

Game Theory Day 6

Homework

Please complete on a separate piece of paper.

1. Consider this version of Newcomb's problem:

Two boxes A and B stand before you and you know that *one* of these two situations obtains, though not which one:

A contains \$1,000 while B contains nothing.

A contains \$1,001,000 while B contains \$1,000,000.

In short, B contains either nothing or a million dollars and A always contains a thousand dollars more than B.

You may take exactly *one* box and keep its contents. However, if the man predicted you would take Box A, he has (already) put you in the first situation, whereas if he predicted you would take Box B, he has (already) put you in the second.

Everything else is as before. Should you take A or B?

- a. Consider the dominance method. How does it apply in this version? Write a payoff matrix.
- b. Consider the expected value method. How does it apply in this version? Find the expected value of choosing Box A vs. Box B.

2. Read the story the following story then answer the proceeding questions:

The birthday gifts *

I believe that the essential error is this.

Someone who thinks you should take box A (rather than B) believes that your choice between taking box A and taking box B "reduces" to a choice between getting the contents of box A and getting the contents of box B, whatever those contents may happen to be.

For instance, suppose that the first situation above obtains, so that box A contains \$1,000 while box B contains nothing. Then, in choosing between taking box A and taking box B, you are choosing between getting \$1,000 and getting nothing, whether you know it or not. —*This is the belief.*

A belief of this sort is very natural and in general quite correct. However, in the context of Newcomb's problem, it proves to be badly wrong and this is the root of the error.

To see what this means, consider a more homely example.

Suppose your birthday is coming and I plan to offer you a choice between two gifts *A* and *B*. For example, *A* is the latest novel by whomever and *B* is tickets to some fabulous concert. I don't know which gift you will choose but at least you will have a choice.

Since these gifts tend to run out fast, I ask my secretary to get them both at once. So, after you have chosen one, I'll be stuck with the other, which I must dispose of in some way, at some cost to me, we may assume – but I can live with that.

Unknown to me, my secretary knows you well and can easily predict which gift you will choose: *A* for sure. So she reasons that she doesn't *really* need to get *B* – this will also spare me the trouble of disposing of it later. She doesn't tell me this but just proceeds to get *A*. As expected, both gifts run out soon and can no longer be obtained but my secretary

has *A* safely tucked away in her cupboard.

On your birthday, she prepares two enticing boxes and places gift *A* in one of them. She wraps this box nicely and labels it 'A'. In the other box, she places some old newspapers, just for weight, wraps it nicely and labels it 'B'. She hands me the two boxes. I have no idea that box B is stuffed with newspapers.

When you arrive, I show you the boxes and explain that your gift is a choice between *A* and *B*. You think for a moment and pick box A, just like my secretary knew you would. So you have obtained gift *A* and I ask my secretary to dispose of the other box, which she simply throws away. Everyone is happy.

In this case, you had a choice between taking box A and taking box B. Unknown to you, box B contained old newspapers although box A did indeed contain *A*. Does this mean that, in choosing between taking box A and taking box B, you were choosing between getting *A* and getting some old newspapers?

Of course not, since there's a good reason why the old newspapers were in box B, viz., my secretary knew that, given the choice between *A* and *B*, you would never choose *B*. Indeed, in the circumstances, it doesn't matter what she put in box B. She could have left it empty or put a *frog* in it or even a million dollars. She could also have put *B* in it. Given what she knew, its actual contents just don't matter.

So what were you choosing between in choosing between taking box A and taking box B? You were choosing between *A* and *B*, of course. That was the choice I wished to offer you and that was the choice you had. In particular, nothing my secretary did *deprived* you of that choice, as strange as this may seem.

But how could that choice have been yours if only *A* was there for the taking and *B* was not there; indeed no longer available? Well, again, because my secretary knew that you would not choose *B*. So it didn't matter that *B* was not there. Its presence in this case was just irrelevant. Of course, its presence would normally be relevant but the case here is special: it was known in advance that you would not choose *B*.

Normally, when someone offers you a choice between two items, it is not known which you will choose and so it matters for the offer to be sincere that *both* be made available in case you choose either. But where it is already known which you will choose, it is not important that the other choice be made available. What for? – if it is known that you will not choose it?

We are tempted to say that it's not being there means that you are *deprived* of the choice but this judgment, while understandable, would be hasty. For its not being there could just mean that it was foreknown that you would not choose it. Let's consider this from a broader angle before returning to Newcomb's problem.

Questions:

- a. Does God (who has foreknowledge of your choice) actually deprive you of your ability to choose (i.e. free will)?
- b. Did Jesus have free will? And why is this an important question to be asked in terms of what Christians (or more specifically Catholics) believe?
- c. A common saying amongst Christians is "God has a plan for us." Does this contradict the biblical giving of "free will?"
- d. Have you seen examples of free will vs. God's plan in YOUR life? For instance, did you make a "wrong" choice that you were able to learn from? Or have you ever felt God encouraging your decision making? Etc...

Disclaimer: Clearly these questions are what you would expect in your Theology course, but as you can see Newcomb's problem and the birthday story are wonderfully analogous. Please think carefully! I want YOUR thoughts as opposed to having a RIGHT or WRONG answer.