The Impact of Selected Nutrition Labels (FoPL) on Consumer Preferences for Functional Foods

Adriana Rusková, Jakub Berčík

Slovak University of Agriculture in Nitra

Faculty of Economics and Management,

Institute of Marketing, Trade and Social Studies

Tr. Andreja Hlinku 2, 949 76

Nitra, The Slovak Republic

xruskovaa@uniag.sk

Abstract

Healthy eating is one of the key changes in people's lifestyles. As a result of these changes, food purchasing mindsets have changed significantly in recent years. Until recently, price was the most important criterion for most customers in grocery stores, but nowadays the quality and composition of food is the most important criterion, especially according to consumer surveys. Recent surveys suggest that price still plays an important role, and in many cases even more than the quality declared in questionnaires. This is the typical question that respondents in surveys tend to answer as they are expected to, rather than as they actually make their purchasing decisions in the shop. For the segment of customers that tends towards a healthy lifestyle, getting enough exercise and eating a healthy diet is important. In order to facilitate the choice of foods for a healthy and balanced diet, nutritional values are displayed on products in some countries, with the three most widely used versions of labelling being NS (Nutri-Score), GDA (Guideline Daily Amounts), MTL (Multiple Traffic Light). The paper highlights the influence of selected nutritional indicators in consumer choice of functional foods. The paper concludes by highlighting the merits of different types of FoPL food labels.

Keywords:*, consumer behavior, functional foods, lifestyle, nutritional indicators*

1. Introduction

Food consumption is one of the basic physiological needs of human beings. The food that our body needs to function daily should contain a balanced ratio of essential macronutrients such as protein, carbohydrates and fat. However, these values are often not considered or not understood by the average consumer when selecting individual food products in the store. These are the most common reasons why food manufacturers have facilitated purchasing decisions by labelling their products with nutritional indicators on the front of the packaging to motivate consumers to make healthier food choices.

1.1 Consumer Behaviour and Lifestyle

Consumer behaviour since 2020 has been strongly influenced by the global problem associated with the Covid-19 pandemic, which has also had an impact on the economic side of individual countries.

https://doi.org/10.15414/2022.9788055225579.125-133

Consumer behaviour and consumption are highly dependent on the market context. Due to the prolonged adverse situation, consumers have also had to adapt their purchasing habits and thus modify their consumption motivations. Moreover, we still do not know what the future effects of the closed and isolated nature of the pandemic in more than one country will have on consumers' purchasing behaviour (Blazquez-Resino, Gutierrez-Broncano & Golab-Andrzejak, 2022).

Lifestyle more closely describes how individuals function and behave on a day-to-day basis when carrying out various activities at work, in leisure or in the way they eat. It is the way in which a personality is shaped by geographical, economic, political, cultural and religious influences throughout its existence. As Farhud (2015) states in his article, according to WHO, up to 60% of the factors influencing a person's health and quality of life stem from his/her lifestyle.

1.2 Healthy Foods and The Current Trend

Food is essential fuel for human functioning. Their purchase and processing pattern is related to the characteristics of the consumer - their social status, economic opportunities, lifestyle, the environment they are in, consumption preferences and various other factors determine this relationship between consumer and food consumption (Martinho et. al., 2022).

In recent years, the prices of products and services have been rising steadily, which unfortunately has not spared the agri-food industry. Food is a product that is inherently related to the basic physiological need of human beings – eating, hence its primary position in the market. The purchase and consumption of food is therefore the primary motive for all consumers, for which they are willing to pay, but often price is the decisive factor in their choice. As mentioned by Carlson et al. (2012), when comparing costs between healthy and less healthy foods, it is also essential to pay attention to the price metric used, and portion sizes (e.g., per 100 grams) should be the same between the pairs being compared. In addition, it is also important to look at how consumers perceive the term 'healthy' in relation to such labelling on food packaging (Waterlander et. al., 2013), as we are unfortunately in an era where the terms 'fit, zero, light, protein, organic, eco, raw and vegan' are becoming synonymous with 'healthy', when their nutritional values on the back of food product packaging may show us otherwise. However, in this context, we are faced with a contradiction between the price and quality of healthy food. On the one hand, we have consumers who will prefer to buy an unhealthy option over a healthier one because of the lower price, and on the other hand, we have consumers who are looking for 'fitness or high in protein, low in calories, etc.' on food products when they buy them, and price doesn't play such a significant role in their choice (Jo, 2016). A factor that can also greatly influence this consumer decision making is a nutritional indicator such as a certain food labelling system (FoPL).

1.3 Nutritional Indicators and Their Role in Consumer Behaviour

The policy of labelling food products with nutritional indicators has been met with conflicting considerations (Lusk, 2019). Labels and nutrition labels on food packaging make consumers more informed choices directly during the purchasing process (Lusk, 2012). However, the flip side of food indicator labels is precisely their costliness and their potential to mislead rather than inform consumers (Schuldt & Schwarz, 2010), (Syrengelas et al., 2017). Such food indicator labelling on product packaging can be objective – scientific in nature, but many companies use the labelling system only as a kind of marketing purpose, such as the use of the word "natural" on non-meat foods (Lusk, 2019). Some of the most well-known food labelling methods include calorie labelling on restaurant menus (Ellison, Lusk & Davis, 2013), nutrition panels (Garretson & Burton, 2000), nutrition labels on the front of product packaging (Julia et.al., 2016), semaphore, numeric and symbolic nutrition labels (Hersey et.al., 2013), and others.

2. Data and Methods

The subject of interest was testing the understanding and perception of the nutritional indicator Nutri-Score and Nutrinform in the selection of functional foods. The experiment consisted of 2 separate surveys. A quantitative survey with a sample of 1000 respondents was administered to 52% of women and 48% of men aged 18 to 75 years (18-29 years, 18%; 30-39 years, 20%; 40-49 years, 19%; 50-59 years, 16%; 65 years and over, 27%). The survey was carried out from 19 April 2021 to 23 April 2021 by an external panel of the MNForce agency. The questionnaire included questions focusing on food purchasing attitudes and healthy lifestyles. For the purposes of the survey, a fictitious brand Fine was created to eliminate the influence of the brand, on which the influence of the Nutri-Score and Nutrinform indicator was subsequently tested. The methodology was modeled after the Swiss model by Egnel et al. (2020).

15 respondents participated in the qualitative survey under laboratory conditions. The testing process can be seen in Figure 1.

Figure 1: The testing process in Laboratory conditions

Source: Own database based qualitative research 2022

Testing was conducted through in-depth interviews using Eye tracking in order to reveal explicit and implicit preferences influenced by the Nutri-Score nutritional indicator.

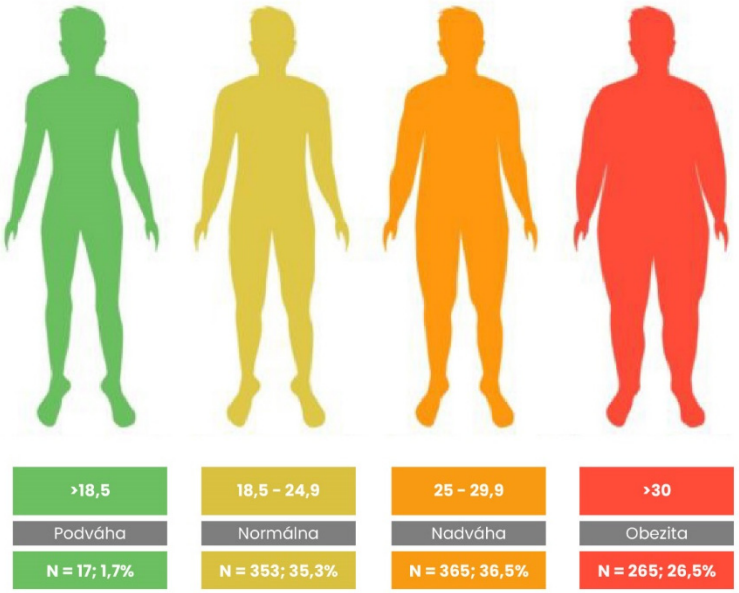
Visual attention of the respondents was monitored by a Tobii Glassess 2 (100Hz) mobile eye camera (eye tracking) and processed using Tobii Pro Lab studio software. Primary data were statistically processed using descriptive and inductive statistics in RStudio software environment.

The survey was conducted on February 2022 in the Laboratory of Consumer Studies at FEM SUA in Nitra.

3. Results and Discussion

The results of the quantitative research on a sample of 1,000 respondents show that 55% of respondents pay a great deal of attention and 13% even a very great deal of attention to buying healthy foods, but this is not reflected in the data based on the calculated BMI of overweight (36.5%) and obese (26.5%) of the sample. In Figure 2, it can be seen that more than half (63%) of the respondents are overweight (36.5%) and (26.5%) are obese according to the BMI index.

Figure 2: BMI index of the survey participants



Source: Own processing based quantitative research 2021

In terms of gender, based on the BMI calculation, more men (44.33%) than women (29.13%) are overweight. By income group, the most obese people are 37.84% in the income category 401 – 700 € and the most overweight people are in the income categories 701 – 1000 € and 1001 – 2000 €. These findings suggest the assumption that although most respondents are interested in healthy eating ultimately at the point-of-sale price determines people reaching for less healthy alternatives. Next, we investigated the impact of two selected nutritional indicators, Nutri-Score and Nutrinform, on the ability to influence consumer choice in the functional food category.

Figure 3: Fictitious brand of functional foods with different nutritional balance

Source: Own processing based quantitative research 2021

When selecting the products in terms of nutritional balance as indicated by the chosen indicators, Nutrinform did not show any significant effect of the variables studied (BMI, healthy eating) (Table I). For the Nutri-Score, a very weak positive correlation can be observed for the variables income and education, i.e. there is a weak tendency for people with higher income/education to improve their product choice more than those with lower income/education (Table II).

Table 1: Selection of products depending on selected factors I.

Variable		
BMI	-0,027	-0,025
Healthy eating	-0,037	0,036
Score	1	1

Source: Own processing based quantitative research 2021

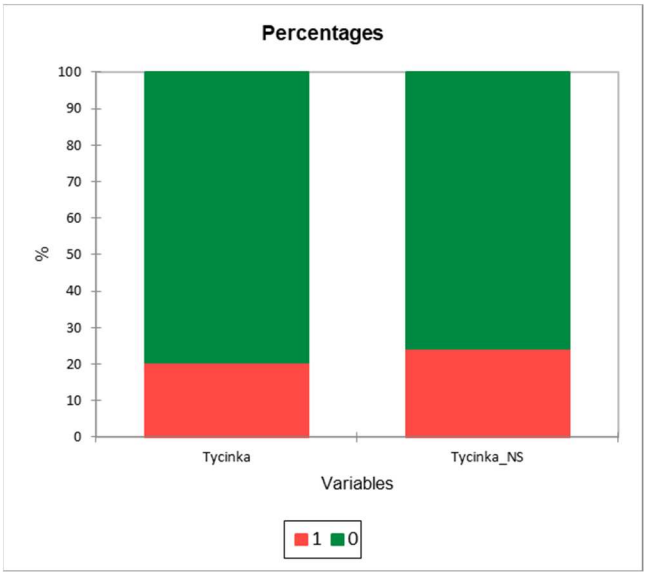
Table 2: Selection of products depending on selected factors II.

Variable		
City size	-0,055	-0,037
Education	**0,108**	0,001
Income	**0,146**	0,020
Score	1	1

Source: Own processing based quantitative research 2021

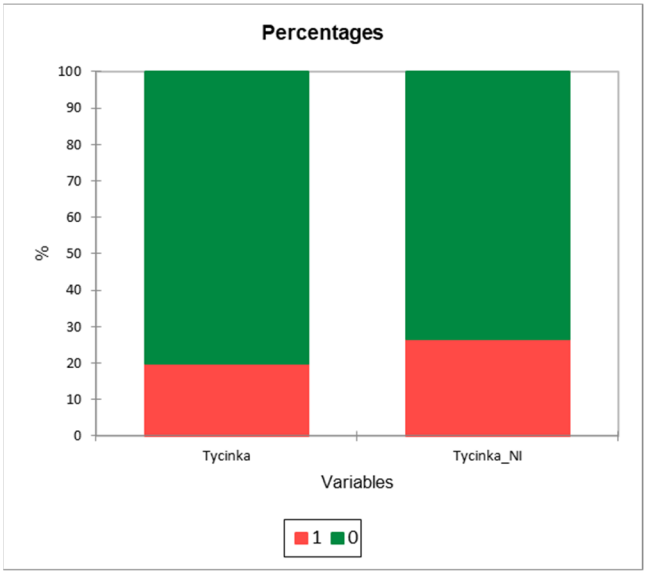
In the case of functional foods (protein, muesli bars), a statistically significant difference in the understanding of nutritional quality through Nutri-Score (p=0.061) was confirmed at α=0.1, indicating that the inclusion of Nutri-Score on the product thus improved the understanding of nutritional quality for this product, but very slightly (if we work with the standard significance level α=0.05, we do not observe a significant improvement), see Figure 4.

Figure 4: Correctness of the determination – Nutri-Score



Source: Own processing based quantitative research 2021

Figure 5: Correctness of the determination – Nutrinform



Source: Own processing based quantitative research 2021

A statistically significant difference in the understanding of nutritional quality at α=0.05 was also found for the Nutrinform labelling of the bar (p=0.001) see Figure 5, indicating that the inclusion of both models (NS and NI) on this product improved consumer understanding of nutritional quality.

Under laboratory conditions, three functional bars (with real labels) were tested and differed in terms of nutritional balance see Figure 6.

Figure 6: Testing of 3 functional (protein) bars under laboratory conditions

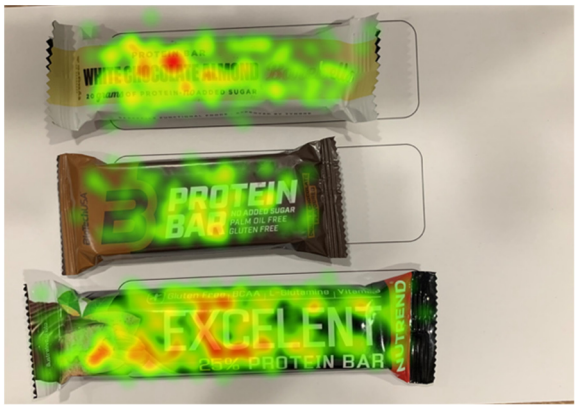
Source: Own database based qualitative research 2022

In the experiment, we focused on the external aspect of each sample, in which we investigated the influence of the factor - packaging design on the respondent. The respondent's task was to answer a question about which of the selected protein bar samples they would choose based on its packaging.

Up to 77% of respondents would choose the Barebells brand, and cited “the white color of the packaging” and “the style of the font” as the most common reasons. Only 14% would choose BioTechUSA, which caught their eye with its chocolate-colored packaging, and seven percent of respondents were represented by the Nutrend brand, which had attractive packaging.

Figure 7 shows us again a heat map, which allows us to see which packaging was the most appealing to respondents. The Excelent bar from the Nutrend brand had the hottest spots, i.e. the spots with the most eye-catching packaging. Respondents paid attention to the picture showing the bar with pistachios on the left side of the packaging and were also attracted by the name of the bar, especially in the areas of the letters 'EXC'. They paid less attention to the right-hand side of the bar packaging where they read the manufacturer's brand name. The second most viewed sample was Barebells, which caught respondents' attention with the flavor name, particularly in the area of the words 'CHOCOLATE – PROTEIN BAR'.

Figure 7: Visual perception of functional bars under laboratory conditions without nutritional labelling



Source: Own processing based qualitative research 2022

The heat map (Figure 8) shows that the hottest spots - the spots with the hottest content – are on the Nutri-Score food indicator for Nutrend's Excelent bar, which has the worst rating on this indicator, but the hotter spots are also on the remaining Nutri-Score ratings. Among the packaging, the most eye-catching this time was the design of the Barebells protein bar, which again caught the eye with its graphic lettering. The indicator also increased preferences, with up to 93% of respondents opting for the Barebells protein bar after seeing the indicator, which is confirmed by the results from the biometric measurement with the eyetracker, with an increase of up to 14% in this round due to the influence of the Nutri-Score.

Figure 8: Visual perception of functional bars under laboratory conditions with nutritional labelling

Source: Own processing based qualitative research 2022

The results suggest that Nutri-Score is an easy-to-read type of nutritional food label that can quickly and efficiently facilitate consumers' purchasing decisions at the point of sale.

4. Conclusion

The results of the study show that despite higher BMI values (36.5% overweight, 26.5% obese), reflecting the state of the population, 86% of respondents said that healthy eating was important to them, with 24% saying it was even very important. We decided to test the impact of two nutritional indicators, Nutri-Score and Nutrinform, in functional food choices. In this context, we tested whether size of residence, BMI and equally healthy eating have an impact on improving the choice in terms of nutritional quality, but this could not be statistically confirmed. For the Nutri-Score, we found a very weak positive correlation for the variables income and education, i.e. there is a weak tendency for people with higher income/education to improve their choice of product more than those with lower income/education. These findings suggest two facts. The first is that people would probably like to get better at losing but their income does not allow them to do so. The second is that people focus on price when making food choices. The fact is that putting both models (NS and NI) on a protein bar product improved consumer understanding of nutritional quality, which was confirmed statistically.

The results of qualitative testing also confirmed that the use of the 'Front of pack labelling' model in the form of the Nutri-Score label has an impact on consumer decision making when choosing a functional food. However, a limitation of the realised survey was to some extent the structure of the tested sample of respondents, where more than half of the individuals confirmed an interest in healthy eating and fitness, which may have influenced the results of the survey.
In order to validate and improve the results, we plan to conduct a similar quantitative study in a real store setting in order to reveal the true impact of the Nutri-Score indicator on consumer purchasing behaviour using eye tracking and electroencephalography (EEG).

Acknowledgements

This research was funded by the Operational Program Integrated Infrastructure within the project: Demand-driven research for the sustainable and innovative food, Drive4SIFood 313011V336, cofinanced by the European Regional Development Fund and the research project VEGA 1/0624/22, "Neurogastronomy: Application of Implicit and Explicit Approaches in Modern Experience Gastronomy and their Influence on Consumer Behaviour".

References

Blazquez-Resino, J. J., Gutierrez-Broncano, S., & Gołąb-Andrzejak, E. (2022). Neuroeconomy and neuromarketing: the study of the consumer behaviour in the Covid-19 context. *Frontiers in Psychology*, *13*, 822856.

Carlson, A., & Frazão, E. (May 1, 2012). Are healthy foods really more expensive? It depends on how you measure the price. It Depends on How You Measure the Price (2012). USDA-ERS Economic Information Bulletin, (96).

Egnell, M., Galan, P., Farpour-Lambert, N. J., Talati, Z., Pettigrew, S., Hercberg, S., & Julia, C. (2020). Compared to other front-of-pack nutrition labels, the Nutri-Score emerged as the most efficient to inform Swiss consumers on the nutritional quality of food products. *PloS one*, *15*(2), e0228179.

Ellison B., Lusk J.L. and Davis D., (2013). Looking at the label and beyond: the effects of calorie labels, health consciousness, and demographics on caloric intake in restaurants. *International Journal of Behavioral Nutrition and Physical Activity*, 10(1), p.21.

Farhud, D. D. (2015). Impact of lifestyle on health. *Iranian journal of public health*, *44*(11), 1442.

Garretson J.A. and Burton S., (2000). Effects of nutrition facts panel values, nutrition claims, and health claims on consumer attitudes, perceptions of disease-related risks, and trust. *Journal of Public Policy & Marketing*, 19(2), pp.213–227.

Hersey J.C., Wohlgenant K.C., Arsenault J.E., Kosa K.M. and Muth M.K., 2013. Effects of front-of-package and shelf nutrition labeling systems on consumers. Nutrition reviews, 71(1), pp.1–14. pmid:23282247

Jo J., Lusk J.L., Muller L. and Ruffieux B., 2016. Value of parsimonious nutritional information in a framed field experiment. Food Policy, 63, pp.124–133.

Julia C., Blanchet O., Méjean C., Péneau S., Ducrot P., Allès B., et al., 2016. Impact of the front-of-pack 5-colour nutrition label (5-CNL) on the nutritional quality of purchases: an experimental study. International Journal of Behavioral Nutrition and Physical Activity, 13(1), p.101. pmid:27645372

Lusk J.L. (2012). "Consumer Information and Labeling." in US Programs Affecting Food and Agricultural Marketing. Armbruster W.J.and Knutson R.D.(eds). New York: Springer Science + Business Media, 2012.

Lusk, J. L. (2019). Consumer beliefs about healthy foods and diets. *PLoS One*, *14*(10), e0223098.

Martinho, V. J., Bartkiene, E., Djekic, I., Tarcea, M., Barić, I. C., Černelič-Bizjak, M., ... & Guiné, R. P. (2022). Determinants of economic motivations for food choice: Insights for the understanding of consumer behaviour. International Journal of Food Sciences and Nutrition, 73(1), 127-139.

Schuldt J.P. and Schwarz N., (2010). "The "organic" path to obesity? Organic claims influence calorie judgments and exercise recommendations." *Judgment and Decision Making*, 5(3), 144–150.
Syrengelas K.G., DeLong K.L., Grebitus C. and Nayga R.M. Jr, (2017). Is the natural label misleading? Examining consumer preferences for natural beef. *Applied Economic Perspectives and Policy*, 40(3), pp.445–460.

Waterlander W.E., Steenhuis I.H., de Boer M.R., Schuit A.J. and Seidell J.C., (2013). Effects of different discount levels on healthy products coupled with a healthy choice label, special offer label or both: results from a web-based supermarket experiment. *International Journal of Behavioral Nutrition and Physical Activity*, 10(1), p.59.