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Effect of high-protein claim on consumer's perceptions of healthful indulgences

Jasmine Louise Sarrouy

Dissertation submitted as partial requirement for the conferral of Master in Science on Emotions

Supervisor:
Doctor Marília Prada, Assistant Professor with Habilitation, Department of Social and Organizational Psychology
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CIÊNCIAS SOCIAIS
E HUMANAS

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Resumo

Hábitos alimentares inadequados estão relacionados com diversos problemas de saúde, nomeadamente a obesidade. Nos últimos anos, para além de muitas estratégias terem sido desenvolvidas para promover um consumo alimentar equilibrado e sustentável, a indústria alimentar tem sido desafiada a desenvolver produtos que não só promovam saúde como também um momento prazeroso, as chamadas "indulgências saudáveis". Partindo da literatura sobre o efeito de halo e o dilema "saúde-prazer", objetivou-se compreender de que forma uma alegação nutricional (teor proteico) e a categoria de produto influenciam as avaliações do consumidor em relação à perceção de salubridade, sabor, saciedade, teor nutricional (e.g., teor de açúcar), intenção de compra e emoções antecipadas. Foi também analisado o padrão de associações entre a avaliação dos produtos e características individuais. Neste estudo experimental colaboraram voluntariamente 161 participantes (93,2% portugueses, 92,5% ensino superior) distribuídos aleatoriamente pelas condições resultantes do delineamento: 2 (alegação hiperproteica vs. controlo) × 2 (iogurte vs. pudim). Os resultados demonstraram que participantes avaliam os produtos hiperproteicos como mais saciantes e com maior teor proteico em comparação com a condição de controlo; mas não se verificaram efeitos principais para a categoria de produto. A perceção de salubridade, sabor e intenção de compra não foi influenciada pelas variáveis independentes. Para a avaliação da culpa antecipada, houve um efeito marginal entre a alegação e a categoria do produto. Embora sejam necessários estudos futuros, esta investigação contribui para o estudo da tomada de decisão e abriu um caminho para a compreensão do impacto da alegação hiperproteica e das "indulgências saudáveis".

Palavras-chave: Hiperproteico, rotulagem de alimentos, alegação nutricional, indulgências saudáveis

Códigos de classificação PsychINFO:

3900 (Consumer Psychology);

3365 (Promotion & Maintenance of Health & Wellness).

Abstract

Unhealthy eating habits are related to several health problems, such as obesity. Over the last few years, in addition to many strategies having been developed to promote a more balanced and sustainable food consumption, the food industry has been challenged to develop products that not only promote health but also a pleasurable moment, the so-called healthful indulgences. In line with the health halo effect and the health-pleasure trade-off dilemma, the goal was to understand how information regarding the nutrition claim and how product category influences the consumer's evaluations of perceived healthfulness, expected taste, satiety, nutritional content (e.g., sugar content), purchase intention, and anticipated emotions. The pattern of associations between the evaluation of the products and individual characteristics was also examined. In this experimental study voluntarily participated 161 subjects (93.2% Portuguese nationality, 92.5% Higher education) distributed randomly between a four conditions design: 2 (high-protein claim versus control condition) × 2 (yoghurt versus pudding). We verified that subjects considered products with high-protein claims as more satiating and higher in protein content than the control condition, but no main effects of product category were verified. The evaluation of perceived healthfulness, expected taste, and purchase intention did not differ significantly for any of the conditions of the independent variables. For the evaluation of anticipated guilt, there was a marginal effect between claim and product category. Although future research is needed, the current study opens a path to understanding the impact of high-protein-related claims and healthful indulgences products on consumer's perceptions and decision-making.

Keywords: High-protein, food labelling, nutrition claim, healthful indulgences

PsychINFO Classification Codes:

3900 (Consumer Psychology);

3365 (Promotion & Maintenance of Health & Wellness).

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ACRONYMS GLOSSARY

BMI – Body Mass Index

SDG – Sustainable Development Goals

INTRODUCTION

Global food systems have been facing a set of complex challenges, regarding both human and environmental health (Chen & Antonelli, 2020). A big shift in eating patterns and food choices has taken place with the change in global food systems and food supply. Due to the complex nature of food choice, Chen and Antonelli (2020) proposed three main categories affecting these choices: intrinsic and extrinsic food-related features, individual differences, and society-related features.

In the present study, we will focus on food-related features, specifically, extrinsic features such as nutritional labels, health claims, food categories, and packaging (Chen & Antonelli, 2020). For most consumers, easily accessible sources of information, such as nutrition labels, are their primary sources of nutrition information (Oostenbach et al., 2019). For example, when examining the effect of nutrition claims on food choice, Oostenbach et al. (2019) highlighted that nutrition claims can influence consumers' perceived healthfulness, expected tastiness, and food purchase intentions, and are moderated by the health consciousness of individuals. Yet, the results depend on the type of claim and type of food product.

Consumers tend to use information-processing heuristics (or "mental short-cuts") to make decisions based on fast and easy justifications, by inferring a general perception of the overall product based on specific information, the so-called halo effect (Belei et al., 2012; Roe et al., 1999; Slovic et al., 2007). Although nutrition and health claims can be useful tools to inform food purchasing, previous literature has shown that they can contribute to the emergence of a health halo effect (Oostenbach et al., 2019), making food products carrying claims seem healthier than they are. In addition, by influencing consumers' perceptions, such claims can potentially lead to overconsumption and lowering of perceived energy intake (Oostenbach et al., 2019).

Nutrition and health claims related to a wide array of nutrients have been extensively studied. For instance, Prada et al. (2016, 2019) studied the impact of gluten and organic-related claims on food perception, whereas Oostenbach et al. (2019), focused on the role played by fat, sugar, and energy-related claims. In contrast, there is a lack of studies that have specifically investigated the impact of high-protein-related claims (for exceptions, see Banovic et al., 2018; Li & Dando, 2019).

Recently, enriched protein content has gained significant attention in the food health and innovation field, so it is highly relevant to understand how the presence of such high-protein claims can shape the way consumers perceive and behave toward food.

Although, overall, consumers acknowledge food with nutrition and health claims (e.g., "low fat" and "high fibre") as healthier options, the purchase intention is often lower due to anticipation of negative hedonic benefits from the product (Ballco et al., 2022). For example, Oostenbach et al. (2019) showed that nutrition claims such as "low fat" can make food products seem healthier, but also less tasty. This effect seems to anchor in the belief that perceived food healthfulness cannot be increased without sacrificing taste attributes, known as the health-pleasure trade-off dilemma (Bialkova et al., 2016; Loebnitz & Grunert, 2018). The dilemma has been challenging food companies once, in recent years, societal interest in consuming healthy foods while having a pleasurable experience has increased (Baker et al., 2022). This trend has been requiring reformulating labels that promote "new" or "improved" products, offering simultaneously hedonic and utilitarian benefits (Ballco et al., 2022; Bialkova et al., 2016; Loebnitz & Grunert, 2018) - the so-called healthful indulgences (Belei et al., 2012).

Another important aspect guiding and influencing consumers' decision-making is related to the anticipated emotions upon purchase and consumption (Burnett & Lunsford, 1994; Hur & Jang, 2015; Oostenbach et al., 2019). For instance, anticipated guilt may serve as an inner inhibitor by motivating individuals to balance out their negative feelings and overall improve the self (Lefebvre et al., 2019). In contrast, anticipated pride incentivizes pursuing behaviours with desirable outcomes and being a socially valued person (Haj-Salem et al., 2022). Yet, anticipated guilt and pride do not always lead to motivational behaviour and may be unfavourable in the long run for healthy goals (Lefebvre et al., 2019).

Previous studies have also shown that the way consumers process their cognitive (e.g., perceived healthiness) and affective (e.g., anticipated emotions) responses in decision-making may differ depending on the level of health consciousness (Hur & Jang, 2015). Specifically, consumers with higher levels of health consciousness tend to be more motivated to pay attention to nutrition claims and invest the cognitive effort to process health labels (Bialkova et al., 2016; Loebnitz & Grunert, 2018; Oostenbach et al., 2019).

In short, food choice is a complex behavioural process that depends on multiple interdependent variables. The current study aims to understand how a high-protein-related claim in different categories of products influences perceived healthfulness, expected taste, satiety, nutritional content (protein, calories, fat, and sugar), food purchase intentions, and anticipated emotions. Secondly, it has been demonstrated that nutrition and health claims influence the perception (e.g., healthfulness) of different types of products, including those typically defined as more utilitarian (e.g., yoghurt; Lähteenmäki et al., 2010), as well as more hedonic (e.g., cookies; Gravel et al., 2012). So, the aim is to contribute to the literature by understanding how consumers' perceptions differ when pursuing healthful indulgences products. Thirdly, we aim to explore how the perceived food characteristics are associated with the consumption frequency, subjective knowledge of the product content, as well as individual characteristics such as age, health consciousness, and Body Mass Index (BMI) (for a similar study see Ballco et al., 2022).

CHAPTER 1 – LITERATURE REVIEW AND HYPOTHESIS

1.1 Nutrition and Health Claims

Global food systems possess complex challenges and from a human society point of view, there is a double burden of malnutrition, that is, 690 million people suffering from hunger, while 13% of the population worldwide are obese and 39% are overweight (Chen & Antonelli, 2020; WHO, 2016). More specifically, 18% of the Portuguese adult population is obese and 38% is overweight (World Obesity, 2019). Whether in Portugal or worldwide, diet is one of the main causes of obesity, gaining weight through excess energy intake when compared to energy expenditure (Benson et al., 2018).

Indeed, health problems related to food consumption are still predominant. Given the negative impacts on human beings, understanding food behaviours, and promoting healthier and more sustainable food choices have been a new multidisciplinary research impulse (Chen & Antonelli, 2020). Due to the complexity of the subject, Chen & Antonelli (2020) proposed three main categories of factors affecting food choice: (1) Food-related features: intrinsic features (e.g., taste and colour) and extrinsic features (e.g., food labelling and packaging); (2) Individual differences: biological (e.g., genetic factors and personal dietary patterns), physical (e.g., access, skills of cooking, and time), psychological (e.g., motivation and stress), cognitive (e.g., anticipated consequences, beliefs, and knowledge) factors; (3) Society-related features: culture, economic variables (e.g., price and income), and policies (e.g., food policy).

In this regard, one approach to nudge consumers to make perceived healthier food choices and to improve their ability to access and process nutrition information is through food labelling (Grunert et al., 2010; Ikonen et al., 2020). Food labelling includes simplified information about the nutritional content of the product and has been recognized as an important strategy to tackle unhealthy diets and obesity (Chen & Antonelli, 2020). Studies have proven that products carrying nutrition or health claims in food labelling, compared to identical products without a claim, are more likely to be selected (Kaur et al., 2017).

Nutrition claims on food products declare or suggest that a given food product has beneficial nutritional properties, by highlighting the presence or the absence of food attributes such as "low fat" or "high fibre" claim (Belei et al., 2012; Benson et

al., 2018). Health claims declare or suggest, through a message in text or image, that there is a link between health and a food category or one of its constituents, for example "*With plant sterols. Proven to lower cholesterol*" (Benson et al., 2018). The purpose of these claims is to give clearer and more attention-grabbing information, and to increase the proportion of consumers who instantly notice and use the available information to make more nutritious choices (Ikonen et al., 2020). Yet, these claims may lead consumers to believe that the product is healthier in all aspects (Ikonen et al., 2020). Individuals tend to engage in overgeneralizations and perceive a specific attribute as an indicator of overall healthfulness, the so-called health halo effect (Wansink & Chandon, 2006). These deductions can lead to the overestimation of the appropriate serving size, increased purchase intentions and overconsumption (Oostenbach et al., 2019; Prada et al., 2016).

Most of the research in this domain has been focused on key nutrition claims related to fat, sugar, and energy content (Oostenbach et al., 2019). In contrast, only a few studies have specifically investigated the impact of high-protein-related claims on food perception and purchase intention. An important exception is the work by Banovic et al. (2018) that found that participants believe that foods with increased protein content (e.g., yoghurts with added protein and protein bars) are associated with the overall feeling of being healthy and are often perceived as more satiating compared to lower-protein versions.

1.2 Patterns of Protein Intake in the Portuguese Context

The Inquérito Alimentar Nacional e de Atividade Física (IAN-AF), revealed that 63% of Portuguese adults are consuming 1–2g/ kg bodyweight/ day of protein. More specifically, this daily protein intake is 55.9% for women and 68.4% for men (IAN-AF 2015-2016, 2017). Given that the recommended daily intake for healthy adults is 0.8–1.2 g/ kg body weight (Westerterp-Plantenga et al., 2012), it may be concluded that generally more than 50% of Portuguese adults are exceeding their protein intake per day. The excessive intake may be due to the overconsumption of "Meat, fish, and eggs" (17% versus the recommended 5%).

This is an important aspect of global health since is not always correct to infer benefits associated with high-protein consumption, as they may not be appropriate for the general population. Still, with the indicated dosage of protein and the right

energy balance, there are benefits for specific age groups (e.g., infants, and the elderly) or specific goals (e.g., sports nutrition) by triggering muscle protein synthesis, or weight loss, since energy intake from protein has a greater effect on satiety than fat or carbohydrate intake (Jørgensen et al., 2019; Westerterp-Plantenga et al., 2012). Otherwise, studies demonstrated that in excess or wrongly adapted to individual's needs, protein can be metabolized into fat, and consequently in the long term have an adverse impact on metabolic function, such as weight gain, obesity and other cardiometabolic diseases (Fappi & Mittendorfer, 2020; Lotfi et al., 2022).

Nowadays, to meet the growing concern about eating habits and demand for healthy food products (Baker et al., 2022), there is higher availability of foods that contain biologically active compounds that are clinically proven to have health benefits, the so-called functional foods (Diplock et al., 1999).

1.3 Functional Foods

Recently, functional foods have gained significant research attention in the food health and technology innovations field (Baker et al., 2022). Despite numerous definitions, experts agree that functional foods contain ingredients that provide health benefits beyond the food's basic nutritional components (Baker et al., 2022; Diplock et al., 1999). Thus, food products with enriched protein content can be considered a type of functional food since they can provide health benefits in addition to satiety and basic nutritional value (Banovic et al., 2018).

Dairy companies saw an opportunity in this trend and so, on the one hand, they improved the nutritional content, taste, and texture such as creaminess, viscosity, and smoothness in high-protein yoghurts (Jørgensen et al., 2019). On the other hand, by associating the same health characteristics ("clean label" and limited additives) and indulgent attributes, they recently developed dairy desserts such as high-protein puddings.

According to the Codex Alimentarius standard definition, high-protein yoghurts and puddings are obtained from fermented milk where the protein has been increased to a minimum of 5.6% (Codex Alimentarius, 2018). Today in the United States and European markets, the largest dairy companies offer a wide range of these concentrated yoghurts and puddings typically containing only 0.2, to 4.0% fat (Jørgensen et al., 2019).

Typically, food products are considered predominantly utilitarian or hedonic (İşeri Uzunoğlu & Sözer, 2020), and both high-protein yoghurts and high-protein puddings have challenged these two food definitions. Utilitarian food is generally more cognitively driven and rationally oriented, providing health and performance benefits, such as giving energy (Dhar & Wertenbroch, 2000; Loebnitz & Grunert, 2018). In contrast, hedonic food is generally associated with people's desire for pleasure (Loebnitz & Grunert, 2018), being characterized as a multisensory and emotional fulfilment aim, and tend to carry an unhealthy image, such as candies or snacks (Bettiga et al., 2020; Dhar & Wertenbroch, 2000; Loebnitz & Grunert, 2018).

In recent years, along with the awareness of the need to make healthier purchase decisions, people seek a pleasurable experience (Baker et al., 2022). As a result of global changes and consumer demands, the distinction between hedonic and utilitarian foods began to increasingly dissolve, involving both attributes (İşeri Uzunoğlu & Sözer, 2020). Marketers and food industries understood that they had to target both taste lovers and nutrition facts seekers (İşeri Uzunoğlu & Sözer, 2020), so they increased their focus on providing consumers with a range of so-called healthful indulgences (Belei et al., 2012), which include, for example, high-protein puddings. Healthful indulgences share two main characteristics: 1) they represent reformulated foods that are generally perceived as unhealthful, by modifying food attributes; 1) the claim emphasizes the healthfulness of the food product, by highlighting the presence or increased amount of food attributes, such as protein, calcium, or antioxidants; or the absence or decreased amount of, for instance, sugar or fat (Belei et al., 2012).

1.3.1 Health-pleasure trade-off dilemma

As previously discussed, food choices may be potentially influenced by expected tastiness, perceived nutrition characteristics and perceived appropriate portion size (Oostenbach et al., 2019). And there is a common belief that perceived food healthfulness cannot be increased without sacrificing taste attributes, as if tastefulness and healthfulness were incompatible (Bialkova et al., 2016; Loebnitz & Grunert, 2018). In this regard, consumers may have lower purchase intentions for hedonic foods endorsed with implicit healthy nutrition claims (Bialkova et al., 2016; Loebnitz & Grunert, 2018). Thus, an efficient strategy and rich source of persuasion to mitigate this trade-off are by affecting the dynamics of multisensory and

emotional food experience (Loebnitz & Grunert, 2018; Steenkamp, 1990). In other words, developing more attractive packages designs and/or advertisement claims, emphasizing the healthfulness of the food product and making the benefit explicit, fosters more positive consumer evaluations of the overall nutrition content (Bialkova et al., 2016; Loebnitz & Grunert, 2018).

1.4 Product Categories: Yoghurts and Puddings

The Portuguese dairy market has undergone some important changes in the last few years, which aligns with the purpose of the present study. To understand how consumers differ in their ability to pursue healthful indulgences products (Ballco et al., 2022) and how high-protein claims can shape consumers' perception and behaviour toward food, this research focused on the growing interest in new segments of enriched protein dairies, such as high-protein yoghurt and high-protein puddings. The following statistical data show the increasing interest of food companies and consumers' in these product categories.

1.4.1 Yoghurts

As presented in the Nielsen Food Yearbook, in Portugal, the yoghurt category in 2021 reached a value of 352,349 million euros (Nielsen, 2020, 2022). In 2021, the category was divided into 12 segments, with four segments of greater weight representing 82% of the sales (liquids, low-fat, Greek, and flavoured yoghurts). A smaller segment - "enriched yoghurts" (where high-protein yoghurts are included) - showed the highest growth in the category, attaining 11% of the sales (compared to 5% in 2019), most likely associated with the increased demand for high-protein products (Nielsen, 2020, 2022).

1.4.2 Fresh dairy desserts

Regarding this category, in 2021 the category was defined in seven segments, with four segments of greater weight representing 83% of the sales (creams, specialities, flans, and puddings). Puddings (including high-protein ones) have shown the highest growth in this category, obtaining 41% of the sales (compared to 5% in 2019) (Nielsen, 2020, 2022).

1.5 Emotional Responses in Decision-making

Affect is also recognized as an important component of human judgment and decision-making (Slovic et al., 2007). When mental resources are limited or the required judgment or decision is complex, affect heuristics can be far easier and more efficient than weighing the pros and cons or retrieving relevant details from memory (Slovic et al., 2007). In this regard, to make the consumer inhibit or consume a certain product, advertising messages use affect as a persuasion tactic, namely through emotional responses (Burnett & Lunsford, 1994), defined by Leigh Gibson (2006, p.54) as "short-term affective responses to the appraisal of particular stimuli, having reinforcement potential".

There are two main types of emotional responses – immediate affective responses and anticipated emotions – varying mainly in the time periods in which emotions can occur (Burnett & Lunsford, 1994). In the present study, we focus on the anticipated emotions that are defined as more conscious affective responses that last longer (Ballco et al., 2022). People anticipate how they will feel and use those feelings to help them to determine an optimal course of action (Hur & Jang, 2015; Mellers & McGraw, 2001). For instance, since consumers' healthy food consumption behaviours are usually related to the pursuit of long-term goals, their behaviours are more influenced by conscious emotional responses, such as anticipated emotions, than immediate affective responses (Hur & Jang, 2015).

1.5.1 Anticipated guilt and pride

Guilt and pride are self-conscious emotions and seem especially relevant in the context of sustainable and healthy behaviour (Lefebvre et al., 2019; Mascolo & Fischer, 1995; Onwezen et al., 2014). On the one hand, guilt is considered one of the most important prosocial emotions. Because it is usually associated with remorse and responsibility, individuals engage in self-evaluation in response to their negative feeling state, motivating them to rectify the caused damage (Burnett & Lunsford, 1994; Izard, 1978; Soorani & Ahmadvand, 2019). Therefore, anticipated guilt serves as an inner inhibitor and involves an immediate punishment through feelings of unpleasantness (Burnett & Lunsford, 1994; Soorani & Ahmadvand, 2019).

On the other hand, pride is defined by Mascolo & Fischer (1995, p.66) as "[an emotion] generated by appraisals that one is responsible for a socially valued outcome or for being a socially valued person". Therefore, anticipated pride serves

as an adaptive role and incentivizes pursuing behaviours with desirable outcomes, which comply with personal or social standards (Haj-Salem et al., 2022). For instance, a study showed that when consumers perceived the food as healthful, the anticipated guilt was negatively influenced, whereas anticipated pleasure was positively influenced (Hur & Jang, 2015). Another study showed that perceived healthiness increased anticipated pride (Onwezen et al., 2014). For that matter, these anticipated emotions can influence purchase intention as well as consumption (Oostenbach et al., 2019).

1.6 Aims and Hypothesis of the Current Study

1.6.1 Aims

Emphasizing certain product's extrinsic attributes on food packaging influences the way an individual perceives the overall product. As previously stated, studies about the impact of high-protein-related claims on consumers' behaviour, especially those associated with healthful indulgences products, are scarce. Moreover, the effect of healthful indulgences products' activation of anticipated emotions is still understudied. An exception is the study by Yang and Kim (2021) examining the effects of goal activation types (utilitarian/hedonic) on consumers' guilt.

Our main goal was to examine how nutrition claims regarding high-protein content (high-protein claim) in comparison with a control version (without high-protein claim), influences the perceived healthfulness, expected taste, satiety, nutritional content, food purchase intentions, expected price, and anticipated emotions (guilt and pride). Furthermore, we aimed to examine how product category (yoghurt and pudding) influences perceived healthfulness, expected taste, satiety, nutritional content, food purchase intentions, and anticipated emotions.

As an exploratory analysis, we also examined the pattern of associations between the evaluation of the products and individual characteristics such as age, BMI, consumption frequency, health consciousness, subjective knowledge of the product content.

To contribute to the 2030 Agenda for Sustainable Development Goals (SDGs) established by the United Nations, the aims of the study are aligned with the third goal – "Ensure healthy lives and promote well-being for all ages" –, and the twelfth goal – "Ensure sustainable consumption and production patterns".

1.6.2 Hypothesis

In line with the literature about the health halo effect (Wansink & Chandon, 2006) and the health-pleasure trade-off dilemma (Bialkova et al., 2016), we outlined the following hypotheses:

Hypothesis 1 – We expected products with a high-protein claim in comparison with the control version (i.e., without the high-protein claim) to be perceived as healthier, more satiating, with higher protein content, higher levels of purchase intention, more expensive, lower calories, fat, and sugar content, and less tasty. Congruently, consumers in the high-protein (vs. control) conditions would report lower levels of anticipated guilt and higher levels of anticipated pride.

Hypothesis 2 – We expected the yoghurt category in comparison with the pudding category to be perceived as healthier, with higher levels of purchase intention, protein content, more satiating, lower levels of expected tastiness, calories, fat and sugar content, and less expensive. Congruently, consumers in the yoghurt (vs. pudding) conditions would report lower levels of anticipated guilt and higher levels of anticipated pride.

We also explored the possibility that the impact of a claim on product evaluation could be moderated by the product category. Because the effects of nutritional claims on consumers perception have been observed using a wide array of products (e.g., Oostenbach et al., 2019), we did not expect to observe an interaction between both factors.

CHAPTER 2 – METHOD

2.1 Participants and Design

A sample of 176 participants was determined by an a priori power analysis (G*Power), using as reference a medium effect size (η_p^2 = .06) and a power 1-β = 0.80 to detect the main effect of food claim (high-protein claim vs. claim control).

A total of 195 individuals were recruited for the study online from social media sites (e.g., Facebook, Instagram, LinkedIn) or by word of mouth. Of those, 34 were removed because they were not eligible (i.e., the eligibility criteria were to accept the Consent Term, be over 18 years of age, and had at least an intermediate level of Portuguese) or failed to complete the survey. The final sample included 161 participants (*M* = 32.60 years old, *SD* = 11.38). As shown in Table 2.1, most of the participants were women (85.7%), had mainly Portuguese nationality (93.2%), were employees (61.5%), and had higher education (92.5%). Moreover, most of the participants reported practising physical exercise regularly (71.6%). Only 29.7% reported being nutrition professionals and 21.9% have a particular interest in nutrition. Finally, according to the self-reported height and weight, most participants (75.2%) were within a normal weight range ($18.5 \leq BMI \leq 24.99$).

The design included two factors: 2 (nutrition claim: high-protein versus control) × 2 (product category: yoghurt versus pudding). Both factors were manipulated between-subjects.

Table 2.1

Characterization of the Sample.

Variables			**Absolute Frequency (*n*)**	**Relative Frequency (%)**
Gender	Women		138	85.7
(n = 161)	Men		23	14.3
Nationality	Portuguese		150	93.2
(n = 161)	Others		11	6.8
		Brazilian	6	54.5
		French	3	27.3
		Belgian	1	9.1
		Chinese	1	9.1
Fluency in		Fluent	9	81.8
Portuguese		Advanced	1	9.1
(n = 11)		Intermediate	1	9.1
Education	Basic education		1	0.6
(n = 161)	Secondary education		11	6.8
	Bachelor degree		63	39.1
	Post-graduation		17	10.6
	Master degree		62	38.5
	Doctorate degree		7	4.3
Occupation	Student		15	9.3
(n = 161)	Working student		35	21.7
	Employee		99	61.5
	Unemployed		6	3.7
	Retired		2	1.2
	Other		4	2.5
*BMI**	Underweight (BMI ≤ 18.49)		5	3.6
(n = 137)	Healthy weight (18.5 ≤ BMI ≤ 24.99)		103	75.3
	Overweight (25 ≤ BMI ≤ 29.99)		24	17.5
	Obesity (BMI ≥ 30)		5	3.6
Physical	Federated athlete		3	1.9
exercise	Practice sports		26	16.1
(n = 155)	Practice physical exercise		82	50.9
	No sports or physical exercise		40	24.8
	Prefer not to answer		4	2.5
Nutrition	Nutrition professional		46	29.7
area	Interest in the area		34	21.9
(n = 155)	No knowledge		75	48.4

*Note: *Intervals calculated according to World Health Organization (2018).*

2.2 Instruments

The original survey was presented in Portuguese (see Appendix A), and included socio-demographic indicators (e.g., age, gender), items assessing participants' perceptions about the product (e.g., healthfulness, tastiness) and anticipated emotions (guilt and pride), manipulation checks and other control measures (e.g., BMI).

2.3 Manipulation Checks

As shown in Table 2.2, we included two manipulation checks – for the category of a product evaluated and for the type of claim presented in the product package.

Table 2.2

Questions about manipulation checks regarding claim condition and product category.

Variables	***Questions***
Products category check	"Which food product have you evaluated?" (a) Yoghurt; (b) Pudding; (c) Ice cream; (d) Cream cheese.
Claim check	"The food product you evaluated in this questionnaire:" (a) It did not contain information on protein content; (b) Contained high protein content; (c) I It provided information on protein content, but I can't remember; (d) I can't recall seeing information on protein content.

2.4 Product's Perception

As shown in Table 2.3, we assess participants' perception of the product by using items adapted from previous studies, all using 7-point rating scales.

Table 2.3

Questions about perception of the product.

Variables	***Instructions and Scale Anchors*** ***In your opinion this product is…***
Healthfulness perception Prada et al. (2019)	1 = *Not healthy at all*; 7 = *Very healthy*
Expected taste Prada et al. (2019)	1 = *Not tasty at all*; 7 = *Very tasty*
Satiety Adapted from Prada et al. (2019)	1 = *Not satiating at all*; 7 = *Very satiating*
Nutritional content Adapted from Prada et al. (2019)	1 = *Not caloric at all*; 7 = *Very caloric* 1 = *Low protein content*; 7 = *High protein content* 1 = *Low fat content*; 7 = *High fat content* 1= *Low sugar content*; 7 = *High sugar content*
Purchase intention (Kytö et al., 2019)	1 = *I certainly would not buy*; 7 = *I certainly would buy*
Expected price	Please indicate how much you think this yoghurt/pudding is worth (from 0€ to 3€)
Anticipated emotions (guilt and pride) Adapted from Mohr et al. (2012)	"Imagine you consumed this yoghurt/pudding. How would you feel?": 1 = *Not guilty*; 7 = *Very guilty* 1 = *Not proud*; 7 = *Very proud*

2.5 Control Measures

Table 2.4 presents the control measures assessed.

Table 2.4

Questions for control measures.

Variables	***Questions and Scale Anchors***
Subjective knowledge of the product content Prada et al. (2019)	"How would you evaluate your knowledge of high-protein products": 1 = *Little knowledge*; 7 = *Very knowledge*
Consumption frequency Adapted from Prada et al. (2017)	"How frequently do you consume high-protein products": 1 = *Rarely*; 7 = *Frequently*
Health consciousness (Hong, 2009)	"I reflect about my health" and "I'm generally attentive to my inner feelings about my health": 1 = *Not at all*; 7 = *Very much* Items correlation: $r = .73$, $p < .001$.
Body mass index (BMI)	"Finally, please indicate your height..." (a) [ ] Cm; (b) Don't know / Prefer not to answer "Finally, please indicate your weight..." (a) [ ] Kg; (b) Don't know / Prefer not to answer
Physical exercise practice	"Please select only one of the following options:" (a) I am currently registered as a federated athlete. Please indicate which sport you do (e.g., athletics, football) and how much time per week you dedicate to this sport [ ]; (b) f I am not a member of a federated sport, I practise a sport (e.g., athletics, football). Please indicate which sport you do and how much time per week you dedicate to this sport [ ]; (c) I do not practise any sport (e.g., athletics, football), but I do exercise (e.g., walking, running, gym class). Please indicate what kind of physical exercise you do and how much time per week you dedicate to it [ ]; (d) I do not play any sport (e.g., athletics, football), nor do I exercise regularly; (e) I prefer not to answer.
Nutrition knowledge and interest	"Do you have a higher education in the field of Nutrition?" (a) Yes. Please indicate your degree [ ] (b) No, but I am interested in and read a lot about this area; (c) No.

2.6 Materials

According to the experimental design, we developed using four labels matching in colour, size, font, and graphics, varying only the description of the product (See Table 2.5). All images were edited in order not to show any other claims than "High-protein", to prevent the potential effect of other information sources on products' evaluations. The control conditions were presented without a high-protein claim (See Figure 2.1). Each control condition and high-protein claim were labelled for the yoghurt category and pudding category.

Based on the principles of pragmatic persuasion, the colour of the claim is a strong indication of sensory expectations of the product and manipulative concerning attractiveness and healthiness (İşeri Uzunoğlu & Sözer, 2020). İşeri Uzunoğlu and Sözer (2020) referred that black and gold can be associated with premium products, so for this study, all four products were designed to be these colours. Concerning the flavour, we chose "vanilla" as it applies to all conditions and because is generally considered a relatively healthy (Li & Dando, 2019).

Table 2.5

Set of designed claims (claim conditions and product categories).

		Claim Conditions	
		Control Condition	High-protein claim
Product Categories	Yoghurt		
	Pudding		

2.7 Procedure

After approval by the Ordem dos Psicólogos Portugueses (OPP), the recruitment process began. The individuals accessed the link or QR code provided (see

Appendix B), which directed them to the Qualtrics platform where the study questionnaire was located (average duration of five minutes). The survey was initiated with an introduction and the Informed Consent Term, which confirmed the voluntary and anonymous nature of the study. See Appendix A. The only incentive to participate was the opportunity to enter a raffle for a 50€ gift card.

Eligible participants completed the online survey (from March 7, 2023 to April 27, 2023), available in Portuguese. To be eligible, participants had to accept the Consent Term, be over 18 years of age, and had at least an intermediate level of Portuguese. The survey was divided into three parts, which included: (i) consumers' sociodemographic characteristics, (ii) randomized questions about consumers' product perception (7-point rating scales), and (iii) control questions; and participants were randomly assigned to one of the conditions (*n* = 42 for the "Yoghurt control"; n = 41 for the "Pudding control"; n = 37 for the "High-protein Yoghurt"; and n = 41 for the "High-protein pudding").

Figure 2.1. *Pudding control condition trial in the Qualtrics questionnaire (question randomization).*

CHAPTER 3 – RESULTS

Data were analysed with IBM SPSS Statistics v29, and for the inferential analyses, an alpha level of 0.05 was used.

3.1 Data Analytical Plan

Only data from participants who completed the survey were included. Control dimensions may present missing data (up to 14.9% of participants chose not to disclose information about, for instance, their weight). In the next section, the following analyses will be presented:

(a) Manipulation checks regarding claim and product category: Frequency analysis of the answers to the manipulation check questions according to the participant's condition.

(b) Claim and product category influence on food perception: To examine the role played by claim and product category on influencing the perceived healthfulness, expected taste, satiety, nutritional content, food purchase intentions, expected price, and anticipated emotions (guilt and pride), we conducted a 2 x 2 univariate ANOVA per evaluative dimension. An independent samples t-test was conducted.

c) Correlation between individual variables and perception towards the products: Pearson correlations were calculated to understand the pattern of correlations between individual variables (i.e., age, BMI, consumption frequency, health consciousness, subjective knowledge of the product content) and perception towards the products.

3.2 Manipulation Checks Regarding Claim and Product Category

Because the present research was conducted with an experimental design, two manipulation check questions regarding the claim and the product category were included in the questionnaire. In these questions, we asked the participant to recall what information was stated by the label on the packaging of the food products shown and which food product was being evaluated, respectively. Table 3.1 summarizes the answers (%) to the claim manipulation check and Table 3.2 to the product category manipulation check.

Table 3.1

Answers to manipulation check regarding claim condition (%).

Claim	***Manipulation check***			
	"Did not contain information on protein content"	*"Contained high protein content"*	*"It provided information on protein content, but I can't remember"*	*"I don't recall seeing information on protein content"*
Control condition	68.7%	9.6%	4.8%	16.9%
High-protein	3.8%	71.8%	15.4%	9.0%

Most participants could accurately recall the claim presented in the product according to their condition (71.8% of those in the high-protein and 68.7% in the control condition). Noteworthy, participants got more answers wrong in the control condition (9.6%) when compared to the high-protein claim (3.8%).

Table 3.2

Answers to manipulation check regarding product category (%).

Product Category	***Manipulation check***			
	Yoghurt	*Pudding*	*Ice cream*	*Cream cheese*
Yoghurt (n = 79)	83.5%	16.5%	0%	0%
Pudding (n =82)	4.9%	95.1%	0%	0%

Likewise, most participants could accurately recall the correct information about the product category for their condition (83.5% of those with the yoghurt product and 95.1% of those with the pudding product). Noteworthy, participants got more answers wrong in the yoghurt condition (16.5%) when compared to the pudding condition (4.9%).

3.3 Claim and Product Category Influence on Food Perception

To assess the impact of a claim on both types of products we conducted a 2 (claim conditions: high-protein versus control) × 2 (product category: yoghurt versus pudding) univariate ANOVAs per evaluative dimension (for descriptive results, see Table 3.3).

Table 3.3

Descriptive results (M, SD) for each evaluative dimension according to claim condition and products category.

Variables		***Claim***					
		Control condition		*High-protein*		*Total*	
Healthfulness		***M***	***SD***	***M***	***SD***	***M***	***SD***
	Yoghurt	4.67	1.97	4.38	1.40	4.53 [c]	1.24
	Pudding	4.34	1.20	4.71	1.52	4.52 [c]	1.37
	Total	4.51 [a]	1.14	4.55 [a]	1.46	4.53	1.30
Expected taste							
	Yoghurt	4.88	1.42	4.70	1.63	4.80 [c]	1.51
	Pudding	4.78	1.46	4.88	1.52	4.83 [c]	1.48
	Total	4.83 [a]	1.43	4.79 [a]	1.57	4.81	1.49
Satiety							
	Yoghurt	4.93	1.63	5.81	1.35	5.34 [c]	1.56
	Pudding	4.93	1.56	5.41	1.56	5.17 [c]	1.57
	Total	4.93 [b]	1.58	5.60 [b]	1.47	5.25	1.56
Protein							
	Yoghurt	5.36	1.59	5.81	1.61	5.57 [c]	1.61
	Pudding	5.34	1.37	5.93	1.47	5.63 [c]	1.44
	Total	5.35 [b]	1.48	5.87 [b]	1.53	5.60	1.52
Calories							
	Yoghurt	4.07	1.18	4.32	1.23	4.19 [c]	1.20
	Pudding	4.17	1.28	4.17	1.28	4.17 [c]	1.28
	Total	4.12 [a]	1.22	4.24 [a]	1.25	4.18	1.23
Fat							
	Yoghurt	3.14	1.24	3.62	1.71	3.37 [c]	1.59
	Pudding	3.41	1.58	3.12	1.65	3.27 [c]	1.61
	Total	3.28 [a]	1.42	3.36 [a]	1.68	3.32	1.55
Sugar							
	Yoghurt	3.17	1.46	3.89	1.52	3.51 [c]	1.53
	Pudding	3.80	1.89	3.15	1.86	3.48 [c]	1.89
	Total	3.48 [a]	1.71	3.50 [a]	1.74	3.49	1.72
Purchase intention							
	Yoghurt	4.07	1.92	3.76	2.03	3.92 [c]	1.97
	Pudding	3.78	1.56	4.44	1.84	4.11 [c]	1.73
	Total	3.93 [a]	1.74	4.12 [a]	1.95	4.02	1.85
Expected price							
	Yoghurt	1.92	0.78	2.00	0.75	1.96 [c]	0.76
	Pudding	2.00	0.79	1.86	0.55	1.93 [c]	0.68
	Total	1.96 [a]	0.78	1.95 [a]	0.66	1.94	0.72
Anticipated guilt							
	Yoghurt	2.48	1.42	2.95	1.60	2.70 [c]	1.51
	Pudding	3.00	1.90	2.51	1.68	2.76 [c]	1.80
	Total	2.72 [a]	1.68	2.72 [a]	1.64	2.73	1.66
Anticipated pride							
	Yoghurt	3.74	1.40	3.92	1.50	3.82 [c]	1.44
	Pudding	3.85	1.32	4.07	1.60	3.96 [c]	1.46
	Total	3.89 [a]	1.35	4.00 [a]	1.55	3.89	1.45

Note: Means in the same line – a,b – refer to the main effect of the claim. Means in the same column – c,d – refer to the main effect of product category. In both cases, means with identical superscripts did not differ significantly.

3.3.1 Healthfulness Perception

Unlike expected, the type of claim, $F(1,157) = .035$, $MSE = 1.705$, $p = .851$, $\eta_p^2 = .000$, or product category, $F(1,157) = .000$, $MSE = 1.705$, $p = .993$, $\eta_p^2 = .000$, did not influence the evaluation of healthiness. The interaction between claim and product category was also non-significant, $F(1,157) = 2.519$, $MSE = 1.705$, $p = .115$, $\eta_p^2 = .016$.

3.3.2 Expected Taste

Similarly to the pattern observed for the healthfulness dimension, the results do not support a main effect of claim, $F(1,157) = .029$, $MSE = 2.265$, $p = .865$, $\eta_p^2 = .000$, nor product category, $F(1,157) = .025$, $MSE = 2.265$, $p = .875$, $\eta_p^2 = .000$, in the evaluations of taste expectation. The interaction between claim and product category was also non-significant, $F(1,157) = .337$, $MSE = 2.265$, $p = .562$, $\eta_p^2 = .002$.

3.3.3 Satiety

As expected, the type of claim influenced the evaluation of satiety, $F(1,157) = 8.013$, $MSE = 2.352$, $p = .005$, $\eta_p^2 = .049$, such that the products with a high-protein claim ($M = 5.60$, $SD = 1.47$) were rated as more satiating than those in the control conditions ($M = 4.93$, $SD = 1.58$). No significant differences were found according to the product category, $F(1,157) = .676$, $MSE = 2.352$, $p = .412$, $\eta_p^2 = .004$. The interaction between claim and product category was also non-significant (see Figure 3.1), $F(1,157) = .664$, $MSE = 2.352$, $p = .416$, $\eta_p^2 = .004$.

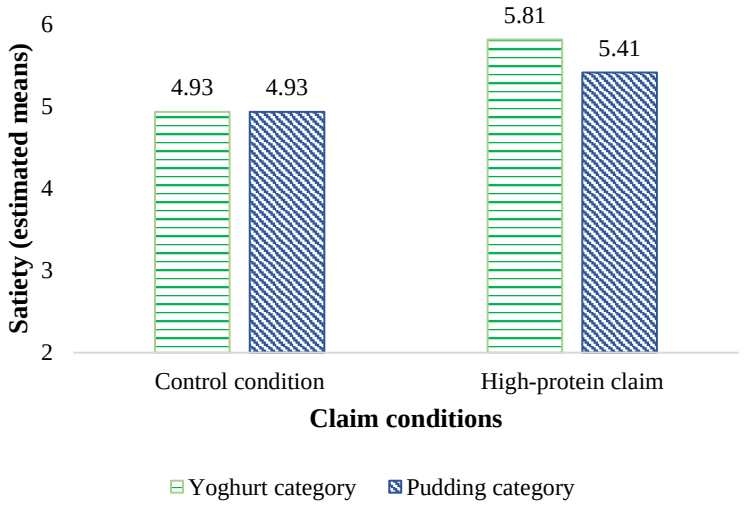

Figure 3.1. *Satiety: Interaction (F <1) between claim and product category.*

3.3.4 Nutritional Content

3.3.4.1 Protein content

As expected, the type of claim influenced the evaluation of protein content, $F(1,157) = 4.735$, $MSE = 2.289$, $p = .031$, $\eta_p^2 = .029$, such that the high-protein claim ($M = 5.87$, $SD = 1.53$) was rated as having higher protein content than product in the control condition ($M = 5.35$, $SD = 1.48$). No significant differences were found in the product category, $F(1,157) = .044$, $MSE = 2.289$, $p = .834$, $\eta_p^2 = .000$. Also non-significant interaction between claim and product category (see Figure 3.2), $F(1,157) = .076$, $MSE = 2.289$, $p = .783$, $\eta_p^2 = .000$.

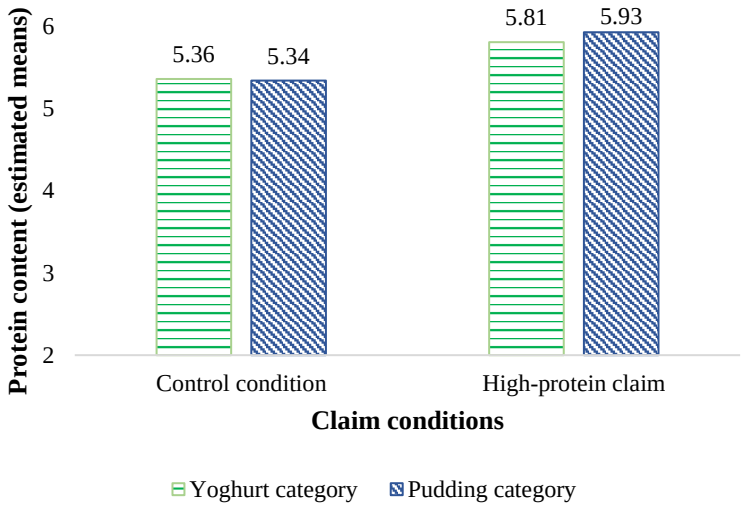

Figure 3.2. *Protein content: Interaction (F <1) between claim and product category.*

3.3.4.2 Caloric content

Unlike expected, the type of claim, $F(1,157) = .416$, $MSE = 1.545$, $p = .520$, $\eta_p^2 = .003$, or product category, $F(1,157) = .019$, $MSE = 1.545$, $p = .890$, $\eta_p^2 = .000$, did not influence the perceived caloric content. The interaction between claim and product category was also non-significant, $F(1,157) = .416$, $MSE = 1.545$, $p = .520$, $\eta_p^2 = .003$.

3.3.4.3 Fat content

Unlike expected, the type of claim, $F(1,157) = .145$, $MSE = 2.396$, $p = .704$, $\eta_p^2 = .001$, or product category, $F(1,157) = .218$, $MSE = 2.396$, $p = .642$, $\eta_p^2 = .001$, did not influence the perceived fat content. The interaction between claim and product category was also non-significant, $F(1,157) = 2.493$, $MSE = 2.396$, $p = .116$, $\eta_p^2 = .016$.

3.3.4.4 Sugar content

Unlike expected, the type of claim, $F(1,157) = .015$, $MSE = 2.885$, $p = .901$, $\eta_p^2 = .000$, or product category, $F(1,157) = .040$, $MSE = 2.885$, $p = .842$, $\eta_p^2 = .000$, did not influence the perceived sugar content. Also non-significant interaction between claim and product category, $F(1,157) = 6.662$, $MSE = 2.885$, $p = .011$, $\eta_p^2 = .041$.

3.3.5 Purchase Intention

Also unlike expected, the type of claim, $F(1,157) = .350$, $MSE = 3.393$, $p = .555$, $\eta_p^2 = .002$, or product category, $F(1,157) = .453$, $MSE = 3.393$, $p = .502$, $\eta_p^2 = .003$, did not influence the evaluation of the purchase intention. The interaction between claim and product category was also non-significant, $F(1,157) = 2.802$, $MSE = 3.393$, $p = .096$, $\eta_p^2 = .018$.

3.3.6 Expected Price

Unlike expected, the type of claim, $F(1,154) = .075$, $MSE = .525$, $p = .785$, $\eta_p^2 = .000$, or product category, $F(1,154) = .078$, $MSE = .525$, $p = .780$, $\eta_p^2 = .001$, did not influence the expected price. The interaction between claim and product category was also non-significant, $F(1,154) = .854$, $MSE = .525$, $p = .357$, $\eta_p^2 = .006$.

3.3.7 Anticipated Guilt

Unlike expected, the type of claim, $F(1,157) = .001$, $MSE = 2.743$, $p = .972$, $\eta_p^2 = .000$, or product category, $F(1,157) = .030$, $MSE = 2.743$, $p = .863$, $\eta_p^2 = .000$, did not influence the evaluation of anticipated guilt. However, there was a marginal effect between claim and product category (see Figure 3.3), $F(1,157) = 9.204$, $MSE = 2.743$, $p = .069$, $\eta_p^2 = .069$. T-test for yoghurt, $t(77) = -1.385$, $p = .170$, and t-test for pudding, $t(80) = 1.234$, $p = .221$, show that in both cases the test value is not significant.

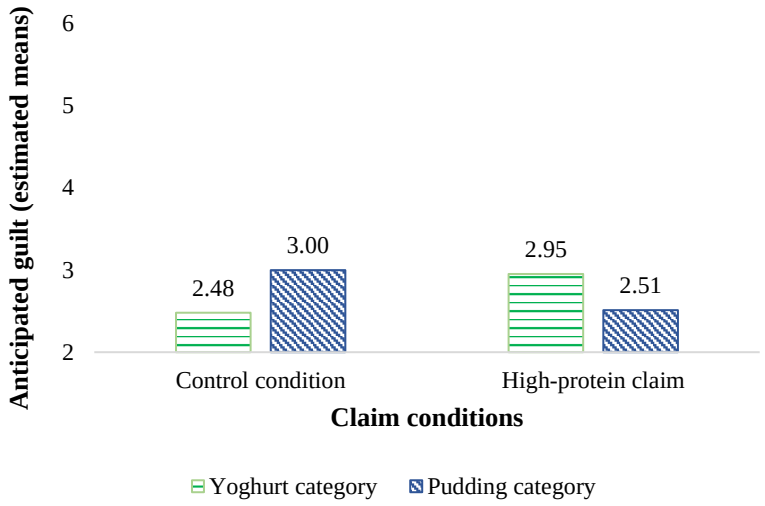

Figure 3.3. *Anticipated guilt: Interaction (F <1) between claim and product category*

3.3.8 Anticipated Pride

The type of claim, $F(1,157) = .759$, $MSE = 2.120$, $p = .385$, $\eta_p^2 = .005$, or product category, $F(1,157) = .345$, $MSE = 2.120$, $p = .558$, $\eta_p^2 = .002$, did not influence the evaluation of the anticipated pride. And non-significant interaction between claim and product category, $F(1,157) = .007$, $MSE = 2.120$, $p = .933$, $\eta_p^2 = .000$.

To sum up, contrary to our predictions, we only observed a main effect of the claim for the satiety and protein content dimensions, such that high-protein products (versus control) were rated as more satiating and higher in protein. Moreover, no main effects of product category were observed. Overall, no interaction effects were observed. Still, for anticipated guilt, there was a marginal effect between claim and product category. And even though t-test was not significant, in the case of yoghurt participants tended to report less anticipated guilt in the control condition and in the case of pudding participants tended to report less anticipated guilt in the high-protein claim condition.

3.4 Correlation Between Individual Characteristics and Products Perception

The association between individual characteristics (i.e., age, BMI, consumption frequency, health consciousness, subjective knowledge of the product content) and perception towards the products (i.e., healthfulness perception, expected taste, satiety, calories/ protein/ fat/ sugar content perception, anticipated guilt and anticipated pride). Results are summarized in Table 3.4.

Age was positively associated with calories content perception, $r = .16$, $p = .043$, fat content perception, $r = .20$, $p = .011$, anticipated guilt, $r = .21$, $p = .008$, and BMI, $r = .29$, $p < .001$. Age was also negatively associated to healthfulness perception, $r = -.18$, $p = .025$, purchase intention, $r = -.25$, $p = .001$, anticipated pride, $r = -.41$, $p < .001$, and consumption frequency, $r = -.17$, $p = .035$.

BMI was positively associated with the anticipated guilt, $r = .30$, $p < .001$, and age, $r = .29$, $p < .001$.

Consumption frequency was positively associated with expected taste, $r = .19$, $p = .019$, satiety, $r = .19$, $p = .018$, healthfulness perception, $r = .28$, $p < .001$, protein content perception, $r = .24$, $p = .002$, anticipated pride, $r = .24$, $p = .003$, purchase intention $r = .50$, $p < .001$, and health consciousness, $r = .27$, $p < .001$. And negatively associated with fat content perception, $r = -.29$, $p < .001$, and sugar content perception, $r = -.22$, $p = .005$.

Health consciousness was positively associated with expected taste, $r = .17$, $p = .034$, satiety, $r = .37$, $p < .001$, protein content perception, $r = .39$, $p < .001$, purchase intention, $r = .28$, $p < .001$, and subjective knowledge of the product content, $r = .50$, $p < .001$.

To sum up, older participants are likely to have a higher BMI, to feel higher levels of anticipated guilt when consuming high-protein-related products, and to perceive them with more calories and fat content. In another respect, the higher the health consciousness, the more the high-protein product is perceived as high in protein content, tastier and satiating, and the higher the consumption frequency, the purchase intention and the level of subjective knowledge of the product content.

Table 3.4

Pearson correlation between individual characteristics and perception towards the products

Dimension	Age	Body Mass Index	Consumption frequency	Health consciousness
Age	-			
Body Mass Index	.29**	-		
Consumption frequency	-.17*	-.05	-	
Health consciousness	.07	.02	.27**	-
Purchase intention	-.25**	-.15	.50**	.28**
Subjective knowledge of the product content	-.05	-.74	.53**	.50**
Healthfulness perception	-.18*	-.10	.28**	.02
Expected taste	-.02	-.16	.19*	.17*
Satiety	-.05	-.14	.19*	.37**
Calories content perception	.16*	.04	-.07	.07
Protein content perception	-.09	-.14	.24**	.39**
Fat content perception	.20*	.06	-.29**	-.13
Sugar content perception	.12	.16	-.22**	-.02
Anticipated pride	-.41**	.05	.24**	.09
Anticipated guilt	.21**	.30**	-.14	-.08

****** Significant Correlation at the 0.01 level
***** Significant Correlation at the 0.05 level

CHAPTER 4 – DISCUSSION

Food choices are a complex phenomenon influenced by various factors such as food environment, nutrition and health claims, and health attitudes. Recent scientific studies have shed light on these interrelated aspects. Oostenbach et al. (2019) showed that nutrition claims on food choice can influence consumers' perceived healthfulness, expected tastiness and food purchase intentions.

In contrast with other nutrients (e.g., sugar, fat), few studies have examined whether high-protein related claims can influence the perception of the consumer. Still, there is evidence that this type of claim may lead consumers to perceive the food as healthier and of higher quality (e.g., Banovic et al., 2018). Therefore, the current study was designed to analyse how high-protein-related claims and product categories (yoghurt versus pudding) influence consumer's perceptions.

Our first hypothesis stated the possibility that the presence of high-protein-related claims would lead to overall more positive evaluations of the product. However, in the current study, we only observed the expect impact on the evaluations of satiety and protein content. This is in accordance with past research in which high-protein content is often judged as more satiating compared to lower-protein versions (Banovic et al., 2018; Li & Dando, 2019). Even thought it was theorized that nutrient content claims show a positive impact on other dimensions like perceived healthfulness (Ikonen et al., 2020; Oostenbach et al., 2019), the evidence provided by our results did not support that influence. Congruently did not show significant differences in perceived healthfulness, caloric, fat, and sugar content, expected taste, purchase intention, and expected price.

Considering our second hypothesis, it was theorized that the yoghurt category would lead to more positive evaluations comparing with the pudding category (e.g., Lähteenmäki et al., 2010). The results did not show significant differences in perceived healthiness, caloric, fat, and sugar content, expected taste, purchase intention, and expected price, therefore do not support the health halo effect.

The results for both hypothesis may be due to the following two factors.

On the one hand, it is possible that an enriched protein yoghurt is perceived as more processed and less natural. Which may damage the healthy image associated with this product category (Lähteenmäki et al., 2010). On the other hand, previous studies have associated black and gold packaging design with premium products

(İşeri Uzunoğlu & Sözer, 2020), and in order to change the trade-off between health benefits and taste (Grunert et al., 2010), we associated this packaging to vanilla flavour. By using this approach, the vanilla yoghurt category may have significantly reduced the utilitarian value (again, it affected the perception of naturalness).

As regards anticipated emotions, the results showed that there was a tendency in the case of yoghurt to report less anticipated guilt in the control condition and in the case of pudding to report the opposite. So, a pudding with high-protein claim seem to attenuate anticipated guilt (comparing to the pudding control). On the other hand, a yoghurt with high-protein claim seem to increment anticipated guilt (comparing to the control condition). This information goes in line with past research (e.g., Hur & Jang, 2015), and is particularly important for marketers, since is a powerful tool in decision-making.

Another interesting finding was regarding the levels of health consciousness. The results have shown that the participants who indeed have higher levels of health consciousness were more likely to consume high-protein products more often and did actively evaluate them as more satiating and tasty, and with more interesting protein (higher) content. These findings are in line with past literature (e.g., Loebnitz & Grunert, 2018 ; Oostenbach et al., 2019).

The present study run into some difficulties in providing answers to the hypothesis of the research, wherefore it is important to understand its shortcomings and limitations. Firstly, as previously mentioned, the chosen design colours of the packaging (black and gold) and the flavour (vanilla) may have impaired consumers' perception. Even though most participants could accurately recall the claim and the product category of their assigned condition, the results did not corroborate with most of our hypothesis regarding differences in evaluating claim and product category. One shortcoming was the lack of manipulation of the packaging design. Did the packaging colours and chosen flavour impact the overall perception? Was the black and gold packaging perceived as premium? Did the packaging influence the perceived naturalness?

Finally, the last limitation to be recognized is the sample size. Even though there was a total of 161 participants collaborating in the present research, this low number may have impaired the statistical power and so, a lack of expected effects were shown.

Some possible directions regarding future studies can be drawn from this research. For example, to understand the impact of colours and taste on the evaluations, and to culminate the lack of manipulation of the packaging design, another study could be conducted using images with products of various shapes, colours and perhaps flavours. Being so, future studies should focus on this matter, and also assess participants' perception of naturalness of the products.

In addition, it would be interesting to compare and/or evaluate more emotional responses, such as shame. Guilt and shame are negative self-conscious emotions typically experienced in situations in which some behavioural standard, norms and values are violated (Lewis, 1971). They have important and very different implications for interpersonal behaviour and adjustment (Tangney, 2005), and are often used interchangeably (Lewis, 1971). The main distinction lies in the fact that guilt is concerned with a negative evaluation of a specific behaviour (for example, "I did ***that*** wrong"), whereas shame pertains to a negative evaluation of the global self (for example, "***I*** did that wrong") (Lewis, 1971). Thus, guilt motivates reparative behaviour by apologizing and fixing situations, while shame motivates defensive and avoidance behaviour (Tangney, 2005).

Another suggestion for future studies is the replication of this research with an incremented number of participants.

Lastly, since the aims of the study were aligned with the third goal – "Ensure healthy lives and promote well-being for all ages" –, and twelfth goal – "Ensure sustainable consumption and production patterns" of the 2030 Agenda for SDGs, it would be relevant to expand to younger participants. As we know, dietary habits are shaped at a very young age and eating behaviours established in childhood persist, with implications such as increased obesity risk (Scaglioni et al., 2018).

CONCLUSION

Today, consumers are becoming increasingly aware of the importance of making healthier and more sustainable purchasing decisions, and to keep up with consumers' needs, companies are constantly adapting their products. Recently, products with enriched protein content have gained significant attention in the field of technological innovations. To culminate the lack of studies, this dissertation is novel as it opens a path to understand how high-protein-related claims and healthful indulgences products may impact consumer’s perceptions and anticipated emotions, which are undeniably important in decision-making.

Despite the unexpected findings, this study is a major starting point and provide a new avenue for further exploration. A wide range of suggestions for future studies has been constructed, which we hope will pave the way for impactful results.

By increasing information and awareness about the effect of high-protein claim on consumer’s perceptions of healthful indulgences, marketers and policymakers can better define strategies to promote more responsible and informed choices. While high protein intake is beneficial for specific groups (e.g., sports nutrition), when poorly adapted to individual needs, it can have a negative impact on health. It is therefore a priority to ensure that sustainable consumption and a healthier, more balanced diet is promoted.

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APPENDIX A – SURVEY

Caro/a participante,

O presente estudo surge no âmbito de uma tese de mestrado a decorrer no Iscte – Instituto Universitário de Lisboa. Objetiva-se entender como as pessoas percecionam diferentes produtos alimentares.

O questionário terá a duração aproximada de **5 minutos**. A participação é de **carácter estritamente voluntário**, tendo a possibilidade de interromper a participação em qualquer momento sem ter de prestar qualquer justificação, bastando para isso fechar esta página de navegação.

Ao participar habilita-se a ganhar um **cartão presente de um valor de 50€** da Sonae.

Para além de voluntária, a participação é **anónima e confidencial**. Os dados obtidos destinam-se apenas a tratamento estatístico e nenhuma resposta será analisada ou reportada individualmente. De acordo com as normas da comissão de Proteção de Dados, a eventual publicação dos dados só poderá ter lugar em revistas da especialidade.

Agradecemos antecipadamente pela sua colaboração!

Tendo tomado conhecimento sobre a informação disponível acerca do estudo, declaro aceitar participar:

O SIM
O NÃO

Antes de iniciar por favor responda a algumas perguntas gerais.

Por favor indique a sua idade:
_____

Indique, por favor, o seu género:
O Mulher
O Homem
O Não binário
O Prefiro não responder

Indique a sua nacionalidade:

O Portuguesa

O Outra. Qual? _____

Indique o seu nível de fluência a português:

O Fluente

O Avançado

O Intermédio

O Básico

O Não fluente

Indique, por favor, a sua ocupação?

O Aluno/a

O Estudante-trabalhador/a

O Empregado/a

O Desempregado/a

O Reformado/a

O Outra

Indique o seu nível máximo de escolaridade (se for estudante, indique o grau que frequenta atualmente)?

O Ensino básico

O Ensino secundário

O Licenciatura

O Pós-graduação

O Mestrado

O Doutoramento

Condição: Iogurte controlo (randomização)

Neste estudo, pretendemos entender como é que as pessoas percecionam diferentes produtos alimentares.

No seu caso, iremos pedir-lhe que avalie um novo **iogurte** indicando em que medida o alimento lhe parece:
... saboroso (1 = Nada saboroso a 7 = Muito saboroso)
... calórico (1 = Nada calórico a 7 = Muito calórico)
... saudável (1 = Nada saudável a 7 = Muito saudável)
... saciante (1 = Nada saciante a 7 = Muito saciante)
... teor proteico (1 = Baixo teor proteico a 7 = Elevado teor proteico)
... teor gordura (1 = Baixo teor gordura a 7 = Elevado teor gordura)
... teor açúcar (1 = Baixo teor açúcar a 7 = Elevado teor açúcar)

Estas avaliações devem ser **rápidas e espontâneas**. Estamos apenas interessados na sua opinião, logo não existem respostas certas nem erradas.

Na sua opinião este **iogurte**, é:

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Nada saudável	O	O	O	O	O	O	O	Muito saudável
Baixo teor de açúcar	O	O	O	O	O	O	O	Elevado teor de açúcar
Baixo teor de gordura	O	O	O	O	O	O	O	Elevado teor de gordura
Nada saboroso	O	O	O	O	O	O	O	Muito saboroso
Nada calórico	O	O	O	O	O	O	O	Muito calórico
Nada saciante	O	O	O	O	O	O	O	Muito saciante
Baixo teor proteico	O	O	O	O	O	O	O	Elevado teor proteico

Em que medida estaria interessado em comprar este **iogurte**?

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Nada interessado	O	O	O	O	O	O	O	Muito interessado

Por favor, indique quanto é que acha que este **iogurte** vale (de 0 a 3€):

_____

Imagine que consumia este **iogurte**. Como se sentiria?

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Nada orgulhoso/a	O	O	O	O	O	O	O	Muito orgulhoso/a
Nada culpado/a	O	O	O	O	O	O	O	Muito culpado/a

Condição: Iogurte hiperproteico (randomização)

Na sua opinião este **iogurte**, é:

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Nada saudável	O	O	O	O	O	O	O	Muito saudável
Baixo teor de açúcar	O	O	O	O	O	O	O	Elevado teor de açúcar
Baixo teor de gordura	O	O	O	O	O	O	O	Elevado teor de gordura
Nada saboroso	O	O	O	O	O	O	O	Muito saboroso
Nada calórico	O	O	O	O	O	O	O	Muito calórico
Nada saciante	O	O	O	O	O	O	O	Muito saciante
Baixo teor proteico	O	O	O	O	O	O	O	Elevado teor proteico

Em que medida estaria interessado em comprar este **iogurte**?

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Nada interessado	O	O	O	O	O	O	O	Muito interessado

Por favor, indique quanto é que acha que este **iogurte** vale (de 0 a 3€):

_____

Imagine que consumia este **iogurte**. Como se sentiria?

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Nada orgulhoso/a	O	O	O	O	O	O	O	Muito orgulhoso/a
Nada culpado/a	O	O	O	O	O	O	O	Muito culpado/a

Condição: Pudim controlo (randomização)

Neste estudo, pretendemos entender como é que as pessoas percecionam diferentes produtos alimentares.

No seu caso, iremos pedir-lhe que avalie um novo **pudim** indicando em que medida o alimento lhe parece:
... saboroso (1 = Nada saboroso a 7 = Muito saboroso)
... calórico (1 = Nada calórico a 7 = Muito calórico)
... saudável (1 = Nada saudável a 7 = Muito saudável)
... saciante (1 = Nada saciante a 7 = Muito saciante)
... teor proteico (1 = Baixo teor proteico a 7 = Elevado teor proteico)
... teor gordura (1 = Baixo teor gordura a 7 = Elevado teor gordura)
... teor açúcar (1 = Baixo teor açúcar a 7 = Elevado teor açúcar)

Estas avaliações devem ser **rápidas e espontâneas**. Estamos apenas interessados na sua opinião, logo não existem respostas certas nem erradas.

Na sua opinião este **pudim**, é:

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Nada saudável	O	O	O	O	O	O	O	Muito saudável
Baixo teor de açúcar	O	O	O	O	O	O	O	Elevado teor de açúcar
Baixo teor de gordura	O	O	O	O	O	O	O	Elevado teor de gordura
Nada saboroso	O	O	O	O	O	O	O	Muito saboroso
Nada calórico	O	O	O	O	O	O	O	Muito calórico
Nada saciante	O	O	O	O	O	O	O	Muito saciante
Baixo teor proteico	O	O	O	O	O	O	O	Elevado teor proteico

Em que medida estaria interessado em comprar este **pudim**?

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Nada interessado	O	O	O	O	O	O	O	Muito interessado

Por favor, indique quanto é que acha que este **pudim** vale (de 0 a 3€):

_____

Imagine que consumia este **pudim**. Como se sentiria?

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Nada orgulhoso/a	O	O	O	O	O	O	O	Muito orgulhoso/a
Nada culpado/a	O	O	O	O	O	O	O	Muito culpado/a

Condição: Pudim hiperproteico (randomização)

Na sua opinião este **pudim**, é:

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Nada saudável	O	O	O	O	O	O	O	Muito saudável
Baixo teor de açúcar	O	O	O	O	O	O	O	Elevado teor de açúcar
Baixo teor de gordura	O	O	O	O	O	O	O	Elevado teor de gordura
Nada saboroso	O	O	O	O	O	O	O	Muito saboroso
Nada calórico	O	O	O	O	O	O	O	Muito calórico
Nada saciante	O	O	O	O	O	O	O	Muito saciante
Baixo teor proteico	O	O	O	O	O	O	O	Elevado teor proteico

Em que medida estaria interessado em comprar este **pudim**?

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Nada interessado	O	O	O	O	O	O	O	Muito interessado

Por favor, indique quanto é que acha que este **pudim** vale (de 0 a 3€):

_____

Imagine que consumia este **pudim**. Como se sentiria?

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Nada orgulhoso/a	O	O	O	O	O	O	O	Muito orgulhoso/a
Nada culpado/a	O	O	O	O	O	O	O	Muito culpado/a

Questões de controlo

Pedimos-lhe agora que responda a um conjunto de questões de controlo face ao produto que avaliou.

Que produto alimentar avaliou?

O Queijo creme

O Pudim

O Iogurte

O Gelado

O alimento que avaliou neste questionário:

O Continha elevado teor proteico

O Não continha informação acerca do teor proteico

O Não me recordo de ver informação sobre teor proteico

O Fornecia informação sobre o teor proteico, mas não me recordo

---

Como avalia o seu conhecimento em relação a produtos alimentares enriquecidos com proteína:

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Baixo conhecimento	O	O	O	O	O	O	O	Elevado conhecimento

Com que frequência consome produtos alimentares enriquecidos com proteína?

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Raramente	O	O	O	O	O	O	O	Frequentemente

A que tipo(s) de consumidores associa **produtos alimentares enriquecidos com proteína?**

_____

Caso consuma produtos enriquecidos com proteína, indique-nos, por favor, quais as **razões** e em que **situações** o faz:

(Caso não consuma este tipo de produtos, explique-nos igualmente o porquê):

_____

Responda agora às seguintes afirmações, indicando a opção que melhor o/a caracteriza:

	1	**2**	**3**	**4**	**5**	**6**	**7**	
Não penso na minha saúde e bem-estar	O	O	O	O	O	O	O	Penso muito na minha saúde e bem-estar
Não estou atento/a aos sinais do meu corpo	O	O	O	O	O	O	O	Estou muito atento/a aos sinais do meu corpo

---

Para finalizar, por favor indique a sua **altura**...

O _____ Cm

O Não sei / Prefiro não responder

Para finalizar, por favor indique a sua **peso**...

O _____ Kg

O Não sei / Prefiro não responder

Selecione, por favor, apenas uma das seguintes opções:

O Atualmente estou inscrito/a como atleta federado/a. Por favor, indique que modalidade desportiva pratica (e.g., atletismo, futebol) e quanto tempo por semana se dedica a essa modalidade.

_____

O Não estando inscrito/a como atleta federado/a, pratico uma modalidade desportiva (e.g., atletismo, futebol). Por favor, indique que modalidade desportiva pratica e quanto tempo por semana se dedica a essa modalidade.

_____

O Não pratico qualquer modalidade desportiva (e.g., atletismo, futebol),mas costumo fazer exercício físico (e.g., caminhada, corrida, aula em ginásio). Por favor, indique que tipo de exercício físico pratica e quanto tempo por semana se dedica a essa modalidade.

_____

O Não pratico qualquer modalidade desportiva (e.g., atletismo, futebol),nem faço exercício físico regularmente.

O Prefiro não responder

Tem formação superior na área da Nutrição?

O Sim. Por favor, indique qual: _____

O Não, mas interesso-me e leio muito sobre esta área.

O Não.

O estudo chegou ao fim. **Mais uma vez agradecemos a sua participação!** Se desejar fazer algum comentário ou pedir algum esclarecimento adicional, por favor use o espaço abaixo ou contacte-nos via e-mail: **marilia_prada@iscte-iul.pt** ou **jlsye@iscte-iul.pt**.

_____

Caso tenha interesse em participar no sorteio do cartão presente de 50€, indique-nos o seu e-mail:
(Note que o seu endereço de email não vai ser armazenado, nem divulgado ou emparelhado com as suas respostas, servindo apenas para o sorteio)

_____

APPENDIX B – SURVEY FLYER