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DETERMINANTS OF ENERGY-REDUCED FOOD CONSUMPTION AMONG YOUNG WOMEN

S u m m a r y

Background. Functional food, and in particular "light" food with a reduced energy value, can help society in the fight against overweight, obesity and other diseases and ailments. In accordance with Regulation (EC) No. 1333/2008 of the European Parliament and of the Council, "energy-reduced food" is food of which the energy value has been reduced by at least 30 % compared to the original food or a similar product. The aim of the study was to assess the determinants of energy-reduced food consumption among female students of Polish universities. The scope of the study included the characteristics of factors determining purchasing decisions and an assessment of the frequency of consumption of selected food examples.

Results and conclusions. The empirical study was conducted using a questionnaire, by employing the computer-assisted web interviewing (CAWI) technique. A total of 258 female students participated in the survey. The scope of the survey included the characteristics of the determinants of purchasing decisions and an assessment investigating how often selected examples of energy-reduced food are consumed. On the basis of the study, it was found that Generation Z representatives look for reduced-calorie food in their purchasing decisions. The key factors influencing their choices are quality, product composition and the belief that it offers health benefits. The respondents most often declared that they consumed products with a reduced energy value, such as light yoghurt, light cottage cheese and light drinks. The study conducted in this work showed that young women are interested in consuming food with a reduced energy value.

Keywords: functional food, energy-reduced food, "light" food, lifestyle, young consumers

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Introduction

Diet and living conditions are one of the most important factors influencing human health and quality of life [20]. Over-consumption of food and inadequate nutrient balance contribute to an increase in the incidence of chronic non-communicable diseases in society and affect life expectancy [32]. Consequently, changing eating habits and increased health awareness among consumers are contributing to the rapid growth of the functional food market [2, 3, 14]. This product category includes foods that provide additional health benefits beyond their primary nutritional function, such as supporting the immune system, improving gastrointestinal function or preventing chronic diseases [1, 15, 22, 26, 27, 28].

It is worth noting that functional foods also include energy-reduced products such as 'light' foods. 'Light' products are formulated to reduce the caloric content of a diet by limiting sugars, fats or other energy components, making them a popular choice among those concerned with healthy body weight [10, 11, 12, 16, 17, 35]. Their inclusion in the functional food category is due to the fact that their consumption can support the prevention of diet-related diseases such as obesity or type 2 diabetes [4, 19, 20].

According to Regulation (EC) No 1333/2008 of the European Parliament and of the Council of 16 December 2008 on food additives [23], an „energy-reduced food" is a food, the energy value of which has been reduced by at least 30 % compared to the original food or a similar product. Regulation (EC) No 1924/2006 of the European Parliament and of the Council of 20 December 2006 [24] lays down the regulations that a food manufacturer must comply with in order to make an energy-reduced nutrition claim for an energy-reduced food. A claim that a food is low in energy, and any claim likely to have the same meaning for the consumer, may only be made where the product contains no more than 40 kcal/100 g (170 kJ) for solids or no more than 20 kcal/100 ml (80 kJ) for liquids. For sweeteners, a limit of 4 kcal/100 ml (17 kJ) applies, with a sweetening intensity equivalent to 6 g of sucrose (approximately 1 teaspoon of sucrose). The most common nutritional claims for light foods include a low fat product (the fat content in 100 g of the product must not exceed 3 g for a solid product and 1.5 g for a liquid product), a non-sugar product (the sugar content in 100 g of the product must not exceed 0.5 g). This type of food not only meets the expectations of modern consumers, but also responds to the needs of the younger generation, which shows a particular interest in health, aesthetics and conscious food choices.

Generation Z (Gen Z), born between 1995 and 2010, accounts for almost a third of the global population [21]. Due to its size and importance in the market, Generation Z is having a significant impact on transforming existing eating habits and shaping new consumption patterns in the food sector [5, 17]. Generation Z, as a group raised in the digital age, is characterized by a unique approach to nutrition. Their choices are determined by health, aesthetics, environmental aspects and trends present in social media

[21, 29]. Functional foods, including 'light' products, are part of this group's lifestyle, which often combines physical activity, conscious shopping and environmental concerns. The frequency of consumption of energy-reduced foods can also be considered as an indicator of their desire to balance enjoyment of food with calorie control of meals. Studies indicate that young consumers are increasingly choosing functional foods for reasons such as the desire for a healthy lifestyle, convenience or the need to adapt their diet to a dynamic lifestyle [25, 33]. 'Light' products allow a reduction in calorie intake without sacrificing favorite flavors, making them an attractive alternative to high-calorie counterparts.

The aim of this publication was to assess the determinants of energy-reduced food consumption among a group of female students of Polish universities. The study attempted to verify the following research hypothesis: Young female students are guided in their choice for consumption of energy-reduced foods by factors relevant to the healthiness of products.

Material and methods

Object of research

The empirical study was conducted among a group of women aged between 19 and 35. Purposive group selection was used in the study. The subjects of the study were female students (N = 258 female respondents). The research sample was intentionally limited to women aged 19 ÷ 35, as the literature indicates that young women are more likely than men to be interested in healthy eating and weight control, and more likely to consume energy-reduced products. In addition, young women, especially from Generation Y, show particular interest in healthy eating issues and the consumption of energy-reduced foods. Thus, the extension of the age range to 35 was intended to include not only female students from Generation Z, but also students classified as Generation Y, i.e. young adult women who are still forming their eating habits and may be in similar life stages (e.g. transition from college to the first job, greater financial independence, independent shopping decisions). Thus, the choice of this research group fills a gap in the literature on the eating habits of young women in the context of the consumption of energy-reduced foods. The respondents were dominated by women aged 23 ÷ 26 (60.47 %), residents of large cities (over 500,000 residents), which accounted for 33.33 %, and rural areas (20.54 %), mainly from the provinces of Mazowieckie (19.38 %), Śląskie (17.44 %), Pomorskie (10.47 %) and Małopolskie (7.75 %), studying social sciences (41.09 %), humanities (24.42 %) and sciences and natural sciences (24.03 %) (Tab. 1).

A large variation could be observed in the declared material situation. More than half of the female respondents declared that their financial situation allows them to

meet some needs, but not all (51.55 %) and 30.23 % that they could afford everything and could still save (Tab. 2).

In the research proceedings, 258 correctly completed survey questionnaires were collected. All female respondents gave their free, informed consent to participate in the study and were assured of its anonymity.

Table 1. Characteristics of the studied group of respondents (N = 258) – place of residence
Tabela 1. Charakterystyka badanej grupy respondentów (N = 258) – miejsce zamieszkania

	Number of people / Liczba osób	[%]
Age [years]/Wiek [lata]		
19 ÷ 22	61	23.64
23 ÷ 26	156	60.47
27 ÷ 30	18	6.98
31 ÷ 35	23	8.91
Place of residence / Miejsce zamieszkania		
village /wieś	53	20.54
city with a population of up to 50,000 / miasto o populacji do 50 000	35	13.57
a city with a population of between 50,000 and 150,000 / miasto o populacji od 50 000 do 150 000	34	13.18
a city with a population of 150,000 to 500,000 / miasto o populacji od 150 000 do 500 000	50	19.38
city with population > 500,000 / miasto o populacji > 500 000	86	33.33
The province I come from / Województwo, z którego pochodzę		
Mazowieckie	50	19.38
Śląskie	45	17.44
Pomorskie	27	10.47
Małopolskie	20	7.75
Dolnośląskie	15	5.81
Lubelskie	15	5.81
Wielkopolskie	14	5.43
Podkarpackie	13	5.04
Warmińsko-Mazurskie	12	4.65
Łódzkie	11	4.26
Kujawsko-Pomorskie	9	3.49
Zachodniopomorskie	8	3.10
Opolskie	7	2.71
Podlaskie	5	1.94
Świętokrzyskie	5	1.94
Lubuskie	2	0.78

Study profile / Profil studiów		
Social sciences / Nauki społeczne	106	41.09
Humanities / Nauki humanistyczne	63	24.41
Medical and health sciences / Nauki medyczne i nauki o zdrowiu	62	24.03
Natural sciences / Nauki ścisłe i przyrodnicze	22	8.53
Engineering and technology / Nauki inżynieryjno-techniczne	5	1.94

Table 2. Material situation of the group of female respondents (N = 258)
Tabela 2. Sytuacja materialna grupy respondentek (N = 258)

Amount of income / Wysokość dochodu	Number of people / Liczba osób	[%]
is wholly inadequate / jest całkowicie niewystarczający	8	3.10
allows only for basic needs to be met / pozwala zaspokoić jedynie podstawowe potrzeby	25	9.69
I/we can afford some but not all expenses / stać mnie/nas na niektóre, ale nie na wszystkie wydatki	133	51.55
I/we can afford everything /stać mnie/nas na wszystko	14	5.43
I/we can afford everything and I/we can still save / stać mnie/nas na wszystko i jeszcze mogę/możemy zaoszczędzić	78	30.23

Source: own study / Źródło: opracowanie własne

Questionnaire and data analysis

The survey was conducted using a questionnaire, by indirect interview method, via an online platform from 1 February to 30 April 2024. The survey questionnaire addressed the assessment of predictors of energy-reduced food choice and the evaluation of the frequency of consumption of 13 'light' products.

The study assessed:

- the attitudes of female respondents towards factors influencing decisions to purchase energy-reduced ('light') foods for consumption;
- the frequency of consumption of energy-reduced products ('light' foods);
- frequency of consumption of 'light' products and two lifestyle variables: pleasure orientation, attention to the nutritional value of food;
- the determinants of light food choice and their impact on the frequency of consumption of light foods;
- the influence of selected lifestyle variables on the choice to consume 'light' products;
- the impact of selected lifestyle variables on the frequency of consumption of "light" products.

During the study, female respondents expressed their level of agreement or disagreement and rated the factors for choosing energy-reduced foods using a 5-point Likert scale, where the values 1, 2, means: “definitely no”, “no”; the value 3 denoted an answer: “I do not know, I have no opinion”; and values 4, 5, corresponded to answers: “yes”, “definitely yes”[18]. The frequency scale of the consumption of energy-reduced food consisted of 13 test items. These items were rated on a 6-point frequency scale with a response category; I don't know (1), I know but I don't consume (2), occasionally (1 ÷ 2 times a month) (3), often (1 ÷ 2 times a week) (4), very often (3 ÷ 5 times a week) (5), once a day (6).

The determinants of the choice of energy-reduced foods included several categories of factors: product-related factors (product composition, product quality, health benefits, interesting taste and aroma, organic origin of raw materials, production without pesticides, artificial fertilizers or synthetic additives), packaging and environmental factors (recyclability of packaging and biodegradability), economic and availability factors (price, product availability, free delivery), and marketing and socio-cultural factors (product brand, reputation of the producer, advertising in the media, promotion by famous people, opinions of friends/family, habits, a sense of connection with the company).

The empirical material collected is presented in the form of a percentage distribution of the responses given and selected descriptive statistics (mean and standard deviation). A Spearman rank correlation analysis was performed to determine the strength and significance of the relationships between factors influencing purchase decisions to consume energy-reduced 'light' foods and lifestyle and willingness to purchase selected 'light' products. The following criteria were used to assess the strength of correlation in the study: r = 0.20 ÷ 0.39 – weak correlation, r = 0.40 ÷ 0.59 – moderate correlation, r = 0.60 ÷ 0.79 – strong correlation, r = 0.80 ÷ 1.00 – very strong correlation [6].

For the lifestyle factors that correlated significantly with the highest number of energy-reduced "light" products (pleasure orientation (for 7 out of 13 products), attention to foods with high nutritional value (6/13), a Chi2 test was calculated to find out the relationship between frequency of consumption of energy-reduced "light" products and selected lifestyle elements. A significance level of $p < 0.05$ was assumed for all statistical analyses. Calculations were performed using Statistica 13.3 (Tibco Software, Palo Alto, USA).

Results and discussion

Generation Z, characterized by high health awareness and easy access to information, makes food choices influenced by many factors [21]. On the basis of the results obtained, it was found that the factors with the highest mean scores, and which may therefore be of the greatest importance to the respondents in their purchasing deci-

sions in relation to "light" foods, were product quality (4.47), product health values (4.37), product composition (4.44), interesting and attractive taste and smell (4.16), price (4.43) and product availability (4.30) (Tab. 3). The scores obtained were translated into observed attitudes towards the factors influencing the decision to purchase for consumption of 'light' foods. Positive attitudes towards purchasing determinants were observed for 6 factors ranging from 49.23 % of "rather yes" and "definitely yes" responses for product availability to 82.56 % for interesting and attractive taste and aroma (Tab. 3). For most factors, however, an ambivalent attitude was observed (for 15 out of 23 factors), for which the percentage of "neither yes nor no, I have no opinion" responses ranged from 46.12 % for media advertising to 70.93 % for "opinions of friends/family members" (Tab. 3). Interestingly, for the factor related to the promotion of a product in the media by well-known people, the percentage of responses was almost evenly distributed between negative (34.88 %) and positive (37.60 %) attitudes. It is noteworthy that the negative attitude was dominant for none of the factors . An analysis of literature showed that in Szczepańska and Grudowska's [30] study of adults (59 % were in the 19 ÷ 30 age group, the remaining 41 % were over 30 years of age), the motives for reaching for light products that were mentioned most frequently by the consumers surveyed included the encouraging effect of advertising (40.4 % of respondents) and the desire to look after health/keep figure (33.5 % of respondents). Other motives included being encouraged to consume them by family/friends (12.8 % of respondents) or a doctor/nutritionist (3.9 % of respondents) and others, among which curiosity and lower energy value were mentioned most frequently (9.4 % of respondents) [30].

Based on the results of our study, we found that the determinants of energy-reduced food consumption among young female students are diverse and reflect the influence of many psychological, social, cultural and economic factors. Understanding these determinants allows the design of effective educational campaigns and marketing strategies that support healthy lifestyles in this demographic group. When preparing recommendations for producers of energy-reduced foods, it is important to emphasize that taste, aroma, quality and composition of products, as well as product availability and price play an important role in promotional campaigns for young female consumers belonging to the Z and Y generations. At the same time, manufacturers of energy-reduced foods in promotional campaigns should increase the emphasis on environmental aspects such as biodegradability and recyclability of packaging in order to better respond to consumer expectations because they elicit ambivalent reactions from consumers and can have a differential impact on their purchasing decisions. At the same time, manufacturers of energy-reduced foods should consider abandoning or transforming marketing strategies based on celebrity and media advertising, which are viewed negatively by selected representatives of generation Z. This was partially confirmed in

our own research, where negative attitudes toward the promotion of food products by celebrities and media ads were characterized by 34.88 and 27.12 % (respectively), ambivalent attitudes by 27.52 and as many as 46.12 % (respectively), while positive attitudes by 37.60 and 26.76 % (respectively) (Tab. 3).

The empirical study further assessed the frequency of consumption by female respondents of 13 exemplary energy-reduced 'light' products, which included four categories: dairy products (cottage cheese, yoghurt, milk, cheese), processed products (chips, sauces, ice cream, biscuits, bars, jellies and gelatin desserts, ketchups and mayonnaise), vegetarian/vegan, organic products and drinks.

Table 3. Respondents' attitudes towards factors influencing decisions to purchase energy-reduced 'light' foods for consumption

Tabela 3. Postawy respondentek wobec czynników wpływających na decyzje o zakupie do spożycia żywności o obniżonej wartości energetycznej „light"

Predictors / Predykatory	Mean ±S D / Średnia ± SD	Negative / Negatywna	Ambivalent / Ambiwalentna	Positive / Pozytywna
		[%]		
Product quality / Jakość produktu	4.47 ± 0.82	7.36	31.79	**60.85**
Health benefits of the product / Walory zdrowotne produktu	4.37 ± 0.84	11.24	34.88	**53.88**
Producing products without the use of pesticides and fertilizers / Wytwarzanie produktów bez użycia pestycydów i nawozów sztucznych	3.77 ± 1.19	18.22	**48.45**	33.33
Manufacture of the product without the use of synthetic additives / Wytwarzanie produktu bez użycia syntetycznych substancji dodatkowych	3.82 ± 1.12	15.51	**51.16**	33.33
Product composition /Skład produktu	4.44 ± 0.81	8.91	33.33	**57.76**
Interesting, attractive taste and smell / Ciekawy, atrakcyjny smak i zapach	4.16 ± 0.88	6.59	10.85	**82.56**
Organic origin of raw materials used in production / Ekologiczne pochodzenie surowców wykorzystywanych do produkcji	3.55 ± 1.15	18.99	**58.91**	22.10
Country of origin (Poland) / Kraj pochodzenia produktu (Polska)	3.30 ± 1.20	28.9	**53.49**	18.22
Price / Cena	4.43 ± 0.81	9.30	33.72	**56.98**
Product availability / Dostępność produktu	4.30 ± 0.87	12.79	37.98	**49.23**
Variety of product range / Różnorodność asortymentu	3.94 ± 1.05	10.08	**56.20**	33.72
Biodegradability / Biodegradowalność	3.20 ± 1.14	25.19	**64.73**	10.08
Recyclable packaging / Możliwość recyklingu opakowania	3.24 ± 1.13	24.42	**63.57**	12.01

Pack size / Wielkość opakowania	3.51 ± 1.13	22.48	**57.75**	19.77
Reputation of the manufacturer / Reputacja producenta	3.44 ± 1.07	19.77	**66.28**	13.95
Habit / Przyzwyczajenie	3.76 ± 1.00	12.79	**65.12**	22.09
A sense of connection with the company / Poczucie więzi z firmą	2.84 ± 1.21	16.28	**51.94**	31.78
Feedback from friends/family members / Opinie znajomych / członków rodziny	3.63 ± 0.99	13.95	**70.93**	15.12
Product brand / Marka produktu	3.21 ± 1.13	29.07	24.42	46.51
Free delivery / Darmowa dostawa	3.78 ± 1.10	15.11	**55.81**	29.08
Sales promotion/Promocja sprzedaży	3.64 ± 1.13	18.60	**59.30**	22.10
Promotion of the product by celebrities / Promowanie produktu przez znane osoby	2.26 ± 1.20	34.88	27.52	37.60
Media advertising / Reklama w mediach	2.47 ± 1.19	27.12	**46.12**	26.76

Explanations / Objaśnienia: values in bold are statistically significant at $p < 0.05$ / wartości pogrubione są istotne statystycznie przy $p < 0,05$.

Pleasure-oriented people and those who pay attention to foods with high nutritional value most often consume “light” products (mean 3.00), vegetarian/vegan products (2.98), drinks (2.92), cottage cheese (2.72) and cheeses (2.59) (Tab. 5). Among those declaring an orientation towards pleasure, significant differences were observed in the frequency of consumption of ketchups and mayonnaise, cheese and milk, compared to other individuals. Respondents most often declared that they consumed “light” products from time to time and that they knew but did not consume them (Tab. 4). In contrast, lack of familiarity with “light” products included an assortment of products - jellies and jelly (27.91 % of respondents), ice cream (22.09 %), chips (21.32 %) and sauces (20.93 %) (Tab. 4). As many as 35.72 % of those pleasure-oriented declared that they were familiar with "light" ketchups and mayonnaise but did not consume them, and 16.28 % consumed them occasionally (1 ÷ 2 times per month). In the case of cheese, 32.56 % knew but did not consume this type of product and 22.48 % consumed it occasionally (1 ÷ 2 times per month). 'Light' milk was known but not consumed by 31.40 % and occasionally consumed (1 ÷ 2 times a month) by 15.50 % of pleasure-oriented people. Among those paying attention to foods with high nutritional value, significant differences were observed for the frequency of consumption of jellies and gelatin desserts, ketchups and mayonnaise, yoghurt, milk, sauces and ice cream. Among those paying attention to foods of high nutritional value, 43.41 % knew but did not consume jellies and gelatin desserts, 34.88 % ketchups and mayonnaise, 27.91 % yoghurts, 30.23 % milk, 39.92 % sauces and 42.25 % ice cream. In contrast, 16.67 % of people occasionally (1 ÷ 2 times a month) consumed ketchups and mayonnaise,

20.16 % yoghurt and 15.50 % milk. In contrast, 18.63 % of people were unfamiliar with jellies and jelly, 14.73 % with sauces and 15.89 % with ice cream.

Referring to a study by Grzelak et al. [13], out of the available range of low-energy foods, students at Poznań higher education institutions most often chose milk and dairy products, which was also confirmed in a group of female respondents. An analysis of the results of Szczepańska and Grudowska [30] also showed that the most frequently consumed light products are dairy products. Similar results were obtained by Wierzbicka et al. [34], who evaluated their consumption by women with a BMI above 25. As their results showed, the most frequently consumed light products included milk (42 %), yoghurt (35 %) and cheese (28 %) [34]. Similar conclusions were also reached by Flaczyk et al. [7], who showed that yoghurts were light products most frequently consumed by the students surveyed. Referring to studies in the literature, it can be assumed that the factor determining the frequent consumption of light dairy products by Polish students may be their high availability. Moreover, many scientific studies indicate health benefits associated with their consumption concerning the reduction of the risk of cardiovascular diseases [9, 30, 31].

The next stage of our own research attempted to assess the influence of choice factors versus frequency of consumption of energy-reduced 'light' foods. The factors for which a significant positive correlation was observed in relation to the frequency of consumption of selected energy-reduced "light" products were: the promotion of a product by famous people (for 10 out of 13 products), biodegradability, a sense of connection with the company and advertising in the media (9/13), the production of products without the use of pesticides and artificial fertilizers and the country of origin of a product (Poland) (7/13) (Tab. 6). In a study conducted by Szczepańska and Grudowska [30], on the other hand, it was demonstrated that the main motive for adults to reach for light products was advertising (40.4 % of responses) and the desire to care for health/keep figure (33.5 % of responses). A different relationship was obtained by Fortuna et al. [7], as in the first group they studied (diabetics), the choice of light wafers was mainly driven by health reasons (about 55 %), while in the second group (healthy, young people), light wafers were consumed under the encouragement of friends or out of curiosity, 35 % and 40 % of the respondents, respectively [8].

Table 4. Frequency of consumption of energy-reduced "light" food products
Tabela 4. Częstość spożycia żywności o obniżonej wartości energetycznej ”light”

Product / Produkt		Once a day / Raz dziennie	Very often (3-5 times a week) / Bardzo często (3-5 razy w tygodniu)	Frequently (1-2 times a week) / Często (1-2 razy w tygodniu)	Occasionally (1-2 times per month) / Od czasu do czasu (1-2 razy w miesiącu)	I know but I don't consume / Znam ale nie spoży-wam	I do not know / Nie znam
Curd cheese / Serek twarogowy	Number of people [%] Liczba osób [%]	5 [1.94]	12 [4.65]	27 [10.47]	**91 [35.27]**	102 [39.53]	21 [8.14]
Beverages / Napoje	Number of people [%] Liczba osób [%]	**15 [5.81]**	19 [7.36]	**36 [13.95]**	64 [24.81]	108 [41.86]	16 [6.20]
Jellies, gelatin desserts / Galaretki, kisiele	Number of people [%] Liczba osób [%]	0 [0.00]	4 [1.55]	4 [1.55]	40 [15.50]	**138 [53.49]**	**72 [27.91]**
Ketchups, mayonnaises / Ketchupy, majonezy	Number of people [%] Liczba osób [%]	1 [0.39]	11 [4.26]	30 [11.63]	50 [19.38]	122 [47.29]	44 [17.05]
Cheeses / Sery	Number of people [%] Liczba osób [%]	4 [1.55]	14 [5.43]	29 [11.24]	68 [26.36]	110 [42.64]	33 [12.79]
Yoghurts / Jogurty	Number of people [%] Liczba osób [%]	**10 [3.88]**	**25 [9.69]**	**44 [17.05]**	**71 [27.52]**	92 [35.66]	16 [6.20]
Milk / Mleko	Number of people [%] Liczba osób [%]	**13 [5.04]**	**20 [7.75]**	**37 [14.34]**	48 [18.60]	111 [43.02]	29 [11.24]
Chips / Chipsy	Number of people [%] Liczba osób [%]	2 [0.78]	3 [1.16]	10 [3.88]	58 [22.48]	130 [50.39]	**55 [21.32]**
Vegetarian / vegan products / Produkty wegetariańskie / wegańskie	Number of people [%] Liczba osób [%]	**18 [6.98]**	**21 [8.14]**	**41 [15.89]**	64 [24.81]	86 [33.33]	28 [10.85]
Sauces / Sosy	Number of people [%] Liczba osób [%]	0 [0.00]	7 [2.71]	19 [7.36]	43 [16.67]	**135 [52.33]**	54 [20.93]
Cookies / Ciasteczka	Number of people [%] Liczba osób [%]	1 [0.39]	6 [2.33]	21 [8.14]	67 [25.97]	121 [46.90]	42 [16.28]
Ice cream / Lody	Number of people [%] Liczba osób [%]	1 [0.39]	5 [1.94]	12 [4.65]	41 [15.89]	**142 [55.04]**	**57 [22.09]**
Bars / Batony	Number of people [%] Liczba osób [%]	1 [0.39]	12 [4.65]	24 [9.30]	**72 [27.91]**	108 [41.86]	41 [15.89]

Explanatory notes / Objaśnienia: values in bold are statistically significant at $p < 0.05$ / wartości pogrubione są istotne statystycznie przy $p < 0,05$

Table 5. Frequency of consumption of energy-reduced 'light' products vs. lifestyle variables: pleasure orientation, attention to nutritional value of food

Tabela 5. Częstość spożycia produktów o obniżonej wartości energetycznej „light" a zmienne stylu życia: zorientowanie na przyjemności, zwracanie uwagi na wartość odżywczą pożywienia

"Light"products / Produkty „light"	Mean ±SD / Średnia ±SD	I am a pleasure-oriented person / Jestem osobą zorientowaną na przyjemności	I am a person who pays attention to foods with high nutritional value / Jestem osobą zwracającą uwagę na żywność o wysokiej wartości odżywczej
"Light" cottage cheese / Serek twarogowy „light"	2.70 ± 1.05	Chi2=11.27; df=10; *p=0.33*	Chi2=17.54; df=10; *p=0.06*
Light beverages / Napoje „light"	2.92 ± 1.27	Chi2=16.43; df=10; *p=0.09*	Chi2=7.98; df=10; *p=0.63*
Jellies, gelatin desserts "light"/ Galaretki, kisiele „light"	**1.95 ± 0.80**	Chi2=15.33; df=10; *p=0.05*	Chi2=25.44; df=10; *p<0.01*
Ketchups, "light" mayonnaises / Ketchupy, majonezy „light"	**2.40 ± 1.06**	Chi2=22.63; df=10; *p=0.01*	Chi2=26.82; df=10; *p<0.01*
"Light" cheeses / Sery „light"	2.59 ± 1.11	Chi2=18.59; df=10; *p=0.04*	Chi2=16.07; df=10; *p=0.10*
"Light" yoghurts / Jogurty „light"	**3.00 ± 1.23**	Chi2=15.08; df=10; *p=0.13*	Chi2=24,40; df=10; *p=0,01*
"Light" milk / Mleko „light"	**2.79 ± 1.32**	Chi2=20.94; df=10; *p=0.02*	Chi2=18.36; df=10; *p=0.04*
"Light" crisps / Chipsy „light"	2.16 ± 0.89	Chi2=7.76; df=10; *p=0.65*	Chi2=16,80; df=10; *p=0,08*
Vegetarian / vegan products / Produkty wegetariańskie / wegańskie	2.98 ± 1.37	Chi2=4.91; df=10; *p=0.90*	Chi2=10.93; df=10; *p=0.36*
"Light" sauces / Sosy „light"	**2.19 ± 0.94**	Chi2=8.06; df=10; *p=0.43*	Chi2=16.20; df=10; *p=0.04*
"Light" cookies / Ciasteczka „light"	2.34 ± 0.95	Chi2=11.97; df=10; *p=0.28*	Chi2=12.15; df=10; *p=0.27*
"Light" ice cream / Lody „light"	**2.10 ± 0.89**	Chi2=12.53; df=10; *p=0.25*	Chi2=23.66; df=10; *p=0.01*
"Light" bars / Batony „light"	2.46 ±1.04	Chi2=6.11; df=10; *p=0.81*	Chi2=9,32; df=10; *p=0,50*

Explanatory notes / Objaśnienia: values in bold are statistically significant at $p < 0.05$ / wartości pogrubione są istotne statystycznie przy $p < 0,05$

However, among the products that correlated significantly (although the correlation was weak) with their purchase factors were mainly: jellies and gelatin desserts, milk (for 12 out of 23 factors), sauces and ice cream (10/23), cottage cheese (9/23) and chips and cheese (8/23) (Table 6). The strongest positive correlation was observed for jellies and gelatin desserts against factors such as a pack size (0.28), a sense of connection with the company (0.27) and biodegradability (0.24). For sauces, biodegradability (0.24), and for ice cream, a sense of connection to the company (0.28) and the promotion of a product by famous people (0.27) (Tab. 6).

Table 6. Choice factors vs frequency of consumption of energy-reduced "light" products
Tabela 6. Czynniki wyboru a częstość spożycia produktów o obniżonej wartości energetycznej "light"

Choice factors	Curd cheese / Serek twarogowy	Beverages / Napoje	Jellies and jelly sweets / Galaretki i kisiele	Ketchup, mayonnaise / Ketchup, majonez	Cheeses / Sery	Yoghurts / Jogurty	Milk / Mleko	Chips / Chipsy	Vegetarian / vegan products Produkty wegetariańskie / wegańskie	Sauces / Sosy	Cakes / Ciastka	Ice cream / Lody	Bars / Batony
Product quality / Jakość produktu	**0.15**	0.00	0.00	0.04	**0.13**	**0.14**	0.09	0.09	-0.02	0.00	0.02	-0.01	0.08
Health benefits of the product / Walory zdrowotne produktu	0.09	0.03	-0.04	0.09	0.06	0.10	**0.12**	0.08	0.05	0.11	0.02	-0.03	0.04
Producing products without the use of pesticides and fertilizers / Wytwarzanie produktów bez użycia pestycydów i nawozów sztucznych	**0.16**	-0.04	**0.12**	**0.16**	**0.18**	**0.16**	**0.14**	0.10	0.09	**0.18**	0.12	0.08	0.11
Manufacture of the product without the use of synthetic additives / Wytwarzanie produktu bez użycia syntetycznych substancji dodatkowych	**0.12**	-0.02	0.10	**0.16**	0.11	**0.15**	**0.16**	0.08	0.04	**0.13**	0.08	0.06	0.12
Product composition / Skład produktu	0.08	0.00	0.01	0.06	0.05	0.09	0.05	0.04	-0.01	0.00	0.03	0.05	0.08

Interesting, attractive taste and smell / Ciekawy, atrakcyjny smak i zapach	0.06	0.05	0.00	-0.10	0.05	0.10	**0.12**	0.02	0.04	-0.06	0.00	-0.02	0.08
Organic origin of raw materials used in production / Ekologiczne pochodzenie surowców wykorzystywa-nych do produkcji	0.09	-0.09	0.10	0.04	0.10	0.12	0.07	0.12	**0.19**	**0.14**	**0.16**	**0.13**	0.07
Country of origin (Poland) / Kraj pochodzenia produktu (Polska)	**0.20**	-0.01	**0.18**	**0.16**	0.12	0.09	0.09	**0.16**	0.02	**0.16**	**0.15**	**0.19**	0.05
Price / Cena	0.03	0.00	-0.06	-0.10	0.07	0.04	0.05	0.09	0.09	0.06	0.04	0.02	0.04
Product availability / Dostępność produktu	0.02	-0.04	-0.02	-0.04	0.08	0.10	0.01	0.02	0.03	0.02	0.03	-0.04	0.04
Variety of product range / Różnorodność asortymentu	0.06	0.01	0.04	0.00	0.07	0.08	0.12	-0.01	0.03	0.12	0.07	0.07	**0.13**
Biodegradability / Biodegradowalność	**0.14**	0.01	**0.24**	**0.15**	**0.14**	0.10	0.12	**0.19**	**0.22**	**0.24**	**0.20**	**0.21**	0.11
Recyclable packaging / Możliwość recyklingu opakowania	0.08	0.01	**0.18**	0.10	0.09	0.09	0.09	**0.17**	**0.20**	**0.21**	0.12	**0.17**	0.06
Pack size / Wielkość opakowania	**0.13**	**0.15**	**0.28**	0.11	0.12	0.10	**0.15**	0.05	0.02	0.06	0.09	0.09	0.10
Reputation of the manufac-turer / Reputacja producenta	0.05	0.00	**0.17**	0.05	0.04	0.11	0.06	0.09	0.12	**0.19**	**0.14**	**0.13**	-0.03
Habit / Przyzwyczajenie	0.05	0.06	0.05	0.03	0.04	-0.03	0.05	0.02	**0.14**	0.02	-0.01	0.01	-0.08
A sense of connection with the company / Poczucie więzi z firmą	**0.17**	0.07	**0.27**	**0.13**	**0.18**	0.11	**0.16**	**0.18**	0.04	**0.13**	**0.13**	**0.28**	0.05
Feedback from friends/family members / Opinie znajomych / członków rodziny	0.06	0.10	**0.20**	0.04	**0.13**	**0.15**	**0.14**	**0.15**	0.01	0.10	0.07	**0.17**	0.06

Product brand / Marka produktu	0.08	0.06	**0.16**	0.04	0.05	0.10	**0.13**	**0.14**	-0.04	0.10	**0.14**	**0.21**	0.04
Free delivery / Darmowa dostawa	0.07	0.09	**0.14**	0.07	**0.13**	0.07	**0.13**	0.11	-0.02	0.08	0.04	0.09	0.08
Sales promotion / Promocja sprzedaży	**0.16**	**0.17**	0.08	**0.13**	**0.14**	0.08	**0.13**	**0.13**	0.03	**0.14**	0.04	0.11	0.05
Promotion of the product by celebrities / Promowanie produktu przez znane osoby	0.11	**0.13**	**0.22**	**0.18**	**0.18**	0.11	**0.19**	**0.14**	-0.03	**0.21**	**0.16**	**0.27**	**0.20**
Media advertising / Reklama w mediach	**0.13**	**0.13**	**0.14**	0.10	**0.18**	0.11	**0.16**	0.07	-0.03	**0.17**	**0.15**	**0.20**	**0.16**

Explanatory notes / Objaśnienia: values in bold are statistically significant at $p < 0.05$ / wartości pogrubione są istotne statystycznie przy $p < 0,05$

Table 7. Lifestyle vs. factors influencing choice of energy-reduced "light" products
Tabela 7. Styl życia a czynniki wpływające na wybór do konsumpcji produktów o obniżonej wartości energetycznej „light”

	Committed to job / Zaangażowaną w pracę zawodową	Committed to learning / Zaangażowaną w naukę	Pleasure-oriented / Zorientowaną na przyjemności	Valuing convenience and speed of food preparation / Ceniącą wygodę i szybkość przygotowywania posiłków	Paying attention to foods with high nutritional value / Zwracającą uwagę na żywność o wysokiej wartości odżywczej	Valuing the culinary traditions of the region I come from / Ceniącą tradycje kulinarne regionu z którego pochodzę	High health awareness / O dużej świadomości zdrowotnej	High physical activity / O dużej aktywności fizycznej
Product quality / Jakość produktu	**0.13**	0.12	0.12	0.05	**0.23**	0.11	**0.14**	0.11
Health benefits of the product / Walory zdrowotne produktu	0.04	**0.16**	0.07	**0.13**	**0.30**	0.08	**0.26**	**0.16**
Producing products without the use of pesticides and fertilizers / Wytwarzanie produktów bez użycia pestycydów i nawozów sztucznych	0.10	0.12	**0.14**	0.00	**0.24**	**0.21**	**0.25**	0.10
Manufacture of the product without the use of synthetic additives /Wytwarzanie produktu bez użycia syntetycznych substancji dodatkowych	0.09	0.11	**0.18**	0.05	**0.22**	**0.25**	**0.24**	**0.13**
Product composition / Skład produktu	0.07	**0.14**	**0.14**	0.09	**0.33**	**0.13**	**0.23**	0.12
Interesting, attractive taste and smell / Ciekawy, atrakcyjny smak i zapach	-0.05	0.04	**0.15**	**0.16**	-0.02	0.08	0.05	-0.08
Organic origin of raw materials used in production / Ekologiczne pochodzenie surowców wykorzystywanych do produkcji	0.04	0.12	0.07	0.00	**0.16**	0.09	0.10	0.10
Country of origin (Poland) / Kraj pochodzenia produktu (Polska)	**0.15**	0.09	0.05	-0.08	**0.20**	**0.28**	**0.23**	**0.16**

Price / Cena	0.04	0.09	0.02	0.12	-0.10	-0.01	-0.09	**-0.13**
Product availability / Dostępność produktu	0.02	0.07	0.06	0.05	0.02	0.03	0.03	-0.02
Variety of product range / Różnorodność asortymentu	**0.13**	0.03	**0.15**	**0.15**	0.01	0.04	0.11	-0.04
Biodegradability / Biodegradowalność	0.07	**0.13**	0.12	0.02	**0.18**	0.11	**0.13**	0.03
Recyclable packaging / Możliwość recyklingu opakowania	0.08	0.10	0.09	0.06	0.12	0.08	0.07	0.01
Pack size / Wielkość opakowania	0.03	0.02	**0.24**	0.08	0.01	**0.14**	0.09	0.05
Reputation of the manufacturer / Reputacja producenta	0.04	0.11	**0.15**	**0.13**	**0.18**	0.04	**0.15**	0.04
Habit / Przyzwyczajenie	0.07	-0.01	0.08	**0.15**	0.05	0.05	0.03	**-0.14**
A sense of connection with the company / Poczucie więzi z firmą	0.08	-0.07	**0.13**	-0.01	0.08	**0.20**	0.09	0.03
Feedback from friends/family members / Opinie znajomych/członków rodziny	0.06	-0.01	0.07	-0.03	0.00	0.08	-0.07	-0.05
Product brand / Marka produktu	0.12	0.00	**0.22**	0.09	0.07	**0.16**	0.05	0.05
Free delivery / Darmowa dostawa	0.11	0.03	**0.21**	0.11	0.08	**0.16**	0.04	0.02
Sales promotion / Promocja sprzedaży	**0.15**	0.05	**0.12**	0.07	0.06	**0.16**	0.12	**0.13**
Promotion of the product by celebrities / Promowanie produktu przez znane osoby	0.01	-0.02	0.09	-0.03	0.09	**0.17**	**0.13**	0.11
Media advertising / Reklama w mediach	0.02	0.03	0.10	0.03	0.07	**0.16**	0.07	0.04

Explanatory notes / Objaśnienia: values in bold are statistically significant at $p < 0.05$ / wartości pogrubione są istotne statystycznie przy $p < 0{,}05$.

Table 8. Lifestyle and frequency of consumption of energy-reduced "light" products
Tabela 8. Styl życia a częstość spożycia produktów o obniżonej wartości energetycznej "light"

	Committed to job / Zaangażowaną w pracę zawodową	Committed to learning / Zaangażowaną w naukę	Pleasure-oriented / Zorientowaną na przyjemności	Valuing convenience and speed of food preparation / Ceniącą wygodę i szybkość przygotowywania posiłków	Paying attention to foods with high nutritional value / Zwracającą uwagę na żywność o wysokiej wartości odżywczej	Valuing the culinary traditions of the region I come from / Ceniącą tradycje kulinarne regionu z którego pochodzę	High health awareness / O dużej świadomości zdrowotnej	High physical activity / O dużej aktywności fizycznej
"Light" cottage cheese / Serek twarogowy „light"	**0.16**	0.01	0.08	-0.05	**0.17**	**0.19**	0.11	**0.16**
"Light" beverages/Napoje „light"	-0.02	0.01	**0.13**	0.06	0.07	0.08	0.08	0.07
Jellies, gelatin desserts „Light" / Galaretki, kisiele „light"	0.05	0.01	**0.20**	-0.08	**0.15**	0.09	**0.14**	**0.13**
Ketchups, "Light" mayonnaises / Ketchupy, majonezy „light"	0.03	-0.01	**0.15**	-0.05	**0.21**	**0.15**	**0.26**	**0.16**
"Light" cheeses / Sery „light"	-0.01	-0.07	0.11	-0.07	0.09	0.08	0.07	0.10
"Light" yoghurts / Jogurty „light"	0.03	0.06	**0.15**	-0.08	0.07	0.01	0.08	0.08
"Light" milk / Mleko „light"	0.04	0.05	**0.17**	0.12	**0.17**	**0.14**	0.08	**0.13**
"Light" crisps / Chipsy „light"	0.06	0.03	0.08	-0.07	**0.14**	0.08	0.11	0.09
Vegetarian/vegan products / Produkty wegetariańskie/wegańskie	-0.03	-0.03	0.04	0.01	0.12	-0.07	0.05	-0.02
"Light" sauces / Sosy „light"	-0.05	0.00	0.10	-0.01	0.10	0.03	0.12	0.09
"Light" cookies / Ciasteczka „light"	0.02	0.11	**0.14**	0.00	0.10	-0.06	0.01	0.02
"Light" ice cream / Lody „light"	0.03	-0.01	**0.15**	0.02	**0.13**	0.02	0.05	0.10
"Light" bars / Batony „light"	-0.04	0.06	0.11	0.01	0.07	0.03	0.04	0.11

Explanatory notes / Objaśnienia: values in bold are statistically significant at $p < 0.05$ / wartości pogrubione są istotne statystycznie przy $p < 0,05$

Lifestyle factors significantly, positively correlated with the determinants influencing purchase decisions for energy-reduced products are: orientation towards pleasure and appreciation of the culinary traditions of the region of origin (11/23 determinants), attention to foods with high nutritional value, high health awareness (9/23). Only for those with high physical activity were negative (very weak) significant correlations observed for price (0.13) and for habit (-0.14) (Tab. 7). Positive, weak but significant correlations were observed for people who pay attention to foods with high nutritional value for the composition of the product (0.33), the health value of the product (0.30) and the production without the use of pesticides and artificial fertilizers (0.24). For those who value the culinary traditions of the region of origin for the country of origin (Poland) (0.28) and the production of the product without the use of synthetic additives (0.25). For those with high health consciousness, the health value of the product (0.26), making the product without pesticides and fertilizers (0.25) and making the product without synthetic additives (0.24) were important factors (Tab. 7). Lifestyle factors significantly, positively correlated with the frequency of consumption of selected 'light' products were orientation towards pleasure (for 7 out of 13 products), paying attention to foods with high nutritional value (6/13) and high physical activity (4/13) (Tab. 8). The strongest positive correlations were observed in those with high awareness and attention to foods with high nutritional health value for 'light' ketchups and mayonnaise (0.26 and 0.21, respectively) and in those with orientation towards pleasure for jellies and gelatin desserts (0.20) (Tab. 8).

Conclusions

1. When deciding to buy energy-reduced food, young women, students at Polish universities, are guided by the factors of importance to the health of a product, such as quality, product composition and health benefits. Attention to healthy eating has a very strong influence on the decision to buy "light" food by young women. This demonstrates a high level of nutritional awareness and a rational approach to food choices.
2. Based on the research conducted, it was concluded that despite easy access to information and numerous campaigns promoting a healthy lifestyle, ambivalent attitudes towards many factors suggest that young women, students of Polish universities (representatives of generation Z), do not always follow uniform criteria when choosing products with a reduced energy value.
3. Female students most often declared the consumption of energy-reduced products, especially light yoghurts, light cottage cheese and light drinks.
4. It was found that young women are mainly guided by pragmatic aspects (such as taste, quality and price) when choosing energy-reduced food for consumption, while environmental and promotional factors are less important to female students.

5. Our study identifies pathways for increased consumption of energy-reduced food by female students at Polish universities for 'light' food manufacturers.
6. The research results obtained fit into the broader context of research on the eating habits of Generation Z, indicating their health awareness and selective approach to marketing messages, which can provide important knowledge and valuable guidance for producers and nutrition specialists, enabling them to better adapt their product offerings to the preferences of this consumer group.

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UWARUNKOWANIA KONSUMPCJI ŻYWNOŚCI O OBNIŻONEJ WARTOŚCI ENERGETYCZNEJ WŚRÓD MŁODYCH KOBIET

S u m m a r y

Wprowadzenie. Żywność funkcjonalna, a w szczególności żywność „light" o obniżonej wartości energetycznej, może pomóc społeczeństwu w walce z nadwagą, otyłością oraz innymi chorobami i dolegliwościami. Zgodnie z Rozporządzeniem Parlamentu Europejskiego i Rady (WE) nr 1333/2008 „żywność o obniżonej wartości energetycznej" to żywność, której wartość energetyczna została obniżona o co najmniej 30% w porównaniu z oryginalną żywnością lub podobnym produktem. Celem badania była ocena uwarunkowań spożycia żywności o obniżonej wartości energetycznej wśród studentek polskich uczelni wyższych. Zakres badania obejmował charakterystykę czynników determinujących decyzje zakupowe oraz ocenę częstotliwości spożycia wybranych przykładów żywności.

Wyniki i wnioski. Badanie empiryczne przeprowadzono z wykorzystaniem kwestionariusza ankiety, techniką wspomaganego komputerowo wywiadu internetowego (CAWI). W badaniu wzięło udział łącznie 258 studentek. Zakres badania obejmował charakterystykę determinant decyzji zakupowych oraz ocenę częstotliwości spożycia wybranych przykładów żywności o obniżonej wartości energetycznej. Na podstawie przeprowadzonego badania stwierdzono, że przedstawicielki Pokolenia Z w swoich decyzjach zakupowych poszukują żywności o obniżonej kaloryczności. Kluczowymi czynnikami wpływającymi na ich wybory są jakość, skład produktu oraz przekonanie o jego walorach zdrowotnych. Respondenci najczęściej deklarowali, że spożywają produkty o obniżonej wartości energetycznej, takie jak jogurty light, twarogi light oraz napoje light. Badanie przeprowadzone w niniejszej pracy wykazało, że młode kobiety są zainteresowane spożywaniem żywności o obniżonej wartości energetycznej.

Słowa kluczowe: żywność funkcjonalna, żywność o obniżonej wartości energetycznej, żywność „light", styl życia, młodzi konsumenci