NEWCOMB'S PROBLEM

Example (Nozick)**.** There are two boxes on the table in front of you. One of them is transparent and can be seen to contain one thousand dollars. The other is opaque. You know it contains either one million dollars or nothing. You must decide whether to

O_1: take only the contents of the opaque box (call the the one box option); or,

O_2: take the contents of both boxes (the two box option).

You know that a remarkably accurate Predictor of human deliberation placed the million dollars in the opaque box yesterday if and only if she then predicted that you would choose today to take only the contents of that box. You have great confidence in the Predictors reliability. $\triangleleft$

What should you do?

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Seminar on Decision Theory, Michaelmas Term 2015.

Decision Theory. Calculate the expected utility of each option and choose the one with higher value!

	M	$\neg M$
O_1	M	0
O_2	$M+K$	K

Two principles of choice.

Evidentialism (EDT): It is the view that "only the *diagnostic* bearing of acts is of practical concern. It only matters to what extent this or that act is evidence of this or that outcome, regardless of whether the act causes the outcome or is merely symptomatic of it."

Causalism (CDT): It is the doctrine that "rational choice must take account of causal information . . . it must attend to whether and how an agent's available acts are *causally relevant* to the outcomes that he desires or dreads."

First arugument. If I take what is in both boxes, the Predictor, *almost certainly*, will have predicted this and will not have put the M in the opaque box, and so I will, almost certainly, get only K. If I take only what is in the opaque box, the Predictor, *almost certainly*, will have predicted this and will have put the M in the opaque box, and so I will, almost certainly, get M. Thus, if I take what is in both boxes, I, almost certainly, will get K. If I take only what is in the opaque box; I, almost certainly, will get M. Therefore I should take only what is in the opaque box.

	M	$\neg M$
O_1	0.9	0.1
O_2	0.1	0.9

$$EU(O_1) = 0.9 \cdot M + 0.1 \cdot 0 = 900K$$

$$EU(O_2) = 0.1 \cdot (M+K) + 0.9 \cdot K = 101K$$

Second arugment. The Predictor has already made his prediction, and has already either put the M in the opaque box, or has not. The M is either already sitting in the opaque box, or it is not, and which situation obtains is already fixed and determined. If the Predictor has already put the in the opaque box, and I take what is in both boxes I get K, whereas if I take only what is in the opaque box, I get only M. If the Predictor has not put the M in the opaque box, and I take what is in both boxes I get K, whereas if I take only what is in the opaque box, I get no money. Therefore, whether the money is there or not, and which it is already fixed and determined, I get K more by taking what is in both boxes rather than taking only what is in the opaque box. So I should take what is in both boxes.

	M	$\neg M$
O_1	$0.9x$	$0.1x$
O_2	$0.1(1-x)$	$0.9(1-x)$

$\Downarrow$ *imaging*

	M	$\neg M$
O_1	$0.8x+0.1$	$0.9-0.8x$
~~O_2~~	0	0

	M	$\neg M$
~~O_1~~	0	0
O_2	$0.8x+0.1$	$0.9-0.8x$

$$EU(O_1) = (0.8x+0.1)\cdot M + (0.9-0.8x)\cdot 0 = 0.8xM + 100K$$

$$EU(O_2) = (0.8x+0.1)\cdot (M+K) + (0.9-0.8x)\cdot K = 0.8xM + 101K$$

References

Nozick, R. (1969). Newcomb's problem and two principles of choice. In N. Rescher (Ed.), *Essays in honor of Carl G. Hempel*, pp. 114–146. Springer.