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Eliciting vulnerable consumers' preferences for redundant vs. organic and functional claims: Experimental auction studies among young and older adults

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ABSTRACT

The growing use of redundant claims on food products pose a risk for organic and functional food producers among others, as it can mislead consumers in their products' evaluations. Redundant claims refer to marketing statements that highlight qualities or attributes that are expected or should be inherent to the product. Previous studies reveal that consumers are generally willing to pay more for redundantly claimed products. In this study, preferences are analyzed for organic, functional, and redundantly labeled apple juice among specific consumer groups, namely young and old adults. To elicit individual monetary preferences a lab experiment and a field study were conducted with 147 younger (average age: 21 years) and 131 older participants (average age: 70 years), in both studies an incentive compatible technique was applied. Results showed that either younger and older consumers are willing to pay higher prices for organic, functional, and redundantly claimed apple juices. Perceived healthiness was a significant factor in increasing preferences for all the added valued products in the case of younger participants, but health only influenced preferences of organic and functional apple juice among older participants. Preferences of redundantly claimed and organic products were similar in the case of young participants, as functional and redundantly claimed juices preferences in the case of older participants.

1. Introduction

Food packaging labels serve as an essential tool for consumers in making informed choices when shopping [1]. The growing demand for more information about the product's production, quality, impact, and peculiarities that consumers will not be able to discern on their own by inspecting or eating the product has prompted companies to add value to their productions by implementing multiple labels on packaging [2,3]. This is because labels that create the impression that a food is safer, healthier, or more environmentally friendly or has other positive social benefits, in line with buyer sensibilities, leads in most cases to significant price increases [4–6]. However, such proliferation and differentiation fail to always support informed purchasing [7,8]. A particular issue that has emerged in recent years is the presence of redundant labeling on food packaging [3].

Redundant labeling is a relatively new topic in food consumer research, thus there is no widely accepted definition for this term. Redundant food label claims refer to marketing statements on food products that highlight qualities or attributes that are expected or should be inherent to the product category, thus adding little or no meaningful information to consumers while potentially creating confusion or exaggerating the product's qualities [9–11]. According to Wilson and Lusk [9], redundant labels have three types: 1) information which was already explicitly mentioned on the packaging (e.g., adding the words "non-GMO" to organic (naturally non-GMO) products [12]); 2) information inherently evident based on the nature of the product (e.g., the words "gluten-free" to naturally gluten-free orange juice [9]); 3) information implicitly covered by legal requirements (e.g., labeling skim milk "low-fat" when skim milk is already low-fat by definition (EU Regulation No. 1308/2013 of the European Parliament)). Despite

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adding minimal, no or overlapping information, hence in name redundant, the presence of these labels can affect consumers' perceptions and their willingness to pay.

Bernard et al [10] found that the appearance of a label with minimal additional information improved the WTP for watermelons and may lead participants to assume that the product is tastier, safer, and more likely to fit the consumer's definition of local if identified with "Delaware preserved farm." Heng et al. [11] found that adding redundant or superfluous labels to organic eggs increased WTP, even when customers were informed of the redundancy or superfluity. Same findings in the paper by Wilson and Lusk [9] in which 40–58 % of respondents were willing to pay price premiums for labeled products and the value continued for many consumers even after being informed of redundancy. Similar results were also found for the work of Ufer et al. [13] and Janβen and Langen [3] on dairy products, finding attractive the addition of redundant labeling on the price premium declared by US and German customers respectively. However, in most cases these are misleading interpretations by consumers, the result of information overload or confusion in decoding the claim [9,11]. Consumers may use decision heuristics to simplify their decision making, so the easy comprehensibility of self-explanatory labels may mediate during choice [14]. In addition, consumers may prefer to interpret labels according to their desired meaning rather than their actual meaning. In such a case, the mere existence of the label may be valuable to the consumer [13].

To extend the limited literature currently available on redundant labeling, the present study through two separate experiments involved different target vulnerable consumers to explore how the presence of labeling on packaging affects consumers' perception and actual monetary preferences. The two non-hypothetical experiments conducted in the laboratory and in the field involved two vulnerable consumer groups, the young and elderly Hungarian population, respectively. As suggested by the literature, different age groups correspond to different preferences, priorities and nutritional needs and consequently different preference and evaluation of labeled food products.

According to Hill and Sharma [15], consumer vulnerability can be defined, as "*a state, in which consumers are subject to harm because their access to and control over resources is restricted in ways that significantly inhibit their abilities to function in the marketplace.*" In the context of redundant claims, consumers have insufficient knowledge of certain food attributes, thus their ability to evaluate food product claims are limited, making them unprotected against redundant claims.

Most research consider infants, young children, ill and older adults as vulnerable groups in terms of food consumption [16], although consumer vulnerability cannot be restricted only to those groups [15]. For example, young adults are more prone to marketing impacts, with a potential exposure of unhealthy or risky food marketing [17]. Also, younger consumers tend to be more interested in labels that emphasize environmental or social responsibility, as they are more interested in issues related to sustainability and ethical consumption [18,19]. They are more likely to be influenced by packaging and design, as they tend to be more visually oriented and tend to perceive the product as healthier, regardless of the actual nutritional content of the product due to the presence of more labeling reported [20]. On the other hand, older consumers tend to be more focused on labels that provide health and nutrition information, as they are more interested in managing chronic health conditions and maintaining their overall well-being [21]. They may be more likely to seek out familiar brands and products and less open to trying new or unfamiliar products based solely on label claims. However, the elderly may have difficulty interpreting labeling due to age-related decline in cognitive and sensory abilities, which could make them more susceptible to misleading or inaccurate labeling claims that suggest, for example, that a food product has certain health benefits [22,23].

In this context, the current study is among the firsts to extend the current literature by exploring the vulnerability of these two specific target consumers to redundant labeling. The reference food used to conduct the experiments is apple juice, one of the most popular and widely consumed products in the Hungarian market available with numerous and varied labeling [24,25]. Respondents simultaneously view and evaluated four apple juices that differed from each other solely by their reported labeling.

Specifically, each study has a twofold objective: 1) to investigate whether the target consumers considered are mistakenly willing to pay a price premium for labels that provide redundant information when compared with the same product without labeling or types of labels that are well-known (e.g., organic and functional); and 2) to identify whether the potential triggers driving the price premium for redundant labeling compete/overlap with the motivations that prompt consumers to reward products that certify onerous production processes (such as organic).

The results provide valuable insights to food companies in designing effective food labeling marketing strategies and inform policy makers about the potential misleading effect of unclear labeling on consumers of all ages.

2. Methods

In order to elicit younger and older adults' willingness to pay for differently claimed products, two separate, but similar studies were set up, both using experimental auction method. Experimental auctions are popular method to determine monetary value of products, because they are not hypothetical, thus experiments resemble a real shopping situation [26]. Study 1 was conducted on the Buda campus of the Hungarian University of Agriculture and Life Sciences in Budapest between November and December 2021. During this time 147 respondents were recruited through posters, flyers and university mail lists. University students were recruited, as they consist mostly of the aimed age group (range 18–25 years), and they are easier to recruit. Previous study shows that there is no significant difference between the bidding behavior between student and non-student participants [27]. Only those participants were allowed to take part in the experiment, who were below 25 years of age, and if they bought and consumed apple juice in the previous month. Participants received HUF 2000 (roughly €5) in coupons as a reward for taking part in the experiment. The experiment consisted of filling out an online survey and evaluation with final purchase of one of the four products presented through the experimental auction method (more details in the next section). A total of 19 experimental rounds were conducted, each experimental round consisted of 6–12 participants and took about 15–20 min to finish.

Study 2 was conducted in one of the market halls of Budapest, Hungary in January 2022. During that period 131 people were randomly recruited among the shoppers of the market hall. All participants were screened according to age (over 55 years old) and if they bought and consumed apple juice in the previous month to avoid unrealistic bids during the data gathering.

Participants received 2000 HUF (approximately €5) in coupons as reward for taking part in the experiment. The experiment consisted of filling out a paper-based survey and evaluation with final purchase of one of the four products presented through the experimental auction method (more details in the next section). Overall, 125 experimental rounds were conducted during the data collection. Each round took approximately 15–20 min to complete. Both studies received ethical waiver from the Director General of the Doctoral and Habilitation Centre of the Hungarian University of Agriculture and Life Sciences, and each respondent signed informed consent prior to participation.

2.1. Experimental products

2.1.1. Study 1

In both Study 1 and Study 2 the same kind of 3-L bag-in-box apple juices were used as experimental products, only in the labeling details were some differences. Study 1 followed a within-subjects design: all participants evaluated four apple juice packs in 3-L boxes with different

type of information and without tasting the products. All juices were packaged in a brown carton box, the labels were the only difference: conventional (label 1), redundant (label 2), functional (with added vitamin C, label 3), and organic (label 4). The labels were similarly designed, and the statements corresponded to product attributes (see Fig. 1).

"Freshly pressed" claim was used in study 1 as redundant claim, as if an apple juice was not made from concentrate, then it must be made from fresh apple. Based on Lusk and Wilson's (2020) categorization, "freshly pressed" claim belongs to information implicitly covered by legal requirements. The term "freshly pressed" implies that a product is made from freshly harvested ingredients, which should be a given for many foods. According to Codex Alimentarius Hungaricus ordinance 1-3-2001/112 [28], fruit juices made partially or completely from concentrate must be labeled as 'made from concentrate', which means that other apple juices lacking this claim are freshly pressed, thus making freshly pressed claim redundant. This type of redundant claim is frequently found in the Hungarian food market.

2.1.2. Study 2

In Study 2, just like in Study 1, four different, 3-L bag-in-box apple juices were evaluated by the participants: conventional (label 1), redundantly claimed (label 2), functional (with added vitamin C, label 3), and organic (label 4) apple juices (see Fig. 2).

However, differently from the previous study the "freshly pressed" redundant claim was substituted with the "natural" claim. "Natural" claim is an information inherently evident based on the nature of the product based on Wilson and Lusk's [9] categorization. Similarly, the label "natural" suggests that a product contains no artificial additives or preservatives, but it doesn't necessarily guarantee the overall quality or healthiness of the food. These terms can be used to create an illusion of superiority or wholesomeness when, in reality, they should be inherent qualities of the products being sold. The decision to apply this claim was due to several reasons. Considering the target population of the study this claim appeared more appealing and comprehensible. Furthermore, empirical evidence at the market showed a widespread amount of food products carrying natural features and reminders. While the application of the natural claim should increase realism of the study, it is acknowledged that it averts the possibility to directly compare preferences among the two redundant claims.

2.2. Experimental design and procedure

2.2.1. Study 1

To investigate individuals' monetary preferences for the above-mentioned products, a Vickrey's second-price auction technique [29] was used in Study 1. This method is an incentive-compatible experimental elicitation in which participants bid simultaneously for products, and the individual with the highest bid purchases the product at the price of the second highest bid. The advantage of this auction method lays in the fact that it can be conducted with bigger groups; additionally, it is considered among the simplest auction methods, requiring less training of the participants [30].

After filling in the demographic questions, the leader of the experiment described the auction method to the participants and a practice round was performed with chocolate bars.

The apple juices were shown to participants in random order to minimize bias. First, they had to provide the WTP of the displayed product, after which participants had to answer a series of questions regarding their attitudes. Attitudes toward responsible food consumption were measured using the 5-question scale on food responsibility developed by Brunsø et al. [31], as responsible attitude could drive organic consumption. Participants' interest in health and natural products was measured using the scales developed by Roininen et al. [32], as it might have a relationship with the evaluation of organic and functional foods. Frequency of purchasing organic food was also measured based on Zander et al. [33].

An online random number generator was used to choose the binding product. The leader of the experiment checked the bids of the chosen product and announced the highest and second highest bid. The highest bidder purchased the randomly drawn juice at the second highest bid.

2.2.2. Study 2

Due to the location of the experiment, the Becker-DeGroot-Marschak (BDM) mechanism was adopted in Study 2 [34], as it can be performed with smaller groups of participants, and it can be used directly at the point of purchase [35]. After recruitment participants were seated in an enclosed area of the market at groups of 1–3 people, where they started to fill in the survey with some socio-demographic questions. Subsequently they watched a video, in which the lottery method was explained in detail. After the video, the leader of the experiment assured that all participants fully understood the course of the experiment. A practice round was not conducted, as it is not required in case of BDM mechanism [36].

As in study 1, products were showed to participants in randomized order. Firstly, individuals provided their WTP for the displayed product, and after that they had to answer questions perceived healthiness of the displayed product without tasting it. Product level perceived healthiness was measured by the scale of Adams and Geuens [37]. Besides WTP, Organic food buying frequency, Food Responsibility, General Health Interest and Natural Product Interest was measured the same way as in study 1.

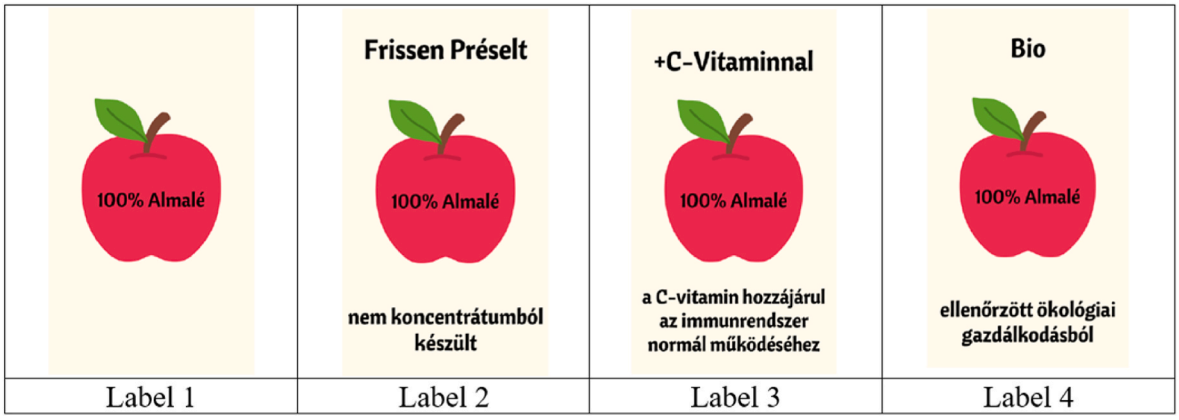

Fig. 1. Labels used in study 1.
Translation of label 1: 100 % apple juice; label 2: Freshly pressed 100 % apple juice, not from concentrate; label 3: 100 % apple juice + vitamin C, vitamin C contributes to the normal functioning of the immune system; label 4: Organic 100 % apple juice, from controlled organic farming.

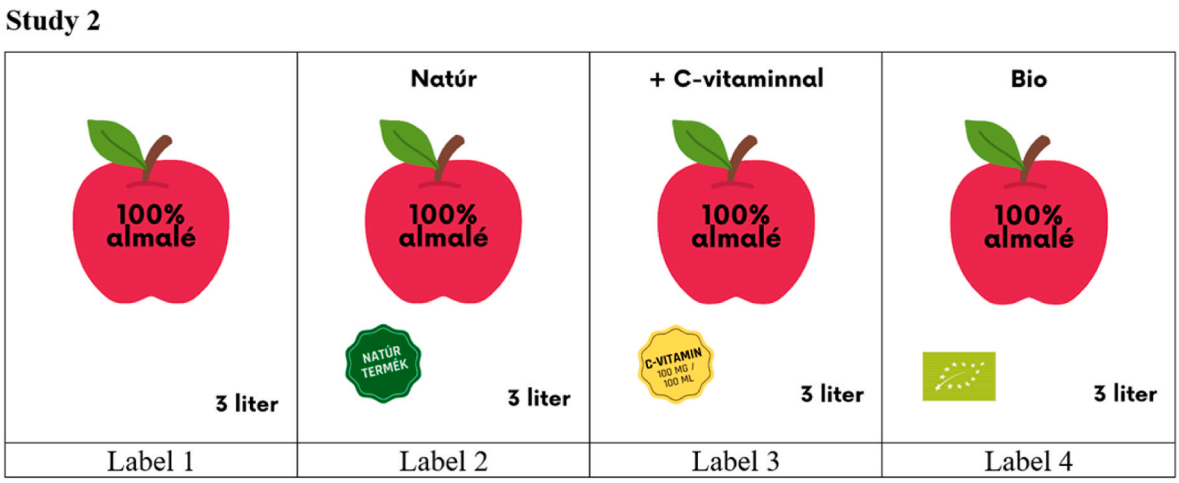

Fig. 2. Labels used in study 2
Translation of label 1: 100 % apple juice; label 2: Natural 100 % apple juice, natural product; label 3: 100 % apple juice + vitamin C, vitamin C 100 mg/100 ml; label 4: Organic 100 % apple juice.

After assessing all the products, product and price were drawn from an urn randomly. The prices in the urn ranged between 600 and 1350 HUF (approximately €1.5 – €3.4) in 50 HUF (around 12 cents) increments. If the participant offered a higher bid compared to the drawn price of the drawn product, the participant purchased the apple juice for the drawn price. If the bid given by the participant was lower than the drawn price, no transaction took place.

2.3. Econometric analysis

Seemingly unrelated regression (SUR) model was employed to analyze correlations between demographics, consumer attitudes and WTP values, as the experimental procedure was structured as a within-subject design. SUR is a multivariate linear regression model that is particularly useful when it is needed to estimate a system of equations. It provides more efficient estimates compared to single equation least squares estimations by incorporating weighting based on the covariance of the residuals from the individual regressions [4]. The following equations were used during the analysis:

Price premium = f (Sex at birth, Age, Residence area, Education, Income, Organic purchase, Perceived healthiness, General Health Interest, Natural Product Interest, Food Responsibility).

To evaluate the robustness of the results, Breusch-Pagan test was conducted. Data analysis was carried out using Stata version 17.0.

3. Results

3.1. Participants' characteristics

3.1.1. Study 1

Table 1 shows the socio-demographic characteristics of the sample. Women and high-income respondents were slightly overrepresented. About half of the sample reported to live in the capital city (only one-fifth of the respondents live in rural areas), which corresponds to the general phenomena that urban people are overrepresented among university students. 80 % of the respondents were college students (the remainder were already graduate students). Considering the purchasing habits related to organic products, less than 20 % of the sample buys organic food on a weekly basis. Half of them rarely buy organic food and 32 % of the respondents buy organic food a few times a month.

3.1.2. Study 2

Table 2 shows the socio-demographic characteristics of participants, which corresponds with the general customer audience of the market

Table 1
Characteristics of young participants of study 1 (N = 147).

Sex at birth		
Male	65	44 %
Female	82	56 %
Age group		
18–25	147	100 %
Residence area		
Capital city	68	46 %
City/town	48	32 %
Village	31	22 %
Education		
Primary school	0	0 %
Vocational school	4	3 %
High school	116	79 %
Diploma	27	18 %
Perceived income		
Low	9	6 %
Average	76	52 %
High	62	42 %
Organic food buying frequency		
Never/Almost never	25	17 %
Less than once per month	50	34 %
1-2 times per month	47	32 %
Once per week	15	10 %
More times per week	10	7 %

Table 2
Characteristics of elderly participants in study 2 (N = 131).

Sex at birth		
Male	44	34 %
Female	87	66 %
Age group		
55+	131	100 %
Residence		
Capital city	108	82 %
City/town	19	15 %
Village	4	3 %
Education		
Primary school	8	6 %
Vocational school	17	13 %
High school	50	38 %
Diploma	56	43 %
Perceived income		
Low	27	21 %
Average	80	61 %
High	24	18 %

hall. In the sample, females are overrepresented, which responds with the shopping habits, especially with older population. As the market hall is located in the capital city, most of the participants live inside Budapest.

Regarding education, less than half of participants completed higher education. Almost the same amount, 38 % has high school level education. Perceived income was reported by 61 % of participants to be average. Less participant reported high perceived income (18 %) compared to low perceived income (21 %).

Participants were asked about their organic food buying frequency. Almost fifth of respondents claimed that they never buy organic food products. Most of the participant said they purchase organic food 1–2 times per month. More, than 10 % of the participants reported a higher organic food purchasing frequency than once per week.

3.2. Willingness to pay and drivers of preferences

3.2.1. Study 1

Table 3 shows the results of the WTP elicitation. Conventional apple juice had the lowest average WTP, so in the further analysis it can be used as a benchmark compared to the other apple juices. In average, organic apple juice reached the highest WTP with 34 % price premium compared to conventional apple juice. Apple juice with redundant claim reached almost the same WTP compared to organic apple juice with the same 34 % price premium. Respondents were willing to pay 19 % price premium for functional apple juice.

Fig. 3 displays the bid distribution in 100 HUF (approximately €0.25) increments. The four different products follow a parallel trend, showing that 50 % of all participants were willing to pay more than 800 HUF (approximately €2) for the products. Bids for conventional products exceed 1000 HUF (approximately €2.5) for the top 20 % participants, whereas functional products reached 1200 HUF, redundantly claimed product 1400 HUF, and organic product 1500 HUF.

To assess the drivers of individual preferences WTP and delta values of WTP on an individual level were used. Redundant premium price is the difference between WTP of redundant and conventional apple juice [Δ (Redundant–Conventional)], Functional premium price is for functional apple juice [Δ (Functional– Conventional)] and Organic premium price is for organic apple juice [Δ (Organic– Conventional)], respectively. The estimated coefficients of the seemingly unrelated regression (SUR) are shown in Table 4.

The seemingly unrelated regression analysis shows the importance of perceived healthiness in WTP for different apple juices. Perceived healthiness of each type of apple juices positively and significantly influences the premium prices of apple juices. Measured food consumer attitudes do not show significant influence, only Natural Product Interest has a positive effect in the case of organic premium price. In addition, it can be noticed that demographics impact the delta WTP. In the case of redundantly claimed apple juices women and participants living in rural areas are willing to significantly pay less. Additionally, higher income resulted in higher delta WTP for all products. On the contrary education negatively influenced functional and organic apple juice premium prices.

Table 3
Apple juices WTP in study 1 (HUF).

	Mean	S.D.	Median	Min	Max	N. zero bids (%)
Conventional	607.44[a]	553.02	500	0	3200	32 (21.8 %)
Redundant	812.65[b]	775.15	700	0	6000	22 (15 %)
Functional	727.24[c]	641.73	650	0	4000	22 (15 %)
Organic	814.39[d]	731.76	790	0	5000	25 (17 %)

Note: values are displayed in Hungarian Forint (HUF). 1 HUF is appr. 0.0025 EUR.
WTP distributions with diverse superscripts are statistically different according to Kolmogorov-Smirnov tests (at $p < 0.001$).

3.2.2. Study 2

The result of the analysis of the WTP elicitation of the four different products can be seen in Table 5. In average, participants paid 5 % more for the apple juice with a redundant claim, 10 % for the functional apple juice, and 24 % more for the organic apple juice.

The bid distribution in study 2 shows a similar pattern compared to study 1, with a slightly higher WTP values. As Fig. 4 shows, 50 % of the participants in study 2 were willing to pay more for the products than 900 HUF (approximately €2.25). 15 % of participants had at least 1200 HUF (approximately €3) WTP for all the products, except organic food, which reached 300 HUF higher WTP among the same proportion of participants.

Delta values of WTP on an individual level were used, as in the analysis of study 1. The result of the seemingly unrelated regression can be seen in Table 6.

Similarly, to younger participants in study 1, perceived healthiness of the apple juice was important for older participants' willingness to pay, except in the case of redundantly claimed apple juice. Consumer attitudes were influencing participants' willingness to pay only for organic apple juice, where General Health Interest positively influenced price premium, although Food Responsibility had a negative influence on WTP of organic food.

Demographics and socioeconomic characteristics were only significant in the case of redundantly claimed apple juice. More educated participants significantly paid more for redundantly claimed product, in contrast to income, where participants with lower income were willing to pay more for redundantly claimed apple juice.

4. Discussion

Both Study 1 and Study 2 provided compelling evidence that consumers exhibit a higher WTP for apple juices with added value in comparison to their conventional counterparts. In Study 1, an interesting revelation emerged – there was no significant difference in WTP for organic apple juice and redundantly claimed apple juice. In other words, consumers were willing to pay a similar amount for both types of products. Moreover, the participants in these studies displayed a positive attitude toward redundant claims, which aligns with earlier research findings [9,11].

What sets these studies apart from their predecessors is the fact that participants were intentionally kept unaware of the redundant nature of the labels on these products. This design choice was made to enhance the realism of the research since consumers, in real shopping scenarios, are typically uninformed about the presence of redundant claims on product labels.

The significance of healthiness in consumers' decisions when purchasing organic and functional foods cannot be overstated. Previous research [38] has underscored the role healthiness plays in influencing consumer choices in these categories. Interestingly, despite suggestions that young adults are less health-oriented compared to their older counterparts [21], our studies found that healthiness significantly influences WTP values based on perceived attributes.

Organic apple juice, in particular, stood out as being perceived as healthier when compared to redundantly claimed and functional apple juice. This perception correlated with observed WTP levels. These findings are consistent with those of Ditlevsen et al. [39], who reported that consumers view organic food as healthy due to its association with purity. However, it's worth noting that the concept of purity can be elusive, highlighting the sometimes-blurred lines between organic and natural claims, as natural products can also be seen as pure by consumers.

The age of consumers can significantly influence their evaluation of food products. Studies show that there are differences in the way various generations assess and value such products [40,41]. Notably, healthiness had a different impact on the evaluations of older consumers in Study 2 compared to the results from Study 1. In this case, healthiness

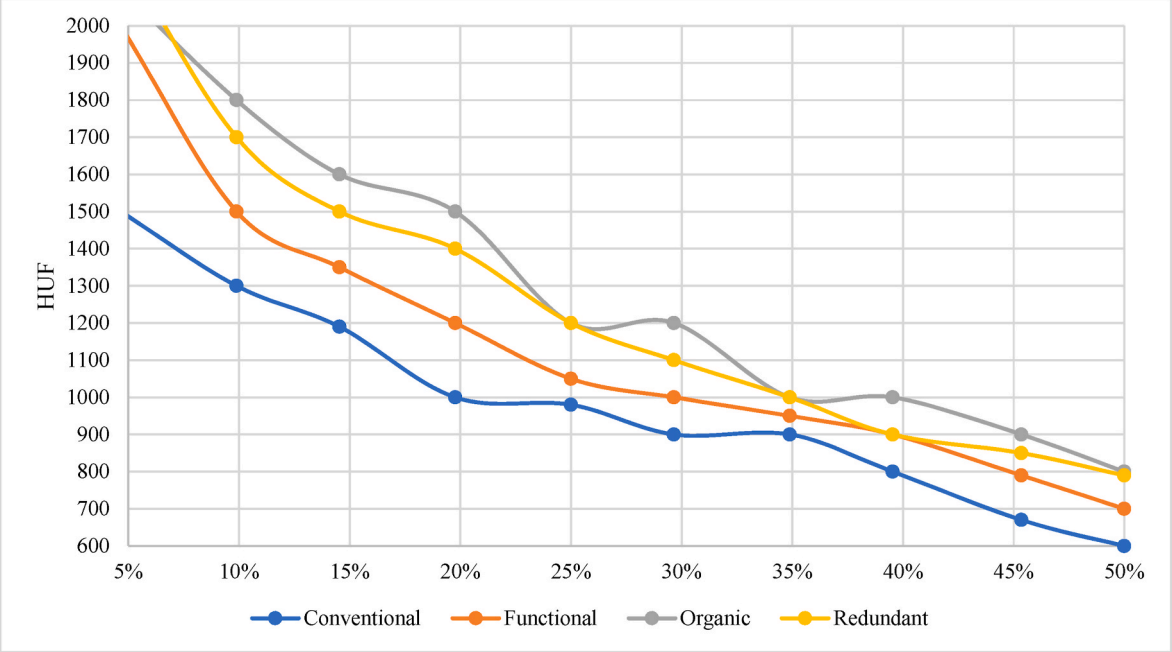

Fig. 3. Distribution of the bids of 4 auctioned products in study 1.

Table 4
Preference drivers of study 1.

	Δ (Redundant–Conventional)	Δ (Functional–Conventional)	Δ (Organic–Conventional)
Sex at birth	**−2.078****	0.035	**−1.911***
Age	1.197	1.590	**2.221****
Residence area	**−2.219****	−0.775	−0.966
Education	−1.020	**−3.151****	**−2.168****
Income	1.112	1.480	1.048
Organic purchase	−0.175	−0.162	−0.059
Healthiness	**4.763****	**4.173****	**3.566****
GHI[a]	0.169	−0.588	−0.437
NPI[b]	0.589	0.754	**1.771***
FR[c]	0.417	−0.031	1.097
Constant	−0.628	−0.812	−0.935
R^2	0.131	0.123	0.160
Chi^2	36.33	31.70	38.43
p	*0.000*	*0.000*	*0.000*

Note: *p < 0.1; **p < 0.05; Cronbach's alpha values: 0.87[a], 0.67[b], 0.79[c]; Breusch–Pagan test of independence: chi^2 (3) = 122.855, Pr = 0.0000.

Table 5
Apple juices WTP in study 2 (HUF).

	Mean	SD	Median	Min	Max	N. zero bids (%)
Conventional	723.85[a]	479.77	700	0	3000	12 (9.2 %)
Redundant	763.47[b]	455.08	700	0	3000	9 (6.9 %)
Functional	796.30[c]	502.56	800	0	3000	13 (9.9 %)
Organic	894.43[d]	610.65	900	0	4000	14 (10.7 %)

Note: values are displayed in Hungarian Forint (HUF). 1 HUF is appr. 0.0025 EUR. WTP distributions with diverse superscripts are statistically different according to Kolmogorov-Smirnov tests (at p < 0.001 for a,b,d and p < 0.01 for c).

did not significantly affect the WTP of older consumers. As Suciu et al. [42] suggest, older participants considered organic apple juice the healthiest option among the alternatives, suggesting a strong preference for health in their choices. However, functional and redundantly claimed apple juices were evaluated similarly, both in terms of healthiness and WTP.

The crucial difference between these two generational groups was that older adults perceived functional apple juice as healthier than redundantly claimed, whereas younger adults considered redundantly claimed apple juice healthier than functional. This variation in perception points to the need for nuanced marketing strategies targeting different age groups.

These results suggest that younger consumers evaluate redundantly claimed and organic products similarly due to the perceived healthiness of the products [43,44]. This may indicate consumer confusion regarding the differences between organic and redundantly claimed apple juice [45]. Similar confusion was observed among older consumers, who found it difficult to differentiate between functional and redundantly claimed products [22], as their evaluations of these products were similar.

The attitude of consumers towards conventional products was consistent across both Study 1 and Study 2. Participants who perceived conventional products as sufficiently healthy were not willing to pay more for any apple juices with additional claims. This suggests that not all consumers actively seek out these additional product features [46].

5. Conclusions

The findings of this research have significant implications for the food industry and policy considerations. Firstly, it confirms that organic and functional claims have a positive impact on consumers' willingness to pay (WTP), consistent with prior studies in this area [6,47], even in less explored markets like Hungary.

Moreover, the research aligns with Wilson and Lusk's findings in 2020, demonstrating that consumers are willing to pay more for products with redundant claims. However, this poses potential risks to the market, as it may divert resources from genuinely organic and functional food products. Redundant claims, lacking any real added value, can compete with authentic organic and functional foods. This situation can be problematic, as organic and functional food producers invest substantial resources in obtaining certifications and developing innovative products [48], while redundant claims remain unregulated, requiring minimal investment from producers. Therefore, regulating the use of terms like "natural" and other redundant claims on food products becomes a policy imperative [8].

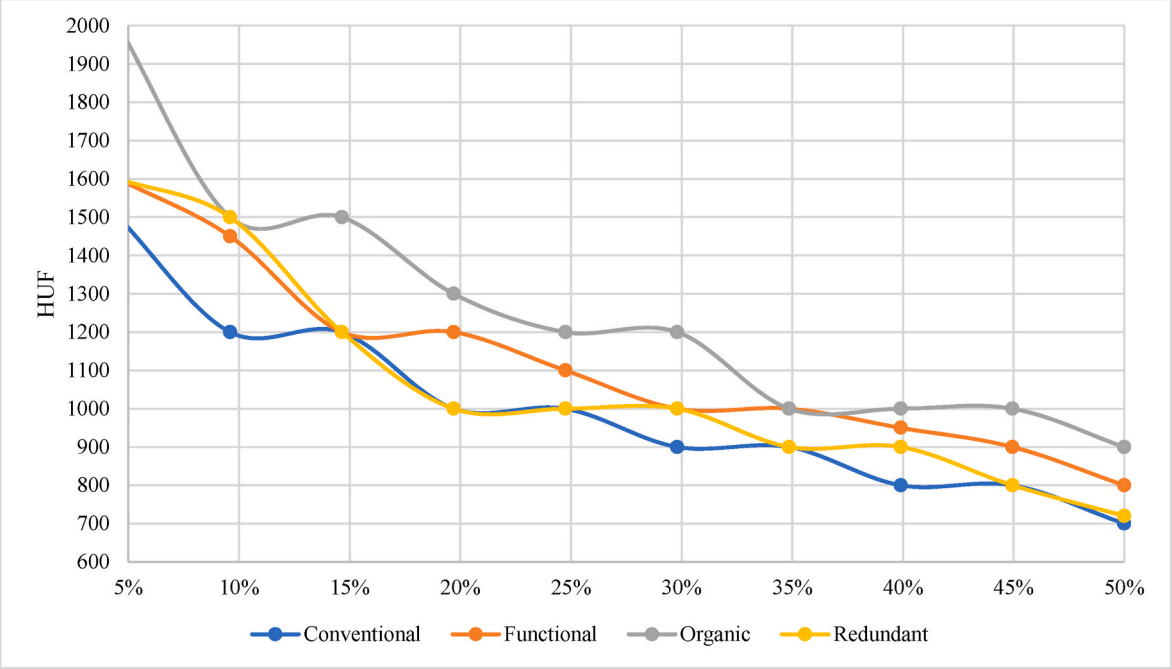

Fig. 4. Distribution of the bids of 4 auctioned products in study 2.

Table 6
Preference drivers of study 2.

	Δ (Redundant–Conventional)	Δ (Functional–Conventional)	Δ (Organic–Conventional)
Sex at birth	1.048	0.126	−0.374
Age	−0.177	−0.412	0.750
Residence	−0.313	0.597	1.336
Education	**3.006****	1.482	1.523
Income	**−1.801***	−0.568	−0.557
Organic purchase	0.582	−0.151	1.307
Healthiness	1.057	**2.462****	**4.237****
GHI[a]	1.049	**1.735***	−1.282
NPI[b]	−0.371	−0.445	0.662
FR[c]	−1.589	**−1.810***	0.418
Constant	−0.530	0.121	−0.939
R^2	0.097	0.062	0.235
Chi^2	15.96	15.13	34.75
p	*0.100*	*0.127*	*0.000*

Note: *p < 0.1; **p < 0.05; Cronbach's alpha values: 0.63[a], 0.63[b], 0.85[c]; Breusch–Pagan test of independence: chi^2 (3) = 89.599, Pr = 0.0000.

The issue of redundant claims isn't just an economic concern. It also affects vulnerable consumer groups [49]. Misleading claims can lead to suboptimal consumer choices [50], as consumers struggle to differentiate between various claims. This can lead to unfair competition against organic and functional food products. As revealed in Study 1, younger adults are particularly susceptible to the perception of healthiness associated with redundant claims [51]. This can lead them to make choices that may not align with their best interests.

Older adults are also at risk of being misled by redundant claims [52,53]. In Study 2, education emerged as the most significant factor influencing WTPs. Older adults with lower education were willing to pay more for organic, functional, and redundantly claimed products. Given that older adults generally have lower levels of education compared to the general population [54], the risk of paying more for products with no actual added value is elevated among this demographic.

This study underscores the need for regulatory measures in the food industry. Redundant claims, identified as a significant concern, pose economic risks and impact vulnerable consumer groups. Strict policies regulating terms like "natural" are essential to maintain fair competition. Concurrently, industry managers should prioritize consumer education, particularly among older adults with lower education levels, to mitigate misleading choices. Implementing these measures fosters transparency in the market, benefiting consumers and authentic organic and functional food producers.

However, it is essential to acknowledge several limitations in this research. First, Study 1 and Study 2 were conducted in different settings, a laboratory and a field, which introduces the possibility of external factors affecting WTP and perceptions differently. Second, the reliance on convenience samples in both studies prevents the generalization of the results to the broader population of young and elderly Hungarian citizens. Additionally, the use of different redundant claims (i.e., "freshly pressed" and "natural") in the two studies may have influenced the results, and using the same claim might have yielded different outcomes among younger and older respondents. Finally, it's important to note that the experimental techniques employed in this research have inherent shortcomings, such as reciprocity and windfall effects, as well as projection bias, which could influence the results. These limitations should be taken into account when interpreting the findings and considering policy implications.

Future prospective for this research could include further investigation into the impact of redundant claims on consumer behavior and market dynamics. Understanding the long-term effects of such claims on consumer choices and the market as a whole is crucial. Additionally, policymakers should consider implementing regulations to address the issue of misleading claims, ensuring fair competition and consumer protection in the food industry. Further studies in different geographic regions and across various demographic groups can help provide a more comprehensive understanding of these issues and guide more effective policy development.

CRediT authorship contribution statement

László Bendegúz Nagy: Conceptualization, Formal analysis, Methodology, Software, Writing – original draft. **Riccardo Vecchio:** Conceptualization, Methodology, Supervision, Writing – review & editing. **Gerarda Caso:** Writing – review & editing. **Burak Atilla Eren:**

Conceptualization, Methodology. **Brigitta Unger-Plasek:** Conceptualization. **Zoltán Lakner:** Conceptualization. **Laura Pfeiffer:** Resources. **Orsolya Tompa:** Resources. **Zsuzsánna Bogóné Tóth:** Resources. **Bianka Bognár:** Data curation, Resources. **Orsolya Fehér:** Funding acquisition. **Ágoston Temesi:** Conceptualization, Methodology, Supervision, Validation, Writing – review & editing.

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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