

Neurobranding in territorial development: from traditional to innovative

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Abstract—Neurobranding is one of the newest areas of neuromarketing, studying with the help of special experimental equipment the neurophysiological reactions of people to different brands. For the study of territorial brands, an eye tracker study using an eye tracker was conducted. Identification of territories occurs with the assignment of associated attributes, including: national colors and heraldry, cultural symbols and archetypes, architectural objects, object environment, complex identity, natural symbols, universal signs, abstract forms, font and grammatical forms. Based on this classification, we identified three: Madrid (font and grammatical form); I.Crimea (complex identity) and Adygea (natural theme). The study of brand identifiers showed that in the marketing promotion of territorial logos, the primary importance is the form of the brand identifier and its semantic load, in second place is its location depending on the angle of view, and last is color. Black-and-white images of brand identifiers are perceived as more complex, since they receive an average of 1.5 times more visual fixations. The most viewed part is in the field of view 0° to 45°, this is shown by the largest fixations of visual attention, while at a viewing angle of 135° - 180° and 90°-135°, the largest saccades indicating reduced attention and low interest in these zones in the presented visualizations. Highlighted areas of peripheral vision can be used as a new experimental paradigm to test the hypothesis that information loss is associated with an increase in eccentricity, which will allow predictive prediction of the success of advertising of territorial logos based on new neurophysiological data.

Keywords—*neurobranding, neuromarketing, brand, identification, neurophysiological methods*

I. INTRODUCTION

In recent years, qualitative changes have occurred in economics related to the beginning of the convergence of the social sciences and the natural sciences. The beginning of a new era of economic research is connected with the use of innovative developments in the field of neurophysiology, psychology, and neurobiology in the study of various economic phenomena. So, in 2004, the first serious work on “neuroeconomics” appeared [1] in which they began to use neuroimaging. Similar methods came to marketing a few years later and the leading universities of the world began to use methods to study the human brain to understand consumer behavior. The enormous prospects for a symbiosis of economics, biology, and psychology, which make it possible to explain the irrationality of human behavior, were recognized by the world community, as confirmed by Thaler R.H [2] in 2017 Nobel Prize in Economics for the development of the behavioral economy. Thus, the prospect of new innovative methods in economic research [3]. Such works, first of all, deal with consumption issues and they lie

in the marketing plane, namely, its integration with neurobiology and behavioral economics, which led to the emergence of a new research area called “neuromarketing” [4,5]. The subject of which is the study of consumer sensorimotor, cognitive and emotional responses to various marketing incentives [6]. At the same time, the scope of Neurobranding in the study of territorial development is practically not developed. It has no clear analysis algorithms, no methodology. Territorial brands, positioning and shaping the image areas formed virtually no area of scientific knowledge, which causes a significant field of scientific research, which determined the relevance of the chosen research topic.

II. METHODS

Neurobranding - this is one of the most new directions of neuromarketing, studying with the help of special experimental equipment the neurophysiological reactions of people to different brands. For the study of territorial brands, we conducted an eye-tracking study [7] using a stationary eye tracker VT 3 mini with a frequency of 250 Hz. Stimulus material was developed using Adobe Photoshop CS 3. The oculomotor behavior of 36 subjects was recorded using the program EventId and processed in the program OGAMA (Open Gaze and Mouse Analyzer) [8]. The processing of the data was carried out using the methods of economic and statistical analysis implemented in the SPSS 17.0 software. The generated data constituted a matrix of 791 data sets.

III. RESULTS

A modern typology of brand logos identification is given in the works of P.E. Rodkina, where the following levels are distinguished: level of recognition, semantic content and emotions from the logo [9]. The territorial brand is the image or universal identifier of the region, as a kind of marker that allows it to be identified. These are graphic objects - logos. As a rule, they are formed in such areas as: sights, natural objects, national products produced in the territory, personalities, history and religion. Identification of areas occurs with the assigned associated attributes, including: national colors and heraldry, symbols and cultural archetypes, architectural objects, object environment, natural symbols, signs universal, abstract form, font and grammatical forms. Based on this classification, we have chosen 12 territorial logos arranged in a circle in order to study their visual visibility depending on the angle of view and type. Of these, in this study, three are analyzed: Madrid (font and grammatical form); I.Crimea (complex identity) and Adygea (natural themes) (Fig. 1).

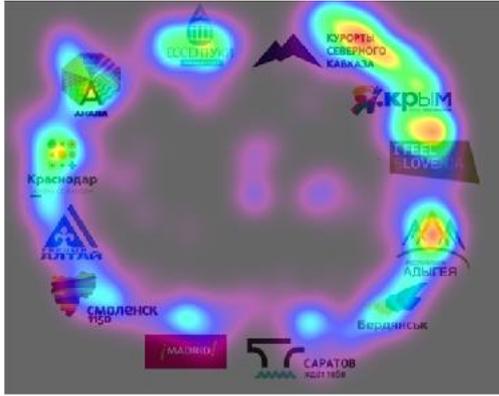


Fig. 1. Heat map of territorial brand identifiers (logos)

The oculomotor behavior includes two types of data: commit and saccade [10]. The first - show stopping sight on the visual object, and the second - the speed of translation and view angle from object to object. Fixations allow you to judge about visual attention, interest and memorability, and saccades about the processing mechanisms of marketing incentives and consumer behavior. The brand identity is associated primarily with the design of visual objects for the effective promotion of territories. In works [11] emphasizes the importance of eye tracking study as a predictor of consumer choice. At the same time, the location of the visual stimulus plays a special role. Depending on the angle of view, it can be located in the line of sight foveal vision, and in the zone of peripheral vision. [12]. Research [13] show that peripheral vision has a greater effect on the selection, while the information provided in the foveal vision of interest is stronger. Consideration of the studied logos to attract attention depending on the zone of their location was carried out in three zones of interest (AOI). The first included a territorial logo with a complex identity "I.Crimea", the second - with the natural theme "Adygea" and the third with the font and graphic form "Madrid". These brand - identity were studied in three different stimulus material in a competitive environment - in color, black and white, and blurred. Each of which was presented to the subjects in four different sequences corresponding to different angles of image placement: 0°- 45°, 45°- 90°, 90° - 135°, 135°- 180° (Table 1).

TABLE I. FIXATION ON DIFFERENT BRAND-IDENTITY, COUNTER

Placeme nt angl e	"I.Crimea" (complex identity)			"Adygea" (natural subjects)			"Madrid" (font and graphic form)		
	Foveal vision		Periph eral vision	Foveal vision		Periph eral vision	Foveal vision		Periph eral vision
	Col or	b / w	Blur	Col or	b / w	Blur	Col or	b / w	Blur
0°- 45°	31	5 0	5.6	35	59	11	59	3 8	10
45°- 90°	24	3 4	6.06	29	40	6.28	17	9	4.43
90°- 135°	19	2 0	7.32	27	34	9	5	1 0	5.83
135° - 180°	41	4 4	-	30	38	4.64	38	5 2	4.01

From the data in the table it can be seen that the number of eye fixations decreases by 9.5 times when peripheral vision is used, which is quite reasonable. In this case, there are zones of 0°- 45° and 135°-180°, where the highest fixations are observed when using foveal vision. Observational fact is that the most poorly viewed area with foveal vision 90°- 135°, but a different trend for peripheral vision is revealed. It is in this zone that the highest fixation indices of blurred images are recorded. Therefore, it can be assumed that this area is the prerogative of mainly peripheral vision. Black and white images of the brand - identity perceived to be more complex, as they are on average 1.5 times more visual fixations. The font shape of the logo attracts the most attention in foveal vision, in color, but worse the most perceived in this angle is a complex identity. However, natural subjects brand identifier has the greatest fixation and, therefore, great competitive advantage in visibility and visual recall.

The study of variations of parameters depending on their coherence should be carried out in the context of gender and age groups, which is presented in the contingency table 2. This makes it possible for marketing purposes to clearly identify the group that is most sensitive to the perception of the logo and, accordingly, form a neuromarketing strategy to promote this identifier.

It is seen that men on average show a greater number of fixations in the field of view from 0 ° to 45 °, longer for them and the total time spent considering the visual stimuli presented. Highest saccades in both men and women are recorded at the viewing angle of 135°-180 ° and 90° -135°, which indicates decreased attention to these areas in the imaging s requirements. Frequency of fixation on different types brand - identifiers represented in Fig. 2.

TABLE II. VARIATION OF PARAMETERS DEPENDING ON THE ANGLE OF VIEW AND GENDER OF THE RESPONDENT

Options	Placement angle							
	0°-45°		135°-180°		45°-90°		90°-135°	
	Gender		Gender		Gender		Gender	
	W	M	W	M	W	M	W	M
Total duration: (ms)	2770	3686	2072	1964	2098	2305	2743	2823
Gaze: fixations (counter)	7	10	4	4	5	5	7	7
Gaze: average length of a saccade	246.9	238.2	305.4	312.8	275.0	288.9	313.4	331.9

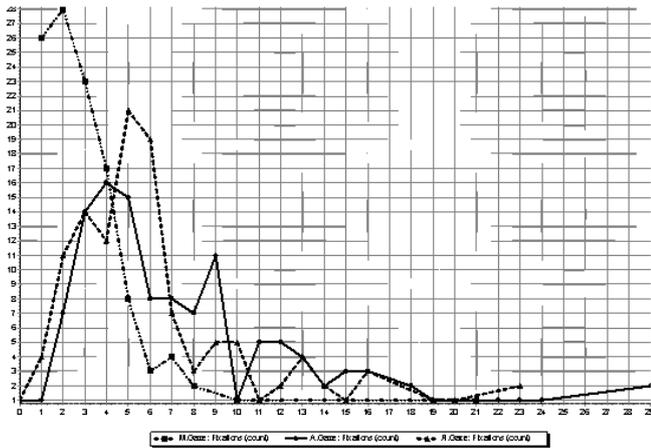


Fig. 2. The frequency of fixations on different types of brand-identifier, counts where is M.Gaze - Madrid (font and graphic form); A.Gaze - Adygea (natural subjects); I.Gaze - I.Crimea (complex identity).

A greater number of fixations goes to the natural theme, namely the images of mountains, in second place by visual attention is a complex identity, including equal-component objects and, lastly, the respondents were interested in text forms. Note, however, that great importance is the color logos [14]. Studies in the color of the brand-identifier of the font form, but in a very bright - pink color, led to high visual attention, which however was completely leveled by the image of the same form in black and white.

IV. CONCLUSION

1. In the marketing promotion of territorial logos, the primary meaning is the form of the brand-identifier and its semantic load, in the second place is its location depending on the angle of view, and last is color. Black and white images of brand identifiers are perceived as more complex, since they are on average 1.5 times more visual fixations.

2. Most viewed part of the subjects in the field of view of 0° to 45° , it shows the greatest fixing of visual attention, while at the viewing angle of 135° - 180° and 90° - 135° check in biggest saccades, indicating a decline in attention and low interest in these areas in the imaging s requirements.

3. When applying territorial brand identifiers to billboards and advertising products, it is necessary to take into account that in the foveal vision, small details are clearly visible at an angle of 0° - 45° and 135° - 180° and fixations are reduced by 9.5 times upon presentation of these same stimuli in peripheral vision, the weakest viewed area in foveal vision is 90° - 135° , but as such, it is not in peripheral vision, but on the contrary shows maximum visual attention. Highlighted areas of peripheral vision can be used as a new experimental paradigm to test the hypothesis that the loss of information is associated with an increase in eccentricity [15], which will allow predictive prediction of the success of advertising of territorial logos based on new neurophysiological data.

The study was carried out with the support of the Development Program of the "Crimean Federal University V. I. Vernadsky for 2015-2024 under the project " Laboratory of Neuromarketing and Behavioral Economics" No 1 /2018/20. Order No. 704 of 08.28.2018.

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