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ARE ECONOMISTS HUMAN?

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Abstract: A controversy among economists and others interested in the limits of rational choice analysis, still running after an onset at least two decades ago, concerns whether intelligent people, and especially experts, can be subject to cognitive illusions. This note provides a striking illustration supporting that disconcerting conjecture. It analyzes the apparent inability of professional economists to give a better than chance response to a very elementary question about consumer surplus.

Are Economists Human?

Ferraro and Taylor (2005) asked about 200 economists at the 2005 annual meeting to answer a question about opportunity cost adapted from Chapter 1 of Frank & Bernanke's introductory micro text. Four out of five got it wrong! This is indeed remarkable. FT argued that it showed a need for more attention to fundamental concepts in training economists. I want to argue that what it shows is something very different: namely, that economists are human.

For what Ferraro and Taylor (FT) have discovered is not that professors of economics have an astonishingly inadequate understanding how to identify an opportunity cost (though what they found certainly looks like that), but that professors of economics, like all other human beings, are vulnerable to cognitive illusions when presented with a question outside of the sort of context in which they are familiar with that sort of question.

Here is FT's survey question:

You won a free ticket to see an Eric Clapton concert (which has no resale value). Bob Dylan is performing on the same night and is your next-best alternative activity. Tickets to see Dylan cost \$40. On any given day, you would be willing to pay up to \$50 to see Dylan. Assume there are no other costs of seeing either performer. Based on this information, what is the opportunity cost of seeing Eric?

And offered a multiple choice of [\$0, \$10, \$40, \$50], only 43 of a sample of 199 (21.6%) at the 2005 ASSA meeting saw that \$10 is the correct response. The number of correct responses from PhD's in economics, consequently, was somewhat less than the expected number if the respondents had been chickens pecking randomly.

But consider an even simpler puzzle, requiring no training in anything, which typically prompts an even higher fraction of wrong answers.

Three poker chips are in a cup. One is marked with a BLUE dot on each side, another with a RED dot on each side, and the third has a BLUE dot on one side and a RED dot on the other. So there is one blue/blue chip, one red/red chip, and one blue/red chip.

Without looking, you take out one chip, and lay it on the table.

1. Suppose the up-side turns out to be BLUE? What is the chance that the down-side will also be BLUE? ____
2. What if the up-side is RED? What is the chance that the down-side will also be RED? ____

3. Before you see how the chip has fallen, what is the chance that it has the same color dot on both sides? ____
4. Suppose you answered $1/2$ in response to Questions 1 & 2. That would mean that whichever the up color of the chip, the chance is $50/50$ that the color on the down side is the same. But if at Question 3 you said that chance is $2/3$, aren't you contradicting yourself? Yes ____ No ____

The predominant answers to Q1 and Q2 from any audience, including an audience of very good economists, is (as the framing implies) $1/2$. An analogous response could be obtained with the notorious Monty Hall problem except that the problem has become so familiar. The universal response to Q3 is $2/3$. And among the very large majority who respond $1/2$ to Q1 and Q2 but $2/3$ to Q3, the almost universal response to Q4 is "NO".

This is logically absurd. But the only sure way to correct it is to do the experiment! Set up the situation and try it a few times. You will find that it is not at all necessary to run enough iterations to make it statistically apparent that the correct response to Q1 or Q2 is $2/3$, not $1/2$. Rather, once in the physical situation you will find your intuition switches and it now becomes intuitively immediate that the correct probability is $2/3$. And you might eventually wonder how you could have missed the logic required, which could scarcely be simpler.

With two same color chips and only one mixed color chips no one doubts that indeed (Q3) the chance is $2/3$ that the chip you picked is a same color chip. And from there no further probability judgment is required, merely some fluency in English. After, if the chance is $2/3$ you picked a same color chip, what that means is that the chance is $2/3$ that whatever the color on the top (say, Blue), the color on the bottom is the same (in this case, Blue). But what logically seems too trivial to miss, in fact is missed by nearly everyone.

I give a detailed account of this 'chips' example, and with it closely related accounts of two other remarkable cognitive illusions (the Wason 'selection task' and Monty Hall), in Margolis 2005. In each case, a cognitive illusion analogous to perceptual illusions prompts even sophisticated subjects to clear intuitions that make no sense. And in each case it is possible to see how in the unfamiliar context of an artificial puzzle, some default habit of mind prompts an ordinarily useful but in this context logically inept response. The difference with FT's opportunity cost problem is that the results FT

obtained are scattershot. The 80+% who missed the correct response scattered their answers about equally among the three incorrect responses, in contrast to 'chips' here (and an analogous response in Monty Hall) where the usual response is a firm intuition that the chance is 1/2. This suggests the default somehow inappropriately triggered is one that steers a person away from actually thinking about the question, so that what we see are essentially random responses, but slightly biased against the correct (\$10) response because it is the only choice not mentioned in the question, hence the least salient to a random guesser.

Consider a case where an explanation of this sort will be less controversial. The figure below is a version of the Muller-Lyer illusion. The left side of the line is the same length as the right, but as long as you stick to the motto that "seeing is believing", you will not believe it. But you will stick to that only if you refuse to try the simple experiment of holding an edge against the figure and checking the claim.

Figure 1 here

And from this first-hand experience with the illusion, an explanation in terms of the force of an inappropriate default might now seem very plausible. The near corner of the building and the far corner of the room in the next figure are also the same length, but now you can see how experience in the world might entrench a default propensity that yields a perception of lines with the inward edges as shorter than their relative angular measure on the retina, and lines with outward edges as longer. But when all there is is a flat set of lines, that ordinarily useful adjustment stubbornly is there anyway, yielding an unambiguous but absurd illusion.

Figure 2 here

Parallel to that, given the quite overwhelming ability of a really simple puzzle like 'chips' to elicit illogical responses from sophisticated subjects, a fortiori it is possible that the FT results do not really show that professors of economics have a grossly inadequate grasp of opportunity cost, but rather that FT's somewhat more difficult question (relative

to 'chips') happens to trigger the sort of cognitive mechanism that accounts for illusory responses elsewhere. If so, FT's respondents do so badly because they are human, hence vulnerable like everyone else to cognitive illusions in unfamiliar contexts, not because professors of economics need better training.

In FT's simple problem, you can't go to both the Clapton concert and its alternative because you can't be in two places at the same time, not because money to pay for Dylan isn't available for Clapton. What is needed is the opportunity cost of using time in one leisure activity rather than another. This is not the value of time issue ordinarily encountered in an economic analysis, which usually trades off value of work vs. value of leisure. And since the out-of-pocket cost for the Dylan concert is zero, nothing prompts a subject to think about the price of the concert, though of course \$0 is indeed a price. This combination of odd features makes the problem just a bit "translucent" relative to a question where a person doesn't have to switch dimensions to get to the opportunity cost. The value of the time used to attend the free Dylan concert here is the consumer surplus foregone by not going to the Clapton concert for which you have a WTP of \$50 but need to pay only \$40. And although consumer surplus is another perfectly familiar notion, no one ordinarily thinks of consumer surplus you could have gotten from the next-best thing you did not choose as the opportunity cost of whatever you did choose, though indeed that is true.

So the question Frank and Bernanke pose in their textbook is a really good one for students. It provokes them to see what at first sight is a weird connection and see why, though odd, it is correct. But as a question outside that tutorial context, it is only weird. The cognitive connection needed to make the correct response readily intuitive is unusual, so that even though the concepts engaged (opportunity cost, value of time, consumer surplus) are familiar to any economist, the connections among them do not just "click" into place.

Indeed, if you were easily prompted to thinking about the opportunity cost of the use of time implications of everyday choices, you could scarcely get through the day. You are almost constantly making choices of what to do next. At each choice, there is something else you might have chosen (or it wouldn't be a choice). Even if a next-best alternative is salient, all you need to know is that you prefer A to B, though every time

you choose A there is an opportunity cost from not choosing B. It makes sense that our brains are organized in a way that inhibits being distracted by contemplation of such questions. It is only under special conditions (here indeed is where training comes in) that focusing on such things as opportunity cost is fruitful.

That on FT's problem this ordinarily useful inhibition easily overrides really simple logic shows that, however useful in general, in particular cases the habit-governed response may not be useful at all. But, again, we could not get through the day unless habit-governed responses ordinarily work out just fine, though always at some risk that the usually useful habitual response might in the case at hand be a blunder. FT's startling result ought to sharpen our alertness to the possibility that more serious situations must arise where cognitive effects yield choices that violate any reasonable interpretation of rational choice.

Sometimes, as illustrated several times in Margolis 2005, we respond as if we were seeing things that logically are certainly not there, prompted by a default expectation that guides intuition unless sufficiently familiar cues steer us beyond that. Sometimes, as here, we don't see something that is important for the question at hand because absent cues familiar enough to be effective, cognition works to inhibit attention. Both sorts of error can arise on purely private matters outside the range of normal experience with sufficiently prompt feedback. But cognitive errors can occur more easily and with more profound consequences in the context of social choices, which are so often well beyond the normal experience of an individual. Then the aggregate response of many individuals can have consequences that may be both large and perverse.

Is a cognitive illusion affecting experts in their domain of expertise unprecedented? Not at all. As I've shown elsewhere (Margolis 1998), for 400 years the very best experts in early astronomy (from Kepler through Thomas Kuhn and beyond) uniformly misjudged a very simple technical issue due to an easily corrected cognitive illusion.

References

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Figure 1

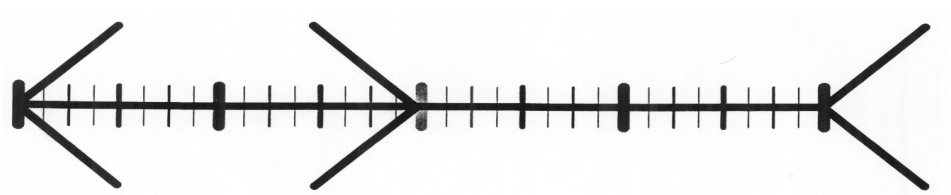


Figure 2

