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SOCIO-PSYCHOLOGICAL DETERMINANTS OF FOOD SECURITY IN UKRAINE: CAUSAL ASPECT[5]

Food security should be achieved not only by developing the production capacity and improving the living standards of the population, but also by raising consumer awareness of rational consumption and environmental protection. The aim of this article is to establish the cause-and-effect relationships of socio-psychological determinants of food security and to find ways to improve the approaches to food packaging, strengthen the potential of food affordability and increase consumer awareness of the environmental aspect of food security. The study substantiates the marketing feasibility of greening packaging, developing the mobility of workers in the labour market and choosing the idea of caring for the next generation as a basis for increasing conscious consumption. The methodological framework makes use of existing statistical and factual data, retrieved via the survey run within the period of the study.
Keywords: food security; sustainable development; patterns of consciousness; economic affordability of food; greening
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Introduction

According to the Farm to Fork strategy, approved by the European Commission under the European Green Deal, modern society needs a rational system of sustainable production, distribution and consumption of food. Waste of food is unacceptable from an economic and moral point of view, because the ever-growing population of the planet needs efficient use

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of food resources. Food production must be optimized in the context of food consumption and waste generation. With this in mind, the aim of our study was to examine consumer behaviour in food packaging colour choices in order to identify trends in consumer preferences and persistent patterns of consumer behaviour. The study is cross-disciplinary and is based on an analysis of social and psychological determinants of consumer behaviour in Ukraine. Having analyzed consumer expectations, the study will make it much easier for food producers to tailor production to customer needs, reducing waste and simplifying marketing promotion strategies. In addition, based on previous research on the psychological aspects of consumer behaviour, food producers will be able to form an associative consumer perception of the most desirable products based on technological feasibility and environmental safety.

Food security issues cover a range of issues related to ensuring the affordability of food, setting up food distribution infrastructure, ensuring food quality standards and the safety of food production for the environment. Building a food security system is based on socio-psychological determinants that determine the willingness of consumers and food producers to be responsible for the environment and to promote a culture of processing and zero waste. The aim of this article is to establish the cause-and-effect relationships of socio-psychological determinants of food security and to find ways to improve approaches to food packaging, strengthen the potential of food affordability and increase consumer awareness of the environmental aspect of food security.

Marketing campaigns aimed at shaping the demand for products should help strengthen the conscious attitude of consumers to consumption, green consumer behaviour and the formation of a way of life that would best meet the principles of sustainable development. When using food packaging materials, producers, together with consumers, must demonstrate a responsible attitude towards the environment, taking care of the possibilities of waste sorting, recycling or reuse.

In the process of forming state policy on food security, it is important to understand the causal aspect of socio-psychological determinants that affect the harmonious combination of components of food security. Thus, the development of innovations, improving the quality of education and skills of citizens will create an opportunity to improve the performance of the national economy and strengthen the basis for the formation of economic affordability of food. At the same time, understanding the connection between socio-psychological determinants that shape the responsible attitude of consumers to the environment will create effective mechanisms to support environmental initiatives and strengthen the implementation of the principles of sustainable development.

Literature Review

Aspects of food security are being studied by many scientists around the world. There are several approaches to the analysis of the challenges facing countries in the process of the food security system establishment. Thus, the economic component of the formation of food security is the subject of study by many scientists. For example, a thorough economic analysis of food security indicators based on various international methodologies as well as modelling

the system of food stability was carried out by Babych M. and Kovalenko A. (Babych, 2018). The study conducted by Shebanina O., Klyuchnik A., Burkovska A. and Caruso D. (Shebanina, 2020) confirms the need for the government to create a sustainable system of social standards for the population, providing an adequate level of purchasing power. This article complements existing research by continuing the analysis of the relationship between meeting the food needs of the population and the economic potential of households.

Issues of consumer behaviour and social aspects of food security awareness are widely considered by scientists. For instance, the role of social norms in predicting plastic avoidance, using the theory of normative social behaviour was explored by Borg K., Curtis J. and Lindsay J. (Borg, 2020), who conducted measuring consumer behaviour in relation to four single-use plastic items (bags, straws, coffee cups, and takeaway containers). The study conducted by Escadas M., Jalali M. and Farhangmehr M. (Escadas, 2020) leads to further understanding of the integrated role of emotions on consumer decision-making involving ethical issues, by considering the influence of both positive and negative emotions on the ethical decision-making process. The research carried out by Fray-Andres E. and Martinwz-Salinas E. (Fray-Andres, 2008) improves our understanding of how consumers feel and what attitudes best define their environmental behaviour, moreover this study showed that environmental attitudes have a significant effect on ecological behaviour and that the level of environmental knowledge moderates this relationship. The findings presented by Thogersen J. and Alfinito S. (Thogersen, 2018) suggest that the situational activation of a normative goal can be an effective means to promote sustainable consumer choices in very different national contexts. The study conducted by Yuksel C. and Kaya C. (Yuksel, 2020) revealed the traces of personal and cultural values in the survey participants' perspectives on the sustainability concept. The study by Waites S., Stevens J. and Hancock T. (Waites, 2020) was conducted to investigate trust as an important mediator in explaining the relationship between green marketing and purchase intentions. This article complements existing research, continuing the analysis of the relationship between consumer awareness of sustainable development and willingness to change their consumer behaviour for the benefit of future generations.

To better understand the behavioural patterns of consumers in our study, we relied on previous research by world scientists. For example, the study conducted by Japutra A. and Song Z. (Japutra, 2020) investigates how mindsets (i.e. the beliefs that individuals have about the nature of human characteristics) are associated with compulsive buying behaviour (i.e., the tendency to buy impulsively and obsessively) as well as provides policymakers and marketers with a better understanding of the different motivations that lead to compulsive buying. The results of the paper by Novoradovskaya E., Mullan B. and Hasking P. (Novoradovskaya, 2020) can contribute to the development of evidence-based behaviour change interventions as it is exploring the psychological predictors of those behaviours can assist in developing efficient and cost-effective interventions for people to acquire and maintain them. The article by Kolbe R. and Burnett, M. (Kolbe, 1991) indicates a general need for improvement in the application of content-analysis methods in researches that describe and explain consumer behaviour. This article complements existing research by continuing to search for psychological patterns of consumer behaviour.

The issue of food distribution as an element of its accessibility to consumers is often addressed by scientists. For instance, changing consumer landscape and evolving models of commerce were addressed in the form of communities of benefit exchange by Bajaja N., Odgen S., Steel M. and Rahman K. (Bajaja, 2021).

The component of ecological stability and sustainable development of agriculture in the process of ensuring food security is often the subject of research by world scientists. For example, monitoring and evaluating of the agricultural land sustainability conducted to monitor the process of sustainable agricultural development goals implementation, problems' identification of regions agricultural land use and their causes, improving the efficiency of administrative decisions of central executive authorities, local authorities and the land market actors were carried out by Kotykova, O., Kuzmenko, O. and Semenchuk, I. (Kotykova, 2019). The survey purpose of the paper by Kotykova O., and Albeshchenko O. (Kotykova, 2017) was a comprehensive study of the sustainable development index in order to find patterns and distinctive features for related groups of countries. This article complements existing research by continuing to look for possible ways to reduce the negative impact on the environment by abandoning the variety of colourful packaging.

Research Methods

The study of food security in the context of the study of consumer behaviour led to the development of a questionnaire, which was answered by 130 respondents. The survey was conducted by surveying every tenth visitor of the ATB grocery retail network in Mykolayiv, Ukraine. The purpose of the questionnaire was to gather information to analyze the relationship between consumer preferences in food choices and internalized patterns of colour associations in the subconscious. The influence of the revealed stereotypes of consumer behaviour is offered to be interpreted for the purpose of optimization of marketing campaigns of particular food products on the basis of greening. At the same time, the information obtained during the collection of respondents' answers was used to establish the relationships between socio-economic determinants of personality and environmental awareness in the field of sustainable development of society.

Before the study, hypotheses were formed, which were confirmed during the analysis of the collected data. Hypothesis 1: the use of monochrome polymers, which are less harmful to the environment and easier to use for processing and reuse in the economy (Amare, 2021), may not only be environmentally friendly but also meet consumer expectations, which will strengthen the marketing potential of food producers. Hypothesis 2: the competitiveness and mobility of workers in the labour market, provided by their qualifications and skills, contribute to their ability to better meet the needs of quality nutrition. Hypothesis 3: Consumers who are concerned about the possibility of safe disposal of food packaging are aware of the fate of future generations. The hypotheses mentioned above were tested on the basis of statistical analysis by the method of least squares using JASP software.

The study found a correlation between 1) the state of satisfaction of food needs and socio-economic determinants; 2) indicators of environmental awareness. Variables of econometric models were used for this purpose:

Y1/2 – 1) the vector of the state of satisfaction of food needs (productive, dependent, endogenous variable); 2) the vector of the importance of taking measures for the sustainability of food consumption (effective, dependent, endogenous variable); X1/2 – 1) the vector of socio-economic determinants (factor, independent, exogenous variable); 2) the vector of the impact of food consumption on the lives of future generations; U is the vector of residues (stochastic component).

General model:

$$Y = f(X, u) \quad (1)$$

Model parameters β_0, β_1 were estimated by a system of normal equations:

$$\begin{cases} \beta_0 n + \beta_1 \sum_{i=1}^{n} x_i = \sum_{i=1}^{n} y_i \\ \beta_0 \sum_{i=1}^{n} x_i + \beta_1 \sum_{i=1}^{n} x_i^2 = \sum_{i=1}^{n} x_i y_i \end{cases}, \quad (2)$$

Microsoft Exel was used to analyze, organize, group, process and encode information. After the initial processing of the data obtained in the form of respondents' answers using a questionnaire, JASP software was used for statistical analysis of data sets and construction of correlation matrices of dependences of the studied changes based on the linear regression model.

Results and Discussion

The study identified the following trends in the formation of internalized patterns of colour attributions (Table 1). Thus, mostly, the sweet taste is associated with pink and yellow. Sour taste, according to respondents, is mostly associated with yellow, green or lime. The salty taste was mostly identified with white. Regarding the bitter taste, most associations arose with brown and black colours. The spicy taste was mainly associated with red. According to the respondents, the neutral taste is mostly associated with white and beige colours.

In support of the previous theory regarding the relationship of internalized patterns of the subconscious with consumer behaviour, we obtained the following results (Table 2). Thus, with the same ingredients, price and volume of the product, if the brand is unknown, when buying milk, consumers prefer white packaging. When buying meat products – red or white packaging. When buying fish products, preferably choose blue or blue packaging. When buying eggs, they prefer white and beige packaging.

When choosing food, consumers often associate the taste of the product with the colour of the packaging in which it is packaged. Thus, under conditions of equal price and volume of production, consumers tend to prefer those products whose packaging colour evokes taste associations that meet consumer expectations. Moreover, if understanding the principle of subconsciously choosing packaging of the colour that evokes the expected taste associations, it is possible to form a successful marketing policy and packaging recycling strategy.

Table 1

Colour attributions of consumers in relation to tastes

Question	What colour in your imagination is associated with:					
Answer options	Sweet taste	Sour taste	Salty taste	Bitter taste	Spicy taste	Neutral taste
White	14	0	64	0	0	39
Beige	4	0	3	3	2	31
Gray	0	0	16	7	2	18
Black	0	0	1	30	10	1
Dark blue	0	4	5	2	0	6
Light blue	0	0	6	1	1	15
Violet	2	2	0	1	1	4
Lilac	11	2	0	1	0	3
Green	3	38	16	9	2	5
Lime	3	34	3	6	0	0
Yellow	29	46	8	8	2	2
Orange	8	0	4	12	9	0
Pink	38	0	0	0	1	5
Red	14	4	1	4	98	0
Brown	4	0	3	46	2	1

Source: developed by authors, based on the results of a survey.

Table 2

Patterns of consumer behaviour in terms of packaging colour selection

Question	What colour packaging are you most likely to choose, given the same ingredients, price and volume of the product, if the brand is unknown, when buying:			
Answer options	milk	meat products	fish products	eggs
White	69	22	17	52
Beige	2	14	2	25
Gray	1	1	15	12
Black	2	13	7	6
Dark blue	22	2	42	4
Light blue	27	1	29	0
Violet	0	4	2	2
Lilac	1	2	3	2
Green	2	10	4	4
Lime	1	1	2	2
Yellow	1	4	0	14
Orange	0	4	1	2
Pink	0	13	2	1
Red	1	33	3	0
Brown	1	6	1	4

Source: developed by authors, based on the results of a survey.

Thus, when choosing a colour association of salty taste, 64% of respondents named white, 30% of respondents associate a neutral taste with white. White packaging was preferred by 53% of respondents when buying milk and 40% of respondents when buying eggs.

Beige was chosen by 24% of respondents, characterizing the neutral taste. Every 5th respondent chooses a beige package when buying eggs.

Gray colour was described by respondents as being associated with a neutral (14%) or salty (12%) taste. In addition, every tenth respondent chooses grey packaging when buying fish products and eggs. Black packaging is chosen by every tenth consumer of meat products, associating this colour with a spicy taste (23%).

Blue packaging is chosen by a third of respondents when buying fish products and almost every fifth consumer of milk, associating this colour with neutral (5%) and salty (12%) flavours. Blue packaging was chosen by every 5th consumer of fish products and milk, associating this colour with neutral (12%) and salty (5%) flavours.

Green packaging, which is associated mainly with sour and salty flavours, was chosen by 8% of meat consumers. 11% of egg consumers chose yellow packaging. Pink and red packaging was preferred by 10% and 25% of meat consumers, respectively (Table 3).

Thus, in terms of particular food products, consumer choice based on taste and colour attributes is as following (Table 4): white (53%), light blue (21%) and dark blue (17%) packaging is mostly preferred for milk; red (25%), pink (10%), white (17%) and beige (11%) colours in packaging are mostly preferred for meat products. Fish products are commonly chosen in dark blue (32%), light blue (22%), white (13%) or grey (12%) packaging. Eggs are usually preferred in white (40%), beige (19%), yellow (11%) and grey (9%) packaging.

Table 3

Attributive characteristics of colours in the associative range of food flavours

Colour	Predominant taste associations, %	The main products of the associative range, %
White	salty (64%) neutral (30%) sweet (11%)	milk (53%) eggs (40%) meat products (17%) fish products (13%)
Beige	neutral (24%)	eggs (19%) meat products (11%)
Gray	neutral (14%) salty (12%)	fish products (12%) eggs (9%)
Black	bitter (23%) spicy (8%)	meat products (10%)
Dark blue	salty (12%) neutral (5%)	fish products (32%) milk (17%)
Light blue	neutral (12%) salty (5%)	fish products (22%) milk (21%)
Green	sour (29%) salty (12%)	meat products (8%)
Yellow	sour (35%) sweet (22%)	eggs (11%)
Pink	sweet (29%)	meat products (10%)
Red	spicy (75%) sweet (14%)	meat products (25%)

Source: developed by authors, based on the results of a survey.

Table 4

Attributive characteristics of food in the associative range of colour selection of packaging

Product	Predominant taste associations, %	The main colours of the associative range, %
milk	neutral (55%) sweet (44%)	white (53%) light blue (21%) dark blue (17%)
meat products	neutral (52%) salty (32%) spicy (14%)	red (25%) white (17%) beige (11%) pink (10%)
fish products	salty (59%) neutral (33%)	dark blue (32%) light blue (22%) white (13%) gray (12%)
eggs	neutral (84%) salty (12%)	white (40%) beige (19%) yellow (11%) gray (9%)

Source: developed by authors, based on the results of a survey.

The study showed the following stereotypes about certain groups of consumer products (Table 5). So, when buying milk, consumers mostly expect to get a product with a neutral or sweet taste. The meat is expected to have a neutral or salty taste. When buying fish, respondents hope to get a predominantly salty or neutral product. When buying eggs, the most anticipated taste is neutral.

Table 5

Statistics of attributive characteristics of colours in the associative range of food flavours

Question	What taste of product do you expect to get when buying:			
Answer options	pack/bottle of milk	meat/meat products	fish/fish products	eggs
Sweet	57	4	7	4
Sour	2	0	1	0
Salty	0	41	77	15
Bitter	0	0	0	1
Spicy	0	18	2	1
Neutral	71	67	43	109

Source: developed by authors, based on the results of a survey.

When choosing perishable foods, consumers prefer cardboard, glass and plastic containers, given the same price, quality and volume of the product. At the same time, when buying long-lasting products, the main advantage is given to packaging made of glass, provided the same price, quality and volume of the product (while the share of cardboard and plastic containers remains significant) (Table 6).

Table 6

Statistics of the choice of the packaging material when buying food

Question	What material packaging will you choose when buying food:	
Answer options	perishable, given the same price, quality and volume of the product?	non-perishable, given the same price, quality and volume of the product?
Glass	48	73
Plastic / polyethylene	25	19
Cardboard	50	27
Wood	6	6
Metal	1	5

Source: developed by authors, based on the results of a survey.

Recent studies confirm the strong impact of coloured plastic on the environment (Amare, 2021). Thus, the use of toxic dyes in the manufacture of coloured polymeric materials often leads to food poisoning and in the process of decomposition of plastic in landfills has a negative impact on the quality of soils and groundwater. The influence of the use of coloured polymers on the microclimate of the root zone of plants (Amare, 2021), the change of soil temperature and the input into the greenhouse effect is proved. According to scientists (Amare, 2021), the use of polymers of white, black, blue and silver colours is the most rational in terms of agricultural technology, although it has many disadvantages in terms of environmental stability.

As the results of our study show, the use of white packaging and its shades (beige, grey) is universal, because this is the packaging chosen by consumers when buying the vast majority of the food. In addition, dark blue, light blue, red and black colours remain quite popular in terms of packaging choice, which correlates with the previously described study and allows the use of further processed polymers in agricultural production. That is why our research strengthens the framework of previous experiments, arguing the expediency of colour "restraint" in the design and manufacturштп of food packaging, which corresponds to the formed colour patterns of consumer consciousness and strengthen the environmental aspect of manufacturing, use, processing and disposal.

When researching the food safety of consumers, it is important to assess the degree of economic affordability of food and to identify possible ways to increase this indicator. To do this, we proposed a model of the impact of socio-economic determinants (monthly budget, competitiveness in the labour market, labour market mobility, cost structure and type of income sources) on the state of satisfaction of food needs. The model is based on the initial data collected on the basis of processing the responses of respondents (Table 7).

The affordability of food directly depends on the level of income of consumers, which is determined by their mobility in the labour market, as well as the availability of skills that best meet the modern needs of technological transformation of labour relations. The "value" of an employee in the labour market can be determined by various criteria, depending on the region of his residence, the economic conditions prevailing in the country, the level of technological development, etc. However, scientists identify the main factors that have the greatest impact on the economic success of the employee as a potential consumer (Kotykova, 2017). The results of the analysis of the initial data allow to build a correlation matrix (Table

8), which describes the relationship between the state of satisfaction of food needs, the monthly budget of respondents, their competitiveness in the labour market, labour market mobility, consumption structure and sources of income.

Table 7

Statistics of satisfaction of food needs and socio-economic determinants of consumers

№	Questions	Answer options	Number of answers
1.	Describe your typical state of satisfaction of food needs:	Famine	2
		There is a significant lack of food	0
		I refuse to consume certain groups of products (meat, fish) because of lack of money to buy them	9
		Nutritional needs are fullfilled, but I do not consume expensive food (delicacies)	78
		Full satisfaction of food needs, including delicacies	41
2.	My monthly budget is:	Less than UAH 2102	23
		From UAH 2,102 to UAH 6,000	53
		From UAH 6,000 to UAH 10,000	30
		From UAH 10,000 to UAH 18,500	17
		More than UAH 18,500	7
3.	On a scale of 1-5, rate your skills that affect competitiveness in the labour market:	I have no additional skills to improve my qualification	11
		I have the same skills as most able-bodied people	30
		I am in the process of acquiring skills that are in demand in the labour market	80
		Have a high level of foreign language or is a specialist in IT / finance/marketing / advertising/engineering	7
		I speak a high level of a foreign language, is a specialist in IT / finance/marketing / advertising/engineering, I have experience of internships and project work	2
4.	Evaluate your own mobility in the labour market on a scale of 1-5:	I'm afraid of losing my job because I don't have a chance to get a similar one in terms of benefits	14
		I'm afraid of losing my job, although I think I have a chance to get a similar one elsewhere	11
		I could quit if I don't like the job, but I prefer stability	53
		I can resign, but finding a job can take a long time	31
		I can easily resign and quickly get a similar job	21
5.	The largest share in the structure of my monthly expenses are:	Food	8
		Food + housing	29
		Expenditures on basic needs (food, housing, clothing, medicine)	53
		Expenditures on basic needs + self-development, recreation	33
		Education, rehabilitation, recreation	7
6.	Describe the type of sources of your income:	Fixed income from social benefits/assistance	36
		Fixed income from employment	51
		Income from employment with KPIs (possibility to increase depending on efficiency)	9
		Income from basic employment + passive income	26
		Several stable sources of income, including own business and passive income	8

Source: developed by authors, based on the results of a survey.

Table 8

Correlation matrix describing the relationship between the state of satisfaction of food needs and socio-economic determinants

		Nutrition sufficiency	Monthly budget	Expenditures share	Income sources	Working skills
Nutrition sufficiency	Pearson's r	—				
	p-value	—				
Monthly budget	Pearson's r	0.148	—			
	p-value	0.092	—			
Expenditures share	Pearson's r	0.224*	0.343***	—		
	p-value	0.010	< .001	—		
Income sources	Pearson's r	0.197*	0.529***	0.288***	—	
	p-value	0.025	< .001	< .001	—	
Working skills	Pearson's r	0.061	0.227**	0.069	0.197*	—
	p-value	0.492	0.010	0.436	0.025	—
Labour mobility	Pearson's r	0.309***	0.207*	-0.004	0.252**	0.163
	p-value	< .001	0.018	0.968	0.004	0.064

* p < .05, ** p < .01, *** p < .001
Source: developed by JASP.

The calculated correlation coefficients show that food adequacy increases simultaneously with the improvement of the structure of consumer expenditures (when consumers spend most of their income not only on food, but also on self-development, recreation, etc.), increasing labour mobility in the labour market and creating additional sources of income in addition to earnings. The monthly consumer budget increases in direct proportion to the improvement of the cost structure, the creation of additional sources of income, the acquisition of skills that increase the competitiveness of the employee in the labour market, as well as increasing mobility in the labour market. Improving the structure of consumer spending according to the model (when consumers spend most of their income not only on food but also on self-development, recreation, etc.) directly depends on the availability of additional sources of income. At the same time, the creation of additional sources of income is directly proportional to the increase in monthly income, improving the cost structure, as well as improving work skills and employee mobility in the labour market. In turn, the acquisition of work skills that improve the competitiveness of workers in the labour market directly depends on monthly income and the creation of additional sources of income. These dependencies can be represented in the form of a diagram (Figure 1).

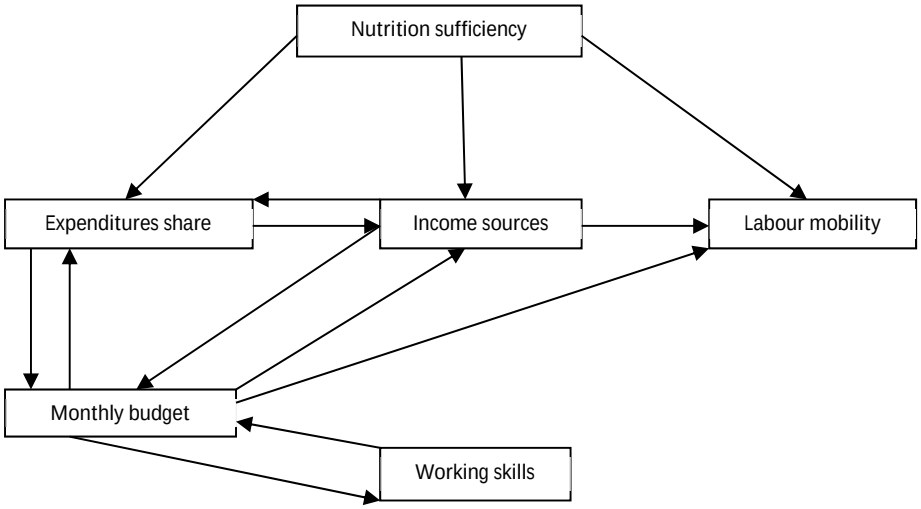
Thus, the established links form a chain, the unifying element of which is the mobility of workers in the labour market, which directly affects the affordability of food for consumers and the main factors influencing the formation of economic affordability of food - the monthly budget of consumers and sources of income. Thus, by developing the mobility of workers in the labour market, it is possible to significantly improve the affordability of food, as increasing the mobility of workers:

- deepens the experience, expertise and professionalism, increases the value of the employee in the labour market;

- reduces psychological stress;
- promotes professional development;
- promotes innovation, knowledge exchange and business development, etc.

Figure 1

The relationship between the state of satisfaction of food needs and socio-economic determinants



It is possible to create the necessary conditions for improving the mobility of workers in the labour market, providing them with decent wages, by:

- stimulating job creation;
- subsidizing entrepreneurship;
- creation of innovation centres;
- the direction of social policy to improve the skills of employees and improve the quality of education.

In addition to the above, stimulating the growth of household incomes should bring to the fore the problems of environmental protection and strengthen the importance of the environmental component of food security in the minds of citizens. Most often, conscious buyers are guided by the principles of preserving the Earth for future generations, trying to minimize the amount of industrial waste, and conserve natural resources by finding and using alternative and other environmentally friendly initiatives. On a domestic scale, this can mean reducing the number of plastic bags, plastic cups and straws used, sorting waste, and eliminating all that is unnecessary.

Scientists (Kotykova, 2019) have calculated the possible impact of individual consumer decisions to achieve the goals of the Paris climate agreement. According to a realistic scenario in which people reduce their consumption of carbon-intensive products, invest in energy-efficient technologies, but do not completely abandon their consumption habits, their efforts will help to reduce CO2 emissions only by 20%. Systemic transformation across all industries and services would need to reduce CO2 emissions by 60% to achieve the targets.

In recent years, Ukraine has decided on the direction of development – the introduction of European living standards in the country. Europeanism is not only belonging to a certain geopolitical space or membership in certain military-political organizations, it is, first of all, the acceptance of certain, special values.

Declaratively, Ukrainians demonstrate an ecocentric vision of the coexistence of humanity and nature: they believe that human beings and the environment have a really close and equal relationship. At the same time, Ukrainians continue to use plastic bags for packaging goods, but intend to switch to environmentally friendly packaging and their own reusable containers. The idea of limiting the consumption of meat and goods made from animal materials (leather, fur) is supported mainly by young people. To improve the environmental situation, Ukrainians are ready to sort garbage, but they are hindered by the lack of special infrastructure (containers, garbage collection services). Material incentives are more important for men than for women when sorting garbage.

Most respondents agreed that man and nature should coexist in harmony and equality (87%, of whom 72% agreed), the least – that nature should be preserved for its own sake (66%, of which 59 % agreed in full).

The judgments proposed for evaluation cannot be called neutral, they include social expectations, which can encourage giving socially approving answers. Therefore, the gender distribution of responses was interesting: in four out of five judgments, the differences in the responses of men and women are significant. Thus, women are much more likely than men to fully agree with the following statements:

- “The humanity and nature must coexist in harmony and equality” (77% vs 66%).
- “The humanity and nature coexist in unity, they are interconnected” (73% vs 62%).
- “Environmental problems need to be solved immediately, the existence of humanity depends on them” (66% vs 52%).
- “Solving environmental problems is a matter for each of us” (68% vs 57%).

This may indicate that women are more ecocentric, or that women may be more likely to behave as conformists to social expectations.

About half of Ukrainians try to limit themselves in the use of environmentally hazardous materials in their lives, and a slightly smaller part also limits the consumption of goods made from animal materials, but the vast majority are not inclined to limit the consumption of meat. Young people are more likely than older people to limit themselves to meat and goods made from animal materials.

About half of respondents limit themselves in the use of environmentally hazardous materials in their lives (53%), another 29% plan to start doing so. Only 4% of respondents said they were not going to limit themselves and another 14% were undecided.

About a third of respondents do not restrict the consumption of goods made of materials of animal origin (32%), the same number – do (also 32%). One-fifth of respondents do not buy such goods at all (20%), 6% do not pay attention to the material, another 10% hesitated to answer. Representatives of the younger age group (18-29 years) significantly more often answered that they do not buy goods of animal origin (29%), while older people (41-55 years) gave such an answer significantly less often (14%).

Almost all respondents (96%) do not limit themselves in meat consumption. Among those surveyed, only 2% were vegetarians and less than one percent were vegans. Another 1% of respondents do not eat meat for personal reasons.

Respondents tend to pay attention to the environmental safety of packaging at the time of purchase, but do so infrequently. They consider paper, cardboard and glass to be environmentally friendly materials, but products in stores are usually packed in plastic bags. At the same time, a significant part of Ukrainians is willing to pay more for goods with environmentally friendly packaging and buy food in their own reusable containers.

About a third of respondents already sort garbage (37%), 43% do not sort, but plan to do so. 14% of respondents do not sort garbage and do not plan to do so, another 6% could not answer.

The main reasons that motivate respondents to sort garbage or plan to start doing so are awareness of the need to care for the environment (75%) and the example of developed countries (32%). A quarter of respondents said that sorting garbage is not a problem / not difficult for them (24%). Less than 5% cited the example of relatives, acquaintances, friends and the fashion for sorting garbage (4% and 3%, respectively).

The main reasons for respondents' refusal to sort garbage are the underdevelopment of the relevant infrastructure in the country (lack of appropriate conditions – 56% and getting garbage to the same landfills – 48%). 12% of respondents believe that waste sorting is a waste of their time, 5% – that it is not significant in improving the environmental situation, and another 4% do not know how to sort waste.

The main factors motivating garbage sorting for respondents are the provision of special containers for various types of garbage (74%) and the establishment of a system of utilities for garbage collection (66%). Encouragement from the authorities or commercial organizations was indicated by 26% of respondents, information materials about the correct way of sorting garbage – 23%, and awareness of sorting garbage in their locality – 19%.

We propose to assess the relationship between environmental awareness indicators such as concerns about packaging recycling, the impact of production on the environment, animal welfare, the safety of product components and the sustainability of production technologies used and their safety for future generations (Table 9).

Table 9

Statistics of public consciousness of greening in the context of food security

№ з/п	Questions	Answer options	Statistics of answers, persons
1.	Do you concern about the possibility of recycling packaging when choosing food?	Yes	81
		No	49
2.	Do you concern about the environmental impact of the manufacturing of this product when choosing food?	Yes	92
		No	38
3.	Do you concern about the conditions of keeping animals involved in the production process when choosing food?	Yes	93
		No	37
4.	Do you concern about the safety of ingredients for consumers when choosing food?	Yes	119
		No	11
5.	Do you concern about the impact of the manufacturing of particular products on the lives of future generations when choosing food?	Yes	102
		No	28

Source: developed by authors, based on the results of a survey.

Thus, there is a significant direct link between all components of the environmental consciousness of food consumers. In addition, the understanding of the importance of packaging recycling is largely related to concerns about the environmental impact of food production (0.582, p-value <.001). Concerns of food consumers about the impact of production on the environment are mostly related to concerns about the impact of production on the lives of future generations (0.568, p-value <.001) and the conditions of animals involved in food production (0.457, p-value < .001). Understanding the importance of keeping animals involved in food production strongly correlates with concerns about the safety of product ingredients for consumers (0.421, p-value <.001). The importance of food safety for consumers is strongly related to concerns about the impact of production on the lives of future generations (0.379, p-value <.001).

Thus, the relationship between environmental awareness, such as concerns about packaging processing, the impact of production on the environment, animal welfare, product safety and sustainability of production technologies, as well as their safety for future generations, can be considered in the form of a diagram (Figure 2).

Thus, the concern about packaging recycling is essentially due to environmental concerns and the safety of the products consumed, and ultimately allows to create preconditions for the safe impact of food production on the lives of future generations.

The ecological consciousness of man is formed under the influence of its structural elements – behavioural, emotional, and cognitive. Ecological consciousness is influenced by culture, traditions, personal needs and experience, the values of the environment in which a person grows and stays, and so on. Sources of influence on eco-consciousness can be divided into internal (self-education, family upbringing, personal experience, etc.) and external (influence of state measures, non-governmental environmental organizations, religious organizations, media, social values, etc.) (Thogersen, 2020).

Table 10

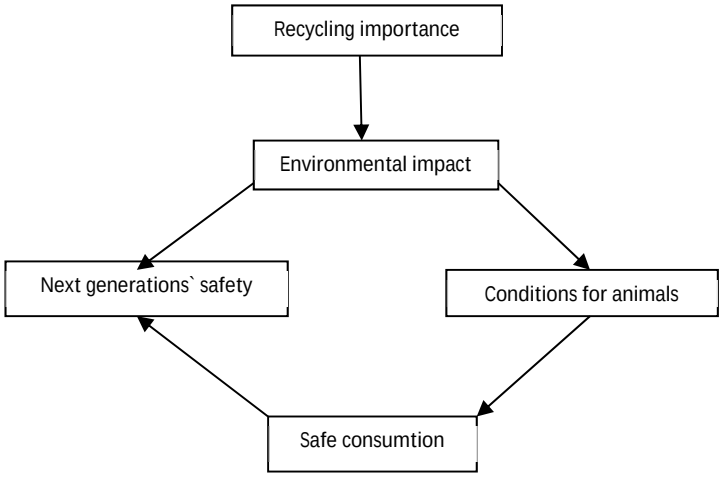
Correlation matrix that describes the relationship between indicators of environmental awareness

		Recycling importance	Environment impact	Conditions for animals	Safe consumption
Recycling importance	Pearson's r	—			
	p-value	—			
Environment impact	Pearson's r	0.582***	—		
	p-value	< .001	—		
Conditions for animals	Pearson's r	0.494***	0.457***	—	
	p-value	< .001	< .001	—	
Safe consumtion	Pearson's r	0.334***	0.230**	0.421***	—
	p-value	< .001	0.008	< .001	—
Next generations` safety	Pearson's r	0.558***	0.568***	0.250**	0.379 ***
	p-value	< .001	< .001	0.004	< .001

* p < .05, ** p < .01, *** p < .001
Source: developed by JASP.

Figure 2

Relationship between environmental awareness indicators



Thus, the development of environmental awareness of the population is one of the goals of the environmental policy of the state. The strategy of eco-policy envisages measures to raise public awareness and develop environmental education. The challenge of environmental policy is taking into account environmental issues in the decision-making process as an equal and not a secondary factor, ensuring the continuity of educational activities, and their dissemination to a wide range of people, including government officials. It is important to provide a detailed explanation of the provisions of the legislation, innovations, methods of their implementation, as well as compliance with environmental regulations, collection and dissemination of relevant data on the state of the environment.

Conclusions

As the results of our study show, the use of white packaging and its shades (beige, grey) is universal, because this is the packaging chosen by consumers when buying the vast majority of the food. In addition, dark blue, light blue, red and black colours remain quite popular in terms of packaging choice, which correlates with the previously described study and allows the use of further processed polymers in agricultural production. That is why our research strengthens the framework of previous experiments, arguing the expediency of colour "restraint" in the design and manufacturшtп of food packaging, which corresponds to the formed colour patterns of consumer consciousness and strengthens the environmental aspect of manufacturing, use, processing and disposal.

Concerns about packaging recycling are essentially due to concern for the environment and the safety of the products consumed, and ultimately create the preconditions for the safe impact of food production on the lives of future generations. To increase the level of environmental awareness of Ukrainians and the formation of values to the environment, it is necessary to implement legislative, institutional, and budgetary solutions:

- to initiate systematic sociological research on the state of environmental consciousness of Ukrainians;
- to develop the implementation of these measures, attract international financial assistance, mechanisms of public-private partnership, disseminate information om the ways to comply with environmental regulations, etc.

The calculated correlation coefficients show that food adequacy increases simultaneously with the improvement of the structure of consumer expenditures (when consumers spend most of their income not only on food, but also on self-development, recreation, etc.), increasing labour mobility in the labour market and creating additional sources of income in addition to earnings. Established links form a chain, the unifying element of which is the mobility of workers in the labour market, which directly affects the affordability of food for consumers, and the main factors influencing the formation of economic affordability of food – the monthly budget of consumers and sources income. Thus, by developing the mobility of workers in the labour market, it is possible to significantly improve the affordability of food.

According to its purpose, the study demonstrated the possibility of reviewing marketing approaches to meet consumer needs, simplifying the technological methods of food packaging and reducing the negative impact on the environment due to recycling and subsequent disposal of packaging. These studies may serve as a basis for further consideration of this problem, as well as to draw the attention of policymakers to the possibility of direct regulation of the types of packaging used in the food industry.

Further research on the possibility of using alternative types of packaging for consumer products, including reusable packaging in terms of safety, convenience, economical and environmental feasibility and consumer readiness for such an innovation would be relevant.

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