



Limiting Aspects of Neuromarketing Research

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Abstract: Marketing specialists, marketing academics and neurologists define more effective strategic approaches for communication with modern consumers through neuromarketing. Defining the limiting factors in the neuromarketing research process by examining the attitudes of relevant respondents was the aim of this empirical research. The conclusion was that neuromarketing research is a modern approach to understanding consumer behaviour during the process of purchasing products and services and that, within certain limits, is in line with ethical criteria.

Keywords: neuromarketing research; neuroscience; consumer behaviour; limiting aspects; ethics

JEL Classification: M31, M39

Omejitveni vidiki nevromarketinških raziskav

Povzetek: Marketinški strokovnjaki in akademiki ter nevrologi lahko opredelijo učinkovitejše pristope komuniciranja s sodobnimi potrošniki s pomočjo nevromarketinških raziskav. Cilj empirične raziskave je bil opredelitev omejitvenih dejavnikov v procesu nevromarketinških raziskav skozi raziskovanje stališč sodelujočih. Ugotovili smo, da so nevromarketinške raziskave sodoben pristop k razumevanju vedenja potrošnikov v procesu nakupa izdelkov in storitev in da so v določenih mejah v skladu z etičnimi merili.

Ključne besede: nevromarketinške raziskave; nevroznanosti; vedenje potrošnikov; omejitveni vidiki; etika

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1. Introduction

Experts in the field of economics, psychology, neurobiology and neuroscience converge their expertise in neuroeconomics, a special discipline in which economists and psychologists provide practical tools for a better understanding of the workings and reactions of stimuli of the consumer (Ulman, Cakar and Yildix, 2015). The focus is on the relationship between perception and the actions of various neurobiological mechanisms that influence consumers' decision making. Neuromarketing is a specific form of market research which, by using conscious and unconscious aspects of the neurological and psychological responses of the respondents, achieve results that could solve certain marketing problems related to consumer behaviour (Fortunato, Giraldi and de Oliveira, 2014).

Neuromarketing is a very important tool for better understanding of consumers, focusing on potentials in communication, identifying the unconscious needs of the consumer, and deriving a more adequate design and creation of all elements of the marketing mix.

Marketing experts, academics and neurologists have been trying to understand consumer behaviour for a long time, in order to afford the consumers a special experience in the purchasing process. Many brand managers try to understand what is it that creates the consumer's desires and needs, primarily by forming unique experiences through which they enliven their brands, although they know that many of them will not attract attention. One of the reasons is that there is a discrepancy between consumer attitudes and direct purchasing behaviour. It is believed that the traditional methods of research measure consumer attitudes towards certain brands, however, those same attitudes do not necessarily have to coincide with the final purchase decision (Agarwal and Dutta, 2015). Namely, traditional methods of research fail to include the subconscious processing of information of potential customers. The above-mentioned leads to discrepancies between market results and consumer behaviour at the time of purchase.

The possibility presented by neuroscientific methods in anticipating choices that a prospective buyer can make in the real world is a remarkable breakthrough and important for the marketing profession as a whole. In this way, marketing experts can "peak" into the workings of the consumer's brain, in order to more efficiently design their actions on the market.

Neuroscience offers very specific benefits, which include explanations of observed heterogeneous phenomena within and between different consumer groups as well as new mechanisms for interpreting psychological phenomena, primarily those pertaining to hormones and genes, which can influence the making of final purchasing decisions (Shiv and Yoon, 2012). In this way, neuroscience directly shapes future models of consumer behaviour and suggests new directions of research techniques.

2. Literature review

The technical tools used for neuromarketing are based on the incredible diversification of neuroscientific research, so it is considered that studies do not stop at merely examining the workings of the human brain, but also include all areas of the psychological and cognitive process of the respondents. By using neuromarketing tools, one can measure the electrical conductivity and the amount of sweating of the skin, certain hormonal changes, muscle movements of the examinee (muscles of the body and face included), as well as blood pressure. Owing to the combination neuroscience and marketing, we can ascertain various aspects of consumer behaviour, which are often left either unexplained or only partially explained by traditional marketing research techniques.

Emotions are the key to understanding consumer behaviour and are a relevant monitoring subject. Emotions are the basis for making all relevant decisions in the purchasing process, and are closely related to perception, attention and the impression that a potential customer has about a product or service (Slijepčević, Popović Šević and Radojević, 2017). Neuromarketing research makes use of various instruments and techniques in order to measure and then evaluate the customer's emotions.

In neuromarketing research, different physiological indicators are used for thoroughly studying consumer behaviour. A group of scientists discovered that certain changes in the level of cortisol (the hormone responsible for stress in the human organism) have a fair share of influence in making decisions during the negotiation process (Mehta et al., 2010).

In recent times, neuromarketing research has outperformed all expectations in terms of predicting of not only respondents within a given research sample but can now be applied to the general consumer population as a whole.

2.1. Limitations of Neuromarketing

Unfortunately, as is the case with other new scientific disciplines, neuromarketing faces certain barriers and the public's distrust. One of the main barriers in neuromarketing research is steep costs. fMRI devices cost more than one million dollars and renting such a device can cost thousands of dollars per hour (Felipe-Barkin, 2013). The use of this method is therefore as expensive as the equipment used as it is static, which complicates research (Ariely and Berns, 2010).

Neuromarketing research is certainly more expensive than the traditional methods of research of the consumer market. However, if a company plans to launch an expensive and long marketing campaign, it is extremely important to have quality and credible market research indicators, which is what neuromarketing research provides. Therefore, neuromarketing is certainly the perfect tool for the final selection of good advertisements. In fact, the high costs of neuromarketing services, fMRI among others, are a key factor for the lack of funds for prolonged experiments. High costs also limit the number of completed neuromarketing studies (Mikic, 2016). Sometimes, conducting neuromarketing studies requires permission from appropriate state institutions (Fortunato, Giraldi and de Oliveira, 2014).

Despite the fact that neuromarketing techniques are non-aggressive and non-invasive, there is an obvious difficulty in finding respondents. Although it is difficult to find them, certain studies show that they have very positive attitudes regarding neuromarketing activities. What's more, respondents said that the experience of being monitored using an fMRI device was interesting, fascinating, and that they enjoyed during their participation in the research (Senior et al., 2007).

After all, pragmatic problems faced by neuromarketing research, there are certain dilemmas regarding compliance with ethical principles. Neuromarketing is used to analyse individual customers' subconscious desires in order to design and create special "triggers" of those desires, transforming them into actual needs, fulfilment of which requires the final purchase of products or services. Critics of neuromarketing believe that this can additionally lead to unjustifiably increased consumer purchases which would turn them into a kind of "addict" for marketing offers tailored in such a way (Gutman, 2013). This is all contrary to natural laws and ethical codes, which precludes any further popularization and development of neuromarketing. The author Oullier (2012) considers that the techniques of monitoring and processing of the inner workings of the consumer's brain can and should be used exclusively for medical and other scientific purposes.

The situation is so dire that it is believed that neuromarketing is still at its infancy, and that the results of this methodology are often exaggerated and misinterpreted in terms of effectiveness on consumers (Ergen and Ulman, 2012). The use of technology that invades the depths of the human brain poses two subtle dilemmas: protecting respondents that may be hurt or subliminally exploited by neuromarketing research, and the protection of consumer autonomy (Murphy, Iles and Reiner, 2008).

It is often debated whether neuromarketing really is a non-invasive method that helps companies to more accurately perceive consumers' true desires and whether it is actually a method that subconsciously suggests the purchasing process to the consumer. Research of the mechanism of the functioning of the brain is interdisciplinary in the field of neuroethics, which deals with moral, sociological, as well as different ethical dilemmas that are closely related to the creation and application of neuroscientific research experiments (Vlasceanu, 2014). Some authors believe that the growing importance of neuroethics has been due to certain forms of public aversion when it comes to the application of neuromarketing (Ulman, Cakar and Yildix, 2015).

Regarding ethical principles when conducting neuromarketing research, it is considered necessary to respect human dignity, which should be the fundamental basis of all research, neuromarketing included. It is extremely important to take special measures, especially when sensitive consumer categories, such as children and young people are involved, with the aim of protecting them against potentially harmful effects such as the purchase of often unnecessary things, as well as over commercialization, which is believed to be the consequence of neuromarketing.

3. Methodology of Research

The survey was carried out at the end of 2017. The research sample was deliberate. The following groups of respondents were interviewed through a questionnaire using the method of online survey. Three Groups of experts were interviewed:

1. Neurologists (employees of the Military Medical Academy in Belgrade, Clinical Centre of Serbia and other health institutions in Serbia that have Neurological departments, members of the Society of Neurologists of Serbia),
2. Marketing experts (experts whose profession is marketing, and are employed as CEOs of marketing agencies, directors of marketing and marketing managers in leading companies in Serbia) and
3. Marketing academics (professors and lecturers who teach marketing at prestigious universities in Serbia, at Belgrade University, University of Novi Sad and University of Niš, among others).

The questionnaire contains a total of 18 questions, and the first, general part contains 3 questions, while the second containing 15 questions directly pertains to neuromarketing research. Within 15 questions, answers in the domain of recognition, applicability, economy, ethics and limitations of neuromarketing research were sought. All questions were of the closed type, and in terms of measurements were nominal and ordinal. The Likert scale of attitudes, which consists of 5 degrees of agreement and measures the intensity and acceptance of the claim, was used. The task of the respondents was to express their degree of agreement or disagreement in relation to each of the claims in the questionnaire. The following five-step scale was used: I do not agree at all, I do not agree, I have no opinion, I agree, I completely agree. Respondents' responses were scored, and the final score was obtained by adding points for each claim. The final result showed the degree to which respondents had a positive or negative attitude in relation to the claim in the questionnaire.

The SPSS program and statistical functions were used for the statistical data processing, and χ^2 test was used due to the types of variables to test the hypothesis. The χ^2 test calculates whether there is a statistically significant connection in the frequencies of two attribute markers or between the obtained frequencies and the frequencies expected in a certain hypothesis.

Statistical conclusion is based on a sample on which certain conclusions about the population are made (statistical collection). The statement or assumption (hypothesis) is tested by standard statistical procedure by testing the hypothesis.

The hypothesis tested by this procedure is called the zero hypothesis (in H_0), as opposed to the alternative hypothesis (in H_1), i.e. the one that is believed in the case that the sampled data leads to the rejection of the zero hypothesis (Mann, 2010).

H_0 - Neuromarketing is a modern research method with limiting factors, but it is in line with ethical principles.

Statistical conclusion is based on the value of test statistics. If the value of the test statistics in the acceptance area (if the principle based on the probability value (p-values) is applied, the p-value is greater than the level of significance), the zero hypothesis is accepted, otherwise it is rejected (the p-value is equal to or less than the level of significance), (Mann, 2010).

The p value is defined as the lowest level of significance on which the zero hypothesis is rejected.

In this paper, the subject of the analysis is the views of the respondents regarding the following group of questions from the questionnaire:

Research Question no. 1 (RQ 1):

- There are high costs in the process of neuromarketing research.

Research Question no. 2 (RQ 2):

- There are difficulties in finding respondents when conducting neuromarketing research.

Research Question no. 3 (RQ 3):

- Neuromarketing leads to a manipulative way of selling products and services.

4. Analysis and Results

The survey involved 109 respondents, 33.9% male and 66.1% female. Almost 50% of the respondents were professional marketing experts.

Looking at the structure of respondents in relation to gender and occupation, it is noted that approximately the same percentage of both male and female respondents were marketing professionals, while approximately the same percentage of females and males were academic workers and neurologists, respectively, and vice versa.

More detailed data on the structure of the used sample can be obtained from the following tables:

Table 1: Structure of the respondents by profession

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Marketing academic	31	28.4	28.4	28.4
	Neurologist	22	20.2	20.2	48.6
	Marketing expert	53	48.6	48.6	97.2
	Other	3	2.8	2.8	100.0
	Total	109	100.0	100.0	

Source: Authors (2017) results of primary research

Table 2: Structure of respondents in relation to gender

Gender			Frequency	Percent	Valid Percent	Cumulative Percent
Male	Valid	Marketing academic	7	18.9	18.9	18.9
		Neurologist	12	32.4	32.4	51.4
		Marketing expert	17	45.9	45.9	97.3
		Other	1	2.7	2.7	100.0
		Total	37	100.0	100.0	
Female	Valid	Marketing academic	24	33.3	33.3	33.3
		Neurologist	10	13.9	13.9	47.2
		Marketing expert	36	50.0	50.0	97.2
		Other	2	2.8	2.8	100.0
		Total	72	100.0	100.0	

Source: Authors (2017) results of primary research

If we compare the structure of male and female respondents according to professions, the bottom line is that the highest percentage of respondents of both genders are in the category of marketing professionals, while a higher percentage of male respondents are neurologists, and a higher percentage of female respondents are academics.

RQ 1: There are high costs in the process of neuromarketing research

Taking into account the gender structure according to the results, over 56% of male respondents have no opinion on this claim, while this number is slightly lower in female respondents and is 43%. On the other hand, over 51% of female respondents agree or fully agree with the stated position, while this percentage is significantly lower for male

respondents at 27%. No male respondent stated that he completely disagreed with the stated claim, while only one female respondent gave that answer. A higher percentage of male respondents - 16.2% disagree with the stated claim, while the percentage of female respondents is somewhat lower - 4.2%.

On the basis of the obtained results, it can be concluded that female respondents are more in agreement with the view that there are high costs in the neuromarketing research process, while on the other hand, the highest percentage of male respondents has no opinion on the subject.

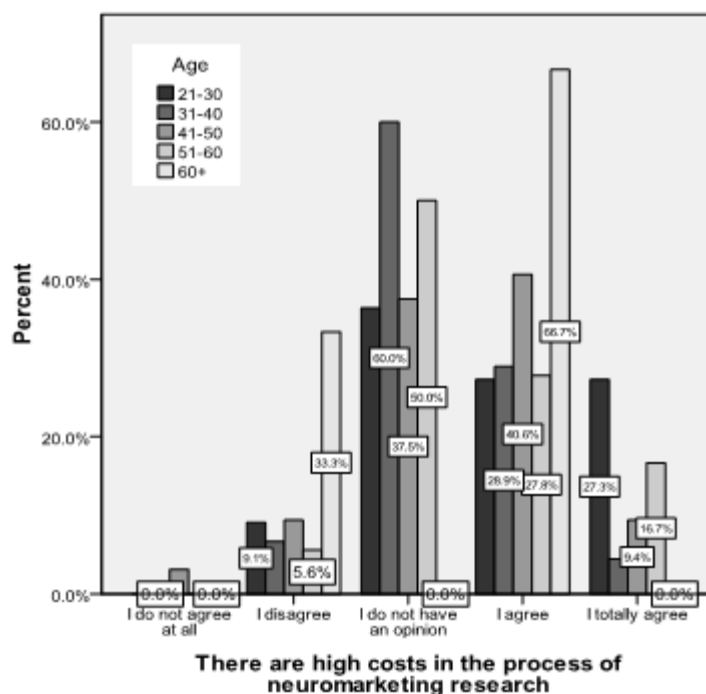


Figure 1: There are high costs in the process of neuromarketing research – Age %.

Source: Authors (2017) results of primary research

When considering the age structure of the respondents, it is interesting to note that 67% of respondents in the 60+ category agree, while 33% do not agree with the above statement. The highest number of subjects aged 21-30 agrees or completely agrees with the stated position (over 54%), while the largest number of respondents from 31-40 and 51-60 years of age groups have no opinion on the above-mentioned position (60%) and (50%).

On the basis of the obtained results, it can be concluded that the oldest and youngest respondents mostly agree with the opinion that in the process of neuromarketing research there are high costs, while middle-aged respondents do not have an opinion on the subject.

RQ 2: There are difficulties in finding respondents when conducting neuromarketing research

Considering the answers, it is noticeable that the majority of respondents have no opinion on this claim (over 48%), while over 35% of respondents agree or completely agree and 15% do not agree and completely disagree with the stated position.

Taking into consideration the gender structure according to the results shown, about 48.6% of respondents do not have an opinion on the given claim. On the other hand, over 38.9% of female respondents agree or completely agree with the stated position, while this percentage is significantly lower for male respondents - 29.7%. No male respondent stated that he fully agreed with the stated position. A higher percentage of male respondents - 21.6% disagreed or completely disagreed with the stated position, while the percentage of female respondents was slightly lower - 12.4%.

On the basis of the obtained results, it can be concluded that the highest percentage of respondents of both genders have no opinion on the claim that there are difficulties in finding respondents when conducting neuromarketing research, while female respondents are more in agreement with that claim.

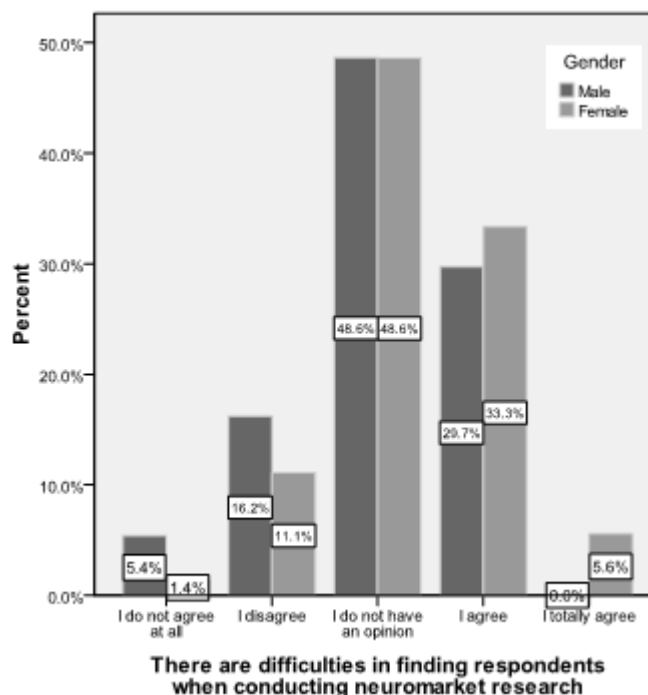


Figure 2: There are difficulties in finding respondents when conducting neuromarketing research – Gender %.
Source: Authors (2017) results of primary research

Taking the age structure of the respondents into consideration, it is noticeable that the largest number of respondents aged 21-30 (63,6%) agreed with the stated claim. It is interesting to note that the majority of respondents from other age categories did not have an opinion on the subject. The percentage with the respondents aged 31-40 years is as high as 64.44%.

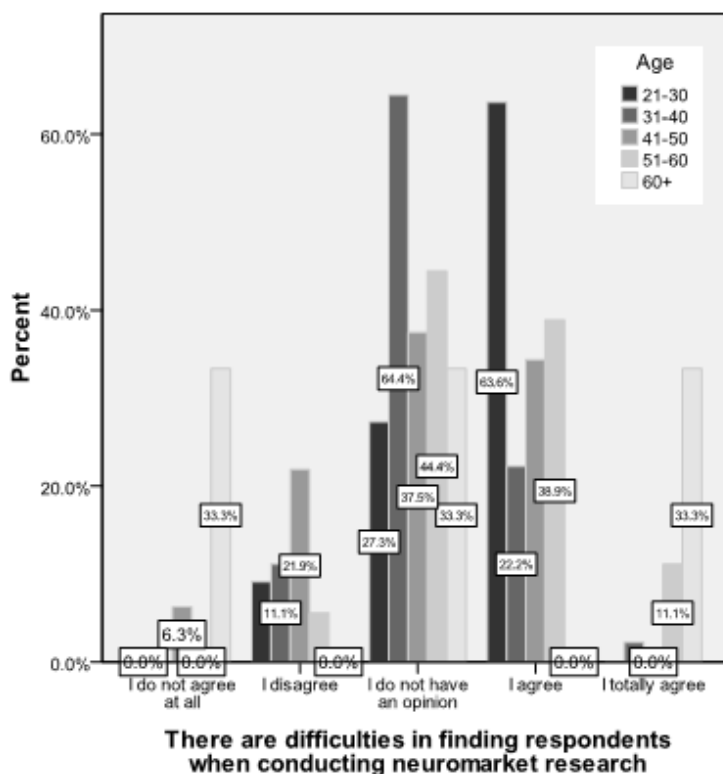


Figure 3: There are difficulties in finding respondents when conducting neuromarketing research – Age.
Source: Authors (2017) results of primary research

On the basis of the results obtained, it can be concluded that the youngest respondents mostly agree with the opinion that there are difficulties in finding subjects when conducting neuromarketing research, while the other respondents do not have the opinion on the above statement.

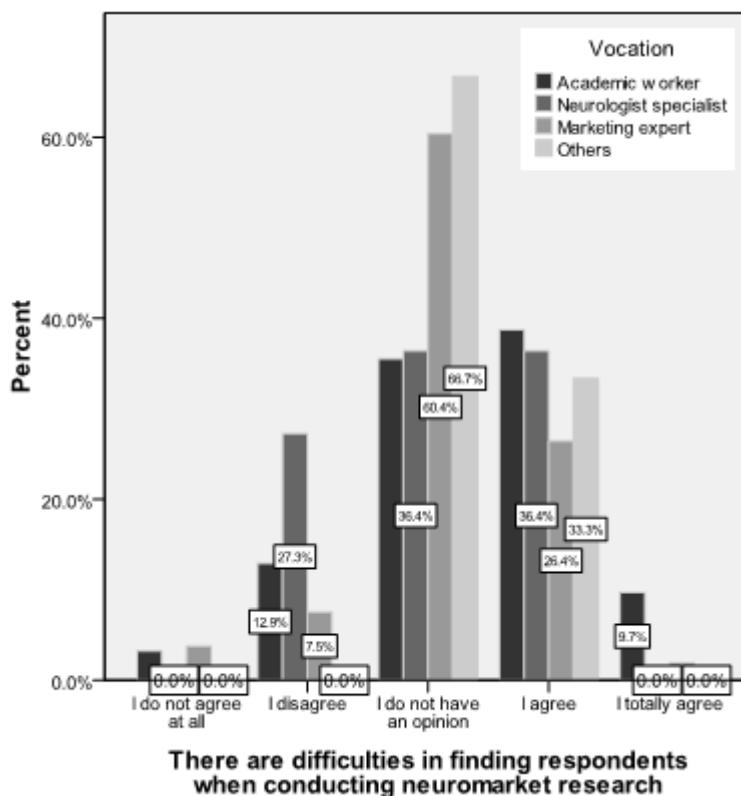


Figure 4: There are difficulties in finding respondents when conducting neuromarketing research – Vocation.

Source: Authors (2017) results of primary research

If we observe the respondents' vocation in Graph 4, we can see that 67% of the respondents from the occupation category "other" and over 60% of the marketing experts did not have an opinion on the above statement, while the largest number of marketing academics – 48% agreed or agreed completely with the stated claim.

On the basis of the results obtained, it can be concluded that the marketing academics mostly agreed with the view that there are difficulties in finding respondents in conducting neuromarketing research, while neurologists and "others" did not have an opinion on the subject.

RQ 3: Neuromarketing is a manipulative way of selling products and services

Observing the answers tells us that most of the respondents disagreed or completely disagreed with the stated claim (over 41%). 25% have no opinion on the said position, while 34% of respondents agree or agree completely.

Taking into consideration the gender structure according to the results, the largest number of male respondents - 43.24% had no opinion on the above-mentioned statement. On the other hand, over 43.06% of female respondents disagreed with the stated position, while this percentage was significantly lower for male respondents - 29.73%. No female respondent stated that she completely disagreed with the stated position. Over 41% of female respondents agreed or fully agreed with the stated position, while male respondents had a slightly lower percentage - 18.9%.

On the basis of the results obtained, it can be concluded that the highest percentage of male respondents had no opinion on the given position, while more female respondents did not agree more with the stated position.

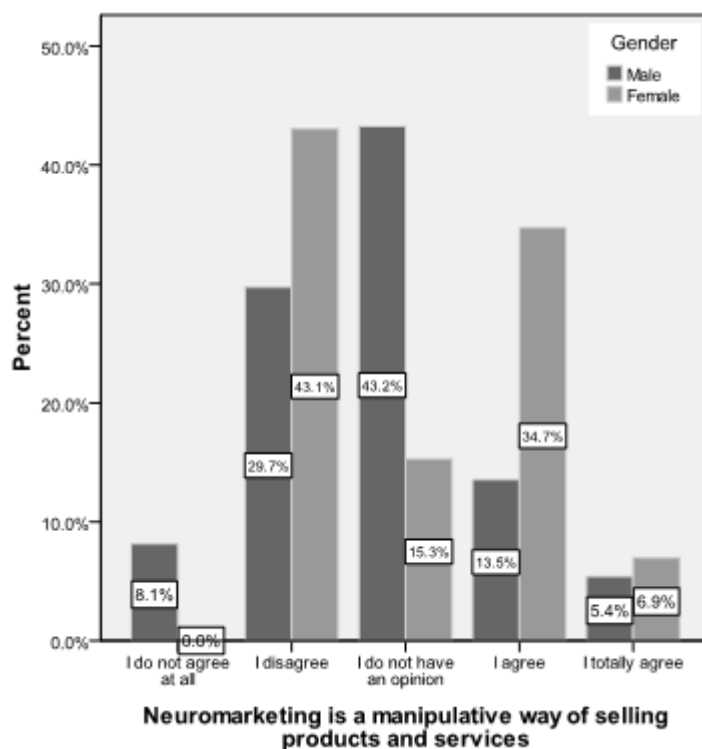


Figure 5: Neuromarketing is a manipulative way of selling products and services – Gender.

Source: Authors (2017) results of primary research

When looking at the age structure of the respondents, it is interesting to note that 81% of 21 – 30-year old's disagreed or completely disagreed with the stated position, while the same number agreed or had no opinion on the subject - 9.1 %. The highest number of respondents aged 41-50 years of age agreed or completely agreed with the stated position (over 41.9%), while the same percentage of respondents of the 51-60 age category - 38.89%, disagreed with the stated position.

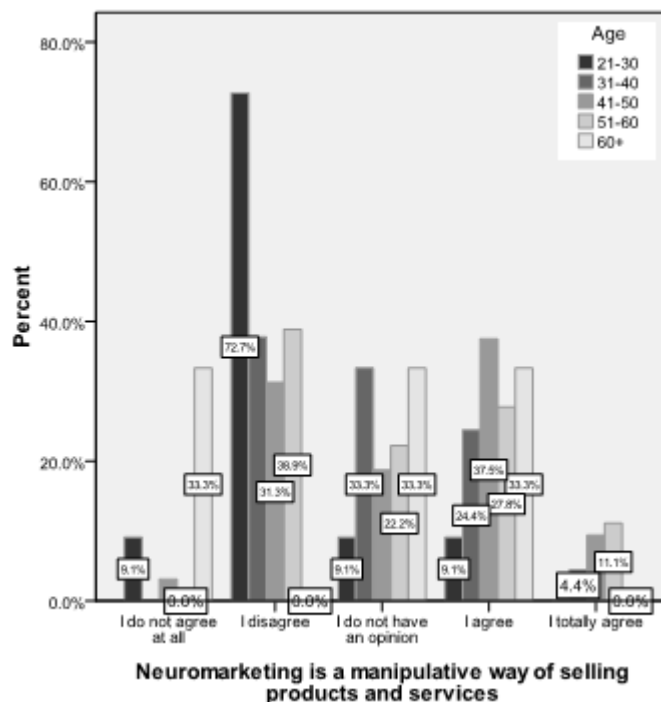


Figure 6: Neuromarketing is a manipulative way of selling products and services – Age.

Source: Authors (2017) results of primary research

On the basis of the obtained results, it can be concluded that the youngest respondents mostly disagreed with the stated position, while the respondents from 41-50 years mostly agreed or completely agreed with it.

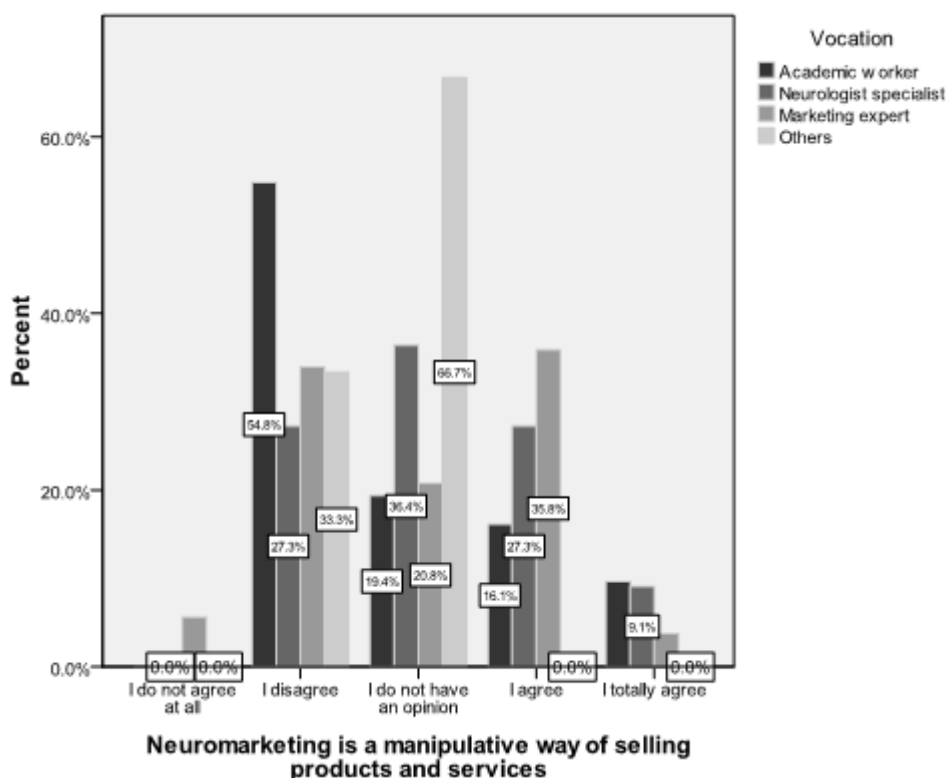


Figure 7: Neuromarketing is a manipulative way of selling products and services – Vocation.

Source: Authors (2017) results of primary research

If we examine the respondents' vocations, we can see that 67% of respondents from the "other" category did not have an opinion on the stated position, while 33% did not agree with the stated position. On the other hand, the largest number of marketing academics did not agree with the stated position (54.8% in total), while the percentage of respondents from the other groups who disagreed was slightly lower: marketing experts - 34%, neurologists - 7.27%.

On the basis of the obtained results, it can be concluded that marketing academics mostly disagreed with the stated position, while the "others" did not have an opinion on the above claim.

5. Conclusion

The subject of the paper "Limiting Aspects in Neuromarketing Research", was part of the research aimed at determining and defining limiting factors in the neuromarketing research process, i.e. examining the attitudes of relevant participants in the process, on whom the realization of this modern method of marketing research which contributes to understanding the behavior of consumers ultimately depends on. A previous research by the authors led to the conclusion that the neuromarketing research accurately analyzes and interprets the inner workings of the consumer's brain, which gives a more realistic picture of what exactly makes consumers to purchase new goods and services (Slijepčević, Popović Šević and Radojević, 2018).

Three research questions were asked to verify the hypothesis. Based on the obtained results it was concluded that the zero hypothesis had been confirmed, which meant that neuromarketing was a modern research method that contributed to understanding the behavior of consumers when purchasing products and that it was in accordance with ethical principles. Respondents from three groups relevant to this scientific and professional field, presented their views, which are extremely important because neuromarketing research, a complex and modern research method, must be viewed from multiple angles. In this paper, the views of the respondents regarding the limiting factors of neuromarketing research were considered, in terms of the high costs of neuromarketing research, the difficulty in finding the subjects necessary for conducting neuromarketing research, and in terms of the validity of the attitude that neuromarketing leads to manipulative ways of selling products and services.

This way of looking at neuromarketing research proved to be very useful, as the results showed that there are differences in attitudes between marketing academics and marketing experts on the one hand, and neurologists and "others" on the other. The results show that marketing academics and marketing experts claim that neuromarketing research is limited by high research costs and the difficulty in obtaining of participants or respondents in neuromarketing research projects, while neurologists maintained a neutral attitude regarding these two significant issues.

The fact that marketing academics have mostly expressed disagreement with the claim that neuromarketing leads to a manipulative manner of selling products and services suggests that regardless of the limiting factors of high costs and the difficulty in finding participants in neuromarketing research, this modern research method is in fact acceptable and justified. One can conclude that neuromarketing is a modern research method not without limiting factors, but that it is in line with ethical principles.

In particular, younger individuals of all professions reacted positively, so in the future we can rightly expect the further development of neuromarketing research. Bearing in mind the fact that neurologists had a neutral attitude regarding the limiting aspects of neuromarketing research, and that they are most qualified first of all in terms of attitudes in terms of consumer health, we can conclude that neuromarketing is not a manipulative way of selling products and services and can therefore be used along with all the advantages that it entails as an extremely precise modern research technique.

Economic constraints that exist according to the views of the academic community and marketing practitioners, those who actually practice neuromarketing research, open up a new field of research in the future. It is necessary to take a view of two important segments: first, to survey companies and organizations that have significant marketing budgets, determine their attitudes, determine their potential budget for neuromarketing research on the one hand, and, on the other hand, make a segmentation of consumers in line with companies that are ready to allocate funds for neuromarketing research, and survey their attitudes regarding participation in neuromarketing research. Potential limitations of neuromarketing research may include the following: artificial research conditions, technical limitations of neuromarketing tools, limited number of respondents, credibility, which could be the subject of some of the subsequent scientific researches.

It can be concluded that the significance of neuromarketing as a marketing research tool is in the sphere of increasing interest of the target audience. Through directly implemented neuromarketing studies, there is an increasing number of companies that will, due to the results obtained, make every effort to better design products and design more effective marketing campaigns. From a managerial viewpoint, through the analysis of neurological, psychological and biochemical mechanisms, undreamed-of business opportunities could be created in order to finally review the effectiveness of marketing campaigns, advertising, as well as evaluate new products before placing them on the market. Knowing how certain products and services affect the emotional states of potential consumers, companies would, due to neuromarketing research, have exceptional conditions to adapt to the market.

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