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What role do attitudes, information and taste play in consumer preferences and willingness to pay for domestic alternatives to exotic superfoods?

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ABSTRACT

Superfoods are a recent health-oriented food trend, especially among younger consumers. The most well-known superfoods, such as quinoa or goji berries, are considered exotic foods, at least for the European market. This contradicts another food trend: the movement towards regional or local foods. As little is known about how consumers evaluate this trade-off when consuming superfoods, we investigate i) consumers' preferences and willingness to pay (WTP) for domestic and exotic superfood ingredients; and ii) factors determining a higher WTP for domestic superfood alternatives. To this end, we conducted a three-step Vickrey auction of fruit smoothies with exotic and domestic superfood ingredients. A total of 116 individuals participated in the within-subjects experiment, which included an information treatment, tastings and a sensory evaluation. In general, participants perceived superfoods as a healthy but expensive food trend potentially harmful to the environment. Moreover, participants were eager to try the exotic smoothie, but agreed more strongly with statements endorsing the positive health benefits and good taste of the domestic smoothie. In general, we found a higher WTP for the domestic smoothie, which was reinforced by providing information about the origin of the fruits. After tasting, the WTP a premium for the domestic smoothie was driven by differences in sensory evaluations, but no longer by product perceptions and food neophobia. This indicates that food neophobia is related to taste uncertainty, which was resolved by the tasting. We discuss practical implications for fruit growers and processors marketing products containing novel and familiar superfood ingredients.

1. Introduction

Superfoods have been a recent trend in food markets, being omnipresent in newspapers, blogs and social media. Superfoods are not a clearly defined food group in contrast to novel foods such as insect-based food or cultured meat. Moreover, no official guidelines exist, i.e., there is neither a scientific, regulatory, nor legal description, as for example in the case of organic food, specifically laying down what constitutes or defines a superfood (Loyer & Knight, 2018). In its colloquial use, the term refers to "a food (such as salmon, broccoli, or blueberries) that is rich in compounds (such as antioxidants, fiber, or fatty acids) considered beneficial to a person's health" (Merriam-Webster, n.d.). Likewise, consumer research frequently adopts this common understanding, that a food with a high "natural" nutrient density with respect to antioxidants, vitamins and/or minerals can be considered a superfood. Thus, authors often equate superfoods with whole foods, meaning that they are – in

contrast to functional foods – neither nutritionally fortified nor enhanced (Butterworth et al., 2020; Fernández-Ríos et al., 2022; Oude Groeniger et al., 2017).

While the demand of and interest in superfoods among Western consumers can be primarily explained by the trend towards healthy eating (Franco Lucas et al., 2022a, 2021; Wiedenroth & Otter, 2021), the most well-known superfoods such as quinoa, açai fruits or goji berries are exotic foods, at least for the European market (Magrath & Sanz, 2020). This might contradict another prominent food trend in recent years, namely the movement towards local foods, i.e. foods grown within a short transport distance (Feldmann & Hamm, 2015; Grebitus et al., 2013; Meyerding et al., 2019). Indeed, some consumers have concerns about the environmental sustainability of exotic superfoods, which have long transportation routes given that they often come from South and Central America or Asia (Franco Lucas et al., 2021; Wiedenroth & Otter, 2021). There are domestic foods from Germany and

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Europe with similar nutrient profiles and a potentially better environmental performance (Magrath & Sanz, 2020; Schmitt et al., 2017). Yet, research on consumers' perception and acceptance of domestic superfoods as alternatives to exotic superfoods is scarce (Butterworth et al., 2020) and we lack insights into how consumers evaluate potential trade-offs between the perceived health-promoting properties and the sustainability of superfoods.

Hence, the aim of this study is to provide empirical evidence on how consumers evaluate these trade-offs, and to determine factors driving their perceptions and willingness to pay (WTP). More specifically, we address the following research question: what role do attitudes, information and taste play in consumer preferences for domestic alternatives for exotic superfood ingredients in snacks? We thereby focus on the role of origin and psychographic consumer characteristics, such as general health interest, interest in local foods, and food neophobia. To this end, we conduct a non-hypothetical Vickrey auction for fruit smoothies with either exotic or domestic superfood ingredients in Germany, and include an information treatment, tastings and a sensory evaluation in three auction rounds.

There has been ample research into profiling the "superfoodies", i.e., consumers knowledgeable about superfoods with a positive attitude and willing to pay a price premium. These consumers are, in general, health conscious and have a high nutritional knowledge. Consequently, they are very involved in their food choices and buy superfoods for intrinsic, health-related reasons. Moreover, they are attracted by comfort food and are open to consuming novel foods (Franco Lucas et al., 2022a, 2021). Superfood intake has also been found to be more pronounced among females, younger and highly educated individuals, and seems to be strongly related to consumers' socioeconomic status (Franco Lucas et al., 2022a; Oude Groeniger et al., 2017; Wiedenroth & Otter, 2021). Thus, Wiedenroth and Otter (2022, 2021) propose to market superfoods particularly to luxury-seeking consumers. Liu et al. (2021), however, argue that the above average product price may limit repurchases once curiosity for a healthy novel food is satisfied. Yet another barrier to the consumption of exotic superfoods is the growing awareness for the environmental impacts of food, with consumers voicing concerns about their ecological sustainability (Franco Lucas et al., 2021; Wiedenroth & Otter, 2021).

Promoting nutrient-rich, domestic foods as alternatives to exotic superfoods has received surprisingly little attention. For bread, Meyerding et al. (2018) report that domestic functional ingredients such as linseeds are more valued by consumers than exotic ones such as amaranth and quinoa. Franco Lucas et al. (2022b) assess consumers' changing attitudes toward superfoods after an information treatment, but they provided only a basic definition of superfoods based on the terms' colloquial use, referring to a high concentration of nutrients and possible health benefits. Wiedenroth and Otter (2022, 2021) suggest that marketing strategies for domestic superfoods such as blueberries may benefit farmers and short food supply chains, but they remain vague and do not assess consumer preferences for domestic superfoods. While numerous studies have established consumers WTP for local produce (e.g., Feldmann & Hamm, 2015; Printezis et al., 2019), we are not aware of studies framing nutrient-dense fruits as substitutes for exotic fruits and investigating consumers' attitudes and response to such information regarding the origin of the fruits. This paper extends the literature in this regard. Moreover, promoting the consumption of fruits by framing vitamin-rich domestic fruits as superfood alternatives could support healthy diets. Guidelines for a healthy diet propose eating at least five portions of fruit and vegetables per day to reduce the risk of non-communicable diseases and to ensure an adequate daily intake of dietary fiber (European Commission, 2021; Who, 2020). In Germany, however, almost 60 % of the population do not meet the national recommendation of eating at least 250 g of fruits per day; and 43 % are still below the recommendation if the intake of fruit juices is considered (Dge, 2011). To increase intake levels of fruits, the 5-a-day public health campaign promotes the daily consumption of five portions of fruits and

vegetables, listing smoothies as a replacement for one portion (Hauser et al., 2024).

In the following section, we describe the set-up and the products chosen as stimuli (fruit smoothies with either exotic or domestic superfood ingredients) for the experimental auction, and our modeling approach. We then present our empirical findings, followed by a discussion. We conclude with some practical implications.

2. Materials and methods

2.1. Sampling and set-up of the experimental auction

We conducted a non-hypothetical experimental auction (EA) combined with sensory tastings and a psychographic survey with 116 participants in Germany in October 2019. Participants were recruited through convenience sampling using university mailing lists of students and employees, indicating that they would participate in a research study examining preferences for healthy snacks. Interested individuals could register for one of the scheduled tastings and were informed to bring cash because they had to use their own money when placing an auction bid. We used a delayed payment mechanism, in which participants received a €15 gift voucher at the very end of the session, to reduce overbidding due to house money effects as suggested in Canavari et al. (2019). All participants had to give informed consent to participate in the study and to the privacy statement.

We ran second-price Vickrey auctions, in which the highest bidder buys the auctioned good at the second highest bidding price (Lusk & Shogren, 2007; Vickrey, 1961), to elicit participant's willingness to pay (WTP) for healthy snack products with superfood ingredients. Six sessions with 11–25 participants each were conducted in a computer lab with partitions separating the individuals. Following Gassler et al. (2019), we randomly assigned the participants of a given session into anonymous groups of three to four bidders. This kept the number of bidders constant across auction groups despite a fluctuating number of individuals showing up for a given session and ensured that marginal bidders remained engaged in the auction mechanism by increasing the cost of misstating their true value for the auctioned good (Canavari et al., 2019; Lusk & Shogren, 2007). After the participants were familiarized with the auction mechanism, a numerical example with books was used to explain why it is in a person's best interest to bid truthfully and not strategically, and a real-money practice auction with granola bars was performed. We allowed for questions about the auction mechanism, the auctioned products, and the information provided. Participants were encouraged to point out ambiguities or ask for clarifications at any time. Thereby, we followed the recommended steps for ensuring true value elicitation prior to conducting the main auctions as outlined by Lusk and Shogren (2007).

Three real-money auctions for the focal goods were conducted: The objective was to assess how consumer perceptions, and sociodemographic and psychographic characteristics shape WTP in Auction I (visual presentation of the products), and how the experimental treatments in Auction II (information provision), and Auction III (tasting) affect WTP for domestic and exotic superfoods, respectively. A within-subject design and a "full bidding" process was chosen as e.g. in Bruschi et al. (2015), Gassler et al. (2019), and Habiyaemye et al. (2023). That is, all participants were exposed to the same treatment in all of the sessions and bids were placed for the entire product rather than for individual product attributes. In each auction, participants simultaneously submitted sealed-bids for two fruit smoothies. The binding auction and product were drawn in the final phase of the experiment, and the highest bidder of each group was determined. Their ID numbers were announced and they collected their purchase upon leaving the experimental sessions.

2.2. Presentation of stimuli, verification check, and measuring product perceptions

The focal products chosen as stimuli were two fruit smoothies from “true fruits” with either exotic or domestic superfood ingredients (250 ml glass bottles). The *exotic smoothie* contained pink dragon fruit and soursop (guanabana) grown in the tropical regions of Southeast Asia and South America and being novel to European consumers; while the *domestic smoothie* featured a blend of different berries (raspberries, blueberries, blackberries, red and black currants) common in Europe.

For Auction I, we presented the product details (ingredient lists, nutrition facts tables) as given in Appendix A1 and passed bottles around for personal inspection. We asked participants to rate each smoothie on a five-point scale ranging from very domestic (1) to very exotic (5). This manipulation check verified that the participants indeed perceived the chosen products as exotic or domestic food products with a mean of 4.47 for the *exotic smoothie* (sd = 0.83; median = 5) and a mean of 1.73 for the *domestic smoothie* (sd = 0.77; median = 2). In the questionnaire, we referred to the exotic and domestic smoothie as “Smoothie 1” and “Smoothie 2” respectively to avoid bias. For initial product perceptions, we asked participants to rate both smoothies on a five-point scale (i.e., 1 = strongly disagree, 5 = strongly agree) using the following two items: “Smoothie [1, 2] contains healthy nutrients and will have a positive effect on my health”, “I am curious to try Smoothie [1, 2] because it contains foods that are unfamiliar to me that I would like to try”.

For Auction II, we designed a superfoods information treatment. First, we provided participants with a definition of superfoods used by the European Food Information Center (EUFIC), defining superfoods as “Foods, especially fruit and vegetables, which, due to their nutrient content have a higher health benefit than other foods” (Eufic, 2012). Then, we introduced domestic foods as having similar nutrient profiles and health-promoting effects as their exotic counterparts; but pointed to these health effects not being scientifically proven. Moreover, we stressed the long transport routes and possible negative environmental effects of exotic superfoods (see Appendix A2). Finally, we provided pictures and information about the superfoods in the smoothies, stressing either the exotic or domestic origin of the fruits (i.e., tropic climate zones of Brazil, Indonesia and Vietnam for pink dragon fruit and soursop; central and eastern Europe for the berries), and their high vitamin contents (vitamins A and C).

For Auction III, we distributed product samples in transparent shot glasses and had participants state their taste perceptions (“Smoothie [1, 2] tastes very good”) using five-point scales (i.e., 1 = strongly disagree, 5 = strongly agree) before submitting their final auction bids.

2.3. Psychographic survey

Participants also completed a questionnaire, which was intertwined with the auctions. The sequence of steps in the economic experiment and the survey is outlined in Fig. 1. The set of instructions is available online (see Supplementary material).

The survey inquired about key socio-demographic characteristics (gender, age, level of education, income), the participant’s lifestyle (“On a scale of 1–10, how would you rate your lifestyle?: 1 = very unhealthy, 10 = very healthy), and their purchase frequency of smoothies (1 = very often (every day), 2 = often (weekly), 3 = occasionally (3–4 times a month), 4 = rarely (1–2 times a month), 5 = never, NA = I do not know). We also captured superfood knowledge (“How would you rate your knowledge of superfoods?”: 1 = very good; 4 = not good at all) and superfood consumption (“How often do you eat superfoods at home?”: 1 = very often, 5 = never, NA = I do not know). Moreover, we had participants rate superfoods on a series of bipolar adjective pairs (e.g., healthy – unhealthy) at the end of a five-point scale to provide insights into their attitude towards superfoods (e.g., “Superfood is ...”: 2 = very healthy; 0 = neither/nor; –2 = very unhealthy).

We measured respondents’ attitudes toward the healthfulness of foods using seven items of Roininen et al. (1999) original eight-item general health interest (GHI) scale measured on a five-point scale (1 = strongly disagree, 5 = strongly agree). We did not include their 8th statement “I do not avoid foods, even if they may raise my cholesterol”, due to the low loading (<0.5) in their original study and being outdated nutrition wise. To assess respondents’ attitudes toward novel foods, we used the German version of the *food neophobia* (FN) scale by Siegrist et al. (2013) in which they replaced “ethnic food” and “ethnic restaurant” by “food from other cultures” and “places, where foods from other cultures are served”. Items were rated on a five-point Likert-type response scale (i.e., 1 = strongly disagree, 5 = strongly agree). Food neophobia is a personality trait characterized by the avoidance and reluctance to taste unfamiliar foods (Pliner & Hobden, 1992). It has been suggested that individuals with high levels of food neophobia also place great importance on the origin of food. This means that familiar foods provide a sense of cultural identification that is significant to them (Barrena & Sánchez, 2013; Siegrist et al., 2013). FN significantly predicted people’s willingness to try exotic foods such as fruit (Bäckström et al., 2004; Mustonen et al., 2012). To measure consumers’ attitudes toward local food (ATLF), we used items from Adams and Adams (2011) scale covering five themes: environmental protection; product quality; farm-worker welfare; health; and cost. Items were rated on a five-point Likert-type response scale (i.e., 1 = strongly disagree, 5 = strongly agree). For further analysis, we used exploratory and confirmatory factor analysis (dropping items with loadings < 0.5). All items, their averages, and the results of the factor analyses are listed in Appendix A3.

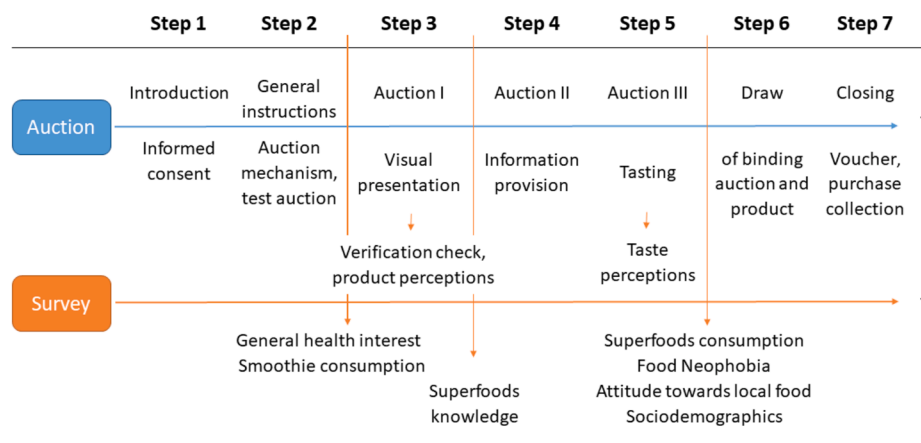


Fig. 1. Timeline of the experiment.

2.4. Empirical analysis

Our modeling objective is to assess how sociodemographic and psychographic characteristics shape WTP in Auction I (visual presentation of the products only), and how the experimental treatments in Auctions II (pictures of the fruits and information about their origin), and Auction III (tasting) affect WTP for domestic and exotic superfoods. Our empirical approach is illustrated in Fig. 2.

We report two analyses. First, we estimate a random effects tobit model for panel data using the “plm” package in R (Croissant and Millo, 2018, 2008) on the pooled data of the three auctions. Thereby, we explicitly account for left censored auction bids (bids are positive amounts including zero), and we allow for time-invariant variables (i.e., gender, age, income, GHI, AtLF, FN) to play a role as explanatory variables. We estimate separate regressions for the WTP (observed bid) for the exotic and the domestic smoothie of the following type:

$$Y_{it} = \beta_0 + \beta_1 \text{Treat}_{it} + \beta_2 \text{Socio}_{it} + \beta_3 \text{Psych}_{it} + \beta_4 \text{Prod}_{it} + \beta_5 \text{Treat}_{it} * \text{Psych}_{it} + v_i + \varepsilon_{it}$$

where Y_{it} is the WTP (auction bid) of respondent i in auction t . *Treat* is a dummy variable that indicates whether the auction bid was provided after the information or taste treatment; *Socio* is a vector of socio-demographic characteristics (i.e., age, gender, and income) of respondent i , *Psych* is a vector of psychographic characteristics (i.e., GHI, AtLF, and FN factor scores) of respondent i and *Prod* is a vector of respondent i 's product perceptions; v_i are the random effects and ε_{it} is an error term. Age, gender, and income were dummy-coded “<25 years” (1 if 24 or younger, based on a median-split, and 0 otherwise), “female” (1 if female and 0 otherwise), and “higherIncome” (1 if above €900 and 0 otherwise), respectively. As robustness checks, we explore different model specifications and additionally report the OLS regression results with robust standard errors.

Second, we report a set of regressions, in which we focus on the differences between the WTP for the domestic and exotic smoothie across the three auctions. The central idea driving the specification of these OLS models is that any differences in WTP_{it} for the domestic and exotic smoothie should be driven by the perceived product and sensory differences between the auctioned smoothies and consumer characteristics. We model the differences in WTP_{it} as $\Delta WTP_{it(\text{domestic-exotic})} = f$ (age, gender, net disposable income, factor scores from the GHI, FN, and AtLF scales, perceived product and sensory differences). This allows us to test for factors that explain the willingness to pay a price premium for the domestic smoothie compared to the exotic smoothie.

3. Results

3.1. Sample characteristics and attitudes

Table 1 shows descriptive statistics of the sample, which indicates a higher proportion of females, younger age groups, and more educated

Table 1
Sample characteristics (N = 116).

Variable	Mean (SD) or Frequency
<i>Socio-demographics</i>	
Female	74.1 %
Age	26.44 (8.11)
<i>Monthly (net) income</i>	
<€900	64.7 %
€900–€1,500	15.5 %
€1,501–€2,600	10.3 %
>€2,600	9.5 %
<i>Education (highest level)</i>	
High School diploma	4.3 %
A-levels	41.4 %
University degree	54.3 %
<i>Following a healthy lifestyle</i> (1 = very unhealthy; 10 = very healthy)	
	7.11 (1.54)
<i>Superfood knowledge</i> (1 = very good; 4 = not good at all)	
	2.38 (0.75)
<i>Superfood consumption</i> (1 = very often; 5 = never; NA = Do not know: 2.6 %)	
	2.78 (1.16)
<i>Smoothie consumption</i> (1 = very often; 5 = never; NA = Do not know: 0.9 %)	
	4.02 (0.85)
GHI (1 = strongly disagree; 5 = strongly agree)	3.77 (0.69)
FN (1 = strongly disagree; 5 = strongly agree)	1.92 (0.68)
AtLF (1 = strongly disagree; 5 = strongly agree)	3.32 (0.88)

individuals compared to the general German population. The individuals in our sample were generally quite keen on following a healthy lifestyle (mean = 7.11). Regarding the psychographic factors investigated in this study, participants scored, on average, above the center of the GHI and AtLF scales, indicating a positive attitude towards healthy foods (mean = 3.77) and local foods (mean = 3.32). Their food neophobia was only slightly pronounced (mean = 1.92). The internal reliability of each scale was assessed by calculating Cronbach’s alpha which exceeded the typical 0.7 threshold (GHI: 0.78, FN: 0.84, AtLF: 0.73). In terms of consumption habits, the sample reflected occasional consumers of superfoods, who felt relatively knowledgeable about superfoods but consumed fruit smoothies infrequently.

Fig. 3 summarizes how respondents rated superfoods on a series of bipolar adjective pairs. The findings from this semantic differential suggest that, in general, participants perceived superfoods as a healthy, yet expensive, food trend. Moreover, 53 % of the participants strongly associated superfoods with exotic foods, while roughly a third perceived them as rather harmful to the environment. There was strong agreement across the sample, that the production of local fruits and vegetables is beneficial for the environment (mean = 4.41).

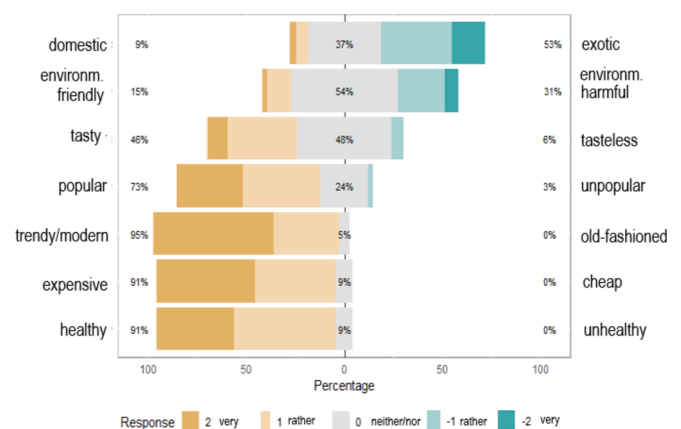


Fig. 3. Participants’ perceptions of superfoods as rated on bipolar adjective pairs. Percentages give the share of responses summed into three categories: those strongly or rather attributing superfoods with the adjective on the left (2, 1); those undecided (0); and those strongly or rather attributing superfoods with the adjective on the right (–1, –2).

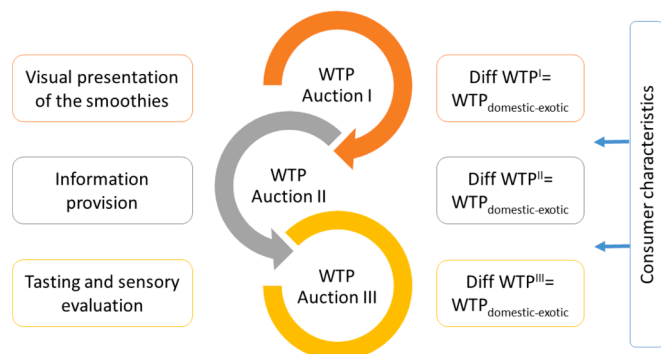


Fig. 2. Schematic representation of the empirical approach.

It should be noted that the sample is not representative of the German population. However, the group of consumers reflected in this study is relatively young and well-educated. This consumer group dominates the ‘superfoods’ segment and is also known to be concerned about the trade-offs between health and the environment (Franco Lucas et al., 2022a; Wiedenroth & Otter, 2021). Therefore, they are an ideal subject pool for addressing our research questions.

3.2. Perceptions of the smoothies and mean WTP across auction rounds

Table 2 presents the participants’ perceptions and sensory ratings of both smoothies. Participants were more eager to sample the exotic smoothie, but they agreed more strongly with the statements endorsing the positive health benefits and good taste of the domestic smoothie.

Table 3 presents an initial, descriptive analysis of the auction data. Mean estimates from Auction I (visual only) provide a measure of the average valuation of the exotic smoothie (€1.34) and the domestic smoothie (€1.44), respectively. Table 3 also indicates a low number of zero bids, which increased over the course of the experiment (and especially for the exotic smoothie). The mean WTP of participants was thus below the retail price of €2.49 per 250 ml bottle, and was more in line with the retail prices of smoothies offered by major private labels. The ‘true fruits’ smoothies used as stimuli represent the premium segment of the market. However, there were several cheaper options, either from other manufacturers in a price range of around €1.99 to €2.29, or from major retail brands in a price range of around €0.99 to €1.19. Therefore, the average WTP reported is a reliable reflection of the market, as the retail price of the ‘true fruits’ smoothies does not correspond to the WTP of the average consumer.

In Auction I, there was a statistically significant difference (€0.10; $p < 0.05$) between the mean bids for the domestic and exotic smoothie. The results for Auctions II (information) suggest that the valuations of both smoothies changed slightly after the information provision. After this treatment, the sample mean WTP for the domestic smoothie increased while it decreased for the exotic smoothie ($p < 0.1$). This

Table 2
Mean scores (with SD) of participants’ perceptions of both smoothies (N = 116).

	Item	Stated at	Smoothie exotic (1)	Smoothie domestic (2)	Diff _{domestic-exotic}
Health perceptions	Smoothie [1, 2] contains healthy nutrients and will have a positive effect on my health.	Auction I	3.78 (0.96)	4.16 (0.82)	0.38 ***
Curiosity perceptions	I am curious to try Smoothie [1, 2] because it contains foods that are unfamiliar to me that I would like to try.	Auction I	3.82 (1.30)	3.22 (1.45)	-0.60 ***
Taste perceptions	Smoothie [1, 2] tastes very good.	Auction III	3.69 (1.25)	4.27 (1.00)	0.58 ***

Notes: scale: 1 = strongly disagree, 5 = strongly agree. Differences were assessed using paired two-samples Wilcoxon tests. Significance codes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 3
Descriptive statistics of bids across auctions (N = 116).

	WTP _{min}	WTP _{max}	WTP _{Sample mean (SD)}	Number of “0s”
<i>Auction I: Visual only</i>				
Smoothie exotic	0.00	3.89	1.34 (0.69)	2
Smoothie domestic	0.20	3.49	1.44 (0.68)	0
Diff _{domestic-exotic}			0.10 *	
<i>Auction II: Information</i>				
Smoothie exotic	0.00	4.60	1.29 (0.69) ^{II:I}	4
Smoothie domestic	0.15	3.49	1.47 (0.63) ^{II:I}	0
Diff _{domestic-exotic}			0.18 ***	
<i>Auction III: Taste</i>				
Smoothie exotic	0.00	3.20	1.19 (0.68) ^{III:II n.s.; III:I *}	8
Smoothie domestic	0.00	3.30	1.43 (0.68) ^{III:II n.s.; III:I n.s.}	1
Diff _{domestic-exotic}			0.24 ***	

Notes: Differences between auction rounds (II:I, III:II) and within rounds (Diff_{domestic-exotic}) were assessed using paired two-samples Wilcoxon tests. Significance codes: . $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; n.s. not significant.

resulted in a statistically significant difference of €0.18 ($p < 0.01$) between the mean bids for the domestic and exotic smoothie. In Auction III, the mean bids for the exotic smoothie were significantly lower than the initial bids in Auction I ($p < 0.05$), while the mean WTP for the domestic smoothie was not affected by the tasting. On average, participants were willing to pay €0.24 more for the domestic smoothie than for the exotic smoothie after both treatments ($p < 0.01$). In the following section, we turn to a more formal analysis of our auction data.

3.3. Effect of attitudes and the information and taste treatments on WTP

Table 4 shows the results of the Tobit panel models for the WTP for the exotic and domestic smoothie across different model specifications (1–3). The findings were consistent and robust across all models with regards to signs, significance, and magnitudes. As there were no statistically significant socio-demographic effects (gender, age, and income) on the WTP for both smoothies in our sample (model 1), we will focus our presentation on models with a more restricted set of regressors (model 2). Excluding the sociodemographic variables, model 2 examined the effect of initial product perceptions on WTP in Auction I. The estimates from model 2 highlighted the effect of perceived health benefits on the WTP for both smoothies, with more favorable nutrient perceptions resulting in higher auction bids.

The results of Auction I (visual only) show the predicted WTP for both smoothies as the baseline (i.e. both treatment indicators evaluated at zero), and for subjects with average factor scores for GHI, FN and AtLF (i.e. evaluated at zero): the predicted WTP would be €1.34 for the exotic smoothie and €1.44 for the domestic smoothie. If a participant had above average attitudes towards local foods, his expected WTP would decrease for the exotic smoothie. If his AtLF score were to increase by one point, his expected WTP for the exotic smoothie would decrease by €0.17 while holding all other variables in the model constant. As expected, we found that higher degrees of FN had a negative effect on the WTP for the exotic smoothie. If a participant’s FN score was to increase by one point, his/her predicted WTP would decrease by €0.25 for the exotic smoothie. GHI had no statistically significant effect on the WTP for both smoothies.

The results of Auction II (information) indicated that providing information on the origin of the fruits had no effect on the WTP for both smoothies. However, the panel regression results suggested that the treatment effect was moderated by the attitude towards local foods.

Table 4
Tobit panel estimates.

	Exotic (1)		Exotic (2)		Exotic (3)		Domestic (1)		Domestic (2)		Domestic (3)	
	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE
Baseline (Intercept)	1.288	0.163	1.335	0.061	1.334	0.063	1.324	0.165	1.448	0.056	1.392	0.039
healthPerceptions	0.175	0.056	0.162	0.057	0.162	0.057	0.155	0.041	0.178	0.042	0.178	0.042
curiosityPerceptions	0.030	0.057	0.036	0.058	0.036	0.058	0.091	0.049	0.055	0.050	0.055	0.050
AtLF	-0.175	0.082	-0.165	0.083	-0.168	0.083	-0.106	0.068	-0.087	0.069	-0.083	0.046
GHI	-0.011	0.115	-0.007	0.114	-0.017	0.118	0.099	0.095	0.106	0.091	-0.025	0.089
FN	-0.252	0.095	-0.248	0.094	-0.266	0.098	-0.065	0.082	-0.055	0.111	-0.024	0.057
higherIncome	0.158	0.133					0.164	0.104				
<25 years	-0.053	0.126					0.045	0.098				
Female	0.029	0.130					0.035	0.135				
Info treatment	-0.052	0.051	-0.052	0.051	-0.052	0.051	0.028	0.038	0.028	0.038	0.028	0.037
info:AtLF	0.030	0.068	0.030	0.068	0.030	0.068	0.116	0.051	0.116	0.052	0.116	0.050
info:GHI	-0.080	0.095	-0.080	0.095	-0.079	0.094	-0.061	0.071	-0.061	0.071	-0.061	0.070
info:FN	0.009	0.076	0.009	0.076	0.009	0.076	0.027	0.057	0.027	0.058	0.027	0.056
Taste treatment	-0.166	0.051	-0.166	0.051	-0.166	0.051	-0.016	0.038	-0.016	0.038	-0.016	0.037
taste:AtLF	0.118	0.068	0.118	0.068	0.118	0.068	0.008	0.051	0.008	0.052	0.008	0.050
taste:GHI	0.046	0.095	0.046	0.095	0.046	0.094	-0.111	0.071	-0.111	0.071	-0.111	0.070
taste:FN	0.135	0.076	0.135	0.076	0.135	0.076	-0.003	0.057	-0.003	0.058	-0.003	0.056
Log-Likelihood(1):	-276.611		-277.947		-283.071		-208.850		-209.8596		-215.474	
Log-Likelihood(0):	-298.091		587.894		594.142		455.700		451.720		458.948	
BIC	664.414		649.529		648.073		528.892		513.355		512.879	

Signif. codes: * p < 0.05; ** p < 0.01; *** p < 0.001; product perceptions were standardized. SE = standard errors. AtLF = Attitudes toward Local Food. GHI = General Health Interest. FN = Food Neophobia.

Participants with more positive attitudes were more receptive to the information treatment, resulting in higher bids for the domestic smoothie (a one point increase in the AtLF factor score would result in a €0.12 increase in the WTP when compared to the baseline auction). This was shown by the significant and positive coefficient for the interaction term.

The results of Auction III (tasting) indicated a negative effect of the tasting on the WTP for the exotic smoothie. Participant's predicted WTP decreased by €0.17 when compared to Auction I (baseline). This corresponded well with the only slightly positive evaluation of the taste of the exotic smoothie, as shown in Table 2, when compared to the taste rating of the domestic smoothie.

Finally, we assessed factors driving the difference in participant's WTP for the domestic and exotic smoothie. Table 5 reports the regression models that explained the willingness to pay a premium for the domestic smoothie across the three auctions. The explanatory variables used were the AtLF, GHI, and FN factor scores, as well as the perceived product and sensory differences.

For auction I (visual only), the intercept was found to be statistically insignificant. This suggests that there is no premium predicted for the domestic smoothie for participants with average GHI, FN, and AtLF factor scores (i.e. if evaluated at zero) and with identical product perceptions (i.e. $\Delta\text{healthPerceptions} = \text{healthPerceptions}_{\text{domestic}} - \text{healthPerceptions}_{\text{exotic}} = \text{zero}$). Participants with higher GHI and FN scores, and more favorable health and stronger curiosity perceptions regarding the domestic smoothie were predicted to have a higher WTP for the domestic smoothie in auction I. For auction II, Table 5 shows that the model predicted a premium (€0.16) for the domestic smoothie after the information provision, indicating a positive treatment effect. Higher FN scores were associated with a higher premium for the domestic smoothie. Auction III results suggest that there is still a premium for the domestic smoothie after the tasting (€0.07). However, the differences in the WTP for both smoothies seemed now primarily driven by differences in the sensory valuations, while perceptions of the product's healthiness or participants' curiosity to try the product did no longer have a significant impact. Moreover, FN was no longer a significant predictor of the WTP for the domestic smoothie. Surprisingly, however, we now saw a significant effect of the LF score and a lower WTP was predicted for participants with a higher AtLF score.

4. Discussion

Smoothies are often considered a trendy, healthy, and nutritious snack option (McCartney et al., 2018; Schienkewitz et al., 2020). When combined with the superfoods trend, they have the potential to increase overall fruit intake, leading to public health benefits and to not just act as a marketing ploy to boost sale. This could also draw more attention to nutrient-dense domestic fruits, as there are concerns about the ecological footprint of imported exotic superfoods (Franco Lucas et al., 2021; Wiedenroth & Otter, 2021). However, there is a lack of studies assessing the drivers of choosing nutrient-dense domestic over exotic fruits. To fill this void, this study set out with the aim of assessing (1) the role of attitudes and consumers' perceptions in WTP for smoothies containing domestic and exotic fruits; (2) whether WTP for both smoothies is affected once participants become aware of the fruits' origin and nutritional properties and once they tasted the smoothies; and (3) the factors explaining the WTP a premium for the domestic smoothie over the exotic smoothie.

4.1. The sample

We sampled a younger, health- and nutrition-oriented consumer group known to represent the main consumers of superfoods in Germany and Europe (Franco Lucas et al., 2022a, 2021; Oude Groeniger et al., 2017; Wiedenroth & Otter, 2021). Our sample perceived superfoods as a healthy but expensive food trend, dominated by exotic foods. As

Table 5
Factors explaining the willingness to pay a premium for the domestic smoothie.

	Auction I		Auction II		Auction III				
	Est.	SE	Est.	SE	Est.	SE			
(Intercept)	0.068	0.055	0.164	0.057	**	0.074	0.035	*	
GHI	0.127	0.065	0.142	0.103		0.048	0.052		
FN	0.144	0.063	*	0.158	0.068	*	0.002	0.041	
AtLF	0.021	0.059		0.110	0.063		-0.125	0.050	*
Δ healthPerceptions	0.185	0.076	*	0.133	0.085		-0.017	0.046	
Δ curiosityPerceptions	0.062	0.025	*	0.064	0.032	*	-0.004	0.019	
Δ tastePerceptions							0.297	0.033	***
Multiple R ²	0.229		0.217			0.634			
Adjusted R ²	0.194		0.182			0.614			
F-statistic:	6.53 on 5 and 110 DF		6.11 on 5 and 110 DF			31.49 on 6 and 109 DF			
p-value:	0.000		4.98e-05			< 2.2e-16			

Signif. codes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Robust SE of type HCO. Differences (Δ) in WTP and product perceptions are calculated as value domestic – value exotic. SE = standard errors. AtLF = Attitudes toward Local Food. GHI = General Health Interest. FN = Food Neophobia.

reported in previous studies (Franco Lucas et al., 2021; Wiedenroth & Otter, 2021), some consumers (approximately one-third in the present study) perceived superfoods as relatively harmful to the environment. This provides an opportunity for the promotion and use of domestic foods as substitutes, especially since the consumers surveyed perceived the production of local fruits and vegetables as good for the environment. Moreover, they strongly associated the consumption of local fruits and vegetables with personal benefits (egoistic beliefs), such as generally being healthier, more nutritious, and tastier. This focus in the samples' perceptions of local food was revealed in the factor analysis. Although societal benefits (altruistic beliefs), such as caring for the environment, fair wages, and supporting the local economy were often linked to local food (e.g., Adams & Adams, 2011; Feldmann & Hamm, 2015), they are not reflected in our latent AtLF factor. This is surprising, but heterogeneity in beliefs is common, so the derived factor may reflect the beliefs of this particular consumer group. This belief structure is plausible, as Feldmann and Hamm (2015) concluded in their extensive review that beliefs related to intrinsic product quality and personal health were the most frequently cited drivers of local food purchases.

4.2. The effect of consumer characteristics and product perceptions

An initial objective of our Vickrey auctions was to determine the role of sociodemographic and psychographic characteristics, as well as product perceptions, on consumers' WTP for fruit smoothies containing either domestic or exotic superfood ingredients (Auction I). First, with respect to *product perceptions*, our findings showed more favorable nutritional perceptions for the domestic fruits, while the exotic fruits easier caught consumers' attention. However, it should be noted that their effect on WTP was similar for both smoothies: stronger perceptions that a smoothie contains healthy nutrients with a positive effect on one's health increased WTP for both the domestic and exotic smoothies; while the curiosity to try a smoothie due to its unfamiliar ingredients did not seem to play a role in consumers' auction bids for either smoothie.

Second, when looking at attitudes, it is important to consider that participants' *attitudes toward local food* were centered on positive health- and nutrition-related associations. Those with stronger beliefs in this regard had lower WTP for the exotic smoothie. Moreover, *food neophobia*, as predicted by the food neophobia literature (Arvola et al., 1999; Barrena & Sánchez, 2013; Pliner & Hobden, 1992; Siegrist et al., 2013; Tuorila et al., 1994), was negatively related to the WTP for the exotic smoothie containing novel fruits (i.e., pink dragon fruit and soursop), with more neophobic consumers showing a lower WTP for the exotic smoothie, while it had no effect on the WTP for the domestic smoothie containing common bush berries. A surprising result, at least at first, is that we found an insignificant effect of *general health interest* on the absolute WTP for both smoothies. However, given that we sampled

quite health-conscious consumers and that healthy product perceptions were significant, this suggests that the more specific and product-related concept was relevant in driving absolute WTP, while the more generic one was not. However, GHI was a driver of the WTPP for the domestic smoothie over the exotic smoothie in Auction I. This could be due to the fact that berry consumption has increasingly become a focus of healthy eating among Germans (Hetebrügge, 2022), and health-conscious consumers are thus more familiar with these fruits and potentially attribute stronger health benefits to them.

Third, in terms of sociodemographic characteristics (i.e., *gender, age and income*), similar to previous studies, we found that they do not play a primary role in determining our participants' WTP for both smoothies and their WTPP for the domestic smoothie (e.g., Padilla Bravo et al., 2013; Streletskaia et al., 2023). We believe this is an artifact of our fairly homogeneous sample; we would at least expect an income-level effect with a broader income distribution. Other effects also seem possible with representative samples, as superfood consumption has been associated not only with wealthier consumers, but also with women and younger consumers (Franco Lucas et al., 2022a; Oude Groeniger et al., 2017; Wiedenroth & Otter, 2021).

4.3. The effect of information and taste

The second objective was to evaluate the changes in WTP for both smoothies after providing information about the autochthonous growing region of the fruits (Auction II) and after the tasting (Auction III). We found no direct effect of the information treatment on the absolute WTP for both smoothies. However, the treatment did drive the WTPP for the domestic smoothie. Moreover, the treatment effect was moderated by the participant's attitude towards local food. When the treatment stressed the origin of the fruits, the attitude towards local food was a significant driver of auction bids for the domestic smoothie, resulting in higher WTP for the domestic smoothie. This is in line with previous studies on moderated treatment effects, which have shown that individuals are more receptive to information that aligns with their attitudes (e.g., Fernqvist & Ekelund, 2014; Gassler et al., 2019; Odou et al., 2023; Vainio et al., 2018).

The results of Auction III (tasting), which showed a negative effect of the tasting on WTP for the exotic smoothie, highlighted the importance of taste to consumers, particularly the importance of meeting consumer expectations. Given the higher curiosity to try the exotic smoothie, the decrease in WTP for the exotic smoothie could be explained as a kind of negative disconfirmation. This occurs when the experience falls short of expectations, leading to dissatisfaction (Deliza & MacFIE, 1996; Raimondo et al., 2024; Seppä et al., 2015). This finding is also in line with Botelho et al. (2017), who emphasize the importance of taste in explaining the WTPP for foreign over domestic varieties of apples and

pears.

For smoothie consumers, “liking the taste” is a primary reason for consumption (McCartney et al., 2018). Therefore, it is unsurprising that the WTPP for the domestic smoothie depended considerably on participants’ sensory experiences. In particular, incorporating taste perceptions into the model significantly increased its explanatory power. The WTPP was strongly driven by differences in the sensory evaluations (on average, the taste of the domestic smoothie was preferred to the exotic smoothie), but no longer by product perceptions. This underscores the importance of sensory experiences in the study of consumer preferences, a point that has been extensively discussed in the existing literature. A noteworthy result is that food neophobia was no longer a significant predictor of the WTPP for the domestic smoothie after the tasting. This suggests that food neophobia has been associated with taste uncertainty, which was resolved by the tasting. This mechanism was introduced by Pliner et al. (1993) and Pliner and Hobden (1992), who discussed the possibility that neophobic individuals may avoid or dislike a novel food because they believe it will be unpleasant. They proposed that exposure to the novel food, such as tasting it, might help to unlearn these negative beliefs. A puzzling finding was that the WTPP for the domestic smoothie decreased with higher AtLF scores. The AtLF for the present sample captures the positive nutritional and health beliefs associated with local foods. Thus, our results may indicate that taste is more important than the origin of the fruits or their potential health benefits. Raimondo et al. (2024) and Vidigal et al. (2011) have drawn similar conclusions.

4.4. Practical implications

The findings have several practical implications for the marketing of processed fruit products with novel and familiar superfood ingredients. First, since exotic superfoods are perceived negatively by some consumers, framing vitamin-rich domestic fruits as superfood alternatives may support their consumption. Second, when marketing products with domestic fruits, such as native berries, fruit growers and fruit processors can build on the product’s familiar taste. They should further promote the positive nutritional image of domestic fruits, stressing their richness in beneficial compounds (e.g., antioxidants, fiber, or micronutrients) and in comparison to alternative, exotic superfoods. In fact, by emphasizing the domestic, local cultivation of fruits, they can target specific consumer groups who associate health and nutritional benefits with local foods. Subsequently, the growth of the consumer market and the demand for domestic superfoods, coupled with the potential for price premiums for locally sourced berries, could present opportunities for the stimulation of domestic production and result in more local sourcing by manufacturers. Third, when marketing products containing exotic, novel fruits, these products benefit from increased attention due to the curiosity of neophilic consumers. However, these products also face limitations due to their unfamiliar taste profile. Therefore, it is crucial to manage consumer expectations. This begins with careful product design, which includes the selection of attractive fruits that arouse interest but also have appealing taste profiles. Country-specific sensory market research then has to ensure that new products align with consumer preferences.

4.5. Limitations and future research

Our study is not without limitations: The sample is relatively younger and better educated than the German population. Therefore, the results cannot be generalized, but represent a typical consumer group for superfoods. To draw more general conclusions for growing the processed fruit market and increase overall fruit intake among less health- and nutrition-oriented individuals, more research using representative samples is needed.

Moreover, the two smoothies used in this study are a narrow sample of possible exotic and domestic superfood ingredients that were selected based on the market availability of comparable products to conduct an

incentive-compatible EA. Future research should consider a broader range of products and focus on the area of cultivation in addition to where plants are native or autochthonous, as a recent study finds that where a plant is grown is more important to consumers than its autochthonous origin (Raimondo et al., 2024). This is important because consumption of blueberries and raspberries in Germany far exceeds domestic production, with only about 20 % of blueberries and 15 % of raspberries on the market coming from Germany (Hetebrügge, 2022).

Given the current proliferation of nutrition and eco-labels on processed foods and their effect on product perceptions and purchase intentions (e.g., Büttner et al., 2024; De Temmerman et al., 2021; Gassler et al., 2023; Jürkenbeck et al., 2024; Sörqvist et al., 2015), another avenue for future research would be to assess whether these labels differently affect purchase intentions for products containing nutrient-dense domestic (locally sourced) and exotic (imported) fruits. Previous research has shown a negative halo effect from unfavorable eco-labels on expected tastiness and perceived healthiness of a food product (e.g., Büttner et al., 2024; Sörqvist et al., 2015). As consumers are concerned about the ecological footprint of imported exotic superfoods (Franco Lucas et al., 2021; Wiedenroth & Otter, 2021), it would be interesting to investigate whether environmental concerns become more salient in the presence of an eco-label, to the extent that they outweigh curiosity and negatively affect taste and health perceptions and in turn purchase intentions, especially in the case of first-time purchases. This would be valuable information for marketers who need to align product attributes with consumers’ conflicting desires for healthy and sustainable yet tasty choices to decide when to emphasize the healthiness, sustainability or taste of a smoothie, as Erhard et al. (2024) note.

5. Conclusion

In summary, the study provides exploratory insights into the factors driving consumer preferences for domestic and exotic superfood ingredients in a perceived healthy snack product (i.e., fruit smoothies). It examines how providing information about the origin of the fruits, followed by a tasting, affects consumers’ WTP. We find that participants generally perceive superfoods as a healthy but expensive food trend. Moreover, they strongly associate them with exotic foods and perceive them as quite harmful to the environment. For the two smoothies in particular, participants were more eager to try the exotic smoothie, but agreed more strongly with statements endorsing the positive health benefits and good taste of the domestic smoothie. When the smoothies could only be inspected visually, WTP and price premiums were driven by food neophobia, and health and nutrient perceptions. In general, we found a higher WTP for the domestic smoothie, which was reinforced by providing information about the origin of the fruits. After tasting, the WTPP was strongly driven by differences in the sensory evaluations, but no longer by product perceptions and food neophobia. These results indicated that food neophobia is related to taste uncertainty, which was resolved by the tasting. We discuss practical implications for marketing processed fruit products with novel and familiar superfood ingredients, emphasizing the role of designing pleasing taste profiles and supporting their positive nutritional image.

6. Ethics statement

The study was conducted in accordance with national and institutional guidelines for research involving human subjects and in accordance with local statutory requirements. The study and its experimental set-up were explained to participants and informed consent was obtained from all individuals prior to participation in the study. The products sampled were safe for consumption. Participation was voluntary. Anonymity was assured, and participants were able to withdraw from the study at any time without consequence. They were compensated for their participation with a €15 gift voucher.

CRedit authorship contribution statement

Birgit Gassler: Writing – review & editing, Writing – original draft, Visualization, Software, Methodology, Formal analysis, Data curation, Conceptualization. **Ramona Teuber:** Writing – review & editing, Writing – original draft, Resources, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence

the work reported in this paper.

Data availability

Data will be made available on request.


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Appendix A1. Visual presentation of the exotic and domestic smoothie before Auction I

Smoothie (1) – 250 ml

with pink dragon fruit and soursop



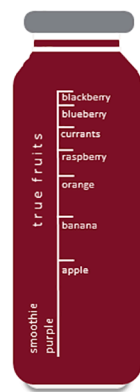
Ingredients:
 1 ½ pressed apples (49%)
 1/2 pureed banana (22%)
 1/9 pureed soursop (17%)
 1/7 pureed pink dragon fruit (12%)

Mean nutritional values	Per 100 ml
Energy	53 kcal / 223 kJ
Fat	0 g
of which saturates	0 g
Carbohydrate	12.4 g
of which sugars	10.7 g
Dietary fiber	0.7 g
Protein	< 0.5 g
Salt	0 g

Notes:
 Graphic illustrations used for publishing purposes only. Real products were shown during the experimental sessions.
 Sources: <https://true-fruits.com/smoothies/smoothie-pink>; <https://true-fruits.com/smoothies/smoothie-purple>

Smoothie (2) – 250 ml

with raspberries, blueberries, blackberries, and currants



Ingredients:
 1 pressed apple (35%)
 1/2 pureed banana (17%)
 1/2 pressed orange (15%)
 10 pureed raspberries (10%)
 18 pureed blueberries (8%)
 10 pureed red currants (6%)
 7 pureed blackberries (6%)
 22 pureed black currants (3%)

Mean nutritional values	Per 100 ml
Energy	52 kcal / 220 kJ
Fat	0 g
of which saturates	0 g
Carbohydrate	12 g
of which sugars	10 g
Dietary fiber	1.8 g
Protein	0.7 g
Salt	0 g

Appendix A2. Information on superfoods in general and the superfood ingredients contained in both smoothies provided before Auction

You will now receive some general information on superfoods. Please read this carefully.

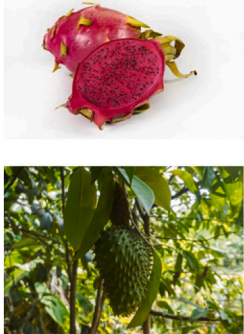

THE PROS

- Exotic superfoods such as chia seeds, goji berries and dragon fruit are frequently considered to have major health benefits.
- However, there are also domestic superfoods such as flaxseed, blueberries, chokeberries and kale.
- These contain just as many healthy nutrients as their exotic counterparts, according to the Verbraucherzentrale Nordrhein-Westfalen (North Rhine-Westphalia consumer advice center).

THE CONS

- The exotic superfoods have travelled a long way. This means they lose many of their nutrients, according to the European Food Information Centre (EFIC).
- The cultivation, processing and long transport of exotic superfoods to Germany has a negative impact on the environment.
- According to the German Nutrition Society, the effects often attributed to superfoods, such as their anti-cancer properties, are not scientifically proven.

Before we continue with the 2nd auction, we will provide you with further information about the two smoothies:

Smoothie (1)	Smoothie (2)
<p>The exotic pink dragon fruit and soursop</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;">  </div> <div style="width: 65%;"> <ul style="list-style-type: none"> • contain high levels of important vitamins, such as vitamin A and C • grow in the tropics, such as in Brazil, Columbia, Indonesia, and Vietnam </div> </div>	<p>The domestic raspberries, blueberries, blackberries, and black and red currants</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;">  </div> <div style="width: 65%;"> <ul style="list-style-type: none"> • contain high levels of important vitamins, such as vitamin A and C • grow in central and eastern Europe and are therefore native to Germany </div> </div>

Pictures from: <https://pixabay.com>

Appendix A3. Summary of the general health interest (GHI), food neophobia (FN), and attitudes toward local food (AtLF) scales – Exploratory and confirmatory factor analysis

Scale	Source Items	Mean (SD)	EFA loading	KMO α	CFA loading	Mean (SD) α final CFA loadings
GHI	Roininen et al. (1999)	3.62 (0.65)		0.83 0.76		3.81 (0.72) 0.78
1	I am very particular about the healthiness of food I eat.	3.47 (1.00)	0.666		0.658	0.650
2	I always follow a healthy and balanced diet.	3.86 (0.94)	0.666		0.631	0.648
3	It is important for me that my daily diet contains a lot of vitamins and minerals.	4.23 (0.85)	0.603		0.525	0.553
4	It is important for me that my diet is low in fat.	2.75 (1.13)	0.291		0.320	
5R	The healthiness of food has little impact on my food choices.	3.78 (1.08)	0.696		0.738	0.715
6R	I eat what I like and I do not worry much about the healthiness of food.	3.72 (1.05)	0.589		0.615	0.600
7R	The healthiness of snacks makes no difference to me.	3.56 (1.04)	0.442		0.450	
FN	Siegrist et al. (2013) based on Pliner and Hobden (1992) , in which the terms “ethnic food” and “ethnic restaurant” are replaced by “food from other cultures” and “places where foods from other cultures are served”.	1.96 (0.66)		0.84 0.85		1.94 (0.70) 0.84
1R	I am constantly sampling new and different foods.	2.31 (1.03)	0.510		0.531	0.524
2	I do not trust new foods.	1.86 (0.87)	0.606		0.531	0.529
3	If I do not know what is in a food, I will not try it.	2.28 (1.15)	0.333		0.347	
4R	I like foods from different countries.	1.46 (0.73)	0.733		0.548	0.555
5	<i>Food from other cultures</i> looks too weird to eat.	1.60 (0.81)	0.741		0.614	0.630
6R	At dinner parties, I will try a new food.	1.80 (0.90)	0.539		0.473	
7	I am afraid to eat things I have never had before.	1.67 (0.92)	0.752		0.687	0.687
8	I am very particular about the foods I will eat.	2.54 (1.33)	0.619		0.773	0.741
9R	I will eat almost anything.	2.27 (1.24)	0.604		0.693	0.652
10R	I like going to places where foods from other cultures are served.	1.78 (1.00)	0.706		0.731	0.737

(continued on next page)

(continued)

Scale	Source Items	Mean (SD)	EFA loading	KMO α	CFA loading	Mean (SD) α final CFA loadings
AtLF	(Adams & Adams, 2011)			0.70 0.66		3.32 (0.88) 0.73
1	The production of local fruits and vegetables is good for the environment.	4.41 (0.77)	0.246		0.153	
5	Local fruits and vegetables are not likely to have been grown with the use of pesticides.	3.01 (1.12)	0.308		0.325	
3	Produce that comes from local sources is healthier for you.	3.29 (1.06)	0.771		0.845	0.866
6	Produce that comes from local sources is more nutritious.	3.26 (1.08)	0.722		0.796	0.789
2	Fruits and vegetables that are grown locally taste a great deal better than produce that is grown far away.	3.40 (1.13)	0.499		0.594	0.602
4	Buying local produce can help you save money on groceries.	2.80 (0.99)	0.305		0.241	
7	Buying local produce can help support domestic farmers.	4.02 (1.00)	0.401		0.352	

1 = strongly disagree; 5 = strongly agree; R = reversed items.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.foodqual.2024.105342>.

References

- Adams, D., & Adams, A. (2011). De-placing local at the farmers' market: Consumer conceptions of local foods. *Journal of Rural Social Sciences*, 26. <https://egrove.olemiss.edu/jrss/vol26/iss2/4>.
- Arvola, A., Lähteenmäki, L., & Tuorila, H. (1999). Predicting the intent to purchase unfamiliar and familiar cheeses: The effects of attitudes, expected liking and food neophobia. *Appetite*, 32, 113–126. <https://doi.org/10.1006/appe.1998.0181>
- Bäckström, A., Pirttilä-Backman, A.-M., & Tuorila, H. (2004). Willingness to try new foods as predicted by social representations and attitude and trait scales. *Appetite*, 43, 75–83. <https://doi.org/10.1016/j.appet.2004.03.004>
- Barrena, R., & Sánchez, M. (2013). Neophobia, personal consumer values and novel food acceptance. *Food Quality and Preference*, 27, 72–84. <https://doi.org/10.1016/j.foodqual.2012.06.007>
- Botelho, A., Dinis, I., Lourenço-Gomes, L., Moreira, J., Costa Pinto, L., & Simões, O. (2017). The effect of sequential information on consumers' willingness to pay for credence food attributes. *Appetite*, 118, 17–25. <https://doi.org/10.1016/j.appet.2017.07.021>
- Bruschi, V., Teuber, R., & Dolgoplova, I. (2015). Acceptance and willingness to pay for health-enhancing bakery products – Empirical evidence for young urban Russian consumers. *Food Quality and Preference*, 46, 79–91. <https://doi.org/10.1016/j.foodqual.2015.07.008>
- Butterworth, M., Davis, G., Bishop, K., Reyna, L., & Rhodes, A. (2020). What is a superfood anyway? Six key ingredients for making a food "super". *Gastronomica*, 20, 46–58. <https://doi.org/10.1525/gfc.2020.20.1.46>
- Büttner, V., Gassler, B., & Teuber, R. (2024). Does the Eco-Score lead to a halo effect? Influence of a sustainability label on product perceptions and purchase intention. *Food Quality and Preference*, 121, Article 105246. <https://doi.org/10.1016/j.foodqual.2024.105246>
- Canavari, M., Drichoutis, A. C., Lusk, J. L., & Nayga, R. M., Jr. (2019). How to run an experimental auction: A review of recent advances. *European Review of Agricultural Economics*, 46, 862–922. <https://doi.org/10.1093/erae/jbz038>
- Croissant, Y., & Millo, G. (2018). *Panel data econometrics with R*. John Wiley & Sons.
- Croissant, Y., & Millo, G. (2008). Panel data econometrics in R: The plm package. *Journal of Statistical Software*, 27, 1–43. <https://doi.org/10.18637/jss.v027.i02>
- De Temmerman, J., Heeremans, E., Slabbinck, H., & Vermeir, I. (2021). The impact of the Nutri-Score nutrition label on perceived healthiness and purchase intentions. *Appetite*, 157, Article 104995. <https://doi.org/10.1016/j.appet.2020.104995>
- Deliza, R., & MacFIE, H. J. H. (1996). The generation of sensory expectation by external cues and its effect on sensory perception and hedonic ratings: A review. *Journal of Sensory Studies*, 11, 103–128. <https://doi.org/10.1111/j.1745-459X.1996.tb00036.x>
- DGE (The German Nutrition Society), 2011. Bedeutung von Obst und Gemüse in der Ernährung des Menschen [WWW Document]. DGE. URL <http://www.dge.de/wissenschaft/fachinformationen/bedeutung-von-obst-und-gemuese-in-der-ernaehrung-des-menschen/> (accessed 11.20.23).
- Erhard, A., Jahn, S., & Boztug, Y. (2024). Tasty or sustainable? Goal conflict in plant-based food choice. *Food Quality and Preference*, 120, Article 105237. <https://doi.org/10.1016/j.foodqual.2024.105237>
- EUFIC, 2012. Superfood: Was verbirgt sich wirklich dahinter? [WWW Document]. URL <https://www.eufic.org/de/gesund-leben/artikel/superfood-was-verbirgt-sich-wirklich-dahinter> (accessed 11.24.23).
- European Commission, 2021. Dietary recommendations for fruit and vegetable intake [WWW Document]. Knowledge4Policy. URL https://knowledge4policy.ec.europa.eu/health-promotion-knowledge-gateway/fruit-vegetables-4_en (accessed 11.21.23).
- Feldmann, C., & Hamm, U. (2015). Consumers' perceptions and preferences for local food: A review. *Food Quality and Preference*, 40, 152–164. <https://doi.org/10.1016/j.foodqual.2014.09.014>
- Fernández-Ríos, A., Laso, J., Hoehn, D., Amo-Setién, F. J., Abajas-Bustillo, R., Ortego, C., Fullana-i-Palmer, P., Bala, A., Battle-Bayer, L., Balcells, M., Puig, R., Aldaco, R., & Margallo, M. (2022). A critical review of superfoods from a holistic nutritional and environmental approach. *Journal of Cleaner Production*, 379, Article 134491. <https://doi.org/10.1016/j.jclepro.2022.134491>
- Fernqvist, F., & Ekelund, L. (2014). Credence and the effect on consumer liking of food – A review. *Food Quality and Preference*, 32, 340–353. <https://doi.org/10.1016/j.foodqual.2013.10.005>
- Franco Lucas, B., Costa, J. A. V., & Brunner, T. A. (2021). Superfoods: Drivers for consumption. *Journal of Food Products Marketing*, 27, 1–9. <https://doi.org/10.1080/10454446.2020.1869133>
- Franco Lucas, B., Götze, F., Vieira Costa, J. A., & Brunner, T. A. (2022a). Consumer perception toward "superfoods": A segmentation study. *Journal of International Food & Agribusiness Marketing*, 1–19. <https://doi.org/10.1080/08974438.2022.2044955>
- Franco Lucas, B., Vieira Costa, A. J., & Brunner, T. A. (2022b). How information on superfoods changes consumers' attitudes: An explorative survey study. *Foods*, 11, 1863. <https://doi.org/10.3390/foods11131863>
- Gassler, B., Fronzeck, C., & Spiller, A. (2019). Tasting organic: The influence of taste and quality perception on the willingness to pay for organic wine. *International Journal of Wine Business Research*, 31, 221–242. <https://doi.org/10.1108/IJWB-09-2017-0062>
- Gassler, B., Faesl, C. K., & Moeser, A. (2023). Toward a differentiated understanding of the effect of Nutri-Score nutrition labeling on healthier food choices. *Agribusiness*, 39 (1), 28–50. <https://doi.org/10.1002/agr.21762>
- Grebitus, C., Lusk, J. L., & Nayga, R. M. (2013). Effect of distance of transportation on willingness to pay for food. *Ecological Economics, Transaction Costs and Environmental Policy*, 88, 67–75. <https://doi.org/10.1016/j.ecolecon.2013.01.006>
- Habiyaremye, N., Mtimit, N., Ouma, E. A., & Obare, G. A. (2023). Consumers' willingness to pay for safe and quality milk: Evidence from experimental auctions in Rwanda. *Agribusiness*, 39, 1049–1074. <https://doi.org/10.1002/agr.21817>
- Hauser, K., Birnbaum, M., Meyer-Graf, S., Marquardt, J.-P., 2024. Was ist 5 am Tag? [WWW Document]. Samstag.de. URL <https://www.samstag.de/was-ist-5-am-tag/> (accessed 3.18.24).
- Hetebrügge, K., 2022. Beerenhunger: Heimischer Anbau nimmt zu, während Importware weiter dominiert. URL <https://ilh.hessen.de/pflanze/obstbau/beerenhunger-heimischer-anbau-nimmt-zu-waehrend-importware-weiter-dominiert/> (accessed 2.26.24).
- Jürkenbeck, K., Sanchez-Siles, L., & Siegrist, M. (2024). Nutri-Score and Eco-Score: Consumers' trade-offs when facing two sustainability labels. *Food Quality and Preference*, 118, Article 105200. <https://doi.org/10.1016/j.foodqual.2024.105200>
- Liu, H., Meng-Lewis, Y., Ibrahim, F., & Zhu, X. (2021). Superfoods, super healthy: Myth or reality? Examining consumers' repurchase and WOM intention regarding superfoods: A theory of consumption values perspective. *Journal of Business Research*, 137, 69–88. <https://doi.org/10.1016/j.jbusres.2021.08.018>

- Loyer, J., & Knight, C. (2018). Selling the “Inca superfood”: Nutritional primitivism in superfoods books and maca marketing. *Food, Culture & Society*, 21, 449–467. <https://doi.org/10.1080/15528014.2018.1480645>
- Lusk, J. L., & Shogren, J. F. (2007). *Experimental auctions: Methods and applications in economic and marketing research, quantitative methods for applied economics and business research*. Cambridge: Cambridge University Press. doi: 10.1017/CBO9780511611261.
- Magrath, A., & Sanz, M. J. (2020). Environmental and social consequences of the increase in the demand for ‘superfoods’ world-wide. *People and Nature*, 2, 267–278. <https://doi.org/10.1002/pan3.10085>
- McCartney, D., Rattray, M., Desbrow, B., Khalesi, S., & Irwin, C. (2018). Smoothies: Exploring the attitudes, beliefs and behaviours of consumers and non-consumers. *Current Research in Nutrition and Food Science Journal*, 6, 425–436.
- Merriam-Webster, n.d. Superfood [WWW Document]. Merriam-Webster.com. URL <https://www.merriam-webster.com/dictionary/superfoods> (accessed 11.15.23).
- Meyerding, S. G. H., Kürzdörfer, A., & Gassler, B. (2018). Consumer preferences for superfood ingredients—The case of bread in Germany. *Sustainability*, 10, 4667. <https://doi.org/10.3390/su10124667>
- Meyerding, S. G. H., Trajer, N., & Lehberger, M. (2019). What is local food? The case of consumer preferences for local food labeling of tomatoes in Germany. *Journal of Cleaner Production*, 207, 30–43. <https://doi.org/10.1016/j.jclepro.2018.09.224>
- Mustonen, S., Oerlemans, P., & Tuorila, H. (2012). Familiarity with and affective responses to foods in 8–11-year-old children. The role of food neophobia and parental education. *Appetite*, 58, 777–780. <https://doi.org/10.1016/j.appet.2012.01.027>
- Odou, P., Schill, M., Chaney, D., & Roznowicz, C. (2023). Store support for local producers as a driver of legitimacy and purchase intentions: A moderated mediation model. *Journal of Cleaner Production*, 394, Article 136361. <https://doi.org/10.1016/j.jclepro.2023.136361>
- Oude Groeniger, J., van Lenthe, F. J., Beenackers, M. A., & Kamphuis, C. B. M. (2017). Does social distinction contribute to socioeconomic inequalities in diet: The case of ‘superfoods’ consumption. *International Journal of Behavioral Nutrition and Physical Activity*, 14, 40. <https://doi.org/10.1186/s12966-017-0495-x>
- Padilla Bravo, C., Cordts, A., Schulze, B., & Spiller, A. (2013). Assessing determinants of organic food consumption using data from the German National Nutrition Survey II. *Food Quality and Preference*, 28, 60–70. <https://doi.org/10.1016/j.foodqual.2012.08.010>
- Pliner, P., & Hobden, K. (1992). Development of a scale to measure the trait of food neophobia in humans. *Appetite*, 19, 105–120. [https://doi.org/10.1016/0195-6663\(92\)90014-W](https://doi.org/10.1016/0195-6663(92)90014-W)
- Pliner, P., Pelchat, M., & Grabski, M. (1993). Reduction of neophobia in humans by exposure to novel foods. *Appetite*, 20, 111–123. <https://doi.org/10.1006/appe.1993.1013>
- Printezis, I., Grebitus, C., & Hirsch, S. (2019). The price is right!? A meta-regression analysis on willingness to pay for local food. *PLoS One*, 14, Article e0215847. <https://doi.org/10.1371/journal.pone.0215847>
- Raimondo, M., Spina, D., D’Amico, M., di Vita, G., Califano, G., & Caracciolo, F. (2024). Taste matters more than origin: An experimental economics study on consumer preferences for native and foreign varieties of walnuts. *Food Quality and Preference*, 115, Article 105106. <https://doi.org/10.1016/j.foodqual.2024.105106>
- Roininen, K., Lähteenmäki, L., & Tuorila, H. (1999). Quantification of consumer attitudes to health and hedonic characteristics of foods. *Appetite*, 33, 71–88. <https://doi.org/10.1006/appe.1999.0232>
- Schienkiewitz, A., Haftenberger, M., & Mensink, G. B. M. (2020). Time trends of non-alcoholic beverage consumption among adults in Germany, 1990–2011. *Nutrition Journal*, 19, 28. <https://doi.org/10.1186/s12937-020-00538-8>
- Schmitt, E., Galli, F., Menozzi, D., Maye, D., Touzard, J.-M., Marescotti, A., Six, J., & Brunori, G. (2017). Comparing the sustainability of local and global food products in Europe. *Journal of Cleaner Production*, 165, 346–359. <https://doi.org/10.1016/j.jclepro.2017.07.039>
- Seppä, L., Latvala, T., Akaichi, F., Gil, J. M., & Tuorila, H. (2015). What are domestic apples worth? Hedonic responses and sensory information as drivers of willingness to pay. *Food Quality and Preference*, 43, 97–105. <https://doi.org/10.1016/j.foodqual.2015.02.013>
- Siegrist, M., Hartmann, C., & Keller, C. (2013). Antecedents of food neophobia and its association with eating behavior and food choices. *Food Quality and Preference*, 30, 293–298. <https://doi.org/10.1016/j.foodqual.2013.06.013>
- Sörqvist, P., Haga, A., Langeborg, L., Holmgren, M., Wallinder, M., Nösti, A., Seager, P. B., & Marsh, J. E. (2015). The green halo: Mechanisms and limits of the eco-label effect. *Food Quality and Preference*, 43, 1–9. <https://doi.org/10.1016/j.foodqual.2015.02.001>
- Streletskaia, N. A., Maruyama, S., Queisser, S., Cole, S., Stelick, A. N., & Lim, J. (2023). How information leads consumers to select specialty foods when tasting is not an option. *Food Quality and Preference*, 105, Article 104769. <https://doi.org/10.1016/j.foodqual.2022.104769>
- Tuorila, H., Meiselman, H. L., Bell, R., Cardello, A. V., & Johnson, W. (1994). Role of sensory and cognitive information in the enhancement of certainty and linking for novel and familiar foods. *Appetite*, 23, 231–246. <https://doi.org/10.1006/appe.1994.1056>
- Vainio, A., Irz, X., & Hartikainen, H. (2018). How effective are messages and their characteristics in changing behavioural intentions to substitute plant-based foods for red meat? The mediating role of prior beliefs. *Appetite*, 125, 217–224. <https://doi.org/10.1016/j.appet.2018.02.002>
- Vickrey, W. (1961). Counterspeculation, auctions, and competitive sealed tenders. *The Journal of Finance*, 16, 8–37. <https://doi.org/10.1111/j.1540-6261.1961.tb02789.x>
- Vidigal, M. C. T. R., Minim, V. P. R., Carvalho, N. B., Milagres, M. P., & Gonçalves, A. C. A. (2011). Effect of a health claim on consumer acceptance of exotic Brazilian fruit juices: Açai (*Euterpe oleracea* Mart.), Camu-camu (*Myrciaria dubia*), Cajá (*Spondias lutea* L.) and Umbu (*Spondias tuberosa* Arruda). *Food Research International, Exotic Fruits: Their Composition, Nutraceutical and Agroindustrial Potential*, 44, 1988–1996. <https://doi.org/10.1016/j.foodres.2010.11.028>
- WHO, 2020. Healthy diet [WWW Document]. URL <https://www.who.int/news-room/facts-sheets/detail/healthy-diet> (accessed 11.20.23).
- Wiedenroth, C. F., & Otter, V. (2022). Can new healthy luxury food products accelerate short food supply chain formation via social media marketing in high-income countries? *Agricultural and Food Economics*, 10, 31. <https://doi.org/10.1186/s40100-022-00238-3>
- Wiedenroth, C. F., & Otter, V. (2021). Who are the superfoods? New healthy luxury food products and social media marketing potential in Germany. *Foods*, 10, 2907. <https://doi.org/10.3390/foods10122907>