**PRINCIPLES OF BEHAVIORAL ECONOMICS**

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**Week 32**

**Lecture 32**

Hello, this is lecture 32 of the course on Principles of Behavioral Economics, and this is the second lecture on mental accounting. In this, we are going to discuss a concept called the hedonic editing hypothesis. Now, this is basically a very important contribution of mental accounting. But before we arrive at the hedonic editing hypothesis, we basically need to understand why we need to talk about this kind of development or hypothesis like this. So, in the last module, we concluded

by discussing the framing of gains and losses, which basically borrows from the concept of prospect theory. So, I will just briefly summarize or recapitulate the concepts that were mentioned there. So, we know that KT's value function incorporates. First, the function V is defined over perceived gains and losses relative to some natural reference point. Second, the value function is assumed to be concave for gains and convex for losses.

$$v''(x)<0, x > 0, v''(x) > 0, x < 0$$

Here, we can also write it as v double prime x less than 0 for x greater than 0 and v double prime x greater than 0 for x less than 0. These are the mathematical implications. Third, the loss function is steeper than the gain function. So, we have vx less than minus v minus x for x greater than 0. Now, the role of the value function in mental accounting is to describe how events are perceived and coded in making decisions.

$$v(x) < -v(-x), x > 0$$

Kahneman and Tversky proposed three ways of framing outcomes: in terms of a minimal account, a topical account, or a comprehensive account. The following example illustrates the implications of the three accounts mentioned in the previous slide. Imagine that you are about to purchase a jacket for $125, or $15, and a calculator for $15 and $125. Basically, the statement was presented in two versions.

One is given in parentheses, and the other one is in brackets. So, I would be reading it twice. First of all, statement 1: imagine that you are about to purchase a jacket for $125 and a calculator for $15. The calculator salesman informs you that the calculator you wish to buy is on sale for $10 at the other branch of the store, located a 20-minute drive away.

Would you make the trip to the other store? Alternatively, the second statement is: imagine that you are about to purchase a jacket for $15 and a calculator for $125. The calculator salesman again informs you that the calculator you wish to buy is on sale for $120 at the other branch of the store, located a 20-minute drive away. Would you make the trip to the other store? So, what it tries to find out is that in the beginning, it was available at $15, and you can get a

discounted price of $10 which is $5 less by driving 20 minutes. Similarly, in the second situation, the calculator was available for a price of $125, and again, you can save $5 by driving 20 minutes to get the calculator at a lower price of $120. Now, in both versions of this problem, most people said that they would travel to save the $5 when the item costs $15 but not when it costs $125. Now, if people were using a minimal account frame, they would just ask themselves whether they are willing to drive 20 minutes to save $5, and it gives the same answer in either version.

So, in a minimal account frame, the focus remains on the necessary concept. So, here the necessary concepts are that how much I am saving, $5, how much I have to drive, 20 minutes. So, if I compare, then both situations are the same, and I should be willing to drive for 20 minutes to save $5 in both situations, which is essentially the prescription of the neoclassicals. Comparing the two options using the minimal account entails examining only the differences between the two options, disregarding all their common features. So, it is not as a ratio or proportion, like I am saving $5 to $15 or I am saving $5 to $125.

These are actually not taken into consideration. $5, 20 minutes drive—that is all that would probably concern us. A topical account relates the consequences of possible choices to a reference level that is determined by the context within which the decision arises. So, here we are bringing in the context. The context is whether I am saving $5 against $15.

Or I am saving $5 against $125. And accordingly, I will make a decision. So, mental accounting is topical. A comprehensive account, the third account, incorporates all other factors including current wealth, future earnings, possible outcomes of other probabilistic holdings, and so on. Economic theory generally assumes that people make decisions using the comprehensive account—that is, when I consider saving $5,

it doesn't matter whether the calculator costs $15 or $125. I will take into consideration several other factors, such as my current wealth situation. Can I let go of $5, or what are my future earnings possibilities? If I am expecting higher income in the future or some windfall—some gain, some bonus—I may let go of $5; otherwise, I would not. Let existing wealth be W, and W* be existing wealth plus the jacket and calculator minus 140.

Minus 140 in the sense that this is 15 plus 125. Now, W star is the existing wealth plus the jacket and calculator. Since you do not actually own them, 140 is subtracted from it. Then the choice comes down to the utility of W star plus $5 versus the W star plus 20 minutes. So, that is another way of looking at it when you go for a comprehensive account frame.

This example illustrates an important general point. The way a decision is framed will not alter choices if the decision maker is using a comprehensive wealth-based analysis. Because again, you can see that it comes down to W star plus $5 versus W star plus 20 minutes. So, whether you would be willing to take that 20-minute drive in order to save $5 or not is again the bottom line. And that again shows that it is not contingent upon whether you are driving to save $5 against $15 or $5 against $125.

However, framing does alter choices in the real world because people make decisions piecemeal, influenced by the context of the choice. So, context plays a major role, and as a result, people thought that saving $5 out of $15 implies you are basically saving 33% of your total expenditure. But saving $5 out of $125 is actually a very minuscule percentage, as a result of which you may let go of it. You do not consider it worth driving 20 minutes to save, say, 1%, 2%, or 5% of your expenditures, right?

So, this is how decisions are made. The decisions are contextual, which basically refers to the context of mental accounting because mental accounting is topical. Now, we will talk about how we code gains and losses. The prospect theory value function is defined over single unidimensional outcomes. If you remember that there was one criticism against prospect theory is that most of the prospects that it was using were regular

and when they used mixed prospects then they were segregated into gains and losses. So, in some way, we can consider them unidimensional. How do we code joint outcomes like x, y? Now, x, y could be both positive, both negative, as well as mixed. Two possibilities are first the outcomes could be valued jointly as v x, y. So, we integrate them and then try to see how they are valued in which case they will be said to be integrated.

Alternatively, they will be valued separately as Vx plus Vy, in which case they are said to be segregated. The issue is which one between integration and segregation produces greater utility. Now again, we will see that this is actually very much contextual. There is no uniform rule that, you know, we should always integrate or we should always segregate. We would be integrating or segregating depending on context, but of course,

on that basis, we can always come up with certain rules. We will be talking about them in the next. The issue is interesting from three different perspectives. First, if a situation is sufficiently ambiguous, how will individuals choose to code outcomes? To some extent, people try to frame outcomes in whatever way makes them happiest.

Second, individuals may have preferences about how their lives are organized. Would most people rather have a salary plus a certain bonus or a salary of an equivalent amount? So, basically, would you like to have, say, a salary of 50,000 and a bonus paid, maybe on a monthly basis of 1,000 or on a yearly basis of 12,000? Or would you like to have a salary of 51,000 every month? Third, most relevant to marketing, how would a seller want to describe the frame, the characteristics of a transaction? Which attributes should be combined and which should be separated?

So, these are the questions that are important while we try to code gains and losses. The jacket and calculator problem demonstrates that mental accounting is piecemeal and topical, but there is more to learn from that example. Why are we more willing to drive across town to save money on a small purchase than on a large one? So, when it is $15? I am traveling for 20 minutes.

I can also understand that traveling for 20 minutes is going to make my entire purchase more expensive. I am trying to save $5. Maybe I would be spending $5 on that 20-minute drive. So, clearly, there is some psychophysics at work here. $5 seems like a significant saving on a $15 purchase, but not so on a $125 purchase.

The disparity in choice implies that the utility of the saving must be associated with the differences in values, which is V minus 125 minus V minus 120. These are in minus

because both are payments, which are going out. So, sort of losses. So, we will be talking about it later that prime payments are not generally considered to be losses.

Nevertheless, since I am making the payment, these are value minus 125 or alternatively V minus 15 minus V minus 10, rather than the value of the difference V5. So, this is different from this. If I consider V 125 minus 120, then it is V5 always, and V15 minus 10 then again this is V5. So, V5 would always be the same, but if I break it, then of course they are not the same.

That is the utility of saving $5 in the purchase of the expensive item must be V minus 125 minus V minus 120 or perhaps the ratio of these values rather than V$5, otherwise there would be no difference between the two versions of the problem. So, basically, otherwise there will be no difference between the two versions of the problem if we consider the values like this. Now, what else do we know about mental accounting arithmetic? Specifically, how are two or more financial outcomes within a single account combined? This is an important question because we would like to be able to construct a model of how consumers evaluate events.

Such as purchases that typically involve combinations of outcomes, good as well as bad. So, there will be four experiments that were conducted by Thaler. In order to develop the theory of hedonic editing or the hypothesis of hedonic editing. So now we are going to talk about those four experiments. So in these four experiments, there will be four pairs of scenarios.

In each case, two events occur in Mr. A's life and one event occurs in Mr. B's life. You are asked to judge whether Mr. A or Mr. B is happier. Would most people rather be A or B? That is the question. So, if you place yourself in A or B, which one would you like to be?

If you think the two scenarios are emotionally equivalent, say no difference. In all cases, the events are intended to be financially equivalent. So, this was the introduction given to all the participants of the experiments. Now, this is the first experiment. Mr. A was given tickets to lotteries involving the World Series.

He won $50 in one lottery and $25 in the other. Mr. B was given a ticket to a single larger World Series lottery. He won $75. Who was happier? So, we can see that the financial implications are the same.

In the case of Mr. A, two things are happening in his life. So, he is winning twice, once $50 and then $25. And one thing is happening in Mr. B's life. So, he is just winning one amount, which is $75. Who is happier?

Most people say that Mr. A should be happier. 64% said that Mr. A should be happier than Mr. B. And there were some percentages higher those who perceived it to be emotionally not different. So, from there it is concluded that multiple gains, when both x and y are greater than 0, segregation is preferred since Vx plus Vy is greater than Vx plus y due to the concavity of the value function.

So, 75 is actually Vx plus y 50 plus 25 and Vx plus Vy is V50 plus V25. And since most people considered A to be happier, this implies that Vx plus Vy must be greater than Vx plus Y. The second experiment: Mr. A received a letter from the income tax department saying that he made a minor arithmetical mistake on his tax return and owed $100. He received a similar letter the same day from his state income tax authorities, saying he owed $50.

There were no other repercussions from either mistake. Mr. B received a letter from the income tax department saying that he made a minor arithmetical mistake on his tax return and owed $150. There were no other repercussions from his mistake. Who was more upset? So since these both situations are of losses, again, two things are happening to Mr. A and one thing is happening to Mr. B. Both of them are asked to pay a certain amount. So they must be upset.

There are losses. So who was more upset? 76% again say that Mr. A must be more upset compared to Mr. B. And of course, there were certain percentages for whom they were emotionally equal. Now, what does it imply? Multiple losses are there.

The outcomes are minus x minus y, where x and y are greater than 0. So, here x takes a value of 100 and y takes a value of 50. Since they needed to pay them, we are assigning a negative sign in front of these numbers. Now, here if Mr. A is more upset, then it implies that V minus x plus V minus y should be greater than V minus x plus y. So, here in this case, integration is preferred again due to the concavity of the value function.

So, here what is happening is that if you look at it, V minus x plus V minus y, we are dealing with the loss domain. So, as a result of which this is a larger value implies that basically someone having v minus x plus y the losses integrated is less upset right. Again,

due to the concavity of the value function. The third experiment: Mr. A bought his first New York State lottery ticket and won $100.

Also, in a freak accident, he damaged the rug in his apartment and had to pay the landlord $80. So, there are two situations or two things happening in Mr. A's life. One is a gain; another one is a loss. The gain is greater than the loss. Mr. B bought his first lottery ticket and won $20.

Who was happier? So this is again overall a gain and only one thing is happening in Mr. B's life. Now 70% felt that Mr. B would be happier compared to Mr. A and 5% said that there is no emotional difference. Now, here we see this is a case of mixed gain. There is gain and there is loss, but the gain is greater than loss.

Let the outcomes are x and minus y, where x is greater than y. Since the loss function is steeper than the gain function, so vx plus v minus y is less than 0, while v minus x x minus y is greater than 0 for x greater than y. So, here in this case, this is greater than 0 and this is less than 0. So, integration is preferred since vx plus v minus y would be less than vx minus y.

$$v(x) + v(-y) \lneqq v(x - y)$$

See, vx plus v minus y is less than 0, but this is greater than 0. So, of course, this has to be less than vx minus y. So, integration results in cancellation. What we are cancelling here?

v(x) > v(x-y) – v(-y)

We are canceling the minor loss that is occurring in Mr. A's life. And finally, the fourth experiment, Mr. A's car was damaged in parking lot. He had to spend $200 to repair the damage. The same day the car was damaged. He won $25 in the office football pool.

Mr. B's car was damaged in a parking lot. He had to spend $175 to repair the damage. So, two things are happening in Mr. A's life. One loss and one gain. Here, the loss is greater than the gain.

And Mr. B's car was damaged. So, he is having a total amount of loss only. Only one thing is happening in his life. And you can see that the loss implications in terms of finances are the same. That is, the net is minus $175.

Here also, this is minus $175. So, who was more upset? Again, people say that 72% said Mr. B would be more upset compared to Mr. A, and there was 6% for whom there was no difference. So here, we have mixed loss. There is some gain.

There is some loss, but since the loss is greater than the gain, we have a mixed loss. Let the outcomes be x and minus y, where x is less than y. So, there is a net loss. The possibilities are vx plus v minus y greater than or equal to, or less than or equal to, x minus y. That is, when we segregate them into vx and v minus y, then we can have the value greater than or less than the integrated one. Now, segregation is preferred if Vx is greater than Vx minus y minus V minus y. More likely, the smaller the x relative to y, this is referred to as the silver lining principle.

So, we would go for segregation when x is small relative to y, when the gain is relatively small compared to the loss. Integration is preferred when X and Y are close, resembling a case of cancellation. When X and Y are close, resembling a case of cancellation. So, we would integrate the gains and losses when X and Y values are pretty close to each other. And then we will have a situation that we just discussed in the previous slide of cancellation.

I am going to show these things using diagrams. So, this is one situation where we have x and y that are relatively close. Now, we need to remember that y is actually greater than x, or the loss is greater than the gain. So, this is y and this is x. You can see that y is greater than x. But the difference between them is not much.

Now, if I subtract the amount of—so this is my x—if an equivalent amount is subtracted from y, then this is my x minus y. Given the value function, I will have here, which is vx minus y. And as opposed to that, if I consider the segregated account, this is my minus y. So, accordingly, this is my v minus y, and this is x. So, given the value function, this is my vx. Now, I have to subtract this distance from here. So, I am here, which is vx plus v minus y. This is what I get by integration.

This is what I get by segregation. Now, you can see that both of them are in the negative domain. So, one thing I can say is that minus vx minus y is less than minus vx minus v minus y. Alternatively, it shows that vx minus y, the value, is greater than vx plus v minus y, right? So, that is why you would prefer integration.

Now, this is with respect to the situation when y is large relative to x or x is small relative to y. So, you can see that the gain has been pretty small. The loss is very large, which is

basically the final case: you lose 200 and gain only 25. So, there is a net loss of 175. Now, what is happening here? This is the corresponding Vy, this is V minus y, and this is Vx.

Now, when I subtract this height from here, I will be somewhere here Vx plus V minus y and this is where we are integrating, which is like when they are integrated together. So, I subtracted x from y and this is the corresponding value vx minus y. So, now you can see that vx minus y is actually a larger negative number as compared to vx plus v minus y. So, as a result of which segregation is preferred. This is called silver lining.

Silver lining is like as you know that when there are clouds and the sun is behind the cloud then there are silver lining formed at the edges of the cloud. So this actually refers to the situation where we become hopeful by seeing those silver linings—that the clouds would be gone soon, the weather would become better, and the days would become sunny. So, silver linings are the situations where we become hopeful, and this is a situation where we are having huge losses. Nevertheless, a small gain makes us somewhat better, so somewhat hopeful.

So, given the shape of the value function, it is easy to derive the following principles of hedonic framing, that is the way of evaluating joint outcomes to maximize utility. We just now summarize the things that we have just discussed. So, segregate gains because the gain function is concave. So, when I am making both gains, then x and y both are gains. Then, x plus—we need to segregate gains to have better utility.

Integrate losses because the loss function is convex. So, both are losses, and we need to integrate. We have argued that integrating them makes us better. Integrate smaller losses with larger gains to offset loss aversion. So, this is the case of cancellation.

When there is one gain and one loss, but the gain is larger, and finally, we have segregated small gains—that is the case of silver lining—from larger losses because the gain function is steepest at the origin. The utility of a small gain can exceed the utility of slightly reducing a large loss. So, these are the four very important principles of hedonic framing as hypothesized by Thaler in his discussion on mental accounting. With this, I conclude this module on hedonic editing principles or hypotheses.

These are the references that have been used. Thank you.