

NEUROMARKETING APPROACH TO EFFICIENT FOOD STYLING

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Abstract: This study explores the use of neuromarketing eye-tracking methods in verifying the efficiency of food styling, which focuses on creating food photographs to appeal to consumers and to use them for marketing purposes. The aim of this study is to verify the effect of styling on the respondent using the Eye Tracking method.

Key words: neuromarketing, effectiveness, eye tracking, marketing communication, food styling

1. Introduction

Marketing in today's hyper-competitive environment is being applied in a variety of areas so that the company is able to compete with others. At the same time marketing is introducing new approaches and methods, such as neuromarketing, to achieve higher marketing communication effectiveness. This study focuses on the use of Eye Tracking's neuromarketing method in verifying the effectiveness of food styling, which focuses on creating food photographs to appealing to consumers so that they can be used for marketing purposes. A number of consumers first "consume by sight", so the food picture must at first glance evoke appetite, desire.

The main objective of this study is to verify the effect of food styling on respondents using Eye Tracking method.

2. Neuromarketing

The notion of neuromarketing began to appear around 2002, when American society as SalesBrain and Brighthouse started offering services related to neuromarketing research.¹ Neuromarketing is a marketing discipline that studies sensorimotor, cognitive and emotional responses of consumers to marketing incentive.² Neuromarketing can be understood as linking of the application of biomedical technology and marketing research.³ Because of this link, for example, the effectiveness of marketing communication tools can be verified, even before they are launched, to determine the potential of the marketing tool.

3. Methodology of its own investigation

Following the goal set, a survey was carried out using the Eye Tracking method to test the effect of food styling on the respondents.

Eye Tracking - The Eye tracking method allows to monitor the human eye's movements with the eye camera while also recording where the person looks, for example on the picture.⁴ The graphical output is the so-called "heat map" (maps) that can

be used to trace the places where the person looked most.⁵ Furthermore, it is possible to determine the paths of sight and the time delays at individual points, ie to indicate certain "areas of interest". The method allows to test prints, promotional materials, or plain text of a magazine or other material. Through this method, the respondents' eye track was monitored throughout the research period, which allowed to determine what visual stimulus the respondents watched during the research. It is possible to identify and evaluate the "visual behavior" of the respondents.

Three photos of food and beverages were presented to respondents, each in two versions - one set of photographs displayed the product naturally without any modification, in the other set the products were adjusted according to the principles of food styling. In particular, they were photos of hamburger, pancakes and freshly brewed light beer. The foods and beverages mentioned were not chosen randomly. Pancakes, hamburger and beer are among the 10 most popular visual stimulus for food and beverages presented on the Instagram social network. In addition, the most popular decoration of these foods and beverages was carried out using the Google images search. After entering the names of the dishes into the search, the first 50 final pictures were taken into account, the decoration style of which was categorized and the most frequently used decoration was used in the preparation of meals.

As part of the food styling, a more effective visual presentation of the hamburger required the melting of the embedded cheese with a hair dryer, and a hairspray was used to obtain the necessary luster. When shooting a modified hamburger, additional lights were added to enhance the gloss of the food. In the case of pancakes, the hairspray was used again to obtain the necessary gloss of ingredients, instead of the rapidly flowing maple syrup, the pancakes were covered with a more "photogenic" engine oil. The visual presentation of freshly brewed beer was adjusted so that the drink glass was sprinkled with sugar water through the sprayer to make the glass look more "dewy". This resulted in a total of 6 photographs.

The prepared photos were projected on a Philips 22-inch monitor on which the Gazepoint GP3 Eye Tracker, a static camera was attached using light pupil viewing technology. A total of 10 respondents recruited from the full-time students of the University of Finance and Administration in Most, each photograph was screened for 5 seconds. Respondents were subjected to the survey individually so they could not influence one another. When analyzing the data, so-called AOIs (Areas of Interest) were selected on each presented image, and then statistical data of the time volume of the views devoted to these areas were analyzed. For each photograph, a so-called heat map was generated, which summarizes the penetration of all realized measurements into one graphical output. Each photo was seen by respondent for 10 seconds.

The Eye Tracking method was further complemented by a post-test, in which respondents were asked five questions focused on the cognitive level of perceived. Each of the tested photos was rated by the respondents in connection with the statement "The meal in the photo looks very tempting and tasty" on the five-point Likert scale. Their preferences were further confirmed by the respondents in the open question: "Which photo and why is appealing to you tastier?". In the third question, the respondents had to sort the photos of the dishes according to their taste. Quite simply, from 1 to 6, when the first photo of the food is the most delicious for the respondents, the sixth is the food which photos are the least appealing to the respondents.

¹ MORIN, Christophe. Neuromarketing: The New Science of Consumer Behavior. *In: Society*. 2011, s. 131-135. ISSN 0147-2011. DOI: 10.1007/s12115-010-9408-1. Dostupné z: <http://link.springer.com/10.1007/s12115-010-9408-1>.

² ROEBUCK, Kevin. *Brain-computer interface*. Milton Keynes UK: Lightning Source, 2011. ISBN 1743042639.

³ ROSENLAGER, Pavel. Využití zdravotnické techniky v neuromarketingu. *In: Ekonomika a management ve zdravotnictví*. 3. vyd. Praha: ČVUT, FBMI 2013, s. 82 – 86. ISBN 978-80-01-05277-8.

⁴ ZURAWICKI, Leon. *Neuromarketing: exploring the brain of the consumer*. London: Springer, 2010, s. 51. ISBN 3540778284.

⁵ POPELKA, Stanislav, BRYCHTOVÁ, Alžběta, VOŽENÍLEK, Vít. *Eye-tracking a jeho využití při hodnocení map*. Geografický časopis / Geographical journal. 2012, č. 64, s. 78.

The prerequisite for the survey is the claim that visual presentation of "unnatural" dishes, i.e. those that have undergone subsequent modifications, will make the respondents more attractive. And this fact will also be reflected appropriately on both the eye camera record and the subsequent post-test interview.

4. Results

To evaluate the data recorded during the realization of Eye Tracking, several basic indicators were used:

- a) The time of first look indicates the exact length (thousandths of a second) of the first view of a particular area on the presented image.
- b) The average tracking time indicates the average time interval for each area of interest during the entire survey (10 seconds).
- c) The average fixation of the view indicates the cumulated length of all views given to individual areas during testing.
- d) The return of respondents indicates the tendency to return with the sight to individual areas of interest repeatedly.

The resulting data for the first pair of photographs is given in Table 1 and Table 2, where the areas of interest (AOI) were selected for the photograph for which their statistics of tracking were calculated. In the tables, the AOIs are sorted according to the second column - i.e. in order of their follow-up by the respondents.

Tab. 1: AOI of untreated hamburger

	Time of first look (Sec.)	Average tracking time (Sec.)	Average fixation of the view (Sec.)	Return of respondents
Cheese	0,72	0,67	2,65	5
Bacon	1,23	0,17	1,17	2
Bun	1,35	0,87	2,22	7
Meat	1,72	0,50	2,63	7
Salad	2,02	0,77	2,43	5
Tomato	2,39	0,32	1,67	1

Table 1 above shows Area of Interest tracking statistics (AOI) for the original untreated photograph of hamburger. Below is statistics of hamburger picture arranged according to food styling principles.

Tab. 2: AOI of hamburger according to food styling

	Time of first look (Sec.)	Average tracking time (Sec.)	Average fixation of the view (Sec.)	Return of respondents
Bun	0,63	0,69	2,71	9
Cheese	1,27	0,97	1,60	7
Bacon	2,27	0,25	1,25	2
Meat	2,44	0,31	1,12	3
Salad	2,93	0,21	1,01	0
Tomato	0,00	0,00	0,00	0

Based on a comparison of the values in Table 1 and Table 2, the respondents' views changed in the view of the original hamburger photo and the food-styled photography, on which the food is presented brighter and, above all, with more intense colors evoking a fuller flavor. From the values, it is obvious that the bun and cheese were followed first, which are brighter and more distinct from the original photograph. This is also evidenced by the number of sight returns restored back to the area of interest already surveyed, in this case the bun where the number of returns increased by 4.

Figure 1 and 2 below show the heat maps of the hamburgers tested, using the color spectrum to indicate the intensity of the viewing of the areas of the photograph. Because the center of the photo was selected for both images, it is clear from the shape and location of the heat map that the eyesight of the respondents

were focused to the center of the photograph. The comparison of both heat maps also shows that higher intensity is focused on the edited photograph of cheese and ham, which are brighter and in full color.

Fig. 1: Heat maps of the original untreated hamburger



Fig. 2: Heat map of hamburger map according to food styling



The second tested pair of photos were pancakes. Recorded data are given in Table 3 and Table 4.

Tab. 3: AOI of untreated pancakes

	Time of first look (Sec.)	Average tracking time (Sec.)	Average fixation of the view (Sec.)	Return of respondents
Blueberries	1,65	0,86	2,51	7
Sauce	2,48	0,42	1,32	0
Strawberries	2,66	0,26	1,10	1

The above Table 3 lists the statistics that relates to the degree of tracking of selected areas of interest for the original, untreated pancake photo. The following table lists statistics of photo modified by food styling.

Tab. 4: AOI pancakes according to food styling

	Time of first look (Sec.)	Average tracking time (Sec.)	Average fixation of the view (Sec.)	Return of respondents
Blueberries	0,02	1,65	3,12	7
Strawberries	1,33	1,06	1,58	8
Sauce	1,96	0,40	0,29	1

Based on a comparison of the data from the original food photo and the food styled photo, it is clear that on the modified photos were blueberries and strawberries more intensively followed with which were more carefully arranged in the dishes, especially strawberries, which show an increase in returns (7 returns extra), which points to a higher level of passion.

Fig. 3: Heat maps of original untreated pancakes



Fig. 4: Heat map of pancakes according to food styling



Comparing the two photos, higher height of the pancakes is also noticeable, which are fluffier. At the same time, when adjusting the food, emphasis on their symmetry was placed so that they are not tilted to the side. On the basis of this, a shape of the heat map is noticeable, where the symmetrically arranged pancakes attracted the attention of the respondents.

The third tested visual stimulus was a photograph of freshly brewed beer. The results are shown in Table 5 and Table 6.

Tab. 5: AOI of untreated beer

	Time of first look (Sec.)	Average tracking time (Sec.)	Average fixation of the view (Sec.)	Return of respondents
Foam	0,15	1,78	3,20	10
Glass	1,21	0,90	1,03	4

The above Table 5 shows statistics of areas of interest for untreated fresh beer. Due to the neutral background, two areas of interest were selected in the photograph - foam and glass, for which their tracking statistics were calculated.

Tab. 6: AOI of beer according to food styling

	Time of first look (Sec.)	Average tracking time (Sec.)	Average fixation of the view (Sec.)	Return of respondents
Glass	0,03	2,10	3,44	8
Foam	1,05	1,16	1,33	7

When comparing the values in Table 5 and Table 6, it is obvious that the order of element tracking in the photo has changed - for the beer adjusted according to the principles of food styling (especially the dewing of the glass with sugar water), the attention of the respondents is first focused on the glass. There is also an increase in the time of focus on the glass and also the increase in the number of returns on the glass compared to the first photograph. It is obvious, therefore, that the dewy glass has attracted the attention of the respondents. On the contrary, the

modified foam, which was more consistent and more regular in shape, impressed less compared to the glass.

Fig. 5: Heat maps of the original untreated beer

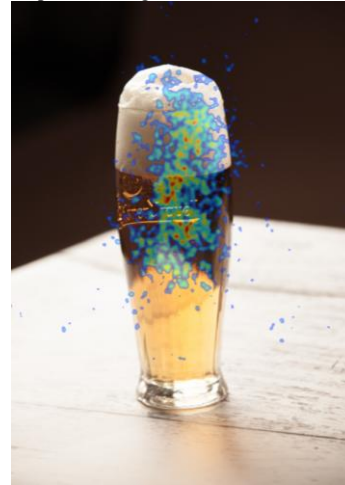


Fig. 6: Heat map of beer according to food styling



When comparing the heat maps of Figures 5 and 6, it can be stated that in Figure 6 the heat maps are more spread out at beer photograph, which indicates higher level of passion of the photograph. However, it is possible to discuss to what extent the interest is influenced by the name of the beer that is shaped on the glass. However, it is necessary to add that heat maps are not only aim at the inscription but also well below and above the inscription.

As a complement to the Eye Tracking method, this short post-test, consisting of a brief query, was also performed. The post-test brought these major outputs:

- a) All respondents preferred the food, which went through a subsequent food styling treatment. Both hamburger, pancakes and beer earned a significantly better average value on the five-point Likert's scale when compared to the original untreated dishes. The average values of the five-point Likert scale are summarized in Table 7.

Tab. 7: Average values of the 5-point Likert scale

	Untreated food	Food according to food styling
Hamburger	2,1	1,0
Pancakes	2,7	1,2
Beer	3,2	1,4

The following table 8 lists the modus and average values calculated on the basis of a 6-point scale, where the respondents

evaluated which food impresses as most delicious. Value 1 was the most positive rating, the most delicious food.

Tab. No. 8: Appraisal of the taste of dishes

	Untreated food		Food according to food styling	
	Average	Modus	Average	Modus
Hamburger	4,4	4	1,3	1
Pancakes	4,7	5	2,3	2
Beer	5,5	6	2,8	3

b) The same result were also provided by the third, control question, the results of which are shown in Table 8 above. When creating a preferential ladder of the photographs tested, the photos of processed food on the basis of food styling appeared at three leading positions.

c) When it comes to verbal reasoning and the reflection of respondents over the possible taste of food, the hamburger at processed photography looks better, fresher, all the ingredients will excel, and the bun is more fresh and crunchy. Adjusted pancakes contain according to respondents fresh fruit, strawberries are even considered as sweeter. Neither motor oil - syrup did not miss the attention of the respondents. According to them, it has better consistency on the edited photo and is more appealing. The modified beer was felt more refreshing, had a richer foam and was also better chilled.

5. Conclusion

The survey shows that food styling practices have a real impact on consumers' perceptions. At the cognitive level of perception, this statement is unambiguous. Respondents always consciously preferred photos that have undergone food styling modifications. They marked them as more attractive, the food appealed to them with more appetizing impression, creating the appearance of greater freshness.

As for measurements using the Eye Tracking method, the intentional adjustment of the food presented in the photos also affected the respondents' attention (view fixation, monitoring time) in this respect. In just one case, the photo of the original untreated food was so featureless that the responders had to give a little more effort to its perception than their modified variant. Even in this case, however, all respondents definitely preferred a modified alternative in the post-test.

This survey, among other shows, why modified food photography is so popular nowadays. Food styling can be considered as a good marketing tool. For many companies, this means that they can hire a professional food stylist, along with a professional photographer, to create attractive photos of their meals. This marketing tool can lead to increased revenue from the offered meals. Many restaurants have no photos in their offer of their meals. Restaurants could make much more use of their website to promote and share their food pictures. Just as ordinary people take photos of their meals, restaurants can take pictures in the same way and then adjust their meals. The use of photo sharing is countless; we can just mention the company websites themselves or social networks, such as the already mentioned Instagram and the most commonly used social network that is Facebook.

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