

# Healthy Nutrition and Behavioral Economics: From Principle to Practice

## Zdrowe żywienie i ekonomia behawioralna: od zasady do praktyki

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### SUMMARY

**Aim:** To highlight the effect of using behavioral economics` methods, in particular, context and presentation of information that can influence behavior and choice of people in matters of healthy nutrition and disease prevention.

**Materials and Methods:** The structure of the study included: coverage of the main issues of healthy nutrition in population of Ukraine and application of behavioral economics` methods, which were developed on the basis of our research (method of social experiment) with subsequent statistical processing of data.

**Results:** The absolute percentage of sales of dishes and drinks with green, yellow and red marking in cafeterias and canteens of Sumy State University at the initial stage, and after implementing of behavioral methods. The most significant changes occurred in sales of dishes with red labeling: it decreased by 20%; parallelly sales of green-labeled dishes increased significantly from 28% (before the experiment) up to 38% (after changing location compared to other dishes and using visual tips) and yellow-labeled dishes: the sales` index increased by 10%. Using of behavioral methods has also influenced the choice of drinks, but not significantly. Sales` index of "green" drinks during the experiment had increased by 4%, "yellow" – by 3%.

**Conclusions:** Simple behavioral methods as changing the default options (change of location/layout) distribution of simple and meaningful information about nutrition, labeling can improve the diet choice of people by shifting it towards the healthier one, which, in turn, will lead to a significant reduction in prevalence of cardiovascular diseases, obesity and related diseases. Cooperation with health officials and politicians in further can lead to the spreading of healthier eating behavior in population without limiting individual choice of people.

**Key words:** healthy nutrition, behavioral methods, public nutrition

**Słowa kluczowe:** zdrowe żywienie, metody behawioralne, żywienie publiczne

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### INTRODUCTION

Healthy nutrition is a diet providing normal growing, development and human vital activity, as well as contributing to the strengthening of our health and diseases prevention. According to the latest recommendations of the WHO and the Public Health Center of Ukraine on healthy nutrition, it is necessary to increase the amount of vegetables, fruits, berries, fish and other seafood, whole-grains, cereals, nuts in the diet. It was also proposed to limit consumption of processed meat, red meat, sugary drinks and sugar, salt and alcohol-added products [1]. Poor nutritional quality and over-consumption can lead to deterioration of health and development of pathological conditions. Even with availability of information on healthy nutrition and programs to normalize body weight, the index of diseases associated with irrational nutrition tends to increase. Unhealthy nutrition is the most important risk factor for diseases of cardiovascular system, which are the first cause of premature mortality in Ukraine,

as well as cancer, diabetes and other conditions associated with obesity [2, 3].

According to the data of Public Health Center of Ukraine, a significant part of Ukrainian population does not adhere to official recommendations on healthy nutrition, consuming few fruits, vegetables, whole-grains, fish and a large number of saturated and trans-fats. Traditional economic analysis cannot explain why lots of people choose risky behavior, influencing their own health. Thus, more and more scientists around the world address behavioral economics, which tries to explain why people behave irrationally and develop stimuli that can change people's behavior.

In the book "Nudge", RH Thaler and CR Sunstein have promoted the idea, that understanding how people make decisions can be used to encourage people to make right choices without limiting the freedom of choice itself. This philosophy of "libertarian paternalism" should encourage scientists, institutions, and governments to create choice

environments that will “nudge” people to make decisions that will respond primarily to their own interests. Such methods are of particular interest in health care, through which improvements in public health can be achieved, since it is known, that even if there is plenty of information about healthy nutrition and programs to normalize body weight, the number of diseases associated with irrational nutrition is still increasing. This article describes the effect of using methods of behavioral economics to solve one of the main problems of public health – rational nutrition [4, 5].

### AIM

The aim of the article is to highlight the effect of using behavioral economics' methods, in particular, context and presentation of information that can influence behavior and choice of people in matters of rational (healthy) nutrition and disease prevention.

### MATERIALS AND METHODS

The structure of the study included: coverage of the main issues of healthy nutrition in population of Ukraine and application of behavioral economics' methods, which were developed on the basis of our research (method of social experiment) with subsequent statistical processing of data. The experiment was conducted during one month, February 1-29, 2021 in the dining rooms of the Public catering complex of Sumy State University, attended by students of all specialties. The research was approved by Ethics Commission of Sumy State University University, according to the European bioethics and bio-rights, Helsinki Declaration of the World Medical Association.

### RESULTS

Taking into account the knowledge of behavioral sciences, one can easily explain why it is difficult for people to eat rationally in modern food conditions. This article is based on the analysis of behavioral methods for justifying the effectiveness of mentioned policies as presentation of dietary recommendations and menu labeling. First of all, it is important to understand that environmental factors such as social atmosphere, presence and level of distractions and even lighting can affect food to-be-chosen by people and consumption amount. Therefore, some of these signals can, accordingly, be used to “nudge” people to rational choices [4]. Thus, introduction of successful means of promoting healthy nutrition, based on behavioral economics, can become an important tool of nutrition programs at schools and institutions of higher education, which aim to achieve a balance between satisfying dietary needs and encouraging healthy nutrition, normalization of body weight, and, accordingly, prevention of diseases [6]. Administrators of public catering have a unique opportunity to control elements that affect choosing food by people. Understanding how behavioral interventions can influence food choices and diet quality, heads of school canteens and university cafeterias can develop possible strategies to promote healthy nutrition. The study we had conducted, describes a behavioral experiment in the public catering

complex of our university, which assessed the impact of certain behavioral methods, namely the context and presentation of information that can affect the choice of food. The experiment was designed to use in the context of any catering complex (at schools, colleges, universities).

In the current food environment, low-nutrient fat products are widely available, inexpensive and sold in large quantities without explicit marking. This circumstances make people prefer unhealthy food, even if this choice contradicts with keeping healthy lifestyle in the nearest future, since most people are susceptible to the biased benefits of the present over future costs or benefits. It is also important to take into account the fact that people tend to be overly optimistic about their health in future, constantly postponing abandoning of the negative ingrained food habits for «tomorrow» [7].

Most daily eating habits are irrational; they are habitual and automatic, as most people have a strong tendency to follow the default options – a phenomenon known as “status quo bias”. Psychologists distinguish two systems of human thinking and decision-making: the “automatic system”, through which decisions are made quickly, relatively easily, without thinking, and the “reflective system”, which is controlled consciously [8]. Unfortunately, the majority of food defaults encourage unhealthy choices. Public catering often offers large portions and unhealthy side dishes (for example, french fries) by default; so, those who want to choose healthier option should ask for an alternative (a large portion to replace with a medium or small one, or another dish at all).

Most nutrition decisions are made mainly by the automatic system. Processing information on the calorie content of food, based on a large amount of numeric data, requires certain efforts from person and involvement of a reflective system. Recent studies demonstrate that it is difficult for people to process numeric information. For example, in recent years some cafes and restaurants have provided detailed information about portions, nutrient content in grams or milligrams along with percentage of the mentioned data, but mostly that is not effective. Many weight loss programs also require patients to count calories and body mass index, but using numeric data is problematic for most people. It has also been studied that labeling healthy food as “healthy” can reduce the demand for this product, because most people correlate notions of “healthy” and “tasteless”.

More effective, in our opinion, is label or price tag of a certain color: green, yellow or red in order to inform buyer on low, medium or high level of calories and harmful substances such as saturated and trans-fats, salts, “sugar rush”, etc. The advantage of this method of “traffic light” is that it satisfies the working mode of automatic system, using self-evident associations between “red” and “stop” and “green” and “go”; with them people make right decisions automatically without thinking. Examples of another effective ways of presenting information on calories and food safety, based on behavioral methods, can be ranking menu items from low-calorie to high-calorie or converting information on calories' amount

**Table 1.** The index of sales of marked goods at the initial stage and after the introduction of behavioral methods in cafeterias and canteens of the Sumy State University catering complex

	Initial index (before implementation),%	Index after layout change, %	Index after implementation of visual tips, %	Index after layout change and visual tips, %	Validity, p
<b>Dishes</b>					
Green	28	31	34	38	p<0,05
Yellow	41	40	43	51	p<0,05
Red	31	29	23	11	p<0,001
<b>Drinks</b>					
Green	38	37	40	42	p>0,05
Yellow	18	19	19	21	p>0,05
Red	44	44	41	37	p>0,05

into easily understood indicators, such as the number of steps a person will need to take in order to "burn" them, etc. Thus, by changing the format of message and making certain information more visible and easy to perceive, one can influence people's beliefs and behavior without limiting their choice.

Information containing recommendations for daily consumption of specific quantities of certain foods (e.g. 1 cup of milk, 100 g of hard cheese or 250 g of meat) also requires understanding and memorizing large amounts of data and visualizing different quantities of servings, e.g. how a portion of steak, weighing 250 g, looks like. These messages are difficult to perceive by most people. Much easier for them is a behavioral method, based on the "half-plate" infographics: an image of a plate, half of which is green-colored and goes with a message: "be sure you fill half of the plate with fruits and vegetables during each meal". According to the results of our research, about 81% of our university students had assessed the "half-plate" method as more motivating, pointing out that even 1 month after experiment with infographics, they chose more vegetables and fruits for lunch than before, as they sought to fill half of their portion like this. This suggests that it's better to sacrifice the accuracy of dietary recommendations to provide simple, memorable and motivating messages.

The experimental study we conducted was based on the effect of behavioral methods on people's eating habits, which proved that public catering can be converted into more useful, by spreading simple and meaningful information and changing the form of messages, which greatly affects decision-making on such an important issue, to maintain public health, as healthy nutrition. We regarded such methods of behavioral influence on decision-making, as layout of dishes and visual tips. Proper layout on display is important when choosing dishes, as it makes certain options more noticeable, attractive and accessible to consumers. Layout affects the subconscious choice of a person, satisfying the automatic system of decision-making. Visual tips also have a positive effect. They include informational signs, labels, tags or emblems that are located directly at the location of food choosing and consumption. For public catering complexes, the method of "half-plate"

can be successfully used to encourage consumers to include useful products in the required quantity for their diet.

According to the data from our study, which lasted for one month from February 1 to February 29, 2020 in the canteens of the Catering Complex of Sumy State University, the following results were distinguished:

- in the first week vegetable salads, salads with vegetable dressing and vegetable-fruit salads were located on the upper shelf at eye level; drinks made of dried and fresh fruits were located before the juices and drinks of industrial production at eye level of the customers. Also vegetable soups and dishes with boiled poultry and fish were added to the main menu. In all retail outlets of the catering complex, the sale index of these dishes and drinks had increased, but not significantly.
- in the second week, another motivation type (visual) was added. A menu with a list of "healthy food" dishes was printed on a green paper; the same list was duplicated in the main menu as well. After this, the sales number of mentioned dishes had increased.
- in the third week the dishes of the "healthy menu" were printed only on green paper and were located at eye level or in the first rows on the shelves. After two weeks of printing the menu on a green paper, visitors had formed the idea that only "healthy" or dietary food was presented in the green list.

Table 1 demonstrates the absolute percentage of sales of dishes and drinks with green, yellow and red marking in cafeterias and canteens of Sumy State University at the initial stage, and after implementing of behavioral methods. The most significant changes occurred in sales of dishes with red labeling: it decreased by 20% ( $p < 0,001$ ); parallelly sales of green-labeled dishes increased significantly from 28% (before the experiment) up to 38% (after changing location compared to other dishes and using visual tips) ( $p < 0,05$ ) and yellow-labeled dishes: the sales' index increased by 10% ( $p < 0,05$ ).

Using of behavioral methods has also influenced the choice of drinks, but not significantly ( $p > 0,05$ ). Sales' index of "green" drinks during the experiment had increased by 4%, "yellow" – by 3%.

## DISCUSSION

Thus, this study evaluates the effectiveness of behavioral interventions in food labeling in promoting healthy choice of food. The results are based on the analysis of objective data, the index of sales of dishes and drinks, rather than on subjective results from customers' surveys. We found that intervention in choice of people by marking dishes, using the "traffic light" method in dining rooms and cafeterias, led to a reliable improvement for choosing a healthy food. The results obtained indicate that simple behavioral interventions in the food environment may take the central stage in health policy; they may help to improve the nutritional behavior in people, and, accordingly, play a significant role in prevention of diseases of the cardiovascular system, diabetes, obesity and others.

During the experiment, it was found that the first changes in the choice of visitors between "red" and "green" purchases occurred after the change in location of dishes, namely, when healthier dishes were placed in the first rows at eye level of customers. Further addition of visual tips, as labeling by the method of "traffic light" and infographics with the method of "half-plate" has led to the fact that sales of "red" goods had decreased even more with parallel increasing in sales of healthy dishes.

## CONCLUSIONS

Behavioral sciences can shed light on important factors that contribute to the emergence of significant public health problems (including unhealthy nutrition). This article focuses on a few behavioral methods that help to explain why in modern food conditions it's so difficult to make the right choice of healthy diet, as well as how to achieve it, without limiting the freedom to choose.

The results of our study provide clear objective evidence that such simple behavioral methods as changing the default options (change of location/layout) distribution of simple and meaningful information about nutrition (method of "half-plate"), labeling (the "traffic light" method) can improve the diet choice of people by shifting it towards the healthier one, which, in turn, will lead to a significant reduction in prevalence of cardiovascular diseases, obesity and related diseases. Cooperation with health officials and politicians in further can lead to the spreading of healthier eating behavior in population without limiting individual choice of people. Despite the fact that this article is devoted to the problems of healthy nutrition in population, the findings can be applied to many other urgent public health problems.

## PROSPECTS FOR FURTHER RESEARCH

The main promising issue is studying of the principles of behavioral economics and creation of methods, based on them, to influence behavior of people who want to be healthy, but for various reasons can not achieve results on their own; as well as the subsequent systematic using of these techniques in the field of health.

## References

- 12 steps to a healthy diet. Public Health Center of Ukraine. 2020. (in Ukrainian) <https://phc.org.ua/news/12-krokv-do-zdorovogo-kharchuvannya> [date access 29.08.2021]
- How to prevent chronic diseases through a healthy diet. Public Health Center of Ukraine. 2020 (in Ukrainian) <https://phc.org.ua/news/yak-zavdyki-zdorovomu-kharchuvannyu-zapobigti-poyavi-khronichnikh-khvorob> [date access 29.08.2021]
- Suls J, Mogavero JN, Falzon L et al. Health behaviour change in cardiovascular disease prevention and management: meta-review of behaviour change techniques to affect self-regulation. *Health Psychol Rev.* 2020;14(1):43-65. doi: 10.1080/17437199.2019.1691622.
- Rudenko L.A., Smiianov V.A., Smiianova O.I. Basic principles of behavioral economics and prospects for their application in the public health system. *Wiadomosci lekarskie.* 2020;73(9):2026–2030. doi: 10.36740/WLek202009225.
- Thaler RH, Sunstein CR. *Nudge: Improving Decisions about Health, Wealth, and Happiness.* Yale University Press. 2008, 201p.
- Matjasko JL, Cawley JH, Baker-Goering MM et al. Applying Behavioral Economics to Public Health Policy: Illustrative Examples and Promising Directions. *PhD3 Am J Prev Med.* 2016; 50(5):13-19. doi:10.1016/j.amepre.2016.02.007.
- Kelly MP, Barker M. Why is changing health-related behaviour so difficult? *Public Health.* 2016;136:109-16. doi: 10.1016/j.puhe.2016.03.030.
- Kurhanska VO, Smiianov VA, Smiianova OI. Public Health and Behavioral Economics. *Visnyk sotsial'noyi hihiyeny ta orhanizatsiyi okhorony zdorov'ya Ukrainy [Bulletin of social hygiene and health care organization of Ukraine].* 2019; 2 (80): 33-39. (in Ukrainian)
- Rudenko LA, Smiianov VA, Smiianova OI. Basic principles of behavioral economics and prospects for their application in the public health system. *Wiad Lek.* 2020;73(9):2026-2030.

### Conflict of interest:

The Authors declare no conflict of interest

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A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical review of the article, F – Final approval of article