

# Neuromarketing: Neuroscience and Psychology Along With Marketing Strategies

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**ABSTRACT:** - *Despite the recent study of the confluence between Marketing and Neuroscience produces comprehensive discussions on limitations and ethical factors. Little has been engaged to consolidate the theoretical structure of the area. This article has the general objective endorse the concept of Neuromarketing. Therefore, it sought as specific objective to expose the concept of Neuromarketing, its origin and its objectives, mapping the concepts, methods and most widely used research tools as well as show the ethical and limiting prospects of the field. Therefore this article makes use of an exploratory research, bringing together elements of qualified marketing literature and information and also the neuroscience literature in order to better understand the evolution of the technological area with the Marketing and Neuroscience study about the progress bond between man and the market. This research concluded that the consumer is always influenced by seasonal marketing niche campaigns, being aware or not of this process.*

**KEYWORDS:-** Neuromarketing. Neuroscience. Marketing. Consumer behavior. Consumption. Behavior.

## INTRODUCTION

Technological advances associated with the development of interdisciplinary studies arrive encouraging and motivating the search for understanding and clarification of the complex features of the human mind. One such possibility is the Neuromarketing, which is the result of the union of Marketing and Psychology and Neuroscience. This area search in the brain's understanding of the human mind, emotions, behaviors and decision-making. Although the Marketing is essentially connected to everything that surrounds the market, it aims to study the needs, seeking to please them fruitful and effective way for organizations to get more loyal customers and profits of its brands. Neuromarketing already arose from the need for more knowledge about the consumer information that these traditional methods and research as a sales monitoring, consumption patterns deductions and traditional market research could not provide.

Lindstrom (2009, page 13) says:

I realized that Neuromarketing an intriguing marriage of marketing with the science, was the window to the human mind we had hoped for so long. The Neuromarketing is the key to open what I call our "logic of consumption" - the thoughts, feelings and subconscious desires that drive purchasing decisions we make every day of our lives. [...] It is more likely that the true reactions and emotions that we, as consumers, we experience is found in the brain, within one nanosecond before thought to be converted into words. So if you want to know the unvarnished truth - the truth bluntly and uncensored, about what makes us buy - our marketing professionals will have to interview our brains.

The Marketing ceases to appeal to the conscious reasoning customer to go straight to your unconscious and due to the development of this knowledge in the academic environment, as in the corporative environment. Lindstrom (2009, page 15), believe that:

The Neuromarketing is not the answer to everything. As a new science, it is limited by our still limited understanding of the human brain. But the good news is that understanding how the unconscious mind drives our behavior is increasing; Today, some of the leading researchers around the world are making major inroads in this fascinating science.

The Neuromarketing makes use of highly modern equipment functional magnetic resonance imaging (MRI), electroencephalogram (EEG), magnetoencephalogram (MEG), positron emission Tomography (PET scan) among others - but that should not be limited in such a restricted way since it can lead not only to advancing knowledge of the relevant area consumption, but also the interaction of factors, behavior and relationships within the market context and organization.

It emphasizes the significance of this article, since the Neuromarketing is a current science of scarce studies. Soon, this exploratory article has the general objective conceptually endorse the Neuromarketing. For this, we sought intended to highlight a broad concept of Neuromarketing, trying not to delimit the search only the definition, but also, their origin and their goals for society, mapping its methods and most widely used techniques, passing also by their and ethical issues limiting. Besides, it has also aimed also foster the development of sapiências from various disciplines to enable new guidelines for the development of science.

For all these surveys, the survey takes place by the set of marketing and neuroscientific literary works, using also secondary site data.

## **THEORETICAL REVISION**

### **What is Neuromarketing?**

The Neuromarketing is a new marketing research approach that has developed in congruence to market characteristics, the wide range, the likeness of products and consumers who are increasingly aware and demanding as the differential treatment. A science that aims to defuse the reactions of the

brain when a person is exposed to certain products, brands and ads.

Conejo, Khoo, Tanakinjal & Yang (2007, page 72), define *Neuromarketing* as: The latest form of study and practice of marketing, the study of brain response to advertisements and all messages and images associated with this through the use of imaging for functional Magnetic Resonance Imaging.

Madan (2010) and Lee et al. (2007, p. 200), define a more comprehensive view of Neuromarketing as:

The application of neuroscientific methods for analysis and understanding of human behavior in the face of market relations and marketing.

Madan (2010, page 34), It has a broader explanation, wherein the Neuromarketing is considered:

An emerging area that connects interdisciplinary studies of psychology and neuroscience to economics. It aims to study how the brain is physiologically affected by advertisements and marketing strategies.

The Neuromarketing is executed by means of advanced investigative technology of behavioral neuroscience. The neuroscientific methods grant, pragmatically and with scientific precision, a new perspective of understanding the implicit incentives of consumer behavior. Through neuro-psycho-physiological indicators such as heart rate, electrical and metabolic activity of the brain, among other important aspects in this segment.

Therefore, the marketing has led the professionals, to instruct in trying to understand through Neuromarketing, the unconscious and emotional side of customers, guiding their unconscious experiences to the degree of awareness, creating for organizations insights, who advise and contribute in creating value for their customers (ZALTMAN, 2003).

### **The origin of Neuromarketing**

The Neuromarketing emerged as a new field of the resulting marketing area of mutual integration of

knowledge of psychology, neuroscience and marketing, using methods, processes and know-how of brain mapping and biometrics, so that in the course of the study this neural activity, scan and decipher human behavior and its links to the market. Despite the development of Neuroscience - a century of wisdom and analysis about how neurons act in a unique way and about the physiology of the cells also act in a singular way - neuroscientists have found that to achieve behavior, the brain needs to bring together groups of neurons, which are allocated in different regions and that are stimulated during certain circumstances to create a result. (NICOLELIS, 2008).

Cavaco (2010, page 21) reports that:

Interest in the behavior is not new; it is clear that currently the investigations are more sophisticated, but in the 1950s, in 1957, more precisely in the book *The Hidden Persuaders*, Vance Packard said: "The use of psychoanalysis directed to the masses to guide persuasion campaigns became the basis of a multi-million dollar industry". However it was from the late 1990s that neuromarketing began to emerge.

The first experiments with the Neuromarketing surged in the 1990s, which were preliminarily performed on secrecy in specialized laboratories hired by large companies like Levis-Strauss, Ford, Coca Cola, Delta Airlines and other (Boricean, 2009). However, it is believed that the precursor of these studies is the scientist, doctor and researcher at Harvard University, Gerald Zaltman (1997), which linked the use of MRI machines to Marketing. Some ensure the concept to David Lewis, the company's creator Mindlab International (Moreira et al., 2011), others claim that the beginning of Neuromarketing was given by scientists in 1970, which gave start using electroencephalography equipment for measuring the feedback of people face to television commercials.

To Cavaco (2010, p. 21): The big "balcony" to the rise of neuromarketing happened from academic

studies of a small group of researchers in the United states, which used magnetic ressinancia devices for Marketing purposes, not for medical studies. Christen this new concept was the scientist Ale Smidts task.

It appears then, that the knowledge of when and who began their studies under is questionable and problematic. However, the term Neuromarketing, was patented by the Nobel Prize in economics in 2002, also a professor of Marketing at Erasmus University - Rotterdam, Netherlands and scientist Ale Smidts.

It was then, that the recent doctrine that aims to understand the variables likely to induce the decision-making process during emerged purchases.

### **Neuromarketing goals for society**

The behavior greatly reduces the decision making. From the social point of view, consumers influence the socio-economic conditions of a country therefore is a determining factor for the level and quality of life of that society.

The Neuromarketing aims to identify the emotional impact of a product, brand or service, understand what are the needs and expectations of customers, predict after the study of the mind consumer behavior in decision making at the time of purchase, ie , go further to the usual conventional market research, where the client only responds to questionnaires, which aims to draw no more than explicit information of the consumer, that is, what it is under your oral area.

Generally, these measurement models applied in these Marketing surveys are completely at the disposal of confidence in the respondents. These inquiries stream information essential to the Marketing Manager, however, they are likely to repeat a partial perspective at the expense of alternatives.

As Lee, Broderick & Chamberlain (2007), the relationship between marketing and neuroscience could result in progress in different fields that are owned not only consumption but also the elements

of relationship, interaction and behavior among the organization's scope and e market.

Lindstrom ( 2009, page 152) assumed the reduction of traditional research in *Marketing* strategies and states that: The traditional market research - questionnaires, surveys, focus groups and so on - gradually play a diminishing role and Neuromarketing will become the main tool that companies use to predict the success or failure of its products.

The failure to ensure full confidence and tactical *Marketing* ploy stands the convenience and interest in research, explore and examine how the brain is physiologically affected by brands, products, advertisements and marketing strategies. Cavaco (2010 page 39) shows that:

They believe that neuroscience can bring new research instruments to provide further insight into the minds of people regarding their motivations, preferences, ambitions, expectations and consumption needs.

The Neuromarketing fully pays conventional research surveys by providing a modern technique whose major goal is to understand in a direct and practical way the implicit subjective reactions in consumer behavior.

The theory of the triune brain that was developed by neuroscientist Paul MacLean (1990), discusses the fact that we have the brain divided into three different functional units, as can be observed in Figure 1 below.



Figure 1: Triune Brain (Three functional units).

Source: Copingskills4kids.net , 2015

The deepest layer is Reptilian brain that controls primitive and instinctive side of human beings, it operates reflexes, survival and reproduction. It is this part that decisions known for Brain Mammal or limbic system, which is responsible for emotions, is it that people recognize the emotions they feel and convey the reptilian brain as a good or bad feeling, preparing for a future decision. The outermost layer is the Neocortex which operates the reasoning that drives the cognitive activities, such as memory. What Neuromarketing is trying to figure out how to communicate with the innermost layer of the brain, the reptilian.

## NEUROMARKETING: RESEARCH METHODS AND TOOLS

### Methods and Techniques.

Some progressive numbers of organizations with excellence in the implementation of brain mapping appear globally and its goal market research, for example: NeuroFocus, Mind Sign, BrightHouse (all US), Neurosense and Neuroco (England) and Brazilian incubator linked to UFRJ and first in the country to work with the Neuromarketing the forebrain.

The Neuroscience until recently was area and interest of the functional and anatomical medicine and the field of psychiatry. But at the end of the 20th century are other Neuroscience fields of study applied in decision-making and consumption habits (Moreno, 2003). Over the years, the development of new devices, non-invasive equipment and techniques allowed the application of different methods of brain imaging. As a result, scientists are learning more and more about the links between brain anatomy and behavior (Almeida, 2014).

The table below (Table 1) sets out how these methods of brain scanning "open a crack" for the performance of the brain. The most significant procedures are the electroencephalogram (EEG), a scan of positronic emission (PET scan), functional magnetic resonance imaging (fMRI), the Magnetoencephalography (MEG), transcranial magnetic stimulation (TMS) and the galvanic

response method Skin (GSR). Table 1 shows the response obtained in the scientific study conducted as follows:

TECHNICAL	DEFINITION
<b><u>Electroencephalogram (EEG)</u></b>	Analyses spontaneous brain electrical activity, captured by using electrodes placed on the scalp with the aid of a conductive paste which, besides fixing them, allows proper acquisition of electrical signals that represent the cerebral electrical activity. The devices are portable, allowing spot searches, but the apparatus only records data superficial layers of the cortex.
<b><u>Positron Emission Tomography (PET)</u></b>	An imaging examination has the ability to show bright colors in regions of the brain where nerve cells are working for some mental task. Therefore, it is injected into the patient a radioactive liquid (harmless).
<b><u>Functional Magnetic Resonance Imaging (fMRI)</u></b>	A specific technique using the detailed three-dimensional image generated by computer and capable of detecting variations in blood flow in response to neural activity. It has good spatial resolution, although the temporal resolution is low.
<b><u>Magnetoencephalography (MEG)</u></b>	A mapping of human brain activity technique that makes use of highly sensitive magnetometer by the magnetic field produced by detecting electric currents that exist naturally in the brain. Allowing the identification of more and less active brain areas. This technique has the advantage of taking measurements at lightning-fast speeds of 1/1000 of a second, about the speed at which the brain works.
<b><u>Transcranial Magnetic Stimulation (TMS)</u></b>	It is a new technique capable of stimulating the brain with some advantages over the existing ones. Neurostimulation is superficial, focal, painless, non-invasive and simple to apply. It exposes a tiny area of the brain to a powerful magnetic field momentarily interrupting its electrical activity.
<b><u>Skin Galvanica response (GSR)</u></b>	It allows to detect these strong emotions by a two electrodes in contact with the fingers, by measuring the electrical activity of the glands that produce sweat on the palms and fingertips, more sensitive to emotions and thoughts. It's used to help identify situations that cause stress and anxiety.

Table 1: Definition of the functioning of the main techniques used in brain scanning.

Source: internal study in 2015.

Below are some images relating to the methods used.

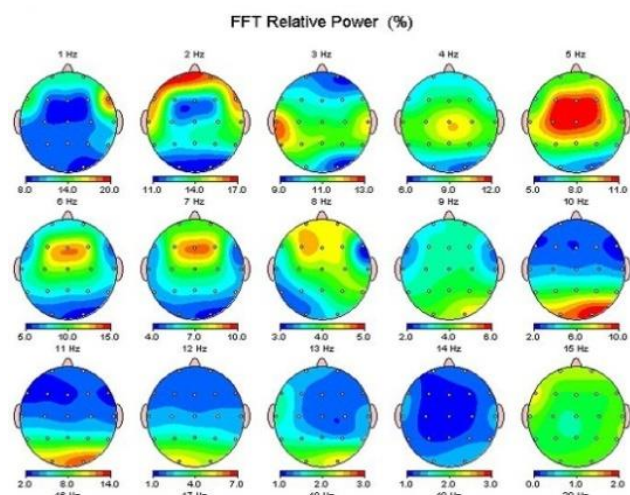


Figure 2: Analyze topographic data obtained by the High-Resolution electroencephalogram (EEG)

Source:

<http://mktcognitivo.com/2015/03/14/consultoria-em-neuromarketing-mktcognitivo-e-neurocog-brasil/>, 2015

Figure 2 shows the result obtained high-resolution EEG from a successful purchase process performed by the external client, here called the survey respondent.

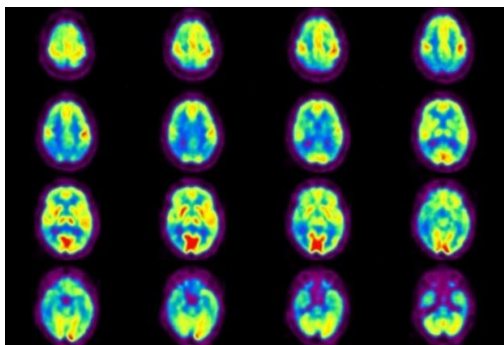


Figure 3: displayed image of the sample of data Tomography Positron Emission (PET)

Source:

<http://www.famerp.br/projis/grp16/diagnostico.htm>

Figure 3 shows the sample data obtained by tomography through positron emission from a successful procurement process conducted by the external client, here named respondent of the survey.

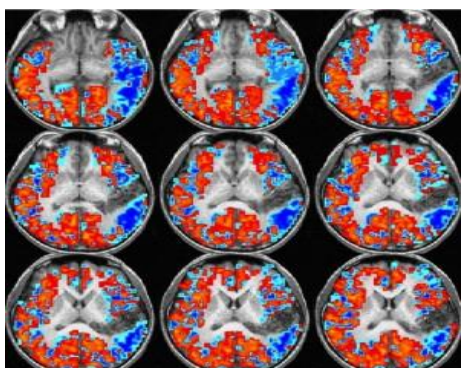


Figure 4: Display of data while using MRI

Source:<http://www.trueimpact.ca/being-bold-understanding-functional-magnetic-resonance-imaging-fmri/> , 2015

Figure 4 demonstrates the stimulated areas in the brain from MRI image from a successful purchase process performed by the external client, here called the survey respondent.

Nonetheless the techniques mentioned in the table above are the most applied today, but other methods are also exercised by scientists in their neuromarketing research. This diversity of established techniques, it is feasible to be used for more affordable methods such as GSR or EEG, when you have no access to popular devices, but more expensive as the MRI, MEG or PET scans. Thus allowing the adaptability of research with permeate technological progress.

Table 2 shows the characteristics of each one of the predominant brain imaging techniques, as well as their best use for the established purpose of the study.

Technique	Initials	Physical Measurement	Measurement Application	Temporal Resolution	Spatial Resolution
Imaging functional magnetic resonance	fMRI	Brain oxygenation level	Metabolic activity	Seconds	1-5 mm
Positron Emission Tomography	PET	2-Radioactive Desoxiglucosa Radiopharmaceuticals	-Metabolic Activity -Cerebral blood flow	Seconds	3-5 mm
Magnetoencephalography	MEG	Magnetic Fields	Neural Activity	Milliseconds	Centimeters
Galvanic Skin Response	GSR	Electrical Resistance	“Excitement”	Fractions of seconds	Not applicable
Electroencephalogram	EEG	Electrical Waves	Cortical Activity	Milliseconds	Centimeters

Table 2: General characteristics of the predominant brain imaging techniques applied in Neuromarketing.

Source: Adapted from CONVIBRA ADMINISTRATION (PERRACHIONE; PERRACHIONE, 2008 PÁG.307)

This Table 2 shows the interaction between *Neuromarketing* constructs available today.

It then becomes impossible to discuss the development of neuromarketing without articulate on these same mechanisms operating in different ways are able to detect brain areas that are active at certain stimulations.

### **Ethical issues in the *Neuromarketing* field of study**

As a new area, Neuromarketing generated inquiries and ethical discussions, legal and social, which may cause obstacles for its progress and performance, as independent of the advantages and gains that can lead to the understanding of consumer behavior, not is consensus among the whole society.

Some of the issues that span the Neuroethics concern the implementation of Neurotechnology for individuals and for society (FARAH, 2005, 2010) one is that the technology of brain imaging and neuroscience equipment must be used only to human health, or is, for studies, discoveries, investigations and examinations that benefit the evolution of this field, and not to understand the behavior of consumers and not assist or serve as an advantage for organizations (CAMARGO, 2009, p. 87).

Part of the population is concerned it is feasible that organizations, in order to increase their volume of sales, develop products that encourage irresistible desires and influencing awareness and consumer buying behavior (LINDSTROM, 2009, p. 13).

But the biggest and most discussed issue of neuroimaging and consequently the Neuromarketing are the issues of violation of privacy and free choice, given that too many marketers are increasingly looking for effective

tricks to influence the power of choice and decision withoutIt is prompted for user approval (Wilson, 2008). Thus, Zenone (2011) means that the risk is from:

Companies begin to investigate our brains, mapping the neural activities leading to the process of choosing a brand, a product or a service. In this way, organizations have the knowledge to develop marketing actions that have focused on trigger neural activity to modify our behavior and serve their own goals.

On the other hand the Endomarketing may contain the waste of unwanted develop new products, which is seen as a gain for the sake of the environment. The Neuromarketing progress can also be used to help in the battle to excessive buying behavior, making it impossible for abusive advertising campaigns are widespread. (PINHÃO, 2011) In this case, scholars like Lindstrom (2009, page14) argues that the scoring Neuromarketing:

I hope that the vast majority of people will handle this instrument for good: to better understand ourselves - our desires, impulses and motivations - and use that knowledge to beneficial and practical purposes ... It is in the interest of advertisers provide products for which the Fall in Love? Things involving emotionally and improve our lives? Seen in this light, the brain tracking, used ethically, ultimately benefiting all of us. Imagine more products that generate more money and, at the same time satisfy consumers. That's a good combination.

The techniques and methods of Neuromarketing have good intentions and goals only will depend organizations to establish good practice Neuromarketing, just as the authorized and competent authorities can crack down on extravagance and unethical executions in market.

### **LIMITATIONS ON THE USAGE OF METHODS**

Regardless of the scientific advancement of Neuroscience and Neuromarketing like any other new field of study, until the moment it has several prisms to be its development in order to settle. And not only the development of technical and scientific knowledge it needs more time to a more solid development, but also the ethical and professional aspects need further evaluation and discussion (KULPAS, 2008).

However it is imperative prudence as their application in this type of research, Medina (2008) states that the fascination with detailed brain activity, it takes place with due consideration in connection to the results, due to which even scientists researchers They know little use that science to the impasses of the real world.

Cavaco (. 2010, page 34) states that:

It is much more than simply necessary to know which areas of the brain are stimulated so you can produce a atratente stimulating consumption. Several aspects are related to the preferences of each person, such as results of previous experiments, meaning that each has compared their experiences, in addition to cultural and religious factors, among others ...

It can be cited as another restraint financial problems of Neuromarketing as Lindstrom (2014, p.20) even following reports in:

The study consumed, from start to finish, almost three years of my life, and cost approximately \$ 7

million, included several experiments and involved thousands of people coming from around the world to serve as an object of study as well as 200 researchers, 10 university professors and doctors, and an ethics commission.

Unlike other behavioral research, forms of brain imaging, except the EGG, have high cost, with projects coming to cost about US \$ 150,000.00 (dollars) (Grose, 2006). In addition to the very high cost, the organizations that make use of such devices require a well-developed condition to stop the equipment, otherwise, should also have a team of radiologists and physicists, to stay for the maintenance and supervision of research. (Perrachione, 2008).

Lindstrom (2014) further states that the progress of Neuromarketing, will generate an increased demand for scientific and market research, causing it to become cheaper and accessible to other companies, which had allowed the evolution of equipment.

In the field research, a survey was conducted on the website Survey Monkey, containing eleven open and closed questions, strictly oriented will analyze the percent of knowledge and ninety-nine respondents from different socioeconomic profiles on Neuromarketing, in order to determine a probable consent the use of techniques and methods by the respondents, as explained in Figure 5-15 below.

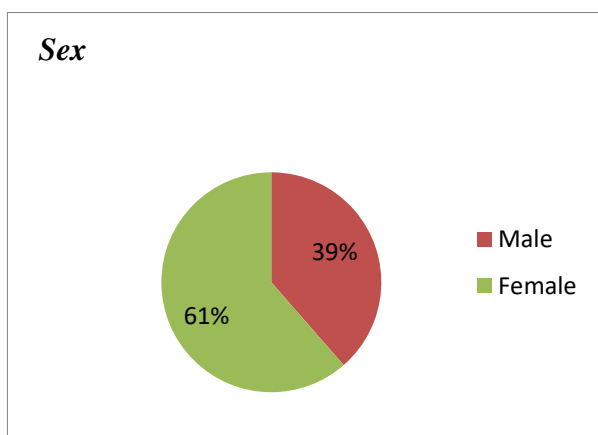


Figure 5 | SOURCE: prepared by author, 2015

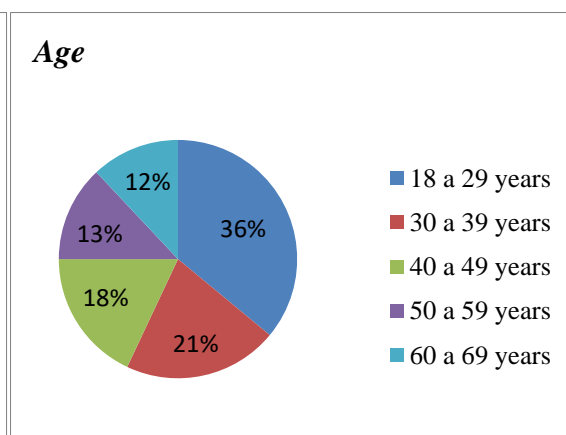


Figure 6 | SOURCE: prepared by author, 2015

Were targets of research men and women 18 to 69 years being the most common female respondents and 62% have 18-29 years 36% of calculated answers.

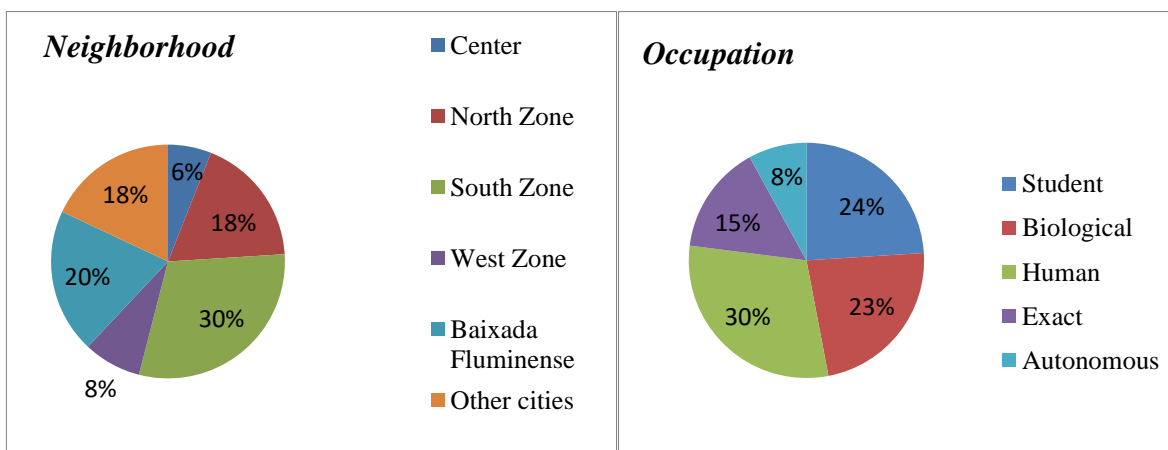


Figure 7 | SOURCE: prepared by author, 2015

Figure 8 | SOURCE: prepared by author, 2015

The most frequent respondents are entered in the range 1-3 times the minimum wage to 37% accurate and 57% are considered possible buyers.

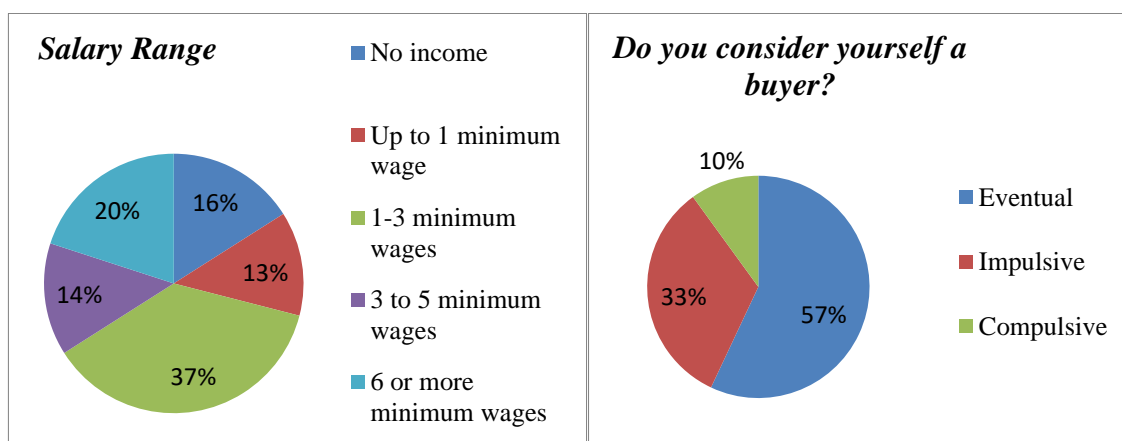


Figure 9 | SOURCE: prepared by author, 2015

Figure 10 | SOURCE: prepared by author, 2015

The most frequent respondents are entered in the range 1-3 times the minimum wage to 37% accurate and 57% are considered possible buyers.

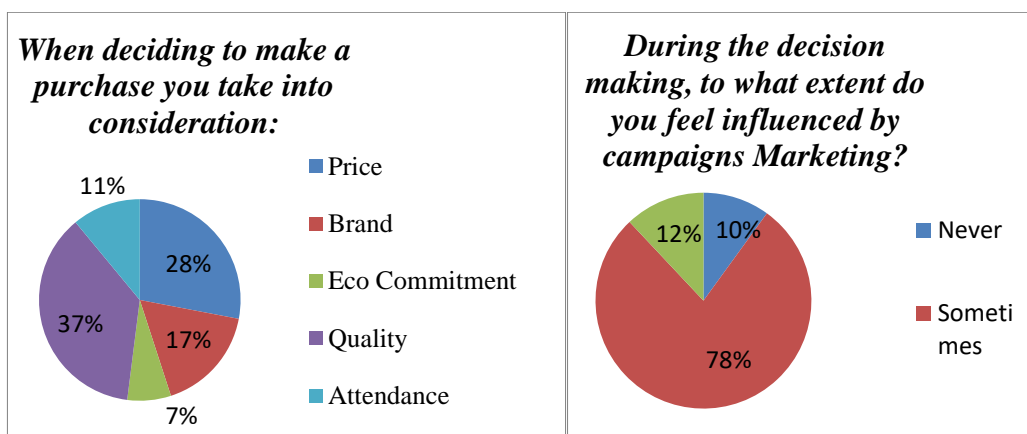


Figure 11 | Source: Prepared by author, 2015

Figure 12 | SOURCE: prepared by author, 2015

Respondents choose in the decision making process of acquiring the quality of the product in 37% accurate. And 78% feel sometimes influenced by the campaigns of Marketing.

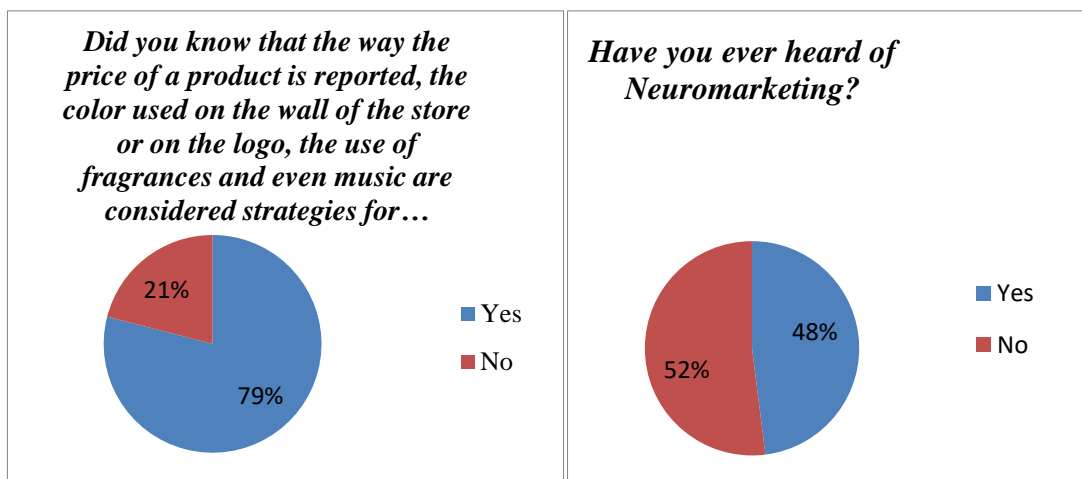


Figure 13 | SOURCE: prepared by author,, 2015

Figure 14 | SOURCE: prepared by author,

Respondents are aware of the process of cognitive influences during the buying decision in 79%. And 52% said they are unaware of the processes used by Neuromarketing.

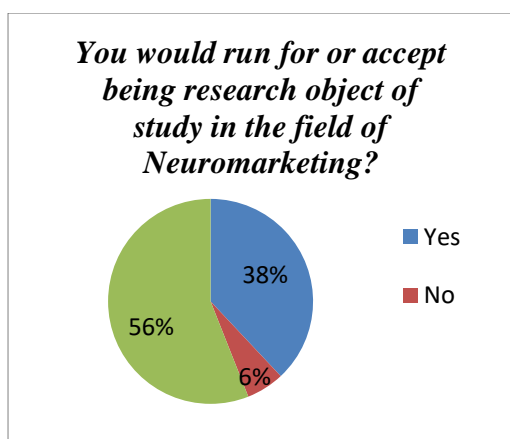


Figure 15 | SOURCE: prepared by author, 2015

The most interested respondents to participate to be targets of Neuromarketing research were a total of 56%.

From the critical analysis of the questionnaire, it is concluded to be an area a new, revolutionary both Neuromarketing is still not widely understood by the respondents and despite being a new aggregator course in the world, should be used ethically and insight by marketers. However, regardless of still being a little known area the majority of respondents were in doubt as to consent to the use of techniques and methods in them.

### FINAL CONSIDERATIONS

Despite the current theoretical and practical evolution of Endomarketing, different stages of this science are so far susceptible to a more intense and profound debate. The article explained in a comprehensive way the most relevant points of this issue, starting with the concept of Neuromarketing transcribed as: a new field of the resulting marketing area of mutual integration of knowledge

of psychology, neuroscience and marketing, using methods, processes and know-how of brain mapping and biometrics, so that during the study of this neural activity, scan and decipher human behavior and its links to the market, since the understanding of Neuromarketing surrounds the booming duty of organizations to anticipate expectations of its consumers, even those at the level of unconsciousness, these levels never before studied.

It also raised the particularities of the origin of Neuromarketing, verifying that its threshold is a problematic and questionable both, not knowing for sure who or when it started. But the substantial purpose of this new area of science is to complement traditional analyzes of research by releasing a current technique whose goal is to understand so hegemonic practices implicit biased behavior on the consumer.

In addition, questions deepened over the neuroscientific technologies more given this new Marketing field, among them: the electroencephalogram (EEG), the Magnetoencefalograma (MEG), a Positron Emission (PET) and Magnetic Resonance for Imaging Functional imaging (MRI).

But regardless of all the trials that the union of neuroscience with the Marketing brought to the market, one can explore the views of those who believe that the Neuromarketing is a broad development for the full understanding of the needs, wants and people's consumer motivations.

Thus, it is understood the indispensability of greater caution both in the execution of research and reading and reporting of results, which integrates the consistent interpretation regarding their limiting elements, for example. The performance and application of new knowledge to be drawn, however for ethics in the existing conference expectations and needs of consumers, expressed orally or not, granting the consumer market is able to suggest and refer actions of organizations, not vice versa.

The survey found that the interviewees are very susceptible to the mechanisms and strategies used in seasonal campaigns Marketing and what areas of your brain are activated during the purchase process are identical to those represented in happy moments of their existence, such as a kiss , marriage, birth and christening of a child, among other cleared and proven by scientists studying the human mind.

Future studies, not just imaging should be performed to prove the biggest influences on shares human responses present exposure seasonal merchandising and marketing campaigns for purposes of safe responses of individuals exposed to these constructs. It concludes that without fail the future of marketing is linked to the Neuromarketing.

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