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ORIGINAL ARTICLE

Growing importance of price: Investigating food values before and during high inflation in Germany

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Abstract

Considering the consumption-induced intensification of global challenges and the continuously changing consumer needs, it is important to understand the drivers of consumer food choices under external pressures. We applied best-worst scaling to elicit the relative importance of 11 food values and conducted latent class cluster analyses based on individual scores, allowing us to gain insights into distinctive consumer segments. Data were collected through online surveys of 1000 consumers in Bavaria, southern Germany, in November 2020 and November 2022. As expected, the relative importance of food value *price* has strongly increased during this period. Similarly, the price-sensitive segment has become larger in 2022 than in 2020, while the societal impact-centered segment has become much smaller in 2022. These findings call for target-specific measures to counteract this trend of increasing price focus that challenges sustainable dietary transitions.

KEYWORDS

best-worst scaling, food values, human values, latent class analysis, price inflation

JEL CLASSIFICATION

Q13, Q18

1 | INTRODUCTION

A shift toward a more sustainable diet presents a major opportunity to reduce greenhouse gas emissions from the food system. With the food system as a whole being responsible for 21%–37% of the total anthropogenic greenhouse gases (Rosenzweig et al., 2020), people's food intake and preferences affect their health as well as the environment and climate (Clark et al., 2019). Recently, the adverse environmental effects of consumption behavior have been widely reported and discussed in the public media.

International climate movements, such as the youth-led movement “Fridays for Future,” have received considerable attention and raised awareness of the urgency and severity of climate change-related global challenges (von Zabern & Tulloch, 2020). The reduction in meat consumption in high-income countries appears to be crucial for reaching international climate targets. Nevertheless, how to change consumer behavior effectively remains an open question (Parlasca & Qaim, 2022). While the reduction of meat consumption might be an inexpensive option to engage in environmentally friendly and fair food

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consumption, other sustainable food choices are perceived as being costlier (e.g., organic production, fair trade, and animal welfare). Hence, significant increases in food prices may restrain consumers from reconsidering their food choices for more sustainable alternatives (Hempel, 2024). Following the COVID-19 pandemic and Russia's attack on Ukraine in February 2022, food price inflation in Germany accelerated, peaking at a monthly inflation rate of 21.2% in March 2023.

Owing to the topicality of events, no study has investigated what drives consumers' food choices during this period of inflation. Hence, this study aims to highlight how accelerating food prices cause changes in consumer food value hierarchies in Germany. Therefore, the best–worst scaling (BWS) of food values adds to the existing research in two ways. First, it examines their relative importance before (2020) and during a period of high price inflation (2022). Second, it studies the food values in a new geographical context, as food values so far have mainly been studied among US American consumers. Moreover, we use the food values for segmentation analyses and evaluated the differences between the segments for the 2020 and 2022 samples. To the best of our knowledge, no study has conducted a latent class cluster analysis to identify consumer segments, as presented by Lusk and Briggeman (2009).

Our study also contributes to the theory by applying the Schwartz Human Values Scale, internal locus of control (ILOC), and the satisfaction with life scale to characterize the resulting consumer segments. While Lusk and Briggeman (2009) draw on the means-end chain theory (in which the means refer to more abstract human values) to explain the role of food values as intermediary values, so far no study has been conducted using human values to explain food value hierarchies. And yet the role of values in understanding consumer preferences and behaviors has long been acknowledged (Stern et al., 1999). Human values are a key component of the self and personality; as such, they are a critical driver of behavior. The higher the level of re-expression of values, the more stable they are (Kahle & Kennedy, 1988). The 10 values that comprise Schwartz's values theory are self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence, and universalism. These values can be structured in bipolar dimensions: "openness to change vs. conservation" and "self-enhancement vs. self-transcendence." Openness to change comprises self-direction and stimulation, whereas conservation comprises security, conformity, and tradition. Self-enhancement involves benevolence and universalism, whereas self-transcendence involves power and achievement. Hedonism can be attributed to openness to change and self-enhancement. According to Schwartz (2012), at a more basic level, the 10 values form a continuum of related motivations. ILOC and life satisfaction

have additionally been chosen to describe the segments because these psychographic factors appear to play a relevant role in consumers' food choices (Hempel & Roosen, 2022). ILOC implies that people believe events in their lives are caused by their own actions and not by factors beyond their control. It has been found to correlate with environmentally responsible behavior and behavioral intention in multiple studies (Weimer et al., 2017). As such, it is different from perceived self-efficacy (i.e., the perceived capability to conduct the necessary actions to achieve an outcome in a particular situation) and perceived behavioral control, one element of the well-known Theory of Planned Behavior (Ajzen, 2002). ILOC appears to be more stable across varying behaviors and situations (Cleveland et al., 2012; Hanss & Doran, 2019). However, thus far, ILOC has mainly been studied with regard to healthy eating behaviors; in those cases, a domain-specific health LOC scale has been used (e.g., Lee et al., 2018). The satisfaction with life scale, developed by Diener et al. (1985) measures life satisfaction, defined as an individual's judgment of their well-being and quality of life. Hong and Giannakopoulos (1994) reported findings from previous research that life satisfaction is consistently related to greater ILOC, which is also supported by their results. Regarding food, Hempel and Roosen (2022) showed that life satisfaction was associated with consumers' increased preferences for local and organically produced food during the COVID-19 pandemic.

Previous studies have investigated changes in food behavior due to economic shocks such as the Great Recession (e.g., Koh et al., 2013; Kuchler, 2011; Smith et al., 2014). For example, these findings indicate that consumers exchange food quality for the quantity of fresh vegetables (Kuchler, 2011). However, little change has been reported regarding consumers' cooking practices and away-from-home consumption during times of recession (Smith et al., 2014). More recently, these studies were complemented by research conducted in a US American context during the COVID-19 pandemic (e.g., Cerroni et al., 2022; Ellison et al., 2021; Lusk & McFadden, 2021). Typically, overall food spending decreases during recessions, but food expenditure makes up a greater share of consumers' total budgets than in the preceding years. Nevertheless, during the COVID-19 pandemic, many people experienced a shift in time availability, leading to increased home production and more resources spent on finding lower-cost options (Lusk & McFadden, 2021). Ellison et al. (2021) revealed reductions in expenditures on food away from home and increased spending on food e-commerce. Furthermore, the authors investigated food values and showed that they were considerably stable during the pandemic; nonetheless, there was a slight reduction in the importance of price. The most important food value was taste. Cerroni et al. (2022) observed a substantial decrease in the importance



of food safety among US American consumers, whereas the values of taste, nutrition, appearance, convenience, and origin increased slightly. The authors concluded that even a substantial shock, such as the COVID-19 pandemic, did not generate considerable shifts in food value hierarchies.

The food value scale proposed by Lusk and Briggeman (2009) is a common measure for studying food-choice drivers. Whereas human values are widely referred to as concepts or beliefs about desirable end-states of existence, food values should be interpreted as intermediary values that relate specifically to people's food choices and, as such, can also be considered drivers or motives thereof. The authors proposed a set of 11 values that specifically relate to consumers' food choices to investigate their relative importance. Contrary to other multi-item scales in this context, the authors aimed to be abstract rather than specific to develop a set of food values generally applicable when explaining consumers' choices between a wide range of food products. According to Lusk and Briggeman (2009), they can be classified into self-centered values (i.e., naturalness, taste, price, convenience, appearance, nutrition, and safety) and society-centered values (i.e., tradition, origin, fairness, and environmental impact). We implemented the food value scale using the BWS approach. Based on the individual best-worst scores, we performed a latent class analysis to cluster consumers. Over the past decades, BWS has been favored over more traditional methods of measurement (e.g., rating scales), as it may assist market researchers in reducing biases (e.g., scalar nonequivalence) and is easy to conduct (Marley & Louviere, 2005). More recently, Caputo and Lusk (2020) conducted a BWS experiment to investigate consumer preferences regarding food policies. They estimated mixed logit models and calculated the preference shares for each of the selected policies. We chose to conduct a latent class clustering approach because of its known benefits over standard clustering techniques, for example, a k-means approach, such as the fact that latent class clustering is a model-based approach with more formal criteria for the choice of the number of clusters and more rigorous statistical testing (Magidson & Vermunt, 2002). More specifically, we followed the procedures suggested by Lusk and Briggeman (2009, Appendix) and Loose and Lockshin (2013), who used the best-worst scores for the latent class approach. The findings of this study will help policy makers to design target-specific communication measures, as they yield information on consumers' distinguishing characteristics necessary for developing and implementing measures aimed at healthier, more climate- and environment-friendly food choices during economically challenging times.

In the following chapter, we describe the methodological approach, starting with the data collection, followed

by the implementation of the BWS and latent class cluster analysis, and present the variables used for the profiling of segments (i.e., sociodemographic and behavioral variables, ILOC, life satisfaction, and Schwartz Human Values). Subsequently, we present the results. First, we show the relative importance of food value for both years. Second, we present the main differences between the identified consumer segments by referring to food values and describe the segments in more detail using the profiling variables. Finally, we derive implications and reflect on the limitations of our study.

2 | METHODOLOGY

2.1 | Data collection

Data for this study were collected via the online access panel of a market research company from November 9 to 19, 2020, and November 18 to 28, 2022, in Bavaria—the largest federal state in Germany in terms of area and the second largest in terms of inhabitants. The market research institute was responsible for programming the questionnaire, collecting data, and incentivizing participants. Quotas were specified for gender, age, education, employment status, and household size to obtain a sample as close to the general population as possible. Only respondents who were at least partly responsible for grocery shopping and were older than 18 years were allowed to participate. Participants took approximately 20 min to complete the survey. In both years, the survey began with questions on participants' sociodemographic information, continued with the BWS of food values, and ended with multi-item scales measuring psychographic variables, such as ILOC and life satisfaction. The BWS of the food values and latent class cluster analysis are described in the subsequent section, followed by an introduction of the variables used for profiling the resulting clusters.

2.2 | Food values and best-worst scaling

Our methodological approach is based on a set of 11 values related to consumers' food choices proposed by Lusk and Briggeman (2009). We chose food values for the segmentation of consumers in our study, closely following the approach of Lusk and Briggeman (2009), who were guided by the idea of "identifying people's beliefs regarding the preferability of competing outcomes resulting from food purchase and consumption" (Lusk & Briggeman, 2009, p. 185). As mentioned above, these can be classified into self-centered values (i.e., naturalness, taste, price, convenience,

appearance, nutrition, and safety) and society-centered values (i.e., tradition, origin, fairness, and environmental impact). Several studies have adopted the BWS approach to determine the relative importance of food values (cf. Bazzani et al., 2018; Cerroni et al., 2022; Verain et al., 2021). Short descriptions of food values can be found in Table 2 in the results section. These descriptions were provided to participants during the survey. They were translated into German for this study. We applied BWS type 1 to elicit consumer importance rankings of food values. BWS type 1 studies aim to scale the characteristics or items of the construct of interest, such as liking, agreement, or importance (Loose & Lockshin, 2013). According to Adamsen et al. (2013), BWS is an option to overcome reliability issues common in simple rating scales such as Likert scales, which have been widely applied in market research studies to examine consumers' (dis)agreement with multiple items. In the context of food value, socially desirable responses are expected, as this is a topic on which strong public opinion exists (i.e., food values related to sustainability might be over-reported, while self-centered values, such as price, taste, and convenience, might be under-reported). Contrary to rating scales, participants were forced to choose the best (most important) and worst (least important) options. By choosing instead of rating, different interpretations of response options can be avoided, which eventually biases the results. Moreover, it is possible to circumvent people's tendency to state that all issues are important (Lusk & Briggeman, 2009). To avoid the reliance on scaling of numerous items with a set of Likert statements or the rating of items online or category scales in consumer research, Jaeger et al. (2008) also choose to implement a BWS approach to elicit preferences for food products.

For the experimental design, we applied a balanced incomplete block design (BIBD) to the 11 food values, yielding 11 choice sets, each including six food values. A BIBD was chosen because it is the most widely used design for count-based analyses, and a theoretical proof for the use of other experimental designs has not yet been reported (Loose & Lockshin, 2013). An example of such a best–worst task is shown in Figure 1.

BWS involves a series of trade-offs between attributes or items through which the respondents' preferences are revealed. Thus, the BWS is a conjoint analysis technique. We conducted a count-based analysis to generate the best–worst scores subsequently used for segmentation analysis. Therefore, we calculated individual best–worst scores for each food value by taking the difference between the number of times that food value was selected as the most important and the number of times it was chosen as the least important across the 11 choice sets the respondent was prompted to fill in. The highest possible score for each food

value was +6, and the lowest possible score was –6, as all food values appeared six times in the BWS task.

2.3 | Latent class cluster analysis

We used the best–worst scores of the food values in a latent class cluster analysis, following the approach of Lusk and Briggeman (2009). Similarly, Jaeger et al. (2008) used the best–worst scores for further analyses, as they verified that the scores were proportional to the parameters of a multinomial logistic regression. The authors used generalized linear mixed models to analyze the BWS data. However, we assumed that food value preferences are heterogeneous among consumers, as was also found by Lusk and Briggeman (2009). Hence, we decided to conduct a latent class cluster analysis based on the individual count scores for all 11 food values to account for this heterogeneity. Our aim was to identify the classes (segments) that revealed homogeneous preferences within classes and heterogeneous preferences across classes (cf. Bir et al., 2019). As pointed out by Rokeach (1973), individuals and groups have different value “priorities” or “hierarchies,” which are also referred to as value systems. Segments defined by value systems, rather than a single value, are more reliable and have greater interpretability. Individuals belonging to a particular segment share the same value system, which is represented by a set of unobservable utilities assigned to value descriptions. The relative importance weights for each value description provided the researcher with an objective assessment of the value priorities within each segment.

The main reason for using the latent class approach as opposed to standard cluster analysis techniques (such as *k*-means) is that it is a model-based clustering approach. Through a statistical model, the choice of the cluster criterion is less arbitrary. Simultaneously, it considered that there is uncertainty concerning the probability of class membership for each object. The basic latent class cluster model takes the following form:

$$f(y_i|\theta) = \sum_{k=1}^K \pi_k f_k(y_i|\theta_k)$$

In this equation, the vector y_i denotes an object's scores on a set of observed variables, K is the number of clusters, and π_k represents the prior probability of belonging to a latent class or cluster k . Alternative labels for the y 's are indicators, dependent variables, outcome variables, outputs, endogenous variables, or items. The distribution of y_i , given the model parameters θ (i.e., $f(y_i|\theta)$), is assumed to be a mixture of densities, which are specific for the classes $f_k(y_i|\theta_k)$ (Vermunt & Magidson, 2002).

Which of the following issues is most important, and which is least important when you purchase food? (check only one issue as the most important and one as the least important)	most important	least important
Naturalness (extent to which food is produced without modern technologies)	<input type="checkbox"/>	<input type="checkbox"/>
Price (price paid for the food)	<input type="checkbox"/>	<input type="checkbox"/>
Nutrition (amount and type of fat, protein, vitamins, etc.)	<input type="checkbox"/>	<input type="checkbox"/>
Origin (where the agricultural commodities were grown)	<input type="checkbox"/>	<input type="checkbox"/>
Fairness (the extent to which all parties involved in the production of the food equally benefit)	<input type="checkbox"/>	<input type="checkbox"/>
Environmental impact (effect of food production on the environment)	<input type="checkbox"/>	<input type="checkbox"/>

FIGURE 1 Example of one of the best–worst tasks presented to the survey participants. The survey was conducted in Germany; thus, a German version of the food value scale was included in the questionnaire. The English version is displayed here to ensure readability for all journal readers.

Specifically, the probability density function for K latent classes can be expressed as follows:

$$f(y_i) = \sum_{k=1}^K P(k) \prod_{j=1}^J \phi\left(\frac{c_{ij} - \bar{c}_{jk}}{\sigma_{jk}^2}\right)$$

Here c_{ij} represents an individual i 's best–worst score for a value j , \bar{c}_{jk} is the mean level of importance for value j , and σ_{jk}^2 is the cluster- and value-specific standard deviation. ϕ denotes the standard normal (Gaussian) density function.

We consider the probability (P) of belonging to one of the four latent classes (k) in the following way: $P(k) = \frac{e^{\alpha_k}}{\sum_{m=1}^K e^{\alpha_m}}$ (Lusk & Briggeman, 2009).

We used the resulting probabilities of class membership to evaluate an individual's probability of being in one of four classes—the class with the highest predicted probability was selected as the predicted class. Bir et al. (2019) compared approaches for assigning individual respondents to identified classes. One approach was also simply based on the highest predicted probability, whereas the other approach considered the difference between the highest and next highest probabilities of class membership. However, they did not find any statistically significant differences between the methods. Hence, we decided to adhere to the simpler approach described above.

It is recommended that the number of clusters (or latent classes) should be selected to achieve the lowest Bayesian Information Criterion (BIC). If the BIC decreases without reaching a minimal turning point, a BIC plot can be used to determine the appropriate number of clusters (Fraley & Raftery, 1998). We investigated the BIC values for all cluster solutions between 2 and 12; the minimum was reached for 11 clusters in both samples (2020: BIC = 48,516.74; 2022: BIC = 46,821.05). Our BIC plots yielded elbows in the two-cluster (2020: BIC = 49,164.57; 2022: 47,692.28) and four-cluster (2020: BIC = 48,984.72; 2022: BIC = 47,300.06)

solutions. Four clusters (or latent classes) were selected because this solution resulted in values that allowed for a plausible interpretation. We conducted the latent class cluster analysis in Stata 16.

2.4 | Profiling variables used to characterize segments

We used the sociodemographic variables of age, sex, and income to better describe the clusters because they are frequently used for stratification. Further, these sociodemographic variables revealed significant differences between the four clusters in 2020. For occupation, we revealed significant differences in full-time employment and retirement between the hedonic and societal impact-centered segments, which might also be reflected in their respective incomes. For the other occupation categories, household size, and education, we could not find significant differences between the four segments in 2020. For the 2022 sample, we selected the same sociodemographic variables for profiling as the 2020 sample. Moreover, as a validity check for our initial segmentation, we examined consumers' stated organic and local food purchases to describe the segments. The survey respondents were asked to give their agreement to two single-item variables on a five-point Likert scale (“I mainly buy locally produced food” and “I mainly buy organically produced food”). These statements are generic and do not refer to any particular product category. We followed the approach of Lusk and Briggeman (2009), who also surveyed respondents' previous organic food purchases and revealed that people for whom naturalness, fairness, and the environment were more important were more likely to have previously bought organic food. Furthermore, we measured human values in 2022 using a short version of the Portraits Value Questionnaire, the well-established 21-item Human Value Scale devel-

oped by Schwartz (1992). It comprised 21 short portraits describing the importance of different values for different people. Different versions of the scale were implemented with diverse female and male respondents. The scales were introduced with “Following, some people will be described. Please indicate the extent to which each person is or is not like you.” Respondents were asked to indicate the likeness on a 6-point scale, from “not at all like me” to “very much like me.” Regarding the analysis, we followed the approach of calculating centered scores for each value, as suggested by Schwartz in the European Social Survey guide.

Additionally, we included ILOC and the satisfaction with life scale in the 2022 sample. To measure ILOC, a three-item scale was used (Jakoby & Jacob, 1999). This scale was validated with two large samples in 1995 and 1996, in which Cronbach’s alpha was .71 and .62. The original German scale was used in this study’s questionnaire. A 5-point Likert scale was used, following the recommendations of Jakoby and Jacob (1999). In our study, Cronbach’s alpha for ILOC was .63. A five-item scale for measuring life satisfaction was adopted from Janke and Glöckner-Rist (2012). Although the authors recommended using a 7-point Likert scale, a 5-point Likert scale was applied in this study for consistency because all other scales were measured on 5-point Likert scales. Cronbach’s alpha was .87 for the satisfaction with life scale.

We applied *t*-tests for independent samples, analysis of variance, and chi-square tests to reveal significant differences between clusters regarding these profiling variables. Whenever the requirements for analysis of variance were not met, we decided on a nonparametric alternative (i.e., Kruskal–Wallis tests). All analyses were performed using SPSS 26 (IBM).

3 | RESULTS AND DISCUSSION

3.1 | Sample description

The final sample comprised 1020 respondents in 2020 and 1004 respondents in 2022. An overview of the sociodemographic information of both samples, as well as a comparison with the general population statistics, can be found in Table 1. We performed a statistical comparison of both samples using *t*-tests and chi-square tests to check for differences between the 2020 and 2022 samples. We did not find significant differences in gender, family status, household size, education level, or occupation (all *P*-values were larger than .05). However, the tests revealed differences in age and income between 2020 and 2022 ($P < .05$); income was lower, while age was higher in 2020 than in 2022.

3.2 | General description of the food values

The count-based analysis of the food values revealed that taste is on average considered as the most important food value, both in 2020 and 2022. While safety and naturalness follow by far on places 2 and 3 in the 2020 sample, taste is closely followed by price in the 2022 sample. Appearance, tradition, and convenience are the three food values that were regarded as least important in both years. The most important as well as the least important food value belong to the group of self-centered values (i.e., taste, safety, naturalness, price, nutrition, appearance, convenience), whereas society-centered values (i.e., origin, environmental impact, fairness, tradition) are situated in the mid-range of all food values, showing rather little importance on average (Table 2).

While we expected the taste to be rated as one of the most important food values based on the findings of other studies on food values and food-choice motives (cf. Baudry et al., 2017; Malone & Lusk, 2017), we did not expect to see such a clear first place in 2020. Conversely, other studies have identified food safety as the most important (Bazzani et al., 2018; Lusk & Briggeman, 2009), which was also among the top three food values in our study. Nonetheless, a study measuring food-choice motives instead of food values in a French sample also revealed taste as the strongest motive (Baudry et al., 2017). Overall, the rather low importance of society-centered values revealed in both samples confirms the findings of previous studies (cf. Bazzani et al., 2018; Cerroni et al., 2022; Verain et al., 2021).

The strong increase in the importance of the food value price is surprising. This is not in line with the findings of Cerroni et al. (2022), who concluded that substantial shocks, such as the COVID-19 pandemic, do not generate substantial shifts in the food value hierarchies of US American consumers. Additionally, Ellison et al. (2021) found a slight decrease in the importance of price during the pandemic, as well for US American consumers. This apparent contradiction may be explained by the different effects of the COVID-19 pandemic on consumers and their food choices. While some did not experience budget constraints, others compensated for them through increased home production and more resources spent on finding lower-cost options due to more time availability (Lusk & McFadden, 2021). However, during inflation in 2022, all consumers will be affected by high food prices in Germany, potentially leading to an overall greater importance of the food value price. Furthermore, this finding might be explained by the geographical context, as the importance of food values is also affected by cultural factors (Barrena et al., 2015).

**TABLE 1** Sociodemographic characteristics of the samples in 2020 and 2022 and statistics of the German population (DE).

Sample		2020		2022	
<i>n</i>		1020	DE	1004	DE
Sex (%)	Female	51	51	53	51
	Male	49	49	47	49
Age (median)	In years	48	46	44	46
Occupation (%)	Full-time employed	51	<i>n.a.</i>	53	<i>n.a.</i>
	Retired	22	<i>n.a.</i>	18	<i>n.a.</i>
	Part-time employed	12	<i>n.a.</i>	14	<i>n.a.</i>
	Other (e.g., homemaker, in school, unemployed)	15	<i>n.a.</i>	15	<i>n.a.</i>
Education (%)	Secondary school	49	57	46	55
	University degree	28	<i>n.a.</i>	33	<i>n.a.</i>
	General qualification for university entrance	22	35	21	37
	No degree or still in school	1	8*	1	9*
Household (%)	1	26	20	26	20
	2	41	34	41	33
	3	17	18	15	18
	4	13	19	14	19
	>4	3	9	5	10
Income in € (%)	<1.000	5	5	10	12
	1.000 ≤ 1.500	8	8		
	1.500 ≤ 2.000	12	10	20	21
	2.000 ≤ 2.500	14	11		
	2.500 ≤ 3.000 (2022: 2.500 ≤ 3.500)	14	11	19	20
	3.000 ≤ 4.000 (2022: 3.500 ≤ 4.500)	17	19	15	48
	>4.000 (>4.500)	18	34	23	
	Not indicated	12	1	12	0

Note: In both surveys, only people aged 18 years and above, as well as those who were sometimes responsible for grocery shopping, were allowed to participate. Therefore, there may be deviations from the general population.

*This share is larger in the general population than in our sample, as we only included people aged 18 years and above.

3.3 | Presentation of the consumer segments based on food values

The latent class cluster analyses resulted in four consumer segments (see Table 3 for 2020 and Table 4 for 2022). The first group comprises health- and safety-concerned consumers because nutrition and safety are considered relatively important. The second segment comprises consumers whose members place relatively high importance on the society-centered values origin, environmental impact, and fairness and is called the societal impact-centered segment (or short: society-centered segment). Group 3 comprises price-sensitive consumers who perceive price as the most important value. Group 4 is the hedonic segment, whose members rated taste as the

most important, closely followed by price in 2020. However, in 2022, price is also the most important food value in the hedonic segment, similar to the price-sensitive segment. Although taste and price were the overall most significant food values in our study, they were of only minor importance in the societal impact-centered segment. While health-concerned and price-sensitive consumers rate most self-centered values as comparatively important, the hedonic segment is additionally characterized by the extremely low importance they place on society-centered values. Therefore, they are contrary to the societal impact-centered segment (Tables 3 and 4).

A comparison of segment sizes between 2020 and 2022 revealed that the health/safety-concerned segment was the largest in both years and increased in size from 2020

TABLE 2 Mean values and standard deviations (SD) of individual best–worst scores (BWS) for all food values.

Food values	Description	BWS 2020		BWS 2022	
		Mean	SD	Mean	SD
Taste	Extent to which food consumption is appealing to the senses	1.78	2.17	2.29	2.16
Safety	Extent to which consumption of food will not cause illness	1.02	2.26	.84	2.07
Naturalness	Extent to which food is produced without modern technologies	.95	2.12	.80	2.29
Price	Price paid for the food	.67	3.01	1.86	2.93
Origin	Where the agricultural commodities were grown	.54	2.14	.10	1.74
Nutrition	Amount and type of fat, protein, vitamins, etc.	.50	2.36	.25	2.13
Env. impact	Effect of food production on the environment	.05	1.95	−.35	2.10
Fairness	Extent to which all parties involved in the production of the food equally benefit	−.14	1.93	−.59	1.65
Appearance	Extent to which food looks appealing	−1.04	2.03	−1.09	2.02
Tradition	Preserving traditional consumption patterns	−1.74	2.26	−1.97	2.29
Convenience	Ease with which food is cooked and/or consumed	−2.59	2.48	−2.14	2.43

TABLE 3 Class means and standard errors in brackets of the four latent classes (2020).

	Group 1 “health-/safety-concerned” 34.22%, <i>n</i> = 349	Group 2 “society-centered” 29.61%, <i>n</i> = 302	Group 3 “price-sensitive” 20.49%, <i>n</i> = 209	Group 4 “hedonic” 15.69%, <i>n</i> = 160
Taste	2.695 (.318)	.371 (.135)	1.237 (.204)	3.071 (.222)
Safety	1.576 (.167)	.913 (.195)	.570 (.206)	.628 (.218)
Naturalness	1.596 (.169)	1.752 (.143)	−.104 (.155)	−.512 (.180)
Price	−.667 (.168)	−1.360 (.140)	4.293 (.232)	2.640 (.277)
Origin	.246 (.170)	2.234 (.168)	.011 (.161)	−1.283 (.189)
Nutrition	1.488 (.181)	−.020 (.239)	.165 (.200)	−.200 (.228)
Environmental impact	−.043 (.122)	1.501 (.155)	−.289 (.151)	−1.958 (.210)
Fairness	−.384 (.119)	1.258 (.182)	−.639 (.150)	−1.556 (.168)
Appearance	−.951 (.151)	−1.633 (.133)	−1.395 (.184)	.285 (.204)
Tradition	−2.254 (.163)	−1.463 (.151)	−1.734 (.208)	−1.170 (.262)
Convenience	−3.304 (.182)	−3.553 (.147)	−2.115 (.211)	.055 (.221)

to 2022. The size of the hedonic segment decreased only slightly within the 2 years. The societal impact-centered segment was the second largest group, with a share of 29.6 % in 2020; nonetheless, the segment size decreased to 5.5 % within those 2 years. Conversely, the size of the price-sensitive segment increases significantly, becoming the second-largest group in 2022 (Tables 3 and 4,

first rows). These findings suggest an inverse relationship; while price is becoming relevant to an increasing number of people, the importance of the societal impact of food consumption is decreasing. A chi-square test revealed that for all segments, the differences in size between both years were significant, assuming a 5% error probability.



TABLE 4 Class means and standard errors in brackets of the four latent classes (2022).

	Group 1 “health-/safety-concerned” 43.13%, <i>n</i> = 433	Group 2 “society-centered” 5.48%, <i>n</i> = 55	Group 3 “price-sensitive” 39.34%, <i>n</i> = 395	Group 4 “hedonic” 12.05%, <i>n</i> = 121
Taste	2.377 (.121)	.590 (.293)	2.277 (.125)	2.838 (.201)
Safety	1.297 (.115)	−.016 (.274)	.501 (.121)	.774 (.193)
Naturalness	1.712 (.142)	1.092 (.291)	−.093 (.120)	.535 (.202)
Price	−.264 (.124)	−.916 (.303)	3.920 (.206)	3.677 (.193)
Origin	.765 (.099)	1.393 (.228)	−.565 (.089)	−.566 (.150)
Nutrition	.823 (.118)	.119 (.301)	−.317 (.123)	.206 (.197)
Environmental impact	.118 (.062)	4.180 (.194)	−.268 (.061)	−4.445 (.120)
Fairness	−.060 (.087)	.951 (.210)	−1.037 (.085)	−1.710 (.149)
Appearance	−1.564 (.119)	−1.719 (.277)	−.816 (.114)	−.062 (.183)
Tradition	−2.284 (.124)	−2.561 (.311)	−1.929 (.127)	−.685 (.217)
Convenience	−2.918 (.152)	−3.114 (.312)	−1.674 (.134)	−.562 (.218)

TABLE 5 Differences in sociodemographic characteristics and behavioral variables (2020).

	Group 1 “health- concerned”	Group 2 “society-centered”	Group 3 “price-sensitive”	Group 4 “hedonic”
Age (mean and SD)	46.81 ^a (15.10)	50.52 ^b (16.69)	47.33 ^{ab} (15.85)	44.46 ^a (13.84)
Gender (female)	53.9% ^a	55.0% ^a	44.5% ^b	46.3% ^{ab}
Income (mean and SD)	4.99 ^a (1.75)	4.81 ^a (1.83)	4.12 ^b (1.88)	4.54 ^{ab} (1.80)
Purchase mainly organic food (mean and SD)*	3.12 ^a (.82)	3.56 ^b (.88)	2.64 ^c (.88)	2.21 ^d (.97)
Purchase mainly local food (mean and SD)*	3.49 ^a (.78)	3.92 ^b (.77)	3.26 ^c (.75)	2.93 ^d (.89)

Note: Different superscript letters indicate significant differences between groups at $P < .05$. We carried out analyses of variance to determine significant differences for the variables age, income, and organic as well as local food purchases. For the variable gender, we conducted a chi-square test.

*These two variables were measured on a five-point Likert scale (from 1 “disagree” to 5 “agree”).

3.4 | Further characterization of the segments

Tables 5 and 6 characterize the segments by sociodemographic and behavioral variables in 2020 and 2022, respectively. For 2022, we also included the ILOC and life satisfaction (Table 6). Concerning the sociodemographic variables, we found a significant difference in age in the 2020 sample in that respondents belonging to the societal impact-centered segment were on average older than those in the health-/safety-concerned and hedonic segments. In the 2022 sample, the mean age was also the highest among those belonging to the societal impact-centered segment, and the difference from the others was not significant. Regarding gender, we revealed a higher share of female respondents in the health-/safety-concerned

and societal impact-centered segments than in the price-sensitive segment in the 2020 sample but could not reveal any significant differences in the 2022 sample. Unsurprisingly, in both samples, the income level was, on average, lowest in the price-sensitive segment. It was significantly lower than in the health-/safety-concerned and societal impact-centered segments but not significantly different from the hedonic segment.

In both samples, the societal impact-centered segments show, on average, the highest agreement toward the statements that they mainly purchase organic food, followed by the health-/safety-concerned, price-sensitive, and hedonic segments, where all differences are significant at the $P \leq .05$ level. The same order and significant differences were observed in the mean agreement toward purchasing mainly local food in the 2020 sample. For

TABLE 6 Differences in sociodemographic characteristics and behavioral variables (2022).

	Group 1 “health- concerned”	Group 2 “society-centered”	Group 3 “price-sensitive”	Group 4 “hedonic”
Age (mean and SD)	45.57 ^a (16.24)	48.29 ^a (17.24)	44.75 ^a (15.92)	45.59 ^a (14.56)
Gender (female)	51.7% ^a	56.4% ^a	54.4% ^a	47.9% ^a
Income (mean and SD)	3.75 ^a (1.53)	3.96 ^{ab} (1.49)	2.89 ^c (1.49)	3.28 ^{bc} (1.55)
Purchase mainly organic food (mean and SD)*	3.26 ^a (.95)	4.02 ^b (.97)	2.59 ^c (.95)	2.11 ^d (.96)
Purchase mainly local food (mean and SD)*	3.69 ^a (.85)	3.98 ^a (.87)	3.15 ^b (.82)	2.98 ^b (.94)
ILOC*	3.77 ^a (.59)	4.02 ^b (.62)	3.54 ^c (.63)	3.64 ^{ac} (.63)
Life satisfaction*	3.41 ^a (.74)	3.68 ^a (.79)	3.01 ^b (.89)	3.10 ^b (.85)

Note: Different superscript letters indicate significant differences between groups at $P < .05$. We carried out analyses of variance to determine significant differences for the variables age, income, organic as well as local food purchases, ILOC and life satisfaction. For the variable gender, we conducted a chi-square test.

*These four variables were measured on a five-point Likert scale (from 1 “disagree” to 5 “agree”).

the 2022 sample, however, the differences between the health-/safety-concerned and the societal impact-centered segments as well as between the price-sensitive and the hedonic segments regarding local food purchases are not significant.

The consumer segments resulting from the 2022 sample can be further described by ILOC and life satisfaction. ILOC was highest for the societal impact-centered segment, followed by the health-/safety-concerned, hedonic, and price-sensitive segments. The differences between the segments were significant for all comparisons except for the health-/safety-concerned and hedonic, as well as the price-sensitive and hedonic segments. Regarding life satisfaction, we observed the same order as for ILOC. However, the differences are insignificant between the health-/safety-concerned and societal impact-centered segments, as well as between the price-sensitive and hedonic segments (Table 6). Respondents belonging to the price-sensitive segment appeared to have the lowest ILOC and were the least satisfied with life in general, likely due to their lower incomes. To enable price-sensitive consumers to consider sustainable alternatives, it is important to provide them with greater security and stability. The strong feelings of insecurity and lack of control over the outcomes of events in their lives keep them from opening up to change and trying new alternatives.

In the 2022 survey, we included the Schwartz Human Values Scale to better characterize the different consumer segments. The results are presented in Table 7, and the means and standard deviations of the human values are listed in Table S1 (Supplementary Material).

There were no significant differences between the four segments regarding conformity, stimulation, or achievement. Tradition is most pronounced for the hedonic segment and, as such, reveals significant differences from all other segments. Similarly, there is a significant difference between the price-sensitive and societal impact-centered segments, as it is the least characteristic of the latter segment. Regarding benevolence, there was a significant difference only between the societal impact-centered and hedonic segments, with the least relevance in the hedonic segment. The four segments differ significantly in terms of the value universalism, which is most pronounced in the societal impact-centered segment and least pronounced in the hedonic segment. Self-direction is also most pronounced in the societal impact-centered segment and reveals a significant difference from the price-sensitive segment. Unsurprisingly, the value of hedonism is most relevant in the hedonic segment and significantly different from that in the societal impact-centered segment. Overall, the value power is relatively unimportant but significantly more important in the hedonic segment than in the other three segments. Regarding the value security, there is a significant difference between the health-/safety-concerned and hedonic segments—it is most pronounced in the latter. Correlations among human values and between human values and the ILOC, as well as life satisfaction and correlations between human values and food values, are presented in the Supplementary Material (Tables S2 and S3).

The societal impact-centered segment is characterized by benevolence, universalism, and self-direction, all of



TABLE 7 Differences between segments (from 2022) concerning human values.

	Group 1 “health-/safety-concerned”	Group 2 “society-centered”	Group 3 “price-sensitive”	Group 4 “hedonic”
Conformity	−.35 ^a (1.01)	−.19 ^a (1.05)	−.22 ^a (.98)	−.27 ^a (1.02)
Tradition	−.15 ^{ab} (.97)	−.53 ^a (1.00)	−.03 ^b (1.03)	.34 ^c (1.01)
Benevolence	.84 ^{ab} (.77)	1.12 ^a (.76)	.75 ^{ab} (.83)	.63 ^b (.79)
Universalism	.75 ^a (.74)	1.24 ^b (.75)	.55 ^c (.74)	−.09 ^d (.85)
Self-Direction	.54 ^{ab} (.78)	.82 ^a (.83)	.43 ^b (.82)	.39 ^{ab} (.85)
Stimulation	−.64 ^a (1.09)	−.87 ^a (1.12)	−.73 ^a (1.08)	−.75 ^a (1.02)
Hedonism	−.20 ^{ab} (1.00)	−.51 ^a (.97)	−.12 ^{ab} (.97)	.16 ^b (1.06)
Achievement	−.51 ^a (.97)	−.68 ^a (1.03)	−.51 ^a (1.00)	−.40 ^a (.99)
Power	−.84 ^a (.90)	−1.13 ^a (1.00)	−.75 ^a (.92)	−.52 ^b (.92)
Security	.18 ^a (.93)	.12 ^{ab} (1.09)	.35 ^{ab} (.93)	.54 ^b (.95)

Note: Means of the centered value scores are displayed with SD in brackets. Different superscript letters indicate significant differences between the groups on a .05 level. We conducted Kruskal–Wallis tests to determine significant differences between groups. Significance level $P < .05$ with Bonferroni correction for multiple tests.

which are comparatively atypical of the hedonic segment. Conversely, the values of tradition, hedonism, power, and security are characteristic of the hedonic segment. In other words (cf. Schwartz, 2012), respondents belonging to the societal impact-centered segment are concerned about the welfare of those with whom they are in frequent personal contact and those in the larger society (or world) and nature. This is supported by the fairly high and significant correlation between human value universalism and the environmental impact of food value (Table S3). The relevance of human value universalism in the society-centered cluster confirms the findings of De Boer et al. (2007), who revealed a positive association between universalism, free-range meat consumption, and meat reduction. According to Schwartz (2012), the underlying motivations for the related values of benevolence and universalism are the enhancement of others and the transcendence of self-interests—these people care less about their individual interests and more about others’ well-being. Hence, they more strongly value a sense of community. Self-direction implies that people aim for independent thoughts and actions. Self-direction in combination with universalism suggests people’s reliance on their judgements and their comfort with diversity (Schwartz, 2012). This might be closely associated with the comparatively high ILOC in the societal impact-centered segment, as ILOC also stands for one’s control over life and actions. This notion is supported by the significant positive correlation between self-direction and the ILOC revealed in this study (Table S3).

According to Human Values Theory (Schwartz, 2012), respondents belonging to the hedonic segment can be described by characteristics centered around the self and individual interests—safety, social esteem, prestige, and pleasure—and tradition, which implies the subordination of the self to socially imposed expectations or behavioral

norms. The food value tradition is significantly correlated with the human values traditions, and security, supporting the idea that consumers belonging to the hedonic segment are guided by conservation values in their food choices, which implies a certain resistance to change and a desire to preserve the past. Similarly, the motivation underlying the values of tradition and security is the preservation of existing social arrangements that provide certainty to life. This is also reflected in ILOC, which was significantly lower in the hedonic segment than in the societal impact-centered segment. The correlation between tradition and ILOC was significant and negative (Table S3). To achieve more sustainable food systems, consumers belonging to the hedonic segment need strong communication measures or even regulatory measures to adopt more sustainable consumption practices, as they are less open to change and care about themselves and their individual interests.

The largest segments in both samples are health-/safety-concerned consumers who rate the food values safety and nutrition as extremely important. This finding implies a strong demand for healthy and nutritious foods that must be considered by marketers. However, policymakers should note that consumer demand for safe food must be met through the enhancement of transparency along the entire food supply chain, as well as the enforcement, control, and communication of clear production and processing standards. The fairly strong preferences of societal impact-centered and health-/safety-concerned consumers for organic and local food reveal that organic and local food is perceived as more natural, environmentally friendly, fair, healthier, and safer than conventional food products. This finding corresponds to the results of Lusk and Briggeman (2009), who studied food values in the United States. Regarding human values, consumers belonging to the health-/safety-concerned segment are

TABLE 8 Differences between the price-sensitive segments in 2020 and 2022.

	2020 “price-sensitive”	2022 “price-sensitive”
Age (mean and SD)	47.33 (15.85)	44.75 (15.92)
Gender (female)	44.5% ^a	54.4% ^b
Income (up to 1.500€)	20.6%	15.7%
Purchase mainly organic food (mean and SD)*	2.64 (.88)	2.59 (.95)
Purchase mainly local food (mean and SD)*	3.26 (.75)	3.15 (.82)

Note: Different superscript letters indicate significant differences between groups at $P < .05$. We carried out *t*-tests to determine significant differences for the variables age and organic as well as local food purchases. For the variables gender and income, we conducted a chi-square test.

*These two variables were measured on a five-point Likert scale (from 1 “disagree” to 5 “agree”).

considerably similar to those in the societal impact-centered consumer group, albeit less pronounced. Hence, they also care about the enhancement of others and the welfare of society and nature.

The segment with the strongest growth in size was the price-sensitive segment, in accordance with the overall increase in the importance of food value price. Despite the large increase in size, the segment composition remained considerably similar regarding sociodemographic and behavioral variables (Table 8). The only significant change was an increase in the share of female consumers. Similarly, Charlebois et al. (2018) revealed that female consumers in Canada are more price-conscious in times of fluctuating food prices than male respondents.

The price-sensitive segment is characterized by low ILOC and low life satisfaction, as stated above. Moreover, the human values of universalism and self-direction are less characteristic than in the health-/safety-concerned and societal impact-centered segments, while tradition and security are more pronounced. Similar to those in the hedonic segment, consumers in the price-sensitive segment strive for order and certainty in life, which is reflected in their desire to preserve their past. To encourage consumers to consider sustainable alternatives, it is important to provide them with greater security and stability. The strong feelings of insecurity and lack of control over the outcomes of events in their lives keep them from opening up to change and trying new alternatives.

4 | IMPLICATIONS AND LIMITATIONS

This study revealed that the food value price increased substantially during food price inflation in Germany in

2022 compared to 2020. Similarly, the importance of the food value taste also increased in the same period—these developments occurred at the expense of the importance of societal impact-centered segments. Moreover, we presented four distinct consumer segments in this contribution, which we identified through latent class cluster analyses based on consumers’ relative importance of the 11 food values. Both analyses in 2020 and 2022 revealed considerably similar segments—a health-/safety-concerned segment, which was the largest segment in both years; a societal impact-centered segment, which was the second largest segment in 2020 but the smallest segment in 2022; a price-sensitive segment, which was the second largest segment in 2022; a hedonic segment, which was the smallest segment in 2020 and the second smallest segment in 2022. In light of current planetary challenges, the low relevance of environmental impact, origin, and fairness in food choices is alarming. The results indicate that their relevance has decreased further owing to increasing food prices in Germany. In particular, price-sensitive and hedonic segments show little interest in altruistic motives for food consumption. While the price-sensitive segment needs more stability and security, which can at least partly be achieved through communication measures, the hedonic segment is difficult to reach in terms of increasing sustainable consumption practices. In the hedonic segment, altruistic (or society-centered) motives play a marginal role, indicating that these consumers most likely do not recognize the adverse effects of human actions on the environment and do not feel responsible. The question remains open regarding whether those consumers can be reached through convincing communication materials or whether carefully designed policy measures are more promising in guiding their food choices.



Limitations and future research. Despite delivering interesting new insights, this study has some limitations, which can be translated into recommendations for future research. First, the samples used were not identical. Hence, the changes in food value hierarchies and the sizes of the different segments may be due to the different structures of the sample. A statistical comparison of both samples showed differences in age and income. Moreover, the observed changes cannot be explicitly ascribed to food price inflation because other factors may have also been at play. While the psychographic variables used to characterize the segments—ILOC, life satisfaction, and human values—turned out to be valuable descriptive measures, they were only measured in the second survey; hence, it was not possible to recheck and validate their correlations with food values.

Following these limitations, we recommend conducting more research on the relationships between human and food values, possibly including consumers' revealed preferences or actual food choices, to obtain a more holistic picture. For example, it would be interesting to investigate whether the growing importance of the food value price and the growth of the price-sensitive segment are accompanied by a decrease in the human value security during periods of strong food price inflation. As we only surveyed consumers in Germany (specifically, Bavaria), we recommend conducting the same study in other countries to discover regional and cultural differences. Furthermore, monitoring food values across time would help shed more light on whether food values are more stable measurements, as suggested by theory, or similarly situation- and object-specific as food choice motives, as suggested by some recent research. Continuous monitoring of food values and the corresponding segmentation analyses can support the design of target-specific measures to achieve more sustainable food systems, as suggested by Cerroni et al. (2022). We recommend including acceptance of policy measures in future studies.

The famous Value-Belief-Norm theory implies a causal relationship between values and the New Ecological Paradigm (i.e., "a view that human actions have substantial adverse effects on a fragile biosphere" (Stern et al., 1999, p. 85) and subsequently with the awareness of consequences, the ascription of responsibility, and pro-environmental personal norms. While egoistic values negatively affect other variables, altruistic values have positive effects (Stern et al., 1999). Reflecting on our findings against this background, we may assume that the superior relevance of self-centered, egoistic values will negatively correlate with the view that human food-related actions have adverse effects on the environment and reveal negative relations with all other subsequent elements of the theory, such as the awareness of consequences or the

ascription of responsibility. Nonetheless, further research is necessary to investigate food values in the context of the Value-Belief-Norm theory.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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