

Sustainable and Responsible Management

The Journal of Sustainable Business

ISSN 2724-4466



Volume No. 7, Issue No. 1 - 2026

Abruzzese Salute ETS

sustainable-and-responsible-management.org

Journal Information

Scientific Director

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ISSN

2724-4466

Online since 18th November, 2020

With authorization from the Court of Pescara no. 1 year 2020

Classification by Italian National Agency for the Evaluation of Universities and Research Institutes (ANVUR)

Scientific Journal

Governing Board Resolution nr. 184 of 27th July, 2023

Classification in the Journal Ranking AIDEA

AIDEA Governing Board Resolution of 15th October, 2024

DOI Prefix by Multilingual European DOI Registration Agency (mEDRA)

10.61013

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Abruzzese Salute ETS

Via Umberto I, 78/80

65010 Cappelle sul Tavo (PE)

Italy



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Ingredient-Based vs Nutrition-Based Claims: Implications for Consumer Health Perceptions and Responsible Food Choices

Guido Cristini

Department of Economics and Management
University of Parma
E-mail: guido.cristini@unipr.it

Donata Tania Vergura*

Department of Economics and Management
University of Parma
E-mail: donatatania.vergura@unipr.it

Cristina Zerbini

Department of Economics and Management
University of Parma
E-mail: cristina.zerbini@unipr.it

Anna Boncompagni

Department of Economics and Management
University of Parma
E-mail: anna.boncompagni@unipr.it

Beatrice Ceccoli

Department of Economics and Management
University of Parma
E-mail: beatrice.ceccoli@unipr.it

** Corresponding author*

Abstract

Growing consumer sensitivity toward individual well-being has fostered more conscious consumption practices and increased attention to health-oriented food products. Within this context, packaging serves as a key communication tool through which firms can highlight health-related attributes that are not directly observable, particularly through the use of nutritional claims. This paper investigates how different types of packaging claims – ingredient-based versus nutrition-property-based claims – influence consumers' desire to consume a product, examining the mediating role of perceived

healthiness and expected taste, two potentially conflicting variables in food evaluation. The study aims to shed light on the cognitive mechanisms through which health-related communication shapes consumer evaluations and perceptions. A between-subjects experiment was conducted (N=300), randomly assigning participants to one of two claim conditions (ingredient-based vs. nutrition-based). Data were analyzed using multiple regression analyses and a parallel mediation model. Results show that nutrition-property-based claim significantly increases perceived healthiness, which fully mediates its effect on desire to eat the product. Expected taste strongly predicts desire to consume but does not mediate the effect of the type of claim. From a managerial perspective, the findings suggest that emphasizing nutritional properties can enhance perceived healthiness, but such communication should be balanced with elements that preserve taste expectations. Combining nutritional claims with sensory cues may therefore improve packaging effectiveness. The originality of the study lies in examining the impact of health-related claims on a hedonic variable such as desire to consume, while distinguishing between ingredient-based and nutrition-property-based claims.

Keywords – Packaging; Nutritional claims; Perceived healthiness; Expected taste; Responsible food choice.

Paper type – Academic Research Paper

Sommario

Claim basati sugli ingredienti vs. claim nutrizionali: implicazioni sulla percezione di salubrità del prodotto e le scelte alimentari responsabili. – La crescente sensibilità dei consumatori nei confronti del benessere individuale ha favorito pratiche di consumo più consapevoli e una maggiore attenzione verso prodotti alimentari orientati alla salute. In tale contesto, il packaging rappresenta uno strumento di comunicazione centrale attraverso cui le imprese possono veicolare caratteristiche salutistiche non direttamente osservabili, in particolare mediante l'impiego di claim nutrizionali. Il presente studio ha analizzato in che modo differenti tipologie di claim riportati sul packaging – basati sull'ingrediente versus basati sulla proprietà nutrizionale – influenzino il desiderio di consumare un prodotto alimentare, esaminando il ruolo di mediazione della salubrità percepita e del gusto atteso, due dimensioni potenzialmente in conflitto nella valutazione del cibo. L'obiettivo è far luce sui meccanismi cognitivi attraverso cui la comunicazione salutistica incide sulle percezioni e sulle valutazioni dei consumatori. A tal fine, è stato condotto un esperimento tra gruppi (N = 300), in cui i partecipanti sono stati assegnati casualmente a una delle due condizioni sperimentali definite dal tipo di claim *ingredient-based* vs. *nutrition-based*). I dati sono stati analizzati mediante analisi di regressione multipla e un modello di mediazione parallela. I risultati mostrano che il claim basato sulla proprietà nutrizionale incrementa significativamente la percezione di salubrità, la quale media completamente il suo effetto sul desiderio di consumo. Inoltre, il gusto atteso emerge come un forte predittore del desiderio di consumo, ma non media l'effetto del tipo di claim. Dal punto di vista manageriale, i risultati suggeriscono che l'enfasi sulle proprietà nutrizionali può rafforzare la percezione di salubrità del prodotto; tuttavia, tale comunicazione dovrebbe essere bilanciata con elementi in grado di preservare le aspettative di gusto. L'integrazione di claim nutrizionali con indicazioni sensoriali può dunque accrescere l'efficacia comunicativa del packaging. Tra gli elementi di originalità dello studio l'analisi dell'impatto della comunicazione salutistica su una variabile edonica quale il desiderio di consumo, distinguendo tra claim basati sugli ingredienti e claim basati sulle proprietà nutrizionali.

Article history:

Received 26 February 2026

Received in revised form 20 April 2026

Accepted 12 May 2026

Available online

DOI link <https://doi.org/10.61013/2724-4466/7.1.39-62>

1 Introduction

Among the 17 Sustainable Development Goals (SDGs) included in the United Nations 2030 Agenda, Goal 3 aims to ensure healthy lives and promote well-being for all individuals at all ages (United Nations, 2015). The adoption of a healthy diet, combined with regular physical activity, represents one of the key factors in achieving this goal, as they constitute major preventive tools against chronic respiratory and cardiovascular diseases (De-Magistris, Gracia, & Barreiro-Hurle, 2017).

In recent years, consumers have increasingly shown greater sensitivity toward their individual well-being (WHO, 2022). This orientation is reflected in more conscious consumption practices, characterized by balanced food choices and a growing interest in health-oriented products aimed at promoting overall health and well-being (Chen, Zhang, Hu, Chen, & Li, 2023). Firms have responded to this growing demand by expanding their product portfolios of elements potentially harmful to consumers' health (Cameron, Charlton, Ngan, & Sacks, 2016). Among these products, a prominent role is played by so-called superfoods, a term used to describe foods known for their health-promoting properties, attributed to their particular chemical composition and high concentration of nutrients – such as vitamins, minerals, and antioxidants – that contribute to health maintenance and the prevention of certain diseases (Ekesa, 2017; Groeniger, van Lenthe, Beenackers, & Kamphuis, 2017).

The increasing diffusion of health-oriented products, such as superfoods, has made product communication increasingly relevant. In this context, packaging represents a strategic tool for firms seeking to enhance and communicate the nutritional characteristics of their products, particularly through nutritional claims (Choi, Northup, & Reid, 2021). These claims are able to provide concise and immediate guidance on healthier food choices (Mediano Stoltze, Busey, Taillie, & Carpentier, 2021). However, the effectiveness of information displayed on packaging depends on several factors, including the amount of information provided and the time available for making a choice.

In the retail context, consumers are often required to make decisions under conditions of information overload, a situation in which they must process an excessive amount of information relative to the limited time available to make a decision (Roetzel, 2018). This informational overload can complicate the selection of healthier products, leading decision-makers to rely on cognitive shortcuts or heuristics when evaluating information (Hu & Krishen, 2019).

Previous research has shown that products frequently display more than one claim on packaging, often repeating the same message or including references to different nutritional attributes (Hieke et al., 2016). Consequently, the selection of information to be communicated on the label plays a crucial role in avoiding consumer cognitive overload.

Although claims are inherently concise, an excessive number or redundancy of claims may reduce their communicative effectiveness. For example, the product's healthiness can be conveyed through the communication of both its ingredients and the nutritional properties associated with them. Although literature has widely demonstrated that both ingredients and nutritional properties can influence consumer perceptions in the evaluation of health-oriented products (Acton & Hammond, 2018; Hartmann, Hieke, Taper, & Siegrist, 2018; Rizk & Treat, 2015; Turner, Skubisz, Pandya, Silverman, & Austin, 2014), in order to avoid overwhelming consumers with similar or overlapping information, it becomes necessary to identify which type of information is more effective in shaping judgements about the product.

Despite the growing body of literature on health-related claims, existing research has predominantly examined their effects on functional outcomes that describe consumer behavior, such as attitudes, purchase intentions, and willingness to pay (Barreiro-Hurle, Gracia, & De-Magistris, 2010; de Mello Marsola, de Carvalho Ferreira, Medina, & da Cunha, 2025; Huang, Chou, Zhang, & Lan, 2025; Krutulyte et al., 2011; Steinhäuser, Janssen, & Hamm, 2019), while comparatively less attention has been devoted to hedonic responses, such as the desire to consume the product (Vadiveloo, Morwitz, & Chandon, 2013). Moreover, prior studies have often treated health claims as a broad and homogeneous category, without distinguishing between particular types of information conveyed on packaging. As a result, there is still a lack of research that directly investigates which type of information is more effective in shaping consumer responses and avoiding information overload. This study addresses these gaps by investigating whether it is more impactful to emphasize the ingredient itself or its associated nutritional property. Specifically, it compares ingredient-based vs nutrition-property-based claims to examine their differential effects on both cognitive (perceived healthiness) and hedonic (desire to eat) responses. In doing so, the research contributes to a more nuanced understanding of how specific forms of health communication through packaging shape consumer perception and motivation to consume.

The present study therefore aims to address the following research question:

RQ. Which between the ingredient and its associated nutritional property exerts a greater influence on product perception and consumers' desire to consume the product?

To answer this research question, a between-subjects experiment was conducted, hypothesizing a parallel mediation model aimed at assessing the role of the claim on consumers' desire to consume the product, as well as the effects exerted by perceived healthiness and expected taste.

From a theoretical perspective, this study: (1) extends the existing literature on packaging information, with particular reference to nutritional claims (distinguishing between ingredient-based and nutrition-property-based claims) and the perceptions consumers develop toward them; and (2)

highlights how such claims influence not only cognitive and functional dimensions, but also motivational and hedonic variables.

From a managerial perspective, the paper provides useful insights into how to effectively communicate the health-related characteristics of products, balancing perceived healthiness with taste expectations, in order to support the development of more effective marketing strategies that are aligned with consumer perceptions and with the aim of guiding responsible consumer choices.

2 Theoretical background and hypotheses development

Numerous studies have examined how consumers' growing attention to individual well-being and health translates into new consumption patterns and food choice criteria (Chen, Zhang, Hu, Chen, & Li, 2023; Fang, Cappelletti, & Zhechev, 2025; Steinhäuser & Hamm, 2018; WHO, 2022). The pursuit of healthy foods now represents one of the primary purchase motivations, driven both by the desire to prevent diseases and by the intention to adopt more balanced lifestyles (Franco Lucas, Costa, & Brunner, 2021).

In response to these transformations, the food industry has progressively expanded its offerings by introducing products formulated to improve their nutritional profile – for instance, by reducing components perceived as unhealthy, such as fats, or by adding beneficial ingredients, such as fiber and micronutrients. This evolution has led to a substantial increase in the presence of products bearing nutritional claims on supermarket shelves. Such claims represent strategic communication tools that synthesize and enhance the functional characteristics of foods, guiding consumers toward choices perceived as healthier (Choi, Northup, & Reid, 2021).

Information displayed on packaging has been shown to significantly influence product perceptions, consumer attitudes, and behaviors throughout the purchase decision process (e.g., Abbas, Munir, & Ahmad, 2024; Mediano Stoltze, Busey, Taillie, & Carpentier, 2021). Packaging thus represents a strategic communication channel capable of shaping consumer choice through claims and labels that summarize a product's healthiness and beneficial properties. The communication of a product's healthiness may emphasize different dimensions, starting from ingredients and their associated nutritional properties. Ingredients, in particular, constitute key information, as they play a decisive role in shaping consumer preferences and perceived healthiness (Acton & Hammond, 2018; Annunziata, Vecchio, & Kraus, 2015; Hartmann, Hieke, Taper, & Siegrist, 2018).

Among a product's ingredients, some assume particular importance as they identify its distinctive characteristics, especially its nutritional benefits. These ingredients can be referred to as “hero ingredients”, as they provide substantial benefits that translate into health advantages for consumers.

At the same time, the nutritional properties derived from the main ingredient represent a relevant source of information that can influence product perceptions (Rebouças, Rodrigues, Freitas, Ferreira, & Costa, 2017; Rizk & Treat, 2015). These properties encompass the attributes that define a food's overall nutritional value and its potential health benefits (Wang, et al. 2022).

Among ingredients that provide substantial benefits to the product, research has focused, for example, on oats and their main associated nutritional property, namely the presence of prebiotics. Oats have been shown to exert positive effects on the gastrointestinal system precisely due to the presence of prebiotics, which contribute to maintaining a balanced gut microbiota (Gibson et al., 2010; Precup, Pocol, Teleky, & Vodnar, 2022). In line with this evidence, some retailers have introduced products that display claims such as “with prebiotics” on their packaging, often accompanied by additional information such as “supports gut flora balance”.

Despite the growing attention towards healthier food choices, these are also often characterized by a tension between the desire for immediate gratification linked to taste and the goal of maintaining good long-term health (Briers, Huh, Chan, & Mukhopadhyay, 2020). Indeed, the literature has shown that health-related and taste-related goals frequently conflict, and that taste often prevails in food decision-making (Bravo, Colamatteo, Romano, & Vistocco, 2025). The relationship between perceived healthiness and tastiness has been widely investigated, albeit with mixed results. On the one hand, several studies support the so-called “unhealthy = tasty intuition”, according to which foods perceived as less healthy are considered tastier (Bialkova, Sasse, & Fenko, 2016; Raghunathan, Naylor, & Hoyer, 2006). On the other hand, other scholars have questioned the universality of this belief, highlighting positive or null associations between perceived taste and perceived healthiness (Dubé, Fatemi, Lu, & Hertzer, 2016; Werle, Trendel, & Ardito, 2013).

Given that both health and taste represent central goals in food choices (Erensoy, Lu, Aaker, & Fishbach, 2025), it is important to understand whether, and how, the communication of healthiness conveyed through packaging can influence consumers' desire to consume a product, also through perceptions of healthiness and expected taste.

2.1 Desire to eat the product

The desire to eat a product can be defined as an intense impulse toward specific foods, which does not necessarily imply pathological behavior but rather represents a normal component of eating behavior (Reents, Seidel, Wiesner, & Pedersen, 2020). Highlighting on packaging either the main

ingredient or the nutritional property that provides health benefits may strengthen consumption motivation, as shown, for example, in the case of protein-related claims (Holtrop, Cleeren, Geyskens, & Verhoef, 2024; McKeon & Hallman, 2024). However, the presence of elements emphasizing a product's healthiness – such as beneficial ingredients or nutritional properties – may also lead consumers to perceive the product as healthier but less tasty, thereby reducing their desire to consume it (Haasova & Florack, 2019). Several studies have compared different types of claims and front-of-pack labels, analyzing their ability to influence consumer behavior (Hong et al., 2022; McKeon & Hallman, 2024), and reporting significant differences in their effects.

Building on this evidence, the present study compares two specific claims: one referring to the ingredient (“with oat flakes”) and the other referring to the nutritional property associated with the same ingredient (“rich in prebiotics”). Most claim-related studies (Hamlin & McNeill, 2018; Hong et al., 2022) have focused on the effects of such messages on functional value variables, such as willingness to pay, purchase intention, or product choice. In contrast, the present research focuses on the hedonic value of food by examining the effect of communication type on desire to consume, a variable rarely associated with a product's health-related characteristics (Raghunathan, Naylor, & Hoyer, 2006). Accordingly, the study aims to investigate whether the type of communication (ingredient vs. nutritional property) directly influences consumers' desire to consume the product, leading to the following hypothesis:

H1. Nutritional-property claim as compared to ingredient-based claim will lead to higher desire to eat the product.

2.2 Perceived healthiness

Perceived healthiness can be defined as the consumers' expectation regarding the impact that a product has on their health status (Mai & Hoffmann, 2015). This perception is positively influenced by the information communicated by firms through product packaging (Van Kleef, Van Trijp, & Luning, 2005). Numerous studies have shown the specific types of claims – such as those related to protein or fiber – positively influence perceived healthiness and other product evaluations (McKeon & Hallman, 2024; Mediano Stoltze, Busey, Taillie, & Carpentier, 2021). Similarly, a substantial body of literature has documented that claims communicating beneficial ingredients or properties strengthen consumers' perceptions of healthiness (Choi, Northup, & Reid, 2021; Roberto et al., 2012). This perception, in turn, positively influences consumer behavior in healthy food choices (Steinhauser, Janssen, & Hamm, 2019).

Traditionally, perceived healthiness has been considered a predictor of functional value variables, such as purchase intention, willingness to buy, and willingness to pay, while its effect on hedonic variables has been neglected. In the present study, instead, perceived healthiness is examined as a mediating variable between claim type (ingredient vs. nutritional property) and a dependent variable of hedonic nature, namely desire to consume the product. It is hypothesized that a claim referring to a nutritional property, by explicitly highlighting the health benefit associated with the ingredient, has a stronger impact on perceived healthiness than a claim mentioning the ingredient itself. In turn, higher perceived healthiness is expected to increase consumers' desire to consume the product. Formally:

H2. Nutritional-property claim as compared to ingredient-based claim (a) will increase the product perceived healthiness, which in turn (b) positively influences the desire to consume the product.

2.3 Expected taste

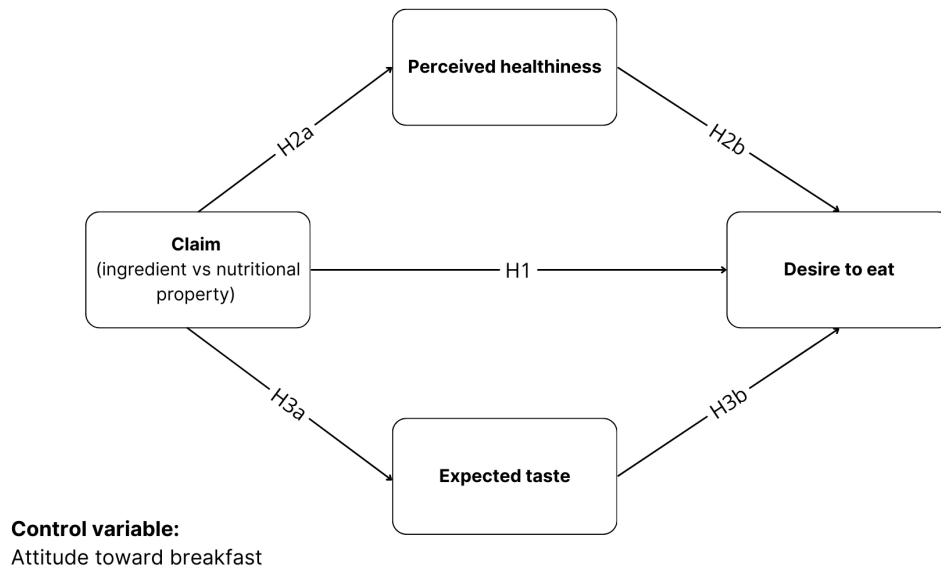
Neurogastronomy suggests that food flavors result from brain processing that integrates information from all sensory modalities (Tokat & Yilmaz, 2023). Consequently, beyond olfaction, visual cues and information conveyed by packaging contribute to the formation of taste expectations (Tokat & Yilmaz, 2023). Information displayed on packaging can therefore significantly influence consumers' expectations regarding the tasting experience.

The findings of Szakály, Soós, Balsa-Budai, Kovács, and Kontor (2020) indicate that products displaying nutritional or health-related claims tend to be perceived as healthier but less tasty, consistent with the cognitive mechanism known as the “unhealthy = tasty intuition”. According to this mechanism, consumers tend to associate less healthy foods with a greater taste expectation, while a greater healthiness of the product would be associated with a lesser taste, thus generating a tension between the health dimension and the perception of gustatory pleasantness (Paakki et al., 2022; Raghunathan, Naylor, & Hoyer, 2006). Moreover, the literature emphasizes that taste represents one of the primary determinants of purchase decisions (Konuk, 2021), and that taste perceptions themselves can be influenced by product elements related to health (Grunert, Seo, Fang, Hogan, & Nayga, 2024). Therefore, the nutritional attributes emphasised in a product's communication could influence taste judgements. Based on these evidences, it is hypothesized that the type of communication conveyed through claims (ingredient vs. nutritional property) may influence the formation of expected taste, which in turn positively affects consumers' desire to consume the product. More formally:

H3. Nutritional-property claim as compared to ingredient-based claim (a) will decrease the product expected taste, which in turn (b) positively influences the consumer's desire to eat the product.

Figure 1 illustrates the overall hypothesized model.

Figure 1 – Hypothesized conceptual model



Source: Authors' elaboration

3 Methodology

A quantitative approach was adopted to pursue the aim of examining which type of communication, ingredient-based or nutritional property-based, is more effective in shaping consumers' perceptions of product taste and healthiness, and how these perceptions, in turn, influence the desire to consume the product. The analysis was articulated in two stages: a preliminary pre-test phase and a between-subjects experimental phase.

3.1 Pre-test and stimuli

A pre-test was conducted to identify a breakfast product category characterized by an intermediate level of perceived healthiness. This was necessary to avoid distortions arising from products perceived as either excessively healthy or insufficiently healthy. To this end, a sample of 54 individuals evaluated three different product categories: biscuits, snacks, and cereals. For each category, a specific product

image was selected and participants were asked to indicate its level of healthiness. Perceived healthiness was measured using a 7-point self-anchored scale developed by Adams and Geuens (2007) (see Table 1).

The results of the pre-test showed that cereals were perceived as the healthiest product ($M_{\text{cereals}} = 4.59$), snacks as the least healthy ($M_{\text{snacks}} = 3.27$), while biscuits were positioned at an intermediate level of perceived healthiness ($M_{\text{biscuits}} = 3.98$). Based on these findings, the biscuit category was selected as the experimental stimulus for the main study, as it can be considered a “neutral condition” suitable for observing perceptual variations attributable exclusively to the claim manipulation.

For the experimental phase, a fictitious-brand biscuit package was developed as stimulus, in order to avoid potential biases related to brand familiarity or brand preference. The packaging was manipulated solely with respect to the claim – ingredient-based (“with oat flakes”) versus nutritional-property-based (“rich in prebiotics”) – while all other visual elements (colors, package shape, brand name, and product image) were kept identical and constant across conditions (Figure 2). The two claims were operationalized to reflect the same underlying product attribute while differing in their communicative framing. Specifically, the ingredient-based claim (“with oat flakes”) emphasized the presence of the core ingredient, whereas the nutrition-property-based claim (“rich in prebiotics”) highlighted the functional benefit associated with that ingredient. This approach ensured that the manipulation isolated the effect of claim framing while holding the underlying product characteristics constant.

Figure 2 – Experimental stimuli



Source: Authors' elaboration

3.2 Data collection

Data were collected through a structured questionnaire consisting of two main sections. The first section was devoted to the measurement of the latent variables: perceived healthiness, expected taste, and desire to consume the product, as well as attitude toward breakfast, which was included in the model as a control variable. The second section gathered sociodemographic information, including age, gender, education level, geographic area of residence, and occupation.

Participants were presented with the product image through the structured questionnaire and were asked to carefully observe the stimulus before answering the questions. This procedure ensured standardized exposure to the experimental stimuli for all participants.

The final sample consisted of 300 participants, evenly distributed across the two experimental conditions. One hundred and fifty respondents were exposed to the stimulus featuring the ingredient-based claim (“with oat flakes”), while the remaining one hundred and fifty participants were shown the stimulus featuring the nutritional-property-based claim (“rich in prebiotics”). All participants completed the questionnaire anonymously and on a voluntary basis.

3.3 Measures

Validated and widely used scales from the literature were employed to measure the latent variables, as reported in Table 1. Perceived healthiness was measured using a 7-point self-anchored scale developed by Adams and Geuens (2007). Expected taste was assessed using a 7-point Likert scale (1 = strongly disagree; 7 = strongly agree) adapted from Paakki et al. (2022). Desire to eat was measured using a single-item 7-point scale proposed by Lambert, Neal, Noyes, Parker, and Worrel (1991). Prior research supported the use of single-item to capture concrete unidimensional constructs, particularly in experimental contexts (Bergkvist & Rossiter, 2007). Previous studies investigating desire to eat in response to food characteristics and olfactory stimuli have successfully employed single-item measures similar to the one adopted in the present study (Fedoroff, Polivy, & Herman, 2003; Wallis & Appleton, 2026). Finally, attitude toward breakfast (control variable) was measured using a 7-point Likert scale adapted from Tapper et al. (2008), where 1 = strongly disagree and 7 = strongly agree. The reliability of these scales was assessed through Cronbach’s α and was satisfactory for all the constructs ($\alpha > 0.70$) as shown in Table 1.

Data analysis was conducted using IBM SPSS software (SPSS Inc., Chicago, IL, USA; Version 29.00) employing a parallel mediation model (Model 4 of Hayes’ PROCESS Macro).

Table 1 – Variables measurement and Cronbach's alpha

Construct	Items	Cronbach's α
Perceived healthiness <i>Adams and Geuens (2007)</i>	Unhealthy-is healthy Has a low nutritional value-has a high nutritional value Is bad for my body – is good for my body Has a negative influence on my weight – has a positive influence on my weight Is bad for my teeth – is good for my teeth	0.846
Expected taste <i>Paakki et al. (2022)</i>	I expect this product to have an excellent taste I expect eating this product to be a pleasant experience	0.933
Desire to eat <i>Lambert, Neal, Noyes, Parker, and Worrel (1991)</i>	No desire – Very strong desire	-
Attitude toward breakfast <i>Tapper et al. (2008)</i>	I usually eat healthy foods for breakfast I often miss breakfast (<i>r</i>) It's okay to miss breakfast (<i>r</i>) I hardly eat anything for breakfast (<i>r</i>) I hate eating breakfast (<i>r</i>) I usually eat unhealthy foods for breakfast (<i>r</i>) I can concentrate on my morning activities even if I missed breakfast (<i>r</i>) I usually have a snack at morning break instead of breakfast (<i>r</i>) I feel okay in the mornings even if I haven't eaten breakfast (<i>r</i>) Eating breakfast is boring (<i>r</i>) I'd rather have a snack at morning break than eat breakfast (<i>r</i>) If I miss breakfast, I feel more tired in the morning I usually have a good breakfast.	0.876

Note. Items marked with (*r*) were reverse-coded.

Source: Authors' elaboration

4 Results

4.1 Sample characteristics

The overall sample consisted of 300 respondents, with an average age of approximately 43 years (min=18; max=65), and exhibited perfect balance with respect to gender distribution. The majority of

respondents had a high school diploma (55%) and worked full-time (58%). The sociodemographic characteristics of the sample are detailed in Table 2, with the participants divided accordingly to experimental conditions (*ingredient-based* claim vs. *nutrition-property-based* claim).

Table 2 – Sociodemographic characteristics of the sample by experimental condition

Variables	Category	Experimental Conditions	
		Ingredient group (n=150)	Nutritional Property group (n=150)
Age group	18-24 years old	12%	12%
	25-34 years old	17.3%	18%
	35-44 years old	18.7%	19.3%
	45-54 years old	26%	24.7%
	55-65 years old	26%	26%
Gender	Male	50%	50%
	Female	50%	50%
Geographical area	Northwest	28%	27.3%
	Northeast	18.7%	20%
	Center	19.3%	18.7%
	South and Sicily	24%	23.3%
	Islands	10%	10.7%
Education	Lower secondary school with license	5.3%	8.7%
	Upper secondary school with diploma	33.3%	30.7%
	Three-year/five-year degree	56%	54%
	Doctorate/Postgraduate	5.3%	6.7%
	Master's degree	5.3%	6.7%
	Lower secondary school with license	5.3%	8.7%
Employment	Full-time	58.7%	57.3%
	Part-time	18%	22%
	No	23.3%	20.7%

Source: Authors' elaboration

4.2 Hypothesis testing

The data were analyzed using a parallel mediation model (Model 4 of PROCESS Macro; Hayes, 2015), with 5,000 bootstrap samples. The type of claim was incorporated as an independent variable,

perceived healthiness and expected taste as parallel mediators, desire to eat as a dependent variable, and attitude toward breakfast as a control variable.

The results shown in Table 3 highlight that the “rich in prebiotics” claim does not have a significantly greater impact on the desire to eat than the “with oat flakes” claim ($\beta = 0.078$, $p = 0.650$, 95% CI = [-0.415; 0.260]). Hypothesis H1 is therefore not supported. On the contrary, the analysis demonstrates that the nature of the claim exerts a substantial influence on the perceived healthiness of the product ($\beta = 0.350$; $p = 0.026$; $F(2,297) = 3.318$; $p < 0.05$), suggesting that the “rich in prebiotics” claim communicates a greater perception of healthiness than “with oat flakes”, thus supporting hypothesis H2a.

Table 3 – Results of the analysis (Ingredient vs. Nutritional property)

Independent	Perceived healthiness			Expected taste			Desire to eat		
	Coeff	SE	p	Coeff	SE	p	Coeff	SE	p
Constant	4.916	0.383	0.000	3.401	0.365	0.000	0.185	0.523	0.724
Claim (Oats=0; Prebiotics=1)	0.350	0.156	0.026	0.032	0.185	0.864	0.078	0.172	0.650
Perceived healthiness	—	—	—	—	—	—	0.184	0.069	0.008
Expected taste	—	—	—	—	—	—	0.713	0.058	0.000
Attitude toward breakfast	-0.095	0.068	0.166	0.188	0.081	0.021	-0.019	0.076	0.424

Note. Model fit indices:

- Perceived healthiness: $R^2 = 0.022$, $F(2,297) = 3.318$, $p = 0.038$
- Expected taste: $R^2 = 0.018$, $F(2,297) = 2.750$, $p = 0.066$
- Desire to eat: $R^2 = 0.427$, $F(4,295) = 54.873$, $p = 0.000$

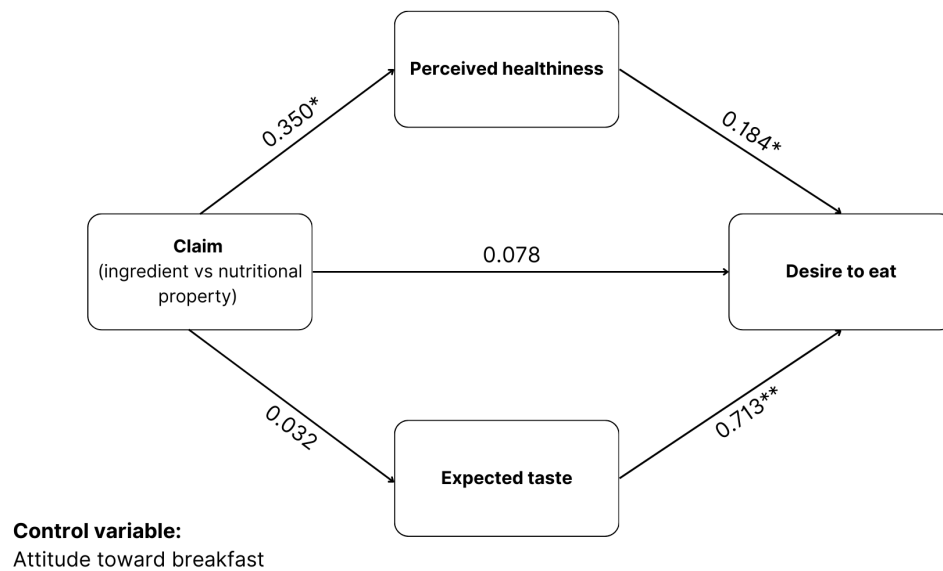
Source: Authors' elaboration

Furthermore, the results demonstrate that perceived healthiness significantly predicts the desire to eat the product ($\beta = 0.184$; $p = 0.008$), confirming the hypothesis H2b. Analysis also showed that perceived healthiness fully mediates (Baron & Kenny, 1996) the relationship between type of claim and

desire to eat (indirect effect: $\beta = 0.064$; 95% CI [0.003; 0.153]). In other words, claims that communicate nutritional properties (“rich in prebiotics”) lead to a greater perception of product healthiness compared to claims that focus on ingredients (“with oat flakes”), and healthiness, in turn, acts as a key driver of the desire to consume the product.

Finally, if the expected taste has a positive and significant influence on the desire to eat ($\beta = 0.713$; $p < 0.001$), thus confirming H3b, then the type of claim does not result in significant differences in terms of expected taste ($\beta = 0.032$; $p = 0.864$), not supporting H3a. The results are graphically presented in Figure 3.

Figure 3 – Results of the mediation model and coefficients



Note. * $p < 0.05$; ** $p < 0.001$

Source: Authors' elaboration

5 Discussion and implications

The objective of this research was to determine whether the type of communication used to emphasize the nutritional properties of a food product influences consumers' perception of and judgment about it.

The results indicate that the type of claim exerts a different effect on how healthy a product is perceived to be. Specifically, the claim based on nutritional properties has a stronger impact on perceived healthiness than the ingredient-based claim. This finding suggests that emphasizing a nutritional benefit activates a different perceptual process to that triggered by ingredient-focused communication. Although the nutritional benefit is inherently linked to the ingredient itself, consumers attribute different levels of healthiness to otherwise identical products when they are framed through distinct communicative cues.

The analyses further reveal that the type of claim does not produce a significantly different effect on expected taste. The hypothesis of a direct relationship between claims and taste expectation was grounded in the literature on the “unhealthy = tasty” intuition, which posits that consumers often infer a trade-off between healthiness and palatability, thus assuming that foods perceived as less healthy tend to be evaluated as tastier, whereas healthier options tend to be considered less flavorful (Raghunathan, Naylor, & Hoyer, 2006). From this perspective, emphasizing a positive nutritional attribute could activate compensatory inferences, leading consumers to expect a reduction in taste as a consequence of improved healthfulness. However, the empirical evidence did not support this assumption. Contrary to the predicted trade-off, highlighting a specific nutritional benefit did not reduce taste expectations. This suggests that health-related claims may not automatically result in a taste penalty, particularly when they focus on the presence of a beneficial attribute rather than the absence or reduction of a hedonic component (e.g., fat or sugar). This result may also be interpreted in light of the distinction between additive and subtractive health claims. While subtractive claims (e.g., “low fat”, “sugar-free”) often activate the “unhealthy = tasty” intuition by signaling a reduction in hedonic components (Szakály, Soós, Balsa-Budai, Kovács, & Kontor, 2020), additive claims (e.g., “rich in prebiotics”) emphasize the presence of beneficial attributes without implying a loss in taste. Overall, these results contribute to the ongoing debate on the “unhealthy = tasty” intuition by indicating that its effect may be context-dependent and less robust when health information is framed positively.

The absence of a significant effect of type of claim on expected taste may also be explained by the fact that both claims convey health-related information rather than sensory attributes of the product, such as texture, flavor, or hedonic cues. Prior research suggests that sensory and experiential cues exert a more direct and substantial influence on taste expectations (Szakály, Soós, Balsa-Budai, Kovács, & Kontor, 2020). Moreover, consumption desire can be conceptualized as a construct closely related to behavior which results from the integration of multiple evaluative processes rather than from a single informational stimulus (Mai & Hoffmann, 2015).

Furthermore, the results show that the nutrition-property-based claim indirectly influences the desire to consume the product through perceived healthiness. The fact that perceived healthiness fully

mediates the relationship between claim type and consumption desire aligns with prior literature, which highlights how nutritional information shapes health-related perceptions and, in turn, affects cognitive evaluations of food products (Mai & Hoffmann, 2015; McKeon & Hallman, 2024). In summary, the type of nutritional claim can influence the desire to eat the product, but only if the perception of healthiness varies too.

Finally, the findings demonstrate that both perceived healthiness and expected taste exert a positive and significant influence on consumption desire. This result corroborates existing research underscoring the pivotal role of health and taste expectations as key predictors and drivers of consumers' desire to eat food products (Erensoy, Lu, Aaker, & Fishbach, 2025).

From a theoretical standpoint, the study makes a significant contribution to the existing body of literature on the use of packaging information and nutrition claims as communication tools capable of influencing consumers' perception of the product. Specifically, the research results reveal a significant distinction between *ingredient-based* and *nutrition-property-based* claims, highlighting how these two forms of communication generate different effects on perceptual and motivational variables. Indeed, the research shows that such claims not only affect functional variables (e.g., purchase intention, willingness to pay), but also directly increase perception of healthiness and indirectly influence hedonic dimensions such as consumption desire. These findings also contribute to the literature on responsible food consumption by showing how specific forms of health communication through packaging can guide consumers toward healthier choices without reducing the anticipated enjoyment of food. In this sense, nutritional claims can act as informational nudges that facilitate more conscious and balanced consumption decisions.

From a managerial perspective, the results provide actionable insights for food companies and marketing professionals. The findings demonstrate that emphasizing a product's nutritional properties (e.g., "rich in prebiotics") is more effective in enhancing perceived healthiness than merely highlighting the presence of an ingredient (e.g., "with oat flakes"). Importantly, communicating nutritional benefits does not reduce expected taste, as initially hypothesized. This suggests that firms can foreground nutrition-property-based claims without risking negative effects on taste expectations.

By emphasizing functional nutritional benefits rather than ingredient cues, companies can effectively balance health and sensory dimensions, guiding consumers toward healthier choices without compromising the anticipated pleasure of consumption. In this sense, nutrition claims can strengthen a product's health-oriented positioning while preserving its hedonic appeal, thereby reinforcing health-related brand associations without diminishing taste expectations. In practical terms, companies can combine nutritional claims with sensory cues on packaging, such as appealing product imagery or indulgence-related color schemes, in order to reinforce expected taste while enhancing perceived

healthiness. This approach is consistent with the present findings, which show that emphasizing nutritional benefits does not reduce taste expectations. By integrating health-related information with elements that evoke sensory appeal, firms may simultaneously strengthen both the functional and hedonic dimensions of product evaluation. However, the effectiveness of specific combinations of cues remains an open empirical question and could be further investigated in future research.

Furthermore, because both perceived healthiness and expected taste positively influence consumption desire, managers should consider health perceptions not merely as cognitive assessments but as behavioral drivers. Investing in effective nutrition claims can indirectly enhance consumption desire by increasing perceived healthiness, highlighting the strategic role of health-related communication as a motivational lever rather than solely as informational content.

In addition, the findings underscore the strategic importance of front-of-pack design. Managers should increase the visual prominence of nutritional benefits, employ concise and easily processable claims, and structure packaging layouts to ensure immediate perceptual accessibility. In doing so, firms can leverage communicative framing as a cost-efficient strategic tool, capable of enhancing consumer responses without requiring costly product reformulation.

Finally, from a responsible marketing perspective, the results suggest that companies can promote healthier consumption patterns through effective packaging communication strategies, while preserving hedonic appeal, thereby supporting more sustainable and conscious food choices.

6 Limits and future research directions

The research offers a significant contribution to understanding the cognitive mechanism that guides consumer response to health information on packaging. The results provide relevant insights into how to improve the communicative effectiveness of nutritional claims. These insights focus on the necessary balance between health value and hedonic consumption experience, with a view to promoting a sustainable lifestyle linked to conscious food choices.

Notwithstanding the significance of the results obtained, the study has some limitations that open the way for further research. Firstly, the experimental design is based on static stimuli (images of packaging) rather than on actual consumption experiences. This may have limited the ability to fully capture the sensory and taste perceptions of the participants. Secondly, the research considered only one product category (biscuits), which may have influenced how consumers interpreted and evaluated the information on packaging.

In view of these considerations, future research and development could be directed toward expanding the analysis in several directions. In particular, it would be appropriate to replicate the experiment on other product categories (e.g. cereals or snacks for the breakfast category) in order to verify the robustness of the model in different contexts.

Furthermore, future studies may benefit from incorporating multisensory stimuli or including actual tasting experiences, in order to more accurately capture the impact of claims on taste perception and consumer behavior. Moreover, further research could include and evaluate potentially pertinent individual variables, such as familiarity with prebiotics and nutritional knowledge, which have the potential to influence consumers' interpretation and evaluation of different types of claims. In addition, further research avenues could explore the moderating role of individual health consciousness, as prior studies suggest that more health-conscious consumers are more responsive to nutrition-related information and tend to process health claims differently (May & Hoffman, 2015).

Overall, the results suggest that effective nutritional communication cannot ignore an understanding of the consumer's hedonic perception dynamics, especially in contexts where health is increasingly important, but not exclusive, factor in the consumer decision-making and food choice process.

References

- Abbas, S., Munir, H., & Ahmad, Y. (2024). Integrating eco-labeling and green advertising in achieving Sustainable Development Goal 12. *Business Strategy & Development*, 7(2), <https://doi.org/10.1002/bsd2.378>
- Acton, R. B., & Hammond, D. (2018). Do consumers think front-of-package "High in" warnings are harsh or reduce their control? A test of food industry concerns. *Obesity*, 26(11), 1687-1691.
- Adams, L., & Geuens, M. (2007). Healthy or unhealthy slogans: That's the question... *Journal of Health Communication*, 12(2), 173-185.
- Annunziata, A., Vecchio, R., & Kraus, A. (2015). Awareness and preference for functional foods: The perspective of older Italian consumers. *International Journal of Consumer Studies*, 39(4), 352-361.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173-1182.
- Barreiro-Hurle, J., Gracia, A., & De-Magistris, T. (2010). The effects of multiple health and nutrition labels on consumer food choices. *Journal of Agricultural Economics*, 61(2), 426-443.
- Bergkvist, L., & Rossiter, J. R. (2007). The predictive validity of multiple-item versus single-item measures of the same constructs. *Journal of marketing research*, 44(2), 175-184.

- Bialkova, S., Sasse, L., & Fenko, A. (2016). The role of nutrition labels and advertising claims in altering consumers' evaluation and choice. *Appetite*, 96, 38-46.
- Bravo, I., Colamatteo, I., Romano, R., & Vistocco, D. (2025). Evaluation of the Quality and Sustainability of Olive Oils by Taster with Different Degrees of Experience. *Sustainable and Responsible Management*, 6(2), 14-39
- Briers, B., Huh, Y. E., Chan, E., & Mukhopadhyay, A. (2020). The unhealthy = tasty belief is associated with BMI through reduced consumption of vegetables: A cross-national and mediational analysis. *Appetite*, 150, 104639.
- Cameron, A. J., Charlton, E., Ngan, W. W., & Sacks, G. (2016). A systematic review of the effectiveness of supermarket-based interventions involving product, promotion, or place on the healthiness of consumer purchases. *Current Nutrition Reports*, 5(3), 129-138.
- Chen, W., Zhang, S., Hu, X., Chen, F., & Li, D. (2023). A review of healthy dietary choices for cardiovascular disease: From individual nutrients and foods to dietary patterns. *Nutrients*, 15(23), Article 23.
- Choi, H., Northup, T., & Reid, L. N. (2021). How health consciousness and health literacy influence evaluative responses to nutrient-content claimed messaging for an unhealthy food. *Journal of Health Communication*, 26(5), 350-359.
- de Mello Marsola, C., de Carvalho Ferreira, J. P., Medina, N. D. O., & da Cunha, D. T. (2025). More than meets the eyes: How can healthiness perceptions and restraint shape the purchase intent of food with nutrition claims? *Food Research International*, 203, 115910.
- De-Magistris, T., Gracia, A., & Barreiro-Hurle, J. (2017). Do consumers care about European food labels? An empirical evaluation using best-worst method. *British Food Journal*, 119(12), 2698-2711.
- Dubé, L., Fatemi, H., Lu, J., & Hertzner, C. (2016). The healthier the tastier? USA-India comparison studies on consumer perception of a nutritious agricultural product at different food processing levels. *Frontiers in Public Health*, 4, Article 6.
- Ekesa, B. N. (2017). Selected superfoods and their derived superdiets. In N. Shiomi (Ed.), *Superfood and functional food: The development of superfoods and their roles as medicine* (pp.95-114). Intech Open.
- Erensoy, E., Lu, L., Aaker, J., & Fishbach, A. (2025). Beauty as a Goal: Creating Harmony Between Health and Taste. *Journal of Consumer Research*. <https://doi.org/10.1093/jcr/ucaf047>
- Fang, X., Cappelletti, G. M., & Zhechev, V. (2025). Toward Healthier and Sustainable Diets: Factors Influencing Chinese Consumers' Olive Oil Purchasing Behavior. *Sustainable and Responsible Management*, 6(2), 109-127.
- Fedoroff, I., Polivy, J., & Herman, C. P. (2003). The specificity of restrained versus unrestrained eaters' responses to food cues: general desire to eat, or craving for the cued food? *Appetite*, 41(1), 7-13.
- Franco Lucas, B., Costa, J. A. V., & Brunner, T. A. (2021). Superfoods: Drivers for consumption. *Journal of Food Products Marketing*, 27(1), 1-9.
- Gibson, G. R., Scott, K. P., Rastall, R. A., Tuohy, K. M., Hotchkiss, A., Dubert-Ferrandon, A., et al. (2010). Dietary prebiotics: Current status and new definition. *Food Science and Technology Bulletin: Functional Foods*, 7(1), 1-19.
- Groeniger, J. O., 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, Article 40.

- Grunert, K. G., Seo, H. S., Fang, D., Hogan, V. J., & Nayga, R. M., Jr. (2024). Sustainability information, taste perception and willingness to pay: The case of bird-friendly coffee. *Food Quality and Preference*, 115, 105124.
- Haasova, S., & Florack, A. (2019). Practicing the (un)healthy = tasty intuition: Toward an ecological view of the relationship between health and taste in consumer judgments. *Food Quality and Preference*, 75, 39-53.
- Hamlin, R., & McNeill, L. (2018). The impact of the Australasian “Health Star Rating” front-of-pack nutritional label on consumer choice: A longitudinal study. *Nutrients*, 10(7), 906.
- Hartmann, C., Hieke, S., Taper, C., & Siegrist, M. (2018). European consumer healthiness evaluation of “Free-from” labelled food products. *Food Quality and Preference*, 68, 377-388.
- Hayes, A. F. (2015). An index and test of linear moderated mediation. *Multivariate Behavioral Research*, 50(1), 1-22.
- Hieke, S., Kuljanic, N., Pravst, I., Miklavec, K., Kaur, A., Brown, K. A., et al. (2016). Prevalence of nutrition and health-related claims on pre-packaged foods: A five-country study in Europe. *Nutrients*, 8(3), 137.
- Holtrop, N., Cleeren, K., Geyskens, K., & Verhoef, P. C. (2024). The impact of nutrition claims on purchase behavior for food products. *International Journal of Research in Marketing*, 42(3), 788-808.
- Hong, X., Li, C., Wang, L., Gao, Z., Wang, M., Zhang, H., et al. (2022). The effects of nutrition and health claim information on consumers’ sensory preferences and willingness to pay. *Foods*, 11(21), 3460. <https://doi.org/10.3390/foods11213460>
- Hu, H., & Krishen, A. S. (2019). When is enough, enough? Investigating product reviews and information overload from a consumer empowerment perspective. *Journal of Business Research*, 100, 27-37.
- Huang, L. S., Chou, Y. J., Zhang, C., & Lan, Y. Y. (2025). Images of ingredients or finished products on food packages: the effects of food readiness and purchasing motivations. *Asia Pacific Journal of Marketing and Logistics*, 37(7), 1787-1800.
- Konuk, F. A. (2021). The moderating impact of taste award on the interplay between perceived taste, perceived quality and brand trust. *Journal of Retailing and Consumer Services*, 63, 102684.
- Krutulyte, R., Grunert, K. G., Scholderer, J., Lähteenmäki, L., Hagemann, K. S., Elgaard, P., et al. (2011). Perceived fit of different combinations of carriers and functional ingredients and its effect on purchase intention. *Food Quality and Preference*, 22(1), 11-16.
- Lambert, K. G., Neal, T., Noyes, J., Parker, C., & Worrel, P. (1991). Food-related stimuli increase desire to eat in hungry and satiated human subjects. *Current Psychology*, 10, 297-303.
- Mai, R., & Hoffmann, S. (2015). How to combat the unhealthy = tasty intuition: The influencing role of health consciousness. *Journal of Public Policy & Marketing*, 34(1), 63-83.
- McKeon, G. P., & Hallman, W. K. (2024). Front-of-package protein labels on cereal create health halos. *Foods*, 13, 1139.
- Mediano Stoltze, F., Busey, E., Taillie, L. S., & Carpentier, F. R. D. (2021). Impact of warning labels on reducing health halo effects of nutrient content claims on breakfast cereal packages: A mixed-measures experiment. *Appetite*, 163, 105229.

- Paakki, M., Kantola, M., Junkkari, T., Arjanne, L., Luomala, H., & Hopia, A. (2022). “Unhealthy = tasty”: How does it affect consumers’ (un)healthy food expectations? *Foods*, 11(19), 3139.
- Precup, G., Pocol, C. B., Teleky, B.-E., & Vodnar, D. C. (2022). Awareness, knowledge, and interest about prebiotics – A study among Romanian consumers. *International Journal of Environmental Research and Public Health*, 19(3), 1208.
- Raghunathan, R., Naylor, R. W., & Hoyer, W. D. (2006). The unhealthy = tasty intuition and its effects on taste inferences, enjoyment, and choice of food products. *Journal of Marketing*, 70(4), 170-184.
- Rebouças, M. C., Rodrigues, M. D. C. P., Freitas, S. M. D., Ferreira, B. B. A., & Costa, V. D. S. (2017). Effect of nutritional information and health claims related to cashew nut and soya milk beverages on consumers’ acceptance and perception. *Nutrition & Food Science*, 47(5), 721-730.
- Reents, J., Seidel, A., Wiesner, C. D., & Pedersen, A. (2020). The effect of hunger and satiety on mood-related food craving. *Frontiers in Psychology*, 11, 568908. <https://doi.org/10.3389/fpsyg.2020.568908>
- Rizk, M. T., & Treat, T. A. (2015). Perceptions of food healthiness among free-living women. *Appetite*, 95, 390-398.
- Roberto, C. A., Shivaram, M., Martinez, O., Boles, C., Harris, J. L., & Brownell, K. D. (2012). The Smart Choices front-of-package nutrition label: Influence on perceptions and intake of cereal. *Appetite*, 58, 651-657.
- Roetzel, P. G. (2018). Information overload in the information age: A review of the literature from business administration, business psychology, and related disciplines with a bibliometric approach and framework development. *Business Research*, 12, 479-522. <https://doi.org/10.1007/s40685-018-0069-z>
- Steinhauser, J., & Hamm, U. (2018). Consumer and product-specific characteristics influencing the effect of nutrition, health and risk reduction claims on preferences and purchase behavior – A systematic review. *Appetite*, 127, 303-323.
- Steinhauser, J., Janssen, M., & Hamm, U. (2019). Who buys products with nutrition and health claims? A purchase simulation with eye tracking on the influence of consumers’ nutrition knowledge and health motivation. *Nutrients*, 11, 2199.
- Szakály, Z., Soós, M., Balsa-Budai, N., Kovács, S., & Kontor, E. (2020). The effect of an evaluative label on consumer perception of cheeses in Hungary. *Foods*, 9, 563.
- Tapper, K., Murphy, S., Lynch, R., Clark, R., Moore, G. F., & Moore, L. (2008). Development of a scale to measure 9–11-year-olds’ attitudes towards breakfast. *European Journal of Clinical Nutrition*, 62(4), 511-518.
- Tokat, P., & Yilmaz, I. (2023). Neurogastronomy: Factors affecting the taste perception of food. *International Journal of Gastronomy Research*, 2(1), 1-10.
- Turner, M. M., Skubisz, C., Pandya, S. P., Silverman, M., & Austin, L. L. (2014). Predicting visual attention to nutrition information on food products: The influence of motivation and ability. *Journal of Health Communication*, 19, 1017-1029.
- United Nations – Department of Economic and Social Affairs (2015). *Transforming our World: The 2030 Agenda for Sustainable Development*. <https://sdgs.un.org/publications/transforming-our-world-2030-agenda-sustainable-development-17981>
- Vadiveloo, M., Morwitz, V., & Chandon, P. (2013). The interplay of health claims and taste importance on food consumption and self-reported satiety. *Appetite*, 71, 349-356.

- Van Kleef, E., Van Trijp, H. C., & Luning, P. (2005). Functional foods: Health claim-food product compatibility and the impact of health claim framing on consumer evaluation. *Appetite*, 44, 299-308.
- Wallis, J., & Appleton, K. M. (2026). Food taste and macronutrient content: different associations with self-reported hunger and desire to eat. *Food Quality and Preference*, 105901.
- Wang, P., Huang, J., Sun, J., Liu, R., Jiang, T., & Sun, G. (2022). Evaluating the nutritional properties of food: A scoping review. *Nutrients*, 14(11), 2352.
- Werle, C. O., Trendel, O., & Ardito, G. (2013). Unhealthy food is not tastier for everybody: The “healthy = tasty” French intuition. *Food Quality and Preference*, 28(1), 116-121.
- World Health Organization (WHO). (2022). *Nutrition – Europe*. <https://www.who.int/europe/health-topics/nutrition>

Acknowledges financial support from:

Funder: Project funded under the National Recovery and Resilience Plan (NRRP), Mission 4 Component 2 Investment 1.3 – Call for tender No. 341 of 15/03/2022 of Italian Ministry of University and Research funded by the European Union – NextGenerationEU.

Award Number: Project code PE0000003, Concession Decree No. 1550 of 11/10/2022 adopted by the Italian Ministry of University and Research, CUP D93C22000890001, Project title “Research and innovation network on food and nutrition Sustainability, Safety and Security – Working ON Foods” (ONFoods).