PRINCIPLES OF BEHAVIORAL ECONOMICS

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Week 33

Lecture 33

Hello everyone, this is Lecture 33 of the Principles of Behavioral Economics. We are now discussing mental accounting, and previously, we have introduced the concept of mental accounting. We have also discussed the experiments that led to the development of the hedonic editing hypothesis. So, in this module, we are going to again talk about the hedonic editing hypothesis or hedonic framing. Besides that, we will also introduce two more concepts: acquisition utility and transaction utility.

So, we discussed the derivation of the following principles of hedonic framing or hedonic editing hypothesis used to evaluate joint outcomes to maximize utility. First of all, we need to segregate gains because the gain function is concave. Second, integrate losses because the loss function is convex. Integrate smaller losses with larger gains to offset loss aversion and segregate small gains, which we call silver linings, 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.

Now, most people share the intuition that leads to these principles. For example, if you ask subjects who is happier—someone who wins two lotteries that pay $50 and $25 respectively or someone who wins a single lottery paying $75. 65% say the two-time winner is happier. A similar majority shares the intuition of the other three principles as well.

These principles are quite useful in thinking about marketing issues. In other words, if one wants to describe the advantages and disadvantages of a particular product in a way that will maximize the perceived attractiveness of the product to consumers, the principles of hedonic framing are a helpful guide. For example, framing a sale as a rebate rather than a temporary price reduction might facilitate the segregation of the gain in line with the principle. So, basically, when we call it a 40% rebate, it indicates that you are saving 40%.

So, that is treated or perceived as a gain. Now, take this example. Yesterday, you had a decent day. You first received a $4800 tax refund. And then an old friend repaid a $2700 loan you had forgotten about.

So, basically, it was lent out a long time ago. Considering the usual prospect theory value function and parameter values, we need to find out: if you integrate the two gains, what is the total value? If you segregate the two gains, then what is the total value? And from the point of view of the total value that we calculated under A and B, which one is better? Should we integrate or should we segregate?

Now, following the PT value function for gain, we have vx equals x raised to the power alpha. Because here, the reference point is equal to 0. So, we are just talking about some random gains, and no further information is provided. So, the reference point is 0; whatever comes is additional gain. And since these are also like I received the tax rebate or you received the tax rebate, as well as you received the loan repayment.

There is no uncertainty involved in it. So, the decision weight is also equal to 1. Now, having said that, when the gains are integrated, then the total value is basically the sum of the two gains: 4800 and 2700. So, the total is x equals 4800 plus 2700 raised to the power alpha, which equals 0.88.

That is going to give me a value of 2570.71. Now, when the gains are segregated, the total value is separated. So now here, we have Vx1 plus Vx2. So, Vx1 is the first gain, where I am gaining 4800 raised to the power alpha, which is 0.88, and x2 is the second gain, which is 2700, again x raised to the power alpha which is 2700 raised to the power 0.88.

And then we get a value of 2781.94.

Following PT value function, for gain $v(x) = x^{\alpha}$ since $r = 0$ and $\pi(1) = 1$.

a) When the gains are integrated, the total value $= (4800 + 2700)^{0.88} = 2570.71$

b) When the gains are segregated, the total value $= 4800^{0.88} + 2700^{0.88} = 2781.94$

So, understandably, from the point of view of the values, it is better to segregate, as recommended by the hedonic editing hypothesis. Segregating gains are giving us a larger value as compared to integrating the gains. But there are certain instances where the hedonic editing hypothesis or hedonic framing fails. So it would be convenient if these same principles of hedonic framing could also serve as a good descriptive model of mental accounting.

Now by good descriptive model of mental accounting implies that mental accounting must be able to or should able to describe the situations that happen in real life. So need to check whether these principles are actually good descriptive model or not. Formally if the symbol '&' is used to denote the cognitive combination of two outcomes Then hedonic editing is the application of the following rule where vx and y equals to maximum of two things. One is vx plus y where we are integrating the two outcomes and then vx plus vy when we are segregating the two outcomes.

$$v(x \,\&\, y) = \text{Max}[v(x + y),\ v(x) + v(y)]$$

So, whichever basically takes a higher value vx and y should be accordingly considered the maximum one between the two. So, in case what hedonic editing hypothesis says is that if both x and y are gains, then vx plus vy should be greater than vx plus y and that is why this should be the value. If x and y are losses, then vx plus y is actually expected to be greater than vx plus vy and accordingly vx plus y takes this value. So, the maximum between the two arguments. The hypothesis that people engage in hedonic editing has obvious theoretical appeal, but some thought reveals that it cannot be descriptively correct.

That is descriptively correct all the time. Consider the jacket and calculator problem again. If the $5 saving were coded in a utility-maximizing way, it would be segregated in either case, but that is inconsistent with the data. Furthermore, there must be some limits to our ability to engage in self-deception. Why stop at segregating the $5 gain?

Why not code it as 5 gains of $1? So, the point is to what extent we should keep on segregating the gains. Nevertheless, hedonic editing represents a nice starting point for investigating how people code multiple events. Thaler and Johnson examined the preference for temporal spacing in two financial outcomes. Temporal spacing here refers to the time difference or preferred time difference between two financial outcomes.

If a subject wanted to segregate the outcomes X and Y, they would prefer to have them occur on different days. So there should be larger temporal spacing. Whereas if they wanted to integrate them, they would prefer to have them occur together, meaning there would be low or no temporal spacing. Integrating means you do not want them spaced apart in time. Or segregating implies that you want them spaced apart in time.

The hedonic editing hypothesis would be supported if subjects preferred temporal separation for cases where the hypothesis called for segregation. So, temporal separation in the sense you want time differences between the two outcomes and temporal proximity, that is less time differences between the two outcomes when integration was preferred. For gains, the hedonic editing hypothesis was supported. That is, we say that for gains, there should be segregation of outcomes, which implies that the experiments showed that people actually preferred temporal spacing or temporal separation between two gains.

A large majority of subjects thought temporal separation of gains produced more happiness. But in contrast to the hedonic editing hypothesis, subjects thought separating losses was also a good idea. In the sense that if I am expecting to experience losses, then I want them with certain temporal separation. Again, temporal separation here implies segregation. So, the hedonic editing hypothesis under mental accounting suggests that losses should be integrated in order to feel

that it basically generates a greater value. So, in order for the pain to feel less, they should be integrated. But in contrast to the hedonic editing hypothesis, subjects thought that separating losses was also a good idea. So, separating losses here implies temporal separation, which means they prefer to have the losses also segregated. The intuition for the hypothesis that people would want to combine losses comes from the fact that the loss function displays diminishing sensitivity.

Adding one loss to another should diminish its marginal impact. So, it is almost like, say, I have invested in the stock market, and the stock market is continuously falling. So, the very first day when there is a sharp fall, I am actually devastated, but maybe If there are consecutive falls in the coming days, then they are to some extent along the expected line. And of course, after a couple of days, I might be more immune to further losses because you can say that this is more along the expected line.

So because of that, my sensitivity or sensitiveness to the falling stock prices are actually or keep on declining. So this is what is diminishing marginal impact. By wishing to spread out losses, subjects seem to be suggesting that they think a prior loss makes them more

sensitive towards subsequent losses rather than the other way around. So, basically if there are consecutive losses, then possibly they are becoming more sensitive to them and as a result of which they want temporal spacing. So, here the hedonic editing hypothesis is actually not supported by

the concept of diminishing marginal sensitivity in the domain of losses as predicted by the prospect theory. In other words, subjects are telling us that they are unable to simply add one loss to another inside the value function parenthesis. Instead, they feel that losses must be felt one by one. So let there be some time gap between one loss and another. And that bearing one loss makes one more sensitive to the next.

To summarize, the evidence suggests that the rules of hedonic framing are good descriptions of the way people would like the world to be organized. Many small gains, including silver linings—losses avoided if possible but otherwise combined—people will also actively parse outcomes consistent with these rules, with the exception of multiple losses. So, out of the four principles, only one might not be valid all the time, and that is the integration of losses. The other three are found to be quite valid in terms of acting or serving the purpose of a descriptive model. Next, we talk about the concept of reference outcomes.

This is an important concept when we discuss the other concepts of transaction and acquisition utility. So, we begin with reference outcomes. Suppose someone is expecting X but receives X plus delta X. Let us define a reference outcome as x plus delta x colon x.

$(x + \Delta x : x)$

So, this is how the colon is introduced as a reference point. So, the reference point is x, and this is the additional gain, which is x plus delta x. The question then arises,

how to value such an outcome. Assume that the expected outcome was fully anticipated and assimilated. This implies that vx colon x equals 0, which implies that even though I am not writing delta x separately, this actually means that even if I have a delta x here, then that does not leave any additional impact. So, basically, if the reference point is x and I also receive x, then the reference outcome—or the value generated by the reference outcome—is actually 0.

$v(x : x) = 0$

You know there is a delta x, and that is completely expected. Then also, we may have a situation where V delta x colon x plus delta x colon x equals 0. A person who opens his monthly pay envelope and finds it to be the usual amount is unaffected. So, this is a case where we are having a scenario where V x colon x or x colon x equals 0. Every month, I expect my salary to be some amount.

And every month, that amount gets credited with minor discrepancies here and there because of different deductions or additions, but not major changes. So, as a result of which, reference to the expected salary, the new salary added does not add any additional value. So, VX colon X equals to 0. What if delta x is not equal to 0? So, some month I receive a substantial amount as additional income from whatever sources.

Is it evaluated alone or in conjunction with the expected value? For example, suppose I expected a Diwali bonus of 10,000 and I received it duly. However, a week later, I received a call telling me that the bonus was actually 8,000, and due to an error in the system, some accounts have received a higher amount. I have to return 2,000. On the other hand, my friend expected the same bonus but received 8,000.

So both of us actually expected a bonus of 10,000. I received 10,000, but then I was asked to return 2,000. So I ended up with 8,000. And my friend, from the beginning itself, despite expecting 10,000, received only 8,000. It is evident that between my friend and me, I will be more upset because I would describe the situation as a loss of 2,000, while for my friend, it is a reduction in gain by 2,000. So this is like minus V10,000 minus V8,000. So this is basically how I am going to read it.

-[v(10000) - v(8000)]

This concept can be used to model a buyer's reaction to a market price that differs from the price he expected.

So this was the expected price, and this is the received bonus. In this context, we define the two concepts of acquisition and transaction utility. What happens when a consumer decides to buy something, trading money for some object? One possibility would be to describe the acquisition of the product as a gain and the foregone money as a loss.

But loss aversion makes this frame hedonically inefficient. Suppose you are feeling thirsty and willing to spend 40 rupees on a bottle of water. If the bottle costs you 30 rupees, you are definitely better off. Now, here we said something like loss aversion makes this frame

hedonically inefficient. This point, I actually mentioned previously also in some other context.

If you remember, then the prospect theory loss function—a loss coefficient—is basically minus 2.25, which we denoted by lambda. So what it tries to tell us is that, suppose in order to buy a pen, I pay 10 rupees and get a pen. Now, if I consider that the pen is worth 10 rupees, that is why I buy it; the transaction takes place, it is over. But if I consider the amount 10 rupees as a loss, as opposed to having the pen as a gain, then even if I ascribe a value of 10 to the pen, a loss would be like 2.25 times

greater than the amount that I pay, so this would be like 22.5, and this is a loss. On the other hand, my gain is only 10 rupees— the pen. So if I compare them, then of course I would always feel that the pain is much bigger than the gain, so I will never be able to buy the pen. That's why loss aversion cannot be considered in this context—that is, if the foregone money is considered as a loss, then basically applying the concept of loss aversion makes this frame hedonically inefficient. We will never be able to purchase anything. Now, I come back to this example of feeling thirsty and getting a bottle for 30 rupees.

Since I got it cheaper than what I expected to pay, I am definitely better off. However, you would not make the purchase if the payment were cognitively multiplied by 2.25, an estimate of the coefficient of loss aversion. Exactly the point I was trying to explain. This thinking has led researchers to reject the idea that costs are generally viewed as losses. Instead, it is proposed that consumers derive two kinds of utility from a purchase.

One is acquisition utility, and the other is transaction utility. Acquisition utility is a measure of the value of the good obtained relative to its price, similar to the economic concept of consumer surplus. So, here in this case, as it is defined, it is a measure of the value of the good obtained relative to its price. So, if I consider the bottle of water worth 40 rupees and I get it for 30 rupees, then I have some utility by obtaining the bottle of water. So that is the utility from acquiring the bottle of water, which is worth 30 rupees.

That is why there is some utility we call acquisition utility. Now, in this context, if I need to explain the concept of consumer surplus very briefly, you know that the demand curve is downward sloping and it starts from here. What we say is that the highest price where the demand curve intersects or touches the vertical axis is the highest price that a consumer in the market is willing to pay for this product. We are measuring price on the vertical axis and quantity on the horizontal axis.

So this is the maximum price one is willing to pay. Now, as the price keeps on going up, then larger and larger consumers or customers enter the market. They buy the goods. As a result, when the price decreases, the quantity demanded increases. Similarly, when prices are lower, the same individual may purchase more than one quantity of the same product, and as a result, the quantity purchased increases.

Now, when the seller sells a quantity, say Q star, it charges a price P star to all the consumers. Now, all those consumers who are paying P star, there were some who were actually willing to pay much higher than P star. So, all of them are paying P star. So, for example, there are a large number of customers who are willing to pay a price higher than P star. Now, those who are willing to pay lower than P star,

they are not able to buy the product, right? So this is the area that we say consumers are willing to pay for the product, but this is the area that they are finally paying for the product. So this is the consumer surplus. Now, this consumer surplus does not accrue to one individual consumer, but this is all the consumers that are in the market and purchasing the commodity. They are together making this surplus. So, this triangle is the consumer surplus. Acquisition utility is said to be similar to the concept of consumer surplus—that you were expecting to pay a price of 40 for the bottle of water, but you actually paid a price of 30.

So, you basically have certain utility, and that is the acquisition utility. Conceptually, acquisition utility is the value the consumer would place on receiving the good as a gift minus the price paid. Transaction utility measures the perceived value of the deal. It is defined as the difference between the amount paid and the reference price for the good, that is, the regular price that the consumer expects to pay for this product. So, this is also, you know, it actually hinges upon the concept of a deal.

For example, here in this case, you expected to pay a price of 40. Say the MRP is 40. This is the reference price, right? Reference price is the amount that is basically paid for the good, that is, the regular price that the consumer expects to pay for this product or most often pays.

But when you are offered a discount, then you experience utility just because of the deal and that is why you may end up buying certain things, as we discussed in the previous lecture, which probably you do not even need. Now consider the following scenario: you are lying on the beach on a hot day, and all you have to drink is ice water. For the last hour, you have been thinking about how much you would enjoy a nice cold bottle of your favorite

brand of beer. A companion gets up to go make a phone call and offers to bring back a beer from the only nearby place where beer is sold.

So there are two options. One is a fancy resort hotel, and another is a small, rundown grocery store. He says that the beer might be expensive and asks how much you are willing to pay for it. So he says that He will buy the beer if it costs as much or less than the price he states.

But if it costs more than the price he states, he will not buy it. You trust your friend, and there is no possibility of bargaining with the bartender or the store owner. What price do you tell him? Two versions of the question were administered. One used the phrase in parentheses, the other phrases in brackets.

The median responses for the two versions were $2.65 for the resort or the bottle of beer from the resort and $1.50 from the rundown grocery store. In 1984 dollars, three prices are now introduced. Now you see that the same individuals are willing to pay two different prices when purchasing from different kinds of stores. When purchasing from the resort, you are willing to pay a higher price. And when purchasing the same brand of beer from a grocery store, you are willing to pay a much lower price.

So in this context, in order to understand what is going on, we introduce three prices. The actual price charged for some good, Z, let us call it P; this is the actual price. The value equivalent of Z is P bar, and the reference price for Z is P star—that is, the regular price that the consumer expects to pay for this product. So P star is the reference price, the regular price that the consumer is expecting to pay. This is the price that you are actually paying, which could be different from P star, and this is the value equivalent of Z. So, for example, you get something—how much do you value it?

$$(z, -p) = (\bar{p}, -p)$$

That is defined by P bar. P bar can be equal to P, can be equal to P star, or can be less than or greater than P or P star. Now, define acquisition utility as the value of the compound outcome Z—the outcome minus P, the actual price that you are paying—which is equivalent to P bar, basically the value equivalent of Z minus the actual price that you pay, P bar. The associated value scale would be V(P bar minus P).

$$v(\bar{p} - p)$$

So, this is coming from here and will be generally coded as the integrated outcome—integrated outcome as P bar minus P—where the cost of goods sold is not treated as a loss, as it will be hedonically inefficient. Now, you remember we discussed that when there is a gain and there is a loss—when there are mixed outcomes—then we go for integration when X and Y are close to each other. So here, the value equivalent and the actual price that we pay are expected to be close to each other, and as a result, we have an integrated outcome. Acquisition utility is the net utility that accrues from the trade of P to obtain Z. So, you pay the price P, and you get a value of P bar.

So, the net utility generated is given by or called acquisition utility. Next, we talk about transaction utility. The other concept, the measure of transaction utility, depends on the price the individual pays compared to some reference price, which is P star. So, in the previous acquisition utility, we were comparing P bar with P, and here we are comparing P star with P. Formally, it is defined as the reference outcome, which is like this: your reference price minus P star, since all these are what you are paying.

So that is why there is a minus sign in front of it, and P is basically the actual price that you are paying. The value of paying P when the expected or reference price is P star. Total utility from a purchase is just the sum of acquisition utility and transaction utility.

$$w(z, p, p^*) = v(\bar{p}, -p) + v(-p : -p^*)$$

So, the value of buying good Z at price P with reference to price P star is defined over W or defined as ZPP star, where WZPP star is the functional form, and basically, the total utility generated is the utility generated from acquisition utility or acquiring the product

and this is basically the value generated from the transaction. Now, going back to the beach and drink example, people are willing to pay more for the beer from the resort because the reference price in the context is higher. So here, the reference price is actually higher when you are purchasing it from a resort. This effect cannot be accommodated in a standard economic model because the consumption experience is the same in either case. The place of purchase should be irrelevant.

Thus, transaction utility explains the differences in the prices of the same utility at different locations that a consumer is willing to pay. What traditional or neoclassical economics basically cannot explain is that, for them, a particular brand of beer should have the same MRP, or there could be certain discounts, but then you must be willing to pay the same price. Accordingly, you are not expected to pay a higher price or willing to pay a higher price when purchasing from a resort and a lower price when purchasing from a small store. The addition of transaction utility to the purchase calculus leads to two kinds of effects in the marketplace.

First, some goods are purchased primarily because they are especially good deals. Most of us have some rarely worn items in our closets that are testimony to this phenomenon. Sellers make use of this penchant by emphasizing the savings relative to the regular retail price, which serves as the suggested reference price. In contrast, some purchases that would seemingly make the consumer better off may be avoided because of substantial negative transaction utility.

The thirsty beer drinker who would pay $4 for a beer from a resort but only $2 from a grocery store will miss out on some pleasant drinking when faced with a grocery store charging $2.50. Alternatively, we can talk about a situation where, say, I am extremely thirsty—maybe I am traveling—and I stop by a store that charges 100 rupees for a bottle of water. I find it exorbitant, and I do not purchase it because I think the deal is too bad. So I do not purchase it. This actually leads to a substantial amount of negative transaction utility.

But then I would have been better off by acquiring that bottle of water and drinking it instead of avoiding it just because of a substantial negative transaction utility. With this, I conclude this module on the introduction of primarily acquisition and transaction utility. These are the references. Thank you.