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The usual suspect: How to co-create healthier meat products

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ABSTRACT

Healthier meat products have a major economic potential and are attracting considerable research and media attention to meet the growing and complex consumer demand. Whether this potential will be realized and at what speed is contingent on consumers' acceptance of these novel foods. This study uses a cross-cultural context to co-create new healthier meat products, while mapping the conditions leading to consumers' product acceptance (*vs.* rejection). Results from online focus groups conducted in Denmark, Spain and the United Kingdom show that consumers generally have a negative attitude toward healthier meat products due to unfamiliarity and perception of over-processing. Nevertheless, partial meat-substitution with plant-based ingredients together with fat and salt reduction show specific conditions under which consumers' acceptance would be possible. This is further related to product-specific factors: ingredients and base meat, and marketing-related factors: labelling and packaging. Finally, implications and recommendations for the manufacturing and marketing of new healthier meat products are provided.

1. Introduction

The continuing growth of world population, urbanization, and income has considerably increased the demand for meat products (OECD-FAO, 2013). This strongly affects both production and consumption of meat creating significant environmental and human health challenges (FAO, 2011a; Apostolidis & McLeay, 2016; Godfray et al., 2018) and bringing forth the demand for new healthier meat products (Hung, de Kok, & Verbeke, 2016; Shan et al., 2017). Healthier meat products are products reformulated by either reducing or replacing unhealthy ingredients (e.g. salt, fat) or by incorporating healthy ingredients (e.g. plant proteins, vitamins) (Shan et al., 2017). As such they include a broad category of products whose overall goal is to improve the nutritional quality and reduce the negative effects related to the consumption of processed meat (Shan et al., 2017).

From an environmental point of view, the development of new healthier meat products could be a good way to lower the impact of meat production on the environment (FAO, 2011b; Van Loo, Caputo, & Lusk, 2020). Nevertheless, consumers' adoption of a diet that include less meat or products where the meat is partially substituted by plant-based ingredients can deliver environmental benefits on a level not attainable by producers alone (Poore & Nemecek, 2018). In terms of human health issues, healthier meat products can overcome the problems associated with various adverse health outcomes that have been related to higher meat consumption, such as heart disease, diabetes, cancer, among others (Micha, Wallace, & Mozaffarian, 2010; Rohrmann et al., 2013; WHO-IARC, , 2015). Indeed, prior research shows that consumers are favourable to the idea of replacing or adding natural components to healthy meat products (Hung, de Kok, & Verbeke, 2016; Hung, Verbeke, & de Kok, 2016), and would be willing to substitute a traditional meat product with a healthier alternative (Rocha, de Noronha, & Trindade, 2019). Prior research has shown that price and base meat are the most important factors for consumers' purchase intention of these products, followed by healthy ingredients and salt and/or fat content (Shan et al., 2017). In a similar vein, Shan et al. (2017) shown that health and flavour concerns and product popularity also influence participants' perceptions towards healthier meat. At the same time caution is warranted as consumers are concerned about products' taste, healthiness and shelf-life (Hung, Verbeke, & de Kok, 2016; Shan et al., 2017). This could be due to the fact that consumers are still strongly attached to meat and these

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products are not similar enough to the traditional meat products (Graça, Calheiros, & Oliveira, 2015; Graça, Truninger, Junqueira, & Schmidt, 2019). Thus, more research is needed to understand consumers' perceptions of healthier meat products. Furthermore, prior research has largely neglected to involve consumers in products co-creation despite the benefits of this methodology to produce better consumer experiences, and in turn lead to a greater consumer satisfaction (Filieri, 2013).

Prior research shows that co-creation, defined as a process of collective creativity (Sanders & Stappers, 2008), and involving consumers at early stages of new product development (NPD), leads to more innovative and suitable new products having a higher chance of consumer acceptance and success at the market (Banovic, Krystallis, Guerrero, & Reinders, 2016; Filieri, 2013). Conversely, the high failure rate of new food products on the market is often associated to the lack of inclusion of consumer voice at the early stages of NPD process (Grunert, Verbeke, Kügler, Saeed, & Scholderer, 2011; van Kleef, 2006). Co-creating new healthier meat solutions with consumers could be an important driver for pushing consumers towards reduction of meat intake, reflecting the significant role of 'healthier' meat alternatives in providing benefits for the environment, the consumers, and the meat industry (Hung, de Kok, & Verbeke, 2016; Filieri, 2013). This in turn can save companies from costly mistakes further into the NPD process (Asioli, Varela, Hersleth, Almli, Olsen, & Næs, 2017; van Kleef, van Trijp, & Luning, 2005).

The present study explores the potential of co-creating healthier meat solutions by taking into account the voice of the consumer from the early stages of NPD. The aim of this work is to explore consumers' opinions, perceptions, preferences, and needs for healthier meat products, as well as to co-create new healthier meat products. Furthermore, this study focuses on a cross-cultural comparison of consumers' perceptions towards new healthier meat products, as this is particularly relevant when the meat industry serves the markets of different countries (Hung, Verbeke, & de Kok, 2016; Banovic et al., 2018). Specifically, we conducted a qualitative study across three European countries, namely Denmark, Spain and the United Kingdom. The three countries under investigation have been chosen due to the different levels of total meat consumption and expenditure. According to FAO (FAOSTAT, 2018), among the three selected countries, in 2018 Spain had a highest per capita consumption of total meat (99 kp/per capita), followed by Denmark (79 kg/per capita) and the UK (77 kg/per capita). Furthermore, the selected countries also differ in the extent to which they spend on meat from their total expenditure on food, where in Denmark meat accounts for about 35% of food expenditure, while in Spain this is 30%, and 25% in the UK (Colmenero, 2000). Finally, Denmark, Spain, and UK have been shown to be significantly different on the basis of their cultural values (De Maya, López-López, & Munuera, 2011). As such, the comparison across the three countries provides broad insights about European consumers' perception of healthier meat products as well as about potential strategies to adopt for the commercialization of these novel products across different European markets. Finally, by co-creating new healthier meat products with consumers, we involve consumers at the early stages of NPD process with a focus on identifying any unmet needs and expectations that consumers may have (Sanders & Stappers, 2008), thus aiming to facilitate the development, production and marketing of novel healthier meat products.

2. Materials and method

A qualitative approach, namely online focus groups, were chosen as the most appropriate method for co-creation of healthier meat products, as they allow for a better interaction among participants (Wong, 2008; Morgan, 1996), encourage exchange of ideas, sharing and commenting on each other's designs and concepts (Haugaard, Hansen, Jensen, & Grunert, 2014). Focus groups have been previously shown to be effective and useful for the co-creation and co-development of new product ideas (Filieri, 2013; Banovic et al., 2016). Online co-creation has been found to be as effective as in person co-creation, with the results being as rich and expressive, but also more succinct and completed in a shorter time (Stappers and Sanders, 2003). Indeed, online co-creation is already being used by companies and alike for the development and marketing of novel products (Tams, 2018).

2.1. Procedure and materials

Six online focus groups have been conducted in three selected European countries, namely Denmark (DK), Spain (ESP), and the UK in March and April 2020. An interview guide in English was developed and back-translated with independent translators of the languages of the selected countries (Silverman, 2020). A pilot test with one face-to-face focus group was carried out in Denmark for pre-testing and adjusting of the protocol.

The video-call platform Zoom was used to conduct the online focus groups. Consistent with guidelines for qualitative research (Verbeke et al., 2015), each online focus groups consisted of eight participants and lasted around 120 min. The first part of the focus group was dedicated to the group discussion (50 min), while the second part included the co-creation task where the participants were divided in the different age and meat consumption subgroups (70 min) (see Fig. 1).

Co-creation task involved *breakout rooms*, where each subgroup was in a separate videocall not accessible by the other participants. An experienced co-moderator, different from the main moderator, was assigned to each breakout room. The co-moderators did not actively participate in the discussion, but simply observed and intervened only if further clarifications were needed. The main group discussion call and separate videocalls (i.e., breakout rooms) were all recorded, transcribed in the original language (i.e., Danish, English, and Spanish), and subsequently translated to English for data analysis.

2.2. Co-creation of healthier meat products

The focus groups were organized in three stages (Fig. 2) where the first two stages covered group discussion about consumer perceptions of meat products in general and healthier meat products in particular, while stage three focused on consumer co-creation. This resulted in the co-creation of eight new product ideas in each country (i.e. DK, ESP, and the UK), for a total of twenty-four product ideas for healthier meat products.

2.2.1. STAGE 1: Consumers preferences toward meat products

After giving informed consent and being introduced to the procedure, participants were prompted to discuss underlying motivations behind meat consumption and their meat products preferences (i.e., motivation task). Following, participants were presented with a definition of meat products[1] and invited to further discuss their preferences by imagining and describing a typical situation in which they would consume a meat product (i.e., meal reconstruction task, adapted from Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004), describing the meal and social context, meal engaging activities, and the associated emotional reactions.

2.2.2. STAGE 2: Consumers' perceptions of healthier meat products

Building on stage one, participants were prompted to undertake a free association task and discuss their thoughts about what they

[1] "*Meat products are products that have been transformed or processed through salting, curing, fermentation, smoking or other processes to enhance flavour or improve preservation. These transformed or processed meat can include ham, salami, bacon and some sausages such as frankfurters and chorizo. Minced meats such as fresh sausages may sometimes, though not always, count as processed meat*", https://www.wcrf.org/dietandcancer/recommendations/limit-red-processed-meat.

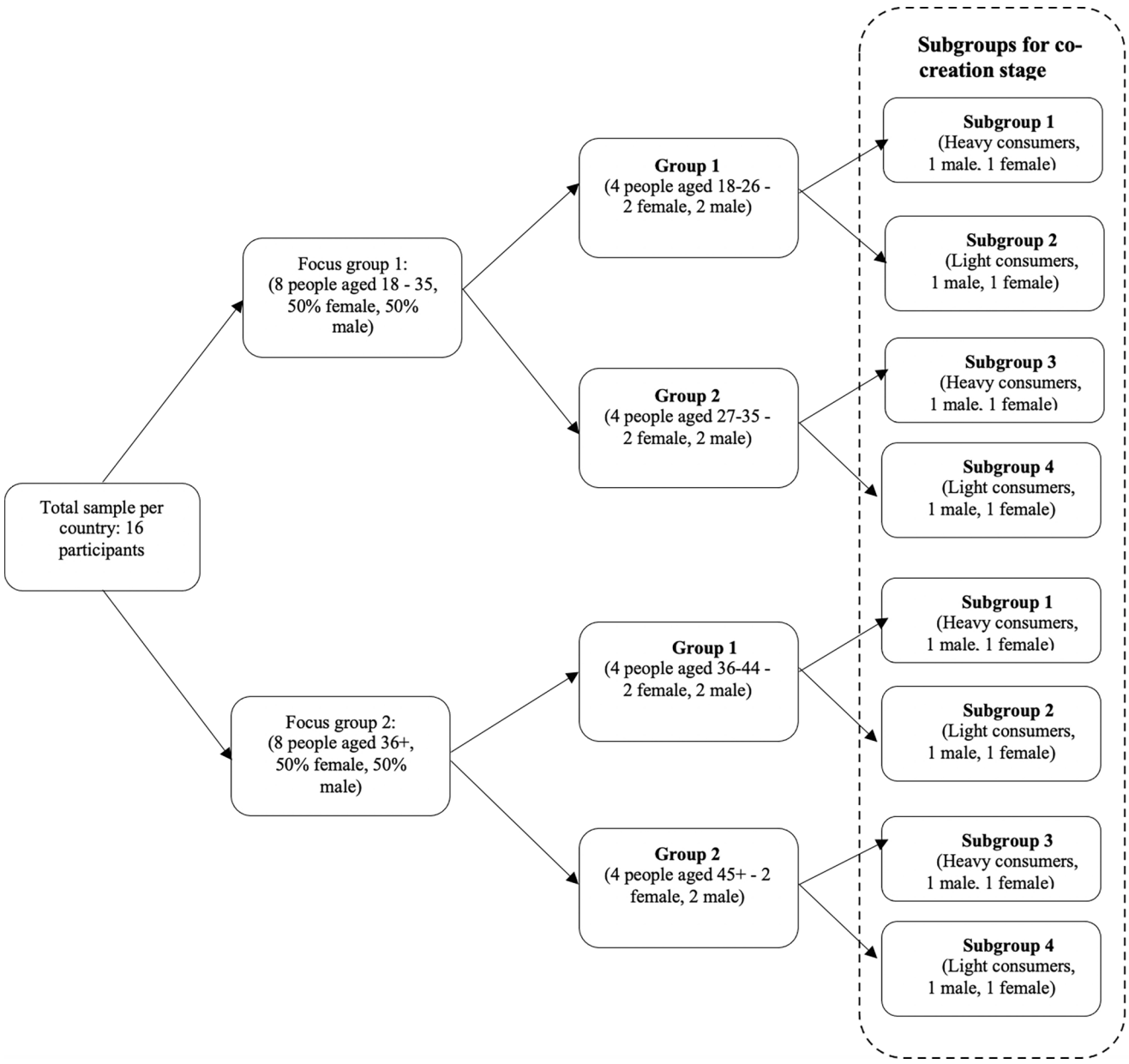

Fig. 1. Sample characteristics per country.

perceived as *healthy* meat products. Specifically, participants were invited to discuss the first word, images and ingredients that come to mind with regards to what they perceive as *healthy* or *unhealthy* meat products. This allowed for the generation of valuable insights on how consumers perceive, interpret, and associate healthy meat products (Son et al., 2014). Subsequently, participants were introduced to the definition of healthier meat products[2] (Grasso, Brunton, Lyng, Lalor, & Monahan, 2014; Jiménez-Colmenero, Carballo, & Cofrades, 2001), shown pictures (Fig. 3) depicting concrete product examples, and shown definitions of ingredients (see Fig. 4) used to make meat products healthier. Presentation order of the pictures was counterbalanced using a Latin square design to avoid order bias (Ares et al., 2013). Participants were then engaged in personification-association task (Banovic et al., 2016), where they identified main characteristics and attributes associated to the products.

2.2.3. STAGE 3: Co-creation of new healthier meat products

After a short break, participants were divided in subgroups of two participants based on their level of meat consumption (Fig. 1). Subgroups maximized the results and numbers of ideas generated by combining group brainstorming and achieving team bonding (De Bono, 2010). Each subgroup was assigned the description of one *persona* (e.g. "*I have decided that I want to eat healthier, but I do not want to give up meat products, even if I do not eat many. Therefore, I would like to add healthier meat products to my diet.")* out of four selected, and asked to envision the target consumer (Creusen, Hultink, & Eling, 2013). Each persona was tailored to the characteristics of the subgroup (i.e. age and level of meat consumption) with the aim of maximizing results and participants' identification. Further, participants were invited to think about the meat product type that would fit the target consumer and subsequently

[2] *"Healthier meat products are products whose composition has been modified by reducing or eliminating the unhealthy constituents found in some meat products – such as high levels of saturated fats and salt. It is also possible to introduce non-meat-based ingredients with health benefits (such as fiber, omega 3s, proteins, etc.). The aim is to improve the nutritional profile and the health properties of the product, while maintaining acceptable taste, and flavor."*

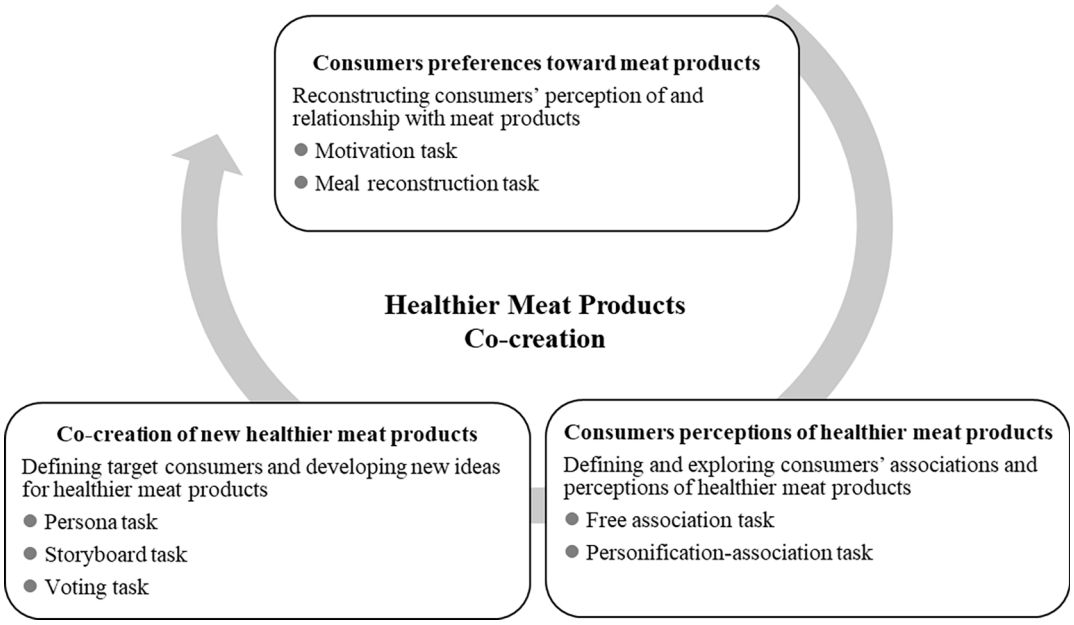

Fig. 2. Conceptual framework.

Fig. 3. Examples of meat products.

developed new ideas. Participants were instructed to specify base meat (e.g., beef), potential ingredients, and other elements they deemed relevant (e.g., packaging). The ideas were recorded by each subgroup on an online board. Each subgroup then presented their ideas to the other participants in the main call, lasting about two minutes. After that participants discussed and voted for the best idea, where each subgroup distributed 12 points (Banović et al., 2016).

2.3. Participants

Forty-eight participants were recruited across selected countries by using purposive homogeneous sampling to ensure the identification and selection of information-rich participants that were particularly knowledgeable about or experienced with meat products (Shan et al., 2017). Participants were screened based on the following criteria: *age*, *gender*, *level of meat consumption*, and whether they *purchase meat products* (Fig. 1). Following the methodology by Grønkjær, Curtis, de Crespigny, and Delmar (2011), each of the two focus groups conducted within country was homogenous in terms of age (e.g., 18–26; 36+; $M_{DK} = 36.2$, $M_{ESP} = 36.1$, $M_{UK} = 37.7$), equally distributed in terms of gender (50% females), varied in terms of meat consumption pattern (i.e., high consumption: consume meat more than 3 times a week; low consumption: consume meat 1 to 3 times a week), and involved eight participants. Selected subgroups served as basis for the co-creation stage.

2.4. Data analysis

The transcriptions were analyzed using the program NVivo 12 (Burlington, United States). A qualitative content analysis was used to establish the main categories regarding preferences and perceptions of healthier meat products, as well as provide links between established categories and participants' profiles (Silverman, 2020). Specifically, no coding framework was defined beforehand; thus, the raw data was coded into conceptually congruent categories by making evidence-based inferences (Finfgeld-Connett, 2014). Each category instance was then counted and frequencies reported, while participant's illustrative quotations were used for representative purposes. To minimize subjectivity bias, all coding was done using the principle of triangulation (Silverman, 2020).

3. Results

Results of the focus groups, across the selected countries, are presented by describing the themes and subthemes that emerged during the three stages of the focus groups. Quotes are used to demonstrate how participants reflected on the different themes, accounting for the participants' background information (i.e., gender, age, meat consumption level: high and low, and country: DK, ESP, and the UK). Findings from each stage are also summarized in tables, in which we have detailed the frequency with which each theme was mentioned by participants during the focus group discussion across the three countries. When different subthemes were mentioned by the same participant, we included them in the frequency count as different instances in which the theme emerged during the data collection.

MINERALS

Minerals are required by the body in small amounts for a variety of different functions, including the formation of bones, teeth and body fluids. Examples are calcium and iron.

In meat products extra minerals can be added, so these can become "a source of" or "high in" a specific mineral (depending on the amount).

FIBRE

Fibre is an essential part of a healthy, balanced diet. It is made up by the parts of fruits and vegetables that cannot be digested and it is of vital importance to digestion.

In meat products, extra fibre can be added, so these can become a "source of fibre"or "high in fibre" (depending on the amount added).

Fig. 4. Examples of ingredients.

3.1. Consumers' preferences towards meat products

Table 1 shows most frequently occurring themes and subthemes in the first discussion stage (i.e., motivation task). The participants first discussed their main motivations for buying meat products, which were related to versatility of the products: *"[…] like to buy it once in a while if we have had a hard day or something and just need some easy cooking."* (female, 22, high, DK), and products' use in different social occasions: "*I buy processed meat products for such special holidays like Easter or Christmas.*" (female, 22, low, DK). When eating meat products, the main motives mentioned were related to taste and evoked pleasure: "*Would say that whenever I know that I'm going to have it, […] I know it's going to taste good.*" (female, 28, low, UK). Satiety was also a prominent theme highlighting the importance of meat products in the diet: "*Satisfaction and gives a feeling of fullness. If I eat a plate that does not have a meat product; I feel that I lack food.*" (female, 24, high, ESP).

In terms of general meat products preferences, participants across the three countries mostly pointed out the fact that meat products should not be considered as a "fast food", but as a part of healthy and balanced diet: "*I do not particularly consider it (meat product) as fast food; I consider it as healthy as a fish or vegetables. I believe that there must be a balance in the diet and it is the same as for any other product.*" (female, 26, low, ESP). Conversely, participants in Spain considered meat products also as convenient food: "*Especially fast, I relate it with convenience because the form already exists and you simply pass it a little through the pan, as you like, […] it is fast. I consider it an easy and comfortable product.*" (female, 28, low, ESP). Spanish, participants also pointed out that it is quite important to consider the base meat from which meat products are made of: "*[…] it depends on what meat you buy, not the same thing buying a Wagyu or Kobe meat […].*" (male, 26, high, ESP), and their main ingredients: "*I look at the ingredients.*" (male, 38, high, ESP).

After being introduced with the meat products definition (see Section 2.2.1), participants engaged in the meal reconstruction task. Table 2 presents different meal and social context activities that participants usually engage with while eating meat products, and corresponding emotional states. When reconstructing the meal where the meat product featured as the central element, participants were mentioning other foods and ingredients they would eat as a side-dish, such as, potatoes or chips, bread, salad, and fried egg, among others: "*I never think that I will eat the meat product without anything else.*" (female, 41, high, DK), "*Along with meat […] you want to have something green.*" (female, 51, low, DK). When social interactions were mentioned, family and friends' gatherings were the most enjoyable experiences related to the meat products: "*Nice weather, on my patio with my family.*" (male, 39, high, UK). These social interactions further evoked positive emotions such as being satisfied and happy: "*When you make a well-made hamburger, you also have a good time in the kitchen, but when you make a ham and cheese sandwich, you don't*

Table 1
Consumers' preferences towards meat products.

Main theme	Subtheme	Example	Denmark (N = 16)	Spain (N = 16)	UK (N = 16)	Total (N = 48)
Motives for buying meat products	*Versatility*	Easy to store, everyday meals	3	5	9	17
	Special occasions	Traditional meals	6	0	2	8
	Social aspects	Cooking for friends, family	4	0	1	5
Motives for eating meat products	*Pleasure*	Taste, guilty pleasure	2	2	7	11
	Satiety	Feeling of fullness	0	4	0	4
Preference towards meat products	*Healthy, balanced diet*	Meat central in the diet	0	2	7	9
	Convenience	Quick, easy	0	4	0	4
	Meat type and ingredients	Kobe meat, Omega 3	0	2	0	2

Table 2
Meal reconstruction task.

Main themes	Subthemes	Denmark (N = 16)	Spain (N = 16)	UK (N = 16)	Total (N = 48)
Meal context	Meat product central meal element	4	2	0	6
	Salad	1	3	0	4
	Potatoes	1	2	0	3
	Bread	0	1	0	1
	Rice	1	0	0	1
	Egg	0	1	0	1
Emotional reactions	Satisfied	1	3	0	4
	Happy	2	1	0	3
	Relaxed	1	0	0	1
	Frustrated	1	0	0	1
Social context	Family	3	1	6	10
	Friends	0	0	1	1
Activities	Alone	2	2	0	4
	Working	1	1	0	2
	Reading	1	0	0	1
	Studying	1	0	0	1
	Using phone	1	0	0	1

have a good time […]." (male, 35, high, ESP). Albeit mentioned less often, participants also referred to activities such as working and reading, in which they were mainly alone or socially unengaged: "*If I am alone, I can also look at my phone or watch some television or read or listen to the music, but I do not when I am with others*." (female, 28, high, DK). Specifically, the idea of being alone when consuming meat products was prevalent in Denmark, but not in Spain and UK.

3.2. Consumers' perceptions of healthier meat products

The word associations related to the healthy meat products are shown in Table 3. Participants saw a prototypical healthy meat product as a highly functional product possessing higher levels of protein, lower levels of fat and salt content, having no additives, minimally processed, and coming from animal production where animals were fairly treated (i.e., animal welfare). Higher levels of protein and lower levels of salt were mainly related to the balanced diet and health benefits.

After being presented with the healthier meat products definition (see Section 2.2.2), participants argued about their perceptions regarding the main characteristics and attributes of healthier meat products (see Table 4). Due to the novel nature of these products and

Table 3
Word association related to healthy meat products.

Themes	Associations	Denmark (N = 16)	Spain (N = 16)	UK (N = 16)	Total (N = 48)
Fat content	Fat-free, fat percentage, low fat,	0	6	7	13
Protein content	Working out, balance of food groups, energy	0	1	10	11
Level of processing	Pure meat, unprocessed, no additives	10	0	0	10
Salt content	Health issues	2	3	3	8
Animal welfare, organic production	Animals bred in a sensible way, antibiotics	6	0	0	6
Meat substitution with plant	Half vegetables/half meat, vegetables, legumes, vegetable oils	4	0	0	4
Vitamins		0	0	1	1
Visual appearance	Color	0	1	0	1

Table 4
Consumers' perceptions of healthier meat products.

Themes	Subthemes	Denmark (N = 16)	Spain (N = 16)	UK (N = 16)	Total (N = 48)
Reluctance towards healthier meat products	Unfamiliarity, technology uncertainty	3	11	17	31
Natural	Minimal manipulation, low processing	3	17	5	25
Healthy ingredients	Plant proteins, fiber	0	16	0	16
Flavor	Meat like, similar to regular meat products	1	1	11	13
Transparency	Trusted source, production process	4	0	0	4
Animal welfare	Well-treated animals	0	0	2	2

their unfamiliarity, participants expressed some reluctance towards meat modifications: "*I think it is in its infancy, therefore there are some things that are not quite in place, at least what I perceive*." (male, 43, high, DK). However, participants expressed their willingness to accept these products under specific circumstances, such as being as natural as possible, minimally manipulated, and transparent: "*I generally feel better with as natural as possible, as little change as possible, and if everything is added then it must be very transparent, I think*." (female, 28, high, DK). Participants further mentioned that having healthy ingredients and retaining the similar flavor as the regular meat product, would be something that would increase acceptance and adoption of these products: "*If it makes it healthier, and it still tastes the same, that's what's key, isn't it*?" (male, 30, high, UK). It is worth noting that the conditions for acceptance of healthier meat products cited by participants across the three countries reflect the characteristics mentioned when being prompted to provide their own definition of healthier meat products (see Table 3). This suggests that consumers would be more willing to accept novel and healthier versions of meat products as long as these correspond to the prototype of what they think is a healthy meat product: i.e., a meat product that is minimally processed, with plant-based ingredients but no additives, and being produced using organic and fair methods of animal farming. Indeed, there was a very fine line between the acceptance and rejection of the healthier meat products, and participants were quite eloquent in expressing their opinions on this matter: *"[…] if you've got 30%-40% meat compared to something which is 78%, that doesn't necessarily make it sound any healthier. It sounds like there's probably more substitutes in there. So, it may have the opposite effect.*" (male, 48, high, UK).

3.3. Co-creation of new healthier meat products

After a short break, participants proceeded with the co-creation stage where they were assigned in subgroups of two people based on their level of meat consumption.

3.3.1. Target consumer – Persona task

Table 5 shows the outcome of the persona task and most frequently mentioned prospective target consumers and their needs. The most often mentioned typical consumer of healthier meat products was an individual with the high-level income, busy schedule, and a hectic lifestyle that translates in a higher need for the convenient, healthy, and sustainable products. However, this target consumer would not compromise on the health for the lower price: "*You'd actually prefer to pay more and get something that's healthier than save money*." (male, 30, high, UK). On the other hand, participants also mentioned that one of the possible

Table 5
Target consumer – persona task.

Themes	Subthemes	Denmark (N = 16)	Spain (N = 16)	UK (N = 16)	Total (N = 48)
Hectic lifestyle	Busy schedule, high-income, need to plan for shopping and meals, city-life	5	0	8	13
Wellbeing	Health conscious with active lifestyle, exercising, sporty	3	2	4	9
Environmentally conscious	Animal welfare, climate change	6	1	0	7
Weight management	Trying to lose weight, sedentary lifestyle	2	0	3	5
Relaxed lifestyle	Love to entertain guests, variety-seeking, new recipes	1	0	3	4
Price sensitive	Younger individuals, students	2	0	2	4
Family	Living with the partner, children	1	0	1	2

target consumers could be a price sensitive younger individual: "*Students living in a student house that want to go for a frozen product which is quite cheap.*" (female, 19, high, UK); "*Students who are basically looking to be more health conscious, but obviously they crave things like fast food, and they want something a bit more guilt-free.*" (male, 22, high, UK).

3.3.2. Co-created new healthier meat products ideas - storyboarding task

Table 6 summarizes findings from the co-creation stage, detailing the most frequently used base meat (i.e., meat type chosen to develop the product) for the co-creation of new healthier meat products, followed by their ingredients, and marketing elements. While the discussion in this stage mostly revolved around the composition of the product (i.e., base meat and ingredients), participants also briefly discussed suggestions related to elements such as labels, packaging, or shelf life that would facilitate the commercialization of these products. Specifically, the most preferred base meat across countries for manufacturing healthier meat products was poultry, where chicken was the most preferred option because it was regarded as healthier (e.g., "*Chicken-Lite*", group 45+, high, UK) as well as more environmentally-friendly and sustainable option (e.g., "*Eco-Friendly Nuggets*", Group 18–26, high, ESP). However, even though regarded as healthy and sustainable, participants were still mentioning the need for a partial substitution of meat with plant-based ingredients (e.g., "*Half-vegetable*," Group 36–44, low, DK), and also added that seasoning and added flavors (e.g. added spices) of the products are quite relevant and could influence the taste of the product, and thus affect product acceptance. Poultry was followed by beef, which was considered as base meat for co-creation only if it comes from sustainable production (e.g., "*Animals raised in the wild with natural feed.*" Group 18–26, low, ESP) and where the meat is partially replaced with the plant-based ingredients (e.g., "[…] *50% plant-based ingredients.*" Group 27–35, low, UK). Pork was the least mentioned as base meat, and again related to sustainable production (e.g., "*Green pig,*" Group 27–35, high, DK) and partial substitution (e.g., "*50% substituted with vegetables*," Group 27–35, high, UK).

Table 6
Co-created healthier meat products' features.

Themes	Subthemes	Denmark (N = 16)	Spain (N = 16)	UK (N = 16)	Total (N = 48)
Base meat	Poultry	4	4	1	9
	Beef	1	3	4	8
	Pork	1	0	3	4
	All	1	1	0	2
	Game	1	0	0	1
Ingredients	Plant-based ingredients	7	4	9	20
	Reduced fat	1	5	7	13
	Reduced salt	1	3	6	10
	No additives	1	5	0	6
	Added minerals, vitamins, omega 3	2	3	1	6
	Added fiber	1	1	1	3
	No water	1	0	1	2
	Gluten free	0	1	0	1
Labelling	Animal welfare	2	0	0	2
	Ingredients list	1	1	0	2
	Calorie information	0	0	2	2
	Fat percentage	1	0	0	1
	Organic	1	0	0	1
Packaging	Size	3	0	3	6
	Sustainability	1	3	1	5
	Design	0	2	1	3
Shelf life	Fresh	1	5	0	6
	Frozen	1	2	1	4
	Vacuum-sealed	0	1	0	1
Other	Outlet, product range	0	6	1	7
	Price	1	2	0	3

The most important ingredients mentioned by the participants, in relation to all base meats, were mainly to increase the products' healthiness levels, such as, plant-based ingredients (e.g., vegetables: beetroot, sweet-corn, carrot; legumes: beans, lentils, peas; nuts and seeds), and reduced fat and salt. Main marketing elements pointed out in the co-creation task were related to product labelling (e.g., animal welfare, ingredients list, etc.), packaging innovations (e.g., package size, sustainable packaging, etc.), and shelf-life (e.g., fresh, frozen, etc.).

3.3.3. New healthier meat products ideas – Voting task

Table 7 shows the most voted healthier meat co-created ideas per country. Despite poultry being the most frequent base-meat mentioned across the three countries, on average, out of 24 created ideas, participants in Denmark, Spain and UK preferred and voted more often for the ideas that included beef as the base meat. However, consistently with findings from Table 6, beef was preferred when associated with improvements in terms of healthy components such as plant-based ingredients and reduced fat. Finally, product concepts including ideas related to packaging innovations, visual presentation, and product size were considered the most original and those that would be more likely accepted by the target consumers. For instance, participants voted for concept ideas that incorporated the development of packages designed to emphasize the characteristics of the product itself (e.g. "*Brightside anytime meatballs - packaging is transparent so to show the bright color of the meatballs",* group 45+, light, UK) or in different sizes to meet the needs of different types of consumers (e.g., large and small families) or packages designed to emphasize the characteristics of the product itself (e.g., transparent packages). This finding is particularly relevant as it underlines the importance of using innovative marketing elements when launching novel healthier meat products on the market. Indeed, the least voted ideas were those considered to be less creative and related to already existing products on the market (e.g. "*Healthy chicken - no water added, seasoning for the heavier taste*", group 18–26, high, DK).

4. Discussion

This study focused on consumers' perceptions and co-creation of new healthier meat products. In this sense, it contributes to the body of knowledge exploring consumers' attitudes and behaviors toward healthier meat products (Ansorena, Cama, Alejandre, & Astiasarán, 2019; Hung, Verbeke, & de Kok, 2016; Rocha et al., 2019; Shan et al., 2017; Shan et al., 2017) and goes one step further by incorporating consumer perspective at the early stages of NPD using a cross-country perspective accounting for differences and similarities among selected European countries. This yields more innovative and appropriate food

Table 7
Summary of best ideas per country.

Country	Focus group 1 - consumers aged 18–35	Focus groups 2- consumers aged 36+
Denmark	***Fiber Minced Meat*** Minced meat combined with ingredients used for falafels (chickpeas and tahini). The salt and fat content coming from the meat is reduced as the saltiness comes from the falafel ingredients. The product can be used in different recipes, such as chili con carne or meatballs, or anything else that could be cooked when being busy during the week. The product comes with herbal mixture for seasoning.	***Meat for All*** Minced beef as basic ingredient, with added vegetables so that consumers can get both meat and healthy ingredients. Five different varieties (e.g., carrot, beetroot), with different colours symbolizing each variety. The vegetables do not dominate in taste, so that consumers can add flavour as needed. The package comes in different sizes so that both smaller and larger families can have the size that best fits with their needs; the big size can be stored in the freezer to avoid food waste.
Spain	***Natural & Free Burger*** 100% organic, free-range beef meat, that is rich in protein and minerals, but low in fat and without additives and allergens. The origin of the product (free-range) is communicated on the product. The product is natural and as little processed as possible. The product is vacuum-packed so that it can last longer even without preservatives. The price is affordable, not excessively expensive.	***Salchichas Corral (Farmyard Sausages)*** Chicken and turkey without fat and salt, but with the addition of natural antioxidants. Different spices (e.g., curries, cumin, and paprika) added to give more flavour to the base meat. The addition of spices makes the product tastier than the traditional sausage, without adding any unhealthy ingredients. The product can be sold either fresh or frozen (not pre-cooked), so that consumers can cook it directly at home. The package is transparent so to show the bright colour of the product given by the spices.
UK	***Popcorn Pork - Porkcorn*** A product that is quick, easy and guilt-free; similar to meat products usually sold in fast foods (e.g., McDonalds' nuggets) but without too much salt or additives. The nuggets are coated with wholegrain breadcrumbs to increase fibre and protein content. The package is white and red, as these colours are associated with fast foods such as KFC and thus might attract younger consumers that usually eat these types of products. The colours of the package will be catchy and attention-grabbing.	***Brightside Anytime Meatballs*** Minced beef as base meat, with added ingredients such as turmeric, coriander, chili, and lentils. Chili is added to reduce the amount of food consumed and to give a bit of colour; turmeric because it is a healthy and so quite good for the consumer; lentils because they contain high fibre, making the product overall more filling. The packaging is designed to show the bright colour of the meatballs.

products that have higher chance for acceptance and market success (Banovic et al., 2016).

The findings show that unfamiliarity and overprocessing could hamper adoption of the healthier meat products, while plant-based ingredients together with fat and salt reduction could increase these products' acceptance. This is consistent with results from prior research showing that consumers are uncertain and skeptical about healthier meat products (Shan et al., 2017, Shan et al., 2017) and that they are more likely to accept these healthier alterations if familiar (Hung, Verbeke, & de Kok, 2016). This study further shows that consumers were generally reluctant towards meat modifications, but they were willing to accept these products under the condition that they are minimally processed, carrying healthy ingredients, and thus more likely to retain sensory characteristics of regular meat, specifically its flavor. This was especially prominent in Spain and the UK, and is in line with prior research showing that expectation factors such as taste and visual appearance might be the key determinants for the acceptance of healthier meat products (Hung, Verbeke, & de Kok, 2016; Hung & Verbeke, 2018).

Findings further show that co-created healthier meat product ideas favor healthy ingredients and packaging innovations. In fact, all created ideas incorporated partial meat substitution with plant-based ingredients, such as, vegetables (e.g., beetroot, carrot) and legumes (e.g., beans, peas). This can be explained by consumers perceiving plant-based ingredients as more natural and healthier, which is line with previous research showing a growing consumer trend towards plant-based diets (Banovic et al., 2018; Lonnie et al., 2018; Springmann et al., 2018). Indeed, the consumers also pointed out that besides partial substitution of meat with plant-based ingredients, reduced fat and salt would further increase the healthiness and acceptance of these new products, which was especially noticeable among consumers in Spain and the UK. This further suggests that when developing and communicating about new healthier meat products a link between the modified ingredients and health benefits should be established in consumers' minds, as this could boost more positive reactions among consumers towards these novel products (Ansorena et al., 2019; Bryant, Szejda, Parekh, Desphande, & Tse, 2019). Finally, co-created ideas provided useful insights for package innovations in terms of sustainability, design, and size. For instance, participants suggested the development of packages in different sizes or packages designed to make the positive characteristics of the product more visible (e.g., transparent packages).

5. Conclusion

The present study offers several managerial implications for companies producing healthier meat products and retailers selling them on their shelves. First, communication efforts and campaigns should be focused on familiarizing consumers with healthier meat products, for instance by underlying the extent to which these products are similar to regular meat products in terms of their nutritional value and sensory characteristics. Second, producers should focus on the development of products that are perceived minimally manipulated and natural, and that are partially substituted with plant-based ingredients. This is consistent with evidence showing that consumers are more familiar with plant-based ingredients and perceive them as more natural (Hung, de Kok, & Verbeke, 2016; Hung, Verbeke, & de Kok, 2016). Furthermore, natural modifications have the potential to reduce consumers' perception of over-processing, with potential positive effects on consumers' expectations about the sensory experience with the products. In this sense, producers could highlight these factors through both advertising and packaging cues, for instance by stressing them in communication materials in-store or by using packages that communicate naturality and transparency through elements such as design and color.

Our findings also open up fruitful avenues for future research. For instance, future studies could quantitatively test interventions aimed at overcoming consumers' unfamiliarity with healthier modifications. For instance, future research could test the effect of showing healthier meat products alongside regular meat products in communication campaigns or stores, or could investigate the role of frontline employees as credible sources of information in the early stage of introduction of the product on the market (Nijssen, Reinders, & Banovic, 2020). Future research could also build on our findings for the development of healthier meat products based on combinations of attributes that consumers mentioned as relevant for their acceptance. Furthermore, the role of marketing factors such as packaging and product information should not be forgone, as findings from the co-creation task suggest that such factors are also relevant in consumers' minds when discussing ideas for novel healthier meat products. In this sense, future research should use these findings to test how packaging cues and marketing factors can be

leveraged to increase consumers' acceptance and ultimately the product's success on the market.

Ethical approval

This research was granted ethical approval by the Research Ethics Committee of Aarhus University (Project ID: 2020–0060164).

CRediT authorship contribution statement

Ada Maria Barone: Conceptualization, Methodology, Investigation, Formal analysis, Writing - original draft, Writing - review & editing. **Marija Banovic:** Conceptualization, Methodology, Investigation, Writing - original draft, Writing - review & editing. **Daniele Asioli:** Investigation, Writing - original draft. **Erin Wallace:** Investigation, Writing - original draft. **Claudia Ruiz-Capillas:** Investigation, Writing - original draft. **Simona Grasso:** Investigation, Writing - original draft, Funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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