

Neuromarketing: Consumers and the Anchoring Effect

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Abstract - The model of economic analysis used on the market by companies has shown too much inability to the explanation of problems arising from the economic man's decision. So that alternative theories have been developed by a conventional series of renowned scientists and institutions. The need of an alternative has generated several different approaches. It is the case of the analysis of behavioral economics, represented in this study by neuromarketing. Theoretical view in the study of the anchoring effect of prices in the consumer's mind is presented. This study evidences the existence of the anchoring effect of prices in consumer decision of students from business courses of the city of Belém – PA (Brazil).

Keywords— *Consumer, Anchoring, Behavioral Economics, Neuroeconomics, Limited Rationality.*

1. Introduction

In the last decades, reality has allowed remarkable research in terms of the development of scientific and managerial marketing activities. Though, marketing research has been often made very especially in industrialized countries, where it has been possible to make funds available for research development in this area. The future of marketing science is now in a new frontier to internalize new concepts and new developments. High level investments are now required to develop new empirical and experimental/laboratories' research, involving high technology. Anyway, as a result of the new global geostrategic environment for business, the so-called emerging markets also begin to develop strong strategies for research and investigation, domestically. It is the case of India, China or Brazil, for example, where many advances in science are now being developed and important research centers being developed. A new world was born.

Considering the new economic global crisis, companies and governments try to fix up now a plausible explanation for the deleterious events. They are looking for a way to protect goods and the ability to generate wealth. However this search has seemed a vain effort, which is tried by companies and governments when explaining these phenomena. Allied to the multiplication of the mistrust among the economic agents on the market, this reality gets worse as soon as the present hard times get evident in

many of the first world countries.

The globalization of the markets is a very important challenge for organizations. It is a reality and many factors are contributing for business at a global scale, as it is the case of worldwide investment, the production and marketing made across frontiers, the weakness of national boundaries relating to the movements of capital, goods and people, the development of some regional unions and regional alliances, the advances in telecommunication technologies and internet, or the world travel facilities, for example. Companies and organizations in general cannot take no notice of this movement toward globalization and companies must be aware of it. Any organization which chooses to be kept out of this trend will face the competition in a global basis anyway because competition comes to the organization's 'front door', either from local, national or international companies. The importance of globalization for marketing is a reality and cannot be disregarded.

Economists, professional investors, CEOs of large companies, governors and even "oracles" have not shown great ability to explain what in fact happens in the economy these days - whether it is actually possible or not.

In the field of the economy there is a perspective that draws special attention: the behavioral economics, and in particular, neuromarketing.

2. Neuromarketing and Consumer's Decisions

Varian (2006) considers that the existing models were not sufficient to explain the phenomena of human behaviors, especially those for consumption. Varian (2006, p. 586) states that the economic model of consumer choice that usually is studied is simple and elegant. It constitutes a reasonable starting point for many types of analysis. However, it is definitely not complete. In many cases it is necessary to use a deeper model of consumer behavior to describe, more precisely, the decision-making.

Ross *et al* (2008) presented an interesting study using Picoeconomics, or analysis of consumption patterns, which defines how the modeling of intertemporal choices in a market where the sub-personal balance between different interests is achieved through negotiation. The research is part of the Neuroeconomics analysis, with the support of laboratory research using imaging techniques. The

authors present the methods adopted by man for self-control and to prevent a range of choices of excessive short-term solutions. Particular focus is given to the rules of personal conduct self-imposed, in which are considered the strategies based on the concept that behavior is a balance among games of negotiation considering sub-personal interests.

Traditionally, marketers and advertisers have long utilized focus group-based research as a means of getting responses to products and communications of a brand. Though the consumer-driven marketplace is changing and so the consumer opinions and reactions. The new technologies that allow marketers to scientifically understand the mind of consumer are now being used. Through brain activity-based research, marketers can pinpoint what exactly drives people to buy a product and uncover how the brain responds to various advertising and marketing tactics (see Williams, 2010).

On this sense, neuromarketing uses new technologies to measure the brain activity of consumer subjects as a way to discover how people respond to products and marketing messages. "The drive behind neuromarketing is to discover how consumers are actually responding to marketing messages, not how they report they are responding, or will respond" (Williams, 2010).

The field of behavioral economics is devoted to the study of how consumers actually make their choices [...]. Many of these choices contradict the conventional economic model of "rational" consumers (see Varian 2006, p. 586). The basic line of this approach – neuromarketing - sustains that man actually has a limited ability to make rational decisions.

Buying decisions are not, in truth, necessarily rational decisions, rather they are decisions made deep within the brain and based on a mix of thoughts and feelings. These decisions take place in the subconscious part of the brain (Williams, 2010).

In decision-making process, the conventional model has dissonant anomalies about consumer theory, which have been effectively and systematically discovered by this field of study. Among such contradictions arising out of the tests made by this approach, some topics may be highlighted, as they are the context effect on consumer choice; uncertainty; time and strategic interaction; or social standards, for example.

The choices based on the concept of uncertainty also tend to influence the consumers decisions, basically because most people demonstrate that they are adverse to loss and defend their current positions at any way. This shows that the consumption act decision is much more tortuous than it seems to be.

Another decisive factor is time, which presents specific peculiarities such as discount situations, or self-control.

Strategic interaction and social norms are also factors or explanatory variables for the decision. It may be considered that the inherent relationship is based on sociological behaviors. A good example of the functioning of this variable is the analysis based on game theory which culminated in the emergence of behavioral theory of games, which considers the bias caused by emotional components such as joy, surprise, anger, fear, etc.

Neuromarketing constitutes in fact a strand of behavioral economics, indicating the path to the relevant analysis on the influences of human irrationality in decision-making. Neuromarketing is the union of Neuroscience and Marketing to explain how consumer really takes his buying decision. Its mission is the consumer brain research (see Lindstrom, 2010, p. 150).

Therefore, neuromarketing has emerged as a science which intends to explain processes and can test campaigns, applications, more exact shapes sensations, using neurosciences as an ally of marketing (see Rodrigues, 2011, p. 02).

However it is necessary to have a broader idea about neuromarketing once it is composed by various disciplines as much as neuroscience and marketing, such as:

- Economics;
- Quantitative Methods;
- Psychology;
- Biology;
- Pharmacology;
- among others.

This seems to bring a fresh realistic approach about this aspect of behavioral economics. The truth is that the global crisis brings evident some barriers to the good performance of companies in the market. Unless the company holds a monopoly, it will devote a good part of its efforts to sell its products and services. Clearly this is not easy to fulfill, once:

- there is a range of professional buyers who are very well prepared;
- there is a stiffer competition;
- there is an extension of the sales cycle;
- today a company sells and buys in teams;
- there is greater resistance to traditional marketing techniques when a sale is near to be closed.

Consequently, neuromarketing appears as a probable solution when these difficulties come out or, at least, neuromarketing emerges as a possible alternative for agents to get better results on the market.

3. Neuromarketing Clinical Techniques

At first modern psychology was combined with the technology to explain decision making processes within the brain. Later, economic behavioral decision making theory was revised in the light of neuroscientific research results. It was just in recent years that consumer behavior and marketing research has started looking towards neuroscience for answers to salient consumer decision motives. It is from here that neuromarketing started to emerge (Simson, 2010).

Recently it has become evident that emotions have a very important role in the decision making processes and are particularly significant in decisions within consumer behavior.

Studies involving neurosciences, when studying emotional processes, show that emotions work primarily and it is not rationality that acts the first role in influencing decision making, perception, cognition or the behavior of an individual. Emotional processes' understanding is fundamental for marketing development and for advertising campaigns. In fact, successful branding and advertising depend on understanding and developing an emotional appeal towards consumers. However, traditional research methods cannot uncover these emotional processes as they are only reflected in the brain and through physiological reactions.

The real reasons to understand the consumers' perception of advertizing are not really caught by traditional marketing and brands. Marketing cannot well understand the consumers' attention and behavior. For this understanding, new techniques are necessary and the role of neuromarketing is vital on this research. Traditional research methods can become more accurate and advertising effectiveness can be increased by using the results of the application of these techniques. Although neuromarketing cannot be used to guide behavior, it can be used to develop the understanding of how emotional processes influence perception and behavior.

Considering the need of studying the human brain, in order to understand the decision making process, Williams (2010) refers that neuromarketing research is usually conducted through one or more of the following clinical techniques:

- **Functional magnetic resonance imaging (fMRI).** A technique that shows what parts of the brain are active by detecting changes in blood flow and the amount of oxygen consumed in different areas. The more active an area, the more oxygen and blood flow required. Subjects are put into a cylindrical imaging device and exposed to marketing material.
- **Electroencephalography (EEG).** The EEG technique measures the electrical activity of the brain (neurons) as recorded by electrodes placed on a subject's head. Subjects are either given

special EEG headsets to wear while exposed to marketing materials. While not as specific or accurate as fMRIs, EEGs are much less intrusive and can also be conducted at about the same cost as a typical focus group, making them extremely accessible to most businesses.

- **Eye tracking.** Eyes are the main focus in this technique as the location and pattern of a subject's gaze is studied to determine which images or portions of an image illicit the most attention.
- **Galvanic skin response (GSR).** GSR is a technique that measures the subtle changes in skin (such as temperature and sweat) that occur in conjunction with certain emotions.
- **Applied neuroscience.** This is a technique that involves no scanning or monitoring of any kind. Instead this technique is market research with a focus on the foundations of neuroscience to train marketers and sales teams to design pitches, offers and marketing messages that appeal to the brain on a subconscious level. This technique is based off of secondary research - or research already conducted by others - and is therefore much more accessible to smaller businesses and nonprofits.

4. What Happens in the Brain of the Consumer

People tend to look at the world under their particular perspective. This is used to filter and to process the perceptions, extracting the significance of many environmental information. This occurs because the brain tries to be the most efficient possible seeking causal relationships between multivariate information, generating finally the perception. This perception, in synthesis, is nothing more than a choice among several possible interpretations for options. After all, if the brain were to process and record all the information provided, probably would collapse.

But after all, how does the consumer's perception work in the brain? The part of the brain responsible for processing the signals from the initial vision is the occipital cortex (which is on the back of the brain). After the occipital cortex, information flows to the front of the brain, specifically towards the frontal lobes. The information takes two paths: primary and secondary. The first crosses the top of the brain, extracting information about where the objects are located in space in relation to the body. Already the secondary is a road that follows through the temporal lobes, located above the ears, and processes the visual information in order to categorize what the person sees. These two routes shall be coordinated by and among themselves, so that the end result is the full perception of the information that the eyes transmit (see Berns, 2008, p. 33).

Neuroscientists believe that visual perception is largely the result of statistical expectations. The perception is the way the brain interprets ambiguous cues using the most likely explanation, which is a direct result of past experiences (see Chavaglia and Filipe, 2011, p. 02).

The perception shapes what will be stored by the rest of the life of a human being, for example, the creation of an anchor price. Memory can be defined as the sum of all existing memories into consciousness, as well as skills that determine the extent and accuracy of these memories (see Eduardo, p. 324). The memory of a person is subdivided into short-term memory (working memory) and into long-term memory. The short-term memory meets a lot of information available to us and that we realized in the environment for the present time; and the long-term memory refers to information that people hold during a long time, in other words, is the memory that we will use to remember through our past experiences. This process lies in the region of the brain called the hippocampus, which acts as if it is - in a military language - an advanced command post.

The hippocampus will always be selecting what goes in working memory and what goes into the long-term memory. These events depend on the personal characteristics of each one of us, namely our past experiences. In general terms, each person will present sensitivity according to his past experiences associated with his genetic formation. Some of these people can become more sensitive to the colours of the product, other to the architecture of the object itself, some to the price of the product and so on considering all other categorizations about the product.

In the case of “anchoring”, let’s consider someone who runs a dealership of vehicles to buy his first car. This person arrives at the booth of popular cars and when he questions the price of a particular car, this price will be perceived as working memory and after then it is written in long-term memory, creating the effect of anchoring for many following years, because whenever this consumer back to the dealership to buy the same type of car his long-term memory will remember him the anchor price proposed in first purchase.

This mechanism works in the sense that the brain stores the information for a brief period (working memory) and then he separates and erases what the brain does not consider as being important.

In this way, anchoring occurs in the sense that the base retail price or suggested by is perceived in the mind of the consumer in a way that this information will influence all his future purchases of that product.

5. The Effect of Anchoring in Decisions

The ultimate goal of this study is to verify the existence of the anchoring effect of prices in

consumer decision of students from business courses of the city of Belém – PA (Brazil).

The neuromarketing, instead of nailing the traditional consumption theory, accepts that the decision is extremely influenced by how the choices are available or how they are placed in context.

The effect of context on consumer choice can be subdivided as follows: buoying effect; anchoring effect; effect of excess options; and preferences built.

The anchoring effect will serve as a parameter to this study. The idea on the effect of anchoring is that people’s choices can be influenced by completely spurious information (see Varian, 2006, p. 590).

What really matters in anchoring situation on consumption is how a number influences decisions of people, i.e. if a person or a group of people is exposed to any information about a product pricing, he will be influenced to be based on this anchoring price as a parameter to his buying decisions for that specific product. The suggested number can only be considered an anchor if the person is interested in buying the product.

What happens to people in this situation is that they tend to be influenced by information available in the environment and at the same time, after the decision is made, they cling strongly to defend this decision, at any cost.

After the "anchor" is created in the mind of the consumer, he responds not only for the current purchase, but also for all the future purchases of that product. Ariely (2008, p. 22) classifies this as an arbitrary coherence. That is, the initial prices are largely arbitrary and can be influenced by random questions and answers; but, once defined in the consumer's mind these prices set up not only what the consumer is willing to pay for something, but also what this consumer is willing to pay for related products.

The act as a whole can be presented in the form of procedure: setting the scene, anchor attachment, factor decision, and repeated purchase. To better illustrate this procedure, the following scheme is presented:

Figure 1- Anchoring Process in Consumption

Presentation of the context => anchor factor => Attachment decision => Purchase repetition.

- Presentation of the context - the consumer faces the information coming from the external environment, i.e. categories shown for each product itself.
- Anchor factor - in this step of the process anchoring itself is formed. Perceived external information will be fixed in the consumer’s mind.
- Attachment to decision - after being created, the anchor price will be a standard in the consumer's

decision, i.e. the consumer will defend his choice at any cost.

- Purchase repetition / Repetition of the pattern - this is the step on which the consumer (already properly anchored) reflects the effect on a future purchase, i.e. each time that this consumer is going to compare prices of a given good, in which the anchor occurred, he necessarily and unconsciously will use the price of the first acquisition.

6. The Study

For this study, the following objectives were defined:

- seeing the effects of anchoring in consumption decisions;
- presenting the results of the effect of anchoring in chocolate consumption in students studying business administration in the city of Belém – PA (Brazil).

It is intended to address the study considering the theory of behavioral economics, only for students of undergraduate courses in business (Administration, Accounting, Economics). For this, it was necessary to identify the behavior of these students before a decision-making situation of consumption. And for that, 300 people belonging this population were interviewed.

Considering the aims of the study and considering that the study on neuromarketing is essential, it permits to meet the demand for more precise tools in the understanding of the consumer behavior. The purposes of the study reflect the need of such kind of tools, indicating the existence of a way that permits a better understanding of this branch of the economic science.

The lack of specific research on this topic shows, in fact, the importance of this study, in academia and business. In addition, this study fills an existing demand for epistemological knowledge about how the human being takes economic decisions.

Methodologically, this study is supported in the existing literature, uses a well defined and contextualized population, exposing and describing its characteristics, and considers a sample by collecting data from the population, the students of management courses in the city of Belém – PA.

Precisely, the universe for the research is the group of people who attend business courses in the city of Belém – PA, where the sample was taken on the basis of the students of the central region of the city of Belém - PA. The sample of 300 people was defined and collected using the criterion of accessibility.

7. Study Results

The experiment was conducted in a way that a leaflet with a picture of a famous (and expensive) brand of chocolate was introduced to some students of management courses, in which they were asked if they would pay an amount equal to the last two numbers of their I.D. (identity document).

In a second moment, students who responded yes to the first question were separated and it was asked to them what would be the maximum value that they would pay by the chocolate.

Students who had the last two digits of the I.D. number larger than 50 were available to pay on average R\$ 25.00 by chocolate; those students who have submitted the last two digits of the I.D. number less than or equal to 50 were available to pay a maximum value of R\$ 16,00 (see figure 1).

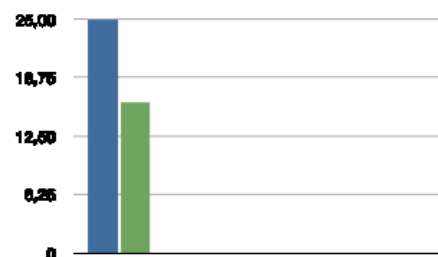


Figure 1 - Average of maximum value paid for the product (Source: Own research).

This result indicates that students were strongly influenced by the value of the last two digits of the I.D. number, confirming the existence of the anchor factor in the determination of the maximum values of payment by the chocolate, i.e. people who formed an anchoring price above fifty were willing to pay more for the chocolate, while people who formed an anchor price less than fifty have shown to be prone to pay less for the chocolate.

8. Conclusions

In this study, an analysis of neuromarketing importance was made. As could be seen, it is nowadays a fundamental branch of neuroeconomics for the understanding of human decisions. For that, some techniques are used to study what happens in the brain of the human being. The aim is to understand the decision-making process of the consumer. In this study, the particular goal of the analysis was to verify the anchoring effect of prices in this decision process.

People can be influenced by apparently irrelevant information in the purchasing process of a product or service.

On the basis of the assumptions of behavioural economics analysis, in particular neuromarketing which seeks the understanding of phenomena relating to consumer behaviour through empiricism derived from specific tests on the subject, it can be concluded that the effect of anchoring in fact exists in the studied situation. This scenario indicates that the rationality of students management courses in the city of Belém - PA is limited in this situation of consumer decision.

As well as in everyday life, certain aspects of economic life can be misunderstood. However, this does not prevent one from saying that the anchoring effect affects the decisions of people in other situations of consumption of goods or services as well. In other words, people are subject to make their decisions based on consumption's information which contents influence them in an unintended or unconscious way. These results contradict the dominant assumption in economic theory, which states that individuals always optimize their results by means of rational decisions at the moment of products' purchase or sale.

These outcomes are intriguing but cause some sense of helplessness in the face of economic decisions about day by day lives, because they really indicate the existence of such kind of effects. The existence of these effects may help economic agents to make their economic decisions. After all, if one now has the conscience of the existence of the behavioural variable and that it has a major impact on the decisions, it is reasonable to assume that economic agents are now more able to make better decisions. These decisions are based on the information designed under this optic, which is the analysis of behavioural economics, in particular, neuromarketing.

The industrial exploitation of neuroscientific research is an important reality and it can be additionally explored in future research. It has also an enormous potential application in healthcare and other domains. These domains may include for example new drugs, diagnostics, medical devices, brain health and training programs, software, etc.

The utilization of expensive equipments may be sometimes a limitation to research. However, if they are available the investigation may go faster. In the neuromarketing area it is important to understand the behavior of agents and, for that, the physical study of the brain may contribute considerably to get important results in this area. A research on this basis is projected using some medical equipments, for the support of the analysis.

The role of economic and social value of neuroscience has been often discussed in terms of technical possibilities. Important advances may be got. In terms of psychological interventions and ethical consequences the relevance of the discussion is also very pertinent. Marketing has now to be redefined. The limits of the utilization of new

techniques and technologies and the limitations of the human being must be considered.

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