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FOOD SAFETY CONCERNS FROM THE VIEW OF GEN Z STUDENTS IN POLAND

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Purpose: This paper aims to identify sources of concern in food safety. Achieving this goal will help determine the extent to which food safety concerns are related to various sources of food information. Such information can help build Gen Z students' confidence in food safety.
Design/methodology/approach: The research was examined in 2022 using a face-to-face survey among students of a major university in Poland. The survey questions were divided into two sections including metrics questions describing the respondents. Individual food concern sources were rated on a 5-point scale from "does not matter "to "to a very great extent". Descriptive statistics were used to describe the characteristics of the sample of respondents. A factor analysis was conducted using the principal components method to simplify and reduce the number of sources of concern in food safety identified in the study.
Findings: The research showed that the main sources of concern of Generation Z consumers about food safety are related to food safety tools and supervision, in addition to the producer and the place of production and purchase of food, and also stem from the situation and factors related to the external environment of the food industry.
Research limitations/implications: Only students in Poland were surveyed. In the future, comparing students' opinions from other countries and social groups would be interesting.
Practical implications: The information obtained from the research can help build Gen Z consumers' confidence in food safety and reduce illnesses from the consumption of unsafe food.
Social implications: The information from the research can help public policy build on food safety among Gen Z consumers. On the other hand, they can help prevent illnesses from consuming unsafe food through more effective public food campaigns.
Originality/value: The study's contribution to the literature is to point out the importance of different food concern sources. This helps build Gen Z consumers' confidence in food safety.

Keywords: food safety, concerns, trust, students, Gen Z.

Category of the paper: surveys, scientific research.

1. Introduction

Safety is the most important attribute of food product quality, as it affects human health and life in all spheres (Lakner, 2021). Its importance is growing as consumer knowledge and awareness increase. Food safety means the absence of hazards and negative impacts on the health and life of the consumer when food is prepared and/or consumed as intended (ISO 22000:2018). The global organizations FAO and WHO even state that there is no food security without food safety (FAO). The issue of food safety is particularly relevant under conditions of globalization and regionalization of the food sector and food trade (FAO, Michalczyk, 2017; Liguori et al., 2022; Kowalczyk, 2017). As a result, the wave of illnesses caused by the consumption of unsafe food has been rising since the 1980s (Food Safety, 2020). This causes large losses and economic risks and thus harms the economy, businesses, and society. These phenomena in the food sector also affect consumers' attitudes, choices, and eating patterns (Hanus, 2018), and food safety problems publicized in the media undermine consumer confidence in the food they buy and increase concerns about food safety (Thanh Mai Ha, Shamim Shakur, 2020). Adulteration and other food safety incidents are focusing public attention and causing a crisis of confidence in food companies and regulators (Bánáti, 2011; Myoung Su Park et al., 2017). FAO report advocates the need for a major shift in the perception of food safety The FAO report advocates the need for a major shift in the perception of food safety from "response and action" to "anticipation and prevention" (FAO).

With this in mind, this article aims to identify the sources of food safety concerns and determine whether the demographic and social characteristics of Generation Z students affect the validity assessment of these sources. In doing so, achieving this goal will help determine the extent to which food safety concerns are related to various food issues. Such information can help build Gen Z consumers' confidence in food safety.

2. Literature review and research question

Trust is a ubiquitous feature of interpersonal relationships (Schwerter, Zimmermann, 2020). Trust in food, especially food safety, is an important issue because it influences consumer choices and eating patterns (Hobbs, Goddard, 2015; Nguyen-Viet et al., 2017). These issues are an important factor in influencing consumer attitudes and behavior (Hanus, 2018). Consumer confidence in food, its safety, and quality are shaped by many factors, including country of origin and culture (Barbarossa et al., 2016; Ariyawardana et al., 2017; Thøgersen, 2023), availability of detailed product information (Macready et al., 2020; Whitworth, 2021, Thøgersen, 2023) and the manufacturer (Wu et al., 2021; Thøgersen, 2023), the existing food

system (Lang, Conroy, 2022; Liu Jie et al., 2023) or the socioeconomic environment, including the activities of consumer organizations and other external circumstances such as a pandemic (Kubatko et al., 2023). Trust varies according to consumers' needs, expectations, attitudes, and experiences. In some situations, institutional trust prevails, while in other situations trust in individuals, leaders, suppliers, competencies, and relationships that occur between different levels of government (Bugdol, 2010; Rapp, Wilson, 2022). There are many different definitions of trust, and taking into account the OECD guidelines, trust can be viewed as a belief in the trustworthiness of other people, i.e. how others are likely to behave toward one another. Lack of trust prevents mutually beneficial cooperation. People's trust also depends on their belief in how well institutions function (Latifah, Amin et al., 2013; Fan Yang, Zili Huang, 2021). Institutional trust includes "trust in the competence" of those working in government and "trust in intentions" (Nooteboom, 2007). If people are convinced that there are strong enforcement mechanisms to discourage socially harmful behavior then they will be more willing to trust others (Mengmeng Guo et al., 2021; Liu Jie et al., 2023), but it depends on an individual's previous social experiences (Schwerter, Zimmerman, 2020), as well as the type of information and communication style (Fan Yang, Zili Huang, 2021). Willingness to trust is substantially higher after a positive social experience relative to a negative social experience (Schwerter, Zimmerman, 2020). Trust shapes consumer attitudes toward new food technology, production, and processing methods, and food origins, and influences food policy (Hobbs, Goddard, 2015), as well as can help make decisions in the absence of knowledge, experience, and familiarity with companies, processes, or products (Janssen, Hamm, 2014). In contrast, a lack of trust can negatively affect the adoption of new technologies, and products, generate resistance to policies, and hinder behavioral changes (Hobbs, Goddard, 2015).

Lack of trust in people or institutions, their competence, and intentions gives rise to all sorts of concerns. Concern is a feeling of uneasiness or uncertainty about the outcome or consequences of something. It is a mental state that occurs when we are unsure of what will happen and think it will be unfavorable to us (Żmigrodzki et al.). Taking the above into account, fear can be genuine, real, legitimate, irrational, subconscious, continuous, excessive, widespread, serious, or unfounded. In this context, we may fear the loss of health or life, pain, illness, security, war, or terrorism. Fears can accompany or accrue to something. Fears can be had, shared, felt, expressed, nourished, gloated about, evoked, aroused, heightened, overcome, dispelled or calmed. Something can be done, eaten, drank, enjoyed, or used without fear, but it can also be trembled, kept silent, hidden, huddled, fled, or withdrawn for fear of something. We can also look for the cause or source of fear (Żmigrodzki et al.). Concern may be a consequence of prolonged stress, an unpleasant event that happened in the past, suggesting that it is related to our past experiences or lack thereof. Feelings of anxiety can also arise for no particular reason. Importantly, consumers' concerns reflect their moods and influence their behavior and diet (Zhang Huan et al., 2018; Thanh Mai et al., 2020; Liguori et al., 2022). Concern may be a consequence of prolonged stress, an unpleasant event that happened in the

past, suggesting that it is related to our past experiences or lack thereof. Feelings of anxiety can also arise for no particular reason. Importantly, consumers' concerns reflect their moods and influence their behavior and diet (Bánáti, 2008; Miao Peng et al., 2020). What is significant and worrying is the expression of mistrust and concern by a significant portion of consumers even as experts declare food safety. Perhaps this is a side effect of the food-related scandals and epidemics of recent decades. Concern can be amplified by inaccurate or erroneous information provided by the relevant control authorities, or by the media disseminating information that is not based on sound science or that wants to create sensationalism and draw attention to itself. Such a situation was encountered during the COVID-19 pandemic. Currently, only 2% of Poles perceive the COVID-19 pandemic as a major source of their concern (McKinsey & Company, 2022).

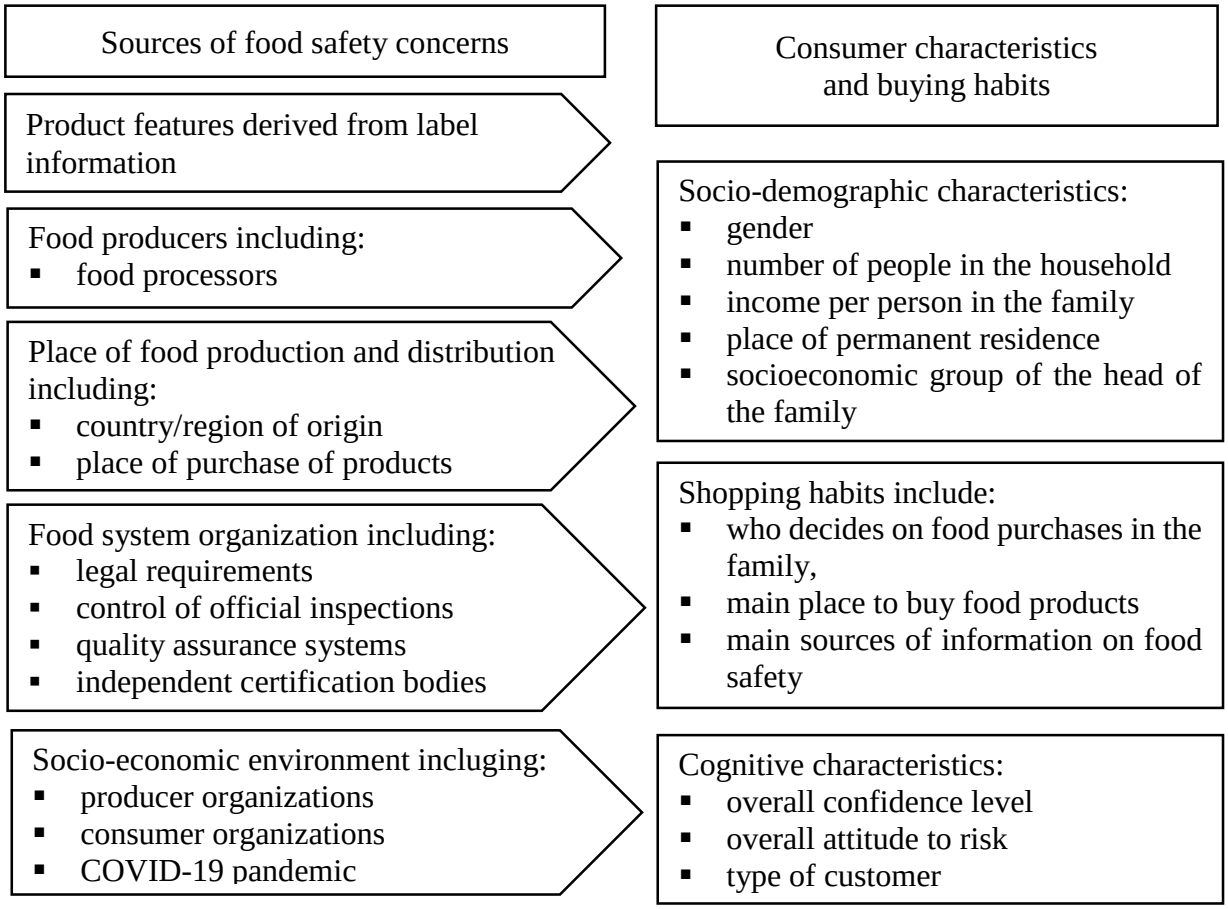

Figure 1. The conceptual framework of food safety concerns.

Source: own elaboration.

Thus, we may be concerned about change, new technologies, responsibility for actions and products offered, or the impact of purchased food on health and life. However, concerns about food safety do not always translate into avoidance of unsafe foods (Liguori et al., 2022). Many other factors have been investigated as possible predictors of risk perception, including political beliefs, sources of information, trust in institutions, inspection and certification procedures, and information (Nam Su-Jung, 2019; Simoglou, Roditakis, 2022). With the above

in mind, it was assumed that the source of concern about the food safety of Generation Z students in Poland could be the characteristics of the products, their producers, where they are produced and distributed, elements of the organization of the food system or the socioeconomic environment (Fig. 1). Taking into account the above, the following research questions were formulated:

RQ1. Are factors related to tools and supervision an important source of concern for food safety among Generation Z students?

RQ2. Do factors related to the manufacturer and place of production or purchase significantly affect Generation Z students' concerns about food safety?

RQ3. Do selected elements of the socioeconomic environment, including the activities of consumer and producer organizations, affect Generation Z students' concerns about food safety?

Consumers' risk perception and response to food safety risks are influenced by sociodemographic factors, as confirmed by studies by Dosmana et al. (2001), Simoglou and Roditakis (2022), Moumita Deb et al. (2023). These factors include gender, age, education, income, number of people in the household, and place of residence, as shown in studies including Zhang Huan et al. (2018), Nam Su-Jung (2019) and Simoglou, Roditakies (2022).

3. Material and Methods

Generation Z students were surveyed. Generation Z includes people born between 1995 and 2010, and they are expected to make up the largest group of consumers by 2030 (Ozdemir-Guzel, Bas, 2021). It is believed that Generation Z people are generally less trusting of various products (Pradhan et al., 2023), and more sensitive and cautious in their purchasing decisions and spending (Squires, Ho, 2023). It is thought that with the rise of global connectivity, generational changes may even play a more important role in determining behavior than socioeconomic differences (Francis, Hoefel, 2018). Students represent a significant group of Generation Z people who are already making or will soon be making food-purchasing decisions. The students participated in the survey voluntarily. The participation was in no way related to their studies and was not evaluated for this reason. The study involved 379 students from five departments of a university in Poland.

The sample was predominantly female (76.9%). The age of the respondents ranged from 19 to 28 years old and averaged 22 years old. 62.2% of the respondents were from 4-person households. More than 82% of the respondents had per capita family incomes of more than PLN 1000, including nearly 41% with incomes of 2000 or more. The largest group of respondents lived in small towns with up to 1 thousand residents (37.7%), nearly 24% in towns with 1-10 thousand residents, and 15% in cities with more than 100 thousand residents.

Nearly 43% of the respondents came from the families of workers in the labor force. 42% of the respondents were those who decide on their family's food purchases. The majority of respondents (76%) buy food products mainly at the supermarket. The main sources of information on food safety are labels for one in two respondents (52.5%), family for 42%, and social media for 41%. The largest percentage of respondents (54%) said they "neither trust nor distrust," and more than 30% described themselves as trusting. More than 61% of respondents expressing their general attitude toward risk said they avoid risk, and more than 20% like risk, while more than 10% dislike risk. Of the 11 customer types listed, respondents most often described themselves as frugal (53%), independent (47%), balanced (45%), analytical (39%) or determined (34%). They were least likely to describe themselves as impulsive (18%), sensitive (18%), insecure (19%) or profligate (19%) customer.

The survey was conducted using a face-to-face survey method from March to May 2022. The questions in the questionnaire were divided into two parts, including metric questions describing respondents in terms of gender, age, family size, income per family member, place of residence and socioeconomic background of the head of the household, who decides on food purchases, main place of food purchase, sources of information on food safety, self-assessment regarding general level of trust and attitude to risk, and type of customer (wasteful, frugal, independent, family-oriented, sensitive, impulsive, balanced, skeptical, uncertain, decisive, analytical).

Twelve sources of concern about food safety were assessed (Table 2). The scale ranged from 'not important' to 'very important. The present study was conducted following the ethical standards set for all research involving human subjects by the Declaration of Helsinki (1964).

Cronbach's alpha statistic (Stadler, 2021) was calculated to assess the reliability of the scale. The KMO index (Kaiser-Meyer-Olkin) and Bartlett's sphericity test were applied to know the appropriateness of conducting a factor analysis. To simplify and identify factors related to consumer concerns about food safety, factor analysis was conducted using the principal components method and Varimax rotation with Kaiser normalization. Statistical analyses were conducted with a confidence level of $\alpha = 0.95$ as a criterion of significance. Statistical analyses were performed using IBM SPSS Statistics 29.

4. Results

The value of Cronbach's alpha statistic is high (0.868), confirming that the proposed set of food safety concerns correctly measured what it was intended to measure.

Respondents' answers show that concerns about food safety to a high and very high degree are related more often than in every second respondent to the control of official inspections (54.7% of indications), the quality assurance system used (52.2%) and the place where products

are purchased (51.5%), in addition to information on the label (50.6%), the food manufacturer (50.4%), and to the least extent to the COVID-19 pandemic (19.7%) - Tab. 1. This indicates the importance of trust in the results of official inspections, the quality systems in place, where products are purchased and the information provided on the label.

Table 1.
Respondents' views on factors affecting food safety concerns

Concerns*	doesn't matter	slightly	moderately	high	to a very high degree
4a	12.7	23.6	34.2	21.2	8.3
4b	2.6	11.9	34.8	36.1	14.5
4c	3.1	18.0	24.2	34.9	19.8
4d	4.4	11.7	32.4	38.3	13.2
4e	3.9	8.8	36.9	36.9	13.5
4f	6.8	18.4	34.8	27.5	12.5
4g	3.4	13.5	30.9	34.8	17.4
4h	4.7	17.1	30.6	31.2	16.4
4i	5.2	16.9	27.3	33.0	17.7
4j	8.6	20.8	36.4	28.6	5.7
4k	9.9	22.1	37.0	25.5	5.5
4l	30.9	23.1	26.2	14.0	5.7

4a – country/region of origin, 4b – information on the label, 4c – control of official inspections, 4d – the place to buy food, 4e – food producer, 4f - farmer, 4g – quality assurance systems used, 4h – independent certification bodies, 4i – applicable legal requirements, 4j – producers' organizations, 4k – activities of consumer organizations, 4l – COVID-19 pandemic.

Table 2.
Total explained variance - concerns

Component	Sums of squares of loads after rotation		
	Total	% of variance	% cumulative
1	3.367	28.062	28.062
2	2.323	19.354	47.416
3	1.859	15.491	62.908

Method of extracting factors - principal components.

The KMO index was 0.833, indicating an excellent relationship between the variables. Barlett's test of sphericity was significant ($p < 0.001$), so the factor analysis model was adequate. The factors found were represented by almost 63% of the total variance (tab. 2). Factorial loads were between 0.496 and 0.816, so almost all factorial loads were above the critical value of 0.50 suggested by Hair et al. (2010). Based on this, three groups of concerns about food safety were identified (tab. 3).

The first component, explaining 28.1% of the variation, included primarily concerns about product oversight resulting from applicable legal requirements and related official inspections of food products, as well as issues related to the quality assurance systems in place and control of compliance with their requirements by independent certification bodies (3c, g, h, i).

Table 3.
Matrix of rotated components – concerns

	Component		
	1	2	**3**
4a	-0.116	0.645	0.361
4b	0.496	0.362	0.045
4c	0.709	0.286	0.094
4d	0.191	0.763	0.067
4e	0.405	0.735	0.062
4f	0.364	0.663	0.139
4g	0.786	0.192	0.118
4h	0.816	0.119	0.145
4i	0.777	0.081	0.264
4j	0.417	0.160	0.705
4k	0.458	0.191	0.681
4l	-0.017	0.104	0.791

Method of extracting factors - principal components. Rotation method - Varimax with Kaiser normalization.
* concerns signs as in Table 1.

A smaller value of factor loadings, but the highest among the other components, was also concerned about label information (3b), which is related to applicable legal requirements. The second component included factors related to the place of production and purchase of food and its producer (3a, d, e, f). In the third principal component, the highest value of factor loadings was recorded for concerns related to the food production environment (3j, k, l).

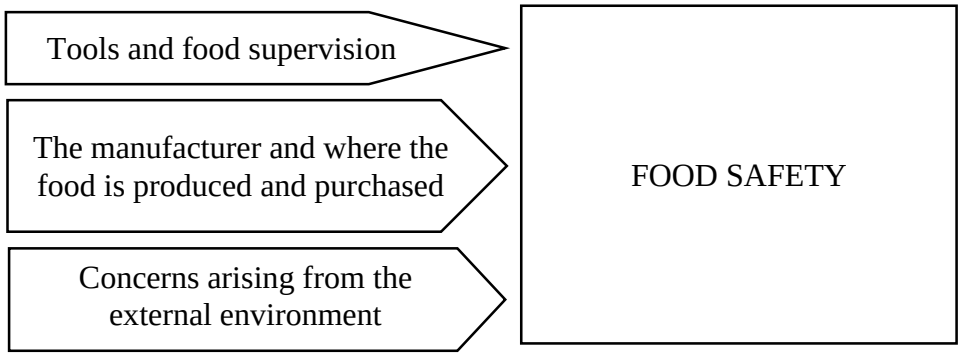

Figure 2. Sources of concern about food safety according to Gen Z students.
Source: Own elaboration.

Thus, the analysis made it possible to distinguish three groups of sources of consumer concern about food safety, these are concerns related to food safety tools and supervision, concerns related to the producer and the place where food is produced and purchased, and concerns arising from situations and factors related to the external environment (fig. 2). These analyses provided positive answers to the research questions posed.

5. Conclusions

Generation Z young adult consumers' concerns about food safety are mainly related to the control of official inspections, quality assurance systems used by food companies, and where products are purchased. For one in two respondents, concerns are related to product information visible on the label and the food manufacturer. The least concern about food safety was related to the COVID-19 pandemic. This indicates the importance of building trust in the results of official inspections, quality assurance systems used and food manufacturers and where products are purchased and that there is limited confidence among respondents in the aforementioned inspection services, food safety tools and manufacturers and distributors. The analysis identified three main groups of sources of concern for Generation Z students about food safety. These are primarily concerns about food safety tools and supervision, concerns about the manufacturer and where food is produced and purchased, and those stemming from situations and factors related to the external environment in which the food industry operates. This study fills a research gap by pointing out the importance of various sources of food safety concerns for young adult consumers representing Generation Z. These concerns are important political, social, and economic issues. The findings can help gain consumer confidence and be useful in developing food safety management policies to prevent foodborne illness. They can help food operators create more effective communications with Generation Z young adult consumers.

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