

## BEHAVIORAL ECONOMICS IN MARKETING: A TEACHING NOTE

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### ABSTRACT

This note is offered in celebration of the Nobel Prize awarded to Professor Kahneman for his contribution of integrating psychological research into the economic thinking. Kahneman's recognition presents a strong challenge to the long held beliefs in classical economics. This teaching note reifies behavioral decision theory.

### PROFESSOR DANIEL KAHNEMAN: PIONEER IN BEHAVIORAL ECONOMICS<sup>1</sup>

Daniel Kahneman was awarded the 2002 Nobel Prize in economic sciences for his pioneering research in integrating psychological perspectives into economics. In its announcement, the Royal Swedish Academy of Sciences cited Kahneman "for having integrated insights from psychological research into economic science, especially concerning human judgment and decision-making under uncertainty."

Kahnemann and his deceased colleague, Amos Tversky<sup>2</sup>, developed an approach to the study of judgment and decision-making that has gained influence in psychology and economics. Kahneman "challenged the micro-foundations of economics," said Deborah Prentice, chair of Princeton's psychology department. "He has documented the shortcuts people take and the biases they have in making decisions. When people don't have a systematic way of making a decision, they do what they can, and that was news to psychologists and economists. If people are not always capable of making rational decisions, then a lot of what economists had inferred on the basis of those assumptions really needed to be re-examined."

<sup>1</sup> The section on Daniel Kahneman's Nobel Prize was excerpted from a Princeton University press release written by Jennifer Greenstein Altmann on October 9, 2002

<sup>2</sup> The Nobel committee does not make posthumous awards, but in interviews Kahneman said the honor also belonged to Amos Tversky, his longtime colleague and friend. Kahneman said "The prize ... is quite explicitly for joint work, but unfortunately there is no posthumous prize,"

### BEHAVIORAL DECISION THEORY: A TEACHING NOTE

Human rationality has been at the center of the debate between economist and behaviorist about the influence of price information on consumer behavior. The economic perspective tends to be supported much more by the rational choice concept, while the behavioral perspective has often been found in actual consumer behavior. Economic theory predicts that gains and losses of equal size are valued the same, whereas behavioral decision theory predicts that they are valued quite differently.

The practical marketing implications of prospect theory (Kahneman and Tversky 1979 and Tversky and Kahneman 1981) and transaction utility theory (Thaler 1980, 1985) challenged the common view in economic theory and in marketing models of consumer choice that a purchase decision involved the comparison of positive utility of a product with the negative utility of its price (Nagle and Holden, 1995).

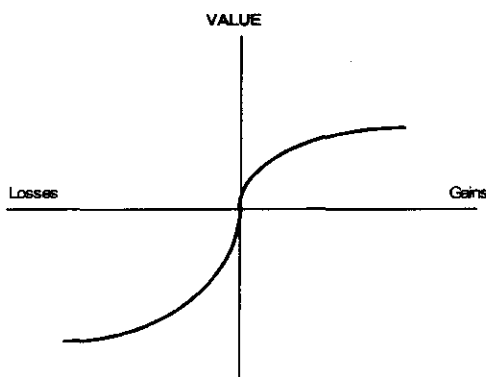
Behavioral decision theory leads to the contention that there are different ways to frame the same transaction, and each way implies somewhat different behavior. For example, Nagle and Holden (1995) describe the following scenario where the outcome is identical but psychologically people would prefer to buy from station A. Station A: Sells gasoline for \$1.50 per gallon, and gives a \$0.10 discount if the buyer pays with cash while Station B: Sells gasoline for \$1.40 per gallon, and charges a \$0.10 premium if the buyer pays with a credit card. The perceived cost of purchasing from station A with a discount is less than purchasing from station B with a surcharge.

### The Value Curve

Buyers' evaluation of purchases in terms of how the product's quality and price are viewed or framed, in terms of gains and losses, influence the attractiveness of a purchase (Kahneman and Tversky 1979; Thaler 1985). Each transaction involves a gain (product or service) in return for a loss (money). A conceptualization of the value curve is shown in Figure.

Three key propositions are found in the curve: (1) the value function is defined over perceived gains and losses relative to a reference point, (2) the value function is assumed to be concave for gains and convex for losses, and (3) the loss function is steeper than the gain function. Let's assume a value function was described by two functions<sup>3</sup>: value (gain) =  $.1631X - .0001X^2$  and value (loss) =  $.22X + .0002X^2$  where X is the monetary gain or loss.

**FIGURE**  
The Value Function of Prospect Theory



There are four principles of joint outcomes (gains, losses) that suggests how value for the buyer and demand for the seller can be optimized. Marketers can use these four principles to focus the marketing mix on increasing the gain, and decreasing the loss to enhance the overall value of the offering. By influencing the structuring of the gains and losses of a transaction, marketers can consistently influence people's choices.

**Segregate Gains.** When there are multiple gains, it is best to segregate the gains. In essence, the point of this is "don't wrap all of the Christmas gifts in one box." For example, retirees prefer to receive a monthly payment over a period of time versus a single lump sum payment and better restaurants serve the various courses of a meal over time rather than all at once.

Segregating gains is symbolized by the formula:  $\text{value}(x) + \text{value}(y) > \text{value}(x+y)$ . For example, a consumer receiving two consumer rebate checks, one in the amount of \$15 and the other in the amount of \$25 would be happier than receiving one rebate check in the amount of \$40. Using the value function for gain, the value of receiving \$15 is 2.42; the value

of receiving \$25 is 4.02. Adding the two values together totals 6.44. This is greater than the value of \$40, which is 6.36. While the human mind does not run quadratic functions in their mind to determine value, Kahneman and Tversky were able to show in their research that subjects will overwhelmingly choose the segregation of gains over integration. The algebraic functions mimic this behavior and are introduced as hypothetical models similar to the demand functions that are used in classical economics.

**Integrate Losses.** When there are multiple losses it is better to integrate the losses. The desirable feature of a credit card is that these transactions are pooled into one monthly statement. Let's say one shopper makes three purchases of \$45, 215 and \$86 respectively and pays cash for each purchase. Another shopper charges the same three purchases on a credit card and pays \$346 one month later when the statement is due. In doing so, the second shopper reduces the total value lost. This would be illustrated as:  $\text{value}(-x) + \text{value}(-y) + \text{value}(-z) < \text{value}(-x-y-z)$ . Using the value function for losses above<sup>4</sup>, the first shopper's value, which segregated the loss, is -52.18. The second shopper, who used a credit card, had a higher value, i.e.  $-52.18 > -64.99$ .

**Combine Losses Against Larger Gains.** People don't like to pay for things like insurance and retirement because they do not have any immediate benefit. But these purchases are important; sellers will offer a plan to integrate the loss (insurance payment) with a gain (payroll). The benefit for the consumer is that they gain the benefit but do not see the loss as the payment is integrated into the paycheck. This transaction would be evaluated as  $\text{value}(x) + \text{value}(-y) < \text{value}(x-y)$ . One employee subscribes to the company's health plan and has \$53.75 deducted from weekly pay of \$600. Another employee, paid the same amount, subscribes to an insurance plan where he writes a check each week for \$53.75. The first employee's net amount of \$546.25 is placed in the gain function for a value of 59.25 while the second employee's gross amount is placed in the gain function and the \$53.75 is placed in the loss function for a net value of 50.61. The first employee would "feel" more value (59.25) than the second employee (50.61).

**Segregate Gains Against Larger Losses.** When there is a mixed loss, it is best to segregate the two. When rebates are offered, the rebate is received after the buyer takes possession of the product. For example, a buyer pays \$180 for a DVD player but receives a

<sup>3</sup> These functions are used to describe the value function in the following case. Obviously, in any value estimation exercise, these functions will change but will still conform to the three key propositions about value functions. These particular functions work for ranges of approximately -600 to +600.

<sup>4</sup> In the case of losses, the loss would be entered as a negative number, i.e. \$45 is entered into the value equation as -45.

rebate of \$20 in the mail two weeks later. This transaction has more value than if the buyer found a DVD player on sale for \$160. This can be symbolized as: value (x) + value (-y) > value (-y+x). The buyer who receives a rebate perceives a better value of -29.90 where the second buyer's value is -30.08.

This section can be introduced to students by asking four questions which describe the four principles of joint outcome (see Appendix). The instructor can then introduce the hypothetical gain and loss function which should verify the class response to the four questions. The example of the computer purchase can then be used to complete the discussion.

### A PEDAGOGICAL EXAMPLE: HOW THE VALUE FUNCTION WORKS

Ever since Bob used a friend's top line notebook computer, his old computer never seemed to be the same. After perusing stores, catalogs and endless product reviews on the internet, he found a Solis e-Lite Mini Notebook that seemed to meet his needs. There was an offer in Midwest Micro, a computer catalog, that bundled together the computer with Windows NT Workstation and Microsoft Office and a wireless setup. The package price was \$1,595 plus \$10.50 (S&H). Solis was offering a \$100 rebate on this offer. However on the Internet, he was able find the same individual component from different vendors at the following prices.

|                        |                               |
|------------------------|-------------------------------|
| Solis Notebook         | \$799.59 plus \$12.95 (S&H)   |
| Windows NT Workstation | 245.25 plus 3.25 (S&H)        |
| Microsoft Office       | 215.00 plus 4.45 (S&H)        |
| Wireless Setup         | 159.95 plus 3.75 (S&H)        |
| Total                  | \$1,419.79 plus \$24.40 (S&H) |

With very little hesitation, he was ready to call Midwest Micro to place his order in the amount of \$1505.50. Given that he would be able to save a considerable sum of money by buying all the components separately, how can his choice be explained?

He didn't get around to placing the order that day. And it was a good thing because the very next day he received an office memo indicating his employer was offering a payroll deduction program for the purchase of computers. The company offered an interest rate of 4% over 36 months. Bob quickly calculated each of 156 weekly payments to be \$10.25. At the time, Bob weekly paycheck was \$1,214. He promptly called Human Resources to set up this plan and then called Midwest Micro with his company's authorization to make the purchase. How did the company's offer impact Bob's decision?

After he had made his purchase, he was still perplexed by his consumption behavior. Bob's good friend, a professor at a nearby university, was able to explain to Bob the phenomenon of the value function and the mental framing of prices. While the professor could not pinpoint the actual process of Bob's thinking, he could offer a hypothetical model<sup>5</sup>. He drew the picture of the value function and estimated the equations for the two curves. For the curve on the right side he suggested the equation value (gain) =  $9.908991X - .003259X^2$ ; for the left hand side, he suggested value (loss) =  $11.786539X + .003859X^2$ , in both equations X represents the monetary amount of the gain or loss. He went on to explain the two situations illustrated in the case.

The first situation is the choice between the catalog offer and the Internet offerings. The products for either offer are identical. The difference is the amount of money paid. Using economic theory, one would predict that the consumer would choose the offer that minimizes price. Prospect theory, taking into account more than the monetary sacrifice, will suggest the higher priced option is more satisfying. Here is the logic of the prospect theory argument:

#### Buying components from the Internet:

|                        | Price      | S&H     | Total      | Value <sup>6</sup> |
|------------------------|------------|---------|------------|--------------------|
| Solis Notebook         | \$799.59   | \$12.95 | \$812.95   | (7,029)            |
| Windows NT Workstation | 245.25     | 3.25    | 248.50     | (2,691)            |
| Microsoft Office       | 215.00     | 4.45    | 219.45     | (2,401)            |
| Wireless setup         | 159.95     | 3.75    | 163.70     | (1,826)            |
| Total                  | \$1,419.79 | \$24.40 | \$1,444.19 | (13,947)           |

The evaluation of this offer is segregated by it individual components. Therefore the computation of the value of the loss is computed separately for each of the four components. The "theoretical" value of the loss is -13,947.

#### Buying the package price from the catalog:

|                                    | Price      | Rebate  | S&H     | Total      | Value <sup>7</sup> |
|------------------------------------|------------|---------|---------|------------|--------------------|
| <u>Package with instant rebate</u> | \$1,595.00 | (\$100) | \$10.50 | \$1,505.50 | (8,998)            |
| <u>Package with delayed rebate</u> | \$1,595.00 |         | \$10.50 | \$1,605.50 | (8,976)            |
|                                    |            | (\$100) |         | (100.00)   | 958                |
|                                    | \$1,595.00 | \$100   | \$10.50 | 1,505.50   | (8,018)            |

<sup>5</sup> The use of quadratic functions to mimic the value functions is hypothetical in nature. These curves do not exist in reality. However, the behavior of consumers is consistent with the mathematical computation of the value curve.

<sup>6</sup> Use loss function to compute.

<sup>7</sup> Use loss function to compute.

The evaluation of this offer depends on how the rebate is paid. When the rebate is "instant" then the gain is integrated into the loss with a resulting value of the loss of 8,998. When the rebate is delayed, the gain of the rebate is segregated from the loss of the financial payment. This results in a value of the loss of 8,018. When both offers are compared, it is apparent that the consumer will minimize the value of the loss by wanting the catalog offer with a rebate to be paid at a later date. This is consistent with prospect theory that says buyers will prefer to integrate losses, thus, the catalog offer is preferred over the Internet offerings. Secondly, buyers prefer to segregate gains against larger losses to gain the so-called "silver lining" of the offer. Therefore, the delayed rebate, segregated from the payment, is preferred.

The second situation demonstrates the power of combining losses against larger gains. By using payroll deduction to pay for the computer, it will be "less" painful than separately receiving a paycheck and then paying separately the periodic payment to a financial institution. The table below will illustrate that the overall value of the gain is larger when the two transactions are combined via a payroll deduction.

| Gain                         | Value of Gain | Loss      | Value of Loss | Net Gain   | Net Value |
|------------------------------|---------------|-----------|---------------|------------|-----------|
| <u>Separate transactions</u> |               |           |               |            |           |
| \$1,214                      | 7,226         | (\$10.25) | (120)         | \$1,203.75 | 7,106     |
| <u>Payroll deduction</u>     |               |           |               |            |           |
| \$1,214                      |               | (\$10.25) |               | \$1,203.75 | 7,206     |

### CONCLUSIONS

This paper demonstrates that consumers do not respond to prices in a perfectly logical manner. Rather, there is a behavioral component that strongly affects consumer's decision process towards buying.

While this single example does not prove a theory, it demonstrates in a mathematical sense how prospect theory what has already been found in several research studies (Kahneman and Tversky 1979; Tversky and Kahneman 1981; Thaler 1980, 1985). The idea of value is a powerful concept that goes beyond the economic perspective that consumers will minimize the price paid. Behavioral economics goes beyond this example to explain a more complete set of consumer decision to maximize value rather than to minimize price paid.

Aspects of behavioral economics need to be better integrated and presented in principles of marketing textbooks so that both the students and professors have a more complete understanding of consumer demand. Including an example of behavioral economics in our marketing curriculum is fitting tribute to a Nobel prize winner.

### REFERENCES

- Kahneman , Daniel and Amos Tversky (1979) "Prospect Theory: An Analysis of Decision Under Risk," *Econometrica*, 47 (March ) 263-291.
- Nagle, Thomas T. and Reed K. Holden (1995), *The Strategy and Tactics of Pricing*, 2<sup>nd</sup> ed., Prentice-Hall, Englewood Cliffs, NJ.
- Thaler, Richard (1985) "Mental Accounting and Consumer Choice," *Marketing Science*, 4 (summer) 199-214.
- Tversky, Amos and Daniel Kahneman (1981) "The Framing of Decisions and the Psychology of Choice," *Science*, 211, 453-458.

### APPENDIX

- Nathan receives two rebates in the mail. One is for \$15 and the other is for \$25.
- Josh receives a rebate check for \$40.  
Who is more satisfied?
- Amanda goes shopping and makes three purchases of \$45, \$215, and \$86 and pays cash for each purchase.
- Kristen goes shopping and makes three purchases of \$45, \$215 and \$86 and uses a credit card.  
Who is more satisfied?
- Ian subscribes to the company health plan and has \$53.75 deducted from his weekly pay of \$600.
- Eric health plan and has to write a check for \$53.75 every week. His weekly pay is \$600.  
Who is more satisfied?
- Elise pays \$180 for a DVD player and receives a rebate of \$20 in the mail two weeks later.
- Erin pays \$160 for a DVD player (same one) on sale.  
Who is more satisfied?