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Philosophy 800: Tutorial
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notes on Nozick's "Newcomb's Problem and Two Principles of Choice"

Here is some information that might help you as you read Nozick's paper.

Section I

1. On p. 46.9, the clause 'which it is already fixed and determined' should apparently be 'which it is is already fixed and determined'.

Section II

2. On p. 49.2, Nozick uses capital-sigma notation. For an explanation of this, see the "Capital-sigma notation" section on the Wikipedia page for "Summation": http://en.wikipedia.org/wiki/Summation.
3. The concept of expected utility is what Nozick uses capital-sigma notation to explain. A quick web search turned up a brief explanation of this concept here: http://facweb.bcc.ctc.edu/wpayne/expected_utility.htm.
4. On p. 50.2, Nozick uses conditional-probability notation: prob($S_1|A$). This expression refers to the probability that S_1 occurs, given that A occurs, or given that A is done. In the context that Nozick is discussing, this locution can be fleshed out as the following: the probability that state S_1 is the case (rather than S_2 being the case), given that the person has done action A (rather than action B).
5. On p. 51.8, the 'S' after 'T_2 =' should be an 'A'.
6. On p. 52.5, Nozick refers to Goodman-style predicates. These are predicates whose construction seems artificial in the way that Nozick's construction of states $T_1 \ldots T_n$ seems artificial. The two most well-known Goodman-style predicates are *grue* and *bleen*. For the definitions of these, see the Wikipedia page for "Grue and bleen": http://en.wikipedia.org/wiki/Grue_and_Bleen.
7. On p. 54.7, Nozick's definition of S_3 ('A_1, & S_1 or A_2 & S_2') should not have a comma in it.

Section III

8. On p. 56.2, when Nozick says that S did not have the recessive gene, he means that it was not the case that S had a copy of the non-disease gene along with a copy of the disease gene and died only because of the dominance of the disease gene—a state of affairs that would give P a 50-percent probability of having inherited a copy of the non-disease gene from his father to go along with what he knows is a copy of the non-disease gene inherited from his mother. In short, the stipulation that S did not have the recessive gene is what justifies Nozick in saying that if S is P's father, then P definitely has the disease. (Incidentally, in most cases, when Nozick says 'gene', the better word would actually be 'allele'. But 'gene' may be fine, too.)

9. On p. 58.1 is the marker for note 12. In the text of that note, on p. 348, the '≈' should apparently be understood to signify negation. (Usually, negation is signified by the simple '~'; it is unclear whether the '≈' here is a typo or is an intentional (though less standard) signifier of negation.)
10. On p. 58.4, the paragraph beginning 'Of the twelve sorts' introduces unnecessary complications. First, there are fourteen, not twelve, such sorts—the text of note 13, on p. 348, leaves out rows with the following entries: 'none, none, some, some', and 'none, none, all, none'. Second, it is immaterial how many such sorts there are, because the only important sort is the one Nozick immediately says he's going to focus on: the one in which each of the states is already fixed and determined (consider: it is already fixed and determined whether the million dollars is in the opaque box or not), and none of the states is probabilistically independent of the alternative actions (consider: whether the million dollars is in the opaque box or not is not probabilistically independent of whether the person chooses one box or two—it is causally independent, but not probabilistically independent).
11. On p. 63, there is a "simple" matrix that can be kind of baffling if you do not have some specifics to think about. See below for an extended discussion.
12. On p. 64.4, 'r_1 is in the closed interval' should be 'r_i is in the closed interval'.
13. On p. 67.7, Nozick uses the phrase 'nonextensional belief context'. If this terminology is unfamiliar, you might want to consult the sentence at p. 68.7 that begins "The relevant feature of nonextensional belief contexts here is that . . ."
14. On p. 71.1, 'prob(he predicts correctly|I take only second)' should be 'prob(he predicts incorrectly|I take both)'.

About the matrix on p. 63:

Here are some examples of the six kinds of situation.

I. For an example of a situation of type I, recall the following choice matrix from p. 49 and p. 59:

	S_1	S_2
A:	10	4
B:	8	3

A dominant action is available (A), so it's a situation of type I rather than type II. To construe it as a situation in which the actions influence which state obtains and the conditional probabilities differ, suppose it is a situation in which you are trying to improve your computer's performance by adding internal hardware. You can either do so aggressively (A) or moderately (B), but the results you'll get will depend on whether your computer's power supply can provide steady power to all the components after the hardware additions. If it can, you'll be in state S_1, and if it can't, you'll be in state S_2. And your action will influence which state obtains: aggressive additions run a pretty high risk of resulting in unsteady power—so, let's say prob($S_2|A$) = 0.7, meaning that prob($S_1|A$) = 0.3. Meanwhile, moderate

additions yield a much better prospect for steady power—let's say prob($S_1|B$) = 0.8, meaning that prob($S_2|B$) = 0.2. Nozick notes that in this kind of situation, you should maximize expected utility rather than choose the dominant action. This is because the fact that *A* dominates *B* is not very helpful in light of the fact that if you choose *A*, you have a 70-percent chance of getting the outcome that has a value of just 4, whereas if you choose *B*, you have an 80-percent chance of getting the outcome that has a value of 8.

II. For an example of a situation of type II, let's use the same matrix, but with the last entry altered so that there is no longer a dominant action available:

	S_1	S_2
A:	10	4
B:	8	5

With no dominant action available, the case for just maximizing expected utility is unopposed (excluding complications beyond the scope of Nozick's paper).

III. For an example of a situation of type III, just think of Newcomb's problem:

	He put $1,000,000 into box 2	He did not put $1,000,000 into box 2
Take both boxes	$1,001,000	$1,000
Take only box 2	$1,000,000	$0

IV. For an example of a situation of type IV, just think of Newcomb's problem altered so that there is no dominant action available. For example, suppose the last entry in the choice matrix is changed from $0 to $2,000. (Operationally, this might happen if you take only box 2 and it happens to be empty and you are then given a $2,000 consolation prize.)

	He put $1,000,000 into box 2	He did not put $1,000,000 into box 2
Take both boxes	$1,001,000	$1,000
Take only box 2	$1,000,000	$2,000

V. For an example of a situation of type V, again recall the following choice matrix:

	S_1	S_2
A:	10	4
B:	8	3

Suppose, again, that you are thinking about adding hardware to your computer aggressively (*A*) or moderately (*B*). To make this situation belong to type V rather than type I, interpret S_1 and S_2 differently from before. Instead of making their probabilities of occurrence affected by your actions (as in the story in which your power supply's effectiveness depends on what you ask of it), make them unaffected by your actions. For example, suppose that even your aggressive additions won't tax your power supply any more than your moderate ones will, and that all that matters, in terms of the success of your hardware additions, is when your computer's internal power supply was manufactured. Let's say that if your computer's internal power supply was manufactured within the past three years, then your additions will turn out very well (10 for *A* and 8 for *B*); and that if your power supply is older than that, then your additions will not turn out well (4 for *A* and 3 for *B*). So let's interpret S_1 and S_2 like that. Clearly your actions have no influence on the occurrence of the states. Also, the conditional probabilities do not differ: if your power supply has a 60-percent probability of having been manufactured within the past three years if you choose action *A*—$\text{prob}(S_1|A) = 0.6$—then your power supply also has a 60-percent probability of having been manufactured within the past three years if you choose action B—$\text{prob}(S_1|B) = 0.6 = \text{prob}(S_1|A)$.

VI. For an example of a situation of type VI, keep basically the same story as for type V, but change the matrix to the one we used for type II:

	S_1	S_2
A:	10	4
B:	8	5

Then, as with type II, there is no dominant action, and the expected-utility principle is essentially unopposed.