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PRACTICE OF NEUROMARKETING RESEARCH ON ARTWORK CONSUMPTION: LITERATURE REVIEW AND MARKETING MANAGEMENT PERSPECTIVE

Nowadays there is a general understanding that we make most of our decisions on the unconscious level. Researchers continue asking people about their attitudes, emotions, and intentions, although not expecting to hear the whole truth. Under such circumstances, neuromarketing tools can significantly change our understanding of consumers and improve firms' performance in the market.

Gallery market being an important part of the country's cultural heritage and tourist attractiveness, may suffer from excluding neuromarketing tools from the marketing management practice. Artworks are difficult to evaluate in terms of objective and measurable parameters. Therefore, people preferences towards a specific piece of art are hard to explain and distinguish during a standard marketing interview.

The aim of this paper is to explore previous works, where researchers used neuromarketing to help them understand customer behavior of gallery visitors and artwork viewers. We review previous neuromarketing research works in gallery market, published during 2003-2020. In this paper, we generalize marketing problems that galleries try to solve with the help of neuromarketing tools. They mostly cover the aspects of customers' attention, emotions, and artwork preferences.

We suggest that neuroscience tools (fMRI and eye-tracking) can be beneficial for solving all three main types of marketing research problems – exploratory, descriptive, and causal. We also outline further perspectives in applying eye-tracking for solving marketing management issues in planning, problem solving and monitoring processes.

Keywords: Eye-tracking, emotions scanning, neuromarketing, galleries marketing, artwork.

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ПРАКТИКА НЕЙРОМАРКЕТИНГОВИХ ДОСЛІДЖЕНЬ СПОЖИВАЧІВ КАРТИН: ОГЛЯД ЛІТЕРАТУРИ ТА ПЕРСПЕКТИВИ ВИКОРИСТАННЯ

Статтю присвячено визначенню місця нейромаркетингових досліджень в процесі управління маркетинговою діяльністю на ринку творів образотворчого мистецтва (зокрема, художніх галерей). Метою дослідження є з'ясування поточних напрямів дослідження поведінки відвідувачів галерей з використанням інструментів нейромаркетингу – відстеження погляду (ай-трекінг) та вимірювання емоційної реакції, а також подальших перспектив розширення практики використання зазначених інструментів.

Дослідження охоплює аналіз попередніх робіт за період 2003-2020 рр. Розглянуті роботи переважно містять опис результатів експериментів та спостережень за поведінкою відвідувачів галерей або глядачів творів мистецтва в лабораторних умовах.

Результатом аналізу стало визначення ключових гіпотез, які можна перевірити з використанням інструментів ай-трекінгу: (1) чи є різниця у перегляді та сприйнятті творів мистецтва різних течій, форм, розмірів, сюжетів тощо; (2) чи залежить тривалість перегляду від емоцій, викликаних творами мистецтва; (3) чи впливає на тривалість перегляду (а відповідно, перебування у галереї) рівень попередньої обізнаності відвідувача; (4) чи залежить споживчий вибір від сили емоційного відгуку споживача та (5) як впливає на сприйняття та рівень емоцій відвідувачів просторова організація художньої експозиції.

Можливе застосування результатів дослідження полягає у окресленні кола маркетингових проблем, вирішення яких можливе з використанням інструментів нейромаркетингу. Існуюча практика вивчення поведінки відвідувачів галерей уже сьогодні дозволяє отримати додаткові переваги від використання ай-трекінгу та вимірювання емоційних реакцій у питаннях формування експозиції, планування галерейного простору, змістовного наповнення комунікаційної складової комплексу маркетингу. Утім відкритими залишаються питання можливості та доцільності використання нейромаркетингових досліджень для вирішення проблем ціноутворення, сегментування ринку, оцінки ризиків та перспектив факторів зовнішнього середовища.

У висновках статті зазначається, що для ринку мистецьких галерей нейромаркетинг може стати ефективним інструментом більш глибокого вивчення існуючих маркетингових проблем, з'ясування особливостей споживачів та прогнозування реакцій на маркетингові стимули, адже у творі мистецтва значною мірою пов'язані зі суб'єктивними реакціями та вищим рівнем емоційного відгуку, які важко правильно ідентифікувати використовуючи традиційні маркетингові підходи та інструменти.

Ключові слова: ай-трекінг, спостереження за емоціями, нейромаркетинг, маркетинг галерей, твори мистецтва.

Introduction and research problem. Neuromarketing uses hearing, sight, touch, and smell to market products and services. While the possibilities of neuroimaging to predict future sales dynamics are rather limited, it can be a good tool for the initial product or service design and marketing communication. Art products, being quite expensive in production and promotion, require using all possible ways to predict their market success or failure. There is a huge number of movements in visual art. And if such trends as classicism, academism, hyperrealism are quite clear in form even for a naïve observer, post-expressionism and various forms of modernism, such as abstractionism or futurism, may seem strange and difficult for comprehension and reflection. However, no one doubts the value of all the existing visual art movements and those yet to appear.

The use of neuromarketing tools will help marketers develop the art product or service more clearly and accurately, following the expectations of the target audience. In the current research, we investigate the current marketing management issues that are resolved based on the result of neuromarketing research.

Recent publications analysis. The general aspects of neuromarketing are covered by such representatives of behavioral economics as the Nobel Prize winners Daniel Kahneman in "Thinking Fast and Slow" (Kahneman, 2011), and Richard Thaler in "Nudge: improving decisions about health, wealth, and happiness" (Thaler & Sustain, 2009). It is worth noting a significant contribution to the study of the visual aids by D. Bridger in her book "Neurodesign. The key to the consciousness of the buyer" (Bridger, 2017). The topic of digital neuromarketing is revealed by Stephen-Davidowitz & Pinker (2017), Jones (2014), and Nahai (2012), whose works cover the digital marketing instruments that can influence consumer behavior online.

Neuromarketing has become popular not only in the B2C markets but also in politics. Political parties use tools to measure brain waves, skin arousal, heartbeats, and facial expressions during parliamentary and presidential elections in Mexico, Poland, Turkey, and other countries (Randall, 2015).

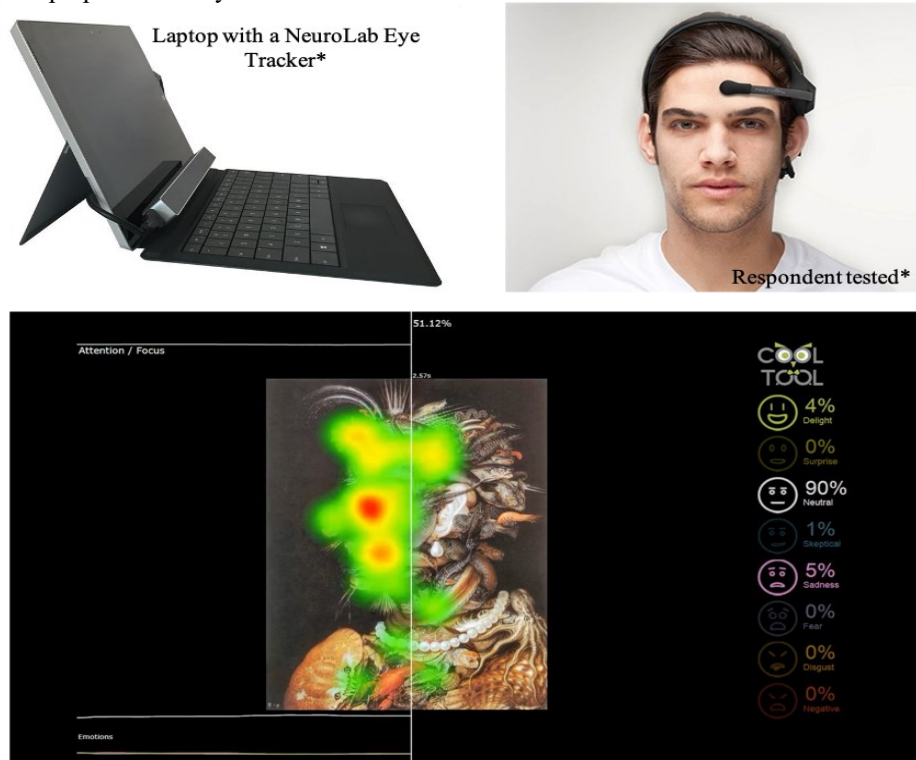
Unsolved parts of the problem. Artworks are a part of a broader category of visual art. While researchers widely use neuromarketing tools to explore consumer attitude towards the visuals used in advertising, they rarely apply eye-tracking or fMRI to analyze artworks as a product and the corresponding consumer behavior. The studies are mostly limited to a small sample of respondents and number of paintings. As a result, marketing management practitioners pay little attention to the results of such studies and hardly ever apply neuromarketing tools to solving current problems on a gallery market.

Research goal and questions. This paper is aimed at generalizing the problems of the artworks consumption that are explored with the help of neuromarketing tools and outline the possible marketing management issues that can benefit from the usage of eye-tracking and other neuroscience instruments.

Main findings. Scientists used eye-tracking and emotion scanning technology before, analyzing the behavior and emotions of people enjoying artwork either in the laboratory environment or in the field: museums, art galleries, etc.

The testing processes covered one or several of the three main aspects - eye-tracking, emotion tracking, and self-report measurement.

Researchers conduct eye-tracking and emotional measurement using the special hardware – mostly portable EEG headsets or laptop mounted eye-trackers.



The way a researcher saw the viewing process on his screen using NeuroLab CoolTool software

*Photos of the Neurolab Kit retrieved from <https://oldapp.uxreality.com/market-neurolab-kit?item=173643261>

Fig. 1. The testing procedure: equipment and software used to track gaze and emotions.

Figure 1 shows the respondent wearing the EEG headset produced by NeuroLab and the corresponding software produced by CoolTool.

The list of the most common research problems explored is as follows:

1. Are there any differences in viewing and perceiving abstract and representational paintings?
2. Does fixation duration correlate with emotional judgments?
3. Does fixation duration correlate with the context knowledge?
4. Do strong emotions increase or decrease artwork preference?
5. Does the paintings' layout in a gallery space influence visual attention and cognitive response?
6. Below we outline the main findings of the previous experiments.

Quite a large layer of research papers is devoted to finding differences in the viewers' cognitive and emotional attitudes toward representational and abstract artworks. Uusitalo et al. (2012) conclude that most representational art is viewed with less concentration on one point and more short eye fixations dispersed over the whole work. Whereas abstract art lacks easy to understand meaningful cognitive elements. It makes viewers concentrate on the central part of the painting, be more focused, and therefore demonstrate fewer fixation points. Uusitalo L. and co-authors limited the viewing time for their respondents, therefore could not determine any differences in the viewing duration. But Heidenreich S. M. and Turano K. A. (2003) could not find any correlation between the artwork style and the viewing time. Their experiment results also deny any correlation between the emotions aroused by the painting or its separate parts and the fixation duration or the time spent in front of the painting. At the same time, Mitrovic et al. (2020) and Goller et al. (2019) in their works used eye-tracking to see whether such emotion as "subjective visual appeal" corresponds with the fixation duration. Their results are also interesting in terms of the differences or similarities between representational and abstract art consumption, as Mitrovic and his co-authors used abstract artworks and Goller with the group explored representational artworks. Both research groups proved the concept "beauty-demands-longer-looks", introduced by Leder et al. (2010), and were able to fixate the longer spontaneous looking/attention toward the works with the subjective visual appeal of the participants. The same result holds for Sartori et al.'s (2015) observations, where the viewers demonstrated positive attention bias toward emotionally positive paintings. Moreover, when observing emotionally negative paintings, in 61% of the cases the viewers still preferred to concentrate on the separate emotionally positive parts of the artworks.

It should be noted that there exists a two-way relation between fixation duration and viewers' emotional response and reflection. Studies reveal the interrelation between the level of personal context with the artwork (interests, backgrounds, and motivations toward the exhibition (Falk and Storksdieck, 2005), and the time spent on viewing the artwork (Grazioso et al., 2020). It is also true that people need more gazing time to start reflecting and experiencing emotions (Leder et al., 2006). Therefore, artists and galleries need to keep the attention of the visitor and make visitors' visual fixation time longer. Bubić A., Sušac A., and Palmović M. (2017) suggest that accompanying artworks with titles will provide a positive impact.

What is more interesting in the process of artwork consumption, especially among the nonprofessional consumers, is the reasons they demonstrate preferences toward certain paintings. Uusitalo et al. (2012) consider this aspect of the problem and report that stronger emotions increase artwork preferences. Emotional responses and their influence on the more positive artwork appraisals were investigated by M. Pelowski et al. (2018) while watching and analyzing consumers' reactions to the installation art pieces at Belvedere Museum (Vienne). The results indicate that those who reported "happiness" tended to experience more positive viewing experience, while those with "sad" emotions had generally negative viewing experience. The researchers also emphasize that there was a significant level of correlation between the level of emotions and the general negative/positive evaluation.

Other papers discuss the question of the influence of gallery spatial layouts and their effect on painting recognition, visual duration, and memory (Krukar and Dalton, 2013, Tymkiw and Foulsham, 2020). Rainoldi M., Ju J., and Neuhofer B. (2020) investigate the visual attention of the museum visitors and the layout of different exhibits (including representational paintings) and various types of information materials. Both aspects are not directly related to our research.

Table 1 summarizes the mentioned above eye-tracking research papers.

They are described by 5 main characteristics: research problematic, where the research was conducted, who participated in it, what artworks were analyzed, and what equipment was used. The experiments were equally conducted in the lab or in the field (museum or gallery). The earliest research (Heidenreich & Turano, 2003) started from 4 respondents and 14 artworks. But the further works are based on observations of 32 participants on average. The number of artworks in questions differs much (from 2 to 110) depending on the overall research design. Mostly the mobile eye-tracking glasses are used to scan eye-movement and emotions (with a couple of exceptions, when a webcam is used).

Conclusions and further research proposals. Our analysis shows that current eye-tracking research cases are limited, but the scope of marketing management problems, where practitioners could apply eye-tracking is rather wide.

Based on the classification of the marketing research designs (Churchill, 1996) and considering the research problems covered above, we can conclude that neuromarketing tools can be beneficial for all three main kinds of marketing problems, generally addressed in marketing research, namely exploratory, descriptive, and causal. Some examples of the research hypothesis are given below:

Exploratory: Will this exhibition evoke strong positive emotions?

Descriptive: How should we organize exhibition space based on the order and duration of visitors' gaze fixation?

Causal: What type of educational background will increase the level of visitors' satisfaction more?

Table 1

Eye-tracking research of art consumption summarized

Study	Research problematic	Research technique			
		Where it was held	Who the participants were	What artworks were analyzed	How eye-movement and emotions were scanned
Heindenreich S., & Turano K., 2003	Visual attention and emotions	museum	4 laypersons	5 abstract and 9 representational artworks	Portable eye-tracker ISCAN
Uusitalo L. et al., 2012	Abstract and representational art differences; Emotions and artwork preference	lab	32 laypersons	40 abstract and representational art	Tobii 120X remote eye-tracking system
Krukar J., & Dalton R. C., 2013	Gallery space and visual attention; memory	museum	32 laypersons	14 abstract paintings	Tobii Glasses mobile eye-tracking device
Tymkiw M. & Foulsham T., 2020	Gallery space and visual attention	museum	51 laypersons	Abstract and representational art	SMI glasses from SensoMotoric Instruments
Mitrovic A. et al., 2020	Visual attention and emotions (subjective liking)	lab	29 laypersons	50 pairs of abstract paintings	EyeLink 1000 desktop mounted eye tracker
Goller J. et al., 2019	Visual attention and emotions (subjective liking)	lab	57 laypersons	60 representational paintings and 60 portraits	EyeLink 1000 desktop mounted eye tracker
Pelowski et al., 2018	Visual attention and visitors' background	museum	51 laypersons	2 installations	Lightweight mobile eye-tracking glasses iViewETG
Bauer, D., & Schwan, S., 2018	Visual attention as an artwork feedback	lab (online)	20 laypersons	17 artworks	Users Web camera
Sartori et al., 2015	Visual attention and emotions	lab	9 laypersons	110 abstract paintings	EyeLink 1000 Tower Mount
Rainoldi et al., 2020	Museum space and visual attention	museum	34 laypersons	Representational art and other exhibits	Tobii Pro Glasses
Grazioso et al., 2020	Visual art and visitors' background	gallery	13 art history students	2 representational paintings	Pupil-Lab Eye-Tracker

Marketing managers in gallery business can introduce eye-tracking to their marketing practice on different stages of product management to receive additional insights or even replace the traditional marketing tools. Currently used hardware is proved to be comfortable for respondents. It influences neither their reactions and behavior, nor their perceptions. The eye-tracking glasses are mobile and can be used not only in the lab environments, but also during a real visit to the gallery. This allows conducting not only exploratory research, but also market testing, e.g., to determine the most suitable exhibition layout based on the gazing duration.

In Table 2 we outline the possible questions that arise during creating and marketing artworks and galleries, one can answer with the help of neuromarketing tools.

The answers to some research questions we can still easier and more quickly receive using traditional marketing tools (e.g., demand estimation). But some are surely better resolved with the use of neuromarketing tools (e.g., creating artwork catalogues based on viewers' emotions to plan further exhibitions). The scope of further research should regard the efficiency and effectiveness of using different neuromarketing tools compared to traditional marketing instruments. Marketing theory and practice should also check whether eye-tracking and similar instruments are suitable for solving problems of segmentation, environmental assessment or pricing policy.

Table 2

Solving marketing problems with eye-tracking

Marketing Management Function	Product management element	Problem statement	Similar previous research (example)
Planning	Segmentation	What are the viewing styles and emotional response of the different kinds of gallery visitors?	No direct eye-tracking research has been conducted to investigate different consumer segments (except for naïve and expert viewers (Bauer & Schwan, 2018))
	Demand estimation	Traditional marketing tools are more suitable	
	Environmental assessment	Are there any cultural differences in artwork perception among gallery visitors?	No direct eye-tracking research has been conducted to determine the influence of culture or other environmental characteristics on the gallery visitors' behavior
Problem solving	Product	Is the title a must for an artwork?	(Bubić, Sušac, & Palmović, 2017)
	Price	What emotions do the artworks with the highest current market price evoke in viewers?	No direct eye-tracking research has been conducted to determine the possible price of the artwork
	Place	What is the best way to organize the exhibition space?	(Heidenreich & Turano, 2003)
	Promotion	What additional info should be used to educate consumers during a promotion campaign to increase their visiting satisfaction?	(Bauer & Schwan, 2018)
Monitoring		Are visitors satisfied with the exhibition/ the artwork?	(Mitrovic, Hegelmaier, Leder, & Pelowski, 2020)

Created by authors based on Iacobucci and Churchill, Jr. (2018)

References

1. Bauer, D., & Schwan, S. (2018). Expertise influences meaning-making with renaissance portraits: Evidence from gaze and thinking-aloud. *Psychology of Aesthetics, Creativity, and the Arts*, 12(2), 193-204.
2. Bridger, D. (2017). *Neuro Design: Neuromarketing Insights to Boost Engagement and Profitability*. Kogan page.
3. Bubić, A., Sušac, A., & Palmović, M. (2017). Observing individuals viewing art: The effects of titles on viewers' eye-movement profiles. *Empirical Studies of the Arts*, 35(2), 194-213.
4. Churchill, G. A. (1996). *Marketing Research, Methodological Foundations*. Chicago, IL: Dryden Press.
5. Falk, J., & Storksdieck, M. (2005). Using the Contextual Model of Learning to understand visitor learning from a science center exhibition. *Science Education*, 89, 744-778.
6. Goller, J., Mitrovic, A., & Leder, H. (2019). Effects of liking on visual attention in faces and paintings. *Acta Psychologica*, 197, 115-123.
7. Grazioso, M., Esposito, R., Maayan Fanar, E., Kuflik, T., & Cutugno, F. (2020). Using Eye Tracking Data to Understand Visitors' Behaviour. *Proceedings of the AVI2CH Workshop on Advanced Visual Interfaces and Interactions in Cultural Heritage co-located with 2020 International Conference on Advanced Visual Interfaces (AVI 2020)*. Retrieved from <http://ceur-ws.org/Vol-2687/paper6.pdf>
8. Heidenreich, S., & Turano, K. (2003). What predicts where one will look when viewing artwork? *Journal of Vision*, 3(9).
9. Iacobucci, D., & Churchill, Jr., G. A. (2018). *Marketing Research: Methodological Foundations*, 12th ed. CreateSpace Independent Publishing Platform.
10. Jones, G. (2014). *CLICK.OLGY: What works in online shopping and how your business can use consumer psychology to succeed*. London: Nicholas Brealey Publishing.
11. Kahneman, D. (2011). *Thinking, fast and slow*. New York: Farrar, Straus and Giroux.
12. Krukar, J., & Dalton, R. (2013). Spatial Predictors of Eye Movement in a Gallery Setting. *Proceedings of the 1st International Workshop in conjunction with COSIT 2013 Scarborough, UK, 2-6 September 2013*, 14-19. Retrieved from https://www.researchgate.net/publication/287988875_Spatial_Predictors_of_Eye_Movement_in_a_Gallery_Setting
13. Leder, H., Carbon, C.-C., & Ripsas, A.-L. (2006). Entitling Art: Influence of Title Information on Understanding and Appreciation of Paintings. *Acta Psychologica*, 121, 176-198.

14. Leder, H., Tinio, P., Fuchs, I., & Bohrn, I. (2010). When attractiveness demands longer looks: The effects of situation and gender. *Quarterly Journal of Experimental Psychology*, 63, 1858-1871.
15. Mitrovic, A., Hegelmaier, L., Leder, H., & Pelowski, M. (2020). Does beauty capture the eye, even if it's not (overtly) adaptive? A comparative eye-tracking study of spontaneous attention and visual preference with VAST abstract art. *Acta Psychologica*, 209.
16. Nahai, N. (2017). *Webs of influence. The psychology of online persuasion*. (2nd ed.). Harlow, UK. Pearson Education Ltd.
17. Pelowski, M., Leder, H., Mitschke, V., Specker, E., Gerger, G., Tinio, P., Husslein-Arco, A. (2018). Capturing Aesthetic Experiences With Installation Art: An Empirical Assessment of Emotion, Evaluations, and Mobile Eye Tracking in Olafur Eliasson's "Baroque, Baroque!". *Frontiers in Psychology*, 9.
18. Rainoldi, M., Ju, J., & Neuhofer, B. (2020). The Museum Learning Experience Through the Visitors' Eyes: An Eye-Tracking Exploration of the Physical Context. In *Eye Tracking in Tourism* (pp. 183-199). Springer, Cham.
19. Randall, K. (2015, November 3). Neuropolitics, where campaigns try to read your mind. *The New York Times*. Retrieved from <https://www.nytimes.com/2015/11/04/world/americas/neuropolitics-where-campaigns-try-to-read-your-mind.html>
20. Sartori, A., Yanulevskaya, V., Akdag Salah, A., Uijlings, J., Bruni, E., & Sebe, N. (2015). Affective Analysis of Professional and Amateur Abstract Paintings Using Statistical Analysis and Art Theory. *ACM Transactions on Interactive Intelligent Systems*, 5, 1-27.
21. Stephens-Davidowitz, S., & Pinker, S. (2017). *Everybody lies: big data, new data, and what the Internet can tell us about who we really are*. (First ed.). New York: Dey St., an imprint of William Morrow.
22. Thaler, R., & Sustain, C. (2009). *Nudge: improving decisions about health, wealth, and happiness*. (Rev. and expanded ed.). New York: Penguin Books.
23. Tymkiw, M., & Foulsham, T. (2020). Eye tracking, spatial biases, and normative spectatorship in museums. *Leonardo*, 53(5), 542-546.
24. Uusitalo, L., Simola, J., & Kuisma, J. (2012). Consumer Perception of Abstract and Representational Visual Art. *International Journal of Arts Management*, 15(1), 30-41.

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