Developing financial consciousness reader
Beáta Kincsesné Vajda PhD
University of Szeged Faculty of Economics and Business Administration
Estimated reading time: 100 minutes

You will read about...

- the basics of behavioral economics and its foundation from neoclassical economics
- Prospect Theory
- framing effects
- heuristics that affect our decision making
- mental accounting
- overconfidence
- the role of emotions

Behavioral economics

Behavioral economics, and relatedly, behavioral finance, is about understanding economic behaviour in real life. It is rooted in neoclassical economics and shows how people violate some of its axioms and the picture of the 'homo oeconomicus' during their decisions. Prospect theory tries to model real– life choices, rather than optimal decisions and describes effects that can be observed when decisions are made.

The text is edited from excerpts from:

- Ackert, L. F., Deaves. R. (2010): Behavioral finance. Psychologxy, -ecision making and Makrets. South-Western Cengage Learning.
- Cartwright, E. (2018): Behavioral Economics. Third Edition. Routledge.
- Furnham, A. (2014): The new psychology of money. Routledge.

SZÉCHENYI 2020
HUNGARIAN GOVERNMENT
European Union
European Social Fund
INVESTING IN YOUR FUTURE

What is behavioral economics?

Behavioural economics has its intellectual foundations in both psychology and economics. It seeks to understand how people select, process and decide upon financial (and other) information. It offers profound and parsimonious information as to why so many seemingly educated and informed people make strangely illogical or irrational decisions with respect to all aspects of their money: borrowing, investing, saving and spending.

It's is about understanding economic behavior and its consequences.

It's about understanding why someone buys a hotdog, goes to work, saves for retirement, gives to charity, gets a qualification, sells an old car, gambles on a horse race, cannot quit smoking, etc. It's also about understanding whether people make good or bad choices, and could be helped to make better choices.

Behavioral economics is about **testing the standard economic model on humans**, seeing when it works and when it does not, and asking whether it can be tweaked, or given an overhaul, to better fit what we observe. It is about applying insights from laboratory experiments, psychology and other social sciences in economics.

Behavioural finance is about **how psychological processes influence the behaviour of all those involved in the financial world**; basically, it is simply a way to explain to those in finance the essential message of behavioural economics.

Behavioural economics was "born" in the late 1960s with experiments that showed that people do not understand some basic statistical phenomena (regression to the mean; the importance of sample size). The pioneers in this area – Amos Tversky and Daniel Kahneman – explored the judgemental heuristics or mental short cuts that people use to think about their money and other related issues.

Another thing behavioral economics does is **give fresh insight into what policies will work and what will not**. For instance, the traditional approach to increase saving for retirement has been complex tax breaks; these are the kinds of things that appeal to Homo economicus but are ignored by Homo sapiens. It is partly for his groundbreaking work in this area that Richard Thaler was awarded the 2017 Nobel

Prize in Economics 'for his contributions to behavioral economics'. Another thing that behavioral economics does is make us question the purpose of policy. This is because the emphasis turns more towards measuring happiness than measuring rational choice. In fact, choice can be influenced by all kinds of context effects, such as a '50 percent off' sticker or a TV advert on the consequences of evading tax; this makes the very notion of rational choice become somewhat meaningless. Clever policy should make people happier, and behavioral economics gives us a better picture of what makes people happier.

From neoclassical economics to behavioral economics

Traditional finance models have a basis in economics, and neoclassical economics is the dominant paradigm. In this representation, individuals and firms are self-interested agents who attempt to optimize to the best of their ability in the face of constraints on resources. The value (or price) of an asset is determined in a market, subject to the influences of supply and demand.

Neoclassical economics makes some fundamental assumptions about people:

- People have **rational preferences** across possible outcomes or states of nature. An important assumption regarding preferences is that people's preferences are **complete**. This means that a person can compare all possible choices and assess preference or indifference. This assumption does not seem to cause too many problems. Surely most people know what they like and what they do not like. A second assumption, **transitivity**, does not seem to be too strong an assumption for most people either. If I prefer vanilla ice cream to chocolate, and chocolate to strawberry, I should also prefer vanilla to strawberry. If transitivity does not hold, we cannot determine an optimal or best choice. So, rational choices are transitive.
- People **maximize utility** and firms maximize profits. Utility theory is used to describe preferences. With a utility function (denoted as 'u(*)', we assign numbers to possible outcomes so that preferred choices receive higher numbers. We can think of utility as the satisfaction received from a particular outcome. Normally an outcome is characterized by a "bundle" of goods. For

example, someone might have to choose between two loaves of bread plus one bottle of water and one loaf of bread plus two bottles of water. If this individual reveals a preference for the former, we would say that: u(2 bread, 1 water) > u(1 bread, 2 water). While the ordering of outcomes by a utility function is important, the actual number assigned is immaterial. The utility function is ordinal (i.e., order-preserving) but not cardinal (which would mean the exact utility value matters). To arrive at her optimal choice, an individual considers all possible bundles of goods that satisfy her budget constraint (based on wealth or income), and then chooses the bundle that maximizes her utility.

- People make **independent decisions based on all relevant information**. Neoclassical economics assumes that people maximize their utility using full information of the choice set.

Expected utility theory was developed by John von Neumann and Oskar Morgenstern in an attempt to define rational behavior when people face uncertainty. This theory contends that individuals should act in a particular way when confronted with decision-making under uncertainty. In this sense, the theory is "normative," which means that it describes how people should rationally behave. This is in contrast to a "positive" theory, which characterizes how people actually behave.

Expected utility theory is really set up to deal with **risk**, not uncertainty. A risky situation is one in which you know what the outcomes could be and can assign a probability to each outcome. Uncertainty is when you cannot assign probabilities or even come up with a list of possible outcomes. Risk is measurable using probability, but uncertainty is not. Whereas, conforming to common practice, we began by saying that we were going to address decision making under uncertainty, the truth is that we will almost always focus on decision-making under risk.

For almost all purposes, when considering decision-making under risk, it is sufficient to think in terms of just wealth. Let's suppose, for simplicity, that there are only two states of the world: low wealth and high wealth. When it is low, your wealth is $50,000, and when it is high, your wealth is $1,000,000. And further assume that you can assign probabilities to each of these outcomes. You are fairly

optimistic about your future, so you assign a probability of 40% to low wealth and 60% to high wealth. Formally, a prospect is a series of wealth outcomes, each of which is associated with a probability. If we call the latter prospect P1, we can represent this situation using the following convenient format:

P1(0.40, $50,000, $1,000,000)

Note that with two outcomes the first number is the probability of the first outcome, and the next two numbers are the two outcomes. If only one dollar figure is given, as in P(.3, $100), the assumption is that the second outcome is "0."

Let us use the notation U(P) for the expected utility of a prospect. For P1, the expected utility, or U(P1), is:

U(P1) = 0.40u(50,000) + 0.60u(1,000,000)

There is abundant evidence that **most people avoid risk in most circumstances**. People are, **however, willing to assume risk if they are compensated for it**. For example, when choosing between two stocks with the same expected return, if you are like most people, you would invest in the one with the lower risk. If you are going to take on a riskier investment, you will demand a higher return to compensate for the risk.

A **risk-averse** person would rather have wealth of $620,000 (whitch is the expected value: 0.4*50,0000+0,6*1,000,000) with certainty as compared to a prospect with a 40% chance of wealth of $50,000 and a 60% chance of wealth of $1,000,000. A risk-averse person is willing to sacrifice for certainty. The certainty equivalent is defined as that wealth level that leads the decision-maker to be indifferent between a particular prospect and a certain wealth level.

We often assume that people are risk averse, but some people actually seem to prefer, at least at times, to take on risk. Such a person is called a risk seeker and has a convex utility function. For such an individual, the utility of the expected value of a prospect is less than the expected utility of the prospect. This person would rather gamble on the uncertain outcome than take the expected value of the prospect with certainty. A **risk seeker** would rather have a prospect with a 40% chance of wealth

of $50,000 and a 60% chance of wealth of $1,000,000 versus wealth of $620,000 with certainty.

Finally, people who are **risk neutral** lie between risk averters and risk seekers. These people only care about expected values and risk does not matter at all. A risk-neutral individual would be indifferent between a prospect with a 40% chance of wealth of $50,000 and a 60% chance of wealth of $1,000,000 and wealth of $620,000 with certainty. For a risk-neutral person, the certainty equivalent level of wealth is equal to the expected value of the prospect.

Expected utility does give us, therefore, a very simple and transparent way to model and understand how people make choices when there is risk. It can be derived from **three axioms**: ordering (meaning that an individual has well defined preferences and can always decide between any two prospects), continuity (meaning that when there are three lotteries (A, B and C) and the individual prefers A to B and B to C, then there should be a possible combination of A and C in which the individual is then indifferent between this mix and the lottery B), and independence (meaning that that two gambles mixed with an irrelevant addition will maintain the same order of preference as when the two are presented independently of the addition).

There is now a large body of evidence that indicates that **actual choice behavior may systematically violate the independence axiom**. Two examples of such phenomena, first discovered by Maurice Allais in 1953, have played a particularly important role in stimulating and shaping theoretical developments in the foundations of behavioral economics.

To understand the so-called **Allais-paradox**, consider the prospect choices in Table 1. In the case of Question 1, people can choose between A and B, while in the case of Question 2, people can choose between C and D.

Table 1: An illustration of the Allais paradox

Question 1

Prospect A		Prospect B	
$1.000.000	100%	0	1%
		$1.000.000	89%
		$5.000.000	10 %

Question 2

Prospect C		Prospect D	
0	89%	0	90%
$1.000.000	11%	$5.000.000	10%

Source: Ackert-Deaves (2010)

Questions 1 and 2 have been presented to many people. A large number of people choose A over B and D over C. We now show that this violates expected utility theory. If expected utility theory can be used to rank outcomes, a preference for A over B, that is, U(A) > U(B), implies:

U(A) = u($1,000,000) > .89u($1,000,000) + .1u($5,000,000) = U(B)

Simplifying, we have: .11u($1,000,000) > .1u($5,000,000)

Again, if expected utility theory holds, a preference for D over C, that is, U(D) > U(C),

implies: .1u($5,000,000) > .11u($1,000,000)

Since .11u($1,000,000) > .1u($5,000,000) and .1u($5,000,000) > .11u($1,000,000) cannot both hold, such choices are clearly contradictory and violate the model of expected utility.

The Allais paradox is not the only documented violation of expected utility theory. sometimes researchers demonstrate that people do not make choices in accordance with certain axioms on which expected utility theory rests.

Prospect theory - basics

It is axiomatic in economics that people make rational decisions about their money. Economists assume we (always) know what we want, which is for our own good, and that we know how to get it. People make cost–benefit analyses in the pursuit of personal satisfaction and getting the most out of life with their individual resources.

Kahneman and Tversky won the Nobel Prize in economics in 2002 for their work on prospect theory, an alternative to expected utility theory, describing describes decisions between alternatives that involve risk. The model is descriptive: it tries to model real– life choices, rather than optimal decisions.

It and like-minded theories were inspired by demonstrated violations of expected utility theory, so we will show some of these violations.

Prospect theory begins with the contention that standard expected utility theory cannot fully account for observed decision-making under risk. This contention is based on empirical evidence that people often behave contrary to expected utility theory.

Key aspects of observed behavior

Psychologists routinely observe the decisions of people to provide evidence on a question of interest. Across many studies psychology researchers noted similar responses to decision problems that were not consistent with expected utility theory.

The problems presented below illustrate three key aspects of observed decision making that provide a basis for prospect theory.

A prospect P(pr, x, y) is a gamble where you have a probability pr of obtaining x and a probability 1- pr of obtaining y. If the second outcome is omitted, as in P(pr, x), it is assumed to be zero, and if the probability is also omitted, as in P(x), it is assumed to be a certain (riskless) prospect.

For the first problem, consider the following pair of choices between prospects. Imagine that you face the following pair of concurrent decisions. First examine both decisions, and then indicate the options you prefer.

Decision (i): Choose between P1($240) and P2(.25, $1,000).

Decision (ii): Choose between P3(−$750) and P4(.75, −$1000).

In other words, the first choice is between a sure gain of $240 and a 25% chance to gain $1,000. The second choice is between a sure loss of $750 and a 75% chance to lose $1,000. For Problem 1, 84% of the respondents chose P1 in Decision (i), which is consistent with risk aversion. Yet, 87% chose P4 in Decision (ii), which is consistent with risk seeking. Expected utility theory cannot incorporate changes in risk attitude like this. Prospect theory, however, allows for changes in risk attitude depending on the nature of the prospect:

People sometimes exhibit risk aversion and sometimes exhibit risk seeking, depending on the nature of the prospect.

Researchers also noticed that **gains and losses seem to be what people care about, rather than the level of wealth**. In the previous problem, for example, we witnessed risk aversion in the domain of gains and risk seeking in the domain of losses. That is to say, the status quo marked a boundary point between risk aversion and risk seeking. On the other hand, expected utility theory generally uses the level of wealth, not changes in wealth, as the variable of importance in a utility function, and allows for no boundary points between risk aversion and risk seeking—people are assumed to exhibit consistent risk preferences.

For the second problem, consider the following decisions.

Decision (i): Assume yourself richer by $300 than you are today. Then choose between P5($100) and P6(.50, $200).

Decision (ii): Assume yourself richer by $500 than you are today. Then choose between P7(−$100) and P8(.50, −$200).

Notice that the two decisions are effectively the same. In both cases, the decision is between $400 with certainty and a prospect with a 50% chance of $500 and a 50%

chance of $300. Yet, 72% of respondents chose P5 and 64% chose P8. The choice of many indicates risk aversion for Decision (i), but risk seeking for Decision (ii). This problem illustrates that risk attitude is not the same across gains and losses, implying that it is the change in wealth, rather than the level, that matters to people. People evaluate an outcome based on the gain or loss from a reference point, usually taken to be current wealth. Notice that in this problem the two decisions assume different starting wealth positions. Expected utility theory assumes that people value outcomes based on the final wealth position, regardless of the person's initial wealth. This leads to the second key aspect of decision-making:

Peoples' valuations of prospects depend on gains and losses relative to a reference point. This reference point is usually the status quo.

Researchers also noticed that people seemed to feel a loss more strongly than a gain of equivalent absolute value. Consider a third problem.

What value of x would make you indifferent between P9(0) and P10(0.50, x, −$25)?

P9 is the status quo. The average response in one experiment was $61.6 That is, for a fair gamble, when the loss is $25, the typical person requires a gain of $61 to be indifferent between accepting or rejecting the gamble. It is quite clear that people are quite averse to a loss. Loss aversion is the term that describes the observation that, for most people, losses loom larger than gains. Noting that risk neutrality implies x = $25, the upside had to be more than two times the absolute value of the downside in order to induce indifference between the two prospects. Was your choice consistent with the average, or do you require more or less? A third key observation for understanding how people make choices follows.

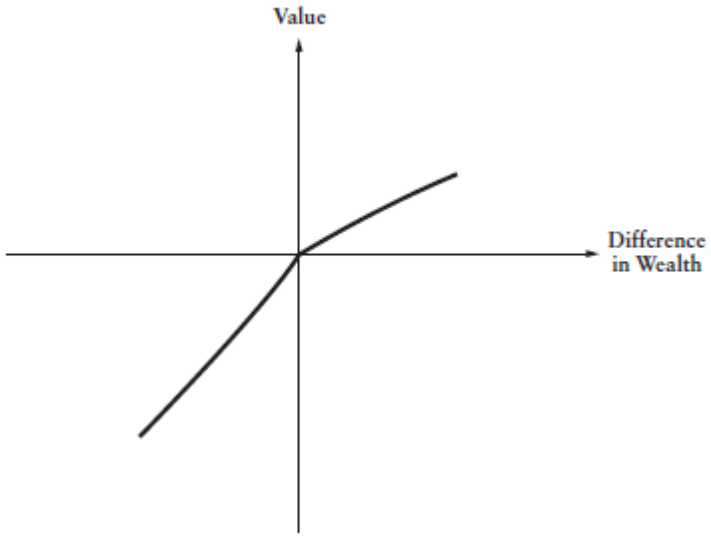
People are averse to losses because losses loom larger than gains.

It is important to note that loss aversion is quite different from risk aversion. While people also prefer a sure thing to a gamble with only positive outcomes when the expected values are identical (e.g., $75 with certainty vs. $50 or $100 with a 50/50

probability), their aversion to such gambles is much weaker than when one of the outcomes pushes them into the loss column.

These results as well as others, encouraged many researchers to consider alternatives to expected utility theory. **Prospect theory provides a model of decision-making under risk that incorporates such observed behaviors.** The value function in prospect theory replaces the utility function in expected utility theory. While utility is usually measured in terms of the level of wealth, value is defined by gains and losses relative to a reference point. The three key observed aspects of decision-making described previously necessitate certain characteristics for the value function: people exhibit risk aversion in the positive domain and risk seeking in the negative domain, which means the value function is concave in the positive domain and convex in the negative domain; decisions are made by focusing on gains and losses, which means that the argument for the value function is not wealth, but rather changes in wealth; and people dislike losses, so the value function is steeper for losses than for gains (Figure 1).

Figure 1: A typical value function in Prospect theory



Source: Ackert-Deaves, 2010, p. 41.

A question that has perplexed researchers for years is: Why do people who buy lottery tickets also purchase insurance? In the expected utility framework, this is puzzling because with a lottery a person is seeking risk. The expected payoff from

a lottery is well known to be substantially less than the price of a ticket and the odds of winning are massively stacked against the ticket holder. With insurance, the same person may pay to reduce risk, appearing to be risk averse. Prospect theory can account for the observation that some people buy lottery tickets and insurance at the same time. It does so **by overweighting low-probability events**. Specifically, prospect theory incorporates overweighting of low-probability events by using decision weights, rather than event probabilities to determine the value of a prospect.

To see why such overweighting is needed, consider the following choice (lottery-like):

Choose between prospects P11(0.001, $5,000) and P12(1.0, $5).

Even though the expected values of the two prospects are equal ($5) as you almost certainly have observed, many people prefer P11 to P12, consistent with risk seeking. Such a choice is indicative of risk seeking in the domain of gains. Earlier we observed another instance of risk seeking, but this was in the domain of losses. It seems that risk seeking can also occur in the domain of gains as well.

Next consider this choice (insurance-like):

Choose between prospects P13(0.001, −$5,000) and P14(1.0, −$5).

In this case we often see people choosing prospect P14, consistent with risk aversion. But this implies risk aversion in the negative domain.

In sum, while we normally have risk aversion in the positive domain, when there is a quite low probability of a payoff this generally shifts to risk seeking. On the other hand, while we normally have risk seeking in the negative domain, when there is a quite low probability of a loss this generally shifts to risk aversion. This is what Kahneman and Tversky characterized as the **fourfold pattern of risk attitudes**.

This pattern suggests risk aversion for gains and risk seeking for losses when the outcome probability is high, and risk seeking for gains and risk aversion for losses when the outcome probability is low.

Framing

Decision problems can be presented in many different ways, and some evidence suggests that people's decisions are not the same across various presentations. If I ask you if you'd rather have a glass that is half empty or a glass that is half full, virtually everyone would see through this transparent difference in decision frames and say that it doesn't matter. A **decision frame is defined to be a decision-maker's view of the problem and possible outcomes. A frame is affected by the presentation mode and the individual's perception of the question, as well as personal characteristics**.

Sometimes frames are opaque, which means that they are trickier to see through. For this reason, when we present a choice problem to a person, a change in frame can lead to a change in decision. This is a violation of expected utility theory, which rests on the assumption that people should have consistent choices, regardless of presentation.

Psychologists and economists have documented that the frame has significant effects on the decisions people make, including decisions of a financial nature. Framing has been shown to have important implications in many areas of behavioral finance.

An important implication of prospect theory is the framing of risky situations. The following example highlights just what an effect framing has on people:

Participants were asked to imagine being a scientist working on an outbreak of an unusual disease, which is expected to kill 600 people. Two alternative programmes to combat the disease have been proposed: the first group of participants were presented with a choice between two programmes:

Programme A: "200 people will be saved"

Programme B: "there is a 1/3 probability that 600 people will be saved, and a 2/3 probability that no people will be saved"

Seventy-two percent of participants preferred programme A (the remainder, 28%, opting for programme B). The second group of participants were presented with the choice between:

Programme C: “400 people will die”

Programme D: “there is a 1/3 probability that nobody will die, and a 2/3 probability that 600 people will die”

In this decision frame, 78% preferred programme D, with the remaining 22% opting for programme C.

However, programmes A and C, and programmes B and D, are effectively identical. A change in the decision frame between the two groups of participants produced a preference reversal, with the first group preferring programme A/C and the second group preferring B/D.

The framing of risky situations can drastically affect the way a person will react to them and this has been widely used in behavioural economics and applied to a diverse range of situations (investing, lending, borrowing decisions) that appear inconsistent with the old economic viewpoint that humans act rationally. Would you rather get a 5% discount, or avoid a 5% surcharge? The same change in price framed differently significantly affects consumer behaviours and is an area of huge importance to marketing.

It is not the reality of the loss that matters but the perception. Nations have gone to war and “stayed the course” until their doom because of loss aversion. It simply means you refuse to admit you made a mistake. As Aronson puts it, “Once we have committed a lot of time or energy to a cause, it is nearly impossible to convince us that it is unworthy.” The real question is: “How bad do your losses have to be before you change course?”

Heuristics

Much research supports the assumption that human decision making across contexts is influenced by perceptual cognitive biases, which are hardwired from birth. These biases are heuristics: short cuts in decision making where we make automatic and “unthinking” decisions, often about purchases on a daily basis.

Most people do not have the capacity or motivation to fully process or evaluate every piece of information that they encounter in their ever-changing worlds.

So, to cope with the sheer amount of data and enhance decision making, humans rely on heuristics to deal with the complexity of their daily environments. Such **cognitive biases allow us to make rapid judgements about complex information that we are unable to thoroughly evaluate**. These stimuli are responded to automatically, without conscious awareness of the underlying cognitive process.

Kahneman has provided a masterful summary of the cognitive and social psychology underlying behavioural economics. He distinguishes between two types of thinking: fast and slow, or systems 1 and 2. **Fast thinking is intuitive, relies on heuristics, and is in a sense automatic, while slow thinking is effortful, deliberate and more logical/rational.** These two systems interact to minimise effort and optimise performance. System 2 thinking requires effort, attention and involvement. It involves thinking, memorising and processing. It involves different forms of energy, but as people become more skilled at any task, their demand for energy diminishes. System 2 thinking keeps you busy and can deplete your willpower. People find cognitive effort mildly unpleasant and avoid it as much as possible. System 1 is lazy while 2 means being more alert, intellectually active, sceptical and rational. Inevitably intelligent people may be better at slow thinking and demanding computation, but that does not mean they are immune to biases and lazy thinking.

Heuristics are biases, mental short-cuts; the products of fast thinking. There are a number of heuristics that are widely discussed in present behavioural economics research. Advertisers and businesses have long known about these because they have understood that the way they frame their message, price option, promotion or proposition has a great impact on whether they will be chosen.

Loss aversion

This is the **tendency to prefer avoiding losses to acquiring gains**. All of us treat losses and gains quite differently. People's decisions are powerfully influenced by

how they frame and describe situations. Nearly all people are much more willing to take risks to avoid losses and much more conservative when it comes to opportunities for gain.

People should test their personal threshold for loss. We are all sensitive to an extent: the question is how sensitive are you? So, the good advice is diversify your investments; focus on the big picture, the broader whole, the wider issues; forget the past because you are not there to justify earlier behaviours; reframe losses as gains like lessons learned, taxes saved; spread out your gains and, paradoxically, pay less attention to your investments, otherwise you will overreact.

In one study a bank targeted people who had not used their credit card for some time. Half were told how good/useful was the cards; and half were told it would be withdrawn unless it was used. As predicted from the theory, those who received the loss framed message were twice as likely to act (i.e. use the card) as those that received the positively framed message.

In short the data show that people give twice the weight to the pain of loss than they do to the pleasure of gain. **We are therefore risk seeking in the realm of gains, but risk averse in the realm of losses**: almost the opposite of what most people suspect. There are many good examples of studies where this has been demonstrated. For instance:

- Homeowners were randomly sent information about the benefits of or losses accruing in not, insulating their home. Those who got the loss message (expressed in daily cash loss) were over 200% more likely to proceed with the insulation.
- Another case study reported on trying to get people to imagine the benefit of buying new technology. Those asked to imagine what they could not do if they did not buy it were more than twice as likely to purchase it.
- Supermarkets know that giving out small coupons increases sales, because if they are not redeemed the customer has lost something.
- The same is true with all sorts of loyalty cards. If these are given to people after they have made a purchase with the acknowledgement or stamp showing they have already made a purchase (and even better a double stamp

as a generous first offer) they are much more likely to use the card, because not doing so represents a loss.

The moral of loss aversion is simple. People are more likely to act if threatened with loss than promised gain in money. The same issue can be framed in opposite ways (losses or gains) but the effects are very different.

Endowment

This is the idea that **people have the tendency to overvalue things they own**. We place a higher value on things that we personally own (a car, a coffee mug, a computer) than their actual, sometimes even printed, market value. These products seem endowed with extra value. People also think a product is more valuable if they get something in return for it, even though it may be of little value. Even little things like stationery, old clothes or books, which are practically worthless, are thought of by owners as potentially high in value.

Curiously, people want more money for a personal product or object that they are trying to sell than the identical object they may want to purchase. This is because the loss of the possession has a greater psychological impact than the benefit derived from gaining it. People **overvalue what they have: they endow it with psychological wealth and are misguided about actual worth**. This can lead them to be very disappointed when selling items but can make manufacturers rich when they explore this heuristic.

Anchoring

Anchoring is the **impact of an arbitrary reference point upon an estimate of an unknown value**. The heuristic bias is caused by people having insufficient adjustment in decisions because final judgements (i.e. agreeing the price) are assimilated towards the starting point of the judge's deliberations.

Anchors can be both internal and external sources of information. Customers seem to have internal expected retail prices (based on all sorts of things), which they use as anchors, basing their response to prices in store upon them. Some customers also base their evaluation of retail price on external sources of numbers such as prices of other products they have come across in store.

For instance, if a customer buys a laptop they are often happy to purchase expensive accompaniments. This is because in comparison to the price of the computer they are perceived as being good value.

It is suggested that the anchoring effect occurs as **we are not motivated enough to revise our price estimates away from a value that we can anchor upon, and so settle with a similar figure**. Further, individuals' original estimates of figures tend to be broad, and so it is cognitively less strenuous to accept whatever an anchor figure is available and focus on more demanding thoughts.

You can anchor by proximity: placing low cost items next to high cost items. Similarly, products of low inherent value can have their value anchored at a higher level if placed next to something expensive.

We also anchor experiences. Against worst case scenarios, less serious issues do not seem as bad. The flight might have been cancelled: it is going but eight hours late.

Curiously, when people have no idea about cost or value they anchor on anything that seems remotely plausible. All free giveaways are thought to be more valuable if the product was seen to have an original cost. Because of the anchoring effect it is usually advised in a negotiation situation to "go in early and go high", to anchor the person around a particular monetary value of your choosing.

Salience

Essentially the idea is that **the more particular information or data seem salient or relevant to a particular problem, the more disproportionate the influence they will have**. Thus, even though the information can be demonstrated not to be (at all, or partly) relevant/salient to a particular decision it can carry more weigh if perceived to be so. This information that is said to be salient is that which receives a disproportionate amount of attention in comparison to other information available. Such information also benefits from enhanced recall.

It could be that the salient information is that which is similar to that previously experienced and thus has a large network of nodes in the memory, with a number

of linkages. Retrieval of such information is facilitated due to the network associated with it, increasing the ease with which it is retrieved.

Fluency

Oppenheimer described fluency as being "**the subjective experience of ease or difficulty with which we are able to process and understand information**". This is a simple heuristic, suggesting that we have a preference for information that is processed with ease. Those things (ideas, objects, theories) which are processed faster, more easily and more smoothly appear to have higher value. Simple, straightforward things seem more important than they are.

Researchers found that stocks with fluent and easily pronounceable names outperformed non-fluently named stocks. The authors based this finding on fluency, and the fact that fluently named stocks are considered to be more valuable due to the ease with which they are processed.

The real test for any brand is that it "readily comes to mind": in fact sooner than all competitive brands. That which is easily read, understood and remembered is always "top of mind". That which is easy encourages behaviour: so people spend more on a credit card than in cash and more with notes than coins worth the same amount simply because they are so much easier. This can work in situations as simple as having see–through containers: things "readily available" are more readily consumed. This is why marketers try so hard to make their product stand out: it should be easily and readily noticeable through packaging colour, shape or logos, which can all have beneficial effects. People also respond to consistency in product design – whether it refers to shape or colour or logo. Pack consistency helps recognisability, which helps sales. It is no surprise that EASY is a brand that has done well. Fluency can occur in other ways. If a product name rhymes, or is very easy to pronounce and spell, it sells more. That is why car manufacturers struggle to find new car names that can sound attractive and pronounceable in different languages. Equally, the fewer the options people have the better.

Having too many options can easily overwhelm people. Less really is more. Fluency is related to ease: ease of navigation round a store, ease of purchase, and ease of

recall. The apparent tendency of corporate managers to utilize suboptimal capital budgeting criteria may be linked to a preference for that which is easy to process.

Representativeness

Indeed, many financial decisions are based on probability assessment. How likely is it that a particular company will continue to post earnings increases? What is the probability that interest rates will rise by 100 basis points over the next quarter? How likely is it that some firm's current round of R&D will bear fruit? And so on. The problem is that **many people have great difficulty understanding probability**. An example of people having difficulty with probabilities is when they have no notion of the difference between simple probabilities (probability of A) and joint probabilities (probability of both A and B). For example, they naturally feel that the probability that they will win the lottery and be overjoyed the next day is higher than the probability that they will just win the lottery. Of course, the opposite is true, since they might be diagnosed with cancer the day after their lottery number comes up.

Those making this mistake are said to be prone to the **conjunction fallacy**. This fallacy is one manifestation of representativeness. **Under the representativeness heuristic, probabilities are evaluated by the degree to which A is representative of B, that is, by the degree to which A resembles B**.

In the case of the lottery, the mental picture of smiling winners and disappointed losers (the consequence) seems more representative of the class of lottery players (winners and losers) than someone (of unknown expression) who just wins, so it seems that being a happy winner is more probable than just winning.

An important variant of representativeness is **base rate neglect**. To illustrate, subjects were shown personality sketches, allegedly from a group of professionals made up of engineers and lawyers. In one treatment, subjects were told that 70% of the professionals were engineers and 30% were lawyers; in another, they were told that 30% were engineers and 70% were lawyers. Obviously, when no specific information is available, one should see that there is a 70% chance of randomly selecting a lawyer/engineer when this occupation is in the majority, and subjects were able to see this. Now consider the following sketch that was presented:

Dick is a 30-year-old man. He is married with no children. A man of high ability and high motivation, he promises to be quite successful in his field. He is well liked by his colleagues.

This sketch was designed to be neutral and unlikely to push subjects in one direction or the other. Indeed, subjects saw this description as neutral, with about 50% saying Dick was a lawyer and 50% saying Dick was an engineer. The problem was that this was true, regardless of whether they had been previously told that 70% of the sample were engineers or 70% of the sample were lawyers. In other words, subjects were ignoring the base rate, hence the term base rate neglect. In terms of representativeness, the description appears representative of a random (50/50) process, so we believe this is indeed the process, ignoring what we know about prior probabilities.

Availability

This is based on the notion that **if you can (quickly and easily) think of something, it will be rated as very important**. The more often a particular event occurs, the more mentally available this is for retrieval – and this factor is used to estimate likelihood of occurrence.

The trouble is that the frequency with which particular events come to mind is usually not an accurate reflection of their actual probability in real life. This short cut also leads to illusory correlations where because people can relatively easily recall events that occurred at much the same time it was believed that they were related to each other.

One famous example is asking people whether dying from a shark attack or having airplane parts fall on your head is more common and they nearly always choose the former.

Availability induces investors to concentrate on those securities that are in the news. Recency leads them to purchase hot stocks or funds when there is little evidence that this is wise.

Familiarity

This heuristic works on the basis of current behaviour being similar to a past experience. **We assume that previous behaviour and its results can be applied to new situations.** What worked in the (very different) past will work in current (and future) situations. In this sense we are "victims" of our past. It also explains why people learn more from failure than from success. The deja vu experience, then, can be very bad for us. It makes us lazy and our decision making poor.

Familiarity is argued to lead to excessive investment in local and domestic securities.

Peak-end rule

Kahneman suggested that **the evaluations we keep in mind of previous experiences are based on the peak of either how pleasant or how unpleasant they were, and how the event was perceived at its end**. Events are not evaluated rationally, considering how pleasant the experience was on average. Memories are powerfully coloured by powerful positive and negative experiences.

In one study he found that participants evaluated 60 seconds of 14°C ice water followed by 30 seconds of 15°C ice water more positively than simply 60 seconds of 14°C ice water alone. The one degree increase in water temperature was experienced as a pleasant improvement and heightened overall memories of the experience.

This is related to the **primacy–recency effect**, well known to memory researchers. Here, information that occurs at the beginning and the end is better recalled than the information that occurs "in the middle". The primacy effect is where information that comes first or early is given more weight, while the recency effect is where the information that comes last is given more weight.

Recognition

Recognisable objects and information are considered to have more value than those that are novel. If a name or place or shape or colour seems familiar it is judged more positively that if it is not recognised.

Simulation heuristic

Kahneman and Tversky suggest that **the ease with which an event is imagined in one's mind is used to make predictions, assess probabilities, evaluate statements and determine the likelihood of that event occurring**. This may appear similar to the availability heuristic, but differs in that the simulation heuristic involves imagining fictitious experiences, whereas availability refers to the recall of real-life memories.

This heuristic is said to be less automatic than the others, and we do not generally spontaneously generate alternatives to a situation. However, when instructed to imagine an alternative possibility this leads to the automatic generation of additional alternative possibilities.

Sunk cost

Economists argue that **sunk costs are not taken into account when making rational decisions**. It is the situation of throwing good money after bad; of continuing on a loss-making project to "justify" the amount of money already spent on it.

Sunk costs may cause cost overrun. In business, an example of sunk costs may be investment into a factory or research that now has a lower value or no value whatsoever. For example, $20 million has been spent on building a power plant; the value at present is zero because it is incomplete (and no sale or recovery is feasible). The plant can be completed for an additional $10 million, or abandoned and a different facility built for $5 million. It should be obvious that abandonment and construction of the alternative facility is the more rational decision, even though it represents a total loss on the original expenditure – the original sum invested is a sunk cost. If decision makers are (economically) irrational, or have the wrong incentives, the completion of the project may be chosen. For example, politicians or managers may have more incentive to avoid the appearance of a total loss. In practice, there is considerable ambiguity and uncertainty in such cases, and decisions may in retrospect appear irrational that were, at the time, reasonable to the economic actors involved and in the context of their own incentives.

Default

Decision making requires effort. **Defaulting on a typical response is easy**. Some people always default on "no", others on "yes". The former always refuse, the latter always accept. Some people seem always to agree; others always disagree. They don't weigh up the evidence fully before defaulting to a particular position.

The default opt out is well known. It has been shown that if you require people to opt out of something, few do so, but if you require them to sign up for donorship few do so. They are less likely to opt out than in. Thus, by defaulting on inactivities governments and manufacturers can ensure that they get people to behave in a particular way. In some countries you have to opt out to register as a non-organ donor. That means that everyone has the right to refuse actively. That is they have to opt out. In most countries a very small percentage do, so any or all of their bodily organs are used after death: but they have to be pro-active.

Manufacturers have learnt to tick boxes when offering people products and services. If you have to "un-tick" or cancel the tick, most do as the manufacturer requires.

Compromise effects

Faced with a list of options most people avoid extremes. Usually they avoid the cheapest and the most expensive option and compromise. That is why manufacturers have decoy products. It has been argued that "organic" produce in big departmental stores are essentially decoy products making more expensive non-organic products seem cheaper and more attractive.

Mental accounting

As we have seen, the framing of outcomes has an important impact on the decisions people make. Let us turn to an example of this in a riskless context. Answer the following yes-or-no question.

- Imagine that you have decided to see a play where admission is $10 per ticket. As you enter the theater, you discover that you have lost a $10 bill. Would you still pay $10 for a ticket to the play?

Mentally note your response, and then answer the next yes-or-no question.

- Imagine that you have decided to see a play and have paid the admission price of $10 per ticket. As you enter the theater, you discover that you have lost the ticket. The seat was not marked and the ticket cannot be recovered. Would you pay $10 for another ticket?

Of course nothing is really different between the questions. A certain amount of money ($10) has been irretrievably lost, and the only decision you have to make is whether or not the theater experience is worth $10 to you. Whether or not the $10 was lost in the form of cash or in the form of a theater ticket is truly irrelevant. Do people see it this way? Many do not. Of the respondents given the first question, 88% said they would buy a ticket. Yet, of the respondents given the second version of the question, the majority (54%) said they would not buy a ticket.

The difference in the responses is due to mental accounting. Mental accounting is one method people use to make decision-making manageable. According to Richard Thaler, mental accounting is **the set of cognitive operations used by individuals and households to organize, evaluate, and keep track of financial activities**. Key components of mental accounting are account assignment, closure, and evaluation. Consider what sorts of accounts may exist. Many people nominally place their money in silos: expenditures (food, housing, entertainment, vacation), wealth (checking account, retirement savings), and income (salary, bonus).

It is important to note that often these "accounts" are mental constructs rather than actual accounts. For example, most of us have not explicitly set up a bank account (or piggy bank) for entertainment.

Traditionally, economists have assumed that funds are fungible (substitutable), but, because of the silo approach created by mental accounting, this may not be so. **Actual decisions people make indicate that money is not always fungible.** While distortions and otherwise odd behavior can result, mental accounting can have a beneficial side in that it may help people exert self-control, encouraging the use of rules such as "don't dip into retirement savings," and "pay for luxuries (like vacations to Cancun or Crete) out of savings." People may, thus, be encouraged to economize and save more.

Returning to the ticket problem, when the ticket was originally purchased, a "ticket purchase account" was set up. If all had gone as planned, the play would have been attended using the original ticket, the pleasure of witnessing the play would have offset the cost of the ticket, and the "ticket purchase account" would have been closed. In Problem 9, the lost $10 bill is not directly linked to the ticket, so people are willing to purchase a new ticket. While not happy about losing $10, absent budget constraints, there is no reason to connect this loss to the ticket purchase decision. On the other hand, in Problem 10, the price of an additional ticket is posted to the still open "ticket purchase account," so the price of a ticket now seems to be $20, which many find to be too high a price.

In the previous problem, there was a natural time to close the account. When a consumption item is paid for in advance, it is natural to close the account when the item is actually consumed (i.e., the play is attended). Other accounts may, however, be somewhat more subtle. Consider the case where there is more discretion as to when accounts should be evaluated and/or closed. Accounts set up for saving and investment fall into this category. How often are such accounts examined— every day or just once a year? And, a different question: How often and under what circumstances are they closed—whenever they are examined, or might other triggers be needed? The answer will surely depend on the type of account. Behavior with respect to retirement savings is likely to be different from behavior with respect to your "lunch money" account.

Prospect theory tells us that **people feel losses more severely than gains, which implies that when there is discretion as to when to close an account, they may choose to avoid doing so if losses will result**. If gains, on the other hand, will result, they may be quite ready to close an account. An example of this is in the context of a stock portfolio. Consider a stock investor who has witnessed one of his picks drop in price. As long as he holds it, he can view it as a "paper loss." Such a frame means that the account remains open. Selling the stock, which can actually be advisable from a tax perspective, necessitates closing the account—and closing the account, especially because of loss aversion, is a painful experience. On the other hand, selling a winning stock allows one to close the account in the gain territory and enjoy the associated gain.

The disposition effect, along with the previously discussed break even and house money effects, suggest that decisions often have path dependence to them. **Path dependence exists if it is important to your decision how you got where you are rather than merely focusing on your current location**. It takes enormous mental discipline to simply look forward without agonizing or gloating over what has transpired. It seems that many have some way to go.

Overconfidence

Overconfidence is **the tendency for people to overestimate their knowledge, abilities, and the precision of their information, or to be overly sanguine of the future and their ability to control it**.

That most people most of the time are overconfident is well documented by researchers in the psychology literature. Overconfidence manifests itself in other ways in addition to faulty precision of knowledge. Many people unrealistically have the tendency to think that their abilities and knowledge are better than average. Illusion of control causes people to believe that they have more power to exert control over events than is logical. Excessive optimism reflects the feeling that things will be rosier than objective analysis suggests.

Better-than-average effect

Some studies have asked people to rate themselves relative to average on certain positive personal attributes such as athletic skill or driving ability, and, consistent with a better-than-average effect, **many rate themselves as above average** on those attributes. But, of course, only (slightly fewer than) 50% of the people in any pool can truly be superior. One researcher surveyed a sample of students, reporting that 82% rated themselves in the top 30% of their group on driving safety.

One factor that facilitates a better-than-average belief is that often the exact definition of excellence or competence is unclear. Naturally enough, people have in the backs of their minds the definition that will make them look best.

Both motivational and cognitive mechanisms are likely behind the better-than-average effect. On the motivational side, thinking that you are better than average

enhances self-esteem. On the cognitive side, the performance criteria that most easily come to mind are often those that you are best at.

Illusion of control

Another strain of overconfidence is called illusion of control. This reveals itself when **people think that they have more control over events than objectively can be true**. For example, one sees dice players acting as if they can control the outcome of the dice roll, and people actually believe that the risk of infection is partly a function of the character of the person that they are coming into contact with.

Excessive optimism

Related to illusion of control is excessive optimism. Abundant empirical investigation has corroborated the existence of this manifestation of overconfidence.

Excessive optimism is present when **people assign probabilities to favorable/ unfavorable outcomes that are just too high/low given historical experience or reasoned analysis**. Examples of such very positive events or very negative events are winning the lottery or dying of cancer. Further, students expect to receive higher marks than they actually do receive, and they overestimate the number of job offers that they will receive. Despite high divorce rates, newlyweds almost universally expect that their marriages will succeed.

Subject to so-called planning fallacy, **people often think that they can accomplish more than they actually end up accomplishing, and that any costs incurred will be as expected**. In reality, many of us fall short of our work goals on a regular basis. And, budget overruns are a common feature of large public projects. The Sydney Opera House, for instance, was supposed to be completed in 1963 at a cost of $7 million. Instead, it was finished 10 years later at a cost of $102 million.

Such lack of realism is not without cost. The inability to meet one's goals can lead to disappointment, loss of self-esteem, and reduced social regard. Also, time and money can be wasted pursuing goals that are unrealistic. Think of someone enrolling in a program of study that to neutral observers is beyond his capability.

Should he fail, a significant amount of time and money will have been wasted, and, because of disappointment, he might be hesitant in the future to strive for other goals that are truly within his grasp.

Overconfidence is prevalent in many realms, not the least of which is financial decision-making. For example, in 15 surveys (each with approximately 1,000 respondents) conducted between 1998 and 2000 by the Gallup Organization for UBS PaineWebber, respondents were asked what they expected the rates of return on the stock market and on their portfolios to be in the following 12 months. On average, respondents expected their portfolios to outperform the market—that is, they were excessively optimistic. Interestingly, men expected their portfolios to outperform by a higher margin than did women. Women, while overconfident, were less so than men.

Evidence shows that in the world of investments, overconfidence leads people to trade too much, underdiversify, and take on too much risk.

Miscalibration, or believing that one's information and analysis is more precise than it really is, can lead people into a false notion that they can time the market or pick the next hot stock. We also discussed in this chapter several forces that work against people learning their true abilities. Consider how self-attribution bias might work in an investment context. When the market is rising, most stocks will do well, including those that investors select for their portfolios, and most people will take that as an affirmation of their acumen. On the other hand, when their stocks drop in price, they will generally blame it on circumstances over which they had no control— such as the general condition of the market or the economy.

Overconfidence may have an impact at the level of markets, and may afflict managers and entrepreneurs. Evidence shows that they are too ready to enter markets, allow cash flows to dictate investment, invest excessively, acquire other companies too readily, and take on too much debt because of excessive optimism and other strains of overconfidence.

Finally, we also need to acknowledge that **overconfidence may not be an unmitigated negative in the sense that it can lead to performance**

enhancement. Consider the case of market entry. An individual has decided to start up a small business, and has made commitments in this regard. While excessive optimism may have been a negative in the sense that too many people pursue this particular goal given the evidence on small business failure rates, it is helpful in another sense. The belief that success is likely can foster effort and motivation, actually increasing one's probability of success.

The force of emotions in investments

Market movements are commonly attributed to the emotions of investors. Yet it is not obvious how to separate the role of emotions from that of fundamentals in producing market outcomes. Emotion includes cognitive, physiological, and evolutionary aspects. Emotions, when in balance, can facilitate decision making, rather than hinder it.

While it may be premature to assert that we understand every factor that affects decision-making, some emotions have proven to be useful in understanding the financial choices people make, perhaps most notably, pride and regret. Regret is obviously a negative emotion. You might regret a bad investment decision and wish you had made a different choice. Your negative feelings are only amplified if you have to report a loss to your spouse, friends, or colleagues. Pride is the flip side of regret. You probably would not mind too much if it just slipped out in conversation that you made a good profit on a trade.

Psychologists and economists recognize the important impact regret and pride have on financial decision-making. Researchers believe that **people are strongly motivated to avoid the feeling of regret**. Importantly, the effects of pride and regret are asymmetric. It seems that **the negative emotion, regret, is felt more strongly by people**.

As was discussed before, central to prospect theory is that people are sometimes risk seeking. This occurs in the domain of losses and in the domain of gains for lottery-type prospects. Is it possible that regret and pride are behind these two tendencies to be risk seeking?

In the case of risk seeking in the domain of losses, it may be that people want to avoid the negative feeling of regret that would occur if they had to recognize a loss,

and so they gravitate away from their natural tendency to be risk averse. As for the lottery effect, a big low-probability gain, whether from picking a long shot at the track or from undertaking some research to find a "diamond in the rough" stock that you think is about to take off against all odds, may lead to anticipated pride and even risk seeking as you can just see yourself telling your friends about your acumen. Whatever the reality, it is clear that pride and regret are powerful emotions that impact the decisions people make. Now we will consider a specific financial behavior and investigate whether emotion explains observed choices.

Researchers have recognized the tendency of investors to sell superior-performing stocks too early while holding on to losing stocks too long. Perhaps you have observed this behavior in others, or even experienced it yourself. Have you ever heard someone express a sentiment such as, "This stock has really shot up so I better sell now and realize the gain?" Or, can you imagine yourself thinking, "I have lost a lot of money on this stock already, but I can't sell it now because it has to turn around some day?" **The tendency to sell winners and hold losers is called the disposition effect.**

After reading this reader and watching the video lesson, you can quickly **test yourself** at **https://create.kahoot.it/share/e4e49696-87ed-4459-84d6-b4820ae47b45**

This teaching material has been made at the University of Szeged, and supported by the European Union. Project identity number: EFOP-3.4.3-16-2016-00014