Report MSc thesis

Beyond the wrapper: understanding children's perception towards plant-based dairy alternatives through the lens of dessert packaging

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Abstract

Food production has a huge impact on the environment. Especially animal-based protein is a problem, because the high numbers of livestock account for a big part of global greenhouse gas emissions. A shift towards reduced consumption of meat and dairy is needed, which can be accomplished by substitution with plant-based alternatives. Children have a big influence on their parents' consumption choices, in particular when it comes to desserts. Next to that, a product's packaging also plays an essential role in influencing consumption choices. So, in order to be able to stimulate consumption towards plant-based dairy alternatives, research was needed with children and on the role of the packaging for plant-based dairy alternatives. Therefore, this study investigated what the influence of the packaging is on the perception of 8- to 10- year-old children towards plant-based dairy alternatives, using desserts as a case study. Co-creation of a packaging was performed with 14 participants, followed by semi-structured interviews about the choices they made for their packaging. Through careful exploration of the different packaging cues, specifically the colour, claims, product names and cartoons/visuals, valuable insights were gained. The colour seemed to cause several associations, namely with desserts, the plant-based character and healthiness. Claims, especially when accompanied by a visual, also influenced perception, emphasizing healthiness and the plant-based character. Product names emerged as crucial determinants of perception, with children preferring 'normal' dairy terms over plant-based terms because of their attractiveness. Where visuals of the flavour positively influenced perception towards the product, visuals showing the plant-based character negatively influenced perception.
Even though children seemed to acknowledge the benefits of healthy choices and environmental consciousness, their overall perception of plant-based desserts seems to be quite negative. Future research might look into whether the same applies to other dairy alternatives. The combination of co-creation and interviews has helped in getting a better understanding of children's perceptions, but there is room for further examination of the methodology. Despite, it can be concluded that the packaging certainly plays a role when it comes to influencing children's perceptions towards plant-based dairy alternatives. Findings of this study can be helpful in stimulating children to consume more plant-based products.

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1 Introduction

1.1 Protein transition

Food production has a huge influence on the environment. What we decide to eat has not only consequences for our health and wellbeing, but also impacts the future of our planet (Michel, Hartmann & Siegrist, 2021). Food production and consumption are responsible for up to 30% of global greenhouse gas emissions (Martin, Lange & Marette, 2021; Vermeulen, Campbell & Ingram, 2012). Especially, animal-based protein is a problem because the high numbers of livestock account for nearly 80% of these emissions (McMicheal et al., 2007). A shift towards reduced consumption of meat and dairy to positively affect environmental health is needed, which can be accomplished by substitution with plant-based alternatives (Michel et al., 2021; Clay, Garnett & Lorimer, 2020; Springmann et al., 2018).

In order to achieve a shift towards reduced consumption of meat and dairy, dietary patterns predominant in minimally processed fruits, vegetables, whole grains, nuts, soy and other legumes have been recommended (Hu, Otis & McCarthy, 2019; Moss et al., 2022). The term 'plant-based' has recently come into use to refer to a diet that avoids the consumption of animal products (Aschemann-Witzel et al., 2021). A variety of plant-based food products have been developed to replace products made from animals and animal-derived products, including dairy alternatives and meat alternatives (Hu et al., 2019). The goal of some of these plant-based alternative products is to mimic the animal-based product as closely as possible (Pointke et al., 2022; Grasso et al, 2022). So, to facilitate and encourage the reduced consumption of animal products, more and more plant-based products are developed that mimic foods that are typically made with animal-derived ingredients, such as hamburgers, milk and cheese (Baptista & Schifferstein, 2023).

The demand for several plant-based milk alternatives is a rising trend, especially among vegetarians (Park, 2021). There is increasing consensus that limiting dairy products can contribute to lowering environmental impact of diets and that alternatives might help reduce the impact of dairy on the planet (Park, 2021; Wickramasinghe et al., 2021). Next to that, plant-based dairy products can serve as an inexpensive alternative option for economically underserved populations of developing countries as well as people living in regions where the supply of cow milk is insufficient (Sethi et al., 2016; Sosulski et al., 1978; Park, 2018). Plant-based, non-dairy milk alternatives such as soy, almond and oat milk are fast-growing segments in food product development (Park, 2021).

1.2 Adult's perception towards plant-based dairy alternatives

For these plant-based dairy alternatives to be accepted by the consumer, it is important to understand the perception of the consumer towards these products (Aschemann-Witzel, Varela & Peschel, 2019; Elzerman et al., 2011). In order to promote a more sustainable diet with plant-based alternatives instead of animal-based products as a protein source, more information is needed about the possible barriers, expectations and possibilities (Michel et al., 2021).

Consumers have an increasing interest in plant-based dairy alternatives (Moss et al., 2022). Plant-based dairy alternatives are considered to be more sustainable and ethical alternatives to conventional dairy (Schiano et al., 2020; Clark & Bogdan, 2019). In the study by Moss et al. (2022), consumers were found to associate plant-based dairy alternatives with health benefits and sustainability. More than half of the population has already tried a plant-based dairy

alternative, with as main reasons trying out a food trend, health beliefs, animal welfare and allergies (Baptista & Schifferstein, 2023). Consumers who are willing to include dairy alternatives in their diet, seem to do this out of curiosity, a willingness to experiment and try new flavours, and wanting to diversify their diet (Adamczyk et al., 2022). Despite the growing interest, there are still some barriers for the acceptance of dairy alternatives (Hartmann & Siegrist, 2017). Consumers do not plan on giving dairy products up completely in favour of plant-based alternatives, according to Adamcyzk et al. (2022). The sensory properties (appearance, taste and texture) are important for influencing the purchasing decision and acceptability by the consumer (Conti-Silva & De Souza-Borges, 2019; Elzerman et al., 2011). The main barriers to substitution with plant-based dairy alternatives are product novelty, the lower sensory attractiveness of the alternatives, and the negative perceptions of the taste, texture, price and artificiality (Aschemann-Witzel et al., 2020; Hoek et al., 2011; Schösler, De Boer & Boersema, 2012; Weinrich & Elshiewy, 2019). The texture and mouthfeel of plant-based dairy alternatives have been shown to not be well-appreciated by consumers (Sethi et al., 2016; Tangyu et al., 2019). By minimizing the barriers that are currently encountered by consumers when it comes to plant-based dairy alternatives, the acceptability of these alternatives can be increased.

1.3 Children's perception towards plant-based dairy alternatives and their role in food consumption choices

Even though their parents make the final food purchase, children have a great influence on food choices (Carnell et al., 2011; Harris et al., 2020; Holsten et al., 2012; Nørgaard et al., 2007). Between the ages of 7 to 11 years old, children start to develop more sophisticated attempts to influence food consumption choices. They start to bargain, compromise and persuade their parents by means of interaction in order to negotiate for products they want (John, 2008). Children participate in a family purchase process by providing ideas and suggestions and by communicating about their food preferences (Dikčius et al., 2019; Holsten et al., 2012; Nørgaard et al., 2007). If children assist parents in a store, they might serve as information collectors and price checkers, pick products for routine purchases and address alternative options (Dikčius et al., 2019). As likes and dislikes of children can motivate and explain food choices in the family (Holsten et al., 2012; Scaglioni et al., 2018), it is important to understand their perceptions towards plant-based dairy alternatives.

The study by Palacios et al. (2010) looked into the degree of acceptability of a variety of milk and milk alternatives. They found that older children were less likely to accept a replacement of non-dairy milk alternatives (Palacios et al., 2010). The study by Schiano et al. (2021) found that consumers, especially younger consumers, may lack the basic dairy processing and composition knowledge needed to make judgments about the healthiness of dairy and dairy alternatives. However, research on children's perception towards and acceptance of plant-based dairy alternatives is lacking. Research about plant-based food alternatives in general showed that taste is important for plant-based foods to be accepted (Colombo et al., 2021). In focus group discussions with children aged 11 to 15, it was found that children thought plant-based dishes should be seasoned better and that plant-based dished that resemble animal-based foods were preferred (Colombo et al., 2021). Pressure from peers and eating habits were found to influence their perceptions towards plant-based foods (Colombo et al., 2021). The question remains whether taste and resemblance to the 'normal' product also play a role in the acceptance of plant-based dairy alternatives among children. Next to that, it is unclear whether children possess sufficient knowledge about plant-based dairy products and how this

influences the formation of their perceptions towards plant-based products and their packaging.

Understanding children's perceptions towards plant-based dairy alternatives is important for their influence on the consumption patterns of families. Because of the lack of research on children's perceptions towards plant-based dairy alternatives, it is important that this will be explored.

1.4 Influence of a product's packaging on the perception

A product's packaging is an essential component of the marketing strategy in the food industry (Hawkes, 2010). The packaging does not only fulfil its basic functions related to containment, protection and convenience anymore (Pal et al., 2019). Food companies invest large amounts of money on package design (Spence, 2016). Food packaging has also received increasing attention in the context of children's eating patterns, as the food industry also targets products at children (Hawkes, 2010).

In a study among parents, it was found that 62 percent of the parents agreed that their children's product preferences are influenced by product packaging (Ogba & Johnson, 2010). Half of them indicated that they think the preferences are influenced by bright colours, whereas the other half agreed that product specific characters on the packaging play a role (Ogba & Johnson, 2010). Another study by Pires & Agante (2011) found that presenting a product in a fun packaging has a significant impact on children's purchase intention. They found that a colourful and fun packaging is more appealing to children.
Next to colour and visuals/cartoons, food companies often use textual and visual cues (e.g., claims, logos) to distinguish from competitors and to help consumers categorize and evaluate products (Chandon, 2012; Christoforou et al., 2018; Van Buul & Brouns, 2015). Another element of the packaging that influences consumers' product evaluation and perception is the product's name or description (Bryant & Barnett, 2019; Irmak, Vallen & Robinson, 2011).

In conclusion, many elements of the packaging have been shown to influence consumer perceptions towards the product: the colour, the claims, the product name and visuals/cartoons. However, not many studies have yet been conducted with children or have focused on the role of packaging of plant-based dairy alternatives. So, knowledge is lacking regarding the perception that children form of plant-based dairy alternatives through seeing the packaging. With this knowledge, it might be possible to stimulate children towards accepting and consuming more plant-based dairy alternatives and with that stimulate the protein transition.

1.5 Objective and research questions

This study aimed to get insights into the influence of the packaging of plant-based dairy alternatives on the perception of 8- to 10-year-old-children towards plant-based dairy alternatives. The packaging of a plant-based dessert was used for this research. Desserts were chosen as case product in this research, as the dessert/after a hot meal is a typical moment for a Dutch consumer to consume dairy (Van Aerde et al., 2012). When Dutch consumers eat a dessert, more than half (65 percent) of them choose to consume dairy (Borgdorff-Rozeboom, 2013). Desserts are important to the total consumption of dairy among Dutch consumers. Next to that, the 'voedselconsumptiepeiling' shows that children eat more 'vla, pap, pudding, mousse' (typical Dutch desserts) compared to adults (VCP, 2021). Given the fact that a lot of

dairy is consumed for dessert, especially among children, plant-based desserts seemed suitable as case product for exploring children's perceptions of plant-based dairy alternatives. In order to come to a better understanding of the influence of the packaging on the perception, the main research question was 'How does the packaging of plant-based dairy alternatives influence the perception of 8- to 10-year-old children towards plant-based dairy alternatives?'

The literature search helped to identify several important elements of the packaging, such as the colour, product name, claims and cartoons/other visuals. Based on that, the following sub-research questions were formulated:

1. How does the colour of the packaging influence children's perception towards plant-based dairy alternatives?
2. How do claims on the packaging influence children's perception towards plant-based dairy alternatives?
3. How does the product name influence children's perception towards plant-based dairy alternatives?
4. How do other visual elements of the packaging influence children's perception towards plant-based dairy alternatives?

2 Theoretical background

2.1 Plant-based dairy alternatives

Nowadays, an increasing amount of plant-based dairy alternatives is available on the market (Schiano et al., 2022; Baptista & Schifferstein, 2023; Vaikma et al., 2021). In recent years, plant-based alternative dairy sales have increased (McCarthy et al., 2017; Schiano et al., 2020; Schiano et al., 2022; Boaitey & Minegishi, 2020). Those include, amongst others, alternatives to milk, yogurt, cheese, ice cream, butter and coffee creamer (Schiano et al., 2022; Adamczyk et al., 2022; Plamada et al., 2023). Plant-based dairy alternatives can be divided into five categories based on their primary ingredient, including cereal-based (oat and rice), legume-based (soy and pea), vegetable-based (potatoes), seed-based (flax and hemp) and nut-based (almond, cashew and coconut) (Bridges, 2018; Sethi, Tyagi, & Anurag, 2016).

In general, plant-based dairy alternatives are nutritionally inferior to cow milk (Plamada et al., 2023; Clark, Pope & Belarmino, 2022). Plant-based dairy is less consistent in its provided nutritional energy compared to cow milk, as plant-based dairy's quality is dependent on different brands and raw materials (Petraru, Ursachi & Amariei, 2021). Next to that, plant-based dairy alternatives are lower in protein content and animal proteins have a higher nutritional quality and greater digestibility. Only soy-based milk presents a protein content comparable to milk protein content (Bocker & Silva, 2022). Compared to dairy, plant-based milk alternatives contain less of certain minerals and vitamins, such as calcium, magnesium, vitamin D and B12 (Silvia, Silva & Ribeiro, 2020; Craig & Brothers, 2021; Bridges, 2018). Therefore, plant-based dairy alternatives are often fortified to improve their nutritional value (Silvia et al., 2020; Bridges, 2018).

The marketing and messaging of plant-based dairy alternatives often emphasize sustainability, commitment to the environment, elimination of 'unnatural foods' or the ethical treatment of animals, which might give them an advantage over conventional dairy products (Schiano et al., 2020; Franklin-Wallis, 2019; Crawford, 2020). On-package, in-store and digital media marketing for plant-based dairy alternatives emphasize how these products are distinct from dairy to address these consumer concerns, while similar enough to deliver what consumers expect and to serve as a right replacement (Fuentes & Fuentes, 2017). This messaging indicates that these products are ethical/socially conscious alternatives to traditional dairy (Fuentes & Fuentes, 2017). In general, consumers are biased towards believing that plant-based alternatives are more sustainable than their dairy counterparts (Schiano et al., 2020). It is advantageous that these plant-based dairy alternatives can be derived from a wide variety of plant sources, including seeds, nuts, legumes, cereals and plants (Mäkinen et al., 2015). Driven by the need to feed the growing world population, this variety of protein ingredients and sources is demanded (Balandrán-Quintana et al., 2019; Jeske et al., 2018). However, more research on consumer perception towards these plant-based dairy alternatives is needed.

2.2 Children's perception on food

The likability and preference of children play a big role in influencing whether children eat certain (healthy) foods (Guinard & Marty, 1997; Guinard, 2000). Children's preferences for a food can be influenced by the food itself (Atik & Ertekin, 2011). Especially the taste of the food is an important factor influencing children's food preferences (Jonsson et al., 2005; Elliott, 2009; Taylor, Evers & McKenna, 2005). Children may reject a product because of its taste and may be unwilling to consume a product solely for its health benefits (Swanson, Perry & Garden, 2002; Pagliarini, Gabbiadini & Ratti, 2005).

The food industry also plays an important role in shaping eating/consuming habits, through different marketing channels (Harris et al., 2009). With the increased use of internet among children and teens, online media and other communication tools and marketing practices are playing a bigger role in promoting food and beverage products to children and teens (Montgomery & Chester, 2009; De Pelsmaeker et al., 2013). Next to marketing, children learn the skills, knowledge and attitudes relevant for consumption through social agents, such as their family, school and peers (John, 1999; Nelson & McLeod, 2005). Social factors, especially parents, have a big influence on children's eating patterns and food preferences (Atik & Ertekin, 2011).

Children's perception on food is influenced by the food itself, the food industry and social factors. However, the question remains whether that also applies for plant-based dairy alternatives.

2.2.1 Children's perception towards (plant-based) dairy

Because of the lack of research available on children's perception and acceptance of dairy and plant-based dairy alternatives, a study was conducted in order to understand children's preferences for dairy and dairy alternatives (Palacios et al., 2010). The study was conducted among schoolchildren aged 8 to 16 years old of different ethnicities, and aimed to assess the degree to which participants accepted a variety of milk and milk alternatives (Palacios et al., 2010). It was found that the older children showed a lower acceptance of non-dairy milk alternatives, but a higher acceptance among the younger children was found. Apparently, younger children will accept the replacement of milk with non-dairy milk alternatives more readily (Palacios et al., 2010). The study by De Pelsmaeker et al. (2013) found that a huge majority of children prefer cow's milk over soy and rice milk. Another study found that the majority of youth (94%) with a median age of 11 indicated to consume dairy products, while 47% consumed non-dairy alternatives such as soy, almond or other plant-based alternatives (Perttu et al., 2021).

As described, some studies are available on the consumption patterns and preferences of children regarding (plant-based) dairy. However, there is still a lack of research on children's perception towards plant-based dairy, especially towards plant-based desserts.

2.3 Packaging and the role of the different elements

Food packaging is an important marketing tool (Hawkes, 2010; Pal et al., 2019; Spence, 2016). Packages reach consumers at two critical moments, namely at purchase and at consumption (Chandon, 2012). Consumers make many in-store, impulsive buying decisions, especially for low-involvement products such as food and drinks (Friese, Wänke & Plessner, 2006). The food package gives consumers information to attend and consider in their decision-making process (Ares et al., 2013; Otterbring et al., 2013; Piqueras-Fiszman et al., 2013; Rebollar et al., 2015). Information that is presented on the front-of-package (FOP) can get attention accidentally, whereas information on the back-of-package requires top-down attentional processes (Grunert, 2016; Pieters & Wedel, 2004). Most consumers only look at FOP features to form their perception, and only few consumers will flip packages to actively look for information (Varela et al., 2014; Machín, et al., 2020). Given the increasing importance of healthiness and sustainability for many consumers, package design is increasingly used as a marketing tactic to make products seem healthy or sustainable (Hallez et al., 2023).

2.3.1 Colour

Colours are often seen as one of the most influential visual packaging cues, which fulfil both aesthetic and symbolic functions (Kauppinen-Räisänen, 2014). The main goals are drawing attention to the product by making the packaging more attractive and influencing product perceptions by letting colours trigger associations and meanings in people's minds (Spence & Velasco, 2018).

The temperature of the colour can influence the meanings that are associated with the colour (Fenko et al., 2010). Cool colours, such as green and blue, are typically associated with nature, feelings of calmness and relaxation, and typically linked with sustainability (Clarke & Costal, 2008; Shi, 2013; Singh & Srivastava, 2011). These colours may cause products to be perceived as healthy and sustainable (Hallez et al., 2023). In contrast, warm colours, such as red and orange, are associated with feelings of excitement and physical arousal (Clarke & Costall, 2008; Singh & Srivastava, 2011). In a study by Schuldt (2013), it was demonstrated that green colour on a food packaging was interpreted as an indication of food healthiness. The participants perceived a candy bar as healthier when it had a green rather than a red calorie label, despite the fact that the labels conveyed the same calorie content (Schuldt, 2013). Another study tried to identify what colours can best be used in plant-based hamburgers to influence consumers' perceptions positively (Da Fonseca et al., 2023). Green was found to be correlated with nature and health, and better nutritional value. A warm colour was found to increase attention to the product and stimulate hunger. Neutral (white) colours can also be considered according to this study, as this colour was correlated with product quality (Da Fonseca et al., 2023). Next to that, colour evokes product associations and category imageries (Aslam, 2006). In the USA, blue is associated with healthy foods, dairy foods and desserts, red is associated with meat and pizza, silver with dairy foods, green with healthy foods, vegetables and yellow with dairy, healthy foods and desserts (Adams & Osgood, 1973).

The colour of the packaging can also give consumers expectations about the flavour (Downham & Collins, 2000). Food colour affects consumers' ability for correctly identifying flavour and forming distinct flavour profiles and dominates other flavour information sources, including labelling and taste (Garber et al., 2000). In a study by Tijsen et al. (2017), it was found that brighter packages were associated with more creamy products (dairy drinks). This association between higher brightness and creaminess seems reasonable, considering that creaminess is a fundamental characteristic of dairy products, which are typically light or white coloured (Antmann et al., 2011). In the study by Ampuero & Vilà (2006) was found that products with a high price that are directed to the upper classes require cold, dark coloured (mainly black) packaging. In contrast, accessible products that are directed to price sensitive consumers require light (mainly white) packaging (Ampuero & Vilà, 2006).

Studies among children have shown that a colourful packaging can make a product more appealing to children (Pires & Agante, 2011; Marshall et al., 2006). The question remains whether the same applies for packaging of plant-based products and which associations with colours exist among children.

2.3.2 Claims

Food companies often use textual and visual cues on food packages to raise health-related associations, advertise their products and set them apart from their competitors (Christoforou et al., 2018; Van Buul & Brouns, 2015). Claims are verbal elements that 'state, suggest or

imply that a food has favourable characteristics, for example related to its nutritional value, production, processing, composition or any other quality (Hallez et al., 2023; European Commission, n.d.). Claims are typically short and simple, and can therefore be processed quite easily and act as heuristics during decision-making (Hallez et al., 2023).

A nutrition claim refers to the nutrients a food contains, whereas a health claim refers to a health effect a food may confer (Collins & Lalor, 2023). People use claims to categorize products and evaluate them on (un)related attributes (Chandon, 2012). Two types of health claims exist, namely 'enhanced function' claims that relate to the consumption of a food (component) that contributes beneficially to health and 'reduced disease risk' claims that relate to the consumption of a food (component) that helps to reduce the risk of a specific disease (Van Kleef, Van Trijp & Luning, 2005). As people react more positively to positive than negative framing, enhanced function claims might be more appealing to the consumer (Van Kleef et al., 2005). However, the study by Ares et al. (2009) found that consumers showed the same attitude towards both types of claims.

Claims regarding protein content, environmental impact and health benefits have been found to increase consumers' willingness to purchase plant-based products (Carvalho et al., 2022; Folkvord et al., 2020; Grasso et al., 2022; Krpan & Houtsma, 2020; Martin et al., 2021; Piester et al., 2020; Ye & Mattila, 2021). In a study in which 137 plant-based meat substitute products were studied, was found that 80% of the products included the claim vegetarian, vegan, plant-based or meat-free (Curtain & Grafenauer, 2019). More than 60% of the products made a nutrition content claim regarding protein, such as 'high in protein' or 'plant-based protein' (Curtain & Grafenauer, 2019). Apparently, these claims are often used for plant-based products.

In the dairy sector, nutrition claims that relate to the fat content are dominating (Krystallis & Chrysochou, 2011). Brands with low-fat claims perform better in the market in comparison to their high-fat counterparts (Krystallis & Chrysochou, 2011). In a study conducted by Van Trijp & Van der Lans (2007), consumer perceptions were investigated by presenting various claims in the context of an actual food product, namely yoghurt. Content claims (mentioning how much or what ingredients a product contains) were being identified as the most credible according to consumers. Schiano et al. (2020) found that consumers primarily make sustainability judgements about dairy products when reading product labels at point of purchase. However, many also indicated that they did not fully understand sustainability- and ethics-related claims (Schiano et al., 2020). In a study in which plant-based dairy beverages were studied, was found that almost 90% of the products contained a nutrition claim (Pérez-Rodríguez et al., 2023). Most often used were 'no added sugars', 'source of calcium' and 'enriched with vitamin D' (Pérez-Rodríguez et al., 2023). Products marketed with nutrition and health claims are usually regarded healthier by consumers (Pérez-Rodríguez et al., 2023).

However, the abovementioned studies have predominantly discussed the most used claims on packages, but did not look into the effect that the claims have on consumers' perception and acceptance of these products. Research is lacking on the influence of the claims on the perception and which claims are the most appealing to children, especially when it comes to plant-based dairy alternatives.

2.3.3 Product names and descriptions

Research has shown that variations in product names and descriptions can influence consumers' product evaluations, preferences and consumption (e.g., Bryant & Barnett, 2019; Irmak, Vallen & Robinson, 2011; Papies et al., 2020; Turnwald, Boles & Crum, 2017; Wansink, Van Ittersum & Painter, 2017). Using sensory and hedonic claims that are more indulgent product descriptors (e.g., rich, sweet, spicy, crunchy) have been shown to be better drivers of preference and acceptance than environmental and health claims in several food categories, among which vegetables and insects (Park et al., 2022; Turnwald et al., 2017; Deroy, Reade & Spence, 2015; Papies et al., 2020; Turnwald & Crum, 2019; Turnwald et al., 2019). Sensory and hedonic claims were also found to increase the perception of meat eaters towards the attractiveness of plant-based foods (Papies et al., 2020).

Plant-based alternatives packages have several often used product descriptors, such as 'veggie', 'vegan', 'plant-based' and 'meat alternative' (Sucapane, Roux & Sobol, 2021). In the study by Sucapane et al. (2021) was found that the use of descriptors that focus on 'plants' (i.e., plant-based) compared to 'meat' (i.e., meat alternative) positively impacted perceptions of healthiness and eco-friendliness and negatively impacted predicted quantity consumed. Considering that familiarity and convenience are important for consumers to replace animal products, the use of traditional terminology may be important (Graça, Godinho & Trüninger, 2019). In a study by Marshall, Bano & Banas (2022), it was shown that vegetarian dishes with names related to traditional dishes (e.g., 'cauliflower steak' or 'vegetable kebab') were preferred over dishes with more neutral names (e.g., 'cauliflower slice' or 'vegetable skewers'). The sample (n=156) of this study consisted of predominantly university students, from which most reported to follow an omnivorous diet (n=96) (Marshall et al., 2022).
On the one hand, plant-based names can have a positive impact on consumption (Sucapane et al., 2021). On the other hand, a name that is more related to the substitute product might be more appealing (Graça et al., 2019). This reveals a gap in research, together with the research gap regarding children's preferences for the product name for a plant-based dairy alternative.

When it comes to plant-based dairy alternatives, food business operators are not allowed to use protected dairy terms, which are laid down in Annex VII of Regulation (EU) 1308/2013. This regulation prescribes that all dairy terms such as milk, butter and yogurt are exclusively for milk and milk products, so dairy alternative products cannot be referred to with those names (European Parliament and Council, 2013). Protecting consumers from misleading and ensuring that consumers can clearly distinguish products are the main reasons for limiting the names of dairy alternatives (Leone, 2019). However, research now suggests that using dairy terms on plant-based products does not mislead, but helps consumers that are looking for plant-based products to identify which might serve as an alternative to conventional dairy products (Domke, 2018;). Terms such as 'alternative for cheese' and 'variation to milk' are therefore often used for plant-based products (Van Dinther, 2021). Despite this, the challenge for product developers of plant-based products remains to come up with names that are attractive to consumers without using these protected terms (Menelik, 2023).

Given the limited research available on consumer perception of a product name that indicates what the product serves as an alternative for and on children's perception of product names for plant-based products in general, this study aimed to explore children's perception towards the name for a plant-based dessert.

2.3.4 Cartoons and other non-textual visuals

Food industry increasingly targets children by targeting their marketing towards them (Elliot, 2014). Fun packaging with cartoons and visuals are used for products targeted at children (Elliot, 2014; Chapman et al., 2006). According to Elliot & Truman (2020), cartoon characters, including licensed cartoon characters, brand mascots and non-cartoon characters from TV or movies, are frequently used for these products. Children may create emotional bonds with the cartoon characters, which encourages them to mimic their behaviour (Lemish, 2006). Therefore, using cartoon characters is expected to create emotional associations, encouraging children to request the products from their parents (Ares et al., 2022). Familiar characters, linked to TV programs, movies or games, are expected to have a stronger influence than unfamiliar characters (Lemish, 2006; Arrúa et al., 2017; Velázquez et al., 2021). However, unfamiliar characters have also been shown to influence children's associations and perception (Enax et al., 2015). The inclusion of unknown cartoon characters (e.g., a green dinosaur on a strawberry yogurt label and a bear on a sponge cake label) were shown to raise associations related to fun (Arrúa, Vidal et al., 2017). According to De Droog, Buijzen & Valkenburg (2012), using unfamiliar characters can even be as effective as using familiar characters if they are congruent with the product, from a conceptual point of view (e.g. a rabbit on a carrots packaging) or from a perceptual point of view (e.g., an orange rhino on a carrots packaging).

Important to take into consideration is that the effect of cartoon characters on food preferences is expected to be larger for younger children, as the ability to differentiate cartoon characters increases with age (Valkenburg, 2004). Older children are more negative about the inclusion of the characters, as they might regard them as 'too childish' (Elliot, 2009). According to Ares et al. (2016), the effect of cartoon characters on children's preferences was larger for 6-9 year-olds compared to 10-12 year-olds children.

Another thing that can be done is using the entertainment potential of packaging, such as the inclusion of games on the back of cereal boxes (Pires & Agante, 2011). The study by Lorestani & Khalili (2019) reported that the inclusion of games in food packages had a positive influence on children's and parents' purchase intentions.

Adding a picture to a package can also result in sales increase (Underwood & Klein, 2002). In a study by Underwood, Klein & Burke (2001) was found that designing packages with product images can gain attention for brands, especially brands that are less familiar and that provide experiential benefits. Increased attention might increase sales by making the brand enter the consumer's consideration set. The package pictures can also create more enjoyable aesthetic experiences for the consumer, leading to better impressions of the product (Underwood & Klein, 2002). A product picture helps the consumer to spontaneously imagine how a product looks, tastes, feels, smells or sounds (Underwood & Klein, 2002).
A growing number of studies have shown that depicting food products on the packaging elicits sensory associations related to the texture, appearance and taste (Miraballes et al., 2014; Rebollar et al., 2017; Rebollar et al., 2019). However, an image can be ambiguous and evoke many interpretations in the mind of the consumer (e.g., the image of a strawberry on a yogurt package can be interpreted as meaning that the yogurt is made with strawberries, that it has strawberries on it, that it has strawberry flavour, etc.) (Gil-Pérez, Rebollar & Lidón, 2020). Pictures of fruit on food packages that contain little or no fruit may create a false impression of the food and its health benefits for the consumer (Underwood & Ozanne, 1998).

It can be concluded that cartoons and visuals/pictures can be helpful in creating a packaging that is appealing to children. However, it is important to take into consideration that rules exist regarding the use of cartoons to make products more attractive to children. Cartoons aimed at children up to the age of 6 years are not allowed on packages. Cartoons aimed at children aged 7 to 12 years are only allowed if the food product meets the 'voedingskundige criteria' (can be found in Appendix 1) (Stichting Reclame Code, 2019). Even though extensive research exists on the use of cartoons and visuals in packages, there remains a gap in understanding their role in the context of plant-based dairy alternatives.

2.4 Conceptual model

During the literature search, it was found that several factors influence consumers' perception of the packaging of the plant-based product, such as the colour, claims, product names and cartoons/other visuals. The packaging of the plant-based dairy alternative might influence the perception towards the plant-based dairy alternative, which influences the acceptance of this alternative. Based on that, the following conceptual model was visualized.

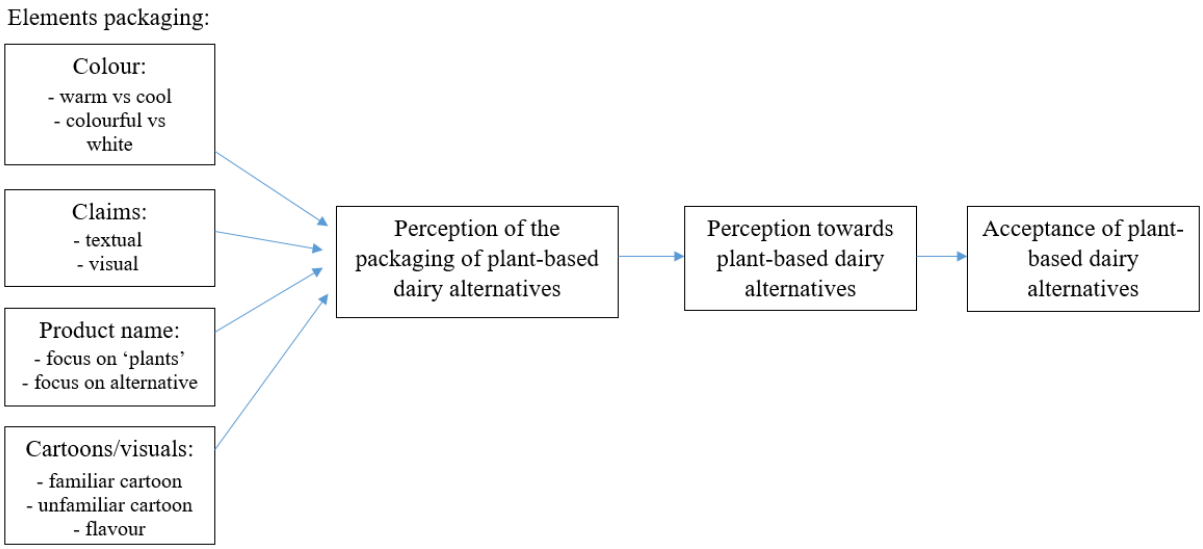

Figure 1. Conceptual model of the influence of the packaging on the perception towards plant-based dairy alternatives

3 Method

3.1 Introduction

In order to get insights into the influence that the packaging has on the perception of children towards plant-based dairy alternatives, qualitative research was conducted. For this research, children were involved in the co-creation of a packaging for a plant-based dessert, which was the case product of this research. A dessert was chosen as the case product for this research, as it is expected that children often want to be/are involved in the decision-making for the dessert. Isler et al. (1979) examined the location, types and frequency of products that children aged 3 to 11 years requested from their mothers. Food accounted for more than half (54%) of the total requests made by children, and most of that included snack/dessert foods (24%). Next to that, the 'voedselconsumptiepeiling' shows that children eat more 'vla, pap, pudding, mousse' (typical Dutch desserts) compared to adults, namely on average 25.5 g/day and 21.1 g/day respectively (VCP, 2021). Desserts were therefore expected to be an interesting product for this study. After the co-creation of the packaging, interviews with the children were conducted. The interviews were held in groups of two children and the researcher. However, as children did focus on answering the questions about their own packaging and were not having interaction and discussions with each other, the data was considered interview data (and not focus group data).

3.2 Target group & recruitment

This research was aimed at getting insights into the influence of the packaging of plant-based dairy alternatives on the perception of children in the Netherlands towards these products. Only children speaking Dutch were included, as the packages that they co-created included claims in Dutch. Based on literature (John, 2008; Colombo et al., 2021), suggesting that children from a certain age start to attempt to influence the consumption choices of their parents, it was decided to include children from the ages of 8 to 10 years old. For this research, no genders were excluded. However, the aim was to include an equal amount of the different genders to get a sample that is as diverse as possible.

The participants were recruited by contacting a primary school in the Netherlands. It is a public school in Noord-Brabant, in a relatively small city called Oss. The children were provided in class with a printed file in which the research was explained, as well as a part where the parents could indicate whether they gave permission for their child to participate in the research. Next to the permission, parents were also asked to fill in two questions about the frequency with which the child consumes desserts and about the types of desserts. The answers to these questions were not meant to lead to the exclusion of a child, they just served as additional information for the researcher. The children did take the printed file home with them and were asked to return it when their parents agreed and signed the file. The aim was to get a sample of around 15 children. Only one class (which consisted of 24 children) was handed out the forms for participation. From those 24 children's parents, eventually 14 signed the form, leading to a sample size of 14. The participants were included based on their willingness to participate.

3.3 Procedure

For this research, participants were asked to co-create the packaging of a plant-based dessert. They did the co-creation in a couple with one of their classmates, with the aim of helping

them to feel more relaxed and to get to know the researcher. Next to that, it was expected that the co-creation of the packaging itself would also make the children feel more comfortable, as they then have something to do (Barton, 2015). That is one of the advantages of using an elicitation method, and therefore the co-creation was used as an elicitation method. The created packages were not used as primary data source, and were not analysed in detail. Elicitation techniques are a category of research tasks that use visual, verbal or written stimuli to encourage participants to talk about their ideas (Gubrium & Holstein, 2001; Barton, 2015). Especially while working with children this can be useful, as communication can be a barrier when conducting research with this target group (Pyle, 2013). Participatory, visual research provides opportunities to overcome such 'communication difficulties' (Clark, 2010). Instead of solely relying on traditional methods (like interviews or surveys), these methods involve more interactive and visually-oriented ways to gather information, which can open up conversations with the researcher (Clark, 2010). Co-creation of the packaging might be helpful in getting children to talk.

Before children were instructed for the co-creation of the packaging, the researcher talked with them about their knowledge regarding the definitions of vegan/plant-based. It is important to learn about their knowledge, before asking them to create a packaging for such a product. After the children expressed their knowledge about the concept, the researcher provided them with a definition of plant-based/vegan/without cow milk/alternative to milk in order to make sure that all children had equal knowledge about the dessert for which they were going to create a packaging. This explanation was formulated in such a way that the children were not steered in a direction (e.g., telling it is more sustainable). Then they were instructed for the co-creation of the packaging. They were told that they may design a packaging for a plant-based dessert and that the plant-based dessert has to be a yogurt/'vla' type of dessert. They were also told that the flavour was up to them to decide. The dessert was a packaging which contains four smaller portions, so for such a product they were asked to design the packaging (see Figure 2).

For the co-creation of the packaging, the children did not have to create the packaging from scratch. They were provided with a 'sleeve' as well as with several elements that they could use. The 'sleeve' is the cardboard that is wrapped around the four smaller dessert potions, similar to the example in Figure 2. They could choose a colour from a choice set, which will serve as the basis of the front of the packaging (in the right size). Glue was provided so they could put the colour on the packaging. They were also provided with a selection of claims (cut-out in advance). The options they received for the colour and claims can be found in Appendix 2. During the instruction, they were told to pick one colour for the basis and to pick at least one claim from the selection of claims presented to them.

Figure 2. Alpro vanilla dessert

The selection of colours was decided based on literature suggesting that cool colours such as green and blue might be appropriate, but that children may also prefer colourful packages (Pires & Agante, 2011; Marshall et al., 2006; Clarke & Costal, 2008; Shi, 2013; Singh & Srivastava, 2011; Hallez et al., 2023). White and brown were also included to give participants a broad variety to choose from. The chosen claims were partly based on looking

at packages of plant-based products in the supermarket, from which a selection was made. The selection of claims was also partly based on the literature, indicating that fat-, sugar- and protein-content claims are often used (Krystallis & Chrysochou, 2011; Curtain & Grafenauer, 2019; Pérez-Rodríguez et al., 2023). Next to that, plant-based alternatives were found to often include claims as vegetarian, vegan or plant-based (Curtain & Grafenauer, 2019), so these were included as well.

The children were instructed to create their own visuals and to come up with a product name by themselves. For the visuals, the researcher brought a laptop, so the children could ask for pictures or inspiration when they did not know how to draw something or what something looked like. The children were provided with pencils and pens in different colours and were free to use their own creativity. Selection of cartoons was difficult without steering children in a direction (e.g., using a picture of a strawberry) and limiting them. Cartoons were also difficult to choose beforehand, as it is hard to determine whether they are familiar or unfamiliar to children. Therefore, children were asked to draw cartoons and other visuals by themselves.
The co-creation and the interviews took place in a separate room. After finishing the co-creation, the children were asked (in their duo) questions regarding their choices for the created packaging.

For both parts of the interview, semi-structured interview guides were used, which can be found in Appendix 3. Semi-structured interviews are a mix of structured and unstructured interviews (Alsaawi, 2014). In such an interview, the questions are mostly pre-planned prior to the interview, however there is also room for the interviewee to elaborate and explain due to the use of open-ended questions (Alsaawi, 2014). So, by using a semi-structured interview guide, there was aimed at getting as much consistency as possible between the interviews without losing the room for discussion and additional questions. In the interviews, participants were asked to explain the choices that they made for their created dessert packaging.
The interviews were recorded, and took up to a maximum of 30 minutes to make sure that the children did not lose their focus/attention. After the interview, the children got a package of the plant-based Alpro dessert as a reward. They could put their own designed packaging around it and take it home with them. The researcher took pictures of the packages they created, so it could be used as additional information during data analysis.

3.4 Pilot

Before conducting the interviews that were used to answer the research question, a pilot study was conducted to highlight problems that would otherwise have been encountered during these interviews. Next to that, the aim of the pilot was that it would help to learn about whether everything went well during the co-creation and whether that needed adaptations. By conducting this pilot, the expectation was that it could be checked whether the assignment of creating the packaging was clear for children and whether the interview guide needed adaptations. The pilot was also conducted to get insights on whether the outcomes would help answering the research questions, so if the method worked as planned or as was intended.
The pilot was conducted with an 8-year-old boy who was already familiar with the researcher in advance. The pilot went well. The pilot showed that the concept of vegan was quite difficult for the participant to understand, so it is important to make sure that the participants understand the concept before continuing. Knowledge about this concept might differ between participants, so being aware of this during the data collection is important. The participant did understand the assignment well and created an interesting packaging. Asking

questions in the second part of the interview also went well. However, it became clear that the interview guide was more a helpful tool and a reminder of what questions to ask. It was hard to stick to the interview guide, but questions did come naturally during the conversation. This is not a problem, but an interesting finding from the pilot. Based on this, the interview guide was critically evaluated one more time, and some notes were added (subjects that give the interviewer reminders during the interview guide and subjects the interviewer should not forget).

During the pilot interview, the participant indicated clearly that the choice of the claims was mostly based on the fact that the claim should contain a picture and not 'just text'. That was an interesting note, so based on that and the literature, it was decided to include a bigger variety of visual claims (next to the textual claims). Children's judgements and behaviours more strongly rely on visual cues compared to adolescents and adults, as their cognitive skills are not fully developed yet (Hallez et al., 2020). The pilot helped shedding light on this topic, leading to the decision to include more visual claims. The answers the participant gave during the pilot interview were found to be interesting and are expected to be helpful in answering the research question. So, overall the research method seemed to be suitable for the research (question).

3.5 Data analysis

The recorded interviews were transcribed. The transcribed interviews were analysed by the means of coding. The program that was used for the coding is ATLAS.ti. Most of the codes were made beforehand in order to make sure that the right and relevant information was gathered from the transcriptions. This is called deductive coding. Some codes were added during the coding and based on the data, which is inductive coding. Codes were made in order to be able to organize and understand the data received from interviewing the participants. A codebook was made for this, which is an important means for documenting the codes and the procedures for applying them (Weston et al., 2001). Coding is the assigning of codes to the raw data (transcribed interviews), which allows researchers to engage in reduction and simplification of the data (DeCuir-Gunby, Marshall & McCulloch, 2010). Coding was used with the aim of making it easier to make connections between the answers of the different participants. For the four different categories of elements (colours, claims, product names and visuals/cartoons), different codes were developed.

The co-creation of the packaging, even though the primary goal was using it as elicitation method, also provided the researcher with some data. This data consisted of the packages that the children designed with the use of the elements (a picture of the created designs). With this data, a table was created showing the choices that participants made regarding the four different packaging elements. This helped the reader see per participant which choices were made, which was especially helpful where quotes of participants were included in the results section.

4 Results

4.1 Participant characteristics

All participants (n=14) were Dutch and lived in the Netherlands. They were all aged between 8 and 10 years old. The sample consisted of 8 girls and 6 boys. How often they eat desserts and what types of desserts is visualized in the table below. This information was filled in by their parents in the file that was handed out among the children.

Table 1. Participant characteristics

Partici-pant	**Age**	**Gender**	**Frequency eating dessert**	**Type of dessert**			
				Yoghurt	**Ice cream**	**Quark**	**'Vla', pap, pudding, mousse**
P1	8	Male	3-4 days/week	Yoghurt		Vanilla quark	
P2	8	Female	3-4 days/week	Yoghurt	Ice cream		'Vla', Smartie dessert
P3	8	Female	5-6 days/week	Arla/alpro fruit, lactose free, or vanilla yoghurt		Fruit quark	Danoontje
P4	8	Female	5-6 days/week	Yoghurt with fruit			M&M dessert
P5	9	Female	3-4 days/week			Quark	'Vla', rice pudding, Danoontje
P6	8	Male	3-4 days/week	Yoghurt	Ice cream		
P7	8	Female	3-4 days/week	Yoghurt		Fruit quark	
P8	10	Female	1-2 days/week		Ice cream		Pudding
P9	8	Male	Rarely				Twix dessert
P10	8	Male	3-4 days/week	Yoghurt	Ice cream		
P11	9	Female	1-2 days/week				White/milk chocolate dessert
P12	8	Female	3-4 days/week		Ice cream		Smartie dessert
P13	10	Male	1-2 days/week	Yoghurt			
P14	8	Male	5-6 days/week	Yoghurt			'Vla', chocolate mousse

Participants were also asked whether they were allowed to pick their dessert. The majority (n=13) indicated that they were (sometimes) allowed to make this decision or were involved in the decision-making, especially on weekends. However, one participant [P1] mentioned that he was not allowed to choose his dessert, as his mother wanted the family to eat healthy. This highlights that children indeed seem to have an influence on their parents' consumption choices for the dessert.

4.2 Pre-knowledge plant-based

Among this sample of participants was found that familiarity with and pre-knowledge about plant-based food was low. Only a few participants (n=5) did answer something else than 'no' when being asked about their knowledge regarding the terms plant-based and vegan. Most of the participants who indicated they were familiar with the term turned out not to have the right or not even an explanation of the term. They mentioned things like 'it is not chocolate,

but quark or something' [P1], 'I heard about it' [P7], and 'it has something to do with plants' [P9]. Only one of the participants mentioned a right explanation, namely about the fact that a plant-based dessert is one made without milk from a cow. This participant also turned out to be the only one who had tried a plant-based dessert before.

Overall, pre-knowledge regarding the term plant-based was found to be really limited among the sample. Only one participant seemed to know the right definition of the concept 'plant-based'.

4.3 Packaging and its influence on the perception of plant-based

The choices that participants made in their packages are visualized in the table below.

Table 2. Choices made for the packaging per participant

Participant	Colour	Claim	Product name	Cartoons and visuals
P1	White	VHC	Representing target group	Cartoon
P2	White	HC + VHC + PC + VPC	Representing flavour Representing plant-based character	Flavour
P3	Green	VPC	Representing flavour	Flavour + plant-based
P4	Blue	VPC	Representing flavour	Flavour + fun/nice
P5	Red	HC + VHC + PC + VPC	Representing plant-based character	Fun/nice
P6	White	HC + VPC	-	Type of product
P7	White	VPC	Representing target group	Fun/nice + flavour + type of product
P8	White	VPC	Representing flavour	Fun/nice + type of product
P9	Blue	HC + PC	Representing flavour	Type of product
P10	Red	HC + PC	Representing flavour	Type of product
P11	Green	PC + VPC	Representing plant-based	Fun/nice
P12	Green	VPC	Representing flavour	Fun/nice + flavour
P13	Green	HC + VHC + VPC	Representing flavour + plant-based	Flavour + plant-based
P14	Red	VPC	Representing flavour	Fun/nice + flavour

Footnote: HC = health claim, VHC = visual health claim, PC = plant-based claim, VPC = visual plant-based claim

In order to illustrate what the results of the co-creation looked like, an example from one of the participants is included in Figure 3. In this example, the choices that the participant made regarding the colour, claims, product name and visuals are visible.

Figure 3. Example of created packaging

4.3.1 Colour

When asked to explain their decision for the colour, participants came up with reasons related to their favourite colour, white being convenient for drawing and colours having a certain association for them. Some participants even came up with multiple different reasons to explain their choice.

More than half of the participants (n=8) mentioned to have chosen a certain colour for their packaging based on that colour being their favourite or a colour that they like. When asked whether the colour has any meaning or association to them, most of them did not come up with anything. Instead, they gave answers like ‘No, only because red is a beautiful colour’ [P5]. Only one participant [p14] mentioned that this favourite colour gave a feeling of happiness.

Four participants mentioned to have chosen white as the basis of their packaging, as white is convenient for drawing. They mentioned things like ‘You can see things better on white, you can draw on it what you want’ [P2] and ‘you can draw on it better’ [P7].

However, there were also participants that did have associations in mind with the colours they chose. The largest part of them (n=8) had an association in mind related to colour fitting with desserts in general or with the flavour of the dessert that they decided to make a packaging for. Especially an association between desserts and white seemed to exist among participants, as things like ‘a dessert packaging is often white’ [P6] were mentioned. Also some participants (n=3) associated their chosen colour with the flavour of the dessert, and indicated that therefore the colours are often used for a dessert. The colour red was associated with several types of fruit: strawberry, berries, raspberry and grapes.

Some participants (n=3) had associations in mind related to the colour and the plant-based character of the dessert, among which two had chosen green and one had chosen white. P2 indicated to have chosen green because of ‘a love’ for plants and animals and thinking that green shows that it is made with care for plants and animals. The other participant that chose green mentioned ‘I chose green because we make a plant-based dessert. Green fits with plants’ [P13]. P7 chose a white packaging and explained that in the following way ‘I think white fits a plant-based dessert as it exudes a sense of healthiness’.

So, colours for the packaging were chosen partly based on preferences for colours without a reason for it, but also partly chosen as certain associations with colours do exist in the minds of the children.

4.3.2 Claims

Regarding the explanations of the chosen claims, participants came up with reasons related to the healthiness of the dessert and related to the plant-based character of the dessert. There was one thing that stood out in the explanations of the choice. The majority of the participants (n=9) mentioned that it was important for them that the chosen claim included a picture/visual, so that it was not only textual. They indicated that was important for them because of the following reasons: ‘then it is clear for people what type of dessert it is’ [P5], ‘it is better and more fun for children’ [P7], and ‘then people can immediately see what it is’ [P8].

A lot of claims were chosen by participants based on the claim indicating something about the dessert related to healthiness. For half of the participants (n=7), healthiness seems to be important for the dessert or seems to be something that they associate with a plant-based dessert. One participant [P13] indicated to have chosen the vitamin and sugar free claim because ‘that is both healthy’. P5 indicated to have chosen the protein claim to show that the product contains a lot of protein, even though it is made without milk. Other participants associated plant-based desserts with healthiness by indicating ‘you can also eat this plant-

based dessert if you want to lose weight' [P2] and 'a plant-based dessert is not suitable for everyone, as most people want a dessert with sugar' [P6].

Next to that, many participants (n=7) chose claims based on the claim indicating something about the plant-based character of the dessert. Some participants (n=3) indicated that because they had to make a packaging for a plant-based dessert, they think it is important that they also show that it is one. Three participants also indicated that it is important that people know that the dessert is made without animal products, as they mention things like 'it is important to show that it is made from plants and not animals' [P8], 'that it is good for animals' [P10], and 'that this dessert is good for plants and animals' [P13]. One participant [P4] also mentioned that it is important that lactose-intolerant people can easily see that the dessert is suitable for them to eat.

The claims for the packaging were chosen for reasons related to health and the plant-based character of the product, but also based on whether they contain a visual.

4.3.3 Product name

Participants chose names indicating something about the taste, the plant-based character and the target group of the dessert. They came up with these names by themselves, but were later also asked what they would think of a plant-based name, such as 'alternative to yoghurt'. Some of the participants (n=5) chose a name related to the taste of the dessert or related to whom the dessert was for. They explained their choice by telling that they think it is convenient that people can immediately see what type of dessert it is and what the flavour is. One participant [P13] called it a 'kinderchoco-toetje', with as reason that it is meant for children and has chocolate flavour.

Three participants chose a name for their dessert that indicates something about the plant-based character of the product, such as 'Aardbei plantaardig' and 'plant-based toetje'. The explanations that they gave for that have to do with the fact that it is then immediately clear for the consumer that it is plant-based [P2, P5] and that it is just a funny name [P11]. P5 explained that a plant-based name was chosen, so 'people immediately know that it is a dessert that is good for plants and animals'.

However, when asked about their opinion regarding a plant-based name, there were also some participants (n=4) indicating that they would not prefer a name that refers to the plant-based character of the dessert. One of them indicates that the logos/claims on the packaging are clear enough already [P9]. Other participants mention things like 'I would prefer to call it *vla* if that was allowed' [P3], 'I think it is weird' [P4] and 'maybe then people think that is tastes like plants and vegetables' [P12]. These participants were not so positive about a plant-based term in the product name, as their perception of plant-based seemed to be something healthy, unlikable and not attractive.

Product names for the dessert were chosen mostly on the basis of the taste of the dessert, for who the dessert was meant, and on the basis of the plant-based character.

4.3.4 Cartoons and other visuals

Regarding the cartoons and other visuals that participants were free to draw on their packaging, was found that most were chosen based on the visual telling something about the product and its taste or just something nice/fun.

Many participants (n=8) did draw a visual representing the flavour of their dessert, e.g., fruits and chocolate. They explained that they preferred a visual of the flavour on the packaging to make clear what the flavour of the dessert is ('I want to make clear what the flavour is' [P9]). One participant indicated about it 'little children might not be able to read strawberry, so in this way they can see it' [P2]. Another participant even mentioned 'I want to make sure it is chocolate flavour, because otherwise people think it is healthy and made of plants' [P10]. Some participants (n=4) chose to draw something not representing the flavour, but the type of product, so for example to show that it is a plant-based product or to show that it is an ice-cream. Statements like 'I have drawn ice-cream as that is my dessert. People can immediately see what it is' [P6] and 'you do not want to come home and have something you did not want' [P7] were used to explain that choice.

However, there were also many participants (n=8) that drew something on the packaging that they consider nice or funny. Most of them indicated that they wanted something beautiful, happy or cheerful for the packaging. The packaging should be nice to see in order to make it more attractive for people to buy, e.g. 'Children should like the packaging and that is why I drew confetti on it, they will be happy when they see it' [P14], and 'If you always have the same packaging, it will get boring' [P5]. There was only one participant [P1] that did draw a cartoon on the packaging, with the explanation that it is some sort of superhero and that this dessert is supposed to make you strong.

Most visuals were chosen or drawn to represent the flavour of the desserts or the type of dessert, to make the packaging look better, but the inclusion of cartoons was really limited.

4.4 Perception towards plant-based

Participants seem to associate the concept of plant-based with positive aspects, such as healthiness and a good environment. Despite this, their perception towards plant-based desserts seemed to be quite negative.

Most participants (n=10) were found to have an association in mind between plant-based (desserts) and healthiness. Apparently, there is a belief among participants that plant-based desserts are healthy and do not contain (a lot of) sugar. One participant indicated that by saying 'I wanted to put on it that it is a plant-based dessert, so people know that this dessert is healthy' [P13].

There were also many participants (n=6) that mentioned something that indicated that they associate plant-based desserts with a good environment. They explain that by saying that plant-based is good for plants, animals, nature and the planet. Statements like 'It is made of good ingredients and good for the planet' [P1], 'it is a dessert that is good for plants and animals' [P5], and 'if children see a picture of plants, they understand that it is good for plants and animals' [12] were used by participants to elaborate on those associations.
Despite participants sharing positive aspects related to healthiness, and environmental and animal friendliness, they seem to have a negative perception towards plant-based desserts. Half of the participants (n=7) mentioned that names indicating about the plant-based character (such as 'alternative to yoghurt') are not attractive to them. They think such names are a bit strange and do not sound tasteful (e.g., 'I think *desserts* sounds way more tasty than something with plant' [P7]). Some participants (n=2) indicated to think that not everyone would like to have a dessert without milk. Most of the participants indicate they would like to taste their own dessert, however, not because of the plant-based character. Their reasons for

picking this dessert in the supermarket only have to do with the fact that they like their own created packaging and with the taste they chose. Their general belief of plant-based desserts seems to be that consumers are not really enthusiastic about it and that it is less tasty.

So, even though participants acknowledge the benefits of healthy choices and environmental consciousness, their overall view on plant-based desserts is not really positive. This negative perception is probably caused by their association of plant-based with something healthy, unlikable and unattractive to consume.

4.5 Conceptual model

The different elements that participants chose for their packaging were found to play a role in the perception forming of children towards plant-based desserts. These were divided into categories, leading to an extended conceptual model, which can be found below (Figure 4).

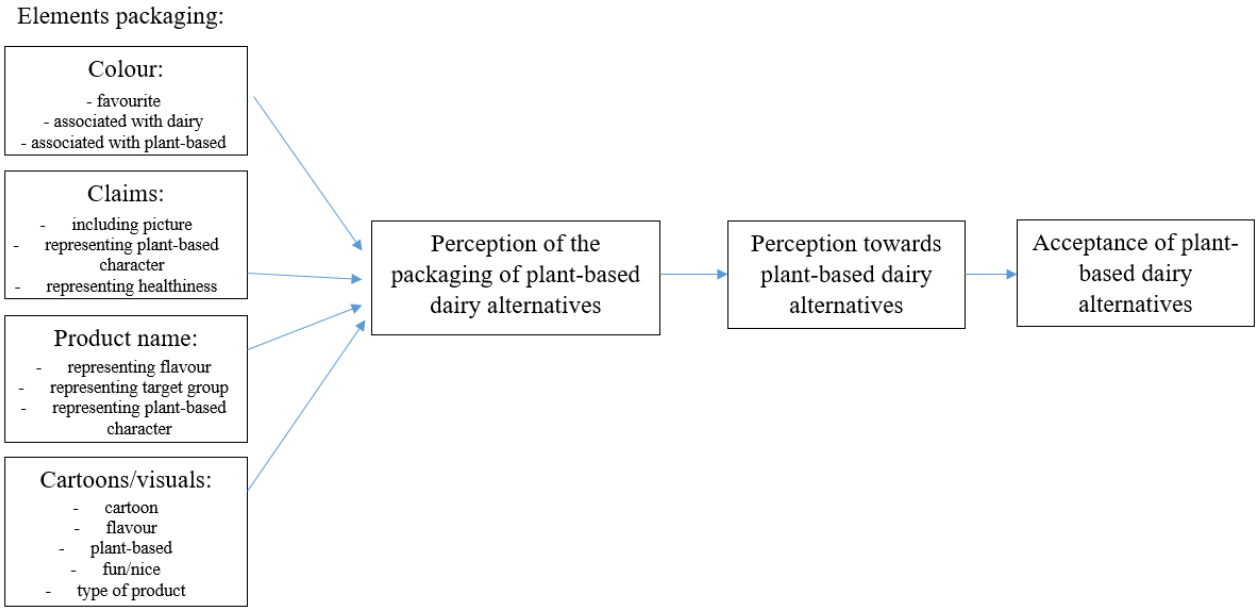

Figure 4. Extended conceptual model of the influence of the packaging on the perception towards plant-based dairy alternatives

5 Discussion

This study uncovered some interesting insights into how the different elements of the packaging influence children's perception towards plant-based dairy alternatives. These insights are discussed below, as well as some considerations for future research.

Regarding the colour, the results revealed associations that participants seemed to have. The association between white and a dessert can be explained by a study in which was found that more bright packages were associated with more creamy products (dairy drinks for example) (Tijsen et al., 2017). This association seems reasonable for plant-based dairy alternatives as well. Some participants were found to have an association between a colour and flavour. This is in line with literature suggesting that the colour of the packaging can give consumers expectations about the flavour of the product (Downham & Collins, 2000). Colour plays an important role in consumers' ability to correctly identify flavour (Garber et al., 2000). Therefore, these associations are understandable. There were also a few participants with an association in mind related to the colour and the plant-based character of the dessert, among which two with green and one with white. According to the literature, cool colours, such as green and blue, are typically linked to sustainability (Clarke & Costal, 2008; Shi, 2013; Singh & Srivastava, 2011). A green colour on a food packaging has been shown to give consumers an indication of food healthiness (Schuldt, 2013). However, in this study, the participant who associated plant-based with healthiness, chose a white packaging. In the study by Da Fonseca et al. (2023) the colour white was correlated with product quality, but not with healthiness or plant-based.
In the theoretical framework was discussed that a colourful packaging can make a product more appealing to children (Pires & Agante, 2011; Marshall et al., 2006), but that it was unclear whether that also applies to the packaging of plant-based products. It was found that participants did seem to care about a fun, nice and colourful packaging for the plant-based dessert. Some participants even explicitly indicated that a nice packaging would increase their intention to buy the product.

The results have also shown which claims are the most appealing according to children. Most participants chose at least one content claim (mentioning how much/what ingredients a product contains). This might be related to the fact that, according to Van Trijp & Van der Lans (2007), consumers perceive content claims as the most credible. However, this decision also might have something to do with the participants having an association between healthiness and plant-based products (as the content claims participants chose were related to ingredients beneficial to health). Many of them mentioned something indicating that they think that plant-based products are healthy, even though the plant-based product in this study was a dessert. This is in line with findings that consumers seem to believe that vegan products are automatically healthier compared to the 'normal' products (Schuldt et al., 2012; Schuldt & Schwarz, 2010; Chandon & Wansink, 2007).
There were also many participants who wanted to include a claim that informs about the product being plant-based, even though many also did not completely understand the meaning of those claims. This is in line with the study by Schiano et al. (2020). They found that consumers indicated to make sustainability judgements about dairy products by reading product labels, while also indicating to not fully understand ethics- and sustainability-related claims (Schiano et al., 2020).
Participants seemed to have a negative perception towards plant-based desserts, despite sharing positive aspects related to healthiness and environmental friendliness and wanting to include this information on the packaging with the use of claims. That is an interesting

contradiction, which might have to do with the type of product. Consumers might not be willing to choose a healthy dessert, as they might think it decreases the taste (Wansink et al., 2004; Raghunathan et al., 2006). Maybe this contradiction is found because participants care about healthiness and sustainability, but not for desserts. Another explanation might be that children want producers to be transparent about the product. Future research might look into that.
Nevertheless, it is also plausible that an intention-behaviour gap plays a role. While children express concerns about healthiness and sustainability, there appears to be a difference between their intentions and actual behaviour. A phenomenon, which can possibly be explained by this intention-behaviour gap (Mullan et al., 2014). Research on the theory of planned behaviour suggests that forming an intention to perform a behaviour positively correlates with the likelihood of the actual performance of that behaviour (McEachan et al., 2011). However, intention is apparently not always translated into behaviour, resulting in a 'gap' between intention and behaviour (Webb & Sheeran, 2006; Sniehotta et al., 2005). Participants in this study might have the right intention, but do not translate these intentions into corresponding actions. The behaviour/actions regarding the consumption of plant-based desserts are outside the scope of this research, but might be interesting for future research to investigate.
Another notable finding was that the majority of participants indicated to prefer a claim which included a visual. This can be explained with the systematic literature review of Hallez et al. (2020), which reveals that children's judgements and behaviours more strongly rely on visual cues compared to adolescents and adults, because their cognitive skills are not fully developed yet. Therefore, marketers often use visual cues that children respond to (Berry & McMullen, 2008).

In exploring participants' preferences for the product name, some participants seemed to prefer names highlighting the plant-based character, while others explicitly mentioned their aversion for such names. Such a contradiction was also found in literature. On the one hand, plant-based names that use product descriptors such as 'plant-based' and 'vegan' have a positive impact on perceptions of healthiness and eco-friendliness (Sucapane et al., 2021). On the other hand, a name that is more related to the substitute products seems to be more appealing (Graça et al., 2019).
Moreover, the research by Sucapane et al. (2021) also revealed that using descriptors that focus on 'plants' negatively impacted predicted quantity consumed. That is in line with what some of the participants in this research indicated, namely that they would not prefer a name with a plant-based term in the product name, as their perception of plant-based seemed to be something healthy, unlikeable and not attractive.
There were also some participants that mentioned they would prefer to call their dessert 'vla', 'yoghurt', or some of the other protected terms that cannot be used for non-dairy products. In a study by Marshall et al. (2022) was also found that vegetarian dishes with names related to traditional dishes were preferred over dishes with more neutral names. This might explain why children want to give the product the 'traditional' name and do not like to call it 'alternative to yoghurt' for example. However, also many children want to call it 'dessert', which might be an easy solution to the problem with legislation.
The last thing that stood out in the results regarding the name for the product is that a part of the children came up with a name suggesting who the product is meant for (e.g., children's dessert). There is a lack of research that can explain why participants chose such a name. One potential explanation for this could be that children then perceive the product as being made by their peers, leading to a sense of connection and resulting in a more positive perception of

the product. However, future research would be needed in order to draw any conclusions and/or to declare this.

Visuals were also found to play a big role in influencing participants' perception. Participants expressed that they want a nice and aesthetically pleasing packaging. Underwood & Klein (2001) found that pictures on the package can create more enjoyable aesthetic experiences for the consumer, leading to better impressions of the product. Next to that, literature tells us that a colourful and fun packaging is more appealing to children (Pires & Agante, 2011). Moreover, more than half of the participants chose to include a visual representing the flavour of their dessert. Multiple studies have shown that depicting food products on the packaging elicits sensory associations for the consumer related to the texture, appearance and taste of the product (Underwood & Klein, 2002; Miraballes et al., 2014; Rebollar et al., 2017; Rebollar et al., 2019). Related to that, one participant mentioned that including a visual on the packaging is important as people otherwise might think that the product is made of plants. This observation aligns with literature suggesting that an image can be ambiguous and evoke many interpretations in the mind of the consumer, and may even cause false impressions (Gil- Pérez et al., 2020; Underwood & Ozanne, 1998).
The last thing that stood out is that only one participant decided to incorporate a cartoon in the packaging design, despite the considerable amount of literature discussing the potential influence of cartoons. According to Elliot & Truman (2020), cartoons characters are frequently used on packages. Children may create emotional bonds with the cartoon characters, which encourages them to request products with these cartoon characters from their parents (Ares et al., 2022). Not many children choosing to include cartoons on their packaging might be due to their age, as the effect of cartoon characters is expected to be greater for younger children (Valkenburg, 2004). However, according to Ares et al. (2016) the effect of cartoon characters on children's preferences was larger for 6-9 years old children compared to 10-12 years old children. The age range of 8-10 years among the participants in this study suggests that the limited selection of cartoon characters may not only be attributed to the effect of age. The method used in this study might have influenced participants' choices, as drawing cartoons might have been perceived as too challenging, leading to most children choosing to draw simpler visuals. The type of product, a dessert, might also have contributed to this discrepancy with the literature. Future research to find an explanation could benefit from looking critically at the methodology of this study, especially checking how challenging the participants perceive the task of drawing visuals/cartoons to be.

When exploring participants' pre-knowledge with the concept 'plant-based', it became clear that children had limited familiarity with the concept and often lacked a comprehensive understanding and definition of the concept. This could potentially be attributed to the demographic context, as all participants live in a relatively small town in North-Brabant (in the Netherlands), as opposed to a more urban setting. Their knowledge of the concept might be different if they had been living in the main urban area of the Netherlands (e.g., Randstad). This limited knowledge of plant-based might also explain the finding that many children associate plant-based products with healthiness. Demographic factors may play a role in shaping the level of awareness and understanding of plant-based concepts among children. However, future research should be conducted in which children with a different demographical background are included to draw conclusions about this.

Another methodological consideration is that children participated in this study in groups of two. Even though experience learned that children did not influence each other in answering the interview questions, they might have influenced each other during co-creation. Some of

the participants did seem to look at their classmates during co-creation and that might have influenced their packaging design in some cases. The duos helped participants feeling more comfortable during co-creation, but it might be better for the reliability of the results to let them do it individually.

The methodology turned out to be suitable for getting a better understanding of children's perception towards plant-based products. However, in some cases, it was unclear whether participants made decisions for their packaging based on whether they consider something important or because they associate it with plant-based (dairy alternatives). Especially for the importance they place on the healthiness of the dessert, further research might be conducted to find out whether that has to do with their general perception of what is important for food or whether they associate that with a plant-based dessert.

Participants mentioned they would like to taste their own desserts, but not because of the plant-based character. Apparently, they are not interested in plant-based products, but only if they work with these themselves. Maybe for future research, it would be interesting to include in the methodology that the product is actually tasted as well.

This study contributed to an increased understanding of children's perception towards plant-based dairy alternatives based on the packaging. The packaging certainly plays a big role and the method was found to be suitable. Future research might further explore the methodology (groups of two, task of drawing, participants from another demographical area, actually tasting the dessert) and the association of plant-based products with healthiness. However, this increased understanding provides a great opportunity to use the packaging to help stimulate children towards consuming more plant-based products.

6 Conclusion

This study investigated what the influence of the packaging of plant-based dairy alternatives is on the perception of 8- to 10-year-old children towards plant-based dairy alternatives, using desserts as a case study. Through careful exploration of different packaging cues, namely the colour, claims, product names and cartoons/visual elements, valuable insights were gained.
Findings revealed some of the associations that children have with the packaging colour. White was often associated with diary and desserts, whereas green was often linked to sustainability. While some participants prefer a green packaging to emphasize the plant-based character, there are concerns among others that it might make the product less appealing. They fear that the association with plants might make the product considered less attractive, both personally and potentially for other consumers.
Claims on the packaging seemed to have a substantial influence on perception, especially when accompanied by a visual. Participants appeared to value both clarifying the plant-based character and emphasizing healthiness equally in their selected and preferred claims.
The product name also emerged as a crucial determinant in the perception towards plant-based dairy alternatives. The most important insight was that a plant-based name was not preferred by participants. They preferred the 'normal' dairy terms, as those were perceived as more attractive.
Cartoons did not seem to play a big role, while images of flavours were important in participants' perceptions towards plant-based dairy alternatives. A visual of the flavour of the dessert seemed to positively influence the perception towards a plant-based dairy alternative, as many participants mentioned the flavour mattered more to them than the plant-based character. So, focusing on the plant-based character with visuals would not positively influence their perception.
Even though children seem to acknowledge the benefits of healthy choices and environmental consciousness, their overall perception of plant-based desserts seems to be quite negative. This contradiction might have to do with the product being a dessert, for which tastiness is important according to children. They associate plant-based with healthiness, leading to a negative perception of the taste and a lower attractiveness of the dessert. So, future research might want to look into whether the same applies to other dairy alternatives. However, the packaging can certainly play a role when it comes to influencing children's perception towards plant-based dairy alternatives, and with that making plant-based products more attractive to children. There is potential in creating a packaging featuring the appropriate colour, visual claims, flavour visuals and a product name that sounds attractive. According to participants, the packaging can in general positively influence the perception towards the plant-based product by using attractive features, but not focusing too much on the plant-based character. Maybe the packaging even plays a bigger role in the perception than the product itself. An insight that can be used to stimulate children towards consuming more plant-based products.

Appendix

Appendix 1. 'Voedingskundige criteria' – Stichting de Reclame Code

Producers must adhere to the these criteria to be allowed to target children with their packaging. For dairy products (including dairy alternatives), the criteria can be found in the table below.

Table 3. 'Voedingskundige criteria' for packages targeted at children

Categorie 5: zuivelproducten					
Subcategorie A: Zuivelproducten niet zijnde kaas. Minimaal 40% zuivel op het totale eindproduct in 100gr/ml					
Voorbeelden	**Energie' (kcal per portie)**	**Natrium (mg/100gr of mg/100ml)**	**Verzadigd Vet (9/100gr of g/100ml)**	**Suikers indien relevant (g/100g or g/100ml)**	**Te stimuleren stoffen/componenten**
Melk en melk-vervangers, yoghurtsoorten, zoete of zachte kaas, kwark, gefermenteerde dranken, zuiveltoetjes	≤ 170	≤ 300	≤ 2.6	≤ 13.5	Eiwit ≥ 12 en % of ≥ 2g/100g of 100ml. En/of minimaal 1 bron van Calcium, een B vitamine of vitamine D.

Appendix 2. Elements packaging plant-based dessert

The following colours were provided to the participants to be used as the basis for the design of the packaging:

- Blue
- Green
- White
- Red
- Yellow
- Brown

The template of the cardboard packaging can be seen Figure 5, as well as the options for the colour. These were presented to participants in this way.

Figure 5. Template packaging and colour options

The following claims were provided to participants:

Figure 6. Claims used for co-creation

Appendix 3. Interview guides

Table 4. Semi-structured interview guide for the co-creation/elicitation part

Interview guide: co-creation/elicitation part	
Introductie	Welkom bij dit onderzoek. Mijn naam is Renske en ik ben heel blij dat jullie er zijn. Hoe is jullie dag op school tot nu toe? Ik ben voor mijn studie een onderzoek aan het doen naar de verpakkingen van toetjes uit de supermarkt. Daarvoor zou ik jullie willen vragen om de verpakking van een toetje te ontwerpen, en dan wil ik graag straks met jullie daar over praten. Ik zou jullie eerst wat vragen willen stellen en dan mogen jullie daarna de verpakking ontwerpen voor het toetje. De vragen duren maar een paar minuutjes en er zijn geen goede of foute antwoorden. Als jullie ergens het antwoord niet op weten, hoeven jullie niet iets te verzinnen. Het is geen test, ik ben gewoon voor mijn studie geïnteresseerd in jullie mening en ideeën. Mag ik het gesprek opnemen?

Huidige consumptie-patroon/wensen	- Eten jullie weleens een toetje? Waarom? - Zo ja, wat voor een toetje eten jullie vaak? - Wat voor een toetje zouden jullie willen eten? Waarom? - Mogen jullie weleens een toetje kiezen in de supermarkt? Waarom wel of waarom niet?
Plantaardig/ Veganistisch	- Weten jullie wat een plantaardig of veganistisch toetje is? - Zouden jullie mij kunnen vertellen wat jullie denken wat plantaardig en/of veganistisch betekent? - Eventueel vertellen dat het zonder koemelk is Definitie: Een plantaardig/veganistisch toetje is een toetje dat geen ingrediënten bevat die van een dier afkomen. Mensen die vegetarisch eten, eten geen vlees of vis. Maar mensen die veganistisch en/of plantaardig eten, eten ook geen dierlijke producten, dus ook geen melk of eieren. Deze dierlijke producten zitten dan ook niet in een plantaardig toetje waarvoor jullie een verpakking gaan maken. - Is het voor jullie duidelijk wat een plantaardig/veganistisch toetje is? - Zouden jullie het nog eens in eigen woorden willen uitleggen?
Instructie	We hebben het gehad over wat een plantaardig/veganistisch toetje is. Dan zou ik jullie nu willen vragen of jullie voor zo een toetje een verpakking zouden willen maken, namelijk voor een vla/yoghurt toetje. Ik heb hier voor jullie de verpakking liggen, die om deze toetjes heen past. Daarbij heb ik verschillende opties voor kleuren die op de bovenkant geplakt mogen worden, jullie mogen eerst 1 kleur daarvan kiezen voor jullie verpakking en dan plakken we die er als eerst op. Dan heb ik ook nog voor jullie verschillende opties voor claims en logo's. Ik zou jullie willen vragen om tenminste 1 claim of logo te kiezen, maar dat mogen er meer zijn als jullie dat willen. Die mogen dan opgeplakt worden op de verpakking. Daarnaast heb ik nog potloden en stiften meegenomen waarmee jullie plaatjes mogen tekenen, een naam voor het toetje mogen opschrijven en ook eventueel de logo's en claims kunnen inkleuren. Jullie mogen de verpakking zo maken als jullie zelf willen. Als jullie willen dat ik een voorbeeld plaatje op zoek van iets wat jullie willen tekenen op de verpakking, dan kan dat ook, dan zoek ik ze op via mijn laptop. Er is geen goed of fout voor wat jullie kiezen om op de verpakking te zetten, ik ben alleen benieuwd naar wat jullie kiezen en wat jullie ideeën zijn. Is dat duidelijk voor jullie? Of hebben jullie nog vragen?
Afsluiting van dit onderdeel	Netjes gedaan! Dat was het dan voor dit onderdeel.

Table 5. Semi-structured interview guide for the interview part

Interview guide: interview part	
Introductie	Welkom bij het tweede deel van dit onderzoek. Jullie hebben een hele mooie verpakking gemaakt. Ik ben heel benieuwd waarom jullie voor bepaalde elementen hebben gekozen. Dat is wat ik graag te weten wil komen met mijn onderzoek. Zullen we het daar even over hebben? Ik wil wel even zeggen nog dat er geen goede of foute antwoorden zijn. Het zijn jullie keuzes en die zijn sowieso goed. Wanneer jullie ergens het antwoord niet op weten, hoeven jullie niks te verzinnen, dat kan gebeuren. Het gesprek zal maximaal 20 minuutjes duren. Na het gesprek mogen jullie de door jullie zelf ontworpen verpakking om de toetjes doen die ik daar heb liggen doen, en dan mogen jullie die straks meenemen naar huis. Vinden jullie het goed als ik ons gesprek opneem?
Kleuren	- Waarom heb jij gekozen voor kleur X? - Wat betekent deze kleur voor jou? - Waar moet je aan denken bij deze kleur? - Waarom wil je graag dat de verpakking deze kleur is?
Claims	- Waarom heb jij gekozen voor claim X? - Wat betekent deze claim voor jou? - Waarom wil je graag dat deze op de verpakking staat? - Is eigenschap X belangrijk voor jou?
Product naam	- Waarom heb je voor deze naam gekozen? - Wat betekent deze naam voor jou? - Wat vind je belangrijk voor de naam van het toetje? - *Wanneer een melk-gerelateerde naam gekozen is* → Wat zou je er van denken als er staat 'plantaardig alternatief voor…'? - En wat zou dat dan voor jou betekenen? Wat denk je daar dan van?
Visuals/cartoons	- Waarom heb je voor afbeelding X gekozen? - Waarom wil je graag dat deze op de verpakking staat?
Afsluiting	- Is er nog iets anders wat jij graag op de verpakking had willen zetten dat niet tussen de opties zat? - Waarom? - Wat voor een toetje zou je kiezen in de supermarkt als je zou mogen kiezen? Waarom? - Zou je dit toetje, wat je zelf hebt ontworpen, kiezen als het in de supermarkt zou liggen? Waarom wel/niet?

	Dan waren dit mijn vragen. Heel erg bedankt dat jullie mee wilden doen. Jullie hebben me echt super erg geholpen voor mijn onderzoek. Hebben jullie nog vragen voor mij? Dan gaan we nu de verpakking om het toetje doen, die jullie straks mee naar huis mogen nemen. Nogmaals, heel erg bedankt en nog een fijne dag!

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