

Contributions of Neuromarketing to Design

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Abstract: The reported study aims to assign different perspectives for reflection; to consider how neuromarketing can assist in understanding consumer behavior, intending to investigate the best way to develop products and improve communication through neuroscience. The systematic literature review referred here applies as a scientific method of research and analysis in a specific area of science. Following the PRISMA guidelines (2009), the research was carried out in March and April 2020, in seven electronic databases for the inclusion of quantitative, qualitative, or mixed studies published in Portuguese or English, master's or doctoral theses and research reports that focused in neuromarketing. One hundred and fifty studies were conducted, 20 of which, met the inclusion criteria. 1st filter: title, abstract, keywords and references; 2nd filter: introduction and conclusion of studies; 3rd filter: full reading of the studies (Liberati et al., 2009).

1 INTRODUCTION

Paying attention to something is a conscious process, but for that to happen, an activation must occur in our brain causing us to be able to pay attention to a particular stimulus. Since this process requires a great deal of cognitive effort, our ability to maintain attention is limited and, therefore, focusing on something is one of the most difficult tasks for our brain. In the middle of so many stimulus in which we are daily exposed, catching the attention of the consumer and maintaining it, is an arduous mission (Dias, 2014; Kandel et al., 1997).


Facing constant changes, in 1999, Kevin Ashton gave name to the term “Internet of Things” (Internet of Things -IoT). The author's use of this term refers to a high integration and connectivity between objects / devices in an intelligent way (Ashton, 2009). It is undeniable that facing a globalized world, the speed / exchange of information occurs in a meteoric way and reflects in the way individuals relate and also in the way they consume (Lipovetsky & Richard, 2008).


With the market becoming increasingly fierce, it is difficult to establish competitive advantages. This


is because most of the companies continue to follow the same methods as for delivering their value proposition; consequently, to use the same practices and reap the usual results (Crescitelli, 2004). The need to get closer to the consumer, become even more relevant to understand him and, thus, devise more assertive strategies. Empathy, putting yourself in the other's place; living the other's "pain"; comes to make even more sense for generating ideas / insights (Brown, 2013; Norman, 2004).

2 CONSUMER BEHAVIOR AND DESIGN

Jordan defends the user experience using a model based on Maslow's hierarchy of needs, placing as main characteristics, the pleasure, functionalities, and usability. The author proposes a holistic approach to products based on human fatigue by two pleasures. So, understanding the human being as a whole indivisible that can not be explained separately by different physical and psychological components (Gawel, 1996; Jordan, 2002).

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In addition to corresponding to the desired experience, a product only makes sense if it establishes an affective connection with the consumer (Brown, 2013; Jorge & da Costa, 2019). After all, what is relevant for the consumer when choosing a particular product or service? Are the differentials that the company invests really important for its consumer? Can the company deliver / communicate its value proposition? Both positive and negative emotions can help to draw consumers' attention to a particular product. The fact is that for a long time, companies have focused their efforts on large-scale production, neglecting to establish a closer relationship with the consumer through emotional connection (Desmet, 2002; Norman, 2004).

For Jordan (2002), pleasure is divided into four types: physical, social, psychological and, ideological. The physical is derived from the relationship of the artifact with the sensorial organs, for example, the texture. The social pleasures are interactions between several people, provided by the artifact. The psychological partners are associated with emotional and cognitive reactions concerning the artifact. Jordan refers to the pleasure of the mind in carrying out tasks related to usability and compatibility of two products friendly considered. The performance of the product must be satisfying so that the benefits are positive (Jordan, 2002; Norman, 2004).

The ideological pleasures are associated with the aesthetic and ethical values of a certain culture, generation, or individual. You will find here the eco-sustainable values of social, political, and moral responsibility. Consuming ecologically correct artifacts demonstrates a moral concern with the world and can be traced to the user. These elastic values can be influenced by idioms and the cultural industry (Jordan, 2002).

3 MARKETING

The principle of the marketing is to meet the needs of consumers and for that, it has as a premise, the search for understanding the consumer behavior (Schewe & Smith, 1982). This requires that marketing professionals have solid knowledge in different areas, such as: Administration, Economics, Psychology, Neuroscience and Communication. The interdisciplinary of profiles and competencies are seen as complementary to critical thinking, resulting in the development of more effective strategies (Kotler & Keller, 2006).

The marketing recognized the added value of being as close to customers as possible in the early

1950s in the USA (Schewe & Smith, 1982). Hence, it was also noted the need to promote adjustments in products / services and approaches - the way it communicates with customers. From there, the principle of diversification and personalization was enhanced. That is, products that until then were produced like commodities gained new forms, versions and even purposes / purposes. For such transformations to be possible, it was necessary to reassess several practices, such as: planning, pricing, promoting and distributing goods and services (Stanton et al., 2004). Intuition and subjectivity can no longer drive a company's strategy. In many segments, profits become increasingly divided, potentially reducing the chances of errors (Kotler & Keller, 2006).

4 TRINO BRAIN - THE SEARCH OF THE BEHAVIOR SOURCE

The triune brain theory was developed in a post-World War II period, between the 60s and 70s. Created by the American doctor and neuroscientist Paul MacLean, the theory is based on the study of the evolution of species; to which the author attributes three functional changes that occurred in the constitution of the human brain (MacLean, 1990).

- 1 Reptilian or primitive - corresponds to the oldest and most original part of the brain of the first animals, reptiles. Responsible for instincts and vital functions, such as feeding, reproduction, and breathing.
- 2 Limbic, paleo mammal, or emotional system - tasked with managing and administering emotions/feelings and pleasures.
- 3 Neocortex, neomamiferous, or rational - responsible for logical reasoning, reason. Understood by the author, as the most modern part of the evolutionary brain.

According to Paul MacLean (1990), these three layers are seen as independent and capable of generating internal conflicts. The fact is that the theory is fragile because it does not constitute a validation of scientific methods, since, through technological advances linked to the studies of neuroscience and evolutionary biology, results have been obtained that deconstruct the theory in question. As an example, it is not possible to relate human evolution from reptiles (Damásio 2012; MacLean 1990; Tieppo, 2019).

5 SOCIAL COGNITIVE NEUROSCIENCE

It is impressive how an organ weighing approximately one kilogram and three hundred grams still holds incalculable hidden values. The study through neuroscience aims at a greater understanding of brain activity by mapping billions of neurons that reflect in the behavior of individuals; those who suffer from influences from the internal and external environment, as well as from other cultures - experiences from the past and which are still closely linked (Kandel et al., 1997).

Generally speaking, all human beings believe that they are unique and that they need to be seen as such. The fact is that the search for mapping and understanding such patterns becomes a complex task in view of the constant transformations/stimuli presented in daily life (Poon & Prendergast, 2006). In view of the referred context, some recent studies until now under the domain of neuroscience have contributed to the achievement of notable interventions in neuromarketing; concerning, they are the works of: (Barrett et al., 2016; Eysenck & Brysbaert, 2018; Kolb & Whishaw, 2015).

Still, for some scientists, researchers, and authors, even in the face of undeniable technological and scientific developments, the human being preserves a prehistoric brain/behavior. Much of this is attributed to the behavioral biology of individuals; which results in many brain stimuli, such as the impact of hormonal issues. One of the reasons why experiments with animals are justified is that many of them not only have an incredible genetic similarity but also exhibit behaviors similar to those of humans (Camargo, 2013).

6 NEUROMARKETING

Neuromarketing is understood as the use of neuroscience experiments with marketing. The purpose is to obtain new ideas for the development of products that can be better adapted to the needs and desires of consumers. Unlike marketing that traditionally seeks and extracts information through conventional research; focus groups, ethnography, and others, neuromarketing works in search of understanding the subconscious, mapping brain stimuli (Plassmann et al., 2015; Schwarzkopf, 2015; Yoon et al., 2012).

In common, all human beings have the same brain structure and from there, marketing understood the importance of using experiments from neuroscience

as a strong ally in the search for a greater understanding of consumer behavior. The conception of the neuromarketing concept was attributed to Jerry Zaltman in the late nineties (Wilson et al., 2008). Until then, "quantifying emotions" and understanding neurological stimuli was something that was even more subjective.

The Neuromarketing has been widely used to develop more attractive products that have a value more suited to the needs and desires of consumers. From a different perspective, neuromarketing plays a somewhat controversial role. One of the valuable findings of neuroscience is that almost all decisions are made unconsciously. Through the knowledge obtained from neural analyzes, it is possible to foresee decisions that until then were pre-conscious and / or unconscious (Balmer, 2014). Therefore, consumers can be more easily influenced by consumption that is not necessarily conscious (Dias, 2012). Persuasion is a term that attributes an interaction where the two parties sign a mutually satisfactory agreement (Garver, 1994). Manipulation, on the other hand, is about convincing someone to do something instead of influencing them because of something that is relevant to both parties (Roiz, 1996).

7 METHODOLOGIES APPLIED TO NEUROMARKETING

One of the substantial aspects that contributed to the credibility of neuromarketing, were the advances coming from neuroscience, mainly through neuroimaging techniques. (Baker et al., 2017). According to one of the main neuromarketing research institutes in Latin America, Fore Brain, some of the methodologies adopted for analysis are (Fore Brain, 2020):

- Electroencephalography - The EEG technique allows you to extract implicit measures of attention, motivation, and memorization;
- Eye Tracking - The technique allows you to calculate the salience, visualization and engagement indices for each evaluated element or region;
- Pupilometry - It allows analyzing the variation of the consumer's pupil diameter, which represents an implicit measure of the emotional intensity value;
- Electrocardiography – It allows you to analyze the variation of the consumer's heart rate, that is, to detect changes in the speed at which the heart is working.

- Reaction Time - The reaction time techniques reveal the degree of association between the chosen attributes and the evaluated stimuli;
- Salivation - The appetite appeal, in turn, can be related to the level of pleasantness generated by the stimulus;
- Facial Electromyography - The results show an implicit measure of emotional valence;
- Sweating - This methodology represents an implicit measure of the value of emotional intensity;
- Behavioral Economics - Different behavioral economics games provide purchase intention indices for each evaluated element.

Fore Brain (2020), understands that through the referred neuromarketing methodologies, it is possible to conceive innovative and personalized solutions, namely in the areas of: product development, marketing and communication, merchandising and media (Fore Brain, 2020).

8 METHOD

The systematic literature review corresponds to a method of scientific investigation containing retrospective and/or experimental observational studies of recovery and critical analysis of the literature (Mendes et al., 2008). Therefore, it was identified as being the most adequate to meet the study objectives in question. The research has the purpose of constituting a synthesis resulting from the most relevant studies on the field of neuroscience, marketing, and design. The purpose is to structure the collection of data, so that it is possible to group them, interpret them, with similarities or not, to contribute to a reflection with more possibilities.

The systematic review of the referred literature corresponds essentially to three initial phases:

- 1 Selection of keywords - a previous floating reading was established, to assist in the identification of key terms. The combinations used were: “neuromarketing and neuroscience”, “neuromarketing and neuroscience”, “neuromarketing”; “neuroscience”; “neuroscience” and “design”.
- 2 Research and selection in scientific databases that allow access to studies in full in the areas of Psychology, Neuroscience, and Administration. APA PsycNet, b-on, CAPES, ELSEVIER Scopus, Pepsic, Scielo, and Web of Science.

- 3 Article selection criteria - i) refer to marketing and science (or neuromarketing) in a context that contemplates consumer behavior; ii) approaching design from an experience perspective; iii) works in Portuguese or English. It was also decided not to restrict the research as to time, in order to consider the relevance of each author in their respective area of expertise.

One hundred and fifty articles resulted from the research, of which, 20 corresponded to the pre-established inclusion criteria (1st filter: title, summary, keywords, and references; 2nd filter: introduction and conclusion of studies; 3rd filter: full reading of studies). As for the management of the theoretical framework, the tool used in order to organize citations and sources was Zotero.

To highlight the authors who most referred to the terms Neuroscience (NS), Marketing (MK) and Consumer behaviour (Design), the table 1 presenting, in descending order, the authors who most dealt with the concepts incorporated in the present study was elaborated, with the following points: yes (1), no (0) and partial (0.5). Those with at least 1.5 points were submitted.

Table 1: Most relevant authors.

Authors	NS	MK	Cb
Dias, A. (2012)	1	1	1
Fore Brain (2020)	1	1	1
Schwarzkopf, S. (2015)	1	1	1
Balmer, A. (2014)	1	1	0,5
Barrett, Lewis, & Haviland-Jones, (2016)	1	1	0,5
Dias, S. W. (2014)	0,5	1	1
Camargo (2009 and 2013)	1	0,5	0,5
Eysenck & Brysbaert, M. (2018)	1	0,5	0,5
Jorge & da Costa, (2019)	0	1	1
Kolb, B., & Whishaw, I. (2015)	1	0,5	0,5
Kotler, P., & Keller, K. (2006)	0	1	1
Plassmann, Venkatraman, Huettel & Yoon, (2015)	1	0,5	0,5
Schewe C. & Smith, R. (1982)	0	1	1
Stanton, Etzel, Walker, Báez & Martínez, (2004)	0	1	1
Baker, D., Ware, J., Schweitzer, N., & Risko, E. (2017)	1	0	0,5
Damásio, A. (2012)	1	0	0,5
Kandel, Schwartz, & Jessell (1997)	1	0	0,5
MacLean, P. D. (1990)	1	0	0,5
Poon & Prendergast, (2006)	1	0	0,5
Tieppo, C. (2019)	1	0	0,5

9 CONCLUSIONS

The object of study referred here addressed a brief contextualization and reflection from different perspectives that often prove to be complementary, and that in common, aim to obtain a better understanding of the behavior of individuals through neuroscience studies/techniques with marketing. The importance of establishing an emotional connection with consumers through design was also mentioned; this factor is important to build better experiences and smoothies the “essentially commercial character” in the transactions.

Although neuroscience is still a relatively new field, through the aforementioned literature review, it was possible to notice significant transformations, mainly due to the foundations resulting from technological advances. Its contribution in the search for a better understanding of the subconscious has resulted in more and more assertive experiments that sometimes are complementary and even deconstruct what was previously believed. The historical context, merges with the future perspectives, in order to preserve such complexity when exploring the human brain.

Meeting the 17 sustainable development goals established by the United Nations Organization (UNO), the work also aspires to make a significant contribution to society, especially by addressing a brief reflection in favor of conscious consumption (Habitat, 2017). The fact is that it is useless to attract the consumer's attention, appeal to their emotions and convey the message if the value that is perceived in the product is not adequate to the consumer's desires and other personal issues.

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