

LIFESTYLE AS DETERMINANT OF EDIBLE INSECT FOOD CONSUMPTION AMONG SELECTED MEMBERS OF GENERATION Z

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Purpose: This study aimed to determine whether the lifestyles of young consumers (students) in Poland can influence their attitudes towards foods containing edible insects.

Design/methodology/approach: The empirical survey was conducted via an online platform (CAWI) among 749 students in Poland in 2023.

Findings: The younger consumers, namely students, were characterised by positive attitudes towards food with edible insects. These consumers demonstrated an attentiveness to the consumption of foods with high nutritional value, a tendency towards physical activity, and a lack of attachment to the culinary traditions of their region of origin.

Research limitations/implications: The research has certain limitations. Despite the large size of the study group, the results obtained are not representative and cannot be generalised to the population of students in Poland.

Practical implications: The results of this study may be of use in the development of new edible insect-based food products.

Social implications: The research adds to the knowledge of the dietary behaviour of young adults (Generation Z) by taking into account lifestyle variables.

Originality/value: The study of young consumers' preferences, acceptance, and willingness to try, eat and/or buy insect-based foods plays a key role in the prospects of entomophagy in Poland.

Keywords: insect-based foods, edible insects, food sustainability, acceptance of novel foods, young consumers.

Category of the paper: Research paper.

1. Introduction

Insect-based foods are rarely accepted by young consumers in Poland despite their nutritional and environmental potential. There is a discrepancy between consumers' understanding of the need to reduce meat consumption, due to issues such as climate change and insufficient agricultural land (Turan, Berber, Sesal, 2024), and their personal preference for foods containing edible insects in their composition (Modlinska et al., 2021; Piwowar et al., 2023). Over the past decade, numerous consumer studies have been conducted to understand the attitudes of consumers living in Western Europe towards edible insects (Onwezen et al., 2021; Puteri, Jahnke, Zander, 2023). These surveys have demonstrated a high level of neophobia, or reluctance to try new foods, among consumers in this region (Onwezen et al., 2021; Wassmann, Siegrist, Hartmann, 2021). In some studies, aversion to eating insects has been shown to correlate positively with a tendency to prefer familiar foods, lack of insect visibility and fear of new food production technologies (Schlup, Brunner, 2018). Consumer research has shown that the emerging insect-based food industry faces significant challenges, particularly in overcoming consumer aversion to eating insects (Barton, Richardson, McSweeney, 2020; Dupont, Fiebelkorn, 2020; La Barbera et al., 2018; Lammers, Ullmann, Fiebelkorn, 2019; Modlinska et al., 2020; Orsi, Voegelé, Stranieri, 2019; Petrescu-Mag, Rastegari Kopaei, Petrescu, 2022; Piwowar et al., 2023; Schäufele, Barrera Albores, Hamm, 2019).

It seems reasonable to look for factors influencing the attitudes of the younger generation towards new foods, including foods containing edible insects in their composition. It is estimated that Generation Z already accounts for around 26% (2.47 billion) of today's population (www.earthweb.com/gen-z-statistics/), so its purchasing power is enormous and will continue to grow. Therefore, as the needs and expectations of new, young consumers change, strategies for reaching this group need to be developed. The traditional marketing approach, the 4Ps (product, price, place, promotion), is not working anymore. It is being replaced by a new way of working known as the 4Cs (consumer, cost, convenience, communication) (Al Laheebi, 2020). Generation Z tries to make conscious purchases, gather product information, analyse and compare - the most important thing is not the features and advantages of the product presented by the manufacturer, but the benefits and opportunities to satisfy specific needs that come with the purchase. They often choose products that are more expensive, but which represent the majority of value to them. They are often motivated by ecological reasons or are opposed to waste. Convenience of purchase and convenient access to information about the product and service is particularly important to them. To reach this audience, it is necessary to be able to select the most appropriate channel and form of communication. Above all, the message should be authentic, sincere, concrete, engaging, and, where possible and necessary, entertaining. It is therefore important to adopt an appropriate brand and product philosophy.

Consequently, identifying potential target consumers is of particular importance in the context of insect-based food products, as a clear divide has been discovered between consumers who are opposed to and those who are in favour of trying them (Sogari, Menozzi, Mora, 2017; Mikulec et al., 2024). Orsi, Voegelé and Stranieri (2019) and Verbeke (2015) proposed that the marketing of insect-based food products should focus on young people and children. This is not only because they represent future generations of consumers, but also because they exert a significant influence on the attitudes of those around them.

The aim of this study was to determine whether the lifestyles of young consumers (students) in Poland can influence their attitudes towards foods containing edible insects in their composition.

A research hypothesis was formulated: Lifestyle variables determine the attitudes of a selected group of Generation Z consumers towards food containing edible insects.

2. Research methodology

An empirical study was conducted among 749 students at three Polish universities: Gdynia Maritime University, the Academy of Applied Sciences in Nowy Sącz and the University of Warmia and Mazury in Olsztyn. The survey was conducted using a specially designed questionnaire, via a web-based platform (CAWI, Computer Assisted Web Interview) in 2023. All respondents gave their free, informed consent to participate in the survey and were assured of anonymity. Participants in the study were those declaring to eat all foods and not to limit their consumption of meat or animal products.

The survey questionnaire included statements relating to:

- Attitudes towards insect foods (4 items): I think buying new insect food is a good idea (1); I think buying new insect food is a wise choice (2); I like the idea of buying new, innovative insect food (3); Buying new, innovative insect food would be enjoyable (4) (Wang et al., 2013).
- Lifestyle (8 items): I am a person committed to work (1); I am a person committed to studying (2); I am a person pleasure oriented (3); I am a person who values convenience and speed of food preparation (4); I am a person who pays attention to the consumption of food with high nutritional value (5); I am a person who values the culinary traditions of the origin region (6); I am a person with high health consciousness (7); I am a person with high physical activity (8). The first, fifth, sixth, and seventh items were adapted from Arvola et al. (2007) and the others (2, 3, 4, 8) were additional.

During the survey, the respondent expressed his or her level of approval or disapproval of all the posted items using a 5-point Likert scale, where the values 1, 2, means: definitely not, rather not; the value 3 denoted an answer: I do not know, I have no opinion; and values 4, 5, corresponded to answers: rather yes, definitely yes (Likert, 1932).

The empirical material was presented in the form of a percentage distribution of the answers given regarding attitudes and lifestyle determinants. The answers were aggregated and presented for three groups: “no” (the number of “definitely no” and “rather no” responses were aggregated), “don't know/don't have an opinion” and “yes” (the number of “definitely yes” and “rather yes” responses were aggregated). A Chi-square test with Yates correction was conducted to determine the relationship between attitudes towards foods containing edible insects and lifestyle determinants. Spearman's rank correlation analysis was used to determine the relationship between attitudes towards insect food and lifestyle.

A multinomial ordered logit model was constructed with the dependent variable exploring attitudes towards foods containing edible insects. The explanatory variable was calculated based on the variables determining attitudes towards edible insect foods (i.e.: I think buying new foods containing insects is a good idea (1); I think buying new foods containing insects is a wise choice (2); I like the idea of buying new, innovative foods containing insects (3); Buying new, innovative foods containing insects would be enjoyable (4). Based on the responses, 3 attitudes were distinguished: negative, ambivalent and positive. The independent variables are lifestyle determinants. The objective variable is ordinal (categories: negative, ambivalent, positive).

A *p*-value of less than 0.05 was assumed for all statistical analyses. The calculations were performed using Microsoft Excel 2000 and Statistica 13.3 (Tibco Software, Palo Alto, USA).

3. Results and discussion

The group of respondents comprised 749 individuals, of whom 412 were women and 337 were men. In terms of the lifestyle variables analysed, 59.68% of the respondents declared a commitment to work, while 86.85% indicated a commitment to study. This indicates that many students combine study with work. Among those surveyed, 81.02% declared themselves to be pleasure-oriented, 86.52% valued convenience and speed of food preparation, and only 64.36% paid attention to the high nutritional value of the food they consumed. Interestingly, less than half, 48.73%, indicated a valuing of the culinary traditions of the region they come from. In addition, 63.82% considered themselves to be health-conscious, and 51.26% considered themselves to be physically active (Table 1).

Table 1.*Study sample characteristics addressing lifestyle determinants*

Features	Number of people	% of indications
Commitment to work		
Definitely not	84	11.21
Rather not	118	15.76
I do not know/I have no opinion	100	13.35
Rather yes	255	34.05
Definitely yes	192	25.63
Commitment to learning		
Definitely not	11	1.47
Rather not	46	6.14
I do not know/I have no opinion	40	5.34
Rather yes	426	56.88
Definitely yes	226	30.17
Pleasure-oriented		
Definitely not	14	1.90
Rather not	36	4.80
I do not know/I have no opinion	92	12.28
Rather yes	407	54.32
Definitely yes	200	26.70
Valuing the convenience and speed of food preparation		
Definitely not	15	2.00
Rather not	35	4.67
I do not know/I have no opinion	51	6.81
Rather yes	353	47.13
Definitely yes	295	39.39
Paying attention to the consumption of foods with high nutritional value		
Definitely not	24	3.20
Rather not	112	14.95
I do not know/I have no opinion	131	17.49
Rather yes	294	39.26
Definitely yes	188	25.10
Valuing the culinary traditions of the origin region		
Definitely not	69	9.21
Rather not	167	22.30
I do not know/I have no opinion	148	19.76
Rather yes	228	30.44
Definitely yes	137	18.29
High health consciousness		
Definitely not	20	2.67
Rather not	102	13.62
I do not know/I have no opinion	149	19.89
Rather yes	313	41.79
Definitely yes	165	22.03
High physical activity		
Definitely not	52	6.94
Rather not	191	25.51
I do not know/I have no opinion	122	16.29
Rather yes	249	33.24
Definitely yes	135	18.02

Source: own elaboration based on survey results.

Only some lifestyle variables were found to influence the statements related to young consumers' attitudes towards food containing edible insects (Table 2-9).

The level of commitment to work or study did not significantly influence attitudes towards food containing edible insects, nor was there any correlation between the variables analysed. All groups were dominated by “no” and “I have no opinion” respondents. The most negative

responses were declared by respondents for statements such as “I like the idea of buying new, innovative foods containing insects” and “Buying new, innovative foods containing insects would be enjoyable” (Table 2-3).

Table 2.

Attitudes towards food containing insects about work commitment

Statements	No			I have no opinion			Yes			Chi2	Spearman's R
	[%]										
	N*	A	P	N	A	P	N	A	P		
I think buying new insect food is a good idea	38.12	39.11	22.77	40.00	39.00	21.00	44.52	35.12	20.36	Chi2 = 2.6; df = 4; p = 0.62	-0.04
I think buying new insect food is a wise choice	37.13	42.57	20.30	38.00	44.00	18.00	43.18	38.26	18.56	Chi2 = 2.81; df = 4; p = 0.58	-0.04
I like the idea of buying new, innovative insect food	49.01	31.68	19.3	47.00	31.00	22.00	53.24	26.62	20.13	Chi2 = 2.61; df = 4; p = 0.62	-0.02
Buying new, innovative insect food would be enjoyable	52.97	36.63	10.40	54.00	34.00	12.00	57.49	33.33	9.18	Chi2 = 1.73; df = 4; p = 0.78	-0.04

Explanatory notes: *N – negative attitude. A – ambivalent attitude. P – positive attitude – attitude.

Source: own elaboration based on survey results.

Table 3.

Attitudes towards food containing insects about commitment to learning

Statements	No			I have no opinion			Yes			Chi2	Spearman's R
	[%]										
	N*	A	P	N	A	P	N	A	P		
I think buying new insect food is a good idea	47,37	31,58	21,05	40,00	45,00	15,00	41,87	36,66	21,47	Chi2 = 2,37; df = 4; p = 0.69	0.03
I think buying new insect food is a wise choice	40,35	42,11	17,54	40,00	50,00	10,00	40,95	39,42	19,63	Chi2 = 3,31; df = 4; p = 0.51	0.04
I like the idea of buying new, innovative insect food	47,37	29,82	22,81	47,50	42,50	10,00	51,84	27,61	20,55	Chi2 = 5,69; df = 4; p = 0.22	-0.02
Buying new, innovative insect food would be enjoyable	54,39	33,33	12,28	57,50	40,00	2,50	55,83	34,05	10,12	Chi2 = 3.93; df = 4; p = 0.42	-0.01

Explanatory notes: *N – negative attitude. A – ambivalent attitude. P – positive attitude – attitude.

Source: own elaboration based on survey results.

The level of pleasure orientation and attention to convenience and speed of food preparation also did not significantly differentiate respondents in terms of their declared attitudes towards

food containing edible insects. And no correlation was observed between the variables analysed (Tables 4 and 5). The majority of respondents gave “no” and “I have no opinion” answers to questions related to attitudes towards products containing edible insects. The highest number of negative responses, over 50%, was observed for the statements: “I like the idea of buying new, innovative foods containing insects” and “Buying new, innovative foods containing insects would be enjoyable” (Table 4).

Table 4.

Attitudes towards foods containing insects about pleasure orientation

Statements	No			I have no opinion			Yes			Chi2	Spearman's R
	[%]										
	N*	A	P	N	A	P	N	A	P		
I think buying new insect food is a good idea	46.00	40.00	14.00	42.39	38.04	19.57	41.85	36.24	21.91	Chi2 = 2.06; df = 4; p = 0.73	0.00
I think buying new insect food is a wise choice	48.00	42.00	10.00	43.48	42.39	14.13	39.87	39.70	20.43	Chi2 = 5.51; df = 4; p = 0.23	0.05
I like the idea of buying new, innovative insect food	56.00	32.00	12.00	55.43	29.35	15.22	50.25	28.17	21.58	Chi2 = 4.64; df = 4; p = 0.33	0.07
Buying new, innovative insect food would be enjoyable	60.00	32.00	8.00	59.78	32.61	7.61	59.78	32.61	7.61	Chi2 = 1.56; df = 4; p = 0.82	0.04

Explanatory notes: *N – negative attitude. A – ambivalent attitude. P – positive attitude – attitude.

Source: own elaboration based on survey results.

Table 5.

Attitudes towards foods containing insects about convenience and speed of food preparation

Statements	No			I have no opinion			Yes			Chi2	Spearman's R
	[%]										
	N*	A	P	N	A	P	N	A	P		
I think buying new insect food is a good idea	58.00	28.00	14.00	47.06	41.18	11.76	40.59	37.04	22.38	Chi2 = 9.10; df = 4; p = 0.06	0.06
I think buying new insect food is a wise choice	54.00	28.00	18.00	41.18	49.02	9.80	39.81	40.43	19.76	Chi2 = 8.087; df = 4; p = 0.09	0.07
I like the idea of buying new, innovative insect food	60.00	26.00	14.00	58.82	27.45	13.73	50.00	28.86	21.14	Chi2 = 4.15; df = 4; p = 0.39	0.07
Buying new, innovative insect food would be enjoyable	64.00	32.00	4.00	64.71	27.45	7.84	54.48	35.03	10.49	Chi2 = 5.13; df = 4; p = 0.27	0.07

Explanatory notes: *N – negative attitude. A – ambivalent attitude. P – positive attitude – attitude.

Source: own elaboration based on survey results.

The surveyed group of students declared that they pay attention to the consumption of foods with high nutritional value. This was found to be a significant differentiating factor between respondents in terms of their answers to the two statements on the scale for assessing attitudes towards food containing edible insects. The majority of people, whether they paid attention to the high nutritional value of the food or not, were significantly more likely to answer that they did not like the idea of buying new, innovative foods containing edible insects ($p = 0.03$) (49.59-56.49%). In contrast, students who could not specify whether they paid attention to the nutritional value of the food they consumed were significantly more likely to give answers that were ambivalent to the idea of buying new, innovative foods containing insects (32.82%). The distribution of responses was similar for the statement: “Buying new, innovative foods containing insects would be enjoyable” ($p = 0.02$). Where a negative answer was given by 58.82% of students not paying attention to the high nutritional value of the food, 61.07% of those with no opinion on whether buying food containing edible insects would be pleasant and 53.53% of those paying attention to the nutritional value of the food consumed (Table 6).

Table 6.

Attitudes towards foods containing insects about paying attention to the consumption of foods with high nutritional value

Statements	No			I have no opinion			Yes			Chi2	Spearman's R
	[%]										
	N*	A	P	N	A	P	N	A	P		
I think buying new insect food is a good idea	39.71	40.44	19.85	46.56	37.40	16.04	41.70	35.48	22.82	Chi2 = 4.03; df = 4; p = 0.40	0.03
I think buying new insect food is a wise choice	42.65	40.44	16.91	44.27	40.46	15.27	39.42	40.04	20.54	Chi2 = 2.66; df = 4; p = 0.62	0.04
I like the idea of buying new, innovative insect food	52.21	27.21	20.58	56.49	32.82	10.69	49.59	27.80	22.61	Chi2 = 10.39; df = 4; p = 0.03	0.03
Buying new, innovative insect food would be enjoyable	58.82	32.35	8.83	61.07	35.88	3.05	53.53	34.44	12.03	Chi2 = 12.32; df = 4; p = 0.02	0.03

Explanatory notes: *N – negative attitude. A – ambivalent attitude. P – positive attitude – attitude.

Source: own elaboration based on survey results.

The analysis of the collected material allowed the identification of the lifestyle variable that most influences respondents' attitudes towards foods containing edible insects in their composition. This variable is: “valuing the culinary traditions of the region of origin”. Significant negative correlations were observed between individual statements related to attitudes towards new foods and the level of valuing regional culinary traditions (Table 7). Whereby, the less the students valued culinary traditions the more positive attitudes towards foods containing edible insects in their composition were manifested. For the statement:

“I think buying new foods containing insects is a wise choice”, significant differences were observed between groups ($p = 0.04$). Those who do not value the traditions of the region of origin and those with an ambivalent attitude to this lifestyle variable were significantly more likely to answer “I have no opinion”. In contrast, those who value the culinary traditions of the region of origin were significantly more likely to answer: “I don't think buying new foods with edible insects is a wise choice” (Table 7). The literature indicates that the tourist experience is an important factor in food awareness, a source of knowledge about the positive attributes of new foods, and a demand factor that determines the willingness to accept these innovations (Piwowar et al., 2023). Consumers who are looking for new food experiences tend to have a higher acceptance of insects as food (Ribeiro et al., 2022). Foreign travel was found to be an important factor influencing Polish consumers' perceptions of food innovation among 20-44 year-olds (Piwowar et al., 2023). According to the literature, the highest likelihood of consuming insect-based foods was observed in individuals with low levels of food neophobia and low disgust sensitivity, but with high levels of variety-seeking tendencies (Lammers, Ullmann, Fiebelkorn, 2019; Modlińska et al., 2021; Ribeiro et al., 2022; Rovai et al., 2021). It should be expected that tourist gastronomy will contribute to the popularisation of insects as food among young consumers in Poland.

Table 7.

Attitudes towards foods containing insects about valuing the culinary traditions of the origin region

Statements	No			I have no opinion			Yes			Chi2	Spearman's R**
	[%]										
	N*	A	P	N	A	P	N	A	P		
I think buying new insect food is a good idea	36.02	39.83	24.15	39.19	38.51	22.30	47.40	33.97	18.63	Chi2 = 8.52; df = 4; p = 0.07	-0.13
I think buying new insect food is a wise choice	33.46	45.76	20.76	39.19	41.22	19.59	46.30	36.16	17.54	Chi2 = 10.136; df = 4; p = 0.04	-0.12
I like the idea of buying new, innovative insect food	47.46	30.08	22.46	49.32	33.11	17.57	54.52	25.75	19.73	Chi2 = 4.93; df = 4; p = 0.29	-0.10
Buying new, innovative insect food would be enjoyable	54.24	37.29	8.47	55.41	33.78	10.81	56.99	32.60	10.41	Chi2 = 1.84; df = 4; p = 0.76	-0.08

Explanatory notes: * N – negative attitude. A – ambivalent attitude. P – positive attitude – attitude; ** bold values are statistically significant.

Source: own elaboration based on survey results.

Understanding which factors may influence consumer perceptions of edible insects plays a key role in the prospects of entomophagy consequently the production and consumption of new food proteins. According to Mancini et al. (2019), to achieve this goal, communication

with potential young consumers becomes crucial. Food choice motivations, such as convenience, health and ecological well-being, have minimal impact on the acceptance of insects as food and feed, among the Norwegian and Portuguese population (Ribeiro et al., 2022). In a study conducted among Polish students, we found similar relationships, as the level of pleasure orientation of the students surveyed and attention to convenience and speed of food preparation did not significantly affect their attitudes towards insect food (Table 4). In addition, health consciousness ($p = 0.05$) and physical activity ($p = 0.03$) of the respondents significantly influenced only one statement included on the scale for assessing attitudes toward new foods with edible insects: “I think buying new foods containing insects is a wise choice” (Table 8 and 9). In contrast, no correlation was observed between the variables analysed. It was found that, for the other lifestyle items, the predominant responses were “no” and “don't know/don't have an opinion” to individual statements describing attitudes towards new foods. Only those with high health consciousness were significantly more likely (21.34% of people), compared to the other groups (17.21% for those who did not declare high health consciousness and 12.75% for those with no opinion on whether they were characterised by high health consciousness) to give a “yes” answer to the statement: “I think buying new foods containing insects is a wise choice” (Table 8).

Table 8.

Attitudes towards foods containing insects about health consciousness

Statements	No			I have no opinion			Yes			Chi2	Spearman's R
	[%]										
	N*	A	P	N	A	P	N	A	P		
I think buying new insect food is a good idea	47.54	35.25	17.21	40.27	43.62	16.11	41.42	34.94	23.64	Chi2 = 7.57; df = 4; p = 0.11	0.06
I think buying new insect food is a wise choice	47.54	35.25	17.21	39.60	47.65	12.75	39.54	39.12	21.34	Chi2 = 9.39; df = 4; p = 0.05	0.07
I like the idea of buying new, innovative insect food	58.20	27.05	14.75	51.68	31.54	16.78	49.37	28.03	22.60	Chi2 = 6.23; df = 4; p = 0.18	0.06
Buying new, innovative insect food would be enjoyable	59.84	33.60	6.56	59.73	33.56	6.71	53.56	34.73	11.71	Chi2 = 6.05; df = 4; p = 0.20	0.05

Explanatory notes: *N – negative attitude. A – ambivalent attitude. P – positive attitude – attitude.

Source: own elaboration based on survey results.

In contrast, they were significantly more likely to answer “yes” to the statement: “I believe that buying new foods containing insects is a wise choice”, which was given by those with low physical activity (22.64%, compared to only 9.84% of those with no opinion on whether they were a person with high physical activity and 19.53% of those with high physical activity)

(Table 9). According to the literature, young adults in Poland (generation Z) express a willingness to take several actions related to changing eating habits to improve the nutritional status of the body (Platta et al., 2023a, 2023b). The predominant ambivalent attitude among students in Poland towards health or environmental concerns in terms of willingness to consume edible insects (Mikulec et al., 2024) may lead to greater resistance or increased susceptibility to persuasion and influence. Ambivalent attitudes are assumed to be flexible and, depending on the context, can either help individuals to better adapt or prevent them from reaching satisfactory conclusions (Rothman et al., 2017; van Harreveld, Nohlen, Schneider, 2015). Therefore, opportunities should be created for young consumers to acquire positive experiences in the consumption of edible insect dishes, thus increasing the target group accepting edible insects as a food source.

Table 9.

Attitudes towards insect food about physical activity

Statements	No			I have no opinion			Yes			Chi2	Spearman's R
	[%]										
	N*	A	P	N	A	P	N	A	P		
I think buying new insect food is a good idea	42.39	34.98	22.63	44.26	41.80	13.94	41.40	36.20	22.40	Chi2 = 518; df = 4; p = 0.27	0.00
I think buying new insect food is a wise choice	38.68	38.68	22.64	42.62	47.54	9.84	41.67	38.80	19.53	Chi2 = 10.52; df = 4; p = 0.03	-0.01
I like the idea of buying new, innovative insect food	52.26	27.98	19.76	50.82	33.61	15.57	50.78	27.34	21.88	Chi2 = 3.28; df = 4; p = 0.51	0.01
Buying new, innovative insect food would be enjoyable	58.44	34.16	7.40	58.20	34.43	7.37	53.39	34.38	12.23	Chi2 = 5.34; df = 4; p = 0.25	0.06

Explanatory notes: *N – negative attitude. A – ambivalent attitude. P – positive attitude – attitude.

Source: own elaboration based on survey results.

Table 10 presents a model showing the variables influencing attitudes towards insect food. Assuming a significance level of 5%, the statistically significant variables are: I am a person who values convenience and speed of food preparation (category: no) and I am a person who values the culinary traditions of my region of origin (category: no). In interpreting the individual variables, the odds ratio was used, from which it can be concluded that:

- people who do not value convenience and speed of food preparation are about 60% more likely to have a positive attitude towards food containing edible insects than people who value convenience and speed of food preparation, *ceteris paribus*;

- those who do not value the culinary traditions of their region of origin are about 24% more likely to have a positive attitude towards foods containing edible insects than those who value the culinary traditions of their region of origin, *ceteris paribus* (Table 10).

The literature highlights that people's motivations for consuming edible insects are based on the geographical location of the countries in which they live. Therefore, market segmentation and consumer characteristics must be taken into account when designing strategies to encourage the consumption of edible insects as part of a global strategy for sustainable food systems (Florença et al., 2022). It may be that consumers are already aware that raising and consuming insects can be a solution to environmental and health problems (Guiné et al., 2023; Kornher, Schellhorn, Vetter, 2019), but educating the European population about the sustainable properties of insect-based foods and targeting marketing strategies to this trait is not sufficient to convince consumers to buy and eat insects (Modlinska et al., 2021).

Table 10.

Models indicating variables affecting attitudes towards insect food

Variable name	Category	Coef.	Std. Err.	Walda	95% confidence		p-value*	OR
Free expression 1	-	-0.512	0.190	7.232	-0.885	0.139	0.007	0.599
Free expression 2	-	1.737	0.201	74.702	1.343	2.131	0.000	5.679
I am a person committed to work	No	-0.080	0.115	0.478	-0.306	0.146	0.489	0.923
I am a person committed to work	I do not know/I have no opinion	0.042	0.141	0.090	-0.234	0.319	0.764	1.043
I am a person committed to learning	No	-0.073	0.208	0.124	-0.481	0.335	0.725	0.929
I am a person committed to learning	I do not know/I have no opinion	0.104	0.224	0.214	-0.335	0.542	0.644	1.109
I am a pleasure-oriented person	No	0.189	0.206	0.841	-0.215	0.593	0.359	1.208
I am a pleasure-oriented person	I do not know/I have no opinion	-0.013	0.166	0.006	-0.338	0.313	0.939	0.987
I am a person who values the convenience and speed of food preparation	No	0.469	0.217	4.673	0.044	0.894	0.031	1.598
I am a person who values the convenience and speed of food preparation	I do not know/I have no opinion	-0.139	0.205	0.461	-0.540	0.262	0.497	0.870
I am a person who pays attention to foods with high nutritional value	No	-0.067	0.143	0.218	-0.348	0.214	0.640	0.935
I am a person who pays attention to foods with high nutritional value	I do not know/I have no opinion	0.204	0.132	2.386	-0.055	0.463	0.122	1.227
I am a person who values the culinary traditions of my origin region	No	-0.272	0.109	6.280	-0.485	0.059	0.012	0.762
I am a person who values the culinary traditions of my origin region	I do not know/I have no opinion	-0.047	0.119	0.157	-0.280	0.186	0.692	0.954
I am a person with a high health consciousness	No	0.241	0.147	2.695	-0.047	0.529	0.101	1.273

Cont. table 10.

Consciousness	I do not know/ I have no opinion	-0.079	0.129	0.376	-0.331	0.173	0.540	0.924
I am a person of high physical activity	No	-0.122	0.110	1.219	-0.338	0.094	0.269	0.885
I am a person of high physical activity	I do not know/ I have no opinion	0.101	0.129	0.614	-0.151	0.353	0.433	1.106

Explanatory notes: * bold values are statistically significant.

Source: own elaboration based on survey results.

4. Conclusions and future perspectives

Insect consumption is not historically documented in Poland. The lack of experience with the consumption of insects and insect-containing foods means that the acceptance of insects as food among Poles is still unclear. The study aimed was to determine whether the lifestyle of young consumers in Poland (Generation Z), using students as an example, can influence their attitudes towards foods containing edible insects. Thanks to the research conducted, we can better understand the attitudes and needs of young food consumers in Poland and, as a result, provide them with such information about food products containing insects or the products themselves that they expect. The results of our research partially confirmed the hypothesis. A lifestyle determinant influencing students' attitudes towards food containing edible insects was an appreciation of the culinary traditions of the region of origin. Students who did not value the culinary traditions of their origin region demonstrated positive attitudes towards foods with edible insects in them. This factor may have influenced the attempt to purchase and consume new foods containing edible insects by representatives of Generation Z in Poland. The promotion of food containing edible insects to young consumers in Poland should be based on presenting its nutritional value and highlighting the role of nutrients in ensuring the health of the population. Reaching out to relevant target groups and creating opportunities for them to have new experiences in consuming food containing edible insects is the most effective way to encourage young consumers to purchase and consume food with insects. The results obtained may contribute to efforts to promote the viability of producing new foods containing edible insects. Future research should take into account several other factors, including gender, age, ethnicity and religious background, which may influence the acceptance of insects as novel foods by consumers in Poland.

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