

Influence of packaging design, nutritional information - FOPL and eco modulation indicator on consumers' food choice decisions

Vplyv dizajnu obalov, nutričného zloženia - FOPL a indikátora ekomodulácie na rozhodovanie sa spotrebiteľov pri výbere potravín

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Abstract

Consumer behaviour and decision making is influenced by several factors that affect consumer food choices. These factors can be perceived through the senses at a conscious level or can motivate us through the consumer's unconscious. Nowadays, classical marketing methods are no longer sufficient to identify the motivators that encourage us to choose products and need to be combined with tools that can explore the customer's unconscious through feelings and emotions. These play a key role in decision-making and give the impulse to buy. To better understand food choice, it is necessary to use methods that analyse in more detail the attractiveness of the visual elements on the packaging. Therefore, we used the Eye Tracker (ET) eye camera to detect the visual attractiveness of specific elements on the packaging. By combining quantitative and qualitative data collection and consumer decision analysis, we focused on the visual attention of packaging design, FOPL labelling, and product labelling packaged in recyclable packaging, which is related to the new EU policy on eco-modulation. The attractiveness of the packaging design sells the product better, but potential decision-making based on nutritional indicators or packaging materials used should also be taken into account. New EU packaging regulations as well as stricter rules for more sustainable - recyclable packaging and a gradual shift towards a circular economy will mean lower packaging costs for producers using recyclable materials. Our research investigated whether information on the packaging of food products has a positive impact on consumer decision-making when choosing not only healthier but also environmentally packaged products.

Keywords: *Neuromarketing, Packaging design, Nutritional indicators, Eco modulation, Eye-tracking*

JEL Classification: M30, M31, M37

Packaging is an integral part of any product as it plays an important function in protecting and handling it. Nowogródzka (2014) claims that the information and promotional function of packaging is more and more important when it is designed. The proper design of product packaging is an integral part of a marketing strategy; it may also contribute to an increase in the competitiveness and interest of purchasers. The informational and promotional functions could be defined as the marketing function and are more and more important when it is designed. The proper design of product packaging is an integral part of marketing strategy; it may also contribute to an increase in competitiveness and interest in purchase. Kelsey (1985) writes that packaging is one of the most important processes to maintain the quality of food products for storage, transportation and end-use. It prevents quality deterioration and facilitates distribution and marketing. A good package can not only preserve the food quality but also significantly contribute to a business's profit. According to Coles (2003) secondary packaging functions

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are selling and sales promotion. In today's highly competitive retail landscape, where numerous competitors vie for consumers' attention, effective packaging plays a crucial role in ensuring a product stands out amidst the array of offerings (Milton, 1991). Moreover, retailers need to acknowledge the diverse ways in which consumers perceive and connect with brands, recognizing variations not only in brand perception but also in the consumer-brand relationship itself (Fournier, 1998; Muniz and O'Guinn, 2001). Bellini, et al. (2016) clarify that up to 70% of purchasing decisions are made by the consumer at the point of sale, so when it comes to packaging design, engagement is key. MAISON D'IDEE (2021) adds that packaging needs to communicate the right information, to engage and persuade the customer and to be visually presented correctly. Packaging is essentially "free" advertising space on the shelf, and it is very important to invest in it. Kostyla (1978), and Hofmeyr et al., (2002) note that packaging has become an extremely powerful and unique tool in modern marketing environments while Nowogródzka (2014) adds that packaging is more powerful in influencing consumers than advertising or other marketing tools. The reason for this is that packaging is a tool that is experienced by all buyers by definition and thus has a strong potential to engage most of the target market. The information contained on food packaging, as one of the components of marketing information, is a factor significantly influencing the opinion of consumers about the product. Based on Verbeke (2007) consumers increasingly rely on the information contained on the packaging, which shows a specific combination of quality attributes determining the expected quality, while making decisions on products. Furthermore, Ciechomski (2008) points out that modern packaging "makes a product more attractive and has a positive impact on potential buyers encouraging them to purchase". Górska (2011) writes that food labelling generally means putting information on food packaging and is supposed to protect consumer interests. Labelling is an element of ensuring the safety of food products, which consists of health and sensory quality as well as nutritional value, while Popescu (2015) adds the information, which is placed on the packaging, must not only fulfil the requirement of compliance with other messages, but also include the content required by law. In Slovak conditions, the mandatory labelling of packaging is regulated by Decree No. 243/2015 Coll., which specifies the information that must be placed on food packaging. Even if there is no single unique solution to encourage healthy food choices (Grandi et al., 2021), FOPL (Front-of-Pack Labelling) makes nutrition information accessible to all consumers, thus supporting healthy food choices (Alonso-Dos-Santos et al., 2019). Becker (2015) adds that FOPLs are intended to direct consumers toward making more nutritious or healthful choices, particularly to encourage the selection of foods and beverages with more positive and less negative attributes. One of the many nutrition indicators on food packaging is Nutri-Score based on Deren et al. (2021), Nutri-Score strongly recommend Nutri-Score in the EU because it is consumer-friendly, interpretative, and easy to understand.

Methodological approach

The presented research was divided into two phases. In the first phase, we carried out qualitative testing of visual attention to the packaging of meat products of the Slovak meat producer Mäsokombinat Púchov. We tested the digital visuals of the packaging using a stationary Eye tracker Tobi Pro X3-20. The second phase was based on qualitative questioning of respondents using a digital questionnaire in Microsoft Forms. The order in which the survey was carried out was chosen in such a way as to find out what respondents noticed on the packaging.

The research took place in March 2023 at the Laboratory of Consumer Studies in Nitra see in Figure 1. Research participants were pre-selected and arranged for a specific day and time. All respondents were students of the Faculty of Economics and Management in Nitra in age between 22 – 25 years old. A number of research participants were N=50 but based on the quality of data we have filtered Eye Tracking (ET) data gathered by the quality of gaze samples. We have chosen 30 participants where the gaze sample was above 80%. Respondents participating in the questionnaire were N=50.

Respondents were asked to view 3 packaging label designs (front page only) of meat products in a digital version, each of them was displayed to them for 30 seconds. After packaging viewing respondents have been focused on the second part of the research.

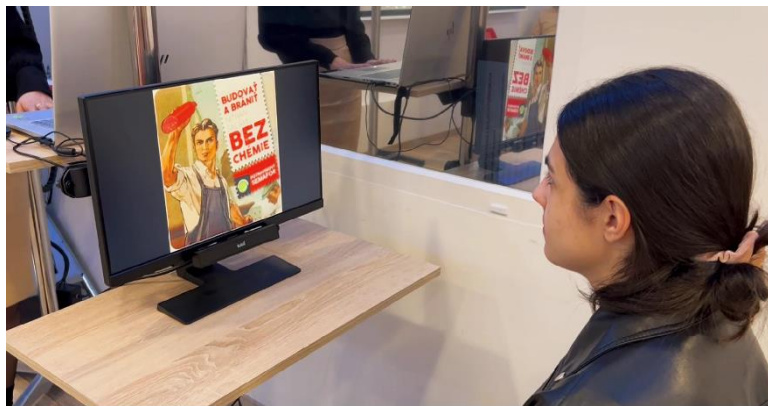
Sample A – Poultry ham

Sample B – Saláma Nitran

Sample C – Saláma s červenou repou

Second part of the research was qualitative questionnaire regarding packaging elements, claims and other information displayed on packaging itself. Questionnaire contained mix of 7 questions where some of them were rating products on a scale.

Figure 1 The testing process in Laboratory of Consumers Studies



Source: Own database based on qualitative research 2023

Results

The research sample represents students belonging to Generation Z in the following numbers. Out of the research sample of 50 students, 27.1% were represented with 22 years of age, 23 years of age had the highest number up to 52.1%, 24 years of age had the least number only 8.3% and 25 years of age students were represented in the sample 12.5%. The majority of the respondents were females up to 77% who live in rural areas (52%) with first degree of higher education.

Visual attention in Sample A – Heat Map of digital packaging visual of the product „Princeznin poklad” see Figure 2 we can clearly say, that most of the participants were viewing pictures of the „princes” and the text „hydínová” Others often viewed elements of the packaging were icons on the right-hand side which are communicating „Minimum E látok, bez gluténu, bez pridaných farbív, znížený obsah soli, bez alergénov”. Less viewed part of the packaging was signed with, 93% of meat content”.

In the questionnaire we asked participants how they rate on a scale from 1 to 5, the visual attractiveness of the packaging for the product Poultry ham (1 being very unattractive and 5 being very attractive). In the questionnaire, 20 respondents which represent 40% declared that they perceive the packaging of Poultry ham as quite attractive ranking with 4 points. 13 respondents (26%) answered that packaging is very attractive to them. Only 1 respondent (6%) found the design of packaging as very unattractive.

The questionnaire has confirmed Eye Tracking data also by another question. We have asked participants: What did you perceive the most about the Poultry Ham packaging? 31 respondents (62%) declared that they saw a princess picture. The second most viewed element based on questionnaire data was 93% meat content, which does not correspond with eye tracking data. The third most viewed part of the design was „graphics of the castle”.

Second, the tested visual see Figure 3– Sample B with the product of Salami Nitran has attracted the most attention with the text „Nitran saláma”. The second most viewed element on the packaging was „Potravinový semafor” which is a kind of FoPL communicating a nutritionally balanced product. Less

visual attention was on the text „bez chémie, persons face and holding salami”. The questionnaire declared that 25 (50%) respondents find the packaging design as quite attractive. In the second question where respondents should answer what the most viewed element of design was. 26 out of 50 respondents declared they saw the text, „bez chémie” which has been confirmed also by ET data. The second most declared element was „obrázok mäsiara” which was not confirmed by ET testing. „Potravinový semafor” was declared seen only by 7 (14%) of respondents.

Third, tested Sample C was Salami with beetroot see Figure 4 where the most visited parts of the packaging were on the text „s blanširovanou červenou repou”, also text „s červenou repou” and brand „Barón”. Less visited parts of the packaging were the product by itself, the text „Saláma” or even a pictogram communicating that the product is gluten-free. In the questionnaire, 40% of participants (20) declared that the packaging design of Salami with beetroot is quite attractive. Up to 14 people (28%) found product design as very attractive. In the second questionnaire question: What did you notice most on the packaging? Most (27) respondents which are (54%) answered that they had seen „a picture with beetroot” and equally 10 respondents (20%) said that they saw the text „with beetroot” and the product itself.

Below in Figures 2, 3 and 4 are Heat maps based on visual attention packaging attributes. What the heat map represents is seen below.

Heat map: presents aggregated data talking about the visual attention of respondents, primarily in terms of the number and length of time spent in eye gaze (the warmer the colour, the longer and greater the number of consumer views).

Figure 2: Heat Map of digital packaging „Princeznin poklad“



Figure 3: Heat Map of digital packaging „Saláma Nitran“



Figure 4: Heat Map of digital packaging „Saláma s červenou repou“



Source: Eye Tracking software export based on research 2023

We have also looked closer at „points of interest AOI” of each packaging design to review in detail, what respondents have been viewing. Below are explained AOI metrics.

Points of interest AOI (Areas of Interest): predefined areas of interest within which it is possible to calculate basic statistical indicators indicating the visual attention of respondents.

- The **Total Fixation Duration** indicator is in seconds (s) and the higher the value, the longer the time spent looking at the place.
- The **First Fixation Duration** indicator is in seconds (s) and the higher the value, the longer the initial view of the place.

- The **Time to First Fixation** indicator is in milliseconds (ms) and the lower the value, the faster you notice the location.

Figure 5
AOI of „Poultry ham“



Figure 6
AOI of „Saláma Nitran“



Figure 7
AOI of „Saláma s červenou repou“



Source: Eye Tracking software export based on research 2023

Based on collected eye-tracking data from visual attention of 30 respondents we have analysed Areas of Interest (AOI) of „Poultry ham“. As we can see in Table 1, respondents focused most of their attention (2,47 s) on the „picture“ itself. This is corresponding with the feedback collected from the questionnaire. The first packaging element that was seen (0,76 ms) was „picture“ followed by „product title“ (1,46). The shortest view only (0,23 s) was made on the „product itself“ but the first longest attention was on „reusable closing“ (0,80 s). Respondents have made the most repeated views (4) on „packing picture“ followed by „title“ (3) see Table 1.

Table 1 Areas of interest (AOI) of Poultry ham

Princeznin poklad	Icon "Dyes"	Icon "E additives"	Icon "Salt"	Icon "Allergen"	Icon "Gluten"	Meat content	Picture	Product	Reusable closing	Title
Total Fixation Duration	0,87	0,53	0,60	0,67	0,42	0,92	2,47	1,26	0,80	1,80
Time to First Fixation	4,03	3,14	5,31	6,09	3,16	4,25	0,76	3,61	5,74	1,46
First Fixation Duration	0,69	0,37	0,53	0,60	0,29	0,55	0,23	0,26	0,80	0,31
Visit Count	1,00	2,00	1,00	2,00	2,00	1,00	4,00	2,00	1,00	3,00

Source: Eye Tracking software export based on research 2023

Areas of interest in the second tested product „Saláma Nitra“ see Figure 6 shows that most attention has been paid to the „picture“ (2,97 s). This has been declared as the second most given feedback in the questionnaire 46%. The first viewed element on the packaging design was also „picture“ (0,77 ms) as this is the largest part of the packaging and attracts the most respondent’s attention. The first shortest view was made on „picture“ only (0,24 s) but the longest was on the „semaphore“ (0,33 s). The most repeated views (4) were made on the „picture“ followed by the text „without additional additives“ (3) see Table 2.

Table 2 Areas of interest (AOI) of „Saláma Nitra”

Saláma Nitran	Picture	Semaphore	Text "Build and protect"	Text "without additional additives"
Total Fixation Duration	2,97	1,81	1,50	1,44
Time to First Fixation	0,77	3,17	1,49	1,82
First Fixation Duration	0,24	0,33	0,32	0,27
Visit Count	4,00	2,00	2,00	3,00

Source: Eye Tracking software export based on research 2023

Product sample C - „Saláma s červenou repou” has been analysed based on AOI see Figure 7 with the following results. Interaction with this product can be seen based on the metrics Total Fixation Duration see Table 3, where most of the attention has been given to „product” (3,39 s) followed by „title” with (1,57 s). The first element seen on the packaging was „title” (1,16 ms) with a tiny delay by the text „beetroot” (1,17 ms). The shortest view was on the „product left” only (0,29 s), but the longest was on „icons” (0,46 s). Most repeated views (3) have been done on three (3) packaging elements such „product, text – beetroot, title”.

Table 3 Areas of interest (AOI) of „Saláma s červenou repou“

Salama s repou	Brand	Icons	Picture left	Picture right	Product	Text "beetroot"	Title
Total Fixation Duration	0,73	0,65	0,72	0,70	3,39	1,43	1,57
Time to First Fixation	3,28	5,56	4,72	5,00	1,45	1,17	1,16
First Fixation Duration	0,40	0,46	0,26	0,37	0,29	0,33	0,29
Visit Count	2,00	1,00	2,00	1,00	3,00	3,00	3,00

Source: Eye Tracking software export based on research 2023

Conclusion

Packaging attractivity plays paying significant role by choosing a product or considering buying it. Based on results from carried out research we can conclude that qualitative testing using Eye Tracking gives us detailed information about visual attention compared to questionnaires where data do not always correspond with visual attention.

Visual attention on the tested product – Poultry Ham has confirmed that most of the attention has been paid to graphics (picture of the princess), which has been seen in (0,76 s) as this is a very dominating element. This has been confirmed also in the questionnaire by 62% of respondents. Both ET and questionnaire confirmed that information about product composition and nutrition information has been seen on average after 4,3 s which declared also 18% of participants. The longest view was made on a sign of the Ecomodulation element „reusable closing” (0,8 s) followed by icons communicating „without E, gluten” etc. Only 15 (30%) respondents declared they have seen information about 93% content of meat.

Visual attention by the second product „Saláma Nitran” does not correspond with the questionnaire. AOI declares that „picture” was the most viewed element (2,97 s.) while the questionnaire said that it was the text „bez chémie”. Picture as the largest element on the packaging was attracting most of the customer's attention. The longest view was made on „semaphore” (0,33 s) which has been declared only by 7 respondents or 14%. Semaphores as a kind of nutritional indicator is an element on the packaging with the second most visual attention (1,81 s) and at the same time, it was the last visited part of the packaging (3,17 s). Most repetitive views were been made on the main packaging graphics „picture” (4) and then a text „without additional additives” (3).

By the third product „Saláma s červenou repou” we found differences in AOI data gathered and questionnaire answers. Based on AOI, most attention respondents paid to the „product” (3,39 s) while in the questionnaire most of them 27 (54%) declared that they have been watching „picture of beetroot”. which has been the second most declared answer. The first element seen on the packaging was „title” (1,16 ms) and the last were icons (5,56 ms). While AOI shows that icons such as gluten-free were seen the longest from all other elements, only 2 respondents (4%) have declared it in the questionnaire.

Based on all the above-mentioned findings we can conclude that visual attention from Eye Tracking devices and questionnaire answers have differences. For this reason, we would recommend repeating the research and upgrading the methodology where other qualitative methods can be added such as electroencephalography (EEG) as well as to focus on the selection representative respondent's database. Findings show that consumers are not paying enough attention to nutritional value or ecomodulation elements on packaging. Based on this research we can also recommend repeating research in real conditions would be interesting to review customers' visual attention to product design. For this reason, we assume packaging design has a massive influence on decision-making but not particularly elements such as FoPL or ecomodulation.

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