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Article

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ETHICAL RESPONSIBILITY OF NEUROMARKETING COMPANIES IN HARNESSING THE MARKET RESEARCH – A GLOBAL EXPLORATORY APPROACH

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Abstract

A key challenge in the 21st century is identifying how to satisfy consumers' needs in the best manner possible, whilst ensuring companies' financial profitability. Scientists play a major role in achieving this goal, as research methods, techniques and tools have continuously evolved. In the last two decades, the development of these instruments has seen an important boost, as neuromarketing methods and techniques added depth and accuracy to traditional studies. The main aim of this paper is to highlight the role and importance of neuromarketing research techniques in the evolution of neurosciences and to explain how these techniques are used in market research. One of the most important challenges for companies who offer neuromarketing services is to stick to ethical principles when performing the investigations. This is an obligation they have both towards the beneficiaries – the companies providing products or services – and towards their consumers as well. This challenge has always been a subject of dispute between the advocates and critics of neuromarketing.

Thus, this paper deals with this and other controversial topics. It starts with analysing a traditional persuasion model that has inherently been influenced by the neuromarketing research features. Then, it addresses the positive and negative aspects that subjects might have to face throughout neuromarketing studies, always bearing in mind the current *Ethical Code of Conduct* issued by the *Neuromarketing Science and Business Association (NMSBA)*. An exploratory online research helped the authors test several hypotheses on ethical issues that neuromarketing companies have to handle. The research was performed on 67 neuromarketing companies from around the world that are members of the NMSBA. The findings are relevant both to researchers and neuromarketing companies, even the Romanian ones, who can use them used as insights.

Keywords: neuromarketing, neuroscience, market research, ethical responsibility, experimental research.

JEL Classification D87, M30, M31

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Introduction

The development of neuroimaging techniques over the last years and their application outside the medical field has opened new research opportunities with respect to consumer behaviour or the own decision-making process. Consequently, new research fields, such as *cognitive neuroscience* (Gazzaniga, 2004) and *social neuroscience* (Cacioppo and Berntson, 2005) have emerged. One of these fields, *neuroeconomics*, is on the border between neurosciences and economy and attempts to explain the decision-making process by developing a neural model (Egidi, 2008). Contrary to the classical economic theory which states that people generally make rational decisions to maximize their own benefit (Camerer and Fehr, 2006), present studies show that 95% of our decisions are taken at the subconscious level (Zaltman, 2003).

Neuromarketing emerged as an expanded field of research on neuroeconomics. The term was introduced by professor Ale Smitds of the Erasmus University in Rotterdam (Roebuck, 2011) as a reference to the application of neuroimaging techniques in the market research. The main difference between neuromarketing research and traditional research methods lies in the fact that with the former the subjects are not asked to express their opinion regarding a particular topic. In other words, oral statements are not taken into account as results are only obtained by recording the participants' brain activity. By getting into the human subconscious mind, the neuromarketing research allows the identification of the subjects' direct reactions to the stimuli they are exposed to – products, packages, services signalled by logos, visual, olfactory, tactile, gustatory or auditory elements characterizing the goods that meet the consumers' needs (Pop et al., 2009).

Bright House (USA) is the first company referred to in the literature (Cacioppo, Berntson, 2005) that used the term *neuromarketing*. It also issued a press release to announce the creation of a market research department which uses the medical imaging technique. Its purpose was to use investigation techniques and tools to map the subjects' brain activity in a highly empirical decision-making field, where decisions are made in highly randomized or indeterminate universes (Pop, 2008), and apply the rules of the scientific endeavour to better consolidate the structure of its offer. The most frequently cited experimental study on the application of neuromarketing to ensure demand orientation, "Cola Brains", was published in 2004 and contained the research results of professor Read Montague at Baylor College of Medicine in Houston, Texas (McClure et al., 2004; Pispers, Dabrowski, 2011). The team headed by professor Montague used the functional magnetic resonance imaging to scan the brain of a group of subjects while they were drinking Pepsi Cola or Coca Cola. Certain brain areas were activated according to the extent to which the subjects were or were not aware of the two brands. Thus, when subjects, being aware of what they were drinking, said they preferred Coke over Pepsi Cola, an area of the frontal lobe was being activated. This is the brain area that coordinates attention, controls the short-term memory and oversees the thinking process. On the other hand, when subjects were unaware of what Cola brand they were drinking, an area of the limbic system was activated, responsible for the emotional and instinctual behaviour (McClure et al., 2004), and almost all believed the taste of Pepsi was nicer than that of Coke. The conclusion of the experiment was that Coke held a dominant position in consumers' subconscious while the preference for Pepsi was mostly based on taste or experience felt during the consumption of the brand.

The literature highlights differing views on the place of neuromarketing within the scientific spectrum. Viewed mostly as a border science or a management tool (Fischer et

al., 2010), neuromarketing may also be approached as a valid research field, being more than the mere application of neuroimaging techniques in marketing products and services or brands (Lee et al., 2007). Professors Foscht and Swoboda state that "...neuromarketing or consumer neuroscience is the technique that investigates the reasons behind individuals' decisions to buy various products or services, depending on which brain areas are activated" (Foscht, Swoboda, 2011).

Hubert and Kenning (2008) view neuromarketing as a useful tool to conduct businesses. They go further and propose that neuromarketing should be renamed "consumer neuroscience". On the other hand, Constensen (2011) believes that neuromarketing is a relatively new and controversial interdisciplinary research field, a component of marketing, by means of which one can properly interpret psychological and neuropsychological knowledge necessary to understand customer behaviour. According to other authors (Georges, Badoc, 2010), neuromarketing is the process that enables the knowledge and understanding of the mechanisms used by the human brain to process information. Kotler (Kotler et al., 2009; Kotler, Keller, 2012) believes that neuromarketing is a means to describe the activity of the brain under the impact of marketing stimuli, which, by means of specific tools, correlates with the psychological reaction following the subjects' exposure to certain ads. Thus, neuromarketing helps entrepreneurs come up with basic ideas when making decisions about approaching the market and the clients and establishing communication with business partners.

Labelling neuromarketing as a science per se entails designing and developing a behavioural model capable of highlighting the marketing stimuli that generate a particular behaviour. Fugate (2007) believes this would qualify as a feasible endeavour on condition that it comes from marketing practitioners rather than from theorists. One attempt to develop a behavioural model was made by Butler (2008), who believes that four different visions should be combined and interconnected within the model – reporting the results of basic research conducted by academicians, reporting the results of applied research conducted by neuromarketing companies (Doherty, 1994), media reporting of research findings from neuromarketing, and power processes, that is, decisions made on the basis of neuromarketing research.

The classical behaviour research methods and techniques emphasize the visible stimuli which trigger a particular consumption and/or buying behaviour. However, due to neuromarketing investigations, researchers are now getting closer to the invisible side of neural connections (Pop, Iorga, 2012), which leads to a deepening and significant refining of market research. This should not be understood as an attempt to give up the classical market research methods and techniques but as an expansion of the scope of scientific knowledge.

1. Neuroimaging techniques used in neuromarketing

Neuromarketing research is conducted with the aid of equipment that until recently was only used by the medical science. The following are the most frequently employed procedures: electroencephalography (EEG), galvanic skin response (GSR), functional magnetic resonance imaging (fMRI), magnetoencephalography (MEG) and eye-tracking (ET) (Kotler et al., 2009).

Electroencephalography (EEG) records the activity of neurons under the scalp. Of particular interest for the neuromarket research are the *alpha* and *beta rhythms*. Researchers measure the level of decrease of the alpha rhythm to be replaced by the beta rhythm, a situation characteristic of the volitional cognitive activity. The underlying principle of EEG investigations is the "Frontal Asymmetry Theory" developed by Davidson (1979, 1993, 1999, 2000, 2004). *Galvanic skin response* (GSR) measures the variations in the skin conductance, induced by the activation of the autonomic nervous system (ANS). Since the activation of the ANS is an index of arousal, it follows that GSR measures the degree of arousal triggered by a stimulus (Ravaja, 2004), thus being a better predictor of market performance than the statement-based methods (LaBarbera et Tucciarone, 1995). One limitation of the GSR measurement is the fact that it only records the intensity of emotional reactions, but not their valence. In other words, it is impossible to determine whether the recorded reaction is positive or negative as both reactions may feature a similar GSR recording (Hopkins & Fletcher, 1994).

Functional magnetic resonance imaging (fMRI) is a technology that allows, due to its very good spatial resolution, the study of the neuronal structures/networks situated deep inside the cerebral hemispheres. The operating principle is based on recording the changes in the magnetic field adjacent to the blood vessels that supply nutrition to the neuron. This change is caused by the decrease of blood oxygenation as active neurons consume an increased volume of oxygen (Huettel et al., 2009). Consequently, a new term was coined, namely, BOLD signal – *Blood oxygen level dependent* (Tank et al., 1992). *Magnetoencephalography* (MEG) records the magnetic field generated by the activity of synchronized neurons (Rouillet, Droulers, 2010). Featuring a very good temporal resolution, this technique allows the analysis of brain processes almost in real time (a precision of milliseconds). *Eye-trackers* (ET) allow the measurement of eye fixation by recording corneal reflections determined by infrared radiations. Two kinds of equipment may be used: fixed (fastened onto the screen on which the research material is projected) and mobile (such as glasses put on the subject's head). This device is resorted to because it is believed that the mental attention is directed toward the object on which the visual attention is focused (Kalliny, 2010).

To implement the research, these techniques may be used not only separately but also in combination (for example, EEG with GSR and/or ET). Thus, information can be collected from several sources and researchers may establish correlations between the brain activity, the degree of arousal and fixation areas. For instance, a great GSR variation correlated with an individual's positive attitude recorded by EEG describes the impact of an ad on the subject (Kotler et al., 2009). A further correlation between the individual's reaction and the point of gaze may identify the cause of that particular reaction. This procedure also helps determine the actual elements of a video clip or message layout that triggered a particular positive and strong reaction.

Although the costs associated with implementing this kind of research are relatively high – amounting to thousands of euros – the results are particularly significant. The application of the fMRI technique revealed that the subjects' exposure to ads activates eight out of nine investigated brain regions. In other words, the subjects' brain reacts in a particular way to the content of the ads (Butler, 2008). Another, more interesting result is the fact that, unlike what had been assumed previously, most purchasing decisions are made instantaneously,

randomly and unwittingly (probably due to a great number of stimuli at the point of sale) (Kotler et al., 2012; Yoon et al., 2006).

2. Neuromarketing and market research ethics

The *ethic dimension* of neuromarketing is one of the biggest and most sensitive challenges with respect to its application in the field of the market research (Jamnik, 2011). Ever since it emerged as a science, neuromarketing has raised many controversies and ethical issues among researchers (Dinu, 2008). Such reactions are triggered by the research methodology which some authors believe has a great potential for intruding into the subject's mind (Canli, Amin, 2002; Illes, 2003; Hyman, 2004; Kennedy, 2004; New York City Bar Association, 2005). The media's sensationalized approach to neuromarketing only enhanced people's distrust of the new technology. Some media reports mentioned the discovery of the "buy button" in the human brain (Dias, 2006; Lindstrom, 2010). To a certain extent, this would allow people have their brain "scammed" and be manipulated to make buying decisions in favour of a particular company or product or service (Neuroscience, 2004).

As is the case with any emerging field, neuromarketing has both ardent advocates and outspoken critics. Advocates of neuromarketing claim this is beneficial to both companies and buyers because it will foster the development of products that are really desired by people (Singer, 2004; Erk et al., 2005; Thompson, 2005). On the other hand, critics warn that people's ability to make informed decisions about purchases and/or consumption will be compromised (Huang, 1998; Herman, 2005; Thompson, 2003; Lovel, 2003). Wilson (2008) and his colleagues tackle the ethical dimension of the impact exerted by marketing (and, more recently, neuromarketing) actions on the individual's freedom of choice (Holban, 2010). They propose a persuasion model that fits both the traditional marketing actions, such as the development and implementation of promotional activities, and activities based on the neuromarketing research. The traditional persuasion model represents a theoretical framework that explains how marketers have conducted effective promotional activities in time.

The model developed by Wilson consists of several sequential phases (screening, exposure, information gathering, message creation, intervention and buying). After selecting relevant individuals of the investigated target group, they are presented with a marketing stimulus and then feedback on the effect of the stimulus on the subjects is collected. Based on the collected data, the marketing message is then developed, advertising a promotional event. During the *intervention* phase, consumers are exposed to the resulting promotion and, depending on their reaction (rational and/or emotional), they will show a particular attitude towards the offer. This attitude will further lead the subjects to accept (purchasing decision) or reject the offer (Foscht, Swoboda, 2011).

During the *screening* phase the subjects' brain activity is recorded through neuromarketing techniques, thus providing information on their subconscious reactions. The data is then analysed to develop a marketing message aimed at triggering affective areas of the brain associated with pleasure and reward (Wilson, 2008).

Neuromarketing research is currently conducted on well-defined samples that allow the statistical validation of results. Current research lays the ground for the application of

personalized marketing that could be attained by applying individual-specific stimuli. Furthermore, researchers claim that it will soon be possible to monitor a subject's brain activity throughout his/her visit at the store (supermarket, hypermarket, proximity store etc.) (Foscht, Swoboda, 2012). A serious dilemma faced by researchers and the companies willing to implement these models is the ethical nature of the market research conducted by means of neuromarketing techniques. With the traditional model potential intrusion on the subject's privacy lies in the fact that s/he is not fully informed about the subsequent use of data collected during the *screening* phase. With the neuromarketing technique, however, the procedure is much more complex. While the confidentiality of data on the brain activity must be ensured, one has also to deal with the property rights to the recordings, the rights of subsequent use and distribution to third parties (Wilson, 2008).

The neuromarketing research allows not only the identification of emotions triggered by the marketing message or a particular product but also the establishment of correlations between these emotions and the elements of the message (or the product characteristics) (Butler, 2008). The ethical issue appears when this feedback is used later to create a message aimed at boosting sales but which does not reflect faithfully the reality about the product characteristics (Wilson, 2008; Tănăsescu, Popescu, 2012). This could mislead consumers into buying goods that do not meet their needs and are not fully up to the promises made. The rules of ethical marketing reject categorically such practices. Moreover, it is believed that the economic success of such an action depends explicitly on the trust that the subjects place in the neuromarketing research and its results (Brammer, 2004). However, such trust cannot be built outside the rigour and good practices of the research ethics (Butler, 2008).

Another issue worth mentioning is *consumer's consent* for being continuously monitored and exposed to marketing messages. For instance, there are software programs that record and interpret an individual's facial expression and even "read" a consumer's emotions or reactions when in front of a product or shop shelf. This information is usually collected through video cameras installed throughout the stores (Foscht, Swoboda, 2012). Consequently, marketers collect information on consumers without asking for their prior permission or even informing them about it. The only notice that consumers are made aware of is "video surveillance".

Although the use of neuromarketing techniques and tools seems to be not only a simple task but also highly beneficial to the company that wants to promote a particular product, service or brand and thus elicit a favourable behaviour on the part of the target segment (preference, purchase, recommendation etc), a major responsibility is entailed by such an action. This is mainly due to the fact that the application of neuromarketing techniques may result in a favourable or unfavourable manipulation of the client. Therefore, the major challenge faced by neuromarketing researchers and the difficulty of ethically implementing this procedure lies in assuring the participants – the subjects, in particular – that their "manipulation" is *a positive one, pursuing rational, educational objectives that are beneficial to humans and society in general*, such as campaigns against drug addiction, smoking, excessive consumption of alcohol and sweets, against unhealthy, fatty diet in which nutritious, organic products are scarce (Pop, Dabija, 2013), and campaigns that promote a good physical condition and the daily consumption of a minimum quantity of water, fruits and vegetables etc. We believe that the subject's "manipulation" through neuromarketing can and should take place when it is performed strictly for his or her

benefit. However, we are deeply concerned with the question of who should be empowered to decide on the extent to which a subject can be influenced and/or “manipulated”. In order to prevent the appearance of situations as those described above, *Neuromarketing Science and Business Association* has drawn up a Code of Ethics (NMSBA, 2013) which all its members are bound to comply with. One of the rules stipulates that researchers are not allowed to mislead participants in the study by taking advantage of their ignorance or lack of information in the field of neuroscience. Likewise, companies are not allowed to lure the subjects with marketing promotions following their participation in the study. Moreover, it is imperative that the objectives of the study should be clearly communicated and the recorded data must not be kept more than it is needed to finish the research. The subjects have the right to interrupt anytime their involvement in the study and demand the recorded data to be erased if they feel prejudiced by their content. These measures should prevent the occurrence of *stealth neuromarketing* where the consumers’ brain activity is manipulated in such a way that they are not aware of what’s going on (Murphy et al., 2008).

3. Objectives and methodology of the experimental exploratory research

The practical element of the present paper takes the form of *exploratory research* conducted among neuromarketing specialists throughout the world. *The research objectives* have to do with *the evaluation of the level of interest the neuromarketing companies have in the ethical side of their activity, the identification of the most frequent ethical issues encountered throughout the research and of the corrective measures taken to prevent and solve the ethical challenges, the evaluation of the degree of transparency shown by organizations which apply neuromarketing techniques and comply with the ethical principles during the process of data collection, analysis and interpretation.*

The research was conducted by means of an *exploratory survey* among experts from all neuromarketing companies around the world, members of NMSBA. Although not all experts responded, 67 valid answers could be obtained from neuromarketing companies which use neuromarketing techniques, due to one of the author’s (Iorga) membership in the association. The investigation on the company representatives was carried out through the *survey methodology*, using the *interviewing technique*. Information was collected through an *online questionnaire* containing several sets of questions (classification, closed, open). The answers were measured on a five-point Likert scale, (1=total disagreement, 5=total agreement).

The survey yielded a high percentage of respondents (52 out of a total of 67 companies), which, at the same time, reflected a good representativeness at international level. Answers were provided by representatives of 22 European companies (16 of which are EU countries), 10 North American companies, 13 South American companies and 5 Asian companies. Most subjects belong to the category of policy makers (1/3 are chief executive officers, 1/5 are administrative officers, 1/6 are chief neuromarketing officers and 1/6 are chief research officers). In terms of their professional training, 2/3 of respondents hold a PhD and/or MA degree and 1/5 of them have a BA degree. One quarter of respondents attended long-term programs and half of them attended short term programs in the field of neuroscience.

The results of the current research are all the more interesting as the research has a comprehensive character since all companies operating in a particular field have been

investigated. That is why the research required no sampling to be performed. Qualitative exploratory research is recommended (Cătoiu et al., 2002) for large and vague topics as it allows an in-depth analysis of relatively complex phenomena that later can be investigated through quantitative methods as well. When implementing the online research, attention was paid to the literature's recommendations about the clarity and simplicity of the investigation tool, and the sequence, logic and length of the questions (Gay et al., 2009; Gronssickle, Raskin, 2001).

The authors have tested the following hypotheses:

- H₁: There are significant differences between the relevance of ethical objections coming from clients and those coming from research subjects.
- H₂: The companies performing neuromarketing studies believe that they do not cause important negative moods (anxiety, fear, cognitive inhibition) to research subjects.
- H₃: The companies that are part of the study believe it is important to employ ethic specialists for the research design.
- H₄: The attitude of neuromarketing companies towards ethical issues concerning the participants' protection varies, remaining however an important concern for everybody.

4. Research results

Participants' responses enabled the authors to create a hierarchy of the most important neuromarketing services (the average - between brackets). Of course, this ranking has been issued according to the services' request frequency. The most often requested service is *video ads creation* (4,21), followed by the *creation of communication campaigns* (4,12) and *printed ads/banners creation* (4,10). Then, there are: *product design* (3,79), *packaging* (3,65), *online media campaigns* (3,53), *sales promotions* (3,46) and last *entertainment* (3,06). It is interesting how the first three services stand out from the list. However, we must mention that *video spots* rank first only in North America (4,60), while *communication campaigns* are leaders in Asia (4,60), *print ads/banners* – are leaders in South America (4,46). In the Middle East, *online media campaigns* (4,00) and *entertainment* (4,00) are most frequent.

Concerning H₁, neuromarketing research companies identified the following differences between clients' and subjects' opinions (see table 1).

While respondents of neuromarketing studies are concerned with the nature of the research, content and methods, the beneficiaries of the neuromarketing studies are more concerned with protecting their company's reputation and understanding how neuroscience techniques work. However, when it comes to data processing, neither category is believed to show any concern (nor raise any ethical issues), as they might see the process as a rather technical one. We want to emphasize that the findings reflect neuromarketing companies' visions towards the attitudes of the two categories. The respondents believe that the media objections to the way neuromarketing studies deal with data security and subjects' privacy issues are *important* and *very important*. Media believe that virtual communication and interaction platforms (Facebook, Youtube, blogs) are an important source for gathering subjects' feedback. These findings reflect the function that the media are supposed to have as democracy and human rights watchdogs. As other authors previously showed (Pop, Iorga and Pelău, 2013), many journalists are misinformed on the neuromarketing research

subject, further misinforming throughout the proliferation of sensational news that have a high manipulative impact, in order to achieve their final goal of increasing their audience. Therefore, we can conclude that **H₁ hypothesis is confirmed.**

Table no. 1. Differences in appreciating the importance of ethical features

Importance of ethical features	Neuromarketing research clients	Neuromarketing research subjects
Very important	<ul style="list-style-type: none"> • Neurosciences knowledge level; • Objections against the impact that the information gathered throughout this kind of research could have if it ended up in the media. 	<ul style="list-style-type: none"> • Subjects’ need to adapt to specific situations and different cultural environments; • Transparently and precisely informing subjects (using specific methods such as video presentations) on the way the investigation process works.
Important	<ul style="list-style-type: none"> • Knowing exactly how the collected data will be used. 	<ul style="list-style-type: none"> • Guarantee data privacy and security to clients (the data is confidential and is not directly linked to a certain person); • Concerns towards data processing and archiving.
Neutral	<ul style="list-style-type: none"> • Data security issues 	<ul style="list-style-type: none"> • The fear that a third party might have access to disturbing information about subjects.
Un-important	<ul style="list-style-type: none"> • Data processing methods 	<ul style="list-style-type: none"> • The security of data processing methods

The companies were then asked if they consider that neuromarketing studies might induce negative moods (anxiety, fear, cognitive inhibition). The vast majority (80%) affirmed that they have never met such situations. Seven respondents consider that anxiety might be an important factor for subjects’ unwillingness to discuss certain themes due to ethical considerations. One respondent regards this factor as unimportant and another one – neutral. However, more than a third believe that anxiety is rather unimportant in generating ethical objections. The contribution of cognitive inhibition to the generation of ethical problems is also reduced.

A very important ethical problem that might cause subjects’ anxiety might be that in Great Britain companies must obtain approval from the Ethics in Public Research Institute for all fMRI-based studies. Thus, commercial studies carried out in this country by neuromarketing companies must comply with fMRI scientific research standards. Another ethical problem that might lead to anxiety is the fact that, before starting the research experiment, subjects are asked to run a complete radiological diagnosis and say if they have ever had a neurosurgical intervention. Such findings will prevent the subjects from taking part into the research.

The respondents stressed the fact that, by observing the strict fMRI research protocol and having the results interpreted by a neuroradiologist, they contribute to the reduction of research-induced anxiety. By implementing the procedure of having the results interpreted by a neuroradiologist, a company was able to save a subject’s life, detecting the traces of a stroke in the brain of a 25-year old female. The likelihood of causing anxiety is diminished as some companies have strict selection criteria and have established their neuromarketing departments in clinics where neurologists and neuropsychologists can rapidly identify

diseases. In such cases, subjects will be prevented from participating. Other respondents reported that their equipment complies with ISO and industry standards and that participants must fill in a form to certify that they have acknowledged the risks. Of course, all companies have very strict procedures regarding their neuromarketing studies and these procedures are explained to participants before the experiments begin. Thus, it is believed that participants' anxiety and the ethical issues that might arrive are reduced to the minimum. We can conclude that neuromarketing companies do not believe their studies can trigger negative moods. Therefore, **hypothesis H₂ is confirmed**.

Respondents have been further asked if they have ever called for ethics experts to solve various situations they had to face during neuromarketing experiments. 80% of the respondents declared they *have not asked* for such services, while only in 20% of the situations such experts were needed. Whilst Asian companies never consult third parties for ethical issues, three companies in Europe and another three from the Americas do so. Their reasons why they do are diverse. While some companies consult NMSBA experts to improve own standards and ethical procedures, others resort to national associations or bodies. In order to guarantee the compliance with ethical codes and principles, companies also work together with psychology or sociology experts. The identification of ethical problems in the responses led to the anonymous interpretation of the data, thus complying with the ethical codes of the industry and national/regional organisms. Often, companies apply specific procedures that do not allow identifying subjects' responses after having collected the data. The small proportion of those who ask for the help of third parties when dealing with ethical problems leads us to the conclusion that **hypothesis H₃ is invalid**.

Finally, respondents have been asked if they comply with the NMSBA (Neuromarketing Science and Business Association) Code of Ethics when performing neuromarketing research. Most of them have declared they rigorously adhere to the Code's procedures, protocols and methods. Moreover, based on this code or on other regulations issued by local or international ethic commissions (ESOMAR, Mexico's Ministry of Health, The National Committee for Science and Technology, Great Britain's Ethics Research Institute, European Universities' Ethics Code etc.), some companies have created their own ethics conduct codes in order to correctly handle customer approach, data collection and management, information analysis and interpretation. According to the responses, in some cases, own codes are even more rigorous than NMSBA's. Each company's ethical code specifications are brought to the attention of both research participants and own employees and business partners. The companies select participants carefully as to prevent the inclusion of children, youngsters, teenagers, physically or mentally disabled persons. Several of the surveyed companies claim to having contributed to the NMSBA's Code development.

As a general rule, subjects get previously informed about the research objectives, the tools and procedures, the evaluation method and its rigor. Their prior consent is required, as they must sign a form stipulating the data processing procedure. If participants do not agree with the conditions, companies stop the experiment and thank them for having participated. A very important aspect for ensuring procedures' quality is data management. Actually, the documentation and protocol are carefully and rigorously accomplished. Neuromarketing companies claim to comply with the NMSBA Code of Ethics when it comes to offering subjects the guarantee that the collected information shall not be used for other purposes than the intended ones or stored for later use. Companies provide total data security and

privacy. Companies do not store the data collected, especially the information that is not connected to the ongoing projects. After completing the project, companies have two options: they either inform the subjects about the results or they extract demographic information and store it separately from subjects' answers. In the latter case, identifying subjects after having completed the study is impossible. In order to ensure total privacy, some companies assign participants a random number, making identification impossible.

When taking part in longitudinal or interconnected studies, participants are requested their express agreement for data storage. Also, companies delete demographic and raw data after some time (ranging from several days to several weeks), keeping only the interpretation of results and their reports. In most of the cases, companies inform participants about the technical procedures of data management (which data will be stored and which will be deleted after processing).

The diverserange of procedures companies adopt to ensure data security and individuals' privacy lead to the same conclusion: **H₄ is valid**.

Conclusions

This research, the first one of such type on the Romanian market according to the authors' knowledge, is the first step towards ensuring an ethical neuromarketing investigation framework in Romania. We believe that this initiative will lay the foundation of rigorous neuromarketing scientific investigations and will be able to refute invalid arguments about neuromarketing's manipulative methods and techniques.

Foreign respondents' valuable experience is a landmark for future neuromarketing studies in Romania. The results of this study stress the need of a more intense and precise training of the subjects taking part in neuromarketing experiments. Thus, companies can prevent the onset of anxiety, fear or cognitive inhibition among respondents. Moreover, these procedures guarantee respondents the total privacy of personal information. Beneficiaries of neuromarketing studies should furthermore receive an introductory guide explaining neuromarketing investigation methods and techniques and their connection with neuroscience.

Neuroimaging research is not only limited to the field of marketing. It is increasingly used in various fields as technology advances, performance increases and information becomes more and more accessible. Similar studies were conducted in electoral campaigns of politicians, in the film industry to test the scenes with the greatest impact on the audience – so that these may be included in the trailers of TV shows – and in architecture to assess the effect of various design elements on the public's perception. *Cognitive ergonomics* developed by Georges and Badoc (2010) show that such endeavours may contribute to creating and building a favourable climate needed to attain the objectives pursued by the neuromarketing research. In fact, researchers who use such techniques verify in advance the rules of film making and screening to facilitate the overall and harmonious training of the human brain. Such apparently insignificant ingredients are fully used to immerse the reader or the onlooker into the plot of a book (such as "The Da Vinci Code") or a film (such as "Titanic") (Pop, Iorga, 2012).

Numerous studies were aimed at obtaining as much information as possible about the intelligence, character and attitudes of consumers by analyzing their brain activity through

neuroimaging techniques (Canli, Amin, 2002; Duncan, 2003; Illes et al., 2003; Gray, Thompson, 2004). This approach has been called “brainotyping”, by analogy with genotyping (Farah et al., 2010). Both instances allow some samples to be obtained, which can be used later to attain objectives different from those set initially, thus intruding on the individual's privacy (Illes, Racine, 2005). For instance, an experiment on monitoring some individuals' faces may provide information on their psychological traits (extroversion, introversion etc) as well as on other more sensitive issues such as the subconscious racial attitude (Phelps et al., 2000; Canli et al., 2002), inner states or their preference for a particular behaviour.

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