

# **PRINCIPLES OF BEHAVIORAL ECONOMICS**

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**Lecture 15**

Hello and welcome back to the course on Principles of Behavioral Economics. This is lecture 15 or module 15, where we are going to talk about heuristics and framing effects. Basically, in the previous module, we talked about some of the biases. Now, biases can be caused by heuristics as well, so now we are going to talk about some heuristics. Previously, we also talked about search heuristics in some context. Followed by, in the next module, we are also going to talk about some of the important effects that are discussed in the context of behavioral economics.

So, beginning with, first of all, we will be talking about three heuristics that come from Kahneman and Tversky's Heuristics and Biases Program. They identified three heuristics that are employed to assess probabilities and to predict values. For instance, how do people assess the probability of an uncertain event or the value of an uncertain quantity? People rely on a limited number of heuristic principles, which reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations. So, ideally, what they try to say is that reality could be pretty complex.

So, we use some heuristics, which are alternatively called rules of thumb, to assess certain probabilities. Though these heuristics are quite useful, sometimes they lead to severe and systematic errors. So, beginning with the representative heuristic, or it is also called representativeness. If event A is highly representative of B, it is likely that A originates from B. That is the basic precept of the representativeness heuristic or representative heuristic. Let us consider an individual who has been described as, "Steve is very shy and withdrawn, invariably helpful, but with little interest in people or in the world of reality.

A meek and tidy soul, he has a need for order and structure and a passion for detail." Suppose someone describes someone called Steve like this. How do people assess the probability that Steve is engaged in a particular occupation from a list of probabilities like

he could be a farmer, he could be a salesman, he could be an airline pilot, he can be a librarian or a physician which profession basically suits him the most given the description of him. In the representativeness heuristic the probability that Steve is a librarian for example is assessed by the degree to which he is representative of or similar to the stereotype of a librarian

this can be considered also as the similarity heuristic I can give you one more example that suppose some information is given to an individual that say an individual X, he lives in Mumbai and his father was a film director. What is the chance that he is also associated with the film industry. Now people would generally say or if I ask rather that what is the probability that he is associated with the film industry or he is also a film director or he is a businessman. People who generally associate or consider him to be or associate a greater probability with that individual being

a film director, again, or associated in some way or other with the film industry. But if we go by probability, then in Mumbai, there are larger numbers of businessmen as compared to film directors. So this is something like representative heuristics. The idea is that when asked to judge how likely it is that A belongs to category B, people answer by asking themselves how similar A is to their image or stereotype of B. For instance, a 6 foot 8 inch African-American man is more likely to be a professional basketball player than a 5 feet 6 inch Jewish guy

because there are lots of tall black basketball players and not many short Jewish ones. at least not these days as reported by Thaler and Sunstein in their book Nudge. So, the point is that since larger number of you know there are more African American basketball players who are very tall, they are part of the American basketball team, then a 6 feet 8 inch African American has greater chance of being a professional basketball player compared to a shorter Jewish guy.

This approach to the judgment of probability leads to serious errors because similarity or representativeness is not influenced by several factors that should affect judgments or probability. Kahneman and Tversky identified the factors as insensitivity of prior probability of outcomes, insensitivity to sample, insensitivity to sample size, misconception of chance, insensitivity to predictability, the illusion of validity and misconceptions of regression. So, you can identify the impact of some of these factors from the very few examples that we have discussed. Basically, getting into a discussion of all these individual factors is beyond the scope of this course.

Next, we move on to availability heuristics. There are situations in which people assess the frequency of a class or the probability of an event by the ease with which instances or occurrences can be brought to mind. For example, if I ask my mother who is an old lady, maybe in her 70s, what do you find it more exciting, to knit a sweater or to go for a movie? Maybe she would say that, it is more exciting or more enjoyable to knit a sweater.

That is because she has crossed the age where she would be enjoying movies. So first of all, she would see people around her who are primarily getting enjoyment of doing similar kind of works. So this is the available information to her that tells her that this is more enjoyable as compared to going for a movie. We can take another example. One may assess the risk of heart attack among middle aged people by recalling such occurrences among one's acquaintances.

Similarly, one may evaluate the probability that a given business venture will fail by imagining various difficulties it could encounter. So we can get to hear about what kind of difficulties the others are facing and accordingly based on that available information we may consider or if there are few entrepreneurs also have failed around me I will consider entrepreneurship to be a very challenging task where the chances of being a failure is greater however there could be much greater chances of success in entrepreneurship, if my ideas are innovative so if I can pick up cases where ideas that are truly innovative, that has picked up, that has given success, then possibly I will not be that much pessimistic.

Alternatively, if I get to hear about people, those who are successful in a particular profession, I may consider that profession is capable of getting more success as compared to some other profession where we would get to hear more failure most often. Therefore, the probability of an event is a function of the ease with which occurrences of that event come to mind. This judgment heuristic is called the availability heuristic. For example, in 2022, 42514 people died in motor vehicle traffic crashes, of which 39% were killed in speeding related crashes and 32% cases were alcohol impaired driving fatalities in the US.

Now, self-driving vehicles offer the prospect of reducing such deaths considerably because the proponents of self-driving vehicles would say that self-driving vehicles neither speed up unnecessarily, nor would they be drinking alcohol and feeling dizzy As a result, the fatalities caused by these two major reasons will not be there, and that's why self-driving cars are much safer. However, people also learn about accidents that are specific to self-driving vehicles and wouldn't occur with human drivers. So at times, some reports appear in newspapers, or people hear about certain pretty weird instances.

For example, if I remember correctly, once a pedestrian was hit by a vehicle, and she was basically in the path of a self-driving vehicle. And that vehicle actually dragged her another 20 feet. Of course, the incident was fatal. Now, when the case was taken up, people specifically felt that had there been a human driver, she would not have been dragged another 20 feet. And her life could have been saved.

So these are the problems with self-driving vehicles as well. And there have been other weird situations where the self-driving vehicle gets confused and does something quite strange. Maybe making rounds of a parking area, going in circles around and around. So these are problems a human being would not cause. So the point is that

when a large number of lives can be saved that's a probabilistic that's a claim that's a probabilistic claim while the incidence of accidents or the unfortunate incidents are reported in the newspaper as a result of which people actually hear about the negative things and the positive things that this many lives could have been saved are not there on in the newspaper because they could have happened they they would have happened or not, or they have happened or not, there is no evidence in favor of it. So given that, what are the prospects of, you know, self-drive cars in future?

For example, Google's Waymo and Tesla's Cybercab. The annual surveys by the American Automobile Association show that the share of US drivers who say they trust self-driving vehicles dropped from 14 to 9% between 2021 and 2024. while the share who say they are afraid has risen from 54 to 66%. So these are actually driven by availability, available information and we call them availability heuristics. Accessibility and salience are closely related to availability and they are important in the context of availability heuristic.

If you have personally experienced a serious earthquake, you are more likely to believe that an earthquake is likely than if you read about it in a weekly magazine. The vivid and easily imagined causes of death, for example from tornadoes, often receives inflated estimates of probability and less vivid causes, for example asthma attacks, receive low estimates even if they occur with a far greater frequency. So it is all driven by not only available information but also what kind of impression a particular event leaves on our mind so something which is more vivid and can be easily imagined probably they leave a more lasting impression as compared to things which we are pretty much familiar with

And we do not really need to imagine it; it doesn't leave a very vivid and important long-lasting impression on our mind. So too, recent events have a greater impact on our behavior and on our fears than earlier ones. If you remember, in 2013, several parts of northern India

were hit by a huge amount of mudflow. Soon after that, pilgrimages to the northern parts of India, like several temples in Uttarakhand, reduced substantially. But as time has passed by,

the number has actually increased over a period of time. Post-COVID, there has been a substantial surge in the number of pilgrims. So as time passes, the impact tends to fade away. And as a result, the information that was previously available to us—the possibility is still equally there, still present. Nevertheless, the information processing ability is reduced.

That information is not readily available to us, and as a result, we tend to ignore it. In all these highly available examples, the automatic system is keenly aware of the risk without having to resort to any tables of statistics. Nevertheless, we may tend to ignore it when it is long gone, or we tend to exaggerate it when it has happened recently. Availability is a useful clue for assessing frequency or probability.

Because instances of large classes are usually recalled better and faster than instances of less frequent classes. However, availability is affected by factors other than frequency and probability. Consequently, the reliance on availability leads to predictable biases, such as biases due to the retrievability of instances, biases due to the effectiveness of a search set, biases of imaginability, illusory correlation, and so on. Next, we move on to the third heuristic of adjustment and anchoring.

This is also at times simply called the anchoring heuristic, but Kahneman and Tversky considered it to be adjustment and anchoring. In many situations, people make estimates by starting from an initial value that is adjusted to yield the final answer. The initial value or starting point may be suggested by the formulation of the problem or may be the result of a partial computation. In either case, adjustments are typically insufficient; that is, different starting points yield different estimates, which are biased toward the initial values. Now we will take up some examples to explain this situation, which is called the anchoring phenomenon.

Consider an example where one is asked to guess the population of, say, Jaipur, a city in Rajasthan. Suppose Jaipur has a population of roughly 3 million. How should we go about guessing? If the individual does not actually know the population of Rajasthan, then he or she is asked to guess. Then how to guess?

One thing we could do is start with some cities we know and give the answer in comparison to that city. What people can do is, suppose I go from a very small town, like a small hill town in Uttarakhand, say Almora. Almora, for example, has a population—the city or the town has a population of, say, nearly 35,000. I know that, or that individual who has come from Almora knows that Jaipur is much, much bigger than Almora.

So what she or he can do, or what if I am coming from Almora, I can consider Jaipur to be 5 or 6 times greater than Almora and then I can make a guess, which is like 35,000 multiplied by 6. So it would be roughly 2 million. So you can see that this is falling far below 3 million. On the other hand, if somebody is coming from Delhi, Delhi has a population of nearly 35 million.

And as a result, that fellow would know that, yes, Delhi is smaller than Jaipur—sorry, Jaipur is smaller than Delhi—but might not have much idea about how small. So he may come up with a guess like Jaipur has a population of 10 million. Which is, you know, less than one-third of Delhi's population. Nevertheless, it is not sufficient.

Jaipur is much smaller than that. So that is why it has been observed that since the guesses are anchored by the populations of the cities one knows about, the numbers can vary by a large amount. So one is guessing it to be just 2 million. The other one may guess it to be something like 10 million. So there are large differences, and none of them comes any closer to the actual population of Jaipur.

Anchors can even influence how you think your life is going. For example, in one experiment, college students were asked two questions. How happy are you, and how often are you dating? When the two questions were asked in this order, the correlation between them was quite low at 0.11, which means that there was no relationship between how happy an individual is and how frequently he or she is dating.

But when the order was reversed so that the dating question was asked first, the correlation jumped to 0.62. So when it is like, 'How often are you dating?' followed by 'How happy are you?' Then it is sort of your answer to 'How happy are you?' being anchored to the question of how frequently you are dating. So if you're not frequently dating, you would think, 'Oh, I'm really having a pretty bad life.' If you are very frequently dating, then you think you are quite happy.

So, as a result, there was a positive correlation of 0.62. Apparently, when prompted by the dating question, the students used what might be called the dating heuristic to answer the

question about how happy they are. Even obviously irrelevant anchors can creep into the decision-making process. For example, in one experiment, a group of students was asked, as a preliminary question, to write down the last two digits of their social security number. So, the last two digits of the social security number would be anything between 00 and 99.

They were then asked to value half a dozen different products, including a box of chocolates, two different bottles of wine, a cordless trackball, a cordless keyboard, and a design book. So, how much would you be willing to pay for these different products? The results showed remarkable consistency in the sense that the students with higher-ending social security digits valued all the products more highly. Those in the top 20 percent—that is, between 80 to 99—were students having a social security number ending with 80 to 99.

For example, if we consider the Aadhaar numbers in our country, then the last two digits of our Aadhaar number. If we asked people to write them down and then asked them to value certain goods. So, those who had Aadhaar numbers with the last two digits between 80 to 99 were observed to actually go for the highest bid—that is, they were willing to pay the highest prices. And the difference between their bids and those of the lowest 20%—that is, having the last two digits of the social security number between 00 and 20—varied between 216% to 346%. So, they were much, much lower as compared to the highest bidders.

So the people who had low last two digits of social security numbers placed lower bids. People who had the last two digits of their social security numbers between 80 and 99 placed much higher bids. This phenomenon has been explained in terms of the theory of arbitrary coherence. So basically, the association between social security numbers and the bidding price is actually an arbitrary coherence; there cannot be any logic behind it, but what we observe is that

the students must have used the last two digits of their social security numbers as anchors. Of course, they did not do it intentionally or knowingly, but those acted as anchors, as a result of which those with higher last two digits placed higher bids, and those with lower last two digits placed lower bids. Now, let us talk about the theory of arbitrary coherence. This is described as follows: Valuations of goods and experiences have a large arbitrary component.

Yet, after one valuation has been made, people provide subsequent valuations that are coherent, scaled appropriately relative to the first. A number of other empirical studies have

found evidence of anchoring effects in various contexts. One study found that the anchoring effect was context-dependent. For example, 99 can be perceived as \$0.99 in the context of a hamburger price. So, then 99 is associated with something cheap.

So, then it is 0.99 while \$99 in the context of an expensive meal. Overall, Kahneman and Tversky noted that anchoring leads to insufficient adjustment, biases in the evaluation of conjunctive and disjunctive events, and the assessment of subjective probability distribution. Again, the examples discussed might have reflected some of these issues. For example, insufficient adjustment—adjustment is not complete.

Assessment of subjective probability distribution, and also there have been examples of biases in the evaluation of conjunctive and disjunctive events. Conjunctive events are—we have already talked about the conjunction fallacy—so that is how you can relate with that to understand what conjunctive events could be. Next, we will talk about some of the effects, and we begin with framing effects. We will continue with our discussions on effects in the next module as well. So, first of all, talking about framing effects,

These effects are one of the most important phenomena in behavioral economics. Numerous studies have found that people's responses in terms of values, attitudes, and preferences depend on the context and procedures involved in eliciting these responses. For example, if a patient expected to undergo an operation is told one of the following two statements, their reactions or willingness to be operated may change. The statements are, first of all, 90 out of 100 individuals who underwent the operation are alive after 5 years.

Alternatively, the same statement can be stated as 10 out of 100 individuals who took the operation are dead after five years. So see, both of them contain the same information. Nevertheless, statement one encourages people to go for the operation. Statement two discourages people to go for the operation. The automatic system thinks in case of statement two, a significant number of people are dead and I might be one of them.

So this is a discouraging impact. The idea is that choices depend in part on the way in which problems are stated. So that is what is framing effect. And actually framing has very important contribution in entirety of behavioral economics. It has been used in prospect theory, in mental accounting, in intertemporal choices,

everywhere because how it is framed on the basis of that people choose the reference points. So the moment we talk about reference dependence then framing comes into picture and we will have more applications or we will discuss much more many more applications

of framing in future in the context of different theories. So that is how framing matters in many domains. The point matters a great deal for public policy as well.

For example, energy conservation is now receiving a lot of attention all over the world, at least before Trump came into power. So, consider the following information campaigns. If you use energy conservation methods, you will save 10,000 rupees per year. If you do not use energy conservation methods, you will lose 10,000 rupees per year. These are alternative campaigns, and you can see they want to convey the same message.

It turns out that information campaign B, framed in terms of losses, is far more effective than information campaign A. Framing works because people tend to be somewhat mindless, passive decision-makers. Their reflective system does not do the work that would be required to check and see whether reframing the questions would produce a different answer. So, if we actually go for reframing, we realize that it's the same thing, but most often the two different frames are not presented to us simultaneously.

So, we just receive it as information, and accordingly, the information may upset us, make us pessimistic, or make us optimistic, depending on the way it is framed. One reason they don't do this is that they wouldn't know what to make of the contradiction. The question relating happiness with the frequency of dating can also be seen as an example of the framing effect. The one that we used in the context of anchoring can also be used in the context of framing. It might be considered that the prior question in this case—that is, when we ask the individual how frequently they are dating—is used as an anchor to understand

How happy that individual is. That is a self-assessment—how happy he or she feels. So, the prior question in this case is relevant to the second. However, if the first question influences the answer to the second, it is an example of procedural invariance. And therefore, a violation of the standard model of expected utility theory, a part of the neoclassical tradition.

Framing effects are particularly important since they account for a high incidence of preference reversal. This phenomenon relates to situations where people favor option A when a question or problem is posed or framed in one way, but favor option B when the same problem is posed in a different way. Alternatively, when preferences are intransitive, it is known as preference reversal. So, here in this case, you are saying first I prefer A to B, then you are saying I prefer B to A. So, this is contradictory.

This is an example of preference reversal. Preferences are transitive, as you know, when we say A is preferred to B and B is preferred to C, then A is preferred to C. But if you say that I prefer A to B and B to C, but C to A, then the preferences are intransitive. This is also a case of preference reversal. We will show specific examples related to that in later modules.

This can be observed due to framing or due to temporal differences as well. Temporal differences imply that when with a time gap, your preferences change. The latter refers to the cases when preferences change over a period of time. Evidence from both the field and from experiments suggests that framing effects are widespread occurring in many different situations.

For example, there is evidence that products are evaluated more favorably and chosen more frequently when the surrounding environment contains more perceptually or conceptually related cues. There is much evidence that people's eating habits, especially the quantity consumed, can be influenced by the size of plates, packages or serving bowls used, even though people deny this. Large sizes can increase the amount served and consumed by 15 to 45%. This principle appears to operate even when cues are not intrinsically related to the product. An interesting example is that when NASA landed the Pathfinder spacecraft on Mars in 1997,

there was an increase in sales of Mars Bar, even though the Mars Bar takes its name from its company founder, not the planet. So with this, I conclude this module. These are the references. Thank you.