



## Thick Indifference Curves, Marketing and Behavioral Economics

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### Abstract

In this paper the differences between two schools of thought, the traditional school and the behavioral economics school, are discussed. The relatively new behavioral economics school is a blend of psychology and economics. The conventional assumptions concerning consumer preferences are explicated and elaborated upon. The assumptions include reflexivity, completeness, transitivity and continuity. Secondary assumptions, such as local nonsatiation and strict convexity, regarding preferences are also explained. Thick indifference curves in a two good world are explained and demonstrated to encompass rational behavior even though they do not reflect a well defined utility function. If a consumer has preferences that exhibit thick indifference curves behavioral economists can be mistaken in thinking that consumer behavior is irrational. The role that marketing plays in forming thick indifference curves is also established.

**Keywords:** Indifference curves; behavioral economics; marketing.

### Introduction

The traditional view in economics assumes that individual decision makers such as consumers and managers within business firms act in a rational manner while trying to optimize an unconstrained or constrained objective function. This maximizing (or minimizing) behavior is assumed to occur across all individuals. Rationality is a key assumption in any optimization situation. With regard to consumer preferences the traditional assumptions include reflexivity, completeness, transitivity, and continuity. Throughout this paper it will be assumed that we have a world with two goods  $x_1$  and  $x_2$ . The consumption bundle will be shown as a bold typed  $x$ , such as  $\mathbf{x}$ ,  $\mathbf{x}'$  or  $\mathbf{x}''$ . The entire set of consumption bundles is shown as a capitalized  $x$ ,  $X$ . Reflexivity conditions that for all consumption bundles in  $X$ ,  $\mathbf{x} \succeq \mathbf{x}$  (where  $\succeq$  means weakly preferred to,  $>$  means strictly preferred to). This is a trivial assumption. Completeness implies that for all  $\mathbf{x}$  and  $\mathbf{x}'$  in  $X$  either  $\mathbf{x} \succeq \mathbf{x}'$  or  $\mathbf{x}' \succeq \mathbf{x}$  or both. This implies that consumers are not paralyzed by indecision; they can easily make choices among consumption bundles. Transitivity assumes that for all consumption bundles in  $X$ , if  $\mathbf{x} \succeq \mathbf{x}'$  and  $\mathbf{x}' \succeq \mathbf{x}''$  then  $\mathbf{x} \succeq \mathbf{x}''$ . This implies that there is a logical consistency present in preference patterns. Continuity implies that the set of strictly preferred consumption bundles is an open set and the set of weakly preferred consumption bundles is a closed set. This also means that thick indifference curves are ruled out. With these four assumptions it can be shown that an ordinal utility function exists.

Other assumptions that are sometimes made regarding preferences are local nonsatiation, strong monotonicity (which implies local nonsatiation) and strict convexity. The first two imply, independently, that more of a good is always preferred to less. A good never becomes a "bad" in other words. Strict convexity is used to generate smooth looking demand curves. It incorporates the ideas of diminishing marginal rates of substitution between goods.

### Behavioral Economics

The relatively new fields of behavioral economics and behavioral finance take issue with the traditional type of models. Behavioral economics is a blend of both economics and psychology. It has just relatively recently made its way into many introductory textbooks in economics. The adherents to these fields believe that decision makers do not always behave in a fully rational manner and thus the models that make the rationality assumption are faulty and can lead to incorrect conclusions about actual behavior in markets. Behavioral economists make use of a small set of beliefs taken mostly from psychology that include framing, prospect theory, and endowment effects.

The behavioral economists point to a variety of anecdotal situations (many contrived in a laboratory typesetting) where individuals do not make optimizing decisions. This is supposedly due to the irrationality of the agent making the assessment. Some examples of their work follow below.

Classical economics assumes that individuals formulate decisions based on the well-known expected utility theory. Behavioral economists claim otherwise. They developed a theory called prospect theory that, in their mind, better explains the decisions made by individuals. Prospect theory assumes that a value function exist that plots utility on the vertical axis and gains/losses on the horizontal axis. The function itself is cubic and crosses the origin. In quadrant three (losses and less utility) of this Cartesian plane the function is increasing at an increasing rate. In quadrant one (gains and more utility) the function is increasing at a decreasing rate. This assumes that a \$2000 loss, for example, takes away more utility than a \$2000 gain would add. This phenomenon is entitled loss aversion.

Behavioral economists have devised a number of different studies regarding loss aversion. The typical study asks individuals to choose between a sure gain of say \$400 (option A) or a 50% chance of gaining \$800 and a 50% to gain/lose \$0 (option B). The expected value of option B is \$400. Most studies show the majority of individuals choosing option A. A similar question is then posed such as option A being a sure loss of \$400 and option B being a 50% chance to lose \$800 and a 50% chance to lose/gain \$0. Again the expected value of option B is \$400. Here most people choose option B. In the first case individuals demonstrate risk aversion as predicted by traditional economics, but in the second situation they exhibit risk seeking behavior which is not rational according to traditional theory. Behavioral economics point to this as evidence backing up their prospect theory which is based on their assumption of loss aversion which fuels the shape of their value function which was explained above.

The field of behavioral economics utilizes a different concept of utility than does the traditional school of thought. Behavioral economists break utility into two different types: acquisition utility and transactional utility. Acquisition utility is similar to the concept of consumer surplus used by traditional economists. Transactional utility is the difference between some reference price which consumers identify as the “normal” price and the price they are actually expected to pay. This suggests that business firms can impact sales simply by framing the reference price in an advantageous manner. For example, by inflating the suggested retail price (reference price) they can deceive consumers into thinking they are getting additional transactional utility even though the good itself has not changed. This would, according to the behavioral school of thought, cause sales to rise. Assuming no change in costs profits would be expected to increase as well. The behavior is viewed as an irrational decision by consumers.

Consumers are also thought to behave irrationally when making intertemporal choices. According to the behavior economics school of thought, consumers and investors do not discount in a rational manner. The list goes on and on as far as examples of supposed irrational behavior by agents in markets. Behavioral economics produces much anecdotal “evidence”, but no concrete, general theories.

### **Thick Indifference Curves**

Perhaps no general theories exist because behavioral economics is itself faulty. If individual agents making decisions have non-traditional looking indifference curves due to a variety of different reasons then the decisions that they make might not actually be irrational at all. They might be quite rational and quite adaptive to explanations via traditional economic theory. One such case is when individuals have thick indifference curves.

Thick indifference curves can represent consumer preferences that possess most of the properties of traditional preferences with the notable exception of local nonsatiation (and hence strong monotonicity). There is no economic law that states consumer preferences must possess local nonsatiation. When indifference curves are thick there can be a variety of optimization solutions. Utility is able to be maximized by choosing different consumption bundles while spending the same amount of income. Therefore if the wrong assumption of typical thin indifference curves is made it can lead to an economist believing that the consumer made an irrational consumption decisions when in fact they have not. The only error was in assuming the consumer’s preferences obeyed the local nonsatiation assumption. What can cause thick indifference curves? There can be many causes of thick indifference curves, but this paper will list some of the strategies and tactics used by marketing experts at attempting to make consumer preferences “fuzzy”.

### **Marketing Tactics**

Understanding the psychology of human behavior has become the primary goal of consumer marketing research. Manipulating the psychology of buying behavior has allowed marketers to greatly exceed the typical buying needs and wants of a product or service. The simple understanding that consumers are more receptive to food advertising when they are hungry, has driven marketers to schedule snack advertisements between meals. This has the effect of “thickening” the indifference map of an individual through time. Marketing strategy aimed at understanding consumer buying behavior has evolved into a data driven psychology research experiment. One of the oldest examples of marketing psychology is the use of emotional appeals. Consumer research has shown emotional and psychological

appeals resonate more with consumers than the features and functions of the product. Demonstrating how a product will improve your life will outsell a product sold only on its features.

The psychology of color in marketing products has been researched extensively to manipulate the consumer buying decision. Color can be used to distinguish your product and its brand from the competition, but more importantly influence the mood and emotions of the buyer. Consumers will make a purchasing decision within 90 seconds and 62%-90% is based solely on the color.

Creating a sense of urgency has long been a successful marketing ploy to deceive the consumer into action to avoid missing a great opportunity or gain a pricing advantage. Advertisers have used limited time-based buying windows to create an impression of limited quantities at a discounted rate. This false sense of urgency can drive consumers to purchasing decisions based out of fear they may miss out on a price savings. Black Friday is an excellent example of a time-based offering using urgency and scarcity to drive consumers to action.

Social identity theory has been applied to marketing strategies to divide consumers into groups to drive brand loyalty based on product ownership. Social identity theory exemplified by the work of Tajfel and Turner proposed that groups were an important source of pride and self-esteem which can be used to help consumers feel a sense of social identity. Marketers try to divide the consumer into an in-group (us) and out-group (them) social groups. The hypothesis of social identity theory is that group members of an in-group will seek to find negative aspects of an out-group, thus creating a 'my product is better than your product' marketing position. Harley Davidson uses social identify theory to create a loyal base of members in an "us against all other motorcycle brands" marketing campaign.

All of the above can cause indifference maps to become fuzzy or thick due to the preferences becoming "fuzzified" by the marketing tactics. For instance, they can lead to consumers assigning the same level of total utility to various quantities of the same good based on unimportant economic attributes such as the color of a can opener that will be hidden in a kitchen drawer or the color of carpet padding that will never be seen.

## **Conclusion**

It might be the case that where behavioral economists think they are seeing irrational behavior might simply be a case where individuals are exhibiting quite rational behavior which is somewhat masked by having preferences that lack local nonsatiation instead of the more standard preferences normally assumed in economics and finance which do not lack nonsatiation (or strict convexity). Utility functions that lack local nonsatiation do not lack rationality, but they can generate thick indifference curves. Preference relations can become fuzzy due to marketing tactics which in turn can generate thick indifference curves. The imposition of thick indifference curves into economic models can accommodate many of the experimental anomalies found in behavioral economics.

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Dr. Richard Vaughan joined the faculty at the University of St. Francis in 2006 after working 22 years in business and earning numerous awards in marketing and operations for a fortune 100 information company. He has served as Director of Marketing with full P&L (\$480M revenue) portfolio management across the nation. Responsibilities included; providing strategic direction, conducting competitive analysis, and developing best in class strategy, structure and process improvement. Rich received his Bachelor of Arts from DePaul University, his Masters of Science in Management and Organizational Behavior from Benedictine University and a Doctorate of Management in Organizational Leadership from the University of Phoenix. Rich holds numerous technical and project management certificates. He teaches graduate and undergraduate classes in marketing and management both online and in the classroom. His research interests include marketing technology, sustainable business models and strategy development.