



**TECHNIUM**  
**SOCIAL SCIENCES JOURNAL**

**Vol. 12, 2020**

**A new decade  
for social changes**

[www.techniumscience.com](http://www.techniumscience.com)

ISSN 2668-7798



9 772668 779000

## **Analysis of differences in selected attributes of neuromarketing within socio-demographic characteristic**

**Anna Tomková**

University of Prešov in Prešov, Faculty of management, Konštantínova 16, 08001  
Prešov, Slovak republic  
[anna.tomkova@unipo.sk](mailto:anna.tomkova@unipo.sk)

**Dagmara Ratnayake-Kaščáková**

University of Prešov in Prešov, Faculty of management, Konštantínova 16, 08001  
Prešov, Slovak republic  
[dagmara.ratnayake-kascakova@unipo.sk](mailto:dagmara.ratnayake-kascakova@unipo.sk)

**Ivana Ondrijová**

University of Prešov in Prešov, Faculty of management, Konštantínova 16, 08001  
Prešov, Slovak republic  
[ivana.ondrijova@unipo.sk](mailto:ivana.ondrijova@unipo.sk)

**Abstract.** The aim of the paper is to identify and specify the differences between the assessment of the attributes of neuromarketing and selected socio-demographic characteristics of respondents. The attributes "store information", "seller information" and "product information" were examined in terms of the respondents' residence and the region of origin of the participants. Data were obtained by the questionnaire method according to the Neuromarketing methodology. The established hypotheses were verified on a sample of 190 respondents through statistical analysis in the IBM SPSS statistical program. The analysis did not confirm the existence of statistically significant differences in the perception of the established attributes of neuromarketing in relation to the place of residence (city or countryside). On the contrary, differences were recorded in terms of the region of Slovakia from which the respondent came.

**Keywords.** Neuromarketing, store, seller, product.

### **1. Introduction**

Marketing experts have tried to find out why some results of marketing research do not correspond to reality. They found that new methods and strategies were lacking that would yield more accurate and scientific data. The reason why quantitative and qualitative marketing research is not always accurate is that the people interviewed do not have to tell the truth and do not know about it themselves. Respondents usually make irrational decisions, without

thinking based on their emotions and feelings. The respondent can be affected by various factors, which then distort his answers, such as emotions. It would be best to capture these factors on paper, but this is not possible in a normal and controlled conversation. They must therefore be captured in the brain as soon as they are formed. Thanks to this, a new scientific department was created - neuromarketing (Lindström, 2009).

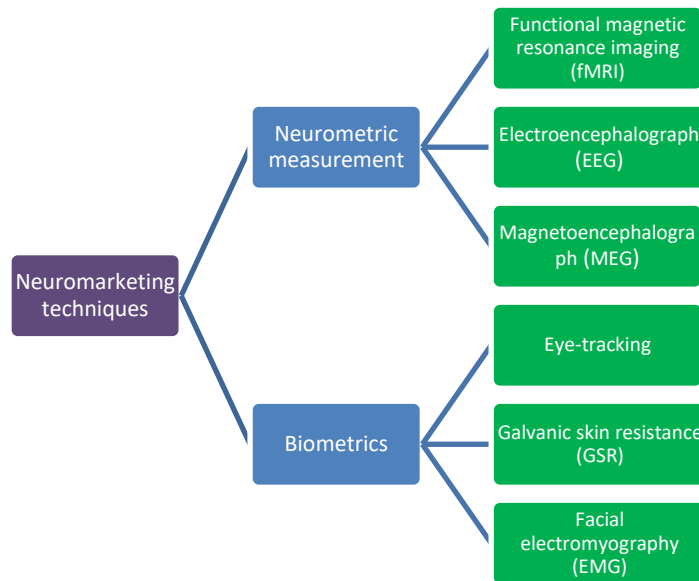
In recent years, the development of neuroscience has significantly changed our understanding of the brain and its functioning, thanks to advances in molecular biology, electrophysiology and computer sophistication. These advances have allowed experts to examine the nervous system in all its aspects. This area has significantly helped to better understand human behavior (Zurawicki, 2010). We define neuroscience as a scientific discipline that deals with the study of the nervous system caused by development, structure and natural principles of functioning. Neuroscientists use this knowledge to examine the effect of brain activity on human behavior (Morris, 2003). Neuroscience is a combination of different disciplines in which it combines molecular biology, neuropsychology, anatomy, developmental biology, cell biology, behavioral psychology, neurology, cognitive neuropsychology and cognitive science into one whole. This relatively new area of research has made a significant contribution to a better understanding of human behavior in recent years. It also provides information on consumer behavior (Zurawicki, 2010).

## **2. Basic techniques of neuromarketing**

We divide neuromarketing techniques into neurometric measurement and biometrics (Figure 1). Neuromarketing includes all methods that can measure the emotional response without the respondent being aware of it. Brain activity and emotional experiences are manifested, for example, by an increased heart rate. When measuring brain activity, the onset of emotions is monitored, which take place in the amygdala - an organ located in the middle part of the temporal lobe. The activity of the amygdala is measured in two ways:

- Depth - by magnetic resonance imaging (fMRI)
- Surface - using an electroencephalograph (EEG)

These measurements are demanding and expensive in financial, organizational and time. Biometrics deals with the body's reactions due to emotions, such as sweating, rapid breathing, and heart rate. By measuring these body changes, it is possible to obtain data that can be combined with outputs from magnetic resonance or electroencephalography, which increases the reliability of neuromarketing research (Tahal, 2017).



**Figure 1.** Neuromarketing techniques.  
(Source: own processing)

Lindström (2010) does not question neuromarketing from an ethical perspective. According to him, neuromarketing is not based on pushing ideas into the consumer's head, nor is it used as a tool to force the consumer to buy, which he does not want. Neuromarketing reveals what is already in our heads.

Why does the neuromarketing cause ethical concern? While neuromarketing has far-reaching use in practice, it is important to deal with a matter of ethics. Neuromarketing and ethic principle difficulty comes from the fact, that researchers can unconsciously cross the line of privacy, what interrupt consumer autonomy protection (Ondriřová, Tomková, 2017).

One of the biggest concerns with neuromarketing and consumer behavior is that marketers could uncover a "buy button" that allows experts to control consumer behavior and force consumers to buy. However, these concerns are unfounded. Most research only describes and seeks to reveal how the human brain works at the point of decision-making in the purchasing process. Experts who advocate neuromarketing claim that neuroscience can be compared to all other methods that have studied human behavior in the past. This research is a way of measuring factors that has not been available to date. Neuromarketing is a more accurate method that measures preferences, not the manipulation of consumer behavior (Thomas, 2017).

### 3. Methodology

The aim of the research was to identify and specify the differences between the assessment of neuromarketing attributes and selected socio-demographic characteristics of customers. The examined differences were characterized in terms of respondents' residence and in terms of the region from which the respondents come. Based on the goal, two hypotheses were established:

Hypothesis 1: We assume that there are statistically significant differences in selected attributes of neuromarketing in terms of residence.

Hypothesis 2: We assume that there are statistically significant differences in selected attributes of neuromarketing from the point of view of the region.

Within the quantitative research, a questionnaire method of empirical data collection and mathematical-statistical methods for their analysis were used.

The questionnaire was created according to the Neuromarketing methodology - information about the store, information about the seller, information about the product, in which the following attributes were: store, seller, product. The methodology contained 30 statements, which were assessed on a 5-point Likert scale with the following scale from 1 (certainly yes) to 5 (certainly not).

Attributes that the methodology contained:

- 1. store** - an establishment in which some goods are sold or bought - a sale or purchase is concluded there. There, the customer views the submitted available goods, services with the potential intention to buy the best and most advantageous goods, service. The final decision of the customer whether to buy the goods or services may change in the store, so it is important that the customer feels comfortable there.
- 2. seller** - a person who sells products or provides services to customers. Seller 's main task is to serve the customer with the intention of selling goods and services. From the point of view of neuromarketing, the behavior and approach of the seller greatly influences the customer's decision-making during shopping.
- 3. product** - a good or service that serves to satisfy needs and desires. Customers can build a strong emotional attachment to certain products, including through the neuromarketing links of their favorite brands.

The research sample consisted of 190 respondents. The average age of the respondents was 27.38 years. In terms of residence, 96 (50.53%) respondents were from the city and 94 (49.47%) from the countryside. From the point of view of the region of Slovakia, from which the respondents come, we considered the region of Slovakia to be the original territorial division into three regions. There were 132 (69.47%) respondents from the Eastern Slovak Region, 27 (14.21%) from the Central Slovak Region and 31 (16.32%) respondents from the Western Slovak Region.

#### 4. Results and interpretations

Hypothesis 1 examined the differences in selected attributes of neuromarketing in terms of residence. A t-test was used to verify it (Table 1).

**Table 1.** Differences in individual attributes of neuromarketing in terms of residence.

	Residence	Mean	St. Deviation	t	Sig (2-tailed)
<b>Store</b>	city	2.25	.582	1.220	.224
	countryside	2.16	.430		
<b>Seller</b>	city	2.41	.689	.287	.774
	countryside	2.38	.627		
<b>Product</b>	city	2.9750	.80433	1.357	.176
	countryside	2.8277	.68899		

(Source: own processing)

Within the differences in terms of residence, we did not record statistical significance for any examined attribute of neuromarketing, and therefore we reject Hypothesis 1.

Hypothesis 2 examined the differences in selected attributes of neuromarketing from the point of view of the region.

Based on analysis of variance,  $F = 2.698$ ,  $Sig. = 0.070$ , no significant differences were recorded in the attribute "store" in terms of region (Table 2).

**Table 2.** Post-hoc comparisons in the "store" attribute from the point of view of the region.

Region	Region	Average difference	Significance
Eastern Slovak Region	Central Slovak Region	-0.199	0.156
Central Slovak Region	Western Slovak Region	0.025	0.981
Western Slovak Region	Eastern Slovak Region	0.174	0.203

(Source: own processing)

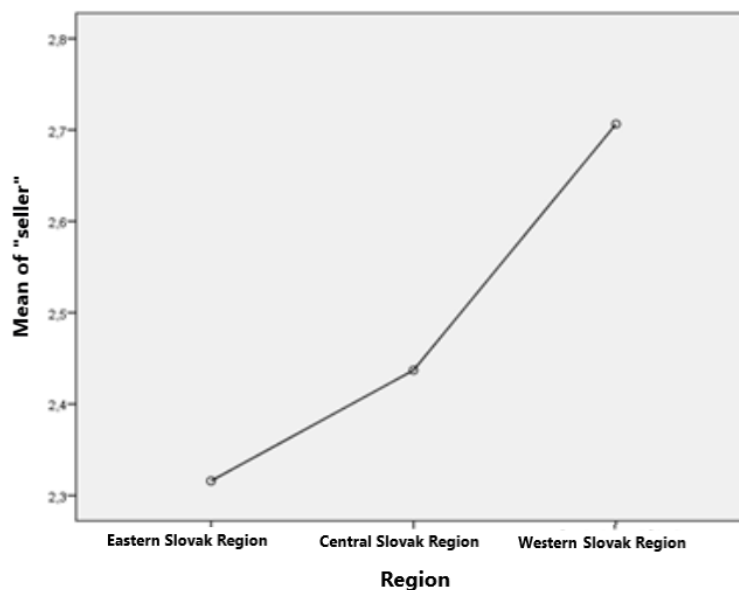
Based on the analysis of variance,  $F = 4.664$ ,  $Sig. = 0.011$ , we found significant differences in the attribute "seller" in terms of region (Table 3).

**Table 3.** Post-hoc comparisons in the "seller" attribute from the point of view of the region.

Region	Region	Average difference	Significance
Eastern Slovak Region	Central Slovak Region	-0.121	0.648
Central Slovak Region	Western Slovak Region	-0.269	0.254
Western Slovak Region	Eastern Slovak Region	0.391*	<b>0.008</b>

(Source: own processing)

Graph 1 and Table 3 show statistically significant differences between the Western Slovak Region and Eastern Slovak Region. We did not notice any other statistically significant differences in the evaluation of neuromarketing attributes from the point of view of the region.



**Graph 1.** Display of the "seller" attribute in terms of region.

(Source: own processing)

The results show that respondents from the Eastern Slovak region pay the least attention to the seller. Respondents from the Western Slovak region care relatively more about what the seller looks like and how he behaves. An honest opinion, a pleasant approach and a willingness to help from the seller are important to them. Respondents from the Eastern Slovak region pay less attention to whether the seller has a modified appearance, how he approaches them and how he addresses them.

Based on the analysis of variance,  $F = .532$ ,  $Sig. = .558$ , we did not find any significant differences in the attribute "product" in relation to the region (Table 4).

**Table 4.** Post-hoc comparisons in the "product" attribute from the point of view of the region.

Region	Region	Average difference	Significance
Eastern Slovak Region	Central Slovak Region	-0.8148	0.865
Central Slovak Region	Western Slovak Region	-0.6476	0.943
Western Slovak Region	Eastern Slovak Region	0.14624	0.595

(Source: own processing)

Hypothesis 2 can be considered confirmed, as one of the examined attributes ("seller") confirmed statistically significant differences in terms of the region from which the respondents come.

## 5. Conclusion and discussion

We did not notice statistically significant differences in the assessment of selected attributes of neuromarketing from the point of view of residence in any attribute. Our analysis shows that the consumer's residence does not have a significant effect on the perception of the store, seller and product. From the point of view of the region of Slovakia, where the consumer comes from, our analysis confirmed statistically significant differences in the perception of the seller. These differences were not confirmed for the "store" and "product" attributes.

Based on these findings, we analyze the result to the detriment of respondents from the Eastern Slovak region. Respondents from the Western Slovak region care more about what the seller looks like and how he behaves. An honest opinion, a pleasant approach and a willingness to help from the seller are important to them. Respondents from the Eastern Slovak region pay less attention to whether the seller has a modified appearance, how he approaches them and how he addresses them. Most people living in eastern Slovakia live in the countryside, and do not have many options in their area to choose a store, unlike in western Slovakia, where there are more concentrated stores, which may mean that customers care about the seller and not just the store or product.

Based on the results of the research, we can agree with the findings of the authors Hall and Lindzey (2002), who describe sellers as those who want to have a lot of experience. Sellers and traders want to look successful and satisfied, to make the customers feel that they are experts in the field and to become a role model for customers. Vysekalová (2011) says that sellers let the customer know that a given store, brand, product or service is very popular and has a strong position in the market. It evokes a feeling of trust and confidence in the customer. They feel that they are part of a large organization. The customer then takes this cooperation as prestige and image, experiencing a sense of protection and security.

The future orientation of this research should also take into account other contexts within which this issue could be studied, e.g. neuromarketing attributes in terms of gender differences. In this sense, Birknerová, Frankovský, Zbihlejšová, and Parová (2017) explain gender in socio-structural, interpersonal, and individual level. Man and woman brain are diametrically opposed to the structural and behavioral levels. These differences are formed from birth, last whole life, and influence attitudes, and behavior that affect shopping behavior and consumer decisions. Gender differences were also studied by Birknerová and Frankovský (2014), who in their research focused on manager work, where they identified statistically significant differences between emotional intelligence aspects between men and women. Men had higher score in aspects as emotional control, self-motivation, stress management, low impulsivity level, assertiveness, adaptation, and relationships – all of which are aspects studied also by neuromarketing.

### **Acknowledgement**

This paper is supported by the grant VEGA 1/0807/19 “Research on the determinants of trading behavior and marketing effects in the area of neuromarketing and the relation to neuro-linguistic programming” and the grant KEGA 012PU-4/2020 “Trading Behavior - Creation of the subject and textbook for non-economic study programs”.

### **References**

- [1] BIRKNEROVÁ, Z., FRANKOVSKÝ, M. 2014. *Rodové diferencie v prejavoch sociálnej, emocionálnej inteligencie a machiavellizmu v manažerskej práci*. Prešov: Radix, spol. s r. o. ISBN 978-80-87573-12-9.
- [2] BIRKNEROVÁ, Z., FRANKOVSKÝ, M., ZBIHLEJOVÁ, L., PAROVÁ, V. 2017. Gender differences in perception of advertising in the context of expectations of advertising. In: *Journal of applied economic sciences*, 12(6), 1751–1758.
- [3] HALL, C., LINDZEY, G. 2002. *Psychológia osobnosti*. Bratislava: Slovenské pedagogické nakladateľstvo - Mladé letá. ISBN 978-80-080-3384-8.
- [4] LINDSTRÖM, M., 2009. *Nákupologie*. Brno: Computer Press. ISBN 978-80-251-2396-6.
- [5] LINDSTRÖM, M. 2010. *Buy ology: truth and lies about why we buy*. New York: Broadway Books. ISBN 978-03-855-2389-9.
- [6] MORRIS, R. 2003. *Neuroscience - Science of the brain*. Liverpool: British Neuroscience Association.
- [7] ONDRIJOVÁ, I., TOMKOVÁ, A. 2017. Neuromarketing a jeho etické aspekty v spotrebiteľskom správaní. In *Journal of Global Sciences*. Vol. 2, no. 1. ISSN 2453-756X.
- [8] TAHAL, R. 2017. *Marketingový výzkum: postupy, metody, trendy*. Praha: Grada Publishing. ISBN 978-80-271-0206-8.
- [9] THOMAS, A. et al. 2017. *Ethics and Neuromarketing: Implications for Market Research and Business Practice*. Berlin: Springer. ISBN 978-3-319-45607-2.
- [10] VYSEKALOVÁ, J. 2011. *Chování zákazníka: jak odkrýt tajemství "černé skříňky"*. Praha: Grada. ISBN 978-80-2473-528-3.
- [11] ZURAWICKY, L. 2010. *Neuromarketing Exploring the Brain of the Consumer*. Springer. ISBN 978-3-540-77829-5.