

10. Revolutionising marketing research? A critical view on the promising neuromarketing

Sándor Huszár – Katalin Pap

The aim of this paper is to provide a brief overview about benefits and disadvantages of possible application of neuromarketing research methods, in which we show that what kind of barriers should neuromarketing overcome to be more acceptable in the marketing area. The paper is considered critically examining neuroscientific methods relating to consumer behavior. Along with some authors, we also argue for that neuromarketing cannot revolutionise researches focusing on consumer behavior, however it can help in the reinterpretation of existing theories. As a consequence, consumer behavior researches can rise to a multidisciplinary level in the future, in which marketing-oriented research groups will be supplemented with representatives of life sciences.

Keywords: neuromarketing, research method, consumer behavior

1. Introduction

Over the past decade significant development in cortical neuro sciences has undergone. In the field of psychology and life sciences researchers began to apply new empirical findings, which has achieved great results in the understanding of the relationship between neural activity and perception. Despite of the widespread adoption of neuroscientific results, economists and marketers discovered the benefits and possible application areas of neuroimaging procedures with delay (Lee et al. 2007). The new discipline called „neuromarketing” has attracted a huge attention of marketing experts who strongly believe that the new methods will revolutionise marketing researches and yield more reliable and valid research results.

Although, neuromarketing research requires a cooperation among representatives of various disciplines (like marketing, psychology and life sciences, etc.), our study aims to discuss the relevant topics from the marketing perspective and take attempt to demonstrate the disadvantages that might be not obvious for marketing experts. We hope that this summary will help marketers for better understanding the scope and possible application areas of neuromarketing researches, while our intent is not to undermine the benefits of applying neuroimaging devices in marketing researches but to emphasise its constraints that should be taken into consideration.

The paper is structured as follows: firstly, we give a brief overview about the scope of neuromarketing and main challenges. Secondly, we highlight some concerns that are relating to the application of medical devices into marketing research. Finally, we summarize the main benefits and disadvantages of neuromarketing.

2. From neuroscience to neuromarketing

There are three large groups relating to our topic: the neurosciences, neuroeconomics and neuromarketing. According to Plassmann et al (2012), neurosciences examine the nervous system, which aims to learn about biological basis of human behavior. According to some views, the neuroeconomics is not a separate discipline, because neuroeconomics use the tools of neurosciences to understand the brain processes due to the economic processes, therefore it is part of neurosciences (Rustichini 2005). For determining the role of neuromarketing we should overview briefly the traditional marketing.

In traditional marketing consumers are usually asked about their needs, so the products / service or sales strategies are established based on the responses collected from potential consumers (Lee et al. 2007). But today's consumers often are not aware of their needs and cannot describe them properly, thus companies tend to create needs that are not exist and align their products and services to their target group in order to attract their attention. Neuromarketing can contribute to better understand these unconscious needs of consumers. Since the consumers are unable to determine or express their need accurately, new techniques (like neuromarketing) should be used for the investigation of physiological changes (Ariely – Berns 2010).

Neuromarketing assumes that individuals' (buying) decision-making, not as much conscious as we supposed (consumers' decisions depend in 80% on unconscious behavior), so the model of "homo economicus" seems already outdated. This is the reason, why neuromarketing is often called the science of human decision-making. According to a narrower interpretation, neuromarketing is a market research tool which uses medical devices, while according to a strict interpretation, it is the integration of the brain researches results in the theory and practice of economics. For the first impression, it might seems strange the combination of these two scientific disciplines: neurology and marketing. But if we take a closer inspection, neuromarketing is a very exciting area where medicine meets with the art of marketing in order to investigate ongoing subconscious processes of human brain (Roth 2013).

In sum, neuromarketing is nothing else than the subdiscipline of the neuroeconomics and neurosciences, which track changes in the brain’s neural activity to investigate the impact of marketing activities (Huber 2010).

Despite of the widespread positive acceptance of neuromarketing, there are challenges that should be overcome for implementation of neuromarketing into the marketing science. Hubert (2010) investigated the challenges and opportunities of applying neuromarketing into consumer researches and management sciences. These challenges have been summarized into 10 theses (Table 1). In our investigation we go further and evaluate these theses according to their role in the acceptance of neuromarketing, thus, we distinguish task-, contribution- and challenge-related theses.

Table 1 Ten theses discussing the status quo, the further development and essential challenges of neuromarketing

	Theses	Evaluation by the authors
Thesis 1	A central challenge for neuroeconomics and consumer neuroscience is to further expand and validate the obtained results.	Task
Thesis 2	Within the next few years, neuroeconomic research will realign. In recent years, mainly inductive studies were conducted (“context of discovery”), but there will be more deductive experimental setups in future.	Task
Thesis 3	The essential challenge of neuroeconomics and consumer neuroscience will be to verify the empiric matter of existing theories, to reject, to modify, and/or to further develop them (“theory testing”).	Challenge
Thesis 4	Findings of neuroeconomics and consumer neuroscience show that boundaries between psychological (e.g., price information) and physiological categories (e.g., product qualities) are arbitrary.	Contribution
Thesis 5	In the classical literature, the concept of emotion was often used in a ‘fuzzy’ and primarily psychological way. In neuroeconomics and consumer neuroscience, emotions have gained importance and have become an essential focus of research. Future economic research will adopt some findings of neuroeconomics and consumer neuroscience and integrate emotions into theories in order to explain economic behavior.	Contribution
Thesis 6	The conceptual revision posits that the physiological measuring methods will become (more) important in economic research. Consequently, the research will probably become (more) interdisciplinary and specific.	Challenge
Thesis 7	A primary challenge of neuroeconomics and consumer neuroscience will be to guide the translation of the obtained findings through companies (or media) into corporate practice. It will be important to avoid disappointments that could result from (over-)simplification.	Challenge
Thesis 8	The future acceptance of neuroeconomics and consumer neuroscience within the scientific community will mainly depend on the success of the (new) neurophysiological description of classical theories and constructs.	Challenge
Thesis 9	The integration of neuroscientific methods and findings will not lead to a revolution of economic and consumer research, but will be carried out evolutionarily.	-
Thesis 10	By facing the challenges of the future, neuroeconomics and consumer neuroscience will become an integrated and accepted branch of economic and consumer research.	-

Source: Hubert (2010)

In our opinion, the task-related theses depict what neuromarketing researches have to do in order to broaden our knowledge, but the advancement depends on the effort spend on conducting various neuromarketing researches and there are no significant barriers that could undermine the status quo of neuromarketing (Thesis 1 and Thesis 2). Tahomi et al. (2011) also argue for more neuromarketing researches are needed in order to broaden our knowledge and to increase the acceptance and validity of such research results. The contribution-related theses emphasize those advantages of neuromarketing which can lead to a better understanding of existing marketing-related topics and can supplement our knowledge in those areas (Thesis 4 and Thesis 5). Although the previous theses are important (Thesis 1, 2, 4, 5), we believe that there are significant barriers hindering the challenge-related theses which can fundamentally affect the status quo of neuromarketing researches.

Thesis 3 posits that an essential challenge of neuromarketing is to test existing theories and, reject, modify, and/or to further develop them while Thesis 8 focuses on the description of classical theories and constructs with neurophysiological methods. In our interpretation the success of these challenges highly depends on how much of the frequently studied topics can be investigated with such methods. Taking into consideration that there are important topics in marketing which are difficult to be measured by neuroscientific methods, neuromarketing can contribute to only a small proportion of marketing topics. For instance, there are survey methods for the investigation of buying intention or loyalty which were developed in the social sciences but it is difficult to interpret how neuroscience can describe these constructs. Consumer loyalty usually measured with rebuying intention, consumers' recommendation, price sensitivity and/or cross-buying intention of other products/services. Since the neuroscientific methods can observe neural brain activity and capturing feelings and emotions, the traditional perception of loyalty may change in the neuromarketing context because the previous mentioned variables cannot be measured with these medical devices. Furthermore, especially in consumer researches, marketers have developed numerous models for describing consumer behavior in various fields in order to investigate the relationship and the effects among the constructs developed in the recent decades. Investigating the complex structures of these constructs may be difficult or even impossible according to our knowledge.

According to Thesis 6, physiological measuring methods will become (more) important in economic research which requires interdisciplinary research groups. From this point of view, the spread of neuromarketing researches will highly depend on how marketing scholars can establish relationship with researchers of life sciences and psychology. It is difficult to find researchers who are inherently focusing on life sciences and tend to take part in

investigating consumer behavior. From this perspective neuromarketing should be accepted not only in the field of marketing but on the scientific community in other disciplines, like in life sciences as well.

Thesis 7 emphasizes the role of neuromarketing to guide the translation of the obtained findings through companies into corporate practice. Since neuromarketing researches requires interdisciplinary expertise, representatives of various disciplines and special medical equipments, it is difficult to find market research companies that could conduct such researches. The universities where the necessary disciplines are represented and such special medical devices are available can be proper research partner for neuromarketing research. But these institutions are fragmented and due to the existing norms of academia (including teaching duties, norms of open science, etc.) and the lack of experience interacting with the industry, research results might be too exploratory or scientific which might have high scientific value, but such results are difficult to be applied into practice.

As we have seen, there are various challenges that should be overcome in order to achieve higher acceptance in the scientific community. The above mentioned challenges will be implemented at the end of the overview into the concerns relating to the application of neuromarketing.

3. Replacing questionnaires with high-tech clinical equipments

The most frequently used clinical equipments for neuromarketing researches are Positron emission tomography (PET), Magnetoencephalography (MEG), Functional magnetic resonance imaging (fMRI) and Electroencephalography (EEG). These imaging devices were inherently developed for medical purposes, but since these equipments are able to investigate neural activity of human body, are also suited for observing neural reactions for marketing stimulus.

The aim of this short review is to highlight that the application of such medical equipments requires certain conditions which are usually not obvious for marketing experts and may have impact on the evaluation and reliability of the research results or even could deter potential research participants from attendance.

We distinguish two different groups of reasons which can hinder neuromarketing researches: factors influencing participation and special environmental conditions. In certain investigations (like positron emission tomography) radioactive isotopes should be intravenously ingested into the body to mark specific molecules which may deter participants

from taking part in the research due to the radioactive elements (even if it's safe from medical perspective) and cause injury for the participant. Furthermore, in some cases participants have to take off clothes and accessories which is also unpleasant and strange during marketing research. All of these factors may lower participants willingness to take part in neuromarketing researches.

Regarding the special environmental conditions, in some cases participants should be relaxed during the investigation otherwise the research results will be distorted, participants should wait 1–2 hours between the preparation and investigation, or should be starved and deprived of drinking in order to conduct the research. This kind of circumstances may not influence participants' intention towards participation but can have impact on the research investigation. For instance, nutrition (food and drinks) related researches cannot be studied properly, because actual hunger and thirst may influence biological processes. In addition, waiting for 1–2 hours may cause frustration for some participants and may influence their responses and opinions about investigated topic.

Table 2 Summarizing the advantages and disadvantages of medical devices applied for neuromarketing researches

	Measurement	Advantages	Disadvantages
Positron emission tomography (PET)	Measures the blood flow and metabolism of the participant.	Applicable on any body parts.	(1) The injected materials are marked with radioactive isotopes (2) All clothes, jewelries and accessories should be removed. (3) The investigation begins after 1–2 hours.
Magnetoencephalography (MEG)	Measures the activity of the brain surface (5mm).	The injection of radioactive isotopes and application of X-rays are unnecessary.	(1) Cooling is required for use which makes its operation expensive. (2) It is not able to observe deep brain structures.
Functional magnetic resonance imaging (fMRI)	Measures cerebral blood flow and oxygen levels which relates to neural activity of the brain.	No radioactive and non-invasive method.	
Electroencephalography (EEG)	Measures bioelectric signals accompanying brain function.	(1) Do not emit electrical signal, captures only the bioelectric signals of the brain. (2) Non-invasive method.	(1) Electrodes are placed on the scalp. (2) Participant should be relaxed otherwise any activity can make changes in the results. (3) Takes 1–2 hours the investigation and placing the electrodes.

Source: own construction

Comparing the above discussed conditional requirements to the nowadays widely used quantitative (questionnaires) and qualitative (interviews) research methods, no doubt that neuromarketing researches requires a high degree of preparation. Table 2 summarizes the main advantages and disadvantages of medical devices which are typically used for neuromarketing researches.

4. Summarizing the advantages and disadvantages

Neuromarketing provides various methods for the investigation of consumer behavior as we demonstrated in previous sections, but there are skeptics who are still questioning its grounding and justification. In this section we summarize the main benefits and disadvantages of neuromarketing.

Other disciplines often criticize marketing because its research methodology is not well-grounded and the reliability of results cannot be compared to the methodology of natural sciences which is partly due to the characteristics of social sciences. But the application of neuroscientific methods in consumer behavior researches may result in a wider scientific acceptance of marketing. Furthermore, it also contributes to the variety of methodologies in marketing researches. Neuroscientific methods can also contribute to a better understanding of consumer needs since it can observe and investigate those information which cannot be or difficult to be captured by traditional research methods, like measuring feelings with questionnaires or interviews. The application of neuromarketing in the product development will yield to products which can better suit consumer needs (Wilson et al. 2008). Neuromarketing also able to measure the feelings and emotions during advertising that helps practitioners to adjust their advertisement to their target group (Butler 2008), which may achieve higher consumer interest. Summarizing these benefits we can conclude that the main benefits of neuromarketing is a wider acceptance of marketing in other disciplines and the measurement of feelings and emotions that was difficult earlier.

Relationship of neuromarketing with marketing: As we discussed in previous sections, neuromarketing is expected to test existing theories and describe constructs widely used in marketing researches. However, some constructs and models are difficult to investigate with neuroscientific methods since these abstract concepts gain meaning only in the existing theories and scientific context. In addition, although the development of neuroscientific methods was remarkable in recent decades, there are still numerous questions remaining unanswered in brain research. It also suggests that the interpretation of empirical findings

gained nowadays may change in the future due to the development of neuroscience which is still evolving.

Lack of resources: One of the main barrier of widespread application of neuromarketing methods in consumer research is relating to the financial expenditures of neuromarketing researches. The cost per hours of an average neuromarketing research can reach 500 USD (Ariely – Berns 2010) that is quite high compared to questionnaire surveys which can provide relatively accurate and reliable information from the research perspective at affordable costs (Wilson et al 2008). Furthermore, the availability of medical devices for marketers may also hinder the widespread application of neuromarketing researches.

Lack of expertise: Neuromarketing research requires representatives of various disciplines, like marketing, psychology, life sciences, etc. which makes the organization of such interdisciplinary researches difficult. Without the contribution of these disciplines marketers cannot conduct these researches itself due to the lack of expertise, because the education programs in the field of marketing (or business administration) do not prepare students for such researches and the necessary competences cannot be acquired. Thus, marketing practitioners do not possess skills for conducting neuromarketing researches and evaluating such results.

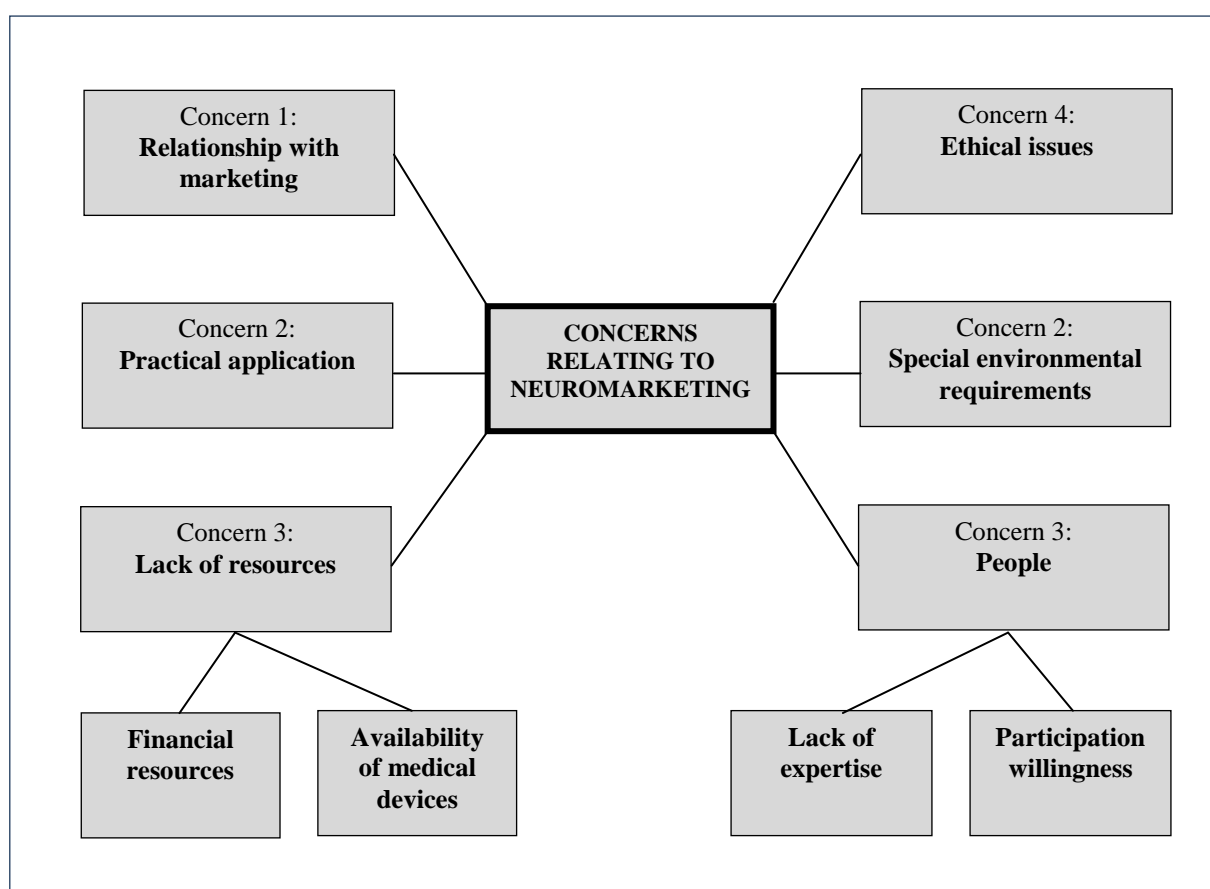
Environmental conditions: In contrary to traditional marketing researches, investigation with medical devices requires specific environmental conditions which may be strange for participants and makes the research procedure more difficult than in traditional marketing research. On one hand it can influence participants' willingness in taking part in the investigation and on the other hand can have impact on the research results due to the unpleasant circumstances, especially if the respondents associate the environment with bad feelings relating to medical examination. Furthermore the environmental requirements and procedures have other limitations as well, for instance claustrophobic people and pregnant women cannot take part in certain investigations.

Ethical issues: One of the biggest disadvantages of neuromarketing is the ethical dimension. As several authors argues for, information captured by neuromarketing should be ignored and the use in marketing campaigns have to be prohibited. According to Lee et al. (2007), these techniques are unacceptable, because they enter into the consumers' opinion. While in the case of a survey with questions of a personal nature, this is an option to refuse to answer the questions, during the brain test it is not possible. The problem is, researchers capture more information from the test than it is required by the research purpose. The ethical issues deserve special attention, because during the investigation researchers capture such

information that are not part of the research, which may lead to the violation of privacy, for instance, if researchers detect medical disorders (eg. a brain tumor) in the participants brain. In one hand, the researchers cannot determine whether the "patch" is a malicious tumor or not, but it seems clearly an anomaly while on the other hand researchers are not likely to have been trained and do not have experience how to communicate these information with the studied person. Thus, we also list this issue among the concerns relating to neuromarketing.

Figure 1 summarizes the above discussed neuromarketing related concerns which are important from the marketers perspective.

Figure 1 Summary of the neuromarketing related concerns



Source: own construction

5. Conclusion

The primary goal of this paper was to give a brief review about the concerns relating to the application of neuromarketing methods in the field of marketing. Since neuromarketing have gained an increasing attention among scientific community, there are still lack of studies

that could contribute to the evolution of neuromarketing, as a „discipline”, and there are also misunderstandings about its scope.

We took attention to demonstrate the main concerns that can hinder the widespread application of neuromarketing. We argue for, despite of the increasing popularity and interest surrounding this exciting topic, neuromarketing will not revolutionize marketing researches, or at least not in that way as still most of marketers expect. Our goal was not to undermine the benefits offered by neuromarketing, that we also acknowledge, but to highlight the disadvantages and emphasize its constraints. We hope that our paper could draw attention of marketers and indicates discussion among scholars of various scientific fields.

References

- Ariely D. – Berns G. S. (2010): Neuromarketing: the hope and hype of neuroimaging in business. *Nature Reviews Neuroscience*, 11, 4, pp. 284–292.
- Butler M. J. (2008): Neuromarketing and the perception of knowledge. *Journal of Consumer Behaviour*, 7, 4-5, pp. 415–419.
- Hubert M. (2010): Does neuroeconomics give new inputs to economic and consumer research? *Journal of Economic Psychology*, 31, 5, pp. 812–817.
- Lee N. B. – Broderick, A. J. – Chamberlain L. (2007): What is 'neuromarketing'? A discussion and agenda for future research. *International Journal of Psychophysiology*, 63,2, pp. 199–204.
- Plassmann, H. – Ramsay T. Z. – Milosavljevic, M. (2012): Branding the brain: A critical review and outlook. *Journal of Consumer Psychology*, 22, 1, pp. 18–36.
- Roth V. A. (2013): *The potential of neuromarketing as a marketing tool*. 1st IBA Bachelor Thesis Conference, Enschede.
- Rustichini, A. (2005): Neuroeconomics: present and future. *Games and Economic Behavior*, 52, pp. 201–212.
- Schüll (2008): Decision and preference in Neuromarketing. *Neuroscience and Society*.
- Wilson R. – Gaines J. – Hill R. P. (2008): Neuromarketing and consumer free will. *Journal of consumer affairs*, 42, 3, pp. 389–410.