1) In 2011 four ISEG students conducted a survey on preferences regarding laptops as part of their Economics Seminar project. They told the people surveyed that the laptops had the same price and only differed in their weights and hard drive memories:

Option	Weight, kg	Hard drive memory, Gb
A	3.04	400
B	1.06	128
C	3.04	250

   a) Some people were presented with the three options, and were asked to indicate their preferred option. Sixteen of them chose option *C*. Is this a sensible choice? Discuss.
   b) 453 people were presented with options *A* and *B* only, and were asked to indicate their preference; 56.5% chose option *A*. 459 people were presented with all three options; excluding the 16 that said they preferred option *C*, 70.4% preferred *A*. This difference—preference for *A* increases by 13.9 percentage points when option *C* is included—is statistically significant: that is, if we assume that the presence of *C* does not affect stated preference and that any difference observed between answers to the two questions was because by pure chance the two groups that answered the two questions happened to be different in their preferences (this is called *sampling variation*), the probability of obtaining a 13.9 point difference or more is about 0.0015% (this is the p-value of the test of different sampling proportions that you have or will study in Statistics). Discuss these results in light of the standard theory of rational choice.

2) In the Spring of 2017 four ISEG students conducted a survey on people's reaction to a small loss as part of their Economics Seminar project. Some of the surveyees were presented with the *ticket-loss* scenario: "Imagine you would like to go to a show. The ticket costs €10 and you have bought a ticket. On your way to the show you realise you've lost the ticket. Will you buy a new ticket?" Other surveyees were presented with the *money-loss* scenario*:* "Imagine you would like to go to a show. The ticket costs €10. On your way to the show you realise you've lost €10. Will you buy the ticket?" In the *ticket loss* scenario 59.8% of people said they would buy a new ticket; in the *money loss* scenario 73.1% said they would still buy the ticket; the probability of such a large difference arising only because of sampling variation (p-value) is only 0.8%. Other people faced the same scenarios but the ticket and money lost were €20; in this case 34% of people would buy the ticket in the case of the ticket-loss scenario, but 49.5% would do so in the money-loss scenario (p-value < 0.0001%).
   a) Compare the effects of the ticket loss and the money-loss on the budget constraint. Place the good "shows" on the horizontal axis, and "all other goods" on the vertical axis.
   b) What is the opportunity cost of attending the show after you have lost the money? And after you have lost the ticket?
   c) Discuss the survey results in light on the standard theory of rational choice. Can you find any explanation for the preferences stated?

3) Robert Frank in his *Microeconomics and Behaviour* (1991, p. 226) begins the excellent chapter on "cognitive limitations and consumer behaviour" with the following anecdote from his personal experience. Cornell University has outdoor and indoor tennis courts. To use the outdoor courts you only have to pay an annual fee; indoor courts, in addition to the annual fee, cost, or costed in 1991, 12 dollars an hour and had to be paid for and booked well in advance owing to strong demand. Everybody agrees that is it's a lot more pleasant to play outdoors rather than indoors when the weather is fine, but outdoor courts are unusable in bad weather. In October and November the weather at Cornell can be either bad or good. Frank observes that many of his colleagues, having paid in advance for an indoor court, insist in using it even if when the time comes the weather is fine and there are outdoor courts available. In order not to waste the 12 dollars, they say. Discuss this behaviour in light of the standard theory of rational choice.

4) In an experiment run at the University of New England, Australia, and reported in 1984 (J. Knetsch e J. Sinden, "Willingness to pay and compensation demanded: experimental evidence…", *The Quaterly Journal of Economics*, 99 (3), 1984, p. 507-21), 70 subjects were randomly allocated to two groups; in one group each subject was given a ticket for a raffle having as a prize 50 dollars or a voucher worth 70 dollars in books, whichever the winner preferred; in the other group each subject was given 3 dollars. The former were given the chance to sell their raffle ticket for 3 dollars; the latter were given the chance to buy an identical raffle ticket for 3 dollars. In the first group 82% of subjects decided not to sell their ticket, so showing that they preferred the ticket to 3 dollars; in the second group 38% of subjects decided to buy a ticket, so showing they preferred the ticket to 3 dollars. Can you explain this difference in preferences in light of the standard model of rational choice?

5) This question is inspired in an example by Richard Thaler, Economics Nobel laureate in 2017 (("Toward a positive theory of consumer choice," *Journal of Economic Behavior and Organization*, 1, 1980, p. 39-60). Imagine you are at a store about to buy a t-shirt for €10. But a reliable friend tells you that you can buy the same t-shirt for €5 at a store a 15-minute walk from where you are.
   a) Would buy where you are or would you go to the other store?

b) Imagine the same situation, but now you are about to buy a smartphone for €400; the same smartphone is available at the other store for €395. Where would you buy?
c) Does it make sense in light of the standard model or rational choice to go the other store to save €5 on the t-shirt but not on the smartphone?

6) Psychologists Amos Tversky, Shmuel Sattath, and Paul Slovic present the following study on preferences for road-safety programmes ((“Contingent Weighting in Judgement and Choice,” *Psychological Review* 95, 371-84). Subjects were told that 600 people died every year at the time in Israel. Two road-safety programmes were being considered. The reduction in the number of casualties was 100 with programme *X* and 30 with programme *Y*.
a) Programme *Y* costs 12 million dollars ($12m) each year. How much would programme *X* have to cost so that it would be exactly as attractive as programme *Y*?
b) If programme *X* costs 55 million dollars ($55m), and *Y* costs $12m which programme would you prefer?
c) Suppose Xavier answers part a) saying that *X* would have to cost $40m to be as attractive as *Y*. As *X* actually costs $55m would Xavier prefer *X* or *Y*?
d) Now suppose that Zebedee says that if *X* costs $55m *Y* would have to cost $15m to be as attractive as *X*. As the actual costs are $55m and $12m would Zebedee prefer *X* or *Y*?
e) In Tversky and his colleagues’ study 67% of all subjects said they preferred *X*, saving 100 lives at a cost of $55m, to *Y*, saving 30 lives at a cost of $12m. On the other hand only 4% of subjects stated costs implying preference for *X* (that is, a cost higher than $55m to make *X* as attractive as the $12m *Y*, or a cost lower than $12m to make *Y* as attractive as the $55m *X*). Discuss these results in light of the standard theory of rational choice.

7) The following example is about choice between risky options. Let *A* = (€140, 80%), that is a lottery where you have an 80% chance of winning €140 and 20% chance of winning nothing. Imagine I have a bag with 100 chips numbered from 1 to 100. To play the lottery you draw a chip from the bag. If the number on the chip is 80 or less you win €140; it the number is higher than 80 you win nothing.
a) Which of the following gifts would you prefer to be given: lottery *A* or €100 in cash? Imagine this is really a gift: you do not have to pay anything to play the lottery.
b) Which of the following lotteries would you prefer to be given: *X* = (€100, 25%) ou *Y* = (€140, 20%)?

8) Notice that in the previous question *X* = (€100, 25%) and *Y* = (*A*, 25%). That is, both *X* and *Y* give you nothing with 75% probability; the only difference between the two lotteries is that with the remaining 25% probability *X* gives you €100 and *Y* gives you lottery *A*. Given this would you like to change any of your previous choices?

9) Robin Cubitt, Chris Starmer, and Robert Sugden (“Dynamic Choice and the Common Ration Effect,” *Economic Journal*, 108 (450), 1998, p. 1362-80) presented hundreds of students with the following decision problem. First the students would have to play a “prior lottery” that terminated the game with no winnings with 75% probability and allowed the students to play on with the remaining 25% probability. Students that survived the prior lottery would then choose between playing the lottery (£16, 80%) or just receiving £10. There was just a little difference. In a group students would have to make the choice between (£16, 80%) and £10 before they played the prior lottery; in the other group students would first play the prior lottery and only then, if they survived, would make the choice between (£16, 80%) and £10. Of the 50 students who had to choose before the prior lottery 56.9% preferred (£16, 80%); in the other group, of the 45 students who survived the prior lottery, only 28.9% chose (£16, 80%). The probability that the difference between the two groups resulted from sampling variation only is 0.6%.
a) Is there in the standard model of rational choice provide anything that might leads us to expect the difference observed between the choices in the two groups? Discuss.
b) What explanation could there be for this difference?

Answers

1.a) Assuming that everybody prefers less weight and more memory option *A* should be preferred to option *C*. We say in this context that *A* dominates *C*. A preference for *C* violates the monotonicity axiom. Only 16 people said they preferred *C*, while 131 said they preferred *B*, and 312 said they preferred *A*. It is possible that the people that said they preferred *C* had not paid attention or stated that preference just to be contrarian.

1.b) Nothing in the standard model of rational choice explains the increase in the stated preference for an existing option when a new option is offered. If anything the opposite might occur: some people might now prefer the third option. But that is not to be expected in our case as the new option is dominated by one of the earlier ones. The findings of this survey have been observed in many studies and is known as the *asymmetric dominance effect*. An explanation put forth for it is that preferences are not perfectly defined beforehand, that is before the people face the options, but are instead “constructed” in the process of choosing. This “construction” would be influenced by the way the problem is framed. In this case, the availability of an additional option clearly comparable to and dominated by *A* would tend to make *A* to look more attractive. This is one of many *framing effects* identified in the literature. Such

effects should not exist according to the standard model of rational choice.

2.a) In both scenarios—ticket loss or money loss—the budget line shifts downwards in a parallel fashion, by the same amount in both scenarios.

2.b) The opportunity cost is the same in both scenarios: the decision maker must choose either to spend all the money they currently have on "all other goods" and forgo the show or go to the show and have €10 (or €20) less for "all other goods."

2.c) The survey results cannot be explained by the standard model of rational choice. In both cases—money loss or ticket loss—the decision maker faces exactly the same budget constraint. It has been suggested that the decision maker is less likely to buy a ticket after losing the previously bought ticket because he does not see the loss of the €10- or €20-note as part of the cost of going to the show but does see the money he has spent on the first ticket in that way. In fact it is not (as the loss of the note is not either), because the money is lost no matter whether he does or does not buy a new ticket—that loss is a *sunk cost*. For this reason this phenomenon in known as the *sunk cost fallacy*. Another explanation is that the consumer has several mental budgets, one for food, another for clothing, another for entertainment, etc. The loss of the ticket would be seen as a coming from the entertainment budget, whereas the loss of a note would be seen as coming from the overall budget and so would the loss would be split among the several sub-budgets.

3) It is the sunk cost fallacy again. The opportunity cost of using either court is now zero.

4) There is no explanation. In either group the choice was the same: do I prefer the raffle ticket our 3 dollars? Having previously been given a ticket or 3 dollars does not make any difference according to the standard model. But it looks as though it made a difference. This is known as the *endowment effect:* the decision maker appears to value more highly something he already owns that the very same thing if he does not own it. Some authors see this as *loss aversion:* for someone selling the ticket parting with ticket is seen as a loss; the money the ticket is sold for is seen as a gain; for people in the other group it is the reverse. Loss aversion explains the difference in stated preferences by postulating that a loss has more psychological impact than a gain of the same amount.

5) It does not. In both cases the relevant choice is the same: do I prefer to spend time an effort to go to the other store and save €5 or not? In other words, is the opportunity cost of my walking to the other store (time, effort, etc.) less than €5, in which case I should go, or is it more than €5? Thaler suggests that this type of "inconsistency"—such as walk to save €5 on a €10 article but not a €400 article—is an application of Weber-Fechner law of psychophysics: a change in a stimulus (the price in this case) is noticeable only if it exceeds a certain proportion of the base value.

6.c) Let "v" stand for 'lives saved'. To Xavier Y = (30v, \$12m) ~ (100v, \$40m), and naturally (100v, \$40m) $\succ$ (100v, \$55m) = X. So $Y \succ X$. In words, if Xavier thinks that spending \$12m to save 30 is as attractive as spending \$40m to save 100 lives, then spending \$12m to save 30 lives is more attractive than spending \$55m to save 100 lives.

6.d) In the same fashion Y = (30v, \$12m) $\succ$ (30v, \$15m) ~ X. Then $Y \succ X$.

6.e) The results are inconsistent from the point of view of the traditional model. An explanation that has been put forth is that decisions are not guided by stable, pre-existing, preferences, but that preferences are as if constructed in the act of deciding, and that the decision is influenced by aspects in the environment and the way the problem is framed, even if those aspects are irrelevant from the point of view of the standard model. The "inconsistency" present in these results is an example of the discrepancy between *choice* (the direct choice between X and Y) and *matching* or the equating of the attractiveness of the two programmes. Some authors have suggested that in a matching question such as 6.a)—what cost of saving 100 lives would make the programme as attractive as saving 30 lives at a cost of \$12m—people resort to *anchoring and adjustment:* they anchor on the \$12m and adjust this number to take into account the additional lives saved in the other programme; psychologists have argued that this adjustment is usually insufficient; in this case it would be insufficient to reflect the true importance people give to saving 70 additional lives

8) It does make sense that if two lotteries differ in only one part the choice between the two should depend only on your preferences regarding that part. So if you prefer €100 to A you should choose X; but if you prefer A to €100 you should choose Y. This is the so-called principle of *independence*, which is one of the principles underlying the main theory of choice under uncertainty, which you will study in Microeconomics II. In reality this principle is systematically violated in choices such as those presented in question 7): many people choose €100 over A and choose Y over X. This "violation" is one of the so-called Allais paradoxes.

9.a) The theory of rational choice makes no distinction between choices beforehand and choices on the moment. The intertemporal consumption model we studied assumes the choices would be the same regardless of when the they are made (the other contexts covered in this unit have no temporal dimension). In the examples we covered there were two periods only; in this case the

quantity consumed in the second period is determined by the quantity consumed in the first. With three or more periods however, a consumer behaving as students in Cubitt and his colleagues' experiment would plan consumption for all periods but, at the end of the first period would likely change the plan for the following periods (in our model that would not happen).

9.b) Generally the results suggest that in some situation people are unable to predict what they actually will desire in the future. Or maybe they now would like to do something in the future but when the moment arrives they yield to other desires and do something else instead. In our present example maybe people thing it is a good idea to take the risk rather go for the safe £10 but when the moment to play arrives they might get cold feet and go for the safe option instead. In this example maybe this might be for the better. But there are other situations where sticking to the planned course of action might be advantageous. Think of those students mates of yours that at the start of the semester make laudable plans to work hard and get excellent grades, and then… then you know what happens; or think of those people that decide to start exercising and live healthily so that they will in perfect shape for the next beach season, but when the time arrives to actually eat or get their bum off the couch and go for a run… In such cases it may be helpful to adopt measures to make it hard to deviate from the initial plan. For instance getting a running or gym mate; then the commitment you have to them is an additional incentive to stick the plan.

Thaler, 1980
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.454.6386&rep=rep1&type=pdf