.

No one really asserts independent conditionals.

As pretentious as it might sound, we are interested in logic as it facilitates our search for truth. Independent conditionals are unlikely to arise very often.

Second, as we already saw, there just aren't any better truth-functional options.

Third, distinguishing between F and G, in contrast to the material interpretation, would import extralogical features into our logic.

We intuitively want G to be false, and the material interpretation yields 'true'.

But, the material interpretation gets G right if the antecedent is made true.

And, while we think G should be false, it doesn't seem that it should be false as a matter of logic.

The reason we think that G is false and that F is true is due to the laws of physics.

If we were living on a planet with very little gravitational force, but on which buildings had limited force fields that kept us tethered to the ground inside, it might indeed be the case that if I jumped out of the window, I would fly to the moon, rather than fall to the ground.

We really want our logic to be independent of all the extra-logical facts.

We don't want to import the physical facts into our logic, anyway.

That's my response to Alex: we want our logic to be completely independent of the facts about the world. As for my response to Todd, notice that considering the red light example in a world in which running red lights is not illegal makes that sentence into an independent conditional.

It's like any of the 5-8 examples, depending on whether I have run a red light or broken a law. But, the connection between running a red light and breaking the law is dissolved, and so it is one of those deviant sentences about which we are uncomfortable, but about whose truth values we don't really have a choice.

As I briefly mentioned in class, last time we met, there are folks working on relevance logics, mostly following an old suggestion of C.I. Lewis's that what I am calling dependent conditionals are best represented modally, as:

Necessarily, if A, then B.

Here, 'necessarily' is a modal operator.

We will talk more about modal operators later in the term, and I have some references in the original notes, but they are really a topic for an advanced logic course.