

What triggers Gen Z to choose plant-based milk analogues?

Sergio Rivaroli, Roberta Spadoni, Cristina Calvo-Porrall and Jörg Lindenmeier

Abstract

Purpose – This study, grounded in the food choice questionnaire (FCQ), examined the relationship between the attitudes and dietary habits of German Generation Z and their willingness to pay (WTP) for plant-based (PB) milk substitutes.

Design/methodology/approach – An online survey was distributed to 252 German Generation Z consumers. The survey included a FCQ and contingent valuation items, which were used to analyse the impact of consumer traits on WTP for PB milk alternatives using interval regression analysis.

Findings – The study's outcomes upended the initial assumptions regarding what motivates Generation Z in Germany to pay more for PB milk substitutes. Vegans' higher WTP than omnivores can be interpreted as a personal investment in affirming and preserving their "plant-based" identity in the eyes of others.

Originality/value – The research provides fresh insights into the motivations of Generation Z consumers regarding their purchasing intentions for PB milk alternatives, offering valuable managerial guidance.

Keywords Food choice, Plant-based milk analogues, Contingent valuation, Consumer behaviour, Generation Z, Germany

Paper type Research paper

Sergio Rivaroli and Roberta Spadoni are both based at the Department of Agricultural and Food Sciences, Alma Mater Studiorum – Università di Bologna, Bologna, Italy. Cristina Calvo-Porrall is based at the Business Department, Faculty of Economics and Business, University of A Coruna, A Coruna, Spain. Jörg Lindenmeier is based at the Department of Management, University of Freiburg, Freiburg, Germany.

Received 28 February 2025
Revised 11 November 2025
Accepted 14 December 2025

© Sergio Rivaroli, Roberta Spadoni, Cristina Calvo-Porrall and Jörg Lindenmeier. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <https://creativecommons.org/licenses/by/4.0/>

Declaration of competing interest: The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

1. Introduction

The surge in interest in alternative foods stems from the need to provide nutritious and sustainable food sources to support the rapidly growing global population. Plant-based (PB) dairy substitutes, also known as "alternative milk", "non-dairy milk", "vegan milk", "milk analogues" or "milk substitutes" (Leialohilani and de Boer, 2020; Ramsing *et al.*, 2023), rooted in various cultural traditions, are now attracting renewed interest, leading to rapid market growth (Jeske *et al.*, 2018). While PB meat substitutes have garnered significant academic and commercial interest, PB milk analogues have quietly become the main driver of this market's growth, with the European PB milk segment leading the category in both sales volume and consumer penetration (Nils-Gerrit, 2024a). The PB milk substitutes market in the EU-27 was valued at nearly €3.15bn in 2024 and is expected to grow steadily, reaching €5.63bn by 2029 (Nils-Gerrit, 2024a). In 2023, the average EU-27 citizen consumed three one-litre packs of PB alternative milk per capita. By 2029, European consumption is projected to exceed five 1-L packs per capita (STATISTA, 2024). Clay *et al.* (2022) noted that this trend may be linked to the rising flexitarian dietary pattern, in which individuals intentionally reduce their meat and dairy intake for environmental, ethical and health reasons. In 2023, Germany was the largest market for PB milk substitutes among the EU-27, generating €749m in revenue (STATISTA, 2024). Given the ever-increasing consumption of PB vegan milk and its significance for revenue generation, the PB milk analogues industry must explore consumer behaviour and focus on the motivations and perceptions surrounding their products to develop a suitable assortment and marketing strategies. Considering the highly competitive nature of these beverages, industries focus

on identifying specific consumer targets that offer the opportunity to gain a real competitive advantage. Generation Z (born 1995–2010) constitutes an appealing consumer target for PB food and beverages due to their pronounced attitude towards alternative dairy proteins, preference for superior dietary quality associated with organic, local and sustainable food consumption (Pelletier *et al.*, 2013), and their open-minded disposition towards new products. Therefore, understanding Generation Z consumers' perceptions of PB milk alternatives is vital to increasing the acceptance of these beverages, especially given that young consumers demonstrate higher rates of PB acceptance and greater consumption frequency (Ammann *et al.*, 2023; Giacalone *et al.*, 2022; Raptou *et al.*, 2024).

Despite the rapid growth of the PB milk market across Europe, scholarly understanding of the behavioural mechanisms affecting consumers' willingness to pay (WTP) for PB milk analogues remains limited. Existing research has mainly concentrated on product attributes and nutritional comparisons, with little known about the attitudinal and psychological drivers – such as perceptions of healthiness, naturalness, ethical concerns or sensory acceptability – that shape young consumers' valuation of PB milk. Furthermore, within the behavioural economics literature, there is an increasing recognition that food choices are not solely rational price–quality trade-offs but are deeply rooted in social identity and moral self-expression, especially among Generation Z consumers (Jakubowska *et al.*, 2024; Jeżewska-Zychowicz *et al.*, 2024). Among these motivations, some are especially relevant to PB milk. Health and weight control reflect instrumental motives related to the expectation of physical and nutritional benefits (Beacom *et al.*, 2022; Ivanova *et al.*, 2021; Miki *et al.*, 2020; Ramsing *et al.*, 2023). Natural content and ethical concerns refer to moral and identity-based motives that behavioural economics links to warm-glow and self-signalling mechanisms, through which individuals gain satisfaction from acting in line with their ethical or environmental values (Bénabou and Tirole, 2011; Iweala *et al.*, 2022). Sensory appeal captures the hedonic aspect of consumption, influencing experienced utility through taste and texture (Moss *et al.*, 2022, 2023). Convenience reduces time and cognitive effort – two key elements of bounded rationality (Su *et al.*, 2024). Finally, price acts as a reference-dependent cue, shaping perceived fairness and value and affecting the anchoring of WTP judgements (Su *et al.*, 2024). Nonetheless, few studies have examined how these non-monetary motives translate into economic behaviours, such as WTP for sustainable alternatives.

Based on what was mentioned above, our guiding research question is:

RQ1. Which attitudes and dietary habits of German Generation Z might influence the economic appreciation for PB milk alternatives?

To fill this gap, this research enhances our understanding of consumer behaviour by integrating psychometric assessments of food choice motivations with stated-preference techniques. By combining Steptoe *et al.* (1995) food choice questionnaire (FCQ) with the contingent valuation method (CVM), we reveal how specific core motivations – such as dietary habits – influence German Gen Z's WTP for PB milk analogues, while others do not. Thus, although prior research has typically examined food choice motives and economic valuation separately, our integrated approach connects these elements, offering a more comprehensive framework for analysing sustainable food consumption. Thus, this study contributes to the existing literature and provides insights and best-practice recommendations for marketing managers.

Given the distinct sensory characteristics and functions of PB foods and beverages within individuals' dietary frameworks, this study contributes to the existing literature by clarifying the motivations affecting German Generation Z consumers' WTP for PB alternatives to dairy milk. The focus on German Generation Z, in turn, provides meaningful context for this analysis. Germany, in fact, is the largest European market for PB milk, with a population highly engaged in sustainability debates and alternative food innovations. Generation Z, on

the other hand, is a group whose consumption choices are heavily influenced by social identity, peer norms and digital trends (Brand *et al.*, 2022; PwC DE, 2020). Their decisions often reflect moral and environmental values rather than just practical considerations. Therefore, studying German Generation Z offers a valuable opportunity to understand how health, ethical and identity motives are internalised and affect WTP for PB milk substitutes in a market where sustainability has become a core value.

The paper is organised as follows. The reviews of the relevant literature on food choice motivations for PB milk analogues and the development of the research hypotheses are described in Section 2. The research method adopted in this study is described in Section 3, while Sections 4 and 5 present and discuss the findings. Managerial implications and limitations in Section 6.

2. Literature review and hypotheses development

Among different approaches to investigating consumers' drink product choices, the FCQ examines the attitudes behind these choices. Validated across various European countries, the FCQ comprises 36 items spanning nine dimensions: health, mood, convenience, sensory acceptability, naturalness, price, weight control, familiarity and ethical concerns. Each dimension includes 3–6 items, which respondents rate on a four-point scale related to their daily food and beverage decisions, despite some studies using different point scales with comparable endpoints, as noted by Dowd and Burke (2013) and others.

After discussing the relevance of examining how the motives for choosing PB milk substitutes are reflected in Generation Z's WTP, the FCQ dimensions were analysed in light of the existing literature on consumers' attitudes towards PB milk analogues and the related research hypotheses formulated. Consumers' attitudes towards PB milk analogues can be assessed through a hypothetical market simulation using a stated preference method. Despite the disparity between consumers' intentions and actions noted in the literature (Ajzen *et al.*, 2004), this study used the WTP measured in hypothetical scenarios to estimate the underlying inclination of consumers to purchase PB milk analogues rather than to gauge the maximum price participants are willing to pay for one litre of this beverage.

2.1 Sensory acceptability

One significant barrier to consumers' acceptance of PB milk substitutes is their lower sensory acceptability compared with consumers' expectations for their direct animal counterparts (Jaeger and Giacalone, 2021; McClements, 2020). Previous studies highlighted the reduced consumers' palatability of PB milk analogues (Alcorta *et al.*, 2021; Jaeger *et al.*, 2024; Jaeger and Giacalone, 2021) due to their flavour, mouthfeel and colour divergence compared to dairy milk (Cardello *et al.*, 2022; Lipan *et al.*, 2021; Moss *et al.*, 2022; Vaikma *et al.*, 2021). Despite differences in sensory consumers' acceptability of PB milk substitutes, the ways PB vegan milk industries have adopted to improve palatability and mouthfeel include adding sugar, salt, stabilisers and emulsifiers to such an extent that, in some cases, this modifies the nutritional value. Based on these, the following hypothesis is proposed:

- H1. Sensory acceptability has a positive influence on the willingness to pay of German Generation Z consumers for PB milk analogues.

2.2 Healthiness, weight control and naturalness

Another major issue in the discussion about PB vegan milk is the lack of nutritional equivalents to dairy milk. Clark *et al.* (2022) noted that many health-care professionals argue that dairy products have a higher nutritional value than PB milk analogues. Although dairy milk is considered a top source of relevant macronutrients (i.e. carbohydrates, fats

and protein) and naturally contains essential micronutrients (Schuster *et al.*, 2018; Vanga and Raghavan, 2018), it has come under media inquiry regarding the potential adverse health effects, especially for those with allergies or intolerances (Michaëlsson *et al.*, 2014, 2017; Noreen, 2024; Yvette, 2023). Chollet *et al.* (2014) found that older Swiss adults believe that full-fat dairy products increase body weight and cholesterol levels. According to Giacalone *et al.* (2022), consumers who prioritise health over taste view PB vegan milk as a suitable substitute for dairy milk due to its appealing health benefits. Among them, a high intake of polyunsaturated fats and minimal intake of saturated fats may reduce the risk of cardiovascular disease and obesity (Chen *et al.*, 2016).

Moreover, the high vitamin E concentration in PB milk alternatives may help protect against cancer-promoting free radicals (Chalupa-Krebzdak *et al.*, 2018). However, given the nutrient deficiencies in PB vegan milk, particularly vitamin B12, minerals, essential amino acids and fatty acids (Mohd Zaini *et al.*, 2023), it is often fortified with nutrients and supplements, which might lead consumers to perceive it as less natural than dairy milk and more processed or artificial. Therefore, the relevant hypotheses are formulated as follows:

- H2. Healthiness perception positively influences the willingness to pay of German Generation Z consumers for PB milk analogues.
- H3. Weight control credence positively influences German Generation Z consumers' willingness to pay for PB milk analogues.
- H4. The perception of naturalness has a positive influence on the willingness to pay of German Generation Z consumers for PB milk analogues.

2.3 Convenience

According to Costa *et al.* (2007), convenience – the time and effort consumers spend buying or using a particular product – is an essential driver of food choice. In this study, convenience can also be conceived as the ability of a PB analogue beverage to behave like dairy milk when added to hot drinks, such as coffee, or when used in cooking. Thus, this aspect is closely related to the physicochemical properties of the PB milk analogues. Mohd Zaini *et al.* (2023) signalled the relevance of this aspect for the success of any PB milk substitute. Su *et al.* (2024), in their study on consumers' preferences and attitudes towards PB milk, suggest that consumers tend to prioritise purchase convenience – defined as purchasing and integrating PB milk analogues into daily dietary practices – as one of the main drivers of choice for these beverages. In this case, the authors consider purchase convenience a multifaceted aspect influenced by three main aspects: purchasing venues, distance and distribution channels. Against this backdrop, we proposed the following hypothesis:

- H5. Convenience perception positively impacts German Generation Z consumers' willingness to pay for PB milk analogues.

2.4 Price

The PB vegan milk sector stands out because its products are more expensive than traditional dairy milk, which may discourage consumers from purchasing them (Su *et al.*, 2024). Rombach *et al.* (2023), in their study of drivers and inhibitors of consumers' WTP for PB milk alternatives, report that food curiosity and food price inflation are the relevant drivers for both willingness to buy and WTP a premium price for these beverages. Similarly, Meixner *et al.* (2024) refer to Gen Z consumers, noting that price is one of the most crucial attributes when choosing PM milk analogues. Similarly, Elzerman *et al.* (2013) identified the price attribute as the most significant barrier to purchasing PB milk analogues. The study by Moss *et al.* (2022), which evaluates consumer attitudes towards PB alternatives to dairy

milk, confirms what was mentioned earlier: Canadian consumers are concerned about the price of PB vegan milk, its sensory properties and the raw materials used. Thus, against this backdrop, the following hypothesis was proposed:

- H6. The price of PB milk analogues negatively affects the willingness to pay of German Generation Z consumers for them.

2.5 Emotion and familiarity

Emotional reactions to food products play a significant role in consumer behaviour choice and WTP. However, despite the importance of this factor, the emotions raised in consumers by PB milk alternatives have not yet been studied extensively (Cardello *et al.*, 2022; McCarthy *et al.*, 2017). McCarthy *et al.* (2017) found that emotional responses to dairy milk and PB milk analogues did not differ, and that consumers associated different emotions with different PB milk alternatives. Jaeger and Giacalone (2021) observed that PB milk variants are primarily related to negative emotions, likely due to the stigma attached to the less appealing early products that the new PB vegan milk products still carry. In agreement with Jaeger and Giacalone (2021), Moss *et al.* (2022) found that negative emotions are associated with some PB milk alternatives (particularly cashew milk), likely due to consumers' unfamiliarity with the products. Given that mood can be considered a more diffuse, longer-lasting and generally milder emotion, the following hypotheses were formulated:

- H7. Positive mood positively impacts German Generation Z consumers' willingness to pay for PB milk analogues.
- H8. Product familiarity positively impacts German Generation Z consumers' willingness to pay for PB milk analogues.

2.6 Dietary habits

One of the main determinants of growth in PB milk analogue consumption is the growing popularity of PB diets worldwide, such as veganism, vegetarianism and flexitarianism (Basu *et al.*, 2024; WHO, 2021), which leads consumers to reduce their meat intake. The vegetarian diet excludes meat and emphasises PB foods such as cereals, vegetables, fruits, legumes, nuts and seeds. Differently, vegan diets are more restrictive than vegetarian diets, as they exclude animal products such as eggs and dairy. Instead, while favouring a PB diet, a flexitarian diet does not exclude meat or fish, even in moderation. Among all motivations for vegetarianism and veganism, the perception of health benefits is the primary reason for switching to these diets (Fehér *et al.*, 2020). Thus, vegans, vegetarians and flexitarians are more significant target groups of PB milk analogue consumers than omnivorous ones. Hence, the following hypothesis was formulated:

- H9. An omnivorous pattern diet negatively impacts the willingness to pay of German Generation Z consumers for PB milk analogues.

2.7 Ethical issues

As highlighted by Haas *et al.* (2019), ethical concerns are among the significant issues putting milk production under increased consumer scrutiny. Beyond environmental anxiety, animal welfare, the suffering of animals in farming and animal rights, these factors are crucial in motivating individuals to adopt PB diets (Janssen *et al.*, 2016). According to Leary *et al.* (2023), aligning food choices with ethical consumption goals may encourage people to choose non-dairy PB alternatives. Furthermore, Halme *et al.* (2023) and McCarthy *et al.* (2017) noted that halting animal mistreatment significantly incentivises the consumption of PB milk alternatives. Therefore, we propose the following hypothesis:

H10. Ethical concerns positively impact German Generation Z consumers' willingness to pay for PB milk analogues.

3. Methods

3.1 Data collection

This study targeted German Generation Z consumers of PB milk substitutes. An online survey explored the motivations and obstacles to WTP among Generation Z consumers for PB alternatives to dairy milk. The cover letter provided instructions for completing the survey and explained the privacy and confidentiality of the collected data. People aged 13–28 years, residents of Germany who gave informed consent to participate in the survey, and who consumed PB vegan milk at least once per week were eligible to participate. A market research company in Germany provided access to an online consumer panel and managed the recruitment process, ensuring as much gender comparability as possible. The online survey took place between January 2023 and February 2023.

An a priori power analysis was performed using G*Power 3.1 to determine the minimum sample size needed for the regression analyses. Since interval regression is unavailable in G*Power, we estimated power with the test “Linear multiple regression: Fixed model, R^2 deviation from zero” (F -test), assuming a medium effect size ($f^2 = 0.15$), an α level of 0.05 and a desired statistical power of 0.80. With 11 predictors (i.e. motives, dietary identity and P_0), the analysis suggested a minimum sample size of $n = 123$ participants. Due to potential data exclusions, a larger sample was targeted to ensure adequate statistical power.

A small target population (30 Generation Z consumers of PB milk analogues) was recruited to pre-test the German-language questionnaire. The first part of the final version of the questionnaire included item batteries on participants' socio-economic profile (e.g. gender, education, occupational status), frequency of consumption of PB milk analogues and eating habits. Following [De Backer and Hudders \(2015\)](#) approach, respondents were asked to indicate their eating habits by adopting a list of nine alternatives: full-time meat eater (1), flexitarian (2), pollotarian (3), pescatarian (4), macrobiotic consumer (5), lacto-ovo vegetarian (6), lacto-vegetarian (7), ovo-vegetarian (8) and vegan (9). These alternatives were grouped into five categories: “Omnivores” (alternative 1); “Flexitarians” (alternatives 2, 3 and 5), i.e. people whose diets are primarily vegetarian but include meat, dairy, eggs, poultry and fish on occasion or in small quantities ([World Health Organization, 2021](#)); “Pescatarians” (alternative 4), i.e. people whose diets include fish, dairy and eggs, but not meat; “Vegetarians” (alternatives 6, 7 and 8), i.e. people where diets exclude meat, poultry and fish; “Vegans” (alternative 9), i.e. people where diets omit all animal products, including meat, dairy, fish, eggs and (usually) honey. The second and third parts of the survey contained item batteries for eliciting WTP responses using the CVM and assessing consumers' attitudes towards PB vegan milk using a modified version of the [Steptoe et al. \(1995\)](#) FCQ items, respectively.

3.2 Participants

To ensure the reliability of our data set, we implemented several quality control procedures. Participants who failed attention checks, provided incomplete responses or exhibited implausibly short completion times were excluded. These procedures ensure that the final data set comprises valid and reliable observations suitable for statistical analysis. A total of 252 Germans (50.4% female) participated in the survey. The survey samples were not nationally representative but were diverse across education and

occupational fields (Table 1). Dietary habits varied, with omnivores and flexitarians being the dominant.

3.3 Procedure

Participants were informed that the study aimed to investigate the relationship between Generation Z's attitudes and their WTP for PB milk substitutes. After introducing the research aim, a hypothetical market simulation was conducted to assess consumers' WTP for PB vegan milk using a stated preference approach. Despite criticism of the CVM approach for its hypothetical responses, which often overestimate WTP (Lusk and Schroeder, 2004), recent literature indicates that biases are less significant for low-priced private goods (Vecchiato et al., 2021), such as PB milk substitutes per litre. Among the CVM techniques for eliciting the WTP, this study adopted the Double-Bounded Dichotomous Choice method due to its efficiency in estimating WTP (Hanemann et al., 1991). After this step, the participants completed a revised version of Steptoe et al. (1995) FCQ to characterise their attitudes towards PB milk analogues.

3.3.1 Eliciting willingness to pay response. The bidding process consisted of two consecutive price questions (Q1 and Q2) that established the upper and lower limits of the respondents' WTP. During Q1, participants were asked whether they were WTP for 1 litre of their preferred PB milk substitute at an initial bidding price of P_0 . The study randomly selected P_0 from PB vegan milk's price-per-litre values, which ranged from €1.35 to €3.50, based on STATISTA data for 2023, which reported an average retail price of €2.21 per litre (Nils-Gerrit, 2024b).

A premium price (Q2. "Are you willing to pay P_h ?", where $P_h > P_0$ and $P_h = 1.5 P_0$) or a discounted price (Q2. "Are you willing to pay P_l ?", where $P_l < P_0$) of 50% of the initial bid was considered for the second bidding process in Q2. In Q1 and Q2, respondents were asked to indicate "yes" or "no" for each bidding price, indicating their intent to purchase. Therefore, participants' responses led to four outcomes:

Table 1 Sample description ($n = 252$)

Data collected	N	%
<i>Sex</i>		
Male	125	49.60
Female	127	50.40
<i>Age group (years)</i>		
Min	19	
Max	27	
Median	23	
<i>Education level</i>		
University	187	71.21
High school	49	19.44
Middle school	9	3.57
None	7	2.78
<i>Occupational status</i>		
Employed full-time	165	65.48
Looking for work	32	12.70
Student	55	21.82
<i>Dietary status</i>		
Omnivores	103	40.87
Flexitarians	113	44.84
Pescitarians	7	2.78
Vegetarians	22	8.73
Vegans	7	2.78

1. the respondent is not willing to buy one litre of their preferred PB milk analogue at the initial price (P_0) and does not want to buy it even at the discounted price P_l , where $P_l = (P_0/2)$ (i.e. they say “no” in Q1 followed by “no” in Q2);
2. the respondent is not willing to purchase one litre of their preferred PB milk analogue at the initial price (P_0), but it is willing to purchase it at the follow-up bid (P_l) (i.e. “no” followed by “yes”);
3. the respondent is willing to buy one litre of their preferred PB milk analogue at the initial bidding price (P_0) but is not willing to buy it at the premium price P_h , where $P_h = (P_0 \times 1.5)$ (i.e. “yes” followed by “no”); and
4. the respondent is willing to purchase one litre of their preferred PB milk analogue at the initial bidding price (P_0) and is willing to buy it at the follow-up bid P_h (i.e. “yes” followed by “yes”).

Thus, the respondent's WTP for one litre of their preferred PB milk analogue will fit into one of four intervals: $(0; P_l)$, (P_l, P_0) , (P_0, P_h) and $(P_h, +\infty)$, and the discrete outcomes of the bidding process (D) are defined as follows:

$$D = \begin{cases} 1 & WTP \leq P_l & (\text{No} - \text{No responses}) \\ 2 & P_l \leq WTP \leq P_0 & (\text{No} - \text{Yes responses}) \\ 3 & P_0 \leq WTP \leq P_h & (\text{Yes} - \text{No responses}) \\ 4 & P_h \leq WTP & (\text{Yes} - \text{Yes responses}) \end{cases} \quad (1)$$

Thus, the survey data were classified as left-censored for “No-No” responses, right-censored for “Yes-Yes” responses and interval-censored for “No-Yes” and “Yes-No” responses.

3.3.2 Eliciting willingness to pay determinants. The interviewees completed a revised version of [Steptoe et al. \(1995\)](#) FCQ to describe their attitudes towards PB vegan milk. The effectiveness of FCQ endorses the use of this tool to evaluate nine factors that influence customers' attitudes: health, mood, convenience, sensory acceptability, naturalness, price, weight control, familiarity and ethical concerns about PB milk substitutes. The modified version adopted here contains 36 statements from the original 36-item FCQ ([Table 2](#)). The questions' motives were evaluated on a seven-point Likert scale, going from 1-Strongly disagree to 7-Strongly agree, and were introduced using the sentence “It is important to me that the PB milk analogue I drink during a typical day [...]”. Items were randomised to prevent any potential order effects, ensuring the interviewee did not perceive the specific food choice motives being investigated.

3.4 Empirical model and data analysis

We assumed that each respondent i had a WTP for one litre of their preferred PB milk alternative product (WTP_i^*), which is the latent variable in [equation \(2\)](#) below:

$$WTP_i^* = \beta X_i + \varepsilon_i \quad (2)$$

where β is a vector of coefficients, X_i is a vector of the WTP determinants (i.e. food choice motives and dietary styles) and the error term ε_i is assumed to have a mean of zero and be normally distributed. Thus, WTP_i^* is unobserved. Still, it remains within the range of the lower bound (L_i) to the upper bound (U_i), consistent with the right-censored and interval-censored data collected. If a respondent has a “Yes-No” response, the probability of the true WTP $\subset [P_0, P_h]$ could be represented by [equation \(3\)](#):

$$Pr(P_0 \leq WTP \leq P_h) \quad (3)$$

Table 2 Adapted FCQ's structure (*n* = 252)

<i>Factor and item no.</i>	<i>Median</i>
<i>Factor 1 – Health</i>	
22. It is enriched with vitamins and minerals	5
29. Keeps me healthy	6
10. Is nutritious	6
27. Is high in protein	5
30. Is good for my skin/teeth/hair/nails etc	5
9. Is high in fibre and roughage	5
<i>Factor 2 – Mood</i>	
16. Helps me cope with stress	5
34. Helps me to cope with life	5
26. Helps me relax	5
24. It intrigues me in some way ^a	5
13. Makes me happy ^a	5
31. It helps me keep a fulfilling lifestyle ^a	5
<i>Factor 3 – Convenience</i>	
1. It can be used in the preparation of other food ^a	5
15. Is easy to heat ^a	5
28. Does not require to be shaken before use ^a	4
35. Can be bought near where I study/live/work ^a	6
11. Is easily available in shops and supermarkets	6
<i>Factor 4 – Sensory Appeal</i>	
14. Smells nice	5
25. Looks nice	5
18. Leaves a good sensation on the palate ^a	5
4. Tastes good	6
<i>Factor 5 – Natural Content</i>	
2. Contains no additives	5
5. Contains natural ingredients	6
23. Contains no artificial ingredients	5
<i>Factor 6 – Price</i>	
6. Is not expensive	5
36. Is on sale ^a	4
12. Is good value for money	6
<i>Factor 7 – Weight Control</i>	
3. Is low in calories	5
17. Helps me control my weight	5
7. Is low in sugar ^a	5
<i>Factor 8 – Familiarity</i>	
33. Is what I usually consume ^a	5
8. Is made with ingredients familiar to me ^a	5
21. It tastes the same as the first plant-based milk I tested ^a	5
<i>Factor 9 – Ethical Concern</i>	
20. Comes from countries I approve of politically	5
32. Has indicated the country of origin of the raw materials used ^a	5
19. Is packaged in eco-compatible containers ^a	5
Note(s): ^a Item modified	

whereas if the respondent has a “Yes-Yes” response, the probability of the true $WTP \in [P_h, \infty]$ is:

$$Pr(P_h \leq WTP) \quad (4)$$

The same rule can be applied to the other two WTP values in interval data, referred to as “No-Yes” and “No-No” responses. Since the dependent variable WTP is in the interval and

involves (right/left) censored data, the information collected through the double-bounded contingent valuation online survey was analysed using an interval regression model (Cawley, 2008) in STATA 18 (StataCorp LLC, 2024) via the interval regression command “intreg” to estimate the factors influencing the WTP of German Generation Z consumers for PB milk analogues. The initial bidding price (P_0) was incorporated into the empirical model to detect bias from the anchoring effect, and the category “Omnivores” was used as the reference for the “Dietary habits” variable.

Data cleaning was performed to delete answers with missing values. To encompass the dimensions of the PB milk analogues’ WTP determinants, the properties of the revised version of Steptoe *et al.* (1995) FCQ were assessed using the “validscale” command in STATA (Perrot *et al.*, 2018). Internal consistency and scalability were evaluated using Cronbach’s α and Loevinger’s H coefficients (Loevinger, 1948); the acceptable thresholds were 0.70 for Cronbach α and 0.30 for Loevinger H . Construct validity was tested using confirmatory factor analysis and goodness-of-fit indices, whereas the adequacy of the statistical model was assessed using root mean square error of approximation (RMSEA) and the comparative fit index (CFI). An RMSEA < 0.06 and a CFI > 0.90 are generally considered to indicate a good fit. The z-scores for each dimension, resulting from the factor analysis of the FCQ that considered only the remaining items, were used in the interval regression analysis alongside the initial bidding price (P_0) to test the anchoring effect and the relationship between their dietary habits profile and the initial bidding price (P_0). To illustrate the relative importance of the WTP determinants, we apply the Shorrocks-Shapely decomposition analysis to the R -squared statistics obtained after conducting ordinary least squares regression using a WTP midpoint value.

4. Results

4.1 Validation of food choice questionnaire dimensions in the German context

Internal consistency and scalability were insufficient to consider all nine original dimensions of FCQ’s model. Cronbach α of some dimensions were <0.70, specifically for familiarity (0.62) and ethical concern (0.69), and after the inspection of the Loevinger’s H values of each constituted item (≥ 0.3) and the associated Cronbach’s α after removing them, the two dimensions were removed by the analysis due to their unreliability. Again, one item about the Convenience dimension was removed to enhance the α coefficient ($H_{28}^{Convenience}=0.22$). The validation of the dimensions based on Likert-scale responses from the German sample is presented in Table 3. The RMSEA (0.050) and CFI (0.910) indicate an acceptable fit of this seven-dimensional modified FCQ.

4.2 Willingness to pay determinants

Table 4 presents the results of the interval regression analysis. The evident anchoring effect ($p < 0.01$) may be attributed to respondents anchoring their WTP to the first bid presented by interviewers they perceived as trustworthy, rather than to ambiguity or limited familiarity with the valued scenarios.

Table 3 Validity and reliability tests on constructed latent dimensions ($n = 252$)

Factors	No. of items kept	Cronbach’s alpha (≥ 0.7)	Loevinger’s H (≥ 0.3)
Factor 1 – Health	6	0.83	0.44
Factor 2 – Mood	6	0.77	0.33
Factor 3 – Convenience	4	0.78	0.47
Factor 4 – Sensory appeal	4	0.74	0.39
Factor 5 – Natural content	3	0.71	0.42
Factor 6 – Price	3	0.73	0.43
Factor 7 – Weight control	3	0.71	0.42

Table 4 Determinants of respondents' WTP (interval regression outcomes; $n = 252$)

Variables	Hypotheses	β	(SE)	p-value
Factor 1 – Health	H2	-0.020	0.129	0.874 ^b
Factor 2 – Mood	H7	0.049	0.109	0.653 ^b
Factor 3 – Convenience	H5	-0.054	0.127	0.671 ^b
Factor 4 – Sensory appeal	H1	-0.094	0.120	0.433 ^b
Factor 5 – Natural content	H4	0.085	0.108	0.432 ^b
Factor 6 – Price	H6	-0.105	0.102	0.301 ^b
Factor 7 – Weight control	H3	0.090	0.103	0.381 ^b
Factor 8 – Familiarity	H8	–	–	–
Factor 9 – Ethical concern	H10	–	–	–
Dietary habits	H9			0.089 ^c
– Omnivore ^a		–	–	–
– Flexitarian		0.133	0.151	0.378
– Pescatarian		0.577	0.451	0.201
– Vegetarian		0.197	0.266	0.460
– Vegan		1.189***	0.459	0.010
Anchoring effect (P_0)		0.759***	0.119	0.000
Sigma		1.002	0.063	

Note(s): *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$; ^areference category; ^bhypothesis rejected; ^chypothesis accepted

The nine determinants of consumers' WTP for PB milk alternatives accounted for 32.1% of the total variance. Of this, 65.78% was attributed to P_0 ($\%R^2 = 52.09\%$, $= 0.759$, p -value = 0.000) and the determinant of "Dietary habits" ($\%R^2 = 13.69\%$, p -value = 0.089), both of which significantly influence Generation Z's WTP for one litre of PB milk analogues. Generation Z consumers who adopt a vegan lifestyle are generally more willing to pay for one litre of PB milk analogue than omnivores ($\beta = 1.189$, $p = 0.010$). Only the coefficients for "Mood" ($\%R^2 = 0.87\%$), "Natural content" ($\%R^2 = 5.21\%$), and "Weight control" ($\%R^2 = 7.59\%$) were positive, suggesting a potentially positive relationship with WTP. However, the impact of these determinants was not statistically significant ($p > 0.1$). Therefore, this result should be interpreted with caution.

5. Discussions

Our study explored the relationship between food choice attitudes and dietary habits among German Generation Z regarding their WTP for PB milk substitutes, thereby contributing to the academic literature on PB food choices.

Contrary to our expectations, a significant relationship between sensory acceptability and Generation Z consumers' WTP was not observed despite its positive magnitude. Suggestive but insufficient evidence supports $H1$, which posits that sensory acceptability could significantly and positively influence consumers' WTP for one litre of PB milk substitutes. This result may indicate that Generation Z consumers do not necessarily consider the relevance of sensory aspects or make sensory comparisons between PB milk substitutes and their animal counterparts during the purchasing process (Cardello *et al.*, 2022; Jaeger and Giacalone, 2021; Moss *et al.*, 2022). This finding can be interpreted through the perspective of Akerlof and Kranton (2000) identity-based utility function and Kahneman's (2011) dual-process models of decision-making. For this cohort, purchasing decisions may be less influenced by hedonic or sensory evaluation (i.e. emotional and intuitive systems) and more by normative or identity-consistent motives (i.e. more deliberative and rational), such as expressing environmental concern or engaging in socially responsible consumption. In this context, the perceived alignment of PB milk alternatives with sustainable and ethical principles may have a greater impact on WTP than sensory factors. The result, therefore, reflects a shift from taste-based to value-based utility,

consistent with recent evidence on identity signalling in sustainable food choices (Akerlof and Kranton, 2000).

Though it has predicted a positive correlation between healthiness and weight control as drivers of Generation Z consumers' WTP for one litre of PB vegan milk, we have found that this correlation does not exist, rejecting *H2* and *H3*. Unlike what was asserted by Chen *et al.* (2016) and Giacalone *et al.* (2022), for German Generation Z, the PB milk substitutes do not offer sufficient health benefits to justify consumers' decision to purchase them. The reasons healthiness and weight control are not significant drivers of PB vegan milk choice are that actual choices may be influenced more by immediate, tangible factors, such as product price (i.e. P_0 in our study) and dietary habits and familiarity (Aldridge *et al.*, 2009). As posited by Aldridge *et al.* (2009) in their research on the role of familiarity in dietary choices, unfamiliar foods or the introduction of a novel food into traditional dietary habits can provoke consumers' suspicion, leading to reluctance towards the new product. Our outcomes align with this evidence, which suggests that, contrary to our expectations, health and weight-control concerns are secondary to other factors in Generation Z consumers' choices of alternative milk. This finding can be interpreted through the lens of present-biased preferences (O'Donoghue and Rabin, 2015). In our study, German Generation Z consumers might undervalue long-term health benefits compared to immediate, tangible factors such as price and familiarity, demonstrating a time-inconsistent evaluation typical of everyday food choices. Thus, German Generation Z's PB milk consumers tend to prioritise immediate satisfaction and familiar consumption habits over delayed or abstract benefits.

Contrary to the hypothesis, the perception of naturalness does not significantly influence the WTP of the German interviewees, thereby rejecting *H4*. These results can be attributed to interviewees' belief that processed and/or fortified foods, such as PB vegan milk, are not as natural as animal milk, which, in turn, arouses scepticism. According to Aldridge *et al.* (2009), scepticism can stem from a feeling of "not knowing", which fosters suspicion and a tendency towards distrust. This can lead to a contrasting reaction to the stimuli presented to the consumer regarding the naturalness of a product. From the perspectives of the authenticity perception and ambiguity aversion (Rozin, 2006), when confronted with products perceived as highly processed or technologically modified, consumers may experience cognitive dissonance between the ethical or environmental appeal of PB milk alternatives and their preference for what feels "natural".

Contrary to the hypothesis, there is insufficient evidence to conclude that convenience perception positively affects German Z consumers' WTP for PB milk analogues; thus, *H5* is rejected. Despite research suggesting that convenience is a relevant driver of food choices (Mohd Zaini *et al.*, 2023; Su *et al.*, 2024), it was not the most significant driver of WTP, compared with factors such as safety and taste (Lusk and Briggeman, 2009). A potential motivation may stem from the observation that consumers who prioritise naturalness and freshness often avoid convenient food products, even when these could save time (Visschers *et al.*, 2013).

Contrary to our expectations, although the negative magnitude leaves some room for considering that the price of PB milk analogue adversely affects German Generation Z consumers' WTP for one litre of this beverage, there is no evidence to support *H6*. This indicates that market-driven factors do not significantly influence German Generation Z consumers' WTP; instead, it is a subjective construct shaped by individuals' perceived value of a product, influenced by personal preferences and external cues, which serve as reference points for interviews (i.e. P_0). This outcome can be understood through the lens of the reference-dependent preferences perspective (Kőszegi and Rabin, 2006, among others). Instead of judging price on an absolute term, German Generation Z consumers might compare it to an internal or external reference point, such as the price of dairy milk or their expectations about "premium" sustainable products. The weak price sensitivity among German Generation Z consumers may therefore indicate that WTP for PB milk substitutes

is influenced more by psychological valuation and identity alignment than by traditional price-based utility.

Regarding the influence of mood on German Generation Z consumers' WTP for PB vegan milk, although the effect was positive, no significant relationship was observed among Germans, thereby rejecting *H7*. This finding can be interpreted through the lens of the affect heuristic (Slovic *et al.*, 2002) and dual-process theory (Kahneman, 2011) perspectives. While affective states often bias judgements by simplifying complex evaluations into "good–bad" feelings (Slovic *et al.*, 2002), Generation Z German consumers may rely more on deliberative (i.e. Kahneman's System 2) processing when assessing functional and ethical product attributes. Moreover, the absence of a significant mood effect may reflect emotional saturation or normative desensitisation due to repeated exposure to emotionally charged sustainability messages, which may reduce their marginal impact on decision-making. From a behavioural perspective, WTP for PB milk analogues among German Generation Z consumers appears to be influenced more by cognitive reasoning (e.g. identity and values) than by fleeting emotional states, aligning with evidence that value-driven consumers demonstrate greater resistance to affect-based persuasion factors. Thus, this outcome suggests that German Generation Z consumers are not notably responsive to the positive emotional triggers and cues marketers use, such as mood-enhancing visuals, experiences or branding, which aim to encourage them to spend money on acquiring PB vegan milk by influencing their mood.

Unlike our initial theoretical framework, familiarity and ethical concerns are two factors excluded from the analysis for parsimony, leaving us neither able to accept nor reject *H8* and *H10*. From a behavioural economics perspective, it suggests that German Generation Z consumers' WTP for PB milk analogues is influenced more by contextual preferences rooted in habit and situational cues (Akerlof and Kranton, 2000). Thus, despite the need for further investigation to verify the motivations behind the exclusion of these two food choice drivers, our samples seem to reflect a population of "reflexive consumers" who are engaged with more general cultural norms than the "ethical consumer", who instead feels a sense of responsibility towards society regarding the ethical consequences of their purchasing behaviour (Vermeir and Verbeke, 2006).

According to the hypothesis, in line with Clay *et al.* (2022) outcomes, German vegans are more willing to pay than omnivores for PB vegan milk, confirming that they are a significant target group for this beverage.

6. Conclusions

No previous studies have investigated the influence of food choice motives and dietary habits on the WTP of Generation Z consumers for PB milk alternatives. This research expands existing knowledge by pinpointing the factors most strongly associated with consumers' WTP for this beverage, thereby shedding light on the decision-making process.

The analyses show that only dietary habits significantly influence the interviewees' WTP for PB milk alternatives. This finding suggests that cultural and social identities play a crucial role in the decision-making process of German Generation Z. For these consumers segment, choosing a PB diet signifies their desire to engage with a community or lifestyle that values sustainability, ethics and health rather than being primarily motivated by genuine ethical, health or sensory considerations; this is why other food choice motivations do not significantly correlate with consumers' WTP. Consequently, the higher willingness of vegans to pay more than omnivores can be primarily interpreted as a personal investment aimed at affirming and preserving their "plant-based" identity in the eyes of others.

As mentioned earlier, social norms and peer influence could shed light on the study's conclusions. Among groups supporting PB diets, there may be a social impetus to embrace this dietary choice. In specific social contexts, PB beverage consumption may be regarded as "cool" or "trendy", making these options an opportunity for consumers to enhance and affirm their social identity, thereby heightening their willingness to invest in them. In addition, within this

context, social norms are essential factors affecting German Generation Z consumers' WTP for PB vegan milks, influencing their views on quality, desirability and identity related to these beverages. Thus, recognising and incorporating these elements into well-crafted communication strategies is essential for PB milk analogue industries to enhance their business effectively.

From a theoretical perspective, the results extend behavioural economic theories of reference-dependent and identity-based preferences (Akerlof and Kranton, 2000) by demonstrating that German Generation Z's food choices are driven by identity utility rather than traditional consumption utility. Unlike conventional economic agents, young consumers incorporate social norms, symbolic meanings and peer recognition in their valuation process. By demonstrating that motives like health, naturalness and sensory appeal do not predict WTP for PB milk analogues, this study questions the idea that cognitive evaluations are the main factor in sustainable consumption. Instead, it uncovers a more expressive and socially embedded decision-making pattern characteristic of reflexive consumers, a concept aligned with youth studies perspectives on self-construction through consumption.

This research advances youth studies by illustrating how German Generation Z consumers demonstrate moral and social reflexivity through their food choices. For these young people, purchasing PB milk analogues is a "micro act" of identity work, connecting individual aspirations with collective meaning. The findings enhance our understanding of how sustainability-focused choices serve as indicators of generational awareness, confirming that Generation Z's consumption habits cannot be oversimplified to rational preferences, but rather should be considered within the broader context of youth culture, peer influence and symbolic consumption.

Marketers should recognise that young consumers view PB milk alternatives primarily to express their identity and social relevance, rather than for their practical benefits. Therefore, to effectively connect with this group, they should use peer communication, collaborate with influencers and share stories within communities that emphasise belonging. Positioning PB milk alternatives as symbols of a conscious lifestyle can further boost brand appeal. In addition, businesses should adopt pricing strategies that make products accessible while strengthening brand value through careful design, honesty and cause-related branding.

The present study is not without limitations due to its nature. It would be helpful to test whether the results remain valid with a representative number of interviews across different national contexts characterised by distinct food cultures and purchasing habits. Moreover, considering the study's findings, using and assessing constructs akin to the value-belief-norm framework (Stern, 2000) or the theory of planned behaviour (Ajzen, 1991) could be helpful to understand better how social norms and personal values can shape consumption patterns for designing interventions and policies to encourage this particular sustainable consumption choice.

Acknowledgements

The authors are grateful to the anonymous reviewers for their valuable comments, which substantially improved our manuscript. The research team also expresses gratitude to FARE-Lab (Food, Agriculture and Resource Economics Laboratory) – Alma Mater Studiorum – Università di Bologna, Italy, for technical support in conducting the research.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

Credit authorship contribution statement

Sergio Rivaroli: conceptualisation, methodology, data collection, data curation, formal analysis, writing – original draft, writing – review and editing, supervision. Roberta Spadoni: writing – review

and editing. Cristina Calvo-Porrall: writing – original draft, writing – review and editing. Jörg Lindenmeier: writing – original draft, writing – review and editing, project administration.

Data availability

Data will be made available upon request.

Ethics statement

Before beginning data collection, participants were informed of the purpose and the subsequent statistical analysis. Participation in the study was completely voluntary and anonymous, and individuals could withdraw from the survey at any time and for any reason. Respondents were required to sign a privacy and consent policy form in advance, which outlined how their data would be collected and processed, in accordance with the European Commission's General Data Protection Regulation (679/2016). The investigation was conducted in line with the principles outlined in the 1975 Declaration of Helsinki (World Medical Association, 2013). As this research did not involve any invasive procedures or laboratory assessments and did not induce any lifestyle changes, ethical review and approval were waived.

References

- Ajzen, I. (1991), "The theory of planned behavior", *Organizational Behavior and Human Decision Processes*, Vol. 50 No. 2, pp. 179-211.
- Ajzen, I., Brown, T.C. and Carvajal, F. (2004), "Explaining the discrepancy between intentions and actions: the case of hypothetical bias in contingent valuation", *Personality and Social Psychology Bulletin*, Vol. 30 No. 9, pp. 1108-1121, doi: [10.1177/0146167204264079](https://doi.org/10.1177/0146167204264079).
- Akerlof, G.A. and Kranton, R.E. (2000), "Economics and identity", *Quarterly Journal of Economics*, Vol. 115 No. 3, pp. 715-753, doi: [10.1162/003355300554881](https://doi.org/10.1162/003355300554881).
- Alcorta, A., Porta, A., Tárrega, A., Alvarez, M.D. and Pilar Vaquero, M. (2021), "Foods for Plant-Based diets: challenges and innovations", *Foods*, Vol. 10 No. 2, p. 293, doi: [10.3390/FOODS10020293](https://doi.org/10.3390/FOODS10020293).
- Aldridge, V., Dovey, T.M. and Halford, J.C.G. (2009), "The role of familiarity in dietary development", *In Developmental Review*, Vol. 29 No. 1, pp. 32-44, doi: [10.1016/j.dr.2008.11.001](https://doi.org/10.1016/j.dr.2008.11.001).
- Ammann, J., Grande, A., Inderbitzin, J. and Guggenbühl, B. (2023), "Understanding swiss consumption of plant-based alternatives to dairy products", *Food Quality and Preference*, Vol. 110, doi: [10.1016/j.foodqual.2023.104947](https://doi.org/10.1016/j.foodqual.2023.104947).
- Basu, A., Bishnu Murti, A. and Chandra Mandal, P. (2024), "Plant-based milk consumption in India: motivators, deterrents and marketing strategies in a competitive market", *Journal of International Food & Agribusiness Marketing*, Vol. 36 No. 2, pp. 220-242, doi: [10.1080/08974438.2022.2084198](https://doi.org/10.1080/08974438.2022.2084198).
- Beacom, E., Repar, L. and Bogue, J. (2022), "Consumer motivations and desired product attributes for 2.0 plant-based products: a conceptual model of consumer insight for market-oriented product development and marketing", *SN Business & Economics*, Vol. 2 No. 8, p. 115, doi: [10.1007/S43546-022-00278-3](https://doi.org/10.1007/S43546-022-00278-3).
- Bénabou, R. and Tirole, J. (2011), "Identity, morals, and taboos: beliefs as assets", *The Quarterly Journal of Economics*, Vol. 126 No. 2, pp. 805-855, doi: [10.1093/QJE/QJR002](https://doi.org/10.1093/QJE/QJR002).
- Brand, B.M., Rausch, T.M. and Brandel, J. (2022), "The importance of sustainability aspects when purchasing online: comparing generation X and generation Z", *Sustainability (Switzerland)*, Vol. 14 No. 9, doi: [10.3390/SU14095689](https://doi.org/10.3390/SU14095689).
- Cardello, A.V., Llobell, F., Giacalone, D., Roigard, C.M. and Jaeger, S.R. (2022), "Plant-based alternatives vs dairy milk: consumer segments and their sensory, emotional, cognitive and situational use responses to tasted products", *Food Quality and Preference*, Vol. 100, p. 104599, doi: [10.1016/J.FOODQUAL.2022.104599](https://doi.org/10.1016/J.FOODQUAL.2022.104599).
- Cawley, J. (2008), "Contingent valuation analysis of willingness to pay to reduce childhood obesity", *Economics and Human Biology*, Vol. 6 No. 2, pp. 281-292, doi: [10.1016/j.ehb.2008.05.003](https://doi.org/10.1016/j.ehb.2008.05.003).

- Chalupa-Krebsdak, S., Long, C.J. and Bohrer, B.M. (2018), "Nutrient density and nutritional value of milk and plant-based milk alternatives", *International Dairy Journal*, Vol. 87, pp. 84-92, doi: [10.1016/j.idairyj.2018.07.018](https://doi.org/10.1016/j.idairyj.2018.07.018).
- Chen, M., Li, Y., Sun, Q., Pan, A., Manson, J.E., Rexrode, K.M., Willett, W.C., Rimm, E.B. and Hu, F.B. (2016), "Dairy fat and risk of cardiovascular disease in 3 cohorts of US adults 1-3", *The American Journal of Clinical Nutrition*, Vol. 104 No. 5, pp. 1209-1217, doi: [10.3945/ajcn.116.134460](https://doi.org/10.3945/ajcn.116.134460).
- Chollet, M., Gille, D., Piccinali, P., Bütikofer, U., Schmid, A., Stoffers, H., Altintzoglou, T. and Walther, B. (2014), "Short communication: dairy consumption among middle-aged and elderly adults in Switzerland", *Journal of Dairy Science*, Vol. 97 No. 9, pp. 5387-5392, doi: [10.3168/jds.2014-8193](https://doi.org/10.3168/jds.2014-8193).
- Clark, B.E., Pope, L. and Belarmino, E.H. (2022), "Perspectives from healthcare professionals on the nutritional adequacy of plant-based dairy alternatives: results of a mixed methods inquiry", *BMC Nutrition*, Vol. 8 No. 1, doi: [10.1186/s40795-022-00542-7](https://doi.org/10.1186/s40795-022-00542-7).
- Clay, N., Sexton, A.E., Garnett, T. and Lorimer, J. (2022), "Palatable disruption: the politics of plant milk", *Social Innovation and Sustainability Transition*, doi: [10.1007/s10460-020-10022-y](https://doi.org/10.1007/s10460-020-10022-y).
- Costa, A.I., de, A., Schoolmeester, D., Dekker, M. and Jongen, W.M.F. (2007), "To cook or not to cook: a means-end study of motives for choice of meal solutions", *Food Quality and Preference*, Vol. 18 No. 1, doi: [10.1016/j.foodqual.2005.08.003](https://doi.org/10.1016/j.foodqual.2005.08.003).
- De Backer, C.J.S. and Hudders, L. (2015), "Meat morals: relationship between meat consumption consumer attitudes towards human and animal welfare and moral behavior", *Meat Science*, Vol. 99, pp. 68-74, doi: [10.1016/J.MEATSCI.2014.08.011](https://doi.org/10.1016/J.MEATSCI.2014.08.011).
- Dowd, K. and Burke, K.J. (2013), "The influence of ethical values and food choice motivations on intentions to purchase sustainably sourced foods", *Appetite*, Vol. 69, pp. 137-144, doi: [10.1016/j.appet.2013.05.024](https://doi.org/10.1016/j.appet.2013.05.024).
- Elzerman, J.E., van Boekel, M.A.J.S. and Luning, P.A. (2013), "Exploring meat substitutes: consumer experiences and contextual factors", *British Food Journal*, Vol. 115 No. 5, doi: [10.1108/00070701311331490](https://doi.org/10.1108/00070701311331490).
- Fehér, A., Gazdecki, M., Véha, M., Szakály, M. and Szakály, Z. (2020), "A comprehensive review of the benefits of and the barriers to the switch to a plant-based diet", *Sustainability (Switzerland)*, Vol. 12 No. 10, doi: [10.3390/SU12104136](https://doi.org/10.3390/SU12104136).
- Giacalone, D., Clausen, M.P. and Jaeger, S.R. (2022), "Understanding barriers to consumption of plant-based foods and beverages: insights from sensory and consumer science", *In Current Opinion in Food Science*, Vol. 48, doi: [10.1016/j.cofs.2022.100919](https://doi.org/10.1016/j.cofs.2022.100919).
- Haas, R., Schnepps, A., Pichler, A. and Meixner, O. (2019), "Cow milk versus plant-based milk substitutes: a comparison of product image and motivational structure of consumption", *Sustainability (Switzerland)*, Vol. 11 No. 18, doi: [10.3390/su11185046](https://doi.org/10.3390/su11185046).
- Halme, M., Pirttilä-Backman, A.M. and Pham, T. (2023), "The perceived value of oat milk and the food-choice motives of young, urban people", *British Food Journal*, Vol. 125 No. 13, pp. 375-389, doi: [10.1108/BFJ-03-2022-0238/FULL/PDF](https://doi.org/10.1108/BFJ-03-2022-0238/FULL/PDF).
- Hanemann, M., Loomis, J. and Kanninen, B. (1991), "Statistical efficiency of double-bounded dichotomous choice contingent valuation", *American Journal of Agricultural Economics*, Vol. 73 No. 4, doi: [10.2307/1242453](https://doi.org/10.2307/1242453).
- Ivanova, S., Delattre, C., Karcheva-Bahchevanska, D., Benbasat, N., Nalbantova, V. and Ivanov, K. (2021), "Plant-Based diet as a strategy for weight control", *Foods*, Vol. 10 No. 12, p. 3052, doi: [10.3390/FOODS10123052](https://doi.org/10.3390/FOODS10123052).
- Iweala, S., Spiller, A., Nayga, R.M. and Lemken, D. (2022), "Warm glow and consumers' valuation of ethically certified products", *Q Open*, Vol. 2 No. 2, pp. 1-21, doi: [10.1093/QOPEN/QOAC020](https://doi.org/10.1093/QOPEN/QOAC020).
- Jaeger, S.R. and Giacalone, D. (2021), "Barriers to consumption of plant-based beverages: a comparison of product users and non-users on emotional, conceptual, situational, conative and psychographic variables", *Food Research International*, Vol. 144, p. 110363, doi: [10.1016/J.FOODRES.2021.110363](https://doi.org/10.1016/J.FOODRES.2021.110363).
- Jaeger, S.R., Dupas de Matos, A., Frempomaa Oduro, A. and Hort, J. (2024), "Sensory characteristics of plant-based milk alternatives: product characterisation by consumers and drivers of liking", *Food Research International*, Vol. 180, doi: [10.1016/j.foodres.2024.114093](https://doi.org/10.1016/j.foodres.2024.114093).
- Jakubowska, D., Dąbrowska, A.Z., Pacholek, B. and Sady, S. (2024), "Behavioral intention to purchase sustainable food: generation Z's perspective", *Sustainability (Switzerland)*, Vol. 16 No. 17, doi: [10.3390/SU1617284/S1](https://doi.org/10.3390/SU1617284/S1).

- Janssen, M., Busch, C., Rödiger, M. and Hamm, U. (2016), "Motives of consumers following a vegan diet and their attitudes towards animal agriculture", *Appetite*, Vol. 105, pp. 643-651, doi: [10.1016/J.APPET.2016.06.039](https://doi.org/10.1016/J.APPET.2016.06.039).
- Jeske, S., Zannini, E. and Arendt, E.K. (2018), "Past, present and future: the strength of plant-based dairy substitutes based on gluten-free raw materials", *Food Research International*, Vol. 110, pp. 42-51, doi: [10.1016/j.foodres.2017.03.045](https://doi.org/10.1016/j.foodres.2017.03.045).
- Jeżewska-Zychowicz, M., Sajdakowska, M., Gębski, J., Kosicka-Gębska, M. and Gutkowska, K. (2024), "The importance of Self-Identities and habitual behavior for eating more plant foods", *Nutrients*, Vol. 16 No. 23, doi: [10.3390/NU16234063](https://doi.org/10.3390/NU16234063).
- Kahneman, D. (2011), *Thinking, Fast and Slow*, Farrar, Straus and Giroux.
- Kőszegi, B. and Rabin, M. (2006), "A model of Reference-Dependent preferences", *The Quarterly Journal of Economics*, Vol. 121 No. 4, pp. 1133-1165, doi: [10.1093/QJE/121.4.1133](https://doi.org/10.1093/QJE/121.4.1133).
- Leary, R.B., MacDonnell Mesler, R., Montford, W.J. and Chernishenko, J. (2023), "This meat or that alternative? How masculinity stress influences food choice when goals are conflicted", *Frontiers in Nutrition*, Vol. 10, p. 1111681, doi: [10.3389/FNUT.2023.1111681/BIBTEX](https://doi.org/10.3389/FNUT.2023.1111681/BIBTEX).
- Leialohilani, A. and de Boer, A. (2020), "EU food legislation impacts innovation in the area of plant-based dairy alternatives", *In Trends in Food Science and Technology*, Vol. 104, pp. 262-267, doi: [10.1016/j.tifs.2020.07.021](https://doi.org/10.1016/j.tifs.2020.07.021).
- Lipan, L., Rusu, B., Simon, E.L., Sendra, E., Hernández, F., Vodnar, D.C., Corell, M. and Carbonell-Barrachina, Á. (2021), "Chemical and sensorial characterization of spray dried hydroSOSustainable almond milk", *Journal of the Science of Food and Agriculture*, Vol. 101 No. 4, pp. 1372-1381, doi: [10.1002/JSFA.10748](https://doi.org/10.1002/JSFA.10748).
- Loevinger, J. (1948), "The technic of homogeneous tests compared with some aspects of "scale analysis" and factor analysis", *Psychological Bulletin*, Vol. 45 No. 6, doi: [10.1037/h0055827](https://doi.org/10.1037/h0055827).
- Lusk, J.L. and Briggeman, B.C. (2009), "Food values", *American Journal of Agricultural Economics*, Vol. 91 No. 1, pp. 184-196, doi: [10.1111/j.1467-8276.2008.01175.x](https://doi.org/10.1111/j.1467-8276.2008.01175.x).
- Lusk, J.L. and Schroeder, T.C. (2004), "Are choice experiments incentive compatible? A test with quality differentiated beef steaks", *American Journal of Agricultural Economics*, Vol. 86 No. 2, doi: [10.1111/j.0092-5853.2004.00592.x](https://doi.org/10.1111/j.0092-5853.2004.00592.x).
- McCarthy, K.S., Parker, M., Ameerally, A., Drake, S.L. and Drake, M.A. (2017), "Drivers of choice for fluid milk versus plant-based alternatives: what are consumer perceptions of fluid milk?", *Journal of Dairy Science*, Vol. 100 No. 8, doi: [10.3168/jds.2016-12519](https://doi.org/10.3168/jds.2016-12519).
- McClements, D.J. (2020), "Development of Next-Generation nutritionally fortified Plant-Based milk substitutes: structural design principles", *Foods*, Vol. 9 No. 4, p. 421, doi: [10.3390/FOODS9040421](https://doi.org/10.3390/FOODS9040421).
- Meixner, O., Malleier, M. and Haas, R. (2024), "Towards sustainable eating habits of generation Z: perception of and willingness to pay for Plant-Based meat alternatives", *Sustainability (Switzerland)*, Vol. 16 No. 8, doi: [10.3390/su16083414](https://doi.org/10.3390/su16083414).
- Michaëlsson, K., Wolk, A., Langenskiöld, S., Basu, S., Lemming, E.W., Melhus, H. and Byberg, L. (2014), "Milk intake and risk of mortality and fractures in women and men: cohort studies", *BMJ (Clinical Research ed.)*, Vol. 349, doi: [10.1136/BMJ.G6015](https://doi.org/10.1136/BMJ.G6015).
- Michaëlsson, K., Wolk, A., Melhus, H. and Byberg, L. (2017), "Milk, fruit and vegetable, and total antioxidant intakes in relation to mortality rates: cohort studies in women and men", *American Journal of Epidemiology*, Vol. 185 No. 5, pp. 345-361, doi: [10.1093/aje/kww124](https://doi.org/10.1093/aje/kww124).
- Miki, A.J., Livingston, K.A., Karlsen, M.C., Folta, S.C. and McKeown, N.M. (2020), "Using evidence mapping to examine motivations for following Plant-Based diets", *Current Developments in Nutrition*, Vol. 4 No. 3, p. nzaa013, doi: [10.1093/CDN/NZAA013](https://doi.org/10.1093/CDN/NZAA013).
- Mohd Zaini, N.S., Khudair, A.J.D., Gengan, G., Abd Rahim, M.H., Meor Hussin, A.S., Idris, H. and Mohsin, A.Z. (2023), "Enhancing the nutritional profile of vegan diet: a review of fermented plant-based milk as a nutritious supplement", *In Journal of Food Composition and Analysis*, Vol. 123, doi: [10.1016/j.jfca.2023.105567](https://doi.org/10.1016/j.jfca.2023.105567).
- Moss, R., Barker, S., Falkeisen, A., Gorman, M., Knowles, S. and McSweeney, M.B. (2022), "An investigation into consumer perception and attitudes towards plant-based alternatives to milk", *Food Research International*, Vol. 159, p. 111648, doi: [10.1016/J.FOODRES.2022.111648](https://doi.org/10.1016/J.FOODRES.2022.111648).

- Moss, R., LeBlanc, J., Gorman, M., Ritchie, C., Duizer, L., McSweeney, M.B., Moss, R., LeBlanc, J., Gorman, M., Ritchie, C., Duizer, L. and McSweeney, M.B. (2023), "A prospective review of the sensory properties of Plant-Based dairy and meat alternatives with a focus on texture", *Foods*, Vol. 12 No. 8, doi: [10.3390/FOODS12081709](https://doi.org/10.3390/FOODS12081709).
- Nils-Gerrit, W. (2024a), "Plant-based milk and dairy alternatives in Europe – statistics & facts", Statista, available at: www.statista.com/topics/10162/milk-and-dairy-alternatives-in-europe/#topicOverview
- Nils-Gerrit, W. (2024b), "Price per unit of milk substitutes in the European Union 2019-2029", Statista, available at: www.statista.com/forecasts/1343011/eu-milk-substitute-market-price-per-unit
- Noreen, I. (2024), *Pros and Cons of Drinking Cow's Milk*, Healthline.
- O'Donoghue, T. and Rabin, M. (2015), "Present bias: lessons learned and to be learned", *American Economic Review*, Vol. 105 No. 5, pp. 273-279, doi: [10.1257/AER.P20151085](https://doi.org/10.1257/AER.P20151085).
- Pelletier, J.E., Laska, M.N., Neumark-Sztainer, D. and Story, M. (2013), "Positive attitudes toward organic, local, and sustainable foods are associated with higher dietary quality among young adults", *Journal of the Academy of Nutrition and Dietetics*, Vol. 113 No. 1, pp. 127-132, doi: [10.1016/j.jand.2012.08.021](https://doi.org/10.1016/j.jand.2012.08.021).
- Perrot, B., Bataille, E. and Hardouin, J.-B. (2018), "Validscale: a command to validate measurement scales", *The Stata Journal*, Vol. 18 No. 1.
- Pwc, D.E. (2020), "Gen Z is talking. Are you listening?", available at: www.pwc.de
- Ramsing, R., Santo, R., Kim, B.F., Altama-Johnson, D., Wooden, A., Chang, K.B., Semba, R.D. and Love, D.C. (2023), "Dairy and plant-based milks: implications for nutrition and planetary health", *In Current Environmental Health Reports*, Vol. 10 No. 3, pp. 291-302, doi: [10.1007/s40572-023-00400-z](https://doi.org/10.1007/s40572-023-00400-z).
- Raptou, E., Tsiami, A., Negro, G., Ghuriani, V., Baweja, P., Smaoui, S., Varzakas, T., Raptou, E., Tsiami, A., Negro, G., Ghuriani, V., Baweja, P., Smaoui, S. and Varzakas, T. (2024), "Gen Z's willingness to adopt Plant-Based diets: empirical evidence from Greece, India, and the UK", *Foods*, Vol. 13 No. 13, doi: [10.3390/FOODS13132076](https://doi.org/10.3390/FOODS13132076).
- Rombach, M., Dean, D.L. and Bitsch, V. (2023), "Got milk alternatives?" understanding key factors determining U.S. Consumers' willingness to pay for Plant-Based milk alternatives", *Foods*, Vol. 12 No. 6, doi: [10.3390/foods12061277](https://doi.org/10.3390/foods12061277).
- Rozin, P. (2006), "Naturalness judgments by lay Americans: process dominates content in judgments of food or water acceptability and naturalness", *Judgment and Decision Making*, Vol. 1 No. 2, pp. 91-97, doi: [10.1017/S1930297500002308](https://doi.org/10.1017/S1930297500002308).
- Schuster, M.J., Wang, X., Hawkins, T. and Painter, J.E. (2018), "Comparison of the nutrient content of cow's milk and nondairy milk alternatives: what's the difference?", *Nutrition Today*, Vol. 53 No. 4, pp. 153-159, doi: [10.1097/NT.0000000000000284](https://doi.org/10.1097/NT.0000000000000284).
- Slovic, P., Finucane, M., Peters, E. and MacGregor, D.G. (2002), "Rational actors or rational fools: implications of the affect heuristic for behavioral economics", *The Journal of Socio-Economics*, Vol. 31 No. 4, pp. 329-342, doi: [10.1016/S1053-5357\(02\)00174-9](https://doi.org/10.1016/S1053-5357(02)00174-9).
- STATISTA (2024), "Average per capita consumption of milk substitutes in the European Union (EU-27) from 2019 to 2029 (in 1-liter packs)", available at: www.statista.com/forecasts/1342995/eu-milk-substitute-market-average-volume-per-capita
- Steptoe, A., Pollard, T.M. and Wardle, J. (1995), "Development of a measure of the motives underlying the selection of food: the food choice questionnaire", *Appetite*, Vol. 25 No. 3, pp. 267-284, doi: [10.1006/APPE.1995.0061](https://doi.org/10.1006/APPE.1995.0061).
- Stern, P.C. (2000), "Toward a coherent theory of environmentally significant behavior", *Journal of Social Issues*, Vol. 56 No. 3, pp. 407-424, doi: [10.1111/0022-4537.00175](https://doi.org/10.1111/0022-4537.00175).
- Su, W., Zhang, Y.Y., Li, S. and Sheng, J. (2024), "Consumers' preferences and attitudes towards plant-based milk", *Foods*, Vol. 13 No. 1, doi: [10.3390/foods13010002](https://doi.org/10.3390/foods13010002).
- Vaikma, H., Kaleda, A., Rosend, J. and Rosensvald, S. (2021), "Market mapping of plant-based milk alternatives by using sensory (RATA) and GC analysis", *Future Foods*, Vol. 4, p. 100049, doi: [10.1016/J.FUFO.2021.100049](https://doi.org/10.1016/J.FUFO.2021.100049).
- Vanga, S.K. and Raghavan, V. (2018), "How well do plant based alternatives fare nutritionally compared to cow's milk?", *In Journal of Food Science and Technology*, Vol. 55 No. 1, pp. 10-20, doi: [10.1007/s13197-017-2915-y](https://doi.org/10.1007/s13197-017-2915-y).

Vecchiato, D., Torquati, B., Venanzi, S. and Tempesta, T. (2021), "The role of sensory perception in consumer demand for tinned meat: a contingent valuation study", *Foods*, Vol. 10 No. 9, doi: [10.3390/foods10092185](https://doi.org/10.3390/foods10092185).

Vermeir, I. and Verbeke, W. (2006), "Sustainable food consumption: exploring the consumer "attitude – Behavioral intention" gap", *Journal of Agricultural and Environmental Ethics*, Vol. 19 No. 2, pp. 169-194, doi: [10.1007/s10806-005-5485-3](https://doi.org/10.1007/s10806-005-5485-3).

Visschers, V.H.M., Hartmann, C., Leins-Hess, R., Dohle, S. and Siegrist, M. (2013), "A consumer segmentation of nutrition information use and its relation to food consumption behaviour", *Food Policy*, Vol. 42, pp. 71-80, doi: [10.1016/j.foodpol.2013.07.003](https://doi.org/10.1016/j.foodpol.2013.07.003).

WHO (2021), *Plant-Based Diets and Their Impact on Health, Sustainability and the Environment*, WHO European Office for the Prevention and Control of Noncommunicable Diseases, pp. 1-7.

World Health Organization (2021), "Plant-based diets and their impact on health, sustainability and the environment: a review of the evidence", available at: www.who.int/europe/publications/item/WHO-EURO-2021-4007-43766-61591

Yvette, B. (2023), *Lactose Intolerance: What You Need to Know*, MedicalNewsToday.

Corresponding author

Sergio Rivaroli can be contacted at: sergio.rivaroli@unibo.it

For instructions on how to order reprints of this article, please visit our website:

www.emeraldgrouppublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com