"AS A MOTHER, I PREFER TO GIVE A HEALTHY SNACK, HOWEVER..."

FEMKE W.M. DAMEN

AS A MOTHER, I PREFER TO GIVE A HEALTHY SNACK, HOWEVER...

Mothers' considerations and value conflicts while providing snacks to their 2-7-year-old children

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Propositions

1. The ideal snack according to mothers is a snack that is perceived as healthy by herself and liked by her child.
   (*this thesis*)

2. An extensive food and motivation diary combined with semi-structured interviews is the best method to measure snack giving behavior, considerations, and value conflicts of mothers.
   (*this thesis*)

3. Qualitative research counts as part of science without actual counting.

4. Using non-trained panelists for descriptive sensory tests delivers less reliable data.

5. Publishing scientific papers requires a bit of acquiescence.

6. The social interaction of a child with its peers is the most missed part during home schooling of primary school kids.

Propositions belonging to the PhD thesis, entitled

"As a mother, I prefer to give a healthy snack, however..."
Mothers' considerations and value conflicts while providing snacks to their 2-7-year-old children.

Femke Damen

Wageningen, 13 October 2020

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Thesis

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CONTENTS

CHAPTER 1

General introduction

1.1 INTRODUCTION

Childhood obesity is a severe public health issue nowadays (WHO, 2016) and has a high chance to track into adulthood (Singh *et al.*, 2008; Nicklaus, 2016; Simmonds *et al.*, 2016). One of the behaviors contributing to childhood obesity is the consumption of energy-dense snacks (Piernas and Popkin, 2010; Pearson *et al.*, 2011; Boots *et al.*, 2015; Fisher *et al.*, 2015) which is highly prevalent among children (Hess and Slavin, 2014; Gevers *et al.*, 2016; Wang *et al.*, 2018; Dunford and Popkin 2018). As mothers are mainly responsible for providing foods to their young children (Taillie, 2018; Mehta *et al.*, 2019; Rahill *et al.*, 2020), it is of importance to gain insights into their considerations and value conflicts while providing snacks to their young children. That is the aim of this thesis.

This introduction chapter starts with the problem definition (section 1.2) including background information on childhood obesity and snacking. Then, section 1.3 explains the target group chosen, followed by food choice models (section 1.4), considerations and conflicts in food choice (section 1.5) and influencing factors (section 1.6). Section 1.7 shortly describes qualitative research, as it is the main method used in this thesis. This chapter ends with the rationale and the outline of this thesis (section 1.8).

1.2 PROBLEM DEFINITION

1.2.1 Childhood obesity

Childhood obesity continues to be one of the more severe public health issues of the current century (WHO, 2016; WHO, 2018). The prevalence of childhood obesity is increasing over the last decades as is shown in the United States and Europe (Wijnhoven *et al.*, 2014; Ogden *et al.*, 2016). Worldwide, approximately 40 million children under the age of five, and approximately 340 million children and adolescents (5-19 years), were overweight or obese in 2018 (WHO, 2020). Childhood obesity is a serious problem, as it increases the risks of health problems such as diabetes (Eckel *et al.*, 2011), cardiovascular diseases (Burke *et al.*, 2008) and liver problems (Lobstein and Jackson-Leach, 2006) also later in life (Tyson and Frank, 2018; Flodmark, 2018).

When obese or overweight children become adults, there is a higher chance that their weight problems remain (Singh *et al.*, 2008; Nicklaus, 2016; Simmonds *et al.*, 2016). Moreover, children's dietary behavior tracks into adulthood (Mikkilä *et al.*, 2005; Northstone and Emmet, 2005; Craigie *et al.*, 2011). Therefore, promoting healthy eating early in life is

important, because this may have the potential to influence dietary behavior throughout the life course (Fisk *et al.*, 2011).

1.2.2 Snack consumption

One of the behaviors contributing to childhood obesity is the consumption of energy-dense snacks (Piernas and Popkin, 2010; Pearson *et al.*, 2011; Boots *et al.*, 2015; Fisher *et al.*, 2015) which is highly prevalent among children (Hess and Slavin, 2014; Gevers *et al.*, 2016; Wang *et al.*, 2018; Dunford and Popkin 2018). Parents of young children associated snacking often with the consumption of unhealthy foods (Marx *et al.*, 2016). However, as snacks are an important factor in children's daily food intake, healthier, smaller, and less-energy-dense snacks could help to positively influence the dietary intake of children and in developing more healthy eating patterns (Kachurak *et al.*, 2019; Xue *et al.*, 2019; Loth *et al.*, 2020b).

The term "snacking" has no single definition (Johnson and Anderson, 2010; Pries *et al.*, 2019). Most definitions refer to the time of the day of an eating occasion, or type, amount or location of the food consumed (Hess *et al.*, 2016). The inconsistency in definitions of snacking used in current literature limits the generalizability of results and findings and is therefore a problem (Blaine *et al.*, 2017; McCafferty *et al.*, 2019). In this thesis, we defined snacks as "all foods, excluding beverages, healthy and unhealthy, consumed in between regular meals (breakfast, lunch, dinner)", in line with definitions used in previous studies (Hartmann *et al.*, 2013; Duffey *et al.*, 2014; Loth *et al.*, 2020a; Gibson *et al.*, 2020).

The provision of snacks by mothers to their children is quite different from the provision of main meals. Main meals are often planned (Fay *et al.*, 2011; Wilkinson *et al.*, 2013), while the decision of which snack is provided is mostly taken on the eating moment itself (Loth *et al.*, 2020a). More specifically, parents are relatively flexible towards the quality and the type of snack consumed by their children, as they have fewer and less-structured rules for snacking occasions than main meals (Davison *et al.*, 2015; Fisher *et al.*, 2015; Loth *et al.*, 2018; Loth *et al.*, 2020a). This could imply that the provision of snacks compared to the main meals relies more on the parenting capabilities of the mothers. Furthermore, snacks are provided with a different purpose than the main meals; where mothers use snacks to manage their children's behavior, main meals are used to provide nutrition (Fisher *et al.*, 2015).

1.3 DEMARCATION

This paragraph describes the demarcated topics in this thesis including the age group of the child, the mother, and the home as the main snacking environment.

1.3.1 Children aged 2-7 years

The incidence of obesity is more likely to occur at a younger age, and the relative risk of adult obesity increases with a lower age of childhood obesity onset (Cunningham *et al.*, 2014; Ward *et al.*, 2017). A better understanding of the role of snacking in early childhood is needed for effective interventions on healthy child growth and obesity prevention (Xue *et al.*, 2019). Therefore, intervening during this stage of life is important to prevent children from becoming unhealthy adults.

To specify the age group of young children, we relied on the work of Piaget, which is considered well-known in the field of cognitive development (Roedder-John, 1999; Barrouillet, 2015; Keenan *et al.*, 2016). Piaget developed a cognitive development model with four consecutive stages that can be linked to children's ages (Piaget and Inhelder, 2000). The consecutive stages and the age groups (average and approximate) include the sensory-motor period (0-2 years), the pre-operational stage (2-7 years), the concrete operational stage (7-11 years), and the formal operational stage (11-15 years). The information processing capacities of children increase with consecutive stages, meaning that their thinking develops from concrete to more logical and abstract, and their problem solving and reasoning skills become more advanced. This thesis focuses on children in the pre-operational stage, *i.e.* children of 2-7-year-old.

Since young children aged 2-7 years do not distinguish between foods and snacks (Contento, 1981), it is not possible to ask them directly about the snacks they consume. Besides, in the pre-operational stage, children could mention for example which foods are healthy, but not explain why it is healthy (Contento, 1981). Zeinstra *et al.* (2007) concluded that children in different cognitive stages perceive food topics differently. Furthermore, children from 2 to 7 years do usually not pick snacks themselves but receive the snack from their caregivers (Ventura and Worobey, 2013; Jacquier *et al.*, 2017; Hagerman *et al.*, 2020), which are often the mothers (Rosenkranz and Dzewaltowski, 2008; Cawley and Liu, 2012; Walsh *et al.*, 2015).

1.3.2 Mothers are key

Parents are mainly responsible for choosing the foods their younger children eat (Hennesy *et al.*, 2012; Boots *et al.*, 2015), and related to that for developing healthy eating patterns

among their children (Golan and Crow, 2004; Sleddens *et al.*, 2014a; Larsen *et al.*, 2015). To understand what children eat as a snack, the snack choices of parents for their children are essential to take into account (Fisher *et al.*, 2015; Boots *et al.*, 2015). Although the role of fathers in providing foods becomes more relevant over the last years (Khandpur *et al.*, 2016; Fielding-Singh, 2017; Litchford *et al.*, 2020), mothers are still mainly responsible for providing foods to their young children (Hardcastle and Blake, 2016; Lipowska *et al.*, 2018; Jones, 2018; Taillie, 2018; Rahill *et al.*, 2020). Therefore, mothers are chosen as target group for this thesis.

1.3.3 Home is the main snack environment

Younger children consume foods and snacks mainly in the home environment (Kral and Rauh, 2010; Moreira *et al.*, 2015; Kueppers *et al.*, 2018). For the development of healthy dietary behaviors among children, the home environment is therefore considered as an important setting (Wit *et al.*, 2015; Haines *et al.*, 2019; Larsen *et al.,* 2020). The home environment is dynamic, being influenced by the availability of foods, wishes of other family members, food modeling, and the presence of chaos and stress (Glanz *et al.*, 2005; Poelman *et al.*, 2015; Larsen *et al.*, 2015; Boles *et al.*, 2019; Fulkerson *et al.*, 2019). Although snack consumption at child care centers (Larson *et al.*, 2011; Gubbels *et al.*, 2015; Seward *et al.*, 2017) and out of the home (Ziegler *et al.*, 2006; Poti and Popkin, 2011; Kasparian *et al.*, 2017) became more prevalent during the last years, this thesis focuses on the home environment as it is especially relevant for young children.

1.4 FOOD CHOICE MODELS

Food choice is one of the most frequent human behaviors. It is a complex behavior that is determined by many factors and their interactions (Köster, 2009). Food choice covers the selection and consumption of foods and beverages, considering where, when, what, how and with whom people eat (Sobal *et al.*, 2006). Food choice is dynamic, and encompasses changing psychological (mood, stress, guilt), social (where are you eating and with whom, and what do others think about it), cultural (different methods of preparation, types of food eaten, rituals and values) and economic meanings (costs of food, income) (Luomala *et al.*, 2004). Therefore, food choice processes are hard to understand and difficult to predict. Food choice includes decisions that are made automatically and subconsciously. However, food choice also includes decisions based on conscious reflection (Furst *et al.*, 1996).
Furst *et al.* (1996) constructed a conceptual model (Figure 1.1, slightly adapted from the original model) of the components playing a role in the food choice process. The basis of

food choice is the life course, which is formed by culture and upbringing and includes past influences, current involvement in trends and anticipation to future events. This is related to cultural, social and physical environments. Next to the role of the life course, five major categories of influences on food choice were identified, these were ideals, personal factors, resources, social framework, and food context. As food choice is a recurring experience, people develop personal systems for food choice. In the model of Furst *et al.* (1996) these personal systems have two major components, value negotiations and strategies.

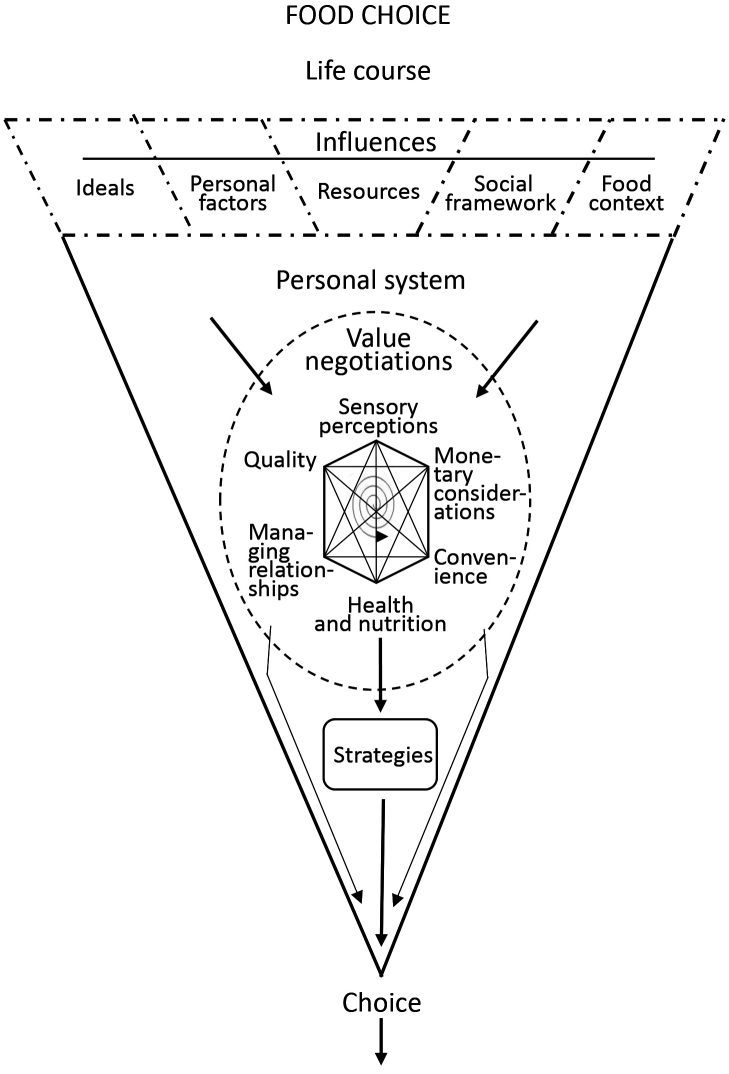

Figure 1.1. Conceptual model of the components in food choice (Furst *et al.*, 1996).

Consumers associate a variety of values with food (Luomala, 2004) and consumers' food behavior depends on their value systems (Osinga and Hofstede, 2004). According to the food choice model of Furst *et al.* (1996), the most important food choice related considerations that consumers have to negotiate are taste (sensory perceptions), cost (monetary considerations), convenience, health and nutrition, inter-personal interactions (managing relationships), and quality. In the research of Lusk and Briggeman (2009), safety appears to be another important food choice related value. The strategies made by people for making food choices are employed to simplify the difficult task of making food choices. Besides, strategies are developed in situations where preferences often conflict (Furst *et al.*, 1996).

A more specific model on food choice is the one of Holsten *et al.*, (2012) on children's food choice processes in the home setting, which is presented in Figure 1.2a. This model shows that children make food choices in the home through an interactive process based on three primary components: the child, the parent, and the food. These primary components are embedded in the context of time, which could be a day, a week, or a year. Actions represent the indirect and direct influence of the parents. The indirect influences are the rules, requests and information parents provide. This also includes modeling behavior. The direct influence of the parents consists of the purchasing and preparing of the food. Outside influences are presented as secondary components. These factors are not always present in the home itself but still influence the food choices at home. For example, this is the influence of peers, media and food outlets. However, these influences are less important compared to the other factors in the model.

Although the model of children's food choice process is designed based on the food choice of 11-14-year-old children, this model is -based on insights from literature- adapted to mothers' snack choice in the home environment for their 2-7-year-old children, to make it applicable for the topic of this thesis (Figure 1.2b). The primary components stay almost the same with the exception that "parent" is changed into "mother". "Children's food choice", becomes "mother's snack choice for her child", and the outside influences are adapted to be relevant for mothers. The factors under the primary components are added with the current insights from the literature on mothers' food and snack choice for their children. The actions are also adjusted to the scope of this thesis. The adapted figure is presented in Figure 1.2b., in the discussion paragraph this figure will be complemented based on the insights of this thesis.

1.5 CONSIDERATIONS AND VALUE CONFLICTS IN FOOD CHOICE

The considerations and value conflicts in food choice are described in this paragraph.

1.5.1 Considerations in food choice

As mentioned in paragraph 1.4, Figure 1.1, the major considerations in food choice are according to Furst *et al.* (1996), taste, cost, convenience, health and nutrition, interpersonal interactions, and quality. Lusk and Briggeman (2009) added safety as another important food choice related value. Other studies also indicated health as an important consideration in the food choice of consumers (Grunert, 2006; Connors *et al.*, 2001; Cunha *et al.*, 2018) as well as a driver in food choice by mothers for their children (Walsh *et al.*, 2015; Machín *et al.*, 2016; Zobrist, 2018). the child's preference, which could be compared with the consideration taste in the model of Furst *et al.* (1996), is another important driver in food choice according to many studies. Evans *et al.* (2011), Holsten *et al.* (2012), Meers *et al.* (2016), and Boak *et al.* (2016), showed in their studies that the preference of the child affected mothers' food choice for their children. However, Moore *et al.* (2010) did not mention the preference of the child in their study on the food choice of British mothers. A reason could be that this study also included food choice for the main meal, which is different compared to the choice for snacks as described in paragraph 1.2.2. Convenience is reported as another consideration in food choice (Connors *et al.*, 2001; Phan and Chambers, 2016; Raskind *et al.*, 2017). Parental time constraints are the main reason for choosing convenience foods. Hayter *et al.* (2015), Smit *et al.* (2017), and Pettigrew and Robberts (2007) reported about the convenience choices of mothers made for the main meals. The current thesis explores which food choice considerations are of relevance in snack provision of mothers to their 2-7-year-old children.

1.5.2 Value conflicts in food choice

The considerations that people consider when making food choices are so-called values (Connors *et al.*, 2001). As many values play a role in the choice of a food or a snack, value conflicts could appear as not all values always serve the same purpose (Furst *et al.*, 1996). Value conflicts happen when fulfilling one value prevents meeting another value (Connors *et al.*, 2001). Luomala *et al.* (2004) investigated the value conflicts in food choice which consumers may experience. The value conflicts included were novelty vs. tradition, health vs. indulgence, economy vs. extravagancy, convenience vs. care, technology vs. nature and others vs. self. The conflicts between convenience and care and between health and indulgence appear to be the most common food-related value conflicts.

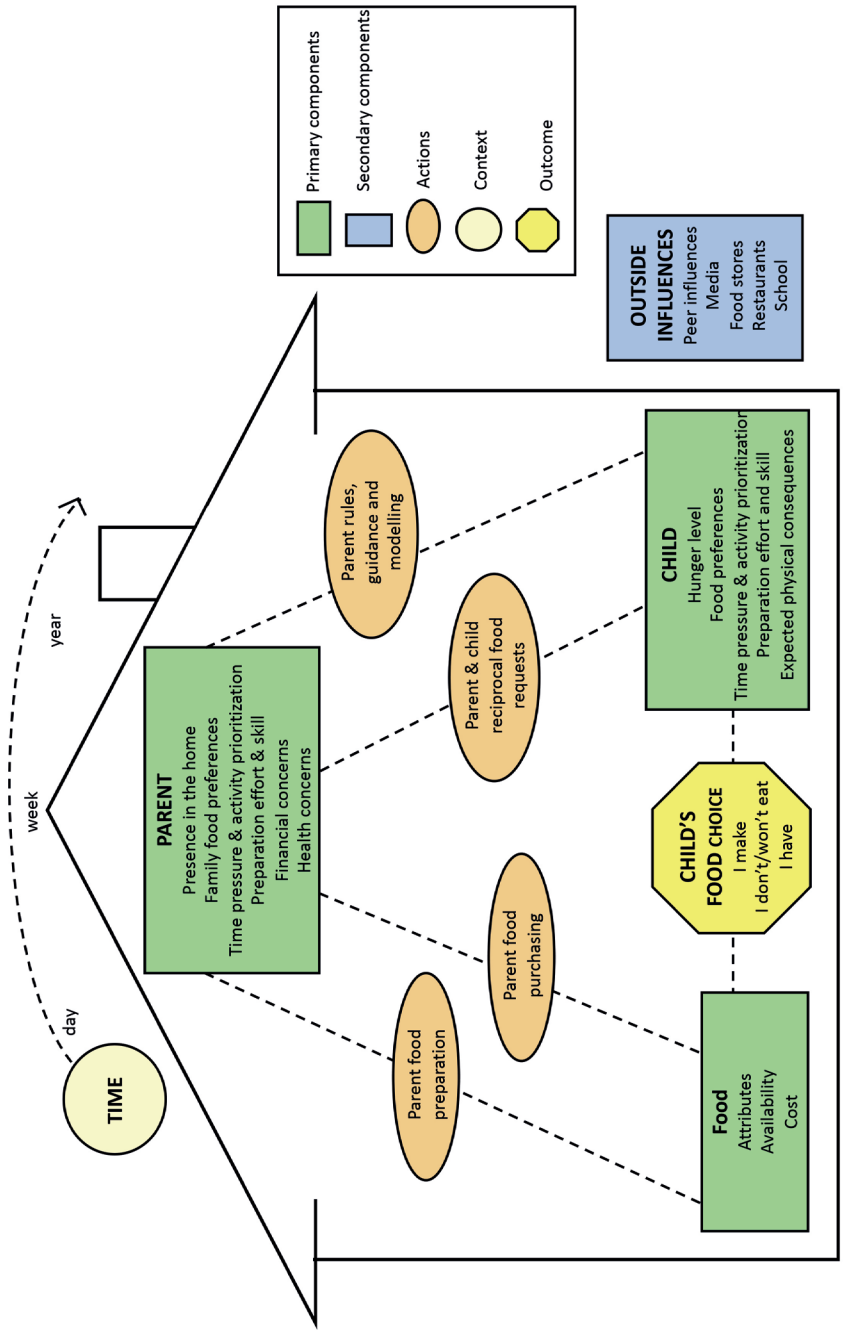

Figure 1.2a. Model of children's (11-14 years) food choice processes in the home setting (Holsten *et al.*, 2012).

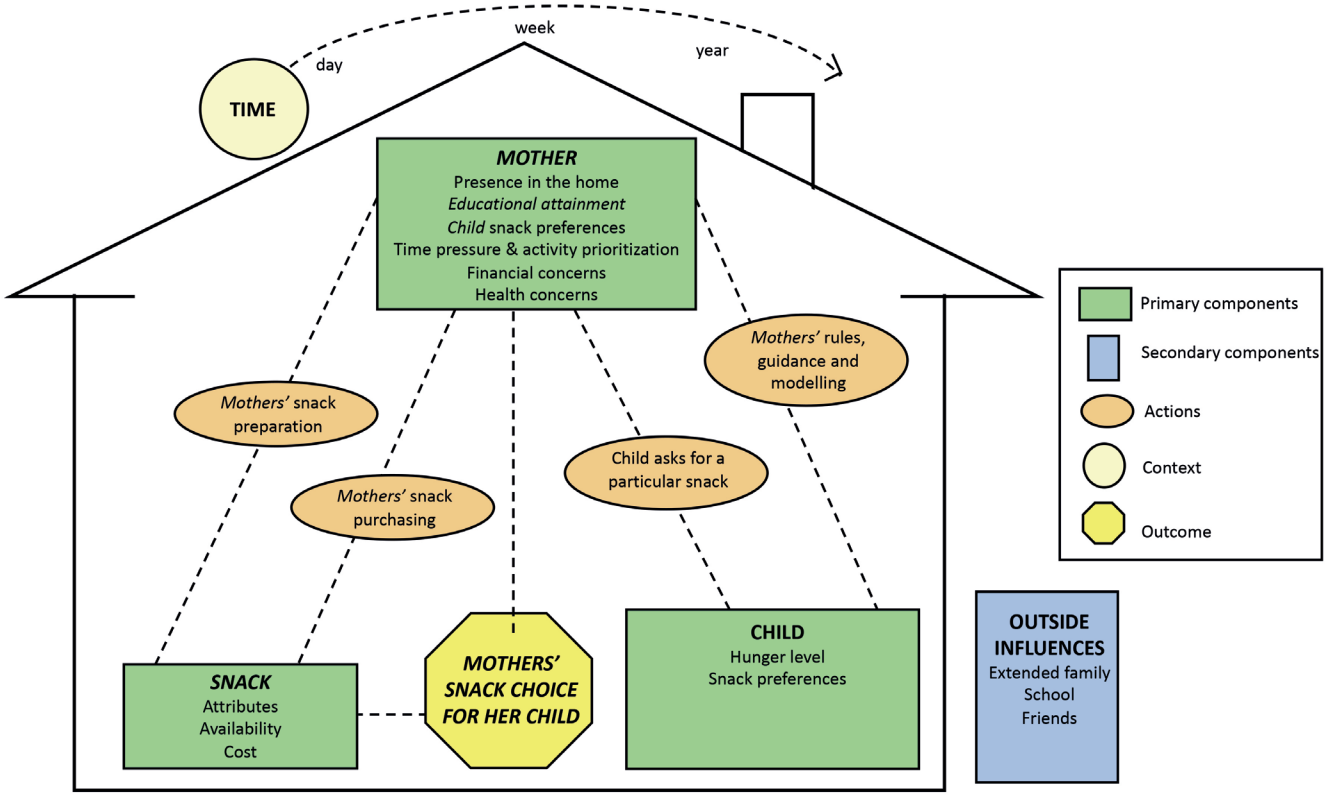

Figure 1.2b. Model of mother's snack choice for her 2-7-year-old children the home setting (adapted from Holsten *et al.*, 2012)

When mothers make snack choices for their children, value conflicts become relevant too. Because mothers want to make the best choice possible for their children, they sometimes experience difficulties and feelings of doubt (Pocock *et al.*, 2010; Johnson *et al.*, 2011; Phull *et al.*, 2015; Machín *et al.*, 2016; Gram *et al.*, 2017; Fielding-Sing, 2017). Besides, mothers want to provide snacks which their children prefer (Boak *et al.*, 2016; Wijtzes *et al.*, 2017) as well as making healthy food choices (Carnell *et al.*, 2011; Walsh *et al.*, 2015; Mehta *et al.*, 2019), two considerations which often conflict (Luomala *et al.*, 2004). In the study of Loth *et al.* (2018) parents mention conflict avoidance as the main reason for letting their child have more influence over the foods served at main meals.

The research done on value conflicts for snacks provided by mothers of young children is limited. Pescud and Pettigrew (2014) found that the unhealthier the food provided, the more feelings of guilt mothers experienced. Okada (2005) stated that people justify their hedonic food choices more compared to healthy choices. Moreover, Hayter *et al.* (2015), reported differences in what parents would like to feed their child and their actual food choice. Choices for convenient main meals were reported by Pettigrew and Roberts (2007) as a reason for mothers to feel guilty and to have doubts about being a good mother because these choices were often perceived to be less healthy. Some studies reported parents experiencing difficulties when a child asks for a certain food, and they prefer to provide something else (Herman *et al.*, 2012; Nepper and Chai, 2016). However, most of these studies focused on main meals and not on snacks, whereas this thesis investigated the value conflicts experienced by mothers of young children while providing snacks.

1.6 INFLUENCING FACTORS ON MOTHERS' SNACK CHOICE, CONSIDERATIONS AND VALUE CONFLICTS

This paragraph describes the factors to be expected to influence mothers' snack choice, considerations and value conflicts which are pointed out in the current thesis.

1.6.1 Culture

Culture could be seen as one of the important influencing factors of food choice (Osinga and Hofstede, 2004; Rozin, 2006; de Mooij, 2010). In the food choice model of Furst (1996) culture is embedded in the life course which forms the basis of food choice. The cultural background of a person is also of importance on childrearing practices (Bornstein, 2012), including the choice, preparation and consumption of food products (Counihan and van Esterik, 2012; Cavusgil *et al.*, 2014; Pineros-Leano *et al.*, 2019). Moreover, culture is of

influence on the value negotiations in the food choice process (Connors *et al.*, 2001; Bisogni *et al.*, 2002). Besides, there are cultural differences in parental feeding practices and their associations with childhood obesity risk (Blisset and Bennett, 2013).

The Food Choice Questionnaire (FCQ) is widely applied to compare food choices in different cultures (*e.g.* Pearcey and Zhan, 2018; Rankin *et al.*, 2018; dos Santos *et al.*, 2020). However, in a review by Cunha *et al.* (2018), it was concluded that for comparing cultures on food choice, the items of the questionnaire should be made culture-specific to be able to accommodate the different cultures. Another commonly used tool for comparing cultures are the six dimensions of culture, described by Hofstede *et al.*, (2010). These six dimensions are power distance, collectivism versus individualism, femininity versus masculinity, uncertainty avoidance, long-term versus short-term orientation, and indulgence versus restraint. In the model, for each country the score on one dimension can be visualized as a score on a linear scale (Hofstede *et al.*, 2010). The model of Hofstede and colleagues is often used to explain differences in work-related values. De Mooij (2010) applied and validated it to consumption-related values and motives. As such, it could be a suitable tool to explore snack choice considerations and the related value conflicts experienced by mothers in different countries.

1.6.2 General parenting

Parents are key in developing healthy eating patterns among their children (Golan & Crow, 2004; Sleddens *et al.*, 2014a) through their general parenting (Gevers *et al.*, 2015a). General parenting consists of attitudes, beliefs, and behaviors, by which parents influence their children's behavior through creating a family emotional climate to raise their children in (Sleddens *et al.*, 2014b; Wang *et al.*, 2017). Sleddens *et al.* (2014b) developed the comprehensive general parenting questionnaire (CGPQ) to measure general parenting. This questionnaire is based on the five general key constructs of general parenting, which are nurturance, structure, behavioral control, overprotection, and coercive control. Previous research has shown that the application of the five key parenting constructs affect children's weight status (Sleddens *et al.*, 2014a; Sleddens *et al.*, 2014b; Kelleher *et al.*, 2015; Demir *et al.*, 2017).

General parenting includes parenting styles and practices, both having different effects on children's behaviors (Rhee *et al.*, 2015; Vaughn *et al.*, 2015; Langer *et al.*, 2017). Parenting styles are the general aspects and standard strategies that parents use in their child-rearing. Parenting styles are static and stable characteristics of parenting and do not vary in response to child behaviors and characteristics (Rhee *et al.*, 2015; Vaughn *et al.*, 2015; Langer *et al.*,

2017), for example parents could have an authoritarian parenting style, this style is shown in all their behavior. Parenting practices are more content-specific and dynamic parenting strategies (Sleddens *et al.*, 2014b; Langer *et al.*, 2017) to influence the child's attitudes, behaviors, or beliefs. An example is the food parenting practice restriction (dynamic) for the consumption of unhealthy foods (content).

Parenting styles and practices influence the dietary behaviors of children (*e.g.* Peters *et al.*, 2012; Sleddens *et al.*, 2014a; Gerards and Kremers, 2015; Davison *et al.*, 2015). This could be by determining the foods children eat (Hennessy *et al.*, 2012, Sleddens *et al.*, 2014b; Boots *et al.*, 2015), the portion sizes (Power *et al.*, 2019), the eating frequency (Boots *et al.*, 2015), the moment of eating (Gevers *et al.*, 2015c), the availability of foods at home (Horst and Sleddens, 2017; Boles *et al.*, 2019), and by modeling dietary behaviors (Davison *et al.*, 2015; Perez-Cueto, 2019). Because of the influences of parenting on the dietary behavior of children, this thesis explores if the key constructs of general parenting could be linked to the snack giving behavior of mothers.

1.6.3 Mothers' educational level

The level of education a mother has gained is another important influencing factor on food choice for her children. Craig *et al.* (2010) reported unhealthier dietary patterns among children aged 5-11 years when having a main food provider with a lower educational level. Cribb *et al.* (2011) found that mothers with a lower education gave less often vegetables to their children and provided more often unhealthy perceived foods. Gevers *et al.* (2016) found that 7-12-year-old children of mothers with a lower educational level consumed more energy-dense snacks, compared to children of higher educated mothers. Likewise, studies of Durão *et al.* (2017), Chen *et al.* (2019), van der Velde *et al.* (2019), and Gutiérrez-Camacho *et al.* (2019) confirm the relation between higher maternal education and a healthier dietary pattern of their children. Whether maternal educational attainment influences mothers' snack choices for their 2-7-year-old children and the possible value conflicts experienced is studied in this thesis.

1.6.4 Influence of siblings in the household

In the home environment, family members, including siblings, influence food choices constantly. This sibling influence continues to exist for some types of food even later in life (Pachuki *et al.*, 2011). Besides, Haines *et al.*, (2019) showed that the family structure, including the parents' marital status and the presence of siblings, influence eating habits. Various studies reported differences in the dietary behavior between oldest and younger siblings, where the youngest child was more likely to have unhealthy eating behaviors

(Northstone and Emmett 2005; Smith *et al.*, 2011; Fisk *et al.*, 2011; Vilela *et al.*, 2015; Vennerød *et al.*, 2017). The presence of siblings in the household is also of influence on childhood obesity; Park and Cormier (2018) reported in their review that the youngest child in the household was more likely to be overweight or obese compared to the middle or oldest child (Ochiai *et al.*, 2012; Haugaard *et al.*, 2013; Mosli *et al.*, 2015; Mosli *et al.*, 2016). However, in this review, two studies found the opposite or no effect (Chen and Escare, 2014; Martinovic *et al.*, 2015).

Research regarding reasons for the differences in dietary behavior between oldest and younger siblings is limited. Some researchers suggest that the availability of unhealthy foods for older siblings in the home environment could be a reason for an unhealthier eating pattern of younger children (Brekke *et al.*, 2007; Fisk *et al.*, 2011). Others indicate that the general parental involvement at home seems less with younger siblings compared to the first-born child (Hotz and Pantano, 2015; Barclay, 2018), which could influence food choices (North and Emmett, 2000). Moreover, as parents become busier when having more children, parental time constraints could be a reason for different food choices (Lawson and Mace, 2008; Lehman *et al.*, 2018). In addition, it could be that mothers become less strict when having more children because the urge to "do all well" might be more present among mothers of first children (Barclay, 2018).

1.6.5 External influences

The influence of other persons, like spouses, grandparents or friends affects mothers' food choice for their children. Walsh *et al.* (2015) described that mothers experienced challenges in their food choice when extended family members, often with another view on giving snacks, or other children, were present. Likewise, Boak *et al.* (2016) concluded that the presence of other persons like friends or grandparents could influence the foods mothers choose to give to their infants. Herman *et al.* (2012) described that when grandparents are around, they have an influencing role in the provision of snacks and this is sometimes experienced as difficult by the mothers.

1.6.6 Health perception of snacks

According to the food choice model of Furst *et al.* (1996), health is an important food choice related consideration that consumers have to negotiate. Moreover, many studies mentioned health to be an often-reported consideration related to the food choice of consumers (Grunert, 2006; Bailey *et al.*, 2018; Cunha *et al.*, 2018; Pineros-Leano *et al.*, 2019; Criss *et al.*, 2019). When becoming a parent, health turns out to be even more important in the food choice process (Bisogni *et al.*, 2012; Moura and Asschemann-Witzel, 2020). Health is not

only expected to be an important consideration for mothers' food choice in general but also more specifically for mothers' choice of snacks provided to their children.

Healthy choices could be expressed by the characteristics of the food, like low in fat, low in sugar, or containing vitamins or fibers (Falk *et al.*, 2001; Bisogni *et al.*, 2012; Bucher *et al.*, 2016). Healthy choices are also associated with the type of foods as fruits and vegetables are often seen as healthy choices (Falk *et al.*, 2001; Lake *et al.*, 2007; Bisogni *et al.*, 2012). Besides, a balanced diet is also considered as important for healthy food choices by the consumer (Falk *et al.*, 2001; Paquette, 2005; Lake *et al.*, 2007; Croker *et al.*, 2009; Bisogni *et al.*, 2012). Bisogni *et al.* (2012) noted that researchers acknowledge that consumers may view healthiness of foods differently compared to experts. This discrepancy could pose a problem because if mothers give their child an unhealthy snack while being convinced it is a healthy one, children could develop an unhealthy snacking pattern which in turn could cause them to be more vulnerable to overweight. Therefore, this thesis investigates how mothers perceive the healthiness of the snacks they provide.

1.7 QUALITATIVE RESEARCH

Qualitative research is an approach that facilitates the examination of people's experiences, views, beliefs and behaviors in detail (Hennink *et al.*, 2020). This type of research is of specific relevance to study social relations (Flick, 2018) and makes use of a specific set of research methods like semi-structured or in-depth interviews, focus group discussions, observations, visual methods, and life histories or biographies (Hennink *et al.*, 2020). Qualitative research usually focuses on words, rather than quantification in both data collection and data analysis (Bryman, 2016), and is a well-established method in explorative research. Qualitative data analysis is interpretive, whereby the researcher interprets the views and experiences of the participants (Levitt *et al.*, 2017; Hennink *et al.*, 2020). So, qualitative research focuses on finding the 'why' and 'how' of certain issues, rather than how often it occurs (Lune *et al.*, 2016). Since we want to gain insights into mothers' considerations and value conflicts while providing snacks to their 2-7-year-old children, qualitative methods are used in this thesis.

1.8 AIMS AND THESIS OUTLINE

The overall aim of this thesis is to identify and provide insights into mothers' considerations and value conflicts while providing snacks to their 2 to 7 years old children. Each chapter

investigates a range of variables in relation to mothers' snack providing. The first chapters of this thesis are focused on actual snack giving behavior of mothers (Chapters 2 and 3), and corresponding feelings (Chapter 4).

Then, differences in snack giving behavior between the youngest versus the oldest child in the household are compared in Chapter 5. Cultural influences on snack giving behavior are highlighted in Chapters 6 and 7. Perceptions regarding health in snack giving behavior of mothers to their children aged 2-7 years are studied in Chapter 8. Figure 1.3 presents the connection between the studies and related chapters in this thesis.

This introduction Chapter 1 introduces the problem of childhood obesity, explains the target group chosen, outlines the background on food choice and snack giving behavior, and outlines the influencing factors on snack giving behavior.

Chapters 2, 3 and 4 arise from Study 1 which entails an extensive 13-day diary study, the Comprehensive General Parenting Questionnaire and a semi-structured telephone interview with 136 Dutch mothers. This study was set up to explore considerations, value conflicts and general parenting related to the snack giving behavior of mothers with children aged 2-7 years.

Chapter 2 describes snack choices and the related considerations of mothers with children aged 2-7 years in the home environment. The data from the diary study was used for this. To understand the relation of general parenting and mothers' snack giving behavior, we explored in Chapter 3 how the key constructs of general parenting relate to mothers' snack choice for their children. Therefore, we asked the mothers to fill in the Comprehensive General Parenting Questionnaire (CGPQ) and related their answers with the snacks provided reported in the diary. In Chapter 4, insights are provided according to the value conflicts mothers may experience while providing snacks to their young children, this data followed from the diary study as well as the semi-structured interviews.

The diary study of Chapter 2 suggested that mothers of first children showed more health-conscious food choice behavior than mothers of not-first children. Chapter 5 presents the validation of these observations; the differences in mothers' snack choice for their youngest child at 2-3 years compared to their oldest child when he/she was of the same age were investigated with semi-structured interviews. Moreover, the reasons for these differences were identified.

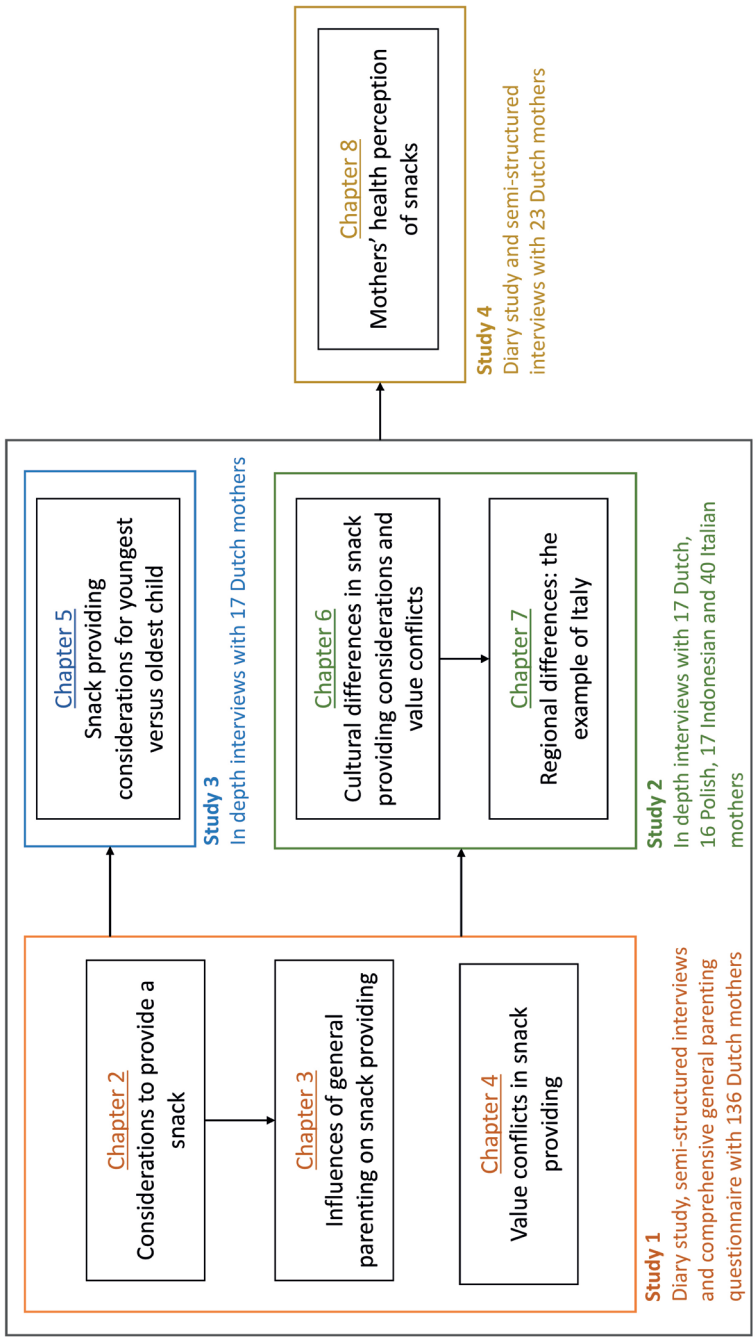

Figure 1.3. Chapter overview, the different colors represent the different studies.

Chapters 6 and 7 emanate from Study 2. Chapter 6 presents the effect of national culture on mothers' snack choice considerations (in this paper named values) and the value conflicts experienced. Semi-structured interviews with 67 mothers of 2-7-year-old children of 4 nationalities (Dutch, Polish, Indonesian, and Italian) were conducted. The results of Chapter 6 indicated that mothers from the North of Italy showed different considerations and value conflicts in snack providing than mothers from the South of Italy. Chapter 7 explores this possible regional effect using semi-structured interviews with mothers from the North (n = 20) of Italy versus mothers from the South (n = 20) of Italy.

Chapter 8 investigated mothers' health perception of snacks provided by conducting diaries and semi-structured interviews (n = 22). We choose to focus on health perception because health was frequently mentioned by the mothers as a consideration in snack providing as well as during value conflicts experienced (Chapters 2, 3, 7, 8). However, the perceived health perception of mothers for a certain snack could be diverse and different compared to the actual nutritional healthiness of a specific snack.

Finally, in Chapter 9, the general discussion of this thesis, a reflection is made on the methodological considerations, the main findings and their implications.

CHAPTER 2

What influences mothers' snack choices for their children aged 2-7?

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ABSTRACT

The increasing intake of energy dense snacks by children is one of the factors contributing to childhood overweight. Mothers are mainly responsible for the foods their young children consume. Therefore, this study aims to describe snack choices and the related considerations of mothers with young children in the home environment. The possibility that snack choices and considerations are related to maternal education, childbirth order, and age groups of the children was also investigated. A food and motivation diary study with 136 Dutch mothers of young children aged 2-7 years was conducted for 13 days. Mothers reported every snack they gave to their child. Fruits, cookies and candy were the most frequently provided snacks; healthiness of the snack and child preference were the most used considerations. Considerations were grouped in six overall categories: health-related, influence of the child, habit-related, strategies, external influence and other considerations. Higher educated mothers and mothers of first children showed more health-conscious behavior. Lower educated mothers more often justified their (unhealthy) snack choice. Next to insight into the number and type of snacks provided, the empirical findings in this study provide new understanding of the considerations of mothers while providing a snack to their young children.

2.1 INTRODUCTION

Childhood obesity rates have been increasing over the last decades in the U.S. as well as in Europe, and remain high (Ogden *et al.*, 2014; Wijnhoven *et al.*, 2014; Dommelen *et al.*, 2014). In 2013, an estimated 42 million children worldwide were overweight (Ng *et al.*, 2014). Since children's dietary behavior and prevalence of overweight are extrapolated into adulthood (Singh *et al.*, 2008; Nicklaus, 2016), childhood overweight is a serious problem as it increases the risk of health problems, also later in life (Daniels, 2009; Reilly and Kelly, 2011; Flodmark, 2018). One of the many factors contributing to childhood overweight is the increasing intake of high-calorie food by children (Poti *et al.*, 2014) including energy dense snacks (Piernas and Popkin, 2010; Boots *et al.*, 2015). This consumption of snacks is a frequently occurring behavior (Johnson and Anderson, 2010) and highly prevalent among children (Larson and Story, 2013; Gevers *et al.*, 2016). Interestingly, young children as well as their parents commonly associate snacks with unhealthy foods (Marx *et al.*, 2016). The term "snack" has no single definition (Johnson and Anderson, 2010), but most definitions are based on time of the day of an eating occasion or type, amount or location of the food consumed (Hess *et al.*, 2016). In the current study, we defined snacks as "all foods, excluding beverages, healthy and unhealthy, consumed in between regular meals", based on definitions used in previous studies (Garriguet, 2007; Mercille *et al.*, 2010; Ovaskainen *et al.*, 2010; Hartmann *et al.*, 2013; Duffey *et al.*, 2014).

Young children consume food mainly in the home environment (Rossum *et al.*, 2008; Kral and Rauh, 2010; Kueppers *et al.*, 2018), which makes the home an important setting for developing eating and food choice behaviors (Wit *et al.*, 2015). Although the home is a relevant environment to study food choice (Holsten *et al.*, 2012), it is complex and dynamic due to all kinds of influences such as the availability of foods or wishes of other family members (Glanz *et al.*, 2005; Poelman *et al.*, 2015). According to Larsen *et al.* (2015) food availability (energy density, variety, and portion size) and food modelling (the social learning that occurs when food intake of parents are observed and eventually are modelled by children) are shaping the child's food home environment. Although snack consumption at child care centers (Gubbels *et al.*, 2015; Seward *et al.*, 2017) and out of the home (Poti and Popkin, 2011; Kasparian *et al.*, 2017) become more relevant the last years, we focus in this study on the food home environment as it influences the child's dietary behavior and is especially relevant for young children.

Parents are mainly responsible for choosing the foods their children eat (Hennessy *et al.*, 2012; Boots *et al.*, 2015) and their food choice can influence the food choice of their children, as demonstrated in various studies (*e.g.* Watts *et al.*, 2014; Bruce *et al.*, 2015; Robson *et al.*, 2016; Jacquier *et al.*, 2018). Although the role of fathers in providing snacks becomes more important the last years (Khandpur *et al.*, 2014; Fielding-Singh, 2017), the role of mothers seems to be especially important in affecting children's food choice. In a study by Holsten *et al.* (2012), children reported a considerably greater role of their mother compared to their father concerning their food choices, except in single father families. Jones (2018) described the role of the mother in food choice as a gatekeeper having the main responsibility for taking care of her children's health. Hardcastle and Blake (2016) see mothers as a key target group to explore family attitudes towards eating, food purchase, and preparation. Since young children aged 2-7 years do not distinguish between foods and snacks (Contento, 1981), it is difficult to ask them directly about their snack choice behavior. Furthermore, young children usually do not pick snacks themselves but receive a snack from their caregivers (Ventura and Worobey, 2013; Jacquier *et al.*, 2017); which are often the mothers (Rosenkranz and Dzewaltowski, 2008; Cawley and Liu, 2012; Walsh *et al.*, 2015). Consequently, mothers generally seem to be held more accountable for the consequences associated with food choice they make for their children than fathers.

The educational level of the mothers is an important driver of food choice for their children. For children under the age of 1 year, Saldiva *et al.* (2014) found that the lower the educational level of the mother, the higher the consumption of unhealthy foods by her children. Craig *et al.* (2010) who studied dietary patterns of 5-11 and 12-17 years old children reported that more unhealthy dietary patterns relate with a lower educational level of the main food provider. Gevers *et al.* (2016) showed that 7-12-year-old children of mothers with a lower educational level consumed more energy dense snack foods, compared to children of higher educated mothers. In addition, studies of Bargiota *et al.* (2013), van Ansem *et al.* (2014), Vilela *et al.* (2015), Emmett and Jones (2015) and Durão *et al.* (2017) confirm this relation between higher maternal education and a healthier dietary pattern of their children. In line with this previous research, we expect that also for mothers of children aged 2-7 years these effects of maternal education on snacks provided and the health-related considerations would be present. Moreover, we explore in this study if other considerations than health-related considerations occur and whether these are different among mothers with different educational levels.

Limited research has been conducted on snack choice behavior of mothers with children aged 2-7 years related to birth order of the children in the household. Vilela *et al.* (2015) found that 2-year old children with older siblings more often consumed energy-dense foods on a daily basis. Brekke *et al.* (2007) also showed this effect of older siblings; the presence of older siblings influenced the intake of sugar-rich and low-nutrient foods of 1-year-old children. In a study by Smith *et al.* (2011) on all foods provided during the day, UK mothers of first children provided vegetables more often compared to mothers of not-first children. Studies of Briefel *et al.* (2006) and Garemo *et al.* (2007) found that parents more frequently provided recommended vitamin supplements to their first children compared to not-first children. Therefore, it could be useful to explore differences in snack provisioning and considerations of mothers for their first children compared to those of mothers for their not-first children. Although previous research does not fit our set age group of children aged 2-7 years and is not all about snack provision, we expect that mothers of first children in the household may use more health-related considerations compared to mothers of not-first children in the household.

As the current study targets children aged 2-7 years, which includes pre-school children (2-3 years), children who just attend primary school (4-5 years) and children who are even older (6-7 years), we focused on differences in snack provision and considerations of mothers of children of these different age groups. Gevers *et al.* (2016), who did a study on the snack intake of Dutch children aged 7-12, found that children from the youngest age group of 7-8 years consumed fewer energy dense snack foods compared to children from the age groups 9-10 years and 11-12 years. Rangan *et al.* (2008) found that the consumption of 'sweets and biscuits', 'lollies and confectionary' and 'sweet pies and pastries' was higher among Australian children aged 4-7 years compared to children aged 2-3 years. Also, Taillie *et al.* (2015) found in a study among children aged 2-13 years that energy intake from snacks increased according to the age of the children. In line with these findings, we expect that age effects may play a role in snack choice of mothers for their young children and the underlying considerations.

Although several studies have been performed on snack choice in relation to children, only a few studies focused on the considerations of mothers when choosing a snack for their young children, either healthy or unhealthy (Blake *et al.*, 2015; Fisher *et al.*, 2015; Jacquier *et al.*, 2017). Therefore, we aim to investigate snack choices made in the home environment and the underlying considerations of mothers with young children aged 2-7. This study is built on four research questions: What are the snack choices mothers of young children make in the home environment (RQ1)? To what extent do mother's snack choices differ according

to maternal education, childbirth order, and age group of the child (RQ2)? What are the underlying considerations of mothers of young children for these snack choices (RQ3)? To what extend do the considerations of mothers for their snack choices differ according to maternal education, childbirth order, and age group of the child (RQ4)?
This study aims at providing a first inventory of this topic and data encompass descriptive statistics to get insight into snack choice behavior and related considerations of mothers of young children. To achieve this aim, a strictly controlled long term diary study was conducted on a large group of mothers balanced for the various characteristics. The analysis of the hypothesized differences in educational level, order of the children in the household (*i.e.* first versus not-first child), and age of the children could provide an indication on what different groups of mothers give as a snack to their children and their underlying considerations.

2.2 METHOD

2.2.1 Study design

This study on snack choice and considerations was conducted with 136 Dutch mothers of young children aged 2-7 years. Data on mothers' snack provision and mothers' choice considerations) was collected by diaries according to previous research (Bolger *et al.*, 2003; Patterson, 2005) and using a grounded theory approach (Dew, 2007; Harris *et al.*, 2009). The participants kept the diary for the duration of 13 days in January 2017, including 2 weekends to include the potential differences in snacks given during weekdays and weekends.

2.2.2 Recruitment, selection, and grouping of participants

Participants were recruited by advertising at schools and day-care centers in the Netherlands, and on social media. Additionally, the snowball sampling technique (Zarantonello and Luomala, 2011) was used to find more participants. Participants were purposively included (Harris *et al.*, 2009; Draper and Swift, 2011) to vary in educational level, number of children (of which the order of the child in the household could be assessed), and age of the children to enable to answer RQ2 and RQ4. For educational level the demarcation was set at Bachelor's degree. The higher educated group includes all mothers with a Bachelor's degree or higher, the lower educated group includes all mothers with an educational level lower than Bachelor's degree. Potential participants (n=180) filled in a selection questionnaire to gather demographic data and to select them according the criteria set for the target group. These criteria were that participants must have at least one child in the age group of 2-7 years old, have the intention to keep the diary for the full 13 days, and that the child does not have a severe food allergy or suffer from chronic diseases (*e.g.* diabetes). Because

mothers with children in the age group between 2 and 3 years were over-represented in the selection questionnaire data, 31 of these mothers were randomly excluded from the study. Another 10 potential participants did not fall into the target group and were therefore excluded. In total, 139 mothers were selected to participate in the study. Each participant was compensated with a €40 gift voucher after keeping the diary for 13 days.

2.2.3 Diary method

Mothers reported every snack they gave to their child in the morning, afternoon, and evening in an online event-based diary. They were instructed to report only the type of snack (*e.g.* crisps or cookie) and the overall amount or number of the snack (*e.g.* a bowl of crisps or two cookies); they did not have to weigh the snacks given (*e.g.* give the amount of grams of the crisps). Besides, they noted for each snack given their considerations for giving the specific snack. From these notes on considerations we extracted verbatim quotes to support our results. If they had more than one child in the target group of 2-7 years, the researcher instructed for which of their children they had to fill in the diary. Every morning, mothers received an email with the survey link to the diary and instructions for that specific day. The data was collected using Qualtrics survey software (www.qualtrics.com, 2017) that could be accessed through any device with web access like smartphone, computer or tablet. Moreover, additional to the online diary, mothers received a paper notebook to give them the possibility to note the snacks they gave during the day and complete the diary online at their convenience later that day. Mothers could decide themselves to immediately report the snacks provided or at the end of the day. If they had not completed the diary at 21:00 in the evening they received a reminder email. Additional questions about the snack provided were asked for every entry of a snack. Questions were related to the considerations for giving the particular snack. The participants were given the possibility to stop with the diaries whenever they wanted, for example when they experienced the burden of keeping the diary to be too intense. The diary study was piloted with 3 mothers of young children (aged 2, 4 and 7 years), which were not involved in the study. Some minor changes to the diary study were made according to the pilot study.

2.2.4 Data analysis

Descriptive statistics using SPSS version 23 were calculated for the demographic data as well as for the snacks per product category. Data from the diaries were imported into software program MAXQDA version 12, to electronically organize, code and analyze the qualitative data. Conventional content analysis was used to allow the categories of considerations and names of these categories to flow from the data as described by Hsieh and Shannon (2005).

The coding was led by the first author and was done independently by both the first author and a second researcher. The imported diaries were read and re-read carefully and coded precisely. Codes with similar meanings were merged to one consideration and considerations which had commonalities were placed under the same overall category. After coding the same 25 diaries, the given code labels were compared, and differences were discussed and resolved to come to a set of code labels to be used for coding the remaining diaries to obtain consistency in coding. Six overall categories of considerations were established, covering 26 subgroups of considerations. To answer RQ2 and RQ4, data on snacks per product category as well as the overall categories of considerations were split per subgroup. Because of the high number of total considerations mentioned by the mothers, this data is presented in percentages. Data saturation was reached, since after analyzing a substantial set of diaries no new code labels appeared and overall categories appeared to be sufficient.

2.3 RESULTS

2.3.1 Participant characteristics

From the 139 mothers starting the diary research, 137 mothers completed the study. Data of one mother was excluded from analysis because she did not use the instructed definition of snacks. Most mothers (84%) filled in the provided snacks and their considerations the same day, the others the day after.

Mothers were aged between 24 and 47 years (mean age = 33.9 years; SD = 4.4 years). Most mothers had a paid job (n = 114; 84%) with an average workweek of 24.3 h (SD = 6.5 h). Eight percent of the mothers had one child, 66% had two children, 21% had three children, and 5% had four children. Table 2.1 presents the distribution of the 136 Dutch mothers according to the subgroups defined for this study: educational level (higher educated mothers n = 65, lower educated mothers n = 71), first child in the household (n = 68) or not-first child in the household (n = 68) and age group of the children (2-3 years n = 48, 4-5 years n = 45, 6-7 years n = 43). The mothers were equally divided over the subgroups (*e.g.* lower educated mother with first child of 6-7 years), and we ensured each subgroup consisted of minimally 10 mothers, as can be seen in Table 2.1.

Table 2.1. Distribution of the participants (n = 136) over the subgroups.

	Lower educated mothers (n = 71)	
	First child (n = 34)	**Not-first child (n = 37)**
2-3 years (n = 25)	11	14
4-5 years (n = 24)	11	13
6-7 years (n = 22)	12	10
	Higher educated mothers (n = 65)	
	First child (n = 34)	**Not-first child (n = 31)**
2-3 years (n = 23)	12	11
4-5 years (n = 21)	11	10
6-7 years (n = 21)	11	10

2.3.2 Mothers' snack choice (RQ1)

In total, 2415 snacks were given by 136 mothers in a period of 13 days, which is an average of 1.4 snack given by the mother per child a day. The average seems quite low; not all mothers gave a snack themselves every day because they were not home, or because their children were not at home, or because others provided the snacks (*e.g.* the father, grandparents). The snacks provided by the mothers are divided in 10 product categories (Table 2.2). Fruit (n = 672, 28%) is the most frequently given snack, followed by cookies (n = 476, 20%), and sweets (n = 421, 17%).

2.3.3 Mothers' snack choice by subgroups (RQ2)

Higher educated mothers provided more vegetables as a snack compared to lower educated mothers. Besides, higher educated mothers more often provided rice crackers, bread sticks and raisins, which are perceived as a healthier alternative for a cookie or candy by Dutch mothers as this is actively communicated by the youth health care organizations in the Netherlands. Lower educated mothers more frequently gave crisps as a snack.

Also differences in snacks provided to first and not-first children in the household were seen. Second and following children received slightly more snacks from their mothers compared to first children. Mothers of the first child in the household gave vegetables, rice crackers, bread sticks and raisins, and bread products more often compared to mothers of not-first children.

Table 2.2. Total number of snacks per product category provided by mothers (n = 136) in a period of 13 days.

Product category	Description	n
Fruits	All fruits like apple, banana, grapes, kiwi, berries, etc. Fruit smoothies, pre-peeled and pre-sliced fruit, and ready to eat bags with fruit puree.	672 (28%)
Cookies	All cookies including muesli and cereal bars, and cake.	476 (20%)
Candy	All candies like lollypops, marshmallows, licorice, chocolate and peppermints.	421 (17%)
Crisps	All crisps.	153 (6%)
Rice cracker, bread sticks and raisins	Rice crackers, bread sticks and raisins. These products are seen as typical products for (young) children in the Netherlands. They are perceived as a more healthy option for a cookie or candy and recommended by the youth health care organizations in the Netherlands.	139 (6%)
Bread products	All bread products like sandwiches, currant bun, gingerbread, cracker, croissant etc.	137 (6%)
Savory snacks	All savory snacks like popcorn, sausage, cheese, nuts, fries etc.	93 (4%)
Vegetables	All vegetables including olives and pickles.	83 (3%)
Pie and pastry	All pies and pastry like apple pie, cream puffs, apple turnover, etc.	82 (3%)
Other products	All other products like desserts (*e.g.* yoghurt, pudding, mousse), noodles, ice-cream, pancakes, soups etc.	159 (7%)

The results also indicate differences between snacks provided to children of the different age groups. Mothers of children aged 2-3 years gave more fruits and rice crackers, bread sticks and raisins, as a snack compared to mothers with children in the older age groups. Mothers of children aged 2-3 years gave less candy compared to mothers of children aged 4-5 years and children aged 6-7 years. On the other hand, mothers of children aged 6-7 years gave more vegetables to their children compared to mothers with children aged 2-3 years and 4-5 years.

2.3.4 Mothers' considerations to provide a snack (RQ3)

Table 2.3 shows the considerations of mothers when giving snacks to their children, grouped in 6 overall categories. These overall categories include health-related considerations, influence of the child, habit-related considerations, strategies, external influence and other considerations. Mothers usually reported multiple considerations while giving a snack; on average they reported 2.2 considerations per snack.

"I gave her avocado, it is healthy, she likes it and it is convenient" [ID034: higher educated, first child, 6-7 years].

The mothers most often mentioned health-related considerations (n = 1394, 26%), followed by influence of the child (n = 1099, 22%) and habit-related considerations (n = 702, 13%). Table 2.3 shows for each individual consideration how many times these are mentioned by the mothers.

Table 2.4 provides the considerations of the mothers while providing a snack to their children grouped per product category. It is obvious that the most frequently mentioned consideration in this study, health, was typically related to the product categories which are generally accepted to be healthy, *i.e.* 84% of the fruits and 80% of the vegetable snacks were given because of health considerations. However, the consideration health was also mentioned when providing rice crackers, bread sticks and raisins (46%), bread products (39%), and savory snacks (29%). Even cookies were in 13% of the cases given with health as a consideration, also candy (4%) and pie (4%) were mentioned by a few mothers as healthy.

"I gave him apple pie because it is fruit too" [ID019: lower educated, first child, 4-5 years];

"He got a spelt cookie, this is a healthy cookie, so a good choice" [ID128: lower educated, not-first child, 6-7 years].

Whether a snack is seen as healthy or unhealthy by the mothers is sometimes depending on comparison with other products. When cookies are given with the consideration of health, mothers frequently mention that they judge it as more healthy in comparison with candy.

"I gave him a cookie which is better than a lollypop" [ID043: lower educated, first child, 6-7 years].

The consideration 'moment of the day or day of the week' is mostly used for the product category crisps (30%). This is also confirmed by our results indicating that crisps are mostly provided on Friday-evening, Saturday, and Sunday (77%) (Data not presented). For the other product categories, no differences in provision between days during the week and weekends were found. The consideration 'child's preference' is slightly more used during the weekends (19%) compared to days during the week (12%); in the weekends children were more often allowed to eat snacks they preferred.

Table 2.3. Categories of mothers' considerations for providing a snack, definitions and frequencies.

Overall category	Considerations	Definition	n
Health-related (n = 1394, 26%)	Healthy	The mother is judging it as healthy.	857
	Justify (unhealthy) snacks	Defending the snack given. These are mostly used for the unhealthier snacks	294
	Reasons related to health/ nutritional value	Health and nutritional value. For example, high in fiber, dental health and rules according healthy foods.	97
	Healthy is already eaten, so unhealthy is allowed	The unhealthy snack is allowed because a healthy snack is already eaten (during that day, or week).	74
	Variation	Diversity in the diet	72
Influence child (n = 1099, 21%)	Preference child	Liking of the snacks by the children.	456
	Child asked	The child asking for a particular snack.	418
	Child choose him/herself	The child could choose him/herself, including the choice from a limited number of options.	225
Habit-related (n = 702, 13%)	Habit	Daily routine and 'because we always do it like this'.	431
	Moment of the day/week	A specific moment of the day or day of the week.	271
External influence (n = 633, 12%)	Party/visit of others	A party or visit of others	180
	Influence of siblings	Siblings getting a snack or ask for a snack.	147
	Influence of mother	The mother is eating or liking the snack.	122
	Influence of others	Influence of others including grandparents, friends of the children, etc. Siblings and mothers excluded.	111
	Everyone gets it, so also the child	Everyone (in the setting of that moment) gets the particular snack and therefore the child also gets it.	73
Strategies (n = 625, 12%)	Rewarding/indulging/ comforting/calming	Rewarding, indulging, comforting or calming the child; to influence the mood of the child.	269
	Satisfy child's hunger	Providing a snack to satisfy the hunger of the child.	120
	Convenience	Convenience of preparing, eating or taking away.	113
	Bridge time to dinner	Span time to eating dinner.	62
	Filling	The satiating properties of the snack.	61
Other (n = 851, 16%)	Availability	The availability of the snack at home, or the unavailability of the desired snack.	176
	Sociable	The nice moments when eating a snack together.	116
	Before/after an activity	Activities to be done of just done. For example, going to sports.	89
	On the go	Snacks prepared or packed for on the go.	87
	Not to spill	Not wasting food. For example, because the package was open or because fruits were ripe.	75
	Other motivations	All other mentioned motivations to provide a snack.	308

Table 2.4. Considerations mentioned per product category, in percentages.

Overall category	Considerations	Fruits	Cookies	Candy	Crisps	Rice crackers, bread sticks and raisins	Bread products	Savory snacks	Vege-tables	Pie and pastry
Health-related	Healthy	84%	13%	4%	2%	46%	39%	29%	80%	4%
	Justify (unhealthy) snacks	0%	19%	34%	20%	1%	1%	13%	0%	16%
	Reasons related to health/nutritional value	6%	3%	1%	2%	12%	6%	5%	11%	0%
	Healthy is already eaten, so unhealthy is allowed	0%	9%	5%	4%	1%	1%	1%	0%	0%
	Variation	6%	2%	1%	1%	6%	5%	4%	1%	0%
Influence child	Preference child	21%	21%	17%	16%	26%	22%	38%	33%	10%
	Child asked	19%	14%	26%	8%	20%	21%	20%	13%	6%
	Child choose him/herself	10%	10%	19%	3%	8%	4%	3%	5%	5%
Habit-related	Habit	29%	21%	19%	10%	4%	7%	9%	5%	2%
	Moment of the day/week	7%	13%	14%	30%	16%	6%	8%	12%	5%
External influence	Party/visit of others	1%	9%	5%	31%	1%	5%	15%	6%	60%
	Influence of siblings	6%	8%	7%	7%	12%	7%	6%	7%	4%
	Influence of mother	3%	9%	6%	7%	4%	6%	5%	4%	10%
	Influence of others	1%	4%	12%	9%	1%	2%	4%	1%	12%
	Everyone gets it, so also the child	0%	4%	2%	12%	1%	4%	5%	0%	22%
Strategies	Rewarding/indulging/comforting/calming	2%	12%	27%	28%	10%	7%	6%	5%	9%
	Satisfy child's hunger	5%	3%	1%	1%	17%	23%	4%	11%	0%
	Convenience	4%	7%	3%	1%	12%	7%	0%	8%	0%
	Bridge time to dinner	2%	2%	1%	3%	11%	7%	4%	14%	0%
	Filling	2%	3%	0%	0%	3%	15%	2%	4%	0%
Other	Availability	5%	7%	7%	13%	13%	14%	22%	12%	6%
	Sociable	2%	8%	4%	10%	4%	2%	12%	5%	16%
	Before/after an activity	2%	7%	3%	3%	4%	7%	5%	0%	0%
	On the go	2%	4%	7%	3%	8%	7%	1%	2%	1%
	Not to spill	10%	17%	10%	10%	17%	23%	16%	11%	5%
	Other motivations	10%	17%	10%	10%	17%	23%	16%	11%	5%

> *"Something extra, because it is weekend, he does not get this daily" [ID022: lower educated, first child, 2-3 years].*

All products given by the mothers scored high on the consideration child preference; highest scored savory snacks (38%), vegetables (33%) and rice crackers, bread sticks and raisins (26%). These results show that mothers tend to give their children a snack they like.

The consideration 'habit' is mostly mentioned for the product categories fruit (29%), cookies (21%), and candy (19%). The consideration to provide a snack because the child asked for it was most often used for the product category candy (26%). Crisps (28%) and candy (27%) were most often used to indulge, reward, comfort or calm children. Candy (30%) was the product category mothers justified most often.

2.3.5 Mothers' considerations to provide a snack according to subgroups (RQ4)

In Table 2.5, considerations (expressed as %) are presented according to the division of mothers in the subgroups. In the next paragraphs, the main results with regard to the subgroups will be explained, supported by verbatim quotes of the mothers.

Maternal education (RQ4)
The results in Table 2.5 indicate that "health-related" considerations are used differently by lower and higher educated mothers. The lower educated mothers more often justify unhealthy snacks they provide, compared to the higher educated mothers

> *"She gets 3 candies, I think candy is not too bad" [ID047: lower educated, first child, 4-5 years].*

Higher educated mothers more frequently used reasons related to (relative) healthiness as a consideration to provide a snack.

> *"Fruit I give only once a day, because of dental health" [ID018: higher educated, not-first child, 2-3 years].*

Another consideration mentioned more often by higher educated mothers is variation. Variation in snacks was important to them, with respect to healthy snacks as well as for more unhealthily perceived snacks.

> *"I gave her some white chocolate, my daughter already had fruit in the morning as snack, I want to vary in what I give her" [ID029: higher educated, first child, 2-3 years];*
> *"…I make sure there is always fresh fruit available and that we can vary the fruit we eat every day. My child can choose from our fruit bowl; however I stimulate her to pick something else than the day before" [ID116: higher educated, not-first child, 2-3 years].*

For the overall category "influence of the child", there was neither a relation between maternal education and the consideration preference of the child nor for the consideration child choose him/herself (Table 2.5). The only difference in this category, was that the lower educated mothers more often provide a snack to their children because their child asked for it.

In the "habit-related" category, the results indicate that lower educated mothers more frequently used considerations related to time of the day or day of the week.

> *"I gave him raisins, he asked for candy, but I do not give any candy in the mornings" [ID028: lower educated, first child, 2-3 years].*

Influence of siblings is the only consideration of the category "external influence" which shows some differences for maternal education. Higher educated mothers more frequently mentioned influence of siblings as a consideration, while providing a snack to their child. Differences are also present in the category "strategies" (Table 2.5). Lower educated mothers more often provided a snack to reward, indulge, comfort or calm their child compared to the higher educated mothers.

> *"He ate his lunch well, as a result he knows he gets a candy" [ID123: lower educated, not-first child, 2-3 years].*

The higher educated mothers more often mentioned the considerations bridge time to dinner and convenience. Other more frequently mentioned considerations by higher educated mothers were 'on the go' and providing a snack because of the 'sociable' effect.

First child versus not-first child in the household (RQ4)

Comparing mothers' considerations to provide a snack to the first child versus to not-first children, we observed that considerations related to healthiness or nutritional value and variation were differing the most in the overall category "health-related". The "habit-related" category showed that mothers of not-first children in the household more often provided a snack because of habit and according to the time of the day or day of the week (Table 2.5).

Table 2.5. Differences in considerations of mothers when providing a snack to their young children according subgroups.

Overall category	Considerations	Lower educated mothers	Higher educated mothers	Mothers of first children	Mothers of not-first children	Mothers of children 2-3 years	Mothers of children 4-5 years	Mothers of children 6-7 years
Health-related	Healthy	51%	49%	50%	50%	42%	30%	28%
	Justify (unhealthy) snacks	60%	40%	53%	47%	30%	32%	38%
	Reasons related to health/nutritional value	27%	73%	67%	33%	34%	29%	37%
	Healthy is already eaten, so unhealthy is allowed	50%	50%	51%	49%	36%	25%	39%
	Variation	29%	71%	59%	41%	47%	22%	30%
Influence child	Child preference	50%	50%	50%	50%	32%	31%	37%
	Child asked	59%	41%	49%	51%	38%	30%	32%
	Child choose him/herself	49%	51%	44%	56%	27%	36%	37%
Habit-related	Habit	46%	54%	38%	62%	38%	36%	26%
	Moment of the day/week	62%	38%	41%	59%	26%	36%	38%
External influence	Party/visit of others	56%	43%	52%	48%	32%	43%	25%
	Influence of siblings	38%	51%	55%	45%	37%	37%	26%
	Influence of mother	51%	59%	62%	38%	37%	29%	34%
	Influence of others	52%	79%	58%	42%	20%	41%	39%
	Everyone gets it, so also the child	45%	46%	61%	39%	48%	28%	24%
Strategies	Rewarding/indulging/comforting/calming	57%	43%	52%	48%	31%	36%	33%
	Satisfy child's hunger	49%	51%	42%	58%	32%	24%	44%
	Convenience	41%	59%	60%	40%	30%	37%	33%
	Bridge time to dinner	21%	79%	52%	48%	26%	38%	35%
	Filling	54%	46%	57%	43%	24%	25%	51%
Other	Availability	43%	57%	52%	48%	31%	35%	34%
	Sociable	38%	62%	60%	40%	28%	38%	34%
	Before/after an activity	47%	53%	41%	59%	7%	50%	42%
	On the go	35%	65%	48%	52%	29%	26%	45%
	Not to spill	53%	47%	52%	48%	9%	46%	45%
	Other motivations	52%	48%	48%	52%	35%	35%	30%

Mothers of the first child in the household also mentioned more considerations in the category "external influence", for example, considerations related to their own influence, influence of others and everyone gets it, so also the child. In a social event, like a party or a visit from family or friends, mothers of first children in the household more often gave them a snack as well because all the children around got the particular snack.
Mothers felt they could not pass their own child and therefore gave (in most cases) more unhealthily perceived snacks.

> *"He took some crisps. They were on the table because we had some friends and their kids visiting. Because the other children also took some crisps he was allowed to eat some too" [ID115: higher educated, first child, 2-3 year]. When it comes to the category "strategies", convenience was more often mentioned by mothers of the first child as a consideration to provide a snack.*

> *"Before dinner, if he watches television he often gets raisins. I give them because he likes them and because it is convenient. Slicing fruit takes me too much time" [ID048: lower educated, first child, 4-5 years].*

Considerations related to an activity were more often mentioned by mothers of the not-first children in the household while the sociable effect of snacking was more often mentioned in case of a first child.

> *"We ate crisps, we had a nice Saturday evening cocooning on the couch" [ID024: lower educated, first child, 4-5 years].*

Age group of the child (RQ4)
Table 2.5 shows that mothers of children in the youngest age group (2-3 years) more often provided a snack because of the "health-related" considerations healthiness and variation, as compared to the two age groups of older children. Mothers of children aged 4-5 and 6-7 years more often provided a snack with the consideration that the child could choose himself.

> *"She could choose a snack she preferred and took a lollypop" [ID003: higher educated, not-first child, 6-7 year].*

Mothers of children in the youngest age group (2-3 years) also more often provide a snack because everyone gets it. Another difference in the overall category "external influence" is

that the influence of siblings is more often reported by mothers of children in the younger age groups of 2-3 years and 4-5 years compared to mothers of children aged 6-7 years.

> *"I preferred to give him some fruit. But it is not possible to give one of my children a cookie and the other a piece of fruit. The oldest already ate fruit at school" [ID064: lower educated, not-first child, 2-3 years].*

In the category "strategy", we see that mothers of children aged 6-7 years reported to satisfy the child's hunger more frequently than mothers of children in younger age groups. In the category with "other" considerations, it is seen that mothers of children aged 4-5 and 6-7 years more often give a snack before or after an activity compared to mothers of the youngest age group. An obvious explanation could be that the youngest children have fewer activities to participate in. Moreover, mothers of children aged 4-5 and 6-7 years more frequently mentioned the consideration that they did not want to waste the food.

2.4 DISCUSSION

This study described choices of snacks and underlying considerations of mothers with young children split in different subgroups, using food and motivation diaries. Fruit was the snack that was mostly given by the mothers, followed by cookies and candies, which is in line with results of the Dutch National Food Consumption Surveys (Ocké *et al.*, 2008; Rossum *et al.*, 2016). This survey, conducted in 2005/2006 among Dutch children aged 2-6 years (Ocké *et al.*, 2008; Rossum *et al.*, 2016), also shows that fruit, sugar and confectionery, and cakes are mainly consumed in between meals.

The most frequently mentioned consideration of mothers to provide a snack to their young child was health. Likewise, previous studies identified health as an important food related value (Connors *et al.*, 2001) and as driver of food choice by mothers (Walsh *et al.*, 2015; Zobrist *et al.*, 2018; Damen *et al.*, 2019a). Child preference was another important motive for mothers to provide a snack. Studies of Evans *et al.* (2011), Carnell *et al.* (2011) Holsten *et al.* (2012), and Damen *et al.* (2019a) also demonstrated that children's preference affected mothers' food choice and selection of food for their children. However, the British mothers in the study by Moore *et al.* (2010) did not mention preference of the child as a feeding goal. A reason for this difference could be that the study by Moore *et al.* (2010) focused on all foods, including main meals where mothers might value variation and developing good dietary behavior above preference of their child. Habits have previously been found as a

driver for food choice in adults (Riet *et al.*, 2011). Other studies found that habits played a major role particularly in the consumption of fruits and vegetables by children of 4-19 years (Reinaerts *et al.*, 2007; Albani *et al.*, 2018) as well as for adults (Guillaumie *et al.*, 2010). Also in our study, habit was the second most mentioned consideration when fruit was provided as a snack, which could reflect the attempt of mothers to establish eating fruit as a good behavior for the future. The other main consideration for mothers in this study to provide a snack, "child asked", was also pointed out by Carnell *et al.* (2011). The snacks children ask for are often unhealthy (Table 2.4). According to several studies (Connors *et al.*, 2001; Phan and Chambers, 2016) convenience is an important driver for food choice but in our study, only mothers of the first child in the household mentioned this consideration as relevant.

2.4.1 Maternal education (RQ2 and RQ4)

In this study, higher educated mothers gave more vegetables and rice crackers, bread sticks and raisins, and fewer crisps to their children compared to the lower educated mothers. Moreover, they more often mention to vary between snacks (Table 2.5). Cribb *et al.* (2011) also found that mothers with a higher education more often gave vegetables to their children, while mothers with a lower education showed a trend of a higher intake of unhealthier foods. However, the study by Cribb *et al.* (2011) was about all foods provided, not only snacks. Vereecken *et al.* (2004) showed that higher vegetable provision was positively related to maternal education, which is also found in the current study. This implicates that higher educated mothers may be more health conscious compared to lower educated mothers, which is supported by numerous previous studies (Bargiota *et al.*, 2013; van Ansem *et al.*, 2014; Saldiva *et al.*, 2014; Vilela *et al.*, 2015; Emmett and Jones, 2015; Gevers *et al.*, 2016; Durão *et al.*, 2017). Interestingly, lower educated mothers in the current study more often justified their (unhealthy) snack choice, which shows that they maybe are aware of what is healthy or less healthy, but judge other considerations to be more important at the moment of snack providing. However, for the given fruit, which is also generally accepted as a healthy snack, no differences between mothers of both educational levels was found in the current study, which is in contrast with the results of other studies (Vereecken *et al.*, 2004; Cribb *et al.*, 2011; Emmett and Jones, 2015). Remarkably, lower educated mothers in this study more often provided snacks to reward, indulge, comfort or calm their child, which is in contrast with the study by Raaijmakers *et al.* (2014) in which rewarding and comforting children with foods was related with a higher maternal education. Saxton *et al.* (2009) found no effects of maternal education on using food as a reward, but found a negative relation between maternal education and using food to comfort their children. This shows that results are not always in line and more research on this topic may be valuable. Lower educated mothers more often provided a snack because the child asked for it. Nepper

and Chai (2016) reported that parents give unhealthy snacks when children ask for it, out of frustration or because they want to please their children, but they found no differences between educational levels.

2.4.2 First child versus not-first child in the household (RQ2 and RQ4)

In this study, mothers of first children in the household provided fewer snacks in total compared to mothers of the not-first children. They more often gave healthier perceived products such as vegetables, bread products and rice crackers, bread sticks and raisins as a snack, compared to mothers of the not-first children and more often used reasons related to health. This more health conscious behavior of mothers of first children is also found in another study (Smith *et al.*, 2011) in which first children were provided with more vegetables compared to not-first children. In addition, Brekke *et al.* (2007) found that the presence of older siblings resulted in a higher intake of sugar-rich and low-nutrient foods among 1-year-old children. These results show that mothers of first children are more careful regarding the healthiness of the snacks they provide. This is also in line with observations of Briefel *et al.* (2006) and Garemo *et al.* (2007). They observed that recommended vitamin supplementation was more often given to the first child in the household compared to not-first children. Previous research shows that the not-first children in the household get more (sweet) snacks and fruits (Smith *et al.*, 2011; Vennerød *et al.*, 2017). Although differences are present in these categories in the current study, these are not overly clear.

2.4.3 Age groups of the child (RQ2 and RQ4)

The targeted age group in this research was children between 2 and 7 years, this age group was split into children aged 2-3, 4-5 and 6-7 years. Mothers of children in the age group of 2-3 years olds more often provided fruit and rice crackers, bread sticks and raisins to their children as a snack compared to mothers of children in the older age groups. They also provided less candy, which is in accordance with the results from a study by Rangan *et al.* (2008). A reason for this could be that for younger children mothers judge healthiness of the snacks as more important. Vegetables as a snack are more consumed in this study by children aged 6-7 years compared to the younger children, maybe because younger children are less used to the taste and texture of vegetables as a snack, or maybe because mothers of younger children offer vegetables less often as a snack to their younger children compared to older children. Mothers of younger children (2-3 years) more often provide a snack because everyone gets it or because of the influence of older siblings (Table 2.5), which is in line with previous research (Cislak *et al.*, 2012; Bogl *et al.*, 2017). It seems that initially mothers did not intend to provide certain snacks to their 2-3 years old children, but because of the presence of the others they do not want to pass their child. Mothers of children in

the two older age groups more often mention that their children could choose the snack themselves, which is also seen by Patrick and Niklas (2005). They found that older children have more autonomy over their snack choice.

2.4.4 Methodological considerations

Finally, the methodology used in this study provided a significant step forward in this type of research. For the current study 136 mothers filled in a qualitative food and motivation diary for a duration of 13 days, whereas in-depth interviewing is the most common procedure used in literature (Moore *et al.*, 2010; Lovelace and Rabiee-Khan, 2015; Boak *et al.*, 2016; Jacquier *et al.*, 2016; Raskind *et al.*, 2017; Jacquier *et al.*, 2017). Diary studies are common in the field of consumer research, but the duration of data collection is often shorter and a smaller number of participants is involved (Carnell *et al.*, 2011, Elliston *et al.*, 2017). To succeed in running a diary for 13 days with so many participants it was necessary to keep them highly involved. Besides the motivational colloquium at the beginning, participating mothers received reminders on their smartphone if the diary was not filled in. Moreover, university staff was available 24/7 for questions and remarks during the full period of the study. All these efforts resulted in only 2 drop-outs out of the 139 participants. Running a food and motivation diary for a long time was an excellent method to gain insights into considerations mothers have while providing a snack to their young children, because it measures their behavior in a natural context, which makes the data more reliable compared to in-depth interviews. Besides, a diary study gives the opportunity to measure all snack moments during the day for a longer period, which is not possible with in depth-interviews. Using diaries also minimizes the time between the experience and the reporting of the experience, which reduces the chance of retrospection (Bolger *et al.*, 2003). The possibility given to the respondents to report the snacks given of that day at the end of the day, relies on memory more heavily than when they immediately fill in the snacks provided which could be seen as a possible limitation. However, it is still more accurate than using interviews to measure this behavior, and by providing the notebooks to write down the snacks of the day the effect will be limited. On the contrary, diaries could influence the way participants behave as they know they have to record what they do (Subar *et al.*, 2015). For example, mothers can report fewer snacks than they actually give or underreport the unhealthier snacks, or decide to give other snacks than they normally do. This might be a limitation of the selected methodology in our study, however we expect that because of the longer time this diary ran, this effect will be small as they get used to this recording of their behavior.

2.5 CONCLUSIONS

To our knowledge, this is the first study that shows the large diversity of snacks provided by mothers and their considerations for giving these snacks. Fruits, cookies and candy were the most frequently provided snacks, while health and child preference were the most used considerations. Our results provide a first indication of differences between higher and lower educated mothers, between mothers of the first child in the household compared to not-first child, and between mothers of children in different age groups, providing convincing answers to the research questions of the study. The empirical findings in this study provide understanding of the mothers' considerations while providing a snack to their young children, which may support the design of new snack products and could be relevant for the design of nutritional education campaigns as well as for improving the design of interventions to help mothers meet children's dietary requirements.

For further research, this method could be expanded to other groups related to snack providing of young children, *e.g.* fathers or single child households (as these were a bit underrepresented in this study). Snacks consumed out of home, for example at child-care, school or on the go could be also an interesting step for further research. To validate the results on the subgroups, a quantitative snack consumption survey should be implemented, and to understand why mothers of the different subgroups behave differently, more qualitative research is needed. Finally, some mothers tend to experience struggles while providing a snack to their young children. More focus on these value conflicts could contribute to on-going improvements in children's dietary patterns.

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CHAPTER 3

General parenting and mothers' snack giving behavior to their children aged 2-7.

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ABSTRACT

The increasing intake of energy-dense snacks among children is one of the contributing factors to childhood overweight. To understand children's snacking habits, snack choices of parents are essential to take into account. General parenting is one of the important factors that can influence the development of healthy eating patterns and weight status among children. Therefore, this study aims to explore how the key constructs of general parenting (nurturance, structure, behavioral control, overprotection and coercive control) relate to mothers' snack choice for their children aged 2-7 years. The Dutch version of the validated Comprehensive General Parenting Questionnaire (CGPQ) was used to assess the key constructs of general parenting. An extensive, 13-day diary study with 136 Dutch mothers was used to measure the snacks mothers provided their children aged 2-4 years and 5-7 years. For both groups of mothers in our sample, differences were found on the scores of coercive control and overprotection. No differences between the mothers were present on the key constructs behavioral control, nurturance, and structure. Results give a first indication that more mothers who scored relatively higher on coercive control provided unhealthy products, like candy and cookies, and fewer mothers provided vegetables, compared to mothers who scored lower on coercive control. A higher score on coercive control combined with a higher score on overprotection was associated with fewer mothers providing unhealthy products like cookies and candies.

3.1 INTRODUCTION

Childhood obesity is an increasing public health-problem (Ogden *et al.*, 2014; Wijnhoven *et al.*, 2014; Boots *et al.*, 2015) and has a tendency to persist into adulthood (Singh *et al.*, 2008; Nicklaus, 2016), which can lead to health-related problems over the course of life (Daniels, 2009; Reilly and Kelly, 2011; Flodmark, 2018). The increasing intake of energy-dense snacks among children is one of the contributing factors to childhood obesity (Vereecken *et al.*, 2004; Piernas and Popkin, 2010; Boots *et al.*, 2015), which can represent a significant proportion of children's daily energy intake (Fisher *et al.*, 2015).

To understand children's snacking habits, the snack choices of parents for their children are essential to take into account (Fisher *et al.*, 2015; Boots *et al.*, 2015). Parents influence the food intake of their children through their interaction with their children, as well as by the availability of foods at home (Horst and Sleddens, 2017). In addition, the educational level of the mother is of influence on their food choice for their children (Craig *et al.*, 2010; Chen *et al.*, 2019; van der Velde *et al.*, 2019; Damen t al., 2019b). Also the family structure, including the presence of siblings has been shown to influcence eating habits of children (Haines *et al.*, 2019, Damen *et al.*, 2020b).

Parents are very important for developing healthy eating patterns among their children and for their children's weight status (Golan & Crow, 2004; Sleddens *et al.*, 2014a) through their general parenting (Gevers *et al.*, 2015a). General parenting consists of attitudes, beliefs, and behaviors, by which parents influence their children's behavior through creating a family emotional climate to raise their children in (Sleddens *et al.*, 2014b; Wang *et al.*, 2017). General parenting entails both parenting styles and practices, which have different effects on children's behaviors (Rhee *et al.*, 2015; Vaughn *et al.*, 2015; Langer *et al.*, 2017). Parenting styles encompass the general aspects of parenting behaviors, which are more static characteristics of parenting, that do not vary in response to child behaviors and characteristics (Rhee *et al.*, 2015; Vaughn *et al.*, 2015; Langer *et al.*, 2017). Parenting practices are more dynamic and content-specific parenting strategies (Sleddens *et al.*, 2014b; Langer *et al.*, 2017) to influence the child's attitudes, behaviors, or beliefs. Gevers *et al.* (2015b) who investigated the clustering of parents on food parenting practices, reported that children of Dutch parents, who belonged to the 'high involvement and supportive' group, more likely consumed less energy-dense snack foods compared to children of parents of the other groups. Parenting styles and practices may thus influence the dietary behaviors of children (e.g, Sleddens *et al.*, 2014a; Gerards and Kremers, 2015; Davison *et al.*, 2015) by determining the foods children eat (Hennessy *et al.*, 2012, Sleddens *et al.*, 2014b; Boots *et*

al., 2015), the portion sizes, the eating frequency (Boots *et al.*, 2015), the moment of eating (Gevers *et al.*, 2015c) and by modelling dietary behaviors (Davison *et al.*, 2015). However, the study of Kong *et al.* (2019) found no associations between mother and child feeding interactions and the BMI of the children. This can be explained by the fact that the BMI can be seen as a longterm effect and is thus further away in the casusal chain as compared to nutritional intake. The influence of parenting styles and practices is therefore important to consider when exploring the dietary behaviors of children (Sleddens *et al.*, 2011), and related to that the snack provision behavior of mothers to their children.

Parenting styles and practices influence especially younger children. Therefore, parents mostly influence the development of children's' dietary habits at a young age (Peters *et al.*, 2012). Besides, children younger than 8 years do not see the difference between foods and snacks (Contento, 1981). They mostly do not pick their snacks themselves, but get them from their caregiver, which are often the mothers (Blissett *et al.*, 2006; Rosenkranz and Dzewaltowski, 2008; Walsch *et al.*, 2015; Damen *et al.*, 2019a). Therefore, parenting styles and practices as used by mothers are important to consider when focusing on young children's dietary and snacking behavior. In addition, a mother's choice to provide a snack is less determined beforehand compared to choices concerning main meals, since a snack is mostly chosen on the eating moment itself (Damen *et al.*, 2019b), while the main meal is often planned before (Fay *et al.*, 2011; Wilkinson *et al.*, 2013). Therefore, the provision of snacks could be determined by parenting strategies and parental choices to a greater extent than to main meals. As a result, choosing a snack could be sometimes experienced as a difficult moment for mothers (Damen *et al.*, 2020a).

Sleddens *et al.* (2014b) developed the comprehensive general parenting questionnaire (CGPQ) to measure general parenting. This questionnaire is based on five key parenting constructs: nurturance, structure, behavioral control, overprotection, and coercive control. Previous research has shown that the five key parenting constructs can affect children's weight status. The use of nurturance, structure, or behavioral control has been associated with a lower BMI in children (Sleddens *et al.*, 2014a; Sleddens *et al.*, 2014b). On the contrary, coercive control and overprotection have been associated with a higher BMI in children (Sleddens *et al.*, 2014a; Sleddens *et al.*, 2014b; Kelleher *et al.*, 2015; Demir *et al.*, 2017). As the consumption of energy-dense snacks could contribute to childhood obesity (Vereecken *et al.*, 2004; Piernas and Popkin, 2010; Boots *et al.*, 2015) and the consumption of healthy snacks could help in developing a more healthy eating pattern (Deming *et al.*, 2017; Kachurak *et al.*, 2019; Xue, *et al.*, 2019), it is of interest to investigate possible associations between the types of snacks provided by mothers to their children and general parenting.

Therefore, the aim of this study was to gain insight into the type of snacks given by mothers, who differ in general parenting, to their children aged 2-4 years and 5-7 years. The CGPQ was developed to investigate how parenting influences children's weight-related behaviors. In the current study, data from the CGPQ was combined with data from extensive diary research on mothers' snack giving behavior to their children aged 2-7 years (Damen *et al.*, 2019b) to investigate possible associations.

3.2 METHODS

3.2.1 Study design

This study on the possible relation between general parenting practices and mothers' snack giving behavior was conducted with 136 Dutch mothers of young children aged 2-7 years. Diaries were used to collect data on mothers' snack provision according to previous research (Bolger *et al.*, 2003; Patterson, 2005), using a grounded theory approach (Dew, 2007; Harris *et al.*, 2009). The Comprehensive General Parenting Questionnaire (CGPQ) (Sleddens *et al.*, 2014b) was used to gather data on mothers' general key constructs of parenting. The participants kept the diary in January 2017, for the duration of 13 days, on the last day participants completed the CGPQ.

3.2.2 Recruitment, selection, and grouping of participants

Participants were recruited on social media platforms (Facebook, Linked-in) and through advertising with flyers at schools and day-care centers in several cities in the Netherlands. Additionally, the snowball sampling technique (Barros da Silva *et al.*, 2018; Bogart *et al.*, 2019) was used to gather potential participants. Potential participants were approached in person as well as by email. Potential participants (n=180) were asked to fil in a selection questionnaire to determine their fit for the study according to the set criteria for the target group. These criteria were that mothers had at least one child in the 2-7 years age group, and the intention to keep a diary for 13 days. Mothers whose child had a severe food allergy or suffered from chronic diseases (*e.g.* diabetes) were not included in the research. The selection questionnaire contained questions regarding the number and age of the children, educational attainment of the mother, and general practices in snack giving behavior. Participants were purposively included (Harris *et al.*, 2009; Draper and Swift, 2011) to differ in educational level, order of the child in the household, and age of the children as previous research showed differences in snack giving behavior of mothers differing concerning those characteristics (Damen *et al.*, 2019b; Damen *et al.* 2020b). For educational attainment, the demarcation was set at Bachelor's degree, with all mothers having a Bachelor's degree or

higher, belonging to the higher educated group. Due to the over-representation of mothers with children aged 2-3 years, and mothers not belonging to the target group, 41 mothers were not included in the study. In total, 139 Dutch mothers were selected and contacted for participation. Two of the participants did not complete the study and one participant did not fill in the diary according to the set definition of snacking, which resulted in a final sample size of 136 participants.

Ethical approval was obtained for the study at the Social Science Ethics Committee of Wageningen University. Before the study started, participants received a letter explaining the duration and set-up of the research. This letter also explicitly stated that the results would be handled anonymously, and that all personal data would be kept confidential. In addition, mothers had the possibility to withdraw from participation at any moment. Each participant was compensated with a €40 gift voucher for completing the study.

3.2.3 Diary study

Every morning, for 13 days, the mothers received an email with a Qualtrics survey link (www.qualtrics.com, 2017) to the diary for registering their snack giving behavior (Damen *et al.*, 2019b). Snacking was described for the mothers as "any food given by the mother herself to the child that is not part of breakfast, lunch, or dinner". Mothers reported every snack they provided to their child in the morning, afternoon and evening. They could also report in the diary if they were not with their child that day, or did not provide any snacks. They were instructed to report only the type of snack (*e.g.* fruit or candy) and the overall amount or number of snacks (*e.g.* a bowl of grapes or two candies). They did not have to weigh the given snacks. Mothers could report the snacks they provided either immediately after giving it, or at the end of the day. If they had not completed the diary at 21:00 in the evening, they received a reminder email. Most mothers (84%) reported the provided snacks the same day; a few others the day after. The mothers had the possibility to stop with the diaries at any time, for example, when they felt keeping the diary was too much work. The diary study was piloted with 3 mothers who were not involved in the study. Some minor changes were made according to the pilot study to the set-up of the diary study.

3.2.4 Comprehensive General Parenting Questionnaire (CGPQ)

The Dutch version of the validated Comprehensive General Parenting Questionnaire (CGPQ) as developed by Sleddens *et al.* (2014b) was used to assess the five general parenting practices nurturance (NUR), structure (STR), behavioral control (BEC), overprotection (OVP) and coercive control (COC) of the participating mothers. Parents scoring high on nurturance foster and recognize individuality and self-assertion, by being supportive and

responsive to their child's needs, showing interest in the child's activities, spending time with their child, praising their child for good behavior, and expressing affection and care. Parents scoring high on structure act in a dependable and predictable manner with clear and consistent guidelines to help their child to achieve goals, solve problems, and perform tasks independently. Characteristics of behavioral control are supervising and managing the child's activities, providing clear explanations for behavior, and using disciplinary approaches in a non-intrusive way. Typical for overprotection is the excessive involvement or monitoring of the child's activities, more than what is considered appropriate for the child's age and the risks to which the child is exposed. Parents scoring high on coercive control use pressure, intrusion, domination, and discouragement of a child's independence and individuality (Sleddens *et al.*, 2014b).

The CGPQ allows evaluating the presence and characteristics of clusters on parenting, as well as the effects of different parenting constructs (Horst and Sleddens, 2017). The questionnaire items were reviewed, and the wording of one question was formulated less strongly (regarding physical punishment, sub-construct of coercive control) in order to prevent expected reluctance from the participating mothers to fill in the question. Two versions of the CGPQ were distributed that were appropriate for the specific age group of the child. One version of the CGPQ was distributed to mothers with children aged 2-4 years and contained fewer questionnaire items (69 items) than the version of the CGPQ distributed to mothers with children aged 5-7 years (85 items). The version for mothers with children aged 2-4 years entailed 18 items for nurturance, 17 items for structure, 15 items for behavioral control, 7 items for overprotection and 12 items for coercive control. The version for mothers with children aged 5-7 years had 20 items for nurturance, 20 items for structure, 20 items for behavioral control, 10 items for overprotection and 15 items for coercive control. The participating mothers had to rate their agreement with the questionnaire items on a 5-point Likert scale, ranging from 1 ('strongly disagree') to 5 ('strongly agree').

3.2.5 Data analysis

The data from the diaries were transcribed and imported into software program MAXQDA (version 12), to electronically organize and code the qualitative data. The reported snack products were grouped in 9 product categories: fruits, cookies, candy, crisps, rice crackers breadsticks and raisins, bread products, savory snacks, vegetables and pie and pastry, see Damen *et al.* (2019b) for all details.

Per respondent, the score for each construct was as a sum scale calculated by averaging the scores on the contributing scale questions. The psychometric performance of each sum

scale was assessed by Cronbach's alpha, using a cut-off value of 0.60 which Sim and Wright (2000) consider sufficient for newly developed measures.

By applying cluster analyses –separately for the two age groups-, mothers were grouped based on their scores on the five general parenting practices. A hierarchical cluster analysis was executed using Ward's method and Squared Euclidean Distance. The dendrogram and the agglomeration coefficients graph were analyzed to determine the number of clusters. The optimal number of clusters was chosen qualitatively on the basis of visual inspection of the dendrogram. In order to test whether the clusters differed meaningfully with respect to the observed scores on the general parenting practices, between cluster ANOVA was applied, using the Tukey-method for testing of significant differences of means between clusters, using conventional levels of significance (5%).

An overview of the clusters and their scores on the practices was made. The clusters of the group of mothers of younger children aged 2-4 years started their names with 'MY-cluster' (mothers of younger children cluster); the names of the clusters of the group of mothers of the older children aged 5-7 years started with 'MO-cluster' (mothers of older children cluster). The clusters on general parenting were connected to the snack giving data resulting from the diaries. Per snack-type, it was counted how many mothers per cluster did provide that snack during the test period, to see whether differences exist in the numbers of mothers per cluster, giving snacks divided over different categories. As far as sample size allowed for quantitative analysis, Pearson's goodness-of-fit chi-squared statistics were calculated to determine possible association between snack and cluster membership for each of the two age groups, using conventional levels of significance (5%). When the number of observations was too low for a meaningful statistical test, we relied on the reporting of descriptive statistics only, as is common in the field of qualitative research.

3.3. RESULTS

3.3.1 Sample characteristics

The participating mothers were aged between 24 and 47 years, with an average age of 33.9 years (SD=4.4). The majority of the mothers had two children (n=90; 66%), 21% (n=28) of the mothers had three children, 8% (n=11) had one child, and 5% (n=7) had four children. Most mothers had a paid job (n=114; 84%), with an average workweek of 24.3 hours (SD=6.5). The distribution of mothers over children's age groups (2-4 years: n=71, 5-7 years: n=65) and mother's educational level (lower educated: n=71, higher educated: n=65) was quite similar.

Likewise, mothers who kept the diary for their first child (n=68) and mothers who kept the diary for their child who was not the first child (n=68) were also equally divided (Damen *et al.*, 2019b).

3.3.2. Comprehensive General Parenting Questionnaire (CGPQ)

Table 3.1 shows the mean scores and significance on the five general parenting practices of all mothers per age group of the child. Mothers' scores on structure, behavioral control, and coercive control were comparable for the two different age groups. However, mothers of children aged 2-4 years scored higher on nurturance and lower on overprotection compared to mothers of children aged 5-7 years.

3.3.3 Clusters on key constructs of general parenting

Before running cluster analyses, outliers and multi-collinearity were checked. No multi-collinearity was present (VIF= 1.01-2.02, Tolerance: 0.53-0.99). The few outliers that were encountered were not deleted from the dataset, due to their relatively small deviation from the mean (<1.5 SD). The dendrogram (not printed) based on Ward's method indicated for both datasets that a solution of 2 or at maximally 4 clusters was adequate to describe the general parenting of the mothers. We choose for both datasets to work with 4 clusters. Table 3.1 presents the average scores, the standard deviations and the results of the ANOVA for each parental construct per cluster. In addition, per cluster frequencies according to the educational attainment of the mother, and whether or not the child they kept the diary for is their first child or not, are presented in Table 3.1.

Mothers of children aged 2-4 years

For the youngest children aged 2-4 years, the two main clusters MY-cluster 1 and MY-cluster 2 were further subdivided into MY-cluster 1a, MY-cluster 1b, MY-cluster 2a, and MY-cluster 2b. Table 3.2 specifies this division.

Table 3.1 shows that cluster MY-cluster 1 and cluster MY-cluster 2 split based on the difference in coercive control. MY-cluster 1 had a mean score of 2.8 on this general parenting practice, MY-cluster 2 scored lower with a mean score of 1.8. The other parental key constructs, educational attainment, and first versus not-first child, were not different between these clusters.

Table 3.1. Mean scores (SD) and significance (Tukey-test of differences of means) on the key constructs of general parenting (measured on 5-point scales), division of educational attainment and division of first vs not-first child, of all mothers per age group of the child and per cluster.

		Key parental construct (1-5)					Educational level		Mother of first vs not-first child	
	Cluster	**Behavioral control**	**Coercive control**	**Nurturance**	**Over-protection**	**Structure**	**Higher educated**	**Lower educated**	**Mother of first child**	**Mother of not-first child**
Mothers of younger children 2-4 years (n=71)	All (n=71)	3.9 (0.2)	2.3 (0.6)	4.5 (0.3)	1.9 (0.4)	4.1 (0.3)	35 (49%)	36 (51%)	33 (46%)	38 (54%)
	MY-cluster 1 (n=36)	3.9 (0.2)	2.8 (0.5)	4.5 (0.4)	1.8 (0.3)	4.1 (0.2)	18 (50%)	18 (50%)	18 (50%)	18 (50%)
	• MY-cluster 1a (n=12)	3.8 (0.2)	3.3 (0.3)^{a}	4.4 (0.2)	2.0 (0.3)^{a}	4.1 (0.2)	4 (33%)	8 (67%)	5 (42%)	7 (58%)
	• MY-cluster 1b (n=24)	3.9 (0.2)	2.5 (0.2)^{b}	4.6 (0.3)	1.7 (0.3)^{b}	4.1 (0.2)	14 (58%)	10 (42%)	13 (54%)	11 (46%)
	MY-cluster 2 (n=35)	3.8 (0.3)	1.8 (0.3)	4.5 (0.3)	1.9 (0.4)	4.0 (0.3)	17 (49%)	18 (51%)	15 (43%)	20 (57%)
	• MY-cluster 2a (n=8)	3.7 (0.3)	1.4 (0.3)^{c}	4.7 (0.4)	1.4 (0.2)^{c}	4.0 (0.3)	4 (50%)	4 (50%)	3 (38%)	5 (62%)
	• MY-cluster 2b (n=27)	3.9 (0.2)	1.9 (0.2)^{d}	4.5 (0.2)	2.1 (0.4)^{a}	4.0 (0.3)	13 (48%)	14 (52%)	12 (44%)	15 (56%)
	F	2.2	145.3	2.4	15.3	0.5	X^2 = 2.59, df = 3, p = 0.460		X^2 = 0.99, df = 3, p = 0.805	
	df_1:df_2	3:67	3:67	3:67	3:67	3:67				
	P	0.102	<.001	0.077	<.001	0.659				
Mothers of older children 5-7 years (n=65)	All (n=65)	4.0 (0.3)	2.1 (0.5)	3.6 (0.3)	2.8 (0.5)	4.0 (0.3)	30 (46%)	35 (54%)	35 (54%)	30 (46%)
	MO-cluster 1 (n=24)	4.0 (0.3)	2.6 (0.4)	3.6 (0.3)	3.2 (0.4)	4.1 (0.4)	10 (42%)	14 (58%)	13 (54%)	11 (46%)
	• MO-cluster 1a (n=14)	4.1 (0.3)^{a}	2.3 (0.3)^{a}	3.6 (0.2)^{ab}	3.4 (0.3)^{a}	4.2 (0.3)^{a}	6 (43%)	8 (57%)	7 (50%)	7 (50%)
	• MO-cluster 1b (n=10)	4.0 (0.3)^{ab}	2.9 (0.5)^{b}	3.6 (0.4)^{a}	2.9 (0.5)^{b}	3.9 (0.4)^{ab}	4 (40%)	6 (60%)	6 (60%)	4 (40%)
	MO-cluster 2 (n=41)	3.9 (0.3)	1.9 (0.4)	3.6 (0.2)	2.6 (0.5)	4.0 (0.3)	20 (49%)	21 (51%)	22 (54%)	19 (46%)
	• MO-cluster 2a (n=25)	4.0 (0.2)^{ab}	1.9 (0.4)^{c}	3.7 (0.2)^{b}	2.8 (0.3)^{b}	4.1 (0.3)^{ab}	10 (40%)	15 (60%)	13 (52%)	12 (48%)
	• MO-cluster 2b (n=16)	3.8 (0.3)^{b}	1.9 (0.4)^{c}	3.5 (0.2)^{a}	2.2 (0.4)^{c}	3.9 (0.4)^{b}	10 (63%)	6 (37%)	9 (56%)	7 (44%)
	F	3.2	32.5	4.7	27.5	4.660	X^2 = 1.58, df = 3, p = 0.665		X^2 = 0.31, df = 3, p = 0.959	
	df_1:df_2	3:61	3:61	3:61	3:61	3:61				
	P	0.029	<.001	0.005	<.001	0.022				

[abc] Different letter within a construct means significant different from each other.

Table 3.2. Cluster division for mothers of younger children aged 2-4 years.

Mothers of Younger children aged 2-4 years (n = 71)	**Cluster explanation**
MY-cluster 1 (n = 36)	Higher in coercive control (mean 2.8)
• MY-cluster 1a (n = 12)	• Higher in coercive control (mean 3.3) Higher in Overprotection (mean 2.3)
• MY-cluster 1b (n = 24)	• Lower in coercive control (mean 2.5) Lower in overprotection (mean 2.0)
MY-cluster 2 (n = 35)	Lower in coercive control (mean 1.8)
• MY-cluster 2a (n = 8)	• Lower in coercive control (mean 1.4) Lower in overprotection (mean 1.4)
• MY-cluster 2b (n = 27)	• Higher in coercive control (mean 1.9) Higher in overprotection (mean 2.1)

MY-cluster 1 was further divided into two sub-clusters MY-cluster 1a and MY-cluster 1b, based on differences in coercive control as well as overprotection. MY-cluster 1a scored significantly higher on coercive control (mean score 3.3) compared to MY-cl1b (mean score 2.5). MY-cluster 1a scored significantly higher on overprotection (mean score 2.0) compared to MY-cluster 1b (mean score 1.7). MY-cluster 2 was further divided into two sub-clusters MY-cluster 2a and MY-cluster 2b based on the significant differences on coercive control and overprotection. MY-cluster 2a scored significantly lower on coercive control (mean score 1.4), as well as on overprotection (mean score 1.4), MY-cluster 2b scored significantly higher on these practices (coercive control mean score 1.9, overprotection mean score 2.1), as presented in Table 3.1. No differences between first and not-first child and educational attainment are present between the sub-clusters.

Mothers of children aged 5-7 years

For the oldest children aged 5-7 years, the two main clusters MO-cluster 1 and MO-cluster 2 were further subdivided into MO-cluster 1a, MO-cluster 1b, MO-cluster 2a and MO-cluster 2b. The mean scores on all general parenting practices per cluster are displayed in Table 3.1. Table 3.3 specifies the division of the clusters.

Table 3.1 shows that MO-cluster 1 and MO-cluster 2 split based on the differences in coercive control as well as overprotection. MO-cluster 1 had lower mean scores on coercive control (2.6), as well as on overprotection (1.9). MO-cluster 2 scored higher on coercive control (mean score 3.2) and on overprotection (mean score 2.6). No differences in educational attainment and first vs not-first child were present between the clusters.

Table 3.3. Cluster division for mothers of older children aged 5-7 years.

Mothers of Older children aged 5-7 years (n = 65)	**Cluster explanation**
MO-cluster 1 (n = 24)	Lower in coercive control (mean 2.6) Lower in overprotection (mean 1.9)
• MO-cluster 1a (n = 14)	• Lower in coercive control (mean 2.3)
• MO-cluster 1b (n = 10)	• Higher in coercive control (mean 2.9)
MO-cluster 2 (n = 41)	Higher in coercive control (mean 3.2) Higher in overprotection (mean 2.6)
• MO-cluster 2a (n = 25)	• Higher in overprotection (mean 2.8) Higher in nurturance (mean 3.7)
• MO-cluster 2b (n = 16)	• Lower in overprotection (mean 2.2) Lower in nurturance (mean 3.5)

MO-cluster 1 was further divided into two sub-clusters MO-cluster 1a and MO-cluster 1b based on differences in coercive control and overprotection. MO-cluster 1a scored significantly lower on coercive control (mean score 2.3) compared to MO-cluster 1b (mean score 2.9). MO-cluster 1a scored significantly higher on overprotection (mean score 3.4) compared to MO-cluster 1b (mean score 2.9). MO-cluster 2 split into two clusters based on the difference in overprotection and nurturance. MO-cluster 2a scored significant higher on overprotection (mean score 2.8) and nurturance (mean score 3.7), compared to MO-cluster 2b (mean score overprotection 2.2, mean score nurturance 3.5). Cluster MO-cluster 2a consisted of more mothers with lower education (60%), compared to cluster MO-cluster 2b (37%).

3.3.4 Mothers' snack giving behavior

The 136 mothers gave in total 2415 snacks in a period of 13 days, which is an average of 1.4 snacks given by the mother to her child a day (see for more details, Damen *et al.*, 2019b). The snacks provided by the mothers belong to 10 product categories; 'fruits', 'cookies', 'candy', 'crisps', 'rice cracker, bread sticks and raisins', 'bread products', 'savory snacks', 'vegetables' and 'pie and pastry'. Table 3.4 shows per sub-cluster how many mothers provided a certain type of snack.

Table 3.4. The number of mothers (percentage) that provided a certain type of snack, per age group of the child, per cluster.

	Cluster	Fruits	Cookies	Candy	Crisps	Rice crackers bread sticks and raisins	Bread products	Savory snacks	Vegetables	Pie and pastry
Total	All (n =136)	134 (99%)	120 (88%)	113 (83%)	111 (82%)	68 (50%)	71 (52%)	63 (46%)	43 (32%)	59 (43%)
Mothers of younger children 2-4 years	All (n=71)	69 (97%)	65 (92%)	53 (75%)	45 (63%)	38 (54%)	42 (59%)	35 (49%)	21 (30%)	33 (46%)
	MY-cluster 1 (n=36)	35 (97%)	34 (94%)	28 (78%)	24 (67%)	20 (56%)	20 (56%)	23 (64%)[a]	7 (19%)[a]	21 (58%)[a]
	• MY-cluster 1a (n=12)	11 (92%)	11 (92%)	11 (92%)	8 (67%)	7 (58%)	6 (50%)	7 (58%)	2 (17%)	7 (58%)
	• MY-cluster 1b (n=24)	24 (100%)	23 (96%)	17 (71%)	16 (67%)	13 (54%)	14 (58%)	16 (67%)	5 (21%)	14 (58%)
	MY-cluster 2 (n=35)	34 (97%)	31 (89%)	25 (71%)	21 (60%)	18 (51%)	22 (63%)	12 (34%)[b]	14 (40%)[b]	12 (34%)[b]
	• MY-cluster 2a (n=8)	8 (100%)	8 (100%)	8 (100%)	4 (50%)	4 (50%)	7 (88%)	4 (50%)	2 (25%)	2 (25%)
	• MY-cluster 2b (n=27)	26 (96%)	23 (85%)	17 (63%)	17 (63%)	14 (52%)	15 (56%)	8 (30%)	12 (44%)	10 (37%)
	X^2	0.000	0.001	1.347	0.008	0.016	1.229	6.222	3.600	2.419
	Df	1	1	1	1	1	1	1	1	1
	P	0.984	0.971	0.246	0.928	0.899	0.268	0.013	0.058	0.094
Mothers of older children 5-7 years	All (n=65)	65 (100%)	55 (85%)	60 (92%)	36 (55%)	30 (46%)	29 (45%)	28 (43%)	22 (34%)	26 (40%)
	MO-cluster 1 (n=24)	24 (100%)	21 (88%)	23 (96%)	16 (67%)	11 (46%)	13 (54%)	8 (33%)	5 (21%)[a]	9 (38%)
	• MO-cluster 1a (n=14)	14 (100%)	11 (79%)	13 (93%)	9 (64%)	6 (43%)	7 (50%)	4 (29%)	2 (14%)	5 (36%)
	• MO-cluster 1b (n=10)	10 (100%)	10 (100%)	10 (100%)	7 (70%)	5 (50%)	6 (60%)	4 (40%)	3 (30%)	4 (40%)
	MO-cluster 2 (n=41)	41 (100%)	34 (83%)	37 (90%)	20 (49%)	19 (46%)	16 (39%)	20 (49%)	17 (41%)[b]	17 (41%)
	• MO-cluster 2a (n=25)	25 (100%)	20 (80%)	23 (92%)	15 (60%)	10 (40%)	10 (40%)	12 (48%)	10 (40%)	10 (40%)
	• MO-cluster 2b (n=16)	16 (100%)	14 (88%)	14 (88%)	5 (31%)	9 (56%)	6 (38%)	8 (50%)	7 (44%)	7 (44%)
	X^2	-	0.243	0.666	1.900	0.002	1.405	1.473	2.878	1.900
	Df	-	1	1	1	1	1	1	1	1
	P	-	0.622	0.414	0.162	0.968	0.236	0.225	0.90	0.753

[ab] Different letter within a construct means significant different from each other

Mothers of children aged 2-4 years

Mothers with children aged 2-4 years mostly provided fruits (97%) and cookies (92%) as snacks, and to a lesser extent candies (75%) and crisps (77%) (Table 3.4). However, fewer mothers provided candies and crisps to their 2-4 years children, compared to mothers of children aged 5-7. Fewer mothers provided their children aged 2-4 years rice crackers, bread sticks and raisins (54%) as well as bread products (59%), compared to the snacks mentioned before, but more often compared to mothers of children aged 5-7 years.

When comparing the snacks given by the mothers in the two different clusters, we see that significantly more mothers in MY-cluster 1 (higher in coercive control) provided savory snacks (64%), and pie and pastry (58%) than mothers in MY-cluster 2 (savory snacks 34%, pie and pastry 12%). Significantly more mothers in cluster MY-cluster 2 (lower score on coercive control), however, provided vegetables (40%) compared to mothers in MY-cluster 1 (19%).

More mothers in cluster MY-cluster 1a (higher score on coercive control) provided candy (92%) to their children compared to mothers in cluster MY-cluster 1b (candy 71%). More mothers in MY-cluster 2a (lower in coercive control and overprotection) provided cookies (100%), candy (100%) and bread products (88%) compared to mothers in MY-cluster 2b (cookies 85%, candy 63%, bread products 56%). For vegetables it is the other way around; more mothers in MY-cluster 2b provided vegetables (44%) compared to mothers in MY-cluster 2a (vegetables 25%).

Mothers of children aged 5-7 years

Fruits (100%) and candy (92%) were the snacks provided by most of the mothers with children aged 5-7 years. Cookies (85%) and crisps (86%) were frequently provided snacks too, as presented in Table 3.4.

When comparing the snacks given by the mothers in the two different clusters, we could see that significantly fewer mothers in MO-cluster 1 (lower in coercive control and overprotection) provided vegetables (21%) as a snack, than mothers in MO-cluster 2 (vegetables 41%). For crisps there was a slight difference noticeable; some more mothers in MO-cluster 1 provided crisps (67%) compared to the number of mothers in MO-cluster 2 (crisps 49%), however this difference was not significant.

MO-cluster 1a (lower coercive control) and MO-cluster 1b (higher coercive control) differed in snacks provided only with regards to cookies. All mothers in MO-cluster 1b provided cookies (100%) compared to 79% of the mothers in MO-cluster 1a. MO-cluster 2a (higher

overprotection) and MO-cluster 2b (lower overprotection) differ on crisps provided. More mothers in MO-cluster 2a provided crisps (60%) compared to mothers in MO-cluster 2b (crisps 31%).

3.4 DISCUSSION

This study described the association between snack giving behavior of mothers to their 2-4 and 5-7-year-old children and the key constructs of general parenting (*i.e.* behavioral control, nurturance, and structure, coercive control, and overprotection). To the best of our knowledge, this is the first study exploring how the key constructs of general parenting cluster for mothers with children aged 2-4 years and 5-7 years and how the snack choice related to these clusters.

On average, mothers provided 1.4 snacks to their child per day. This average seems quite low, which is attributable to the fact that not all mothers provided a snack every day. This was because the mother was not always at home, others provided the snacks (*e.g.* the father, grandparents), or because the child was not at home and had eaten its snacks somewhere else. Results showed that most mothers of both age groups provided fruits as a snack, followed by cookies, which is in line with the results of the Dutch National Food Consumption Surveys (Ocké *et al.*, 2008; Rossum *et al.*, 2016). More mothers of children aged 5-7 years provided candy compared to mothers of children aged 2-4 years, which is in line with the results from Rangan *et al.* (2008).

The data from the Comprehensive General Parenting Questionnaire (CGPQ) indicated differences in scores on coercive control and overprotection between mothers with children aged 2-4 and 5-7 years. Scores for the other key constructs, behavioral control, nurturance, and structure were not different. Overall, a larger number of mothers who scored higher on coercive control provided unhealthy products like pie and pastry (MY-cluster 1, children 2-4 years), candy (MY-cluster 1a, children 2-4 years) and cookies (MO-cluster 1b, children 5-7 years) compared to mothers lower in coercive control. In addition, fewer mothers who scored higher on coercive control provided vegetables (MY-cluster 1, children 2-4 years) compared to mothers lower in coercive control. Coercing children to eat has been associated with unhealthy eating, as it directs children away from internal cues to hunger and satiety. This could lead to an increase in the consumption of unhealthy foods and a decrease in the preference for healthy foods by children (Sleddens *et al.*, 2014a). Restrictive feeding is a component of coercive control, which has been associated with a greater intake

of unhealthy snacks. Less restrictive feeding has been associated with the intake of more healthy snacks (Boots *et al.*, 2015). Moreover, in a longitudinal study, Boots *et al.* (2019) found that restrictive feeding predicted an increased preference for sweets and salty foods by children aged 4-6 years. Less restrictive feeding was a driver for a higher preference for fruit and vegetables by these children. In addition, Philips *et al.* (2014) found a small positive correlation between coercive control of parents and frequency of sweet food consumption of children aged 6-12 years. Pressure, another component of coercive control, has also been associated with a larger intake of unhealthy snacks (Rodenburg *et al.*, 2014) and a higher BMI (Kelleher *et al.*, 2015). Moreover, children's fruit and vegetable consumption associated negatively with parent's use of pressure (Fisher *et al.*, 2002).

In the current study, a higher score on coercive control combined with a higher score on overprotection seemed to be associated with fewer mothers providing unhealthy products like cookies, candies (MY-cluster 2b, children aged 2-4 years) and crisps (MO-cluster 2, children aged 5-7 years). In addition, when a higher score on coercive control was combined with a higher score on overprotection, more mothers provided vegetables as a snack (MY-cluster 2b, children aged 2-4 years). Wang *et al.* (2017) suggested that control over eating may be associated with the consumption of less unhealthy snacks by children. Scoring higher on overprotection (MO-cluster 2a, 5-7 years) only, compared to scoring lower on overprotection (MO-cluster 2b, 5-7 years), was associated with more mothers providing crisps to their children. However, whether this difference is only caused by the lower score on overprotection is not certain as more mothers in MO-cluster 2a (60%) compared to MO-cluster 2b (37%) were also lower educated. Lower educational attainment of the mothers was in this dataset related to a higher provision of crisps by the mothers to their children (Damen *et al.*, 2019b). Van der Horst and Sleddens (2017) showed that overprotection is of influence on children's dietary behavior. In their study, parents who scored high on overprotection, also scored higher on modelling healthy food intake, which is beneficial for children's dietary behavior. Besides, parents scoring high on overprotection were more likely to use practices which are beneficial for children's eating styles, like monitoring intake of less healthy foods, food availability of healthy foods in the home, encouragement of balances (Van der Horst & Sleddens, 2017) and covert control (Sleddens *et al.*, 2014a). However, parents scoring high on overprotection were also more likely to use practices which have a negative impact on children's eating behavior, like emotional feeding (Sleddens *et al.*, 2014a), pressure to eat, and restriction (Van der Horst & Sleddens, 2017). Furthermore, Philips *et al.* (2014) found a small negative correlation between fruit and vegetable consumption of children aged 6-12 years and overprotection. Peters *et al.*, (2013) reported that over-reactiveness, one of the dimensions of overprotection, associated with higher non-core food consumption

by children, whereas parents lower in over-reactiveness associated with higher fruit and vegetable intake by children. As not many studies considering overprotection are present (Padilla-Walker and Nelson, 2012; Horst and Sleddens, 2017) the current study is relevant.

No differences are found between mothers' educational attainment or mothers of a first versus a not-first child for the clusters. It seems that there is no connection in the current study between general parenting and these constructs. In a study by Philips *et al.* (2014) among parents of children aged 6-12 years old, it was found that higher educated parents were more overprotective than lower educated parents. For coercive control this study did not find differences between educational attainment of the parents.

However, the results of the current study must be interpreted with some care because the dataset for the use of the CGPQ is relatively small and a more extensive dataset could have provided more reliable results. However, for the collection of the qualitative data from the diaries, the number of mothers participating, and the duration of data collection was relatively large (Damen *et al.*, 2019b). The duration of data collection for diaries is often shorter and a smaller number of participants is involved (Carnell *et al.*, 2011; Elliston *et al.*, 2017). A challenge in keeping a dairy is the influence on the behavior of participants, as they are aware that they have to record what they do (Subar *et al.*, 2015). For example, mothers can overreport healthier snacks, report fewer snacks than they actually provide, or decide to give other snacks than they normally do. Because reporting in the diary took place over a relatively long period of time, we expect this effect to be small as mothers get used to the recording of their snack giving behavior. In fact, this effect of self-reporting could also have been of influence while answering the questions of the CGPQ, as the mothers might have reported what they think is social desirable behavior.

Furthermore, the CGPQ, which is a validated questionnaire measuring general parenting, was slightly adapted to make the questionnaire suitable for the current study. We reformulated one question for the scale of coercive control in a less strong way. However, because we reformulated only one word, we expect the effect to be minimal.

While conventional measures such as Chronbach's alpha did not give reason for concern about the quality of the sum scales of the CGPQ, our sample size did not allow to study the psychometric properties (*e.g.* unidimensionality) of the sum scales in more detail. Factor analytic methods require a minimum in the order of 100 respondents to be meaningful (Tabachnick and Fidell, 2001; Mundfrom *et al.*, 2005). A future replication of our study would preferably use a decisively larger sample to allow for such validation study.

This study related mothers' snack giving behavior with general parenting. Recently the Comprehensive Snack Parenting Questionnaire (CSPQ) by Gevers *et al.* (2018) and the Parenting around SNAcking Questionnaire (P-SNAQ) by Davison *et al.* (2018) became available. The use of those questionnaires, which specifically focus on snacks, could be also relevant for the topic about snack giving. As our data were gathered in a comprehensive study in January 2017, these questionnaires were not available yet. For future research, it could be of interest to link data of actual snacks provided by mothers to those snack-focused questionnaires as well.

3.5 CONCLUSION

The current study provided a first insight into the possible associations between general parenting of mothers with children aged 2-7 years and their snack giving behavior. Focusing on snacks is relevant, as snack choice is more flexible and less planned before compared to main meals, which could imply that the snack moment relies more on the parenting capabilities of the mothers. The current explorative study reveals that the general key constructs of parenting, coercive control and overprotection, associated with the snack choice of mothers. When mothers scored relatively higher on coercive control, more of them provided unhealthy products like candy and cookies, and fewer of them provided vegetables. A higher score on coercive control combined with a higher score on overprotection associated with fewer mothers providing unhealthy products like cookies and candies.

As datasets are relatively small (children 2-4 years, n=71; children aged 5-7 years, n=65), future research could be more extended to provide more reliable statistically underpinned data. Exploring the key constructs of parenting in relation to child snacking is important to understand better parenting influences on snacking (Davison *et al.*, 2015). The preliminary insights from this study could provide useful information for targeting parents of younger children in nutritional education campaigns as well as for interventions to help mothers meet children's dietary requirements.

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CHAPTER 4

Value conflicts in mothers' snack choice for their 2-7-year-old children

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ABSTRACT

Value conflicts appear when people experience struggles, doubts, and feelings of guilt when making food choices. This study aims to provide insight into value conflicts, which mothers may experience while providing snacks to their young children. Mothers are mainly responsible for providing the snacks their young children eat, making it a big responsibility for them as children's dietary behavior tracks into adulthood. Possible value conflicts Dutch mothers (n = 136) experience while providing snacks to their 2-7-year-old children were investigated using food and motivation diaries and semi-structured interviews. Differences between mothers' educational level, first versus not-first child and the differences in age of the children were taken into account. Results showed that the younger the children, the more value conflicts the mothers experienced. Mothers experienced most value conflicts when they provided snacks perceived as unhealthy. Six main value conflicts are elicited by this study, namely, conflicts between healthy and unhealthy snacks; conflicts between healthy and convenient snacks; conflicts related to providing snacks just before dinner; conflicts related to influence of others; conflicts when the child asks but the mother says "no"; and conflicts related to many unhealthy snacks at parties or visits. The insights gained in this study can be used for interventions to promote a healthier lifestyle, support the design of new snack products, and can give guidance for marketing challenges in global snack markets.

4.1 INTRODUCTION

Food choice is one of the most frequent human behaviors. Many factors and their interactions determine the complexity of this behavior (Köster, 2009). When children are young, their parents are mainly responsible for providing the foods their children eat (Hennessy *et al.*, 2012; Boots *et al.*, 2015). This makes it a big responsibility for parents as children's dietary behavior tracks into adulthood (Craigie *et al.*, 2011; Nicklaus, 2016). A considerable part of this dietary behavior is the frequent intake of energy dense snacks by children (Piernas and Popkin, 2010; Boots *et al.*, 2015; Gevers *et al.*, 2016). In the Netherlands, snack consumption among children is highly prevalent too; according to the Dutch National Food Consumption Survey of young children, aged 2-6 years, 77% of the children has three or more eating occasions a day, besides the main meals (Ocké *et al.*, 2008). This makes snacking an important factor contributing to childhood overweight (Larson and Story, 2013). Childhood overweight is a serious problem as it increases the risk of health problems, not only in childhood but also later in life (Daniels, 2009; Reilly and Kelly, 2011).

Consumers' food choices depend on the consumer's value system (Osinga and Hofstede, 2004), as consumers associate a variety of values with food (Luomala *et al.*, 2004). According to the food choice model of Furst *et al.* (1996), major choice-related values are taste, cost, convenience, health and nutrition, inter-personal interactions, and quality. Safety is also an important food choice related value (Lusk and Briggeman, 2009). These multiple food-related values can cause value conflicts, as they do not always serve the same purpose (Furst *et al.*, 1996). Value conflicts happen when fulfilling one value prevents meeting another value (Connors *et al.*, 2001). Luomala *et al.* (2004) investigated value conflicts that consumers may experience while making food choices. Conflicts between convenience and care, and between health and indulgence appeared to be major food-related value conflicts. Mothers are of particular importance in food and snack choice for their children (Holsten *et al.*, 2012; Walsh *et al.*, 2015) as they are mainly responsible for food provision (Hardcastle and Blake, 2016; Jones, 2018). Value conflicts may appear when mothers experience struggles, doubts, and feelings of guilt when making food choices for their children. In a study by Hayter *et al.* (2015), parents mentioned differences between what they would like to feed their children and what they actually provide. Others found that the more unhealthy the food, the more feelings of guilt mothers experienced (Pescud and Pettigrew, 2014). Likewise, Okada (2005) concluded that people experience a higher need for justifying a hedonic choice compared with a healthier choice. Bahr-Brugge and Almås (2006) found that when Norwegian women served pizza, they always defended and justified this unhealthy and convenient choice.

Usually, mothers would like to make the best choices for their child, and therefore, they could experience difficulties and feelings of doubt (Johnson *et al.*, 2011; Machín *et al.*, 2016; Fielding-Singh, 2017; Gram *et al.*, 2017). In fact, mothers wish to combine healthy food choices, with their child's taste preferences (Carnell *et al.*, 2011; Boak *et al.*, 2016; Walsh *et al.*, 2015; Wijtzes *et al.*, 2017; Damen *et al.*, 2019b), two values that often conflict (Luomala *et al.*, 2004). To which extent value conflicts occur in snack choice has not yet been studied. This study aims to provide insight into value conflicts mothers may experience while providing a snack to their young children, using analysis of diaries and semi-structured interviews. Differences between mothers' educational level, first versus not-first child, and the differences in age of the children were also taken into account.

4.2 METHOD

4.2.1 Study design

Possible value conflicts Dutch mothers experience while providing snacks to their 2-7-year-old children were investigated. Value conflicts include, in this study, both conflicts between two separate values (*e.g.* health vs convenience) and interpersonal activity conflicts (*e.g.* conflicts related to influence of others). The age range of 2-7 years was set, according to the age ranges of Piaget and Inhelder (2000). They developed a model with four consecutive stages of age groups in which the information processing capacities of children increase, their thinking changes from concrete to more logical and abstract, and problem solving and reasoning skills become more advanced. Furthermore, according to Contento (1981), who studied how children think about food and eating, children in the pre-operational stage (2-7-year-old) do not make the distinction between foods and snacks. This is of importance for this research, because it shows that it does not make sense to ask young children themselves about their food choice during snacking moments but to ask their mothers. Therefore, mothers were chosen as the target group in our study, because children in the range of 2-7 years usually do not pick snacks themselves but receive it from their caregivers (Ventura and Worobey, 2013; Jacquier *et al.*, 2017). These are often the mothers (Rosenkranz and Dzewaltowski, 2008; Cawley and Liu, 2012; Walsh *et al.*, 2015). For this study, we defined snacks as "all foods, healthy and unhealthy, consumed in between regular meals", based on definitions used in previous studies (Garriguet, 2007; Mercille *et al.*, 2010; Ovaskainen *et al.*, 2010; Hartmann *et al.*, 2013; Duffey *et al.*, 2014).

Value conflicts were examined using food and motivation diaries and semi-structured interviews. These two different qualitative data collection methods allow for within-method

triangulation, to enhance the validity of the results (Thurmond, 2001; Denzin, 2017). A grounded theory approach was used for data collection (Dew, 2007; Harris *et al.*, 2009). Information on actual snack giving in the home environment and underlying considerations and value conflicts was collected with diaries, for the duration of 13 consecutive days, including 2 weekends, in January 2017. Within two weeks after completion of the diaries, semi-structured interviews with the participants were conducted, as previously described by Turner (2010) and Creswell (2014). These interviews were held by telephone to gain additional information on value conflicts in snack giving, so not only focusing on the 2 weeks of keeping the diary but also when occurring in other situations. The designs of the diary research and the semi-structured interviews were piloted with three mothers of young children not involved in the final study. Only minor changes to the diary study were made; according to this pilot study, the design of the interviews remained unchanged, except for replacement of the term "value conflicts" by the simpler term "difficult moments".

4.2.2 Recruitment and selection of participants

To recruit participants, social media, posters at schools and day-care centers in the Netherlands, and snowball sampling (Zarantonello and Luomala, 2011) were used. Potential participants (n = 180) completed a questionnaire on demographics to select them according the criteria set for the target group. These criteria included having at least one child in the age group 2-7 years, having the intention to keep the diary for the full 2 weeks and being willing to have an interview at the end of the study. Another criterion was that the child did not have a severe food allergy or suffered from chronic diseases (*e.g.* diabetes). Ten respondents did not meet the inclusion criteria and a disproportionate number of mothers of children aged 2-3 years responded. Therefore, in total, 41 respondents were excluded from the study, and 139 mothers were selected to participate. These 139 participants were purposively included (Harris *et al.*, 2009; Draper and Swift, 2011) to vary regarding the order of the child in the household, age group of the child, and educational level of the mother. Mothers were divided into two groups according to their educational attainment. The group of higher educated mothers included mothers with a bachelor's degree or higher, the lower educated group mothers with a degree lower than bachelor's.

Before the study started, participants received a letter explaining the duration and set-up of the research. This letter also explicitly stated that the results would be handled anonymously, and all the personal data would have kept confidential following the rules of the data management plan of Wageningen University. Mothers had the possibility to withdraw from participation whenever they wanted. Each participant received a €40 gift voucher after keeping the diary and finishing the interview.

4.2.3 Diary research

Mothers reported every snack they gave themselves to their child in the morning, afternoon, and evening in an online, event-based diary (Bolger *et al.*, 2003). In addition, they reported their motivations, considerations, and satisfaction regarding these snack choices. Mothers were asked to fill in the diary for only one child. If they had more than one child in the target group of 2 to 7 years, the researcher instructed them for which child they should keep the diary. Data were collected using Qualtrics survey software (www.qualtrics.com, 2017) and could be accessed through any device with web access. Every morning, mothers received an email with the link to the diary. An additional email was sent only to those mothers who had not completed the diary by 21:00 h in the evening. Mothers could decide themselves to report each snack immediately after the moment it was given or to report all snacks at the end of the day. For this reason, the mothers received a paper notebook to have the possibility to note the snacks and to complete the diary at their convenience later that day.

4.2.4 Semi-structured interview

An interview scheme was developed to maintain consistency in interviewing. See, for details, Table 4.1.

Table 4.1. Interview guide.

Interview guide
Review of the diary study
What were your experiences in keeping the diary on snack giving?
Was filling in the diary of influence on you snack giving behavior? If no, could you explain? If yes, why? How? And in what extend?
What did you experience as most striking in your snack giving behavior in these 13 days of participation?
Value conflicts
What are for you difficult moments in providing snacks to your children? Why are these moments difficult for you? How do you deal with such moments? How do you feel about it? Can you give examples?

First, participants were asked about their experiences participating in the diary research, followed by what they experienced as most striking in their snack giving behavior in the 13 days of participation. The main focus of the interviews was on the value conflicts participants experienced in providing snacks to their children in general, not only focused on the 13 days of the research but also on other days and in other situations; see Table 4.1. Two researchers

carried out the interviews by telephone. Interviews ranged in duration from 5-30 minutes at a time convenient for the participant. Interviews were recorded digitally.

4.2.5 Data analysis

In total, 137 mothers completed the diaries and the subsequent semi-structured interview. Data from the diaries, as well as transcribed data from the interviews, were imported in the software program MaxQDA version 12. This program was used to organize, code and analyze the qualitative data. Diaries and interviews were coded separately; for each method, new code labels were developed. Coding was led by the first author and was done independently by both the first author and a second researcher. After coding the same 25 diaries, given code labels were compared, and differences were discussed and resolved to come to a set of code labels to be used for coding the remaining diaries to obtain consistency in coding. The same was done for coding of the interviews. Conventional content analysis was used to retrieve the categories of value conflicts from the diaries as well as from the interviews, as described by Hsieh and Shannon (2005). Codes with comparable meanings were merged to one value conflict. The type of value conflicts retrieved from the diaries, and the interviews were comparable, and therefore, six main value conflicts were defined based on the results from both the diaries and the interviews. The occurrence of these types of value conflicts was also analyzed for the differences in mothers' educational attainment, first versus not-first child, and the age groups of the children. Data saturation was reached, because after analyzing a substantial set of diaries, no new value conflicts appeared; this was similar for the interviews.

4.3 RESULTS

4.3.1 Participant characteristics

Final analyses were based on a sample of 136 mothers, as one mother was excluded because she used another definition of snacks than instructed. On average, mothers were 33.9 years of age (SD = 4.4), 84% of them had a paid job working on average 24.3 h a week (SD = 6.5). Most mothers had two children (66%), 21% had three children, 8% had one child and 5% had four children. Around half of the mothers (52%) had a lower educational level; the others (48%) had a higher educational level. Half of the mothers (50%) filled in the diary for their first child in the household, the others for their second or following child. The percentage of children in the three age groups 2-3 years, 4-5 years, and 6-7 years was respectively 35%, 33%, and 32%. In total, 134 out of the 136 interviews were analyzed, as two interviews were not properly recorded.

4.3.2 Results for mothers' educational level, first versus not-first child, and age groups of the children

During the 13 days of the diary research, mothers reported that they gave in total 2415 snacks to their children and experienced value conflicts in 6% (n = 134) of these snack giving moments. These conflicts were experienced by 56% of the mothers (n = 76); the others reported not having experienced value conflicts. When value conflicts were mentioned, the explanation often included phrases like: "I would prefer to give her..., but...", "I know it is not the best choice, although..." or "I gave him..., however...". Value conflicts mainly occurred when mothers gave unhealthy snacks like cookies, candy, crisps, or pie. During the interviews, most mothers (n = 114, 85%) mentioned experiencing one or more value conflicts when providing a snack to their young children.

From the diary as well as from the interviews, no differences appeared in the total number of value conflicts experienced between mothers with different educational levels. Diaries showed that mothers recording for first-born children experienced value conflicts slightly more frequently compared with mothers recording for subsequent children in the household. This difference was especially present for more unhealthy snacks like cookies, pie, and crisps. From the interviews this difference was not found.

> *"I gave her the cookie she asked for. I preferred to give her a rice cracker, but she really wanted that cookie. I did not want to put energy into it and did not want the whining, so I gave her the cookie" [ID131: higher educated, first child, 2-3 years, diary].*

Mothers of younger children more often experienced value conflicts when providing a snack; this was seen in both the diary study and the interviews. The diaries revealed that almost half of the value conflicts were experienced by mothers of children aged 2-3 years, one-third by mothers of children aged 4-5 years, and only one-fifth by mothers of children aged 6-7 years. From the diaries, it appeared that 65% of the mothers who mentioned not experiencing value conflicts at all were mothers of children in the oldest age group of 6-7 years. Also from the interviews, we observed that mothers of older children experienced fewer value conflicts. Of all value conflicts mentioned in the interviews, 41% (n = 80) was mentioned by mothers of children aged 2-3 years, 33% (n = 65) by mothers of children aged 4-5 years and 26% (n = 50) by mothers of children aged 6-7 years.

> *"I gave her a piece of cake, because we had people with kids over for a birthday visit. However, I preferred to give her fruit, so I am not totally happy with my choice" [ID095: lower educated, first child, 2-3 years, diary].*

4.3.3 Main value conflicts

This study elicited six main value conflicts experienced by mothers with young children, namely, conflicts between healthy and unhealthy snacks; conflicts between healthy and convenient snacks; conflicts related to providing snacks just before dinner; conflicts related to influence of others; conflicts when the child asks but the mother says "no"; and conflicts related to many unhealthy snacks at parties or visits. In the sub-sections below, these value conflicts will be explained and supported by verbatim quotes of the mothers. Table 4.2 provides an overview of the main value conflicts including illustrative quotes per value conflict.

Conflicts of healthy versus unhealthy

Almost all value conflicts mentioned in the diaries and the interviews related to health. Especially, the discrepancy between healthy and (more) unhealthy snacking was a reason for experiencing value conflicts. For example, mothers preferred to give a healthy snack but ended up with a more unhealthy choice.

> *"I intended to give some fruit, but gave an ice cream because she asked for it. There is nothing wrong with ice cream, however I think giving fruit is more important" [ID053: lower educated, not-first child, 2-3 years, diary];*

> *"I do not want to be a 'hysterical' mother who never gives the nice snacks. However, I recognize that it feels more difficult for me if I provide them with a cookie with chocolate of which I know it contains loads of sugar... Then I always think, I wish I did not give it to them. However, I also think they are allowed to get something nice every now and then. So then I am in conflict with myself" [ID113: lower educated, not-first child, 2-3 years, interview].*

Conflicts of healthy versus convenience

When mothers preferred convenience above a healthier choice, they also experienced value conflicts. They cannot make another choice because they were too busy, and later, they felt guilty about the choice they made. This value conflict was mentioned both in the diaries and the interviews.

> *"I gave ready to eat fruit puree, it is a convenient way of giving fruit, I was busy baking cake. However, I prefer to give 'real' fruit" [ID076: higher educated, first child, 4-5 years, diary];*

"Sometimes I want to give something healthy like fruit, but I am busy too. So I give something else instead, so I choose a more convenient option, in the end it feels bad" [ID120: higher educated, first child, 4-5 years, interview].

Conflicts related to providing a snack just before dinner

Mothers mentioned in the diaries and interviews that the time of the day is a reason for experiencing value conflicts. To illustrate, just before dinner, children become hungry and often ask for a snack, a situation many mothers experience as difficult. Mothers do not want their children to be hungry, but they also want their children to eat their dinner.

"I gave a cookie, however I am not totally happy with the choice because it was just before dinner and she does not eat dinner that well. However, I was busy cooking dinner" [ID045: lower educated, first child, 4-5 years, diary];

"A difficult moment is just before dinner, if they start whining for a snack. At such a moment I sometimes think, hmmm I just give it to them" [ID067: lower educated, not-first child, 6-7 years, interview].

As a solution for this, mothers mentioned they try to provide their children healthier or less filling snack options, like vegetables or crackers.

"The moment just before dinner is always difficult. Dinner is never ready in time. You have to pick up the children from day-care or from their friends and you arrive home late. Cooking dinner always takes too long and they start whining for snacks. Sometimes I give in and sometimes I do not. However, I do not provide candy; they will get a carrot, a tomato or a bread stick. I do this because otherwise I know for sure they will not eat their dinner" [ID121: higher educated, not-first child, 4-5 years, interview].

Conflicts related to influence of others

Mothers also frequently mentioned in the diaries that they would have preferred to give a healthy choice but changed their mind because of the influence of others.

"We had children over to play. In that case, I always give candy. My experience is that most children are used to that and ask for it themselves. I do not want that other children do not like to come to play at our place because they do not get any candy" [ID014: higher educated, first child, 6-7 years, diary].

In the interviews, it was also mentioned that when other children are around, mothers sometimes experienced value conflicts. They mentioned that they provide more snacks and that the snacks are unhealthier, like candy, cookies, or crisps.

> *"If other kids come over to play I give candy or a cookie instead of something healthy more often. I try not to do so, but in those cases I feel a kind of pressure to please the kids" [ID018: higher educated, not-first child, 2-3 years, interview].*

Another reason to provide more unhealthy snacks is that mothers do not want other children to judge their children based on the snacks they provide.

> *"When kids come over to play, it is sometimes difficult. I give more unhealthy snacks than I normally do. I would feel bad if other children said to my children: 'At your place we never get a nice snack' so eh... that my children will be judged because I do not give the nice snacks... Yes, then I would feel bad, so I try to find a balance in what I give" [ID108: lower educated, not-first child, 4-5 years, interview].*

Another value conflict frequently mentioned in the interviews is when the child gets a snack from someone else, especially when the snack is not that healthy.

> *"I experience difficulties if other people give a snack to my child, especially snacks I would not choose myself. For example, a birthday treat, which only contained candy! I think that is not an appropriate snack to give" [ID075: lower educated, first child, 6-7 years, interview].*

Table 4.2. A selection of quotes that support the main value conflicts presented in the results.

Main value conflicts with quotes from diary and interview.
Conflicts of healthy versus unhealthy
"I gave chocolate, but think it was better to give a healthier snack, because he also did not get his fruit today" [ID048: lower educated, first child, 4-5 years, diary];
"I did not provide a healthy snack, so I am not totally confident with my choice" [ID112: higher educated, not-first child, 6-7 years, diary];
"She is a picky eater, so during main meals we have a lot of struggles and fights. I do not want to argue about the snacks, so if she only wants to eat banana as a fruit, it is okay. However, it feels difficult, I prefer a healthier option" [ID005: lower educated, not-first child, 2-3 years, interview].

Table 4.2. *Continued*

Conflicts of healthy versus convenience
"I think this (a chocolate) was not a good choice, I am a bit chubby myself, and therefore I want the kids to eat more healthily. However, with this snack I chose for convenience instead of health" [ID117: lower educated, not-first child, 6-7 years, diary];
"I prefer to choose a healthy snack, like vegetables, but often I choose something else because of convenience" [ID063: lower educated, first child, 2-3 years, interview];
"That I sometimes choose for the more convenient snack is a fact, sometimes I am just too busy. At such moments, my children eat more candy or cookies than they normally do. Those are difficult moments for me" [ID111: Higher educated, not-first child, 2-3 years, interview].
Conflicts related to providing a snack just before dinner
"It was 30 minutes before dinner, giving a snack gives me doubts because it distracts them from eating dinner" [ID116: higher educated, not-first child, 2-3 years, diary];
"At the end of the afternoon, it is a difficult moment. I need to start cooking in 30 minutes and then they start asking for a snack. Then I am in doubt, what shall I give? Because I do not want them to be satiated just before dinner" [ID075: lower educated, first child, 6-7 years, interview];
"Sometimes he asks for a snack just before dinner, I have difficulties to say no, but at such a moment I do, those are the difficult moments for me" [ID109: lower educated, first child, 4-5 years, interview].
Conflicts related to influence of others
"I prefer to give her a more nutritious snack, but when a friend is over to play she asks for something else. Because this is not happening every day I give in" [ID061: higher educated, not-first child, 4-5 years, diary];
"Normally I prefer to give fresh fruit or dried fruit, however when others are around I become less strict" [ID102, higher educated, not-first child, 4-5 years, diary];
"When others are around, it is more difficult for me to say no" [ID028: lower educated, first child, 2-3 years, interview].
Conflicts related to child asks, mother says "no"
"*If they want a snack, and I do not agree, that is a difficult moment*" [ID014: higher educated, not-first child, 6-7 years, interview];
"It is difficult when they whine all the time, while I do not want to give it to them" [ID051: higher educated, not-first child, 4-5 years, interview];
"If she asks for a snack I know she really likes and I say no, and she becomes really sad. Then it is difficult to keep saying no, I feel bad" [ID063: lower educated, first child, 2-3 years, interview].
Conflicts related to unhealthy snacks at parties or visits
"I prefer not to give her cake, but because it was a birthday I did. However, I do not really like this" [ID113: lower educated, not-first child, 2-3 years, diary];
"He ate a small bowl of crisps with dip. I put some on the table because friends were visiting. So the children also wanted to eat it. I understand he wanted to have the same, however it did not feel good, because I want to protect my child from eating unhealthy foods" [ID012: lower educated, first child, 6-7 years, diary];
"I experience difficult moments if I go for a visit with my child and he is offered something else, while I would prefer to give him fruit. He normally never gets candy" [ID064: lower educated, not-first child, 2-3 years, interview].

Conflicts related to child asks, mother says no

Mothers mentioned during the interviews that they experienced value conflicts when their child wanted to have a particular snack, but they did not agree with it. They mentioned that their child started to whine or even cried or screamed to try to get the particular snack. As the mothers did not want to capitulate, they said "no" but often felt bad and sometimes guilty, making these situations a value conflict in snack giving.

> *"When they are asking and whining over and over again for that specific snack, and you are busy yourself... Then sometimes you just give that snack. Yes, to stop the whining. For me that is a very difficult moment" [ID098: higher educated, not-first child, 2-3 years, interview].*

In the diaries, this conflict was not reported as only the considerations on the actual snacks given were part of the diary research.

Conflicts related to unhealthy snacks at parties or visits

In the interviews, the most frequently mentioned value conflict was when there was a party or a visit from others. Overall, mothers experienced these value conflicts because many snacks were available for their children to take, others were around, and there was a convivial atmosphere.

> *"When there is a party, there are a lot of snacks available on the table. My children want to take a snack almost every second, and then I have trouble in saying no. When other children are around and they are allowed to take the snacks, I allow my children to do so too, however this does not feel okay" [ID003: higher educated, not-first child, 6-7 years, interview].*

In the diaries this value conflict was also mentioned; however not all mothers had a party or a visit during these 13 days.

Finally, mothers also made remarks in their diaries and interviews when they were very satisfied or happy about their choice. This was especially the case when a healthy choice was in line with the preference of their child.

> *"My child wanted a tangerine. I felt proud of her, because she asked for a healthy snack and not for a candy" [ID026: higher educated, not-first child, 6-7 years].*

4.4 DISCUSSION

This study described the value conflicts mothers experienced while providing a snack to their young children. Mothers in this study experienced most value conflicts when they provided snacks they perceived as unhealthy, like cookies, candy, crisps, and pie. This is in line with the research of Pescud and Pettigrew (2014), who reported that guilt is an emotion that parents increasingly experience when providing unhealthier or too much foods to their children.

No differences in the number of value conflicts appear between mothers with different educational levels. This result was unexpected, as previous analyses on this dataset revealed that higher educated mothers showed more health-conscious snack giving behavior compared to lower educated mothers (Damen et al., 2019b). Moreover, others (Bargiota et al., 2013; van Ansem et al., 2014; Saldiva et al., 2014; Vilela et al., 2015; Emmett and Jones, 2015; Gevers et al., 2016; Durão et al., 2017) also found higher educated mothers to be more health-conscious compared with lower educated mothers. Because most value conflicts in the current study are health related, it was expected that when mothers were more health-conscious, they would also experience value conflicts more often.

Mothers of younger children more often experienced value conflicts when providing a snack than mothers of older children. Parents feel that healthy-eating habits should start at an early age, preferably when children become toddlers (Nepper and Chai, 2016). Moreover, at this stage, food neophobia and picky eating behavior usually start (Dovey et al., 2008). Russel et al. (2015) found that mothers of children who are picky eaters experience more negative emotions and use more often non-responsive feeding practices such as using snacks as a reward and give pressure to their child to eat certain foods. Various studies (e.g. Stifter et al., 2011; French et al., 2012; Savage et al., 2018) showed that using more responsive feeding practices to young children, so be responsive to children's cues of hunger and fullness and support children's self-regulation in eating (Russel et al., 2015), helps in preventing obesity risk. Carrigan et al. (2006) found that when children were very young, preparing homemade food was more important for mothers. They perceived it as their responsibility to provide their children a diet that would enable them to grow up healthy. In accordance, Carnell et al. (2011), reported that some mothers became more flexible in feeding their children when their children became older. The higher responsibility that mothers may feel when providing food to their young children might explain why in the current study mothers of younger children experienced value conflicts more often.

Mothers of first-born children reported more value conflicts in the diary study but not in the interviews. Previous research showed that mothers of first-born children are more careful regarding the healthiness of the snacks they provide (Damen *et al.*, 2019b). Also Brekke *et al.* (2007) and Smith *et al.* (2011) showed that mothers of first children behave more health-conscious compared to mothers of subsequent children. Although the purposive sampling of the participants in this research allow for comparison of mothers with first-born and not first-born children, mothers' educational attainment, and age groups of the children, it does limit the interpretation of the results to a more general population.

The mothers frequently mentioned a value conflict between healthy and unhealthy snacks, both in the diaries as well as in the interviews. Often, mothers preferred to give a healthy snack but ended up with an unhealthier one and therefore felt bad. Also Hayter *et al.* (2015) reported that parents often mention differences in what they would like to feed their children and what they actually provide. Luomala *et al.* (2004) concluded that one of the most common value conflicts in food choice is the conflict between health and indulgence. In their study, respondents mentioned they knew about the importance of healthy eating and mentioned self-indulgence as an essential part of their lives (Luomala *et al.*, 2004). Okada (2005) concluded that people feel guiltier about eating indulgent hedonic foods, such as candies, than they feel for healthier snacks, like fruits or vegetables because consuming hedonic foods gives need for justification. Also in the current study, mothers experienced more value conflicts while providing unhealthier snacks.

Another value conflict observed in both the diaries and interviews is the one between health and convenience. When mothers preferred to provide a healthy snack, but they are too busy, they provided their children a more convenient snack. Because such a snack was usually not perceived as healthy, they felt guilty and experienced value conflicts. Various studies underpinned the role of time constraints in providing healthy foods to children; however, these studies mainly focused on main meals rather than snack foods. Nepper and Chai (2016), who studied parents' barriers in healthy eating among school-aged children, reported that parents have trouble in providing healthy foods during the main meals, because they are busy and strapped for time. Hayter *et al.* (2015) investigated perceptions of low-income parents in the United Kingdom about feeding their pre-school children. They found that parents express conflicts between what they would like to provide their children as a food and what they could provide due to time constraints. In a study by Walsh *et al.* (2015) about how mothers make food choices for their pre-school children, mothers frequently mentioned a lack of time to prepare healthy meals. Likewise, Damen *et al.* (2019a) found that convenience is an important value for Dutch mothers, and that they sometimes lack

time to prepare healthy snacks for their children. Pettigrew and Roberts (2007) reported that mothers feel guilty about their children's health and doubt about being a good mother, because of the convenient choices they made for main meals, which is in line with the value conflicts observed in the current study.

Just before dinner, mothers perceive difficulties when providing a snack; this was reported in both the diaries and in the interviews. Holsten *et al.* (2012) reported that 11-14-year-old children described that parents affected their food choice by rules they set. One of the rules mentioned is not to eat something just before dinner because their parents expect them to eat their dinner.

The influence of other persons, like grandparents, spouses, or friends, often triggered mothers' value conflicts. Especially when others provided the children an unhealthy snack, mothers experienced value conflicts. Likewise, Walsh *et al.* (2015) described that mothers experience challenges in food choice when extended family members, with different views on giving snacks, are present. Similarly, Boak *et al.* (2016) concluded that the presence of others, like grandparents, extended family, or friends could have an influence on foods mothers choose for their infants. Pettigrew and Roberts (2007) reported that mothers feel undermined by their spouse or other direct family in their ability to control the quality of their child's diets. Herman *et al.* (2012) described the influencing role of grandparents in the provision of snacks as being difficult for mothers. In the current study, mothers also experienced value conflicts in providing snacks to their children when other children came over to play. Also Walsh *et al.* (2015) described that mothers struggle with food choice for their own children when other children are around. Mothers in the current study mentioned that they provided more and unhealthier snacks, because they did not want their children to be judged by other children on the type of snacks provided.

In addition, the interviews showed that mothers experienced value conflicts when their child wanted to have a particular snack, and the mother says "no", especially when their child started whining. Nepper and Chai (2016) reported that parents have strategies to deal with food requests of their children and feel conflicts between giving what their child asks for and what they prefer to give. In a focus group with mothers of children aged 1 to 12 years on child feeding in general (Pettigrew and Roberts, 2007), mothers described the conflict between what the child asks for and what they would like to provide. Herman *et al.* (2012) described that low-income mothers have difficulties to say "no" when their children request snack foods, and that they feel bad and frustrated when they give in.

Another value conflict mothers frequently mentioned in the interviews occurred when there was a party or when others visited. Levinson *et al.* (1992) stated that celebrations and cultural festivities expose values that can remain hidden in everyday consumer behavior. During parties or visits of others, most of the available snacks were unhealthy. Therefore, mothers struggled with limiting the amount of unhealthy snacks taken by their children without getting complaints. Similarly, Pescud and Pettigrew (2014) reported that parents experience feelings of guilt associated with the provision of large quantities of unhealthy foods at special occasions such as parties.

The current study elicited six main value conflicts mothers experience when providing snacks to their children. These are conflicts between healthy and unhealthy snacks; conflicts between healthy and more convenient snacks; conflicts related to providing snacks just before dinner; conflicts related to the influence of others; conflicts related to the child asks but the mother says "no"; and conflicts related to many unhealthy snacks at parties or visits. To the best of our knowledge, no studies have been conducted specifically focusing on value conflicts in providing snacks to young children before. Previous studies mainly focused on main meals or on snack eating behavior of older children. Moreover, the study is unique because it used two types of methods: measuring value conflicts in daily life using diaries and semi-structured interviews of a relatively large number of mothers. The understanding that was gained about these value conflicts of mothers of young children can be useful for interventions to promote more healthy eating behavior among children. In addition, the results can be of support in the design of (new) snack products, which can help to reduce the value conflicts experienced by mothers of young children. For example, snacks could be designed which are more healthy alternatives of existing unhealthy snacks or snacks that are both convenient and healthy.

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CHAPTER 5

Youngest versus oldest child: why does mothers' snack choice differ?

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ABSTRACT

Young children frequently consume energy dense snacks, which is one of the factors contributing to childhood overweight. The consumption of more healthy snacks could help in meeting the dietary intake requirements of children. Previous research suggested that mothers of first children showed more health-conscious food behavior compared to mothers of not-first children. However, what is missing from earlier research is an in-depth exploration of differences in considerations to choose a snack and the reasons connected. Therefore, this study aims to characterize differences in mothers' snack choice for their youngest child at 2-3 years and their oldest child when he/she was of the same age. Moreover, this study aims to identify reasons for these differences. A grounded theory approach was used for data collection and analysis. Semi-structured interviews were carried out with 17 Dutch mothers with two or three children. All mothers indicated differences between snacks provided to their youngest child (2-3 years) and their oldest child when it was of the same age. Most frequently mentioned differences were youngest children receive unhealthy snacks at a younger age, the structure regarding snack providing is more fixed, and that youngest children receive less age-specific snacks. Most frequently mentioned reasons for these differences were role modeling, novelty of the first-born, availability of other types of snacks at home, and school hours of the oldest child. The study provided insights into the possible role of siblings in shaping snack consumption. Results might be relevant for the development of intervention strategies to increase mothers' awareness and to help to meet children's dietary requirements.

5.1 INTRODUCTION

Early in life, children develop their dietary behavior and food preferences (Savage *et al.*, 2007). Parents are of great importance in the development of their children's dietary behavior, and related to that, their child's weight status (Sleddens *et al.*, 2014; Larsen *et al.*, 2015). Since children's dietary behavior, as well as the prevalence of overweight, are extrapolated into adulthood (Singh *et al.*, 2008; Craigie *et al.*, 2011; Nicklaus, 2016), food and snack choices of parents for their young children are crucial (Holsten *et al.*, 2012; Walsh *et al.*, 2015). Children frequently consume energy dense snacks (Boots *et al.*, 2015; Gevers *et al.*, 2016), which is one of the factors contributing to childhood overweight (Piernas and Popkin, 2010; Larson and Story, 2013). However, as snacks are an important factor in children's daily food intake, more healthy, smaller, and less-energy dense snacks, could help in influencing the dietary intake of children and in developing more healthy eating patterns (Deming *et al.*, 2017; Kachurak *et al.*, 2019; Xue, *et al.*, 2019).

Young children consume foods and snacks mainly in the home environment (Kral and Rauh, 2010; Kueppers *et al.*, 2018). In the home environment the influence on food choices of family members, including siblings, is constantly present (Horst *et al.*, 2007; Holsten *et al.*, 2012; Bogl *et al.*, 2017), an influence which also continues to exist later in life (Pachucki *et al.*, 2011). For the development of healthy dietary behaviors among children, the home environment is considered as an important setting (Haines *et al.*, 2019). Mothers are mainly responsible for providing foods and snacks to their young children (Johnson *et al.*, 2011; Hardcastle and Blake, 2016; Jones, 2018; Kueppers *et al.*, 2018), although the role of fathers in providing foods becomes more relevant (Khandpur *et al.*, 2014; Fielding-Singh, 2017). Family structure, including the presence of siblings and parents' marital status, has been shown to influence eating habits (Haines *et al.*, 2019) as well as childhood obesity (Park and Cormier, 2018). The review of Park and Cormier (2018), including six relevant studies on child's birth order and obesity, reported that the youngest child in the household was more likely to be overweight or obese compared to the middle or oldest child (Ochiai *et al.*, 2012; Haugaard *et al.*, 2013; Mosli *et al.*, 2015; Mosli *et al.*, 2016). Two studies found the opposite or no effect (Chen and Escare, 2014; Martinovic *et al.*, 2015). Besides which, various studies reported differences in the dietary behavior between oldest and youngest siblings. Vilela *et al.* (2015) reported that 2-year-old children with older siblings were more likely to consume energy-dense foods every day compared to 2-year-olds without older siblings. Northstone and Emmett (2005) reported that children with older siblings were more likely to eat 'junk food' diets. Likewise, Fisk *et al.* (2011) reported that 3-year-olds with older siblings were more likely to have a more unhealthy diet. However, there is no evidence that these

differences are also present for snacks and no explanations are given about the reasons why different products are consumed.

Our previous research on mothers' considerations when providing snacks to their 2-7-year-old children revealed that mothers of first children showed more health-conscious behavior compared to mothers of not-first children (Damen *et al.*, 2019b). Second and following children received more snacks from their mothers compared to first children. In addition, they were less often served healthy snacks, such as vegetables, rice crackers, bread sticks, and raisins, than first children were. This more health-conscious behavior showed by mothers of first children was also found in a study by Smith *et al.* (2011), in which first children got more vegetables compared to not-first children. Similarly, Vennerød *et al.* (2017) showed that children with older siblings were more exposed to sweet snacks. In addition, mothers of first children experienced more value conflicts when providing (unhealthy) snacks to their children aged 2-7 years (Damen *et al.*, 2019c), which could imply differences in mothers' snack choice for their youngest child at 2-3 years and their oldest child when he/she was of the same age. Some researchers suggest that these differences could be due to the availability of unhealthy snack foods for older siblings in the home environment, which were not available when they were only child (Brekke *et al.*, 2007; Fisk *et al.*, 2011). Others indicate parental time constraints, as parents become busier when having more children (North and Emmett, 2000; Lawson and Mace, 2008; Lehmann *et al.*, 2018). Moreover, the general parental involvement at home seems less with younger siblings compared to the first-born child, as parents have to spread their attention among more children (Hotz & Pantano, 2015; Barclay, 2018). This parental time constraint of mothers with more than one child could also affect food choices (North and Emmett, 2000). Moreover, it is possible that mothers become less strict when they have more children because the urge to "do all well" might be more relevant to the mothers' first child (Barclay, 2018). As described before, some studies show differences in foods provided to the oldest and youngest child in the household, and some studies present underlying reasons for this. However, no study focused on both the differences as well as the motives mothers have for the snacks provided to the youngest compared to the oldest child in the household.

In our previous study, we observed some differences in snack choices of mothers for the youngest child in the household compared to the older children in the household (Damen *et al.*, 2019b). However, that study focused on general considerations of mothers in choosing a snack for their children, and not specifically on the differences between siblings. Consequently, the reasons underlying these differences were not explicitly investigated. Therefore, the current study aims to characterize differences and identify reasons for these

differences in mothers' snack choice for their youngest child at 2-3 years and their oldest child when he/she was of the same age. Grounded theory (Charmaz, 2014) was used to systematically collect and analyze the data and to construct theories from the data itself.

The findings in this study may help to better clarify the potential role of siblings (if any) in shaping the obesity risk. In addition, the results might be relevant for the development of novel intervention strategies to help mothers meet children's dietary requirements as well as for preventing childhood obesity.

5.2 METHODS

5.2.1 Study design

Semi-structured interviews with 17 mothers were used to characterize differences and the related reasons in snack choices of mothers between the youngest and oldest child in the household. This qualitative approach gives the possibility to work on an explorative way and it is a useful tool to gather diverse and rich data. A grounded theory approach was used for data collection and analysis (Charmaz, 2014). This study took the current snack provision to the youngest child as a base and compared this with the prior snack pattern of the older sibling when he or she had the age of 2-3 years. We explained to the mothers what was meant by the term snacks in the current study before the interview started. This definition was: "all foods, excluding beverages, healthy and unhealthy, consumed in between regular meals", based on definitions used in previous studies (Mercille, *et al.*, 2010; Ovaskainen *et al.*, 2010; Hartmann *et al.*, 2013; Duffey *et al.*, 2014). An interview guide was developed and used to maintain consistency in interviewing, see for details Table 5.1.

Interviews were recorded digitally and lasted about 35 minutes. The research was piloted with two mothers of the target group, who were not involved in the study. Minor changes to the interview guide were made based on the results of the pilot study.

5.2.2 Recruitment and selection of participants

Social media and snowball sampling (Zarantonello and Luomala, 2011; Barros da Silva *et al.*, 2018) were used to recruit participants. Potential participants (n = 45) filled in a selection questionnaire to gather demographic data and to select participants according to the criteria set for the target group. These criteria were that mothers had two or three children, of which the youngest child was 2 or 3 years old and the oldest sibling not more than 4.5 years older than the youngest. To create a group as homogenous as possible, single mothers and

families with more than three children were excluded from this study. In total, 17 mothers were selected to participate in the study.

Table 5.1. Interview guide.

Interview guide
General snack providing
Could you tell something about the providing of snacks to your children? - Do you have a certain pattern (week/weekend, moment of the day, other...) What type of snacks do you provide? - How much do you provide? (portion size) - Do you have habits in snack providing? - Where do you give the snacks? (place at home) - Which considerations do you have to give your child a snack? - What are the reasons to (or not to) provide a snack?
Snacks for your oldest child
Do you remember when you started giving snacks to your oldest child? - If yes, when? Could you tell something about the snack giving to your oldest child? - What type of snacks did you give? - When did he or she get a snack? - Which information did you use for choosing snacks? - From whom came this information? (family, internet, health centre, other)
Snacks for your youngest child
Do you remember when you started giving snacks to your youngest child? - If yes, when? Could you tell something about the snack giving to your youngest child? - What type of snacks do you give? - When did he or she get a snack? - Which information did you use for choosing snacks? - From whom came this information? (family, internet, health centre, other)
Differences between snack giving to the oldest and youngest child
Do you think there are differences in your snack giving behavior between your youngest child and your oldest child when he/she was 2-3 years old? - If yes, what do you think these differences are? - If no, were you consciously working to make no differences? How did this go?

5.2.3 Ethical procedure

All mothers provided informed consent before participating in the study. The informed consent form explained that the study was about snacks they provide to their children, however, the exact goal on the differences between their youngest and oldest children was not explained to not influence the data. Besides, we explained them that they could stop at any moment with the interview without giving a reason, that all results would only be used for scientific research and that their data would be handled anonymously. After finalizing the interview, each mother received a gift voucher as compensation.

5.2.4 Data analysis

Interviews were transcribed, and data was qualitatively analyzed with help of the software program MAXQDA (version 12). This program was used to organize, code and assist in analyzing the qualitative data. To ensure anonymity, each participant was given a unique number. A grounded theory approach was used for analyzing the qualitative data. First, the transcribed interviews were read several times. After this, the transcripts were coded openly. Two researchers, including the first author, independently coded the interviews. They compared and discussed the assigned codes until consensus on the used codes was attained. Codes with comparable meanings were merged into one code. Categories for differences in snack choices and considerations were developed by the first author and discussed. Data saturation was reached as after analyzing 14 interviews, no new codes had to be added to the interviews. Subsequently, a table was retrieved with the type and number of differences and the reasons for choosing a certain snack. For constructing the tables, key themes were developed to structure the data, these key themes were derived from the key themes of considerations in snack providing as developed by Damen *et al.* (2019a). After constructing the tables, a schematic overview was designed to combine all data.

5.3 RESULTS

5.3.1 Participant characteristics

All mothers (n = 17) were of Dutch origin and lived in the Netherlands, together with their partner. The average age of the respondents was 33.0 years (SD = 3.1 years), ranging from 27 to 40 years. Most participants (n = 15) had a paid job, working on average 26.4 h a week. Almost two-third of the participants (n = 11) were higher educated with a bachelor's degree or higher. Twelve mothers had two children; five mothers had three children. The average age gap between the oldest and the youngest child was 31.8 months (SD = 10.7 months), ranging from 17 to 54 months.

5.3.2 Mothers' common patterns in snack provision

During the interviews, the mothers made some general remarks, which concerned all children in the household. These remarks revealed a characteristic pattern in the moment of providing a snack and in the type of snacks. All mothers mentioned having a snack provision pattern including (but not necessarily limited to) fruit in the morning and products like cookies and/or candies in the afternoon. Of all 17 mothers, 14 mothers gave fruit to their children every morning. The other three mothers indicated that they usually gave fruit, but not strictly every day. The main explanation for this was that their children did not prefer to eat fruit.

Whereas in the morning the main snack was fruit, the types of snacks given in the afternoon were more diverse. Children had more freedom of choice during the afternoon snack moment, as they could choose from which product category they preferred to have a snack. Most frequently mentioned snacks which mothers provided during the afternoon were candy (n = 13), rice crackers, bread sticks and raisins (n = 12), cookies (n = 11) and crisps (n = 11). For crisps, the majority of the mothers mentioned it was a product for special occasions, such as weekends or parties. In the evening, mothers rarely provided snacks.

Some of the mothers (n = 10) indicated to have a fixed place at home for consuming snacks. In most cases, this was the kitchen table (n = 8). Mothers mentioned finding it important to use a fixed place because it offers their children a moment to relax while eating.

> *"We always eat and drink at the kitchen table because I think it is important to have a moment of rest and just sit and eat" [Mother 12].*

5.3.3 Differences in mothers' snack choices for the youngest child compared to the oldest

Table 5.2 shows the differences between mothers' snack choice for their youngest child at 2-3 years and their oldest child when he/she was of the same age. All mothers indicated differences in snacks they provided to their youngest child compared to its older siblings when they were of the same age of 2-3 years. Differences were classified in product-related and time-related differences.

Product-related differences

Product-related differences included the youngest child receives unhealthy snacks at a younger age, and less often age-specific snacks and an increased frequency of providing snacks (Table 5.2). The majority of the mothers (n = 15) mentioned the youngest child received unhealthy snacks such as cookies and candies at a younger age compared to the older siblings. Their youngest children want to eat the same type of snacks and the same portion as their older sibling.

> *"For the oldest, we were stricter with the snacks compared to the youngest. The youngest child eats sweet snacks like cookies and candies, but also nuts more early compared to the oldest" [Mother 04].*

Table 5.2. Differences related to mothers' snack choice for the youngest child at 2-3 years and the oldest child when he/she was of the same age.

Key themes	**Differences**	**Mothers** (n = 17)
Product-related	Youngest child receives unhealthy snacks at a younger age	15
	Youngest child receives less often age-specific snacks	5
	Youngest child is more frequently provided with snacks	4
Time-related	Timing/structure regarding snack providing is more fixed	8
	Snack moment is more hectic with more children	3

Table 5.3. Reasons for differences between mothers' snack choice for the youngest child at 2-3 years and the oldest child when he/she was of the same age.

Key themes	**Reasons for differences**	**Mothers** (n = 17)
Child-related	Role modeling: the youngest child wants to eat the same as the oldest	15
	The age gap between siblings is small	3
Mother-related	The novelty of the first-born /mother is less strict for the youngest child	8
	Mother wants to treat her children equally	7
	Mother wants to avoid conflicts	5
Product-related	Availability of other types of snacks at home	8
	The youngest child joins the snacking of the oldest child	6
Time-related	School schedule of the oldest child causes different snack times	8
	Less time available because of more children	3

The two mothers, who did not mention to provide their youngest child unhealthy snacks at an earlier age, were conscious in not making this difference.

> *"If you have noticed that the pattern you have developed works well with the first child, you want to do this the same way with the youngest child" [Mother 07].*

Another product-related difference is that mothers mentioned that their youngest children received less often age-specific snacks, like toddler cookies or dried fruit compared to their oldest child.

> *"I gave my oldest child snacks meant for toddlers, like unsalted veggie crisps or toddler cookies more often. Nowadays, the youngest does not get these toddler products" [Mother 11].In addition to the difference in the provision of healthy and age-specific snacks, some mothers also mentioned the increase in frequency of snack provision to their youngest child (n = 4), see Table 5.2.*

> *"My youngest child more often receives a snack compared to my oldest at that age" [Mother 09].*

Time-related differences

The changed timing and structure regarding snack providing (n = 8) was the most mentioned time-related difference between the youngest and the oldest child. This timing, regarding snacking, became for the youngest child more fixed.

> *"We have now another structure than I had with the oldest. The oldest could choose herself when she had her nap and got a snack when she was hungry. Now, we have a more fixed structure, because of the school schedule of the oldest. Nap and snack time is more set now" [Mother 15].*

The other time-related difference between the youngest and the oldest child mentioned by the mothers was that the snack moment became more hectic with more children (n = 3).

> *"The snacking moment is more hectic now we have two kids, compared with having only one child. When I had only my oldest child, snacking was more a moment of eating together. Now, I am busier" [Mother 07].*

5.3.4 Mothers' reasons explaining different snack choices

Table 5.3 shows the reasons mentioned by mothers for the differences between their snack choice for the youngest child at 2-3 years and the oldest child when he/she was of the same age. The mothers most frequently mentioned mother-related reasons.

Child-related reasons

Role modeling was the most frequently mentioned reason for differences in mothers' snack choice for their youngest child at 2-3 years and oldest child when he/she was of the same age. The youngest child wants to eat the same snack as the oldest child (n = 15). When the youngest child sees the oldest child getting a snack, mothers mentioned that their youngest child wanted that specific snack too.

> *"Because she is older, and is already more used to eating sweets, cookies and crisps, I cannot say 'yes' to her and 'no' to the youngest... My youngest sees her older sister eating those snacks, so she wants to eat the same" [Mother 05].*

Child-related reasons

Role modeling was the most frequently mentioned reason for differences in mothers' snack choice for their youngest child at 2-3 years and oldest child when he/she was of the same age. The youngest child wants to eat the same snack as the oldest child (n = 15). When the youngest child sees the oldest child getting a snack, mothers mentioned that their youngest child wanted that specific snack too.

> *"Because she is older, and is already more used to eating sweets, cookies and crisps, I cannot say 'yes' to her and 'no' to the youngest... My youngest sees her older sister eating those snacks, so she wants to eat the same" [Mother 05].*

Mothers also spontaneously mentioned that role modeling might be even more important during main meals. As snacks are usually accepted better, children reject (parts of) the main meals more often, especially when their older sibling rejects it too.

> *"The youngest is still thinking: if my sisters say they do not like it, then I will also say that I do not like it" [Mother 03].*

> *"They often find snacks tastier, so they will eat them much more easily" [Mother 15].*

A few mothers also mentioned the small age gap of their children (n = 3) as a reason for differences in snack choice for the youngest child at 2-3 years and the oldest child when he/she was of the same age.

> *"I do not make a distinction, but that is also because they are only a year and four months apart. So basically in everything, they are both either allowed or not allowed to eat it" [Mother 01].*

Mother-related reasons

Mothers mentioned being less strict for their youngest compared to their oldest child at 2-3 years. They addressed it to the novelty of the first-born (n = 8) (Table 5.3). Being a mother for the first time was new and they wanted to do everything well, also with regard to providing snacks.

> *"I have searched for information about sleeping, eating, regularity... I think those are things you do with your first child. At least, I did that to see how it should be done. (...) I just wanted to do it all right" [Mother 07].*

For the youngest child, mothers mentioned having this feeling of doing perfect less, because they feel more experienced and mature in providing snacks.

> *"With the oldest, I was much more focused, I tried to do everything as instructed. I listened very well to the advice of the health care center. For the youngest that is different, you follow the rules less strictly; I just give snacks without thinking that much" [Mother 04];*

> *"With my first child I was more cautious while giving snacks; I really relied on the rules. With the second one, I am far more flexible. I think it has to do with experience, being less strict, and thinking it over to a lesser degree" [Mother 15].*

Not only for the children is it important to get the same snacks as their siblings, but also for the mother. A frequently mentioned reason (n = 7) is that mothers want to treat their children equally thus also when providing snacks (Table 5.3).

> *"I want to give both of them the same products, I want to have the feeling that I treat them equally" [Mother 16].*

Avoiding conflicts (n = 5) is another important reason for the mother.

> *"If I give a certain snack to the oldest, but not to the youngest, there will be a fight" [Mother 13].*

Product-related reasons

The product-related reason most frequently mentioned by the mothers was the availability of other types of snacks at home. This availability of snacks is different due to the changing preference of the oldest child (n = 8). Some mothers explained this change in preference by the other types of products that friends of the child bring to school.

> *"Up to 4 years, she had little interaction with other children. From the moment she went to school, you really noticed the influence of other children. The result is that she asks for sweets more often. I think that going to school, and being in touch with other children, led to reduced influence from me and more influence from other children" [Mother 17].*

Because other products are available in the home environment, mothers bought traditional toddler snacks less often. In addition, mothers mentioned that the youngest child joined the snacking of the oldest (n = 6), Table 5.3.

> *"Back in the days, when she had his age, she also often got rice crackers and breadsticks. Those were the kind of products available at home. But the youngest never gets those products; we do not have them at home" [Mother 14].*

Time-related reasons

One of the differences between snacks provided to the youngest child at 2-3 years and the oldest child when he/she was of the same age, was the more fixed timing regarding snack provision. This effect related to the time schedule of the oldest child and not to the presence of more children in the household. Mothers explained that the school schedule of their oldest child (n = 8) determined the fixed schedule (Table 5.3).

> *"That shift in the planning is not due to the number of children, but because the oldest has to go to school now. When we eat it is at other times when the oldest comes home from school" [Mother 01].*

Some mothers mentioned snack moments to be more hectic. The mothers who experienced this (n = 3), related that to the presence of more children in the household.

> *"It is more hectic now, compared to having only one child. Now one child is already eating while you are preparing the snack for the other child" [Mother 11].*

5.4 DISCUSSION

The current study aimed at identifying differences and reasons for these differences in mothers' snack choice for their youngest child at 2-3 years compared to their oldest child when he/she was of the same age. Previous research found that mothers of first-born children showed more health-conscious behavior. In total, they provided fewer snacks compared to mothers of not-first children, they more often gave healthier perceived snacks, and more often used reasons related to health to choose a certain snack (Damen *et al.*, 2019b). The current study confirms these differences and found other differences as well. Also, the underlying reasons were identified.

5.4.1 Common patterns in snack provision

Mothers in this study mainly provided fruit in the mornings, whereas they provided products like candies and cookies mostly in the afternoon. This structured behavior is typical for Dutch mothers (Damen *et al.*, 2019a) and clearly different compared to the snack behavior in the U.S., as described by Loth *et al.* (2018). They reported U.S. parents to have less control over the type and amount of snacks consumed by their children as well as over the moment of snacking. In the current study, snacks were mainly consumed at a fixed place in the home. Loth *et al.* (2018) reported about the fixed place of families to consume main meals, but not for consuming snacks. This shows that the snack environment of Dutch children (created by the mothers) seems to be more consistent and structured compared to the snack environment in the U.S.

The types of snacks provided were similar to the snack consumption reported in the Dutch National Food Consumption Surveys (Ocké *et al.*, 2008; Rossum *et al.*, 2016). The survey showed that fruit, sugar and confectionery, and cakes are products mainly consumed in between meals. The reasons for giving fruit in the morning is that it is healthy and that it is a habit (Damen *et al.*, 2019b). Other research also showed that habit is an important factor in the food choice of fruit and vegetables (Reinaerts *et al.*, 2007; Guillaumie *et al.*, 2010, Albani *et al.*, 2018). Another reason to provide fruits is the preference of the child (Damen

et al., 2019b). In the current research, children who did not prefer fruit as a snack, were not provided with fruits every day.

5.4.2 Differences and related reasons

All mothers indicated differences between the snacks they provided to their youngest child and their oldest child when he/she was at the age of 2-3 years. The main findings of the current research are related to each other in Figure 5.1, showing which underlying reasons (Table 5.3) explained the differences (Table 5.2) in mothers' snack providing to their youngest child (2-3 years) compared to their oldest child at that age.

Child-related reasons

Child-related reasons include role modeling and the small age gap between siblings, as showed in Table 5.3. All mothers mentioned these reasons to explain product-related differences.

Mothers explained that their youngest child wanted to eat the same snacks and the same amount of snacks as their oldest child consumes. Role modeling of older siblings is also reported by Piernas and Popkin (2010) and Mosli *et al.* (2015), showing that younger siblings imitate the behavior of their older siblings by consuming larger quantities of foods in presence of their older siblings. In addition, Kramer and Conger (2009) suggested that the youngest child might imitate its older sibling's unhealthy behavior, which might include unhealthy snacking. Because the youngest child wants to eat the same amount and same type of snacks, younger children received unhealthier snacks at a younger age, they received snacks more frequently, and they got toddler specific snacks less often compared to their older siblings when they were of the same age. This is confirmed by other studies, reporting children with older siblings to consume more unhealthy foods, like junk foods and, sugar-rich snacks (North and Emmett; 2000; Northstone and Emmett; 2005; Brekke *et al.* 2007; Fisk *et al.*, 2011). In addition, it is reported that first-born children more often receive healthy food products like vegetables (Smith *et al.*, 2011) and supplementation of vitamins and minerals (Briefel *et al.*, 2006; Garemo *et al.*, 2007) compared to not-first children. These differences may explain the higher risk of childhood obesity among the youngest siblings in the household (Park and Cormier, 2018).

Some mothers mentioned the small age gap between their children as a reason for providing unhealthy snacks at a younger age and the increased frequency of providing snacks. Price (2008) confirms this effect, by indicating that birth order differences between siblings are bigger when their age gap is larger. In the current study, the average age gap between the

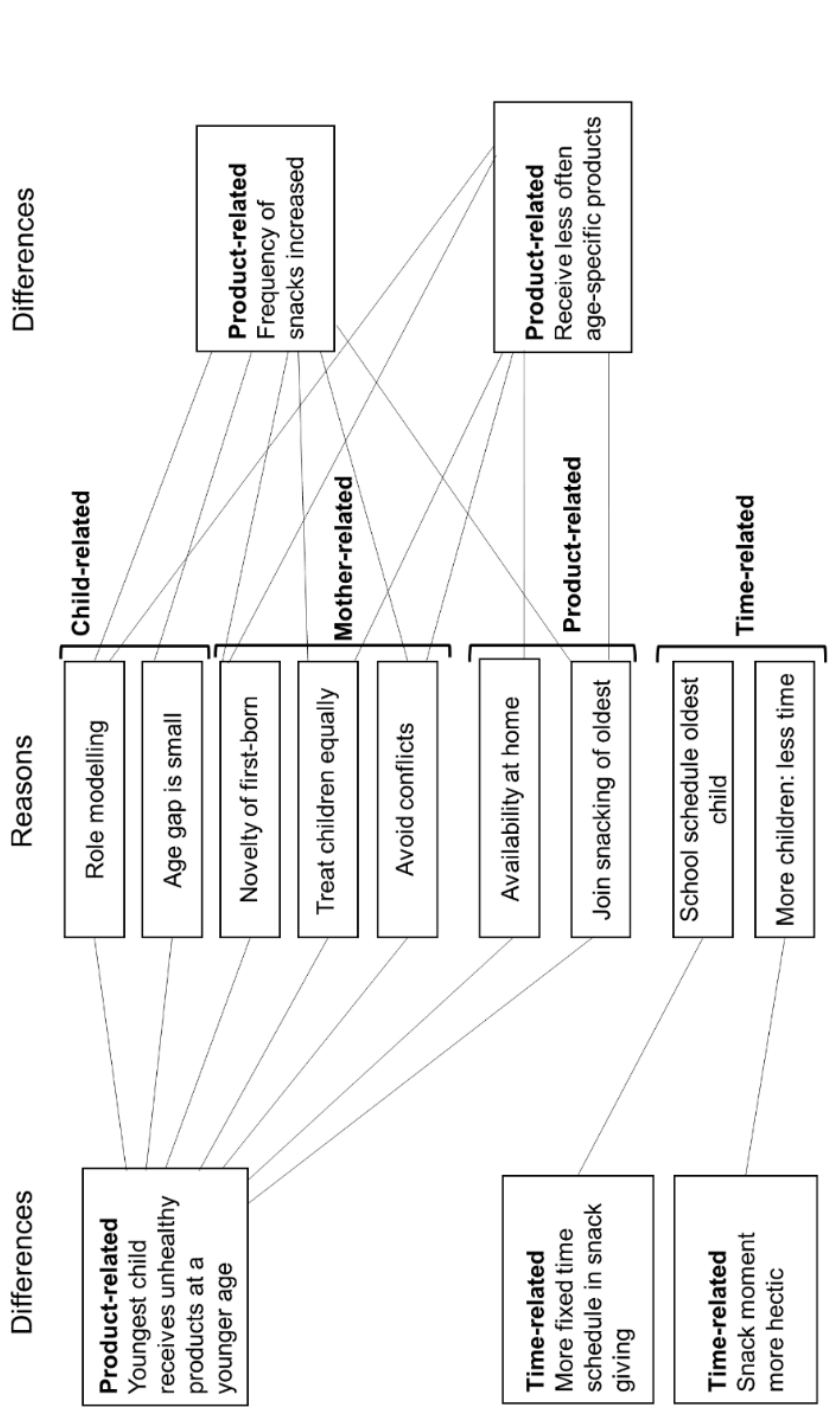

Figure 5.1. Relations between differences and underlying reasons in mothers' snack providing to the youngest child at 2-3 years and the oldest child when he/she was of the same age.

siblings was 31.8 months ranging from 17 to 54 months. This might explain why only three mothers mentioned the difference due to the small age gap in the current research.

Mother-related reasons

Part of the changing behavior of mothers as they get more children can be caused by the novelty of the first-born effect, see Figure 5.1. This effect comes with the lack of experience and the urge 'to do well' with the first-born child (Lewis and Kreitzberg, 1979, Barclay, 2018). It is probable that with having more children, mothers' ideals about raising their children become less strict (Barclay, 2018), as parents become more mature with parenting (Price, 2008). This is also mentioned by the mothers in the current research.

Mothers in the current study mentioned the importance of treating their children equally; and they therefore chose to provide their youngest child with unhealthier snacks at an earlier age, to provide them age-specific snacks less often, and to provide them more snacks compared to their oldest child at 2-3 years. Larsen *et al.* (2015) reported that children obey less well when they feel that they are treated differently compared to their siblings. Buist *et al.* (2013) reported that differences in parental treatment between siblings could cause behavioral problems among children. Another reason mentioned was that mothers want to avoid conflicts between their children and therefore offered the same type and amount of snacks to siblings. Loth *et al.* (2018) reported that parents mentioned conflict avoidance as the main reason for letting their child have more influence over the foods served at the main meals. Likewise, Snuggs *et al.* (2019) found conflict avoidance as a main goal of parents during main meals. A result of this conflict avoidance could be that parents more often admit to food-related demands of their children, resulting in the provision of less healthy foods or snacks (Norman *et al.*, 2015), which could explain the differences found in the current study.

Time-related reasons

The time-related reasons mothers mentioned are the school schedule of the oldest child, which causes a more fixed snack pattern for the youngest child and the fact that less time is available because of having more children. Each time-related reason seems to explain just one single difference. The parental time-constraint of having several children has an impact on the schedule of snacking as well as on the food choices made (North and Emmett, 2000). The mothers explained the difference due to the more hectic snack moment with the presence of more than one child in the household. With the advent of a second child, the pressure on the mother's time and attention increases (Lehmann *et al.*, 2018) which could explain this more hectic eating moment. In addition, the general parental involvement

at home is less present with younger siblings compared to the first-born child as mothers have to divide their attention between several children (Hotz and Pantano, 2015; Barclay *et al.*, 2018). Although the snacking moment is more hectic, mothers did not mention this to influence the type of snacks given.

Product-related reasons

The availability of other types of snacks at home is one of the product-related reasons mentioned by the mothers in this study. Differences explained by this reason are that the youngest child receives unhealthier snacks at an earlier age, as well as that they receive less age-specific snacks. As the first-born child grows older, there is a shift in the presence of the types of food products at home. This means that there are food products available at home that were not present when the first-born child grew up (Fisk *et al.*, 2011). Many studies reported the association between the type of foods available at home and the consumption pattern of the children in the household (Wyse *et al.*, 2011; Ding *et al.*, 2012; Couch *et al.*, 2014; Loth *et al.*, 2016), which confirms our result of mothers providing more unhealthy snacks when these become available at home.

5.4.3 Research implications

The results of the current research are useful for understanding why there are differences in the dietary behavior between oldest and youngest siblings (Northstone and Emmett, 2005; Fisk *et al.*, 2011; Vilela *et al.*, 2015; Damen *et al.*, 2019b). In addition, the results could be seen as one of the underlying reasons of the differences in the prevalence of overweight and obesity between the oldest and youngest children in a household as observed in several studies (Ochiai *et al.*, 2012; Haugaard *et al.*, 2013; Mosli *et al.*, 2015; Mosli *et al.*, 2016b; Park and Cormier, 2018).

We related the differences in snacks provided to the youngest children at 2-3 years and their oldest sibling when he/she was of the same age with the reasons for these differences. These findings could be useful in the design of novel intervention strategies on preventing childhood obesity as well as to help mothers meet children's dietary requirements. We propose the grouping of differences according to the key-themes as an effective way to categorize the diverse and complicated factors which play a role. In addition, the results show that research on family structure and home (food) environment could provide new insights into food choice behavior of mothers for their children.

5.4.4 Considerations for further research

Semi-structured interviewing is a widely used method in food choice research of mothers (*e.g.* Moore *et al.*, 2010; Lovelace and Rabiee-Khan, 2015; Boak *et al.*, 2016; Higginbottom *et al.*, 2019; Pineros-Leano *et al.*, 2019). Besides, this method was chosen as it appeared from previous research that snack choice for young children is a sensitive topic among mothers, which they do not want to discuss with other mothers in a focus group setting (Damen *et al.*, 2019a). In this study, a comparison is made between the youngest child and older siblings when both were at the age of 2-3 years, so a part of the interview was retrospective. Mothers had to tell about situations of some years ago when their oldest child was of 2-3 years-old. To cover the retrospective effect, future research could consider a longitudinal set-up of the study.

This study focused on differences in mothers' snack providing between their youngest and oldest child and reasons for these differences. However, some mothers spontaneously mentioned to expect some differences, like portion size, and reasons, like role modeling, to be present more clearly during main meals, which was also found by Loth *et al.* (2018). Therefore, it could be relevant to extend a future study to the consumption of main meals.

5.5 CONCLUSIONS

To our knowledge, this is the first study that shows reasons for differences in mothers' snack choice between their youngest child now and their oldest child at that age. All mothers indicated that there is a difference between snacks provided to their youngest child now and their oldest child at the age of 2-3 years. Mothers mentioned several reasons for these differences, which were classified in child-related, mother-related, time-related and product-related differences and reasons.

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CHAPTER 6

Values and value conflicts in snack providing of Dutch, Polish, Indonesian and Italian mothers.

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ABSTRACT

This study investigates which values play a role in the decision of mothers about snacks to offer to their young children with a focus on the value conflicts that might occur. The study explores whether national culture is reflected in mothers' values in snack choice for their young children and the related value conflicts. Semi-structured interviews with 67 mothers of 2-7-year-old children divided over 4 national cultures (Dutch, Polish, Indonesian and Italian) were conducted. Questions were asked about their values and value conflicts when providing a snack to their young children. Four key themes could be distinguished to cluster the mentioned values. The health-related key theme includes all values that are associated with the healthiness of the product, the child-related key theme all values that connects to the child, the time-related key theme includes the value convenience and the product-related key theme includes all values that are associated with the product itself. Dutch and Polish mothers mostly valued health of the snack, whereas Indonesian and Italian mothers mostly valued the preference of their child. Data also shows specific prevalence between values and nationalities: convenience was very important for Dutch mothers, valuing organic food was typical for Polish mothers, religion played a role for Indonesian mothers, while Italian mothers placed more value on brand compared to the mothers of other cultures. In all cultures, the value conflicts mentioned were mainly related to health.

6.1 INTRODUCTION

Over the last decades, rates in childhood obesity have been on the rise (Lobstein, 2003; Ogden *et al.*, 2014; Wijnhoven *et al.*, 2014). Worldwide, around 42 million children are overweight (Ng *et al.*, 2014). Childhood obesity tracks into adulthood (Singh *et al.*, 2008; Nicklaus, 2016) and can cause health problems later in life (Reilly and Kelly, 2011; Tyson and Frank, 2018). The consumption of energy-dense snacks by children, which is a frequently occurring habit (Larson and Story, 2013; Gevers *et al.*, 2016), is one of the factors contributing to childhood obesity (Piernas and Popkin, 2010; Boots *et al.*, 2015). Just like obesity, children's dietary behavior tracks into adulthood (Mikkilä *et al.*, 2005; Craigie *et al.*, 2011). Therefore, knowing how the snacks are chosen is important.

Mothers play a crucial role in the development of children's dietary behavior (Holsten *et al.*, 2012; Hardcastle and Blake, 2016). Mother's choices are critical especially for young children who get snacks directly from their caregivers (Tiggemann and Lowes, 2002), which are often the mothers (Rosenkranz and Dzewaltowski, 2008; Walsh *et al.*, 2015). Because mothers want to make the best choices for their children, they sometimes experience struggles (Johnson *et al.*, 2011; Machín *et al.*, 2016; Fielding-Singh, 2017). Besides, mothers prefer to make healthy food choices for their children (Carnell *et al.*, 2011; Walsh *et al.*, 2015), as well as food choices their children prefer (Carnell *et al.*, 2011; Boak *et al.*, 2016; Wijtzes *et al.*, 2017), two considerations which often become in conflict (Luomala *et al.*, 2004). Connors *et al.* (2001) labelled the considerations people take into account when making food choice decisions as values. Mothers have to deal with multiple of these values when choosing a snack for their children. When these food-related values do not serve the same goal, value conflicts occur (Furst *et al.*, 1996; Connors *et al.*, 2001), and a discrepancy can arise between what mothers would like to provide as a snack and what they actually provide (Hayter *et al.*, 2015). Therefore, crucial questions are if mothers from different cultures have the same values in snack providing, if they perceive similar value conflicts, and whether cultural differences influence these values and value conflicts.

Hofstede *et al.* (2010) defined culture as the whole of all the unwritten rules shared within a society, which are taught to new generations. According to Axelson (1986), culture indicates a certain way people act, feel and think and when this is connected to food, he coined the word 'foodways'. Foodways include the determination of what is edible but also all the activities that involve food selection and consumption. The cultural background of a person sets the scene during the choice, preparation, and consumption of food products (Counihan and van Esterik, 2012). Various aspects of culture can affect food choice, food behavior

and food consumption, like traditions and rituals social organizations, table manners, and meaning of food in life (Rozin, 2006). Culture is one of the most important parameters influencing food choice (Osinga and Hofstede, 2004; Rozin, 2006; de Mooij, 2010) and this food choice is passed from one generation to the other (Aboud, 2011, Hofstede *et al.*, 2010). Moreover, culture plays a role in value negotiations in a person's food choice process (Connors *et al.*, 2001; Bisogni *et al.*, 2002). Therefore, mothers' culture is expected to play a role in mothers' snack choice behavior for their children as well.

Multiple studies investigated the influence of culture on food choice (*e.g.* Michaelidou *et al.*, 2012; Freedman, 2016; Pelly *et al.*, 2018), whereby the quantitative Food Choice Questionnaire (FCQ) has been widely applied to compare food choices in different cultures (*e.g.* Prescott *et al.*, 2002; Mardon *et al.*, 2015; Pearcey and Zhan, 2018). However, in a review by Cunha *et al.* (2018) on comparing cultures using the FCQ, they concluded that for comparing cultures the original set of items of the questionnaire, which are derived from only one specific culture (UK), should be adapted to accommodate the different cultures.

A well-acknowledged model for characterizing cultures on national level is the cultural dimensions model of Hofstede *et al.* (2010). This model has been widely used to explain differences in organizations and other spheres of life (Hofstede *et al.*, 2010). De Mooij (2010) applied and validated the model to (food) consumption-related values and motives.

The provision of snacks to children is a recurrent occasion in which the cultural dimensions and the mothers universal value of caring children' health are important. In the current study, we define snacks as all foods, either healthy or unhealthy, eaten in between the regular meals. The main aim is to explore which values matter to mothers in snack choice for their young children, and whether they experience value conflicts. Additionally, we explore cross-cultural differences in these values and value conflicts. The insights obtained from this study point to the relevance of culture specific interventions to help mothers to meet children's dietary requirements.

6.2 METHOD

6.2.1 Study design

In total, 17 Dutch mothers, 16 Polish mothers, 17 Indonesian mothers and 17 Italian mothers, all with at least one child aged 2-7 years were selected to participate in the study. Semi-structured interviews with the mothers were used to explore their values and

experienced value conflicts, when providing a snack to their young children. Interviews were digitally recorded and lasted about 45 minutes. An interview schedule with fixed topics (*e.g.* personal information of the mothers, consumption of snacks: when, how and where, preferences of the child, features and properties of the ideal snack, difficult moments in snack providing) was developed and used to maintain consistency in interviewing. Interviews were conducted in English, when the researcher and participant had a different mother tongue. If both researcher and participant had the same native language, the interview was conducted in that language. Interviews were held either at the participant's home or at the university depending on the preference of the participant. The research was piloted with four mothers of children in the targeted age group, in order to determine any flaws related to time, feasibility and sensitiveness of the topic.

6.2.2 Recruitment and selection of participants

The Netherlands, Poland, Italy and Indonesia were chosen because of their differences on Hofstede's cultural model and its six dimensions. The country scores (www.geerthofstede.com/research-and-vsm/dimension-data-matrix, April 2018) on Hofstede's 6 dimensions are presented in Table 6.1.

Table 6.1. Hofstede dimension scores, per country (www.geerthofstede.com/research-and-vsm/dimension-data-matrix, April 2018).

	Dutch	Indonesian	Polish	Italian
Power distance[a]	38	**68**	**78**	50
Collectivism vs Individualism[b]	80	60	**14**	76
Femininity vs masculinity[c]	**14**	64	46	70
Uncertainty avoidance[d]	53	**93**	48	**75**
Long-term vs short-term orientation[e]	67	**38**	62	61
Indulgence vs restraint[f]	**68**	29	38	30

Relatively high or low scores per dimension are printed in bold

[a] The lower the score, the less power distant the culture, the higher the score the more power distant.

[b] The lower the score, the more collectivistic the culture, the higher the score the more individualistic.

[c] The lower the score, the more feminine the culture, the higher the score the more masculine.

[d] The lower the score, the less uncertainty avoiding the culture, the higher the score the more uncertainty avoiding.

[e] The lower the score the more short-term oriented the culture, the higher the score the more long-term oriented.

[f] The lower the score the more restraint the culture, the higher the score the more indulgent.

Mothers from these four different countries were approached through community organizations, cultural societies, social media and primary schools. A non-probabilistic, snowball sampling method was followed. The data was collected in the Netherlands and in Italy. As the Indonesian and Polish mothers lived in the Netherlands, an extra inclusion criterion was that these mothers did still stick to the eating culture and traditions of the native country. When recruiting the mothers, they were asked if they had the opinion they still did so, if this was the case they could participate in the study.

6.2.3 Data analysis

The first author transcribed the interviews and qualitatively analyzed the data using the software program MAXQDA (version 12) by attaching codes to the mentioned values and value conflicts. The first author also developed the code labels. A second researcher in addition to the first author independently coded the interviews. After coding the interviews, they compared and discussed the assigned codes until consensus on the used codes was reached. After this, tables could be retrieved of the type and number of values and value conflicts the mothers experienced using the software program. As most values the mothers applied while providing a snack to their young children were comparable, these values could be easily grouped into the different categories of values (*e.g.* healthiness, balance/moderation, portion size).

While grouping the mentioned values of the mothers of the four cultures, it was seen that some values were comparable or related to each other. Therefore, we could define four key themes in which the related values could be easily grouped. These were the key themes including health-related, child-related, time-related and product-related values. The health-related key theme includes all values that are associated with the healthiness of the product or healthy behavior of the mothers. The child-related key theme includes all values that connects to the child, for example what the child prefers to snack, or the development of the child's taste. The time-related key theme includes the values convenience and making own food and the product-related key theme includes all values that are associated with the product itself. Only those values that were mentioned more than 5 times by at least one cultural group, are included in the key-themes.

6.3 RESULTS

6.3.1 Participant characteristics

The average age of the respondents was 35.6 years, ranging from 25 to 48 years. Most participants (84%) were higher educated with a bachelor's degree or higher. On average,

the mothers had 1.7 children. Table 6.2 shows an overview of the demographic information of the mothers per country.

Table 6.2. Participants' characteristics per country of origin.

	Dutch (n = 17)	Polish (n = 16)	Indonesian (n = 17)	Italian (n = 17)
Average age, years (range)	36.1 (25-46)	34.9 (31-39)	33.8 (25-42)	37.5 (29-48)
Education lower than BSc, number	4	4	2	1
Education BSc or higher, number	13	12	15	16
Average number of children	2.1	1.8	1.8	1.3
1 child	5	5	7	12
2 children	6	10	7	5
3 children	5	1	3	0
4 children	1	0	0	0

6.3.2 Values in snack selection

Table 6.3 shows the values that arose during snack selection of the Dutch, Indonesian, Polish and Italian mothers for their young children. These values are categorized in the key themes health-related, child-related, time-related and product-related.

Health-related values

A common view amongst the mothers of the four cultures is that healthiness was an important value in snack providing. Almost all mothers mentioned healthiness as a must have for a snack.

"It needs to be nutritious and healthy" [ID16: Dutch mother];

"For snacks... it needs to be healthy, that's the most important" [ID32: Polish mother].

However, further analysis of the sub-constructs of healthiness (Table 6.4) reveals a more nuanced picture. The Indonesian mothers mention healthiness as an important value, but mention less often the specific sub-constructs belonging to healthiness. They just mention health, but specify this less often.

"I also want a snack to be healthy" [ID03: Indonesian mother];

"I try to give a healthy snack, but it is hard" [ID27: Indonesian mother].

Table 6.3. Values arising during snack selection of mothers for their young children per country.

Key themes	Values	**Dutch** (n = 17)	**Polish** (n = 16)	**Indonesian** (n = 17)	**Italian** (n = 17)
Health-related	Healthiness	**17**	**16**	**15**	**14**
	Balance / moderation	**15**	**12**	4	7
	Natural / fresh / organic	4	**11**	5	8
	Portion size	**10**	4	**9**	8
	Variation	**9**	5	4	**9**
Child-related	Child's preference	**12**	**14**	**16**	**17**
	Freedom for child / not forcing to eat	3	**9**	2	6
	Health status of child	6	4	8	6
	Development of taste	2	7	2	1
	Prevent hunger	4	6	5	1
Time-related	Convenience	**14**	7	**10**	7
	Making own food	0	**9**	6	4
Product-related	Religion*	0	0	**10**	0
	Price	**9**	7	6	5
	Brand	1	0	0	8
	Sustainability	6	1	0	1
	Packaging	4	2	3	5

Values mentioned by more than half of the mothers in a country are bold.
*Choice of snack is assigned by religion of the mothers.

Table 6.4. Sub-constructs of the value healthiness.

Sub-constructs of value healthiness	**Dutch** (n = 17)	**Polish** (n = 16)	**Indonesian** (n = 17)	**Italian** (n = 17)
Healthy	12	15	9	11
Not too much sugar	8	7	6	6
Having good ingredients	9	6	4	4
Needs to give energy	5	5	3	9
No additives	3	4	1	5
Not too much salt	1	2	3	2
Not too much fat	2	0	0	0
Total	40	39	26	37

The mothers of the other cultures are more specific in defining the health value. They mention many sub-constructs related to healthiness, often more than once.

> *"It is important for me that a snack for my son does not contain a lot of sugar. So, not too much sugar, but also not too much salt and fat. It needs to be filling, but also low in calories" [ID15: Dutch mother];*

> *"I choose to give vegetables or crackers because I think it is healthy, because they don't contain too much salt or too many additives, it is as natural as possible" [ID55: Polish mother];*

> *"I really value healthy snacks, so natural flavors, natural coloring, safe origin of the ingredients and possibly organic" [ID60: Italian mother].*

Apparently, Indonesian mothers mentioned health often in relation with preference of the child, which was their number one value.

> *"Something that is healthy, but they need to like it" [ID50: Indonesian mother];*

> *"It needs to be healthy... I think potato chips" [ID01: Indonesian mother].*

It seems that the Indonesian mothers mention healthiness as a relevant value, but weigh it as less important when compared to the other mothers.

Balance / moderation, another value belonging to the key theme health-related (Table 6.3), is mostly mentioned by Dutch and Polish mothers and less often by Indonesian and Italian mothers.

> *"And then... if they had three slices of cheese, I tell them it is enough for now" [ID14: Dutch mother];*

> *"For me, balance is very important. There needs to be a balance between healthy and less healthy snacks. If there is a good balance it is not too bad if they sometimes eat unhealthy snacks" [ID36: Polish mother].*

Dutch and Italian mothers mentioned variety more often compared to Indonesian and Polish mothers (Table 6.3). Polish mothers mentioned portion size as a health-related value less often compared to the mothers from the other cultures. On the other hand, Polish mothers highly value snacks being natural, fresh or organic. Moreover, almost half of the Italian mothers mentioned these values, but Dutch and Indonesian mothers mentioned them less often.

> *"I already helped my grandfather in the vegetable garden when I was a little girl. There was nothing in the shops, so you had to do it yourself. My grandfather still has a big vegetable garden, all organic. This I also want for my children" [ID29: Polish mother];*

> *"For me it is important that a snack is healthy and natural, so something that is not processed" [ID65: Italian mother].*

Child-related values

The child's liking of the snack provided was very important for most mothers in this research, especially for the Indonesian and Italian mothers, who consider their child's preferences as most important when choosing a snack (Table 6.3). They stated that the child does not eat the snack if he does not like it, so in their opinion child's liking of the snack was a prerequisite for choosing it.

> *"For me the snack needs to be healthy, at the same time it is clear that I realize that if the snack itself is not desirable he will not eat it at the end" [ID60: Italian mother].*

Indonesian mothers, compared to the mothers of the other cultures, were more often worried about the health status of their child, often related to weight or dental health.

> *"From my culture in Indonesia, they always all like sweet snacks. That is causing the children in Indonesia all have the broken teeth, I think that is because of the sweet snacks and the rice. Yeah... that has also happen to my son, he has so many caries" [ID02: Indonesian mother];*

> *"She has my genes, and I am not that skinny, neither my husband, so I want to avoid she get diabetes too" [ID26: Indonesian mother].*

For more than half of the Polish mothers it was important to "not force" their child to eat, so that they have the freedom to choose their preferred snacks. Besides, Polish mothers also mention more often that they value the taste development of their children. Mothers from the other countries do not mention these values as often as the Polish mothers do.

> *"I do not want to force him to eat a specific snack" [ID33: Polish mother];*

> *"Sometimes he does not like things, but then we agreed that he needs to taste. Then I try to give it to him several times and at the end, he likes it. Keep trying, but not forcing. Just try, just one bite and at the end he likes it" [ID34: Polish mother].*

The value preventing hunger is less mentioned by Italian mothers, compared to the mothers of the other countries.

Time-related values

The most mentioned value belonging to the key theme time-related is convenience (Table 6.3). The Dutch mothers highly value convenience; almost all Dutch mothers mention convenience as an important value when providing snacks to their young children, just after healthiness and balance/moderation.

> *"For me it is important that it is quick to prepare. I would rather prepare a banana than I have to peel an apple and cut it in pieces. So for mothers it is important that it is easy and quick, knowing it is also healthy" [ID17: Dutch mother].*

Almost half of the Polish and Italian mothers, and more than half of the Indonesian mothers, mentioned convenience as an important value. The other value belonging to the key theme time-related is making own food. This value can be interpreted as the opposite of convenience. Especially Polish and Indonesian mothers highly value to make their own snacks, whereas Dutch mothers never mention this value.

> *"Almost all food is homemade, I prefer to cut a salad myself instead of buying ready to use. I think it is not a problem to make food yourself, it takes not too much time" [ID36: Polish mother];*

> *"Nowadays you can buy so many things in the store, that I think: you can make an effort and cook, but you just do not do that" [ID14: Dutch mother].*

Product-related values

A recurrent theme in the interviews, were values related to the properties of the snack like price, packaging, brand, religion and sustainability (Table 6.3). However, the mothers from the different cultures valued these characteristics differently. Compared to the other mothers, the Dutch ones stated more frequently the price of the snacks as a value. Brand is a value mentioned mostly by Italian mothers.

> *"I choose the brand that is the best-known brand, it might suggest that the product is more reliable than others, maybe more controlled" [ID59: Italian mother].*

As some of the Indonesian mothers were religious, an important value in snack selection for them was religion. The Indonesian mothers were the only mothers of the four cultures mentioning religion.

> *"I don't know in here, but in Indonesia especially for the Muslim community and for my family we always check the packaging, the ingredients, it needs to be Halal. So even if my daughter really likes to eat something, she knows she has to check the packaging" [ID50: Indonesian mother].*

Sustainability, the other value belonging to this key theme, was mainly mentioned by the Dutch mothers. Packaging was not an important value for all mothers.

6.3.3 Value conflicts in snack selection

When two important values do not serve the same goal, they can cause value conflicts. The mothers from the four cultural groups all reported these kind of conflicts between values, as presented in Table 6.5. Interestingly, all conflicts mentioned are related to health.

Table 6.5. Frequency of value conflicts mothers from different cultures experience while providing snacks to their young children.

	Dutch (n = 17)	**Polish** (n = 16)	**Indonesian** (n = 17)	**Italian** (n = 17)
Health vs. Child's preference	8	6	**14**	8
Health vs. Convenience	**10**	4	2	2
Health vs. Social environment	7	5	6	8
Health status of child vs. Child's preference	1	2	6	1
Health vs. Price	4	5	2	0

Values mentioned by more than half of the mothers in a country are bold.

The most mentioned value conflict mothers experience while providing snacks, is the conflict between a healthy snack on the one side and the preference of the child on the other side. Mothers highly value the healthiness of the snacks; however, it is also important for them that their child likes the snack they provide. When these values are not in line, for example, when the child wants to eat chocolate or chips, value conflicts appear. Especially Indonesian mothers experience this type of conflict.

> *"I need to fight with her, because she loves sweet things. I try everything for snacks with vegetables. I make carrot cake or carrot pie, or I make spinach chips. But, if she sees green things she does not want it. That is really a challenge for me. Really difficult" [ID26: Indonesian mother].*

Polish mothers are stricter and are not willing to make compromises when a child complains or asks for an unhealthy snack. They mention the conflict between health and child's preference less often.

> *"When he complains in terms of 'I am hungry and I want cookies' then yeah, it is just bad luck for him" [ID54: Polish mother].*

Interestingly, the mothers did not indicate social environment as a value, but when describing the value conflicts all mothers noticed the conflict between health and social environment (Table 6.5). In almost all cases, mothers are struggling with the provision of unhealthy snacks to their children by their husband or grandparents, or because other children get unhealthy snacks, which their children also want to have.

> *"The grandparents give my children a lot of treats that I would definitely not give them. Like very sweet candies on which you can see the sugar on top" [ID45: Dutch mother];*

> *"As far as my partner is concerned, he's a disaster. If there are packaged ice creams and snacks in our house, it's because he brings them. It's a fight!" [ID58: Italian mother].*

The Dutch mothers highly value both convenience and health, but these two values often conflict. They perceive healthy snacks as more time consuming and when there is a time restriction, they sometimes choose convenience over a healthier snack. For the mothers of the other cultures this was barely a problem.

> *"Sometimes I just give him a bag of cookies, because it is quick and convenient, but of course I could also cut some fruit and give it to him, but at that moment time counts" [ID13: Dutch mother].*

The conflict between health status versus the preference of the child, is a conflict most reported by Indonesian mothers (Table 6.5). They highly value the preferences of their children, but also notice health problems with their children, like problems with their weight or their teeth. Because these two values are often contradictory, they experience value conflicts.

> *"Yeah... because the little one has really bad teeth, so in the front almost 75% are black, with holes everywhere. Because she eats too much sweets. She likes to have ice cream for example. So I then choose to buy things that are easy to finish fast, let's say small cornets in 6 and then everyone get 1 and another 2 maybe for tomorrow" [ID51: Indonesian mother].*

The conflict between health and price is mostly experienced by the Dutch and Polish mothers. For Polish mothers, this is closely related to their high valuation of fresh and organic food, which is often more expensive.

6.4 DISCUSSION

6.4.1 Cross-cultural comparison

Our study demonstrated that mothers with different cultural background reveal differences in values and value conflicts when choosing snacks for their young children. In the European continent, food patterns differ according to the region one lives (Counihan and Van Esterik, 2012), thus the target was to gather participants from one country in the west, one country in the east and one country in the South of Europe. The inclusion of a country from Asia was preferred, because even more differences were expected. The results show many instances in which culture could have played a role. However, inherent to the character of qualitative research, the numbers of respondents and countries in the current study limit the claims that can be made about systematic differences due to cultural differences. Nevertheless, to get an indication whether cross-cultural differences might elucidate differences in values as indicated by the mothers, we discuss the results per key theme in the next paragraphs. Since our 4-country set involves variation on all six dimensions, these will be explained below. Note that these dimensions are about the social context in which people live and think, not

about their personalities. Depending on culture, any behavior, including the giving of snacks to children, might take on a new meaning. For example, are snacks given to show love, to feed a child, to care for a child's health or to be a good mother?

Power distance is associated with division of status in society between people with different attributes or roles. In family life, this has implications for status distribution between genders and ages, and between parents and children. The higher the score, the more parents expect obedience from their children, the lower the score, the more parents treat their children as equals. Individualism versus collectivism shows how individuals are related to groups. In individualistic cultures, individuals are expected to be independent from groups. They can change groups and belong to multiple groups. Moreover, individual taste, choice and initiative are seen as a good thing. In collective societies, life-long, loyal membership of a single in-group is the expectation. Masculinity versus femininity is about aggression, and about the emotional roles of men and women. When a culture is masculine, there are emotional and status inequalities between husband and wife, men are supposed to be forceful and to deal with facts, women with feelings, fathers are supposed to be more tough, mothers to be more caring. Uncertainty avoidance is the extent to which the members of a culture feel threatened by anything unknown. This includes relations, situations, people but also foods and snacks. Conversely, familiar things are valued more, and linked to strong emotions. In strongly uncertainty avoidant cultures, there are tight rules for children on what is good and on what is taboo, and this includes food and rituals around food. Long-term orientation is the extent to which society is oriented towards future rewards or obligations, as opposed to momentary ones. In a long-term oriented culture, balance, thrift and moderation are typically valued, and traditions can be adapted to context. Finally, indulgence stands for freedom of acting on one's impulses, enjoyment of life, and having fun. In indulgent societies, life should be easy and pleasurable (Hofstede *et al.*, 2010).

All mothers, independent of their culture, mentioned healthiness as an important value in snack providing (Table 6.3). From literature, we also know that mothers from various countries value health in food choice (Bouwman *et al.*, 2009; Johnson *et al.*, 2011; Carnell *et al.*, 2011; Machín *et al.*, 2016). However, when further exploring this health value, our data suggests that the Indonesian mothers value health less than the mothers with the other nationalities do. Apparently, in addition to health as value, they seem to value the mother-child relation, as indicated by their high scores on the child-related key theme (Table 6.3). Prioritizing a relational over an individual theme could be related to the high score on collectivism of the Indonesian culture. Where the European mothers value teaching their children to be independent, the focus of Indonesian mothers is more on the needs and

desires of their child. The focus on needs, goals and desires caused by the social context is also described by Parkinson *et al.* (2005). This might result in the pampering of their children with foods they love to eat, which are maybe less healthy. Likewise, Tan *et al.* (2016) found, in a study about the perception and understanding of mothers of health claims on milk powder for children that Indonesian mothers did not care a lot about these health claims, as long as their children were happy. Another notable result belonging to the health-related key theme is the high score of the Polish mothers, and to a lower extent of the Italian mothers, on the value natural / fresh / organic (Table 6.3). The dimension scores reveal that Polish, as well as Italian cultures score high on uncertainty avoidance. De Mooij (2010) described that in strongly uncertainty avoiding cultures, there seems to be more fear of contamination. People seek for health in the purity and quality of their foods (de Mooij, 2010), which may explain the scores on natural / fresh / organic in our study. Moreover, Markovina *et al.* (2015) reported the importance of natural content as an important food choice motive of Polish consumers.

All mothers, but especially the Indonesian and Italian mothers, mention the child's preference as important (Table 6.3). These findings are in line with studies done in the USA (Evans *et al.*, 2011; Meers *et al.*, 2016), Australia (Russel *et al.*, 2015; Boak *et al.*, 2016) and UK (Carnell *et al.*, 2011), which revealed that children's preference affected mothers' food choice. Particularly, in the current study, Polish mothers mentioned frequently freedom of the child as a value. According to the cultural dimensions the Polish culture has a comparatively large power distance and strong restraint but is not so high on individualism (Table 6.1). These cultural characteristics could indicate that in Poland freedom is an ideal situation that can never be taken for granted.

The time-related key theme includes the values convenience and making own food. In our study, Dutch mothers highly value convenience. Likewise, Dutch consumers, in the research of Markovina *et al.* (2015), highly valued convenience. Of the mothers from the four cultures studied, the Dutch ones most often mentioned the conflict between health and convenience. According to the De Mooij (2010), convenience as a motive for food choice associates with low uncertainty avoidance and low masculinity, which definitely fits Dutch culture, which is feminine, long-term oriented and not very uncertainty avoiding. The Polish and the Italian cultures score high on uncertainty avoidance (respectively 93 and 75), as well as on masculinity (respectively 64 and 70), which could explain their lower scores on convenience. Making own food reveals the mother's care for and time investment in their young children. This value is mentioned by the Polish and Indonesian mothers, and could be linked to more collectivist cultures, with their strongly scripted social roles. Additionally,

food safety concerns could play a role in the high scores of the Polish and Indonesian mothers on making own foods. When making your own food you control what is in the food yourself, which is a determinant of high uncertainty avoidance, a dimension on which the Polish as well as the Italian cultures score high. It was expected that the Italian mothers would mention more often to make their own food, however this was not the case. A reason could be that this research is focusing on snacks, and not on the main meals which may be more often prepared from scratch by the Italian mothers.

Product-related values assigned by the mothers also differed between the four nationalities. The Dutch mothers highly value price for snack products, as was also found by Markovina *et al.* (2015). The importance of price may be explained by the dimension of long-term orientation, for which the Dutch culture scores highest of the four cultures in this research. In the Dutch culture, it is important to look at the future and not spend all the money at once. The Dutch mothers also stated sustainability more often than the mothers of the other countries did, which could also be interpreted as caring for the future. While providing a snack, religion is mentioned as an important value by the Indonesian mothers (Table 6.3). The Indonesian mothers mention that the snacks they provide need to be Halal, which is also reported by Tan (2016) as an important value for Indonesian mothers. One could directly attribute this to religion. However, choice of religion, and the way in which it is enacted is modified by culture (Hofstede *et al.*, 2010). High collectivism, as the Indonesian culture, makes it more likely that food rituals are shared and seen as linked to the group's identity. Based on a cross-cultural study about food preferences, Osinga and Hofstede (2004) conclude that in essence not religion in itself, but the culture in which that religion grew, matters in food choice.

For Italian mothers, brand is an important value, which is also seen in the research of Mascarello *et al.* (2015) were Italian consumers highly value taste and naturalness of food products, but also mention brand as important. In our study, the Italian mothers scored high on the value brand (Table 6.3). Italy scores relatively high on the dimension uncertainty avoidance of the Hofstede model (Table 6.1). A characteristic of strongly uncertainty avoiding cultures is that familiar things are valued more and that members of these cultures feel threatened anything unknown, including foods. This might explain the higher valuing of brand by the Italian mothers in our study, as well-known brands are seen as familiar and safe to them. Similarly, Tiozzo *et al.* (2017) stated that Italians often do not trust the foods they eat. Another characteristic of the Italian culture is the relative high score on masculinity, in which status is seen as important. This may be an explanation too, as you can show off by using specific brands.

Although these results and interpretations are presented with caution due to the explorative nature of this study, they do indicate that national culture, as operationalized in Hofstede dimensions, is a meaningful framework for explaining values as well as value conflicts in snack giving behavior of mothers. As a result, different motives, and different value conflicts may be at work when mothers are providing snacks to their young children. If this analysis applies, it is expected that mothers from countries with comparable dimension scores as the mothers from the countries in this study, will mention the same values as important in snack giving and experience similar value conflicts. For example, mothers from the Scandinavian countries like Norway and Sweden are expected to experience comparable values and value conflicts as the Dutch mothers do. Therefore, the insights of this study help conjecture how the results could be extrapolated to other counties. These insights could be of relevance for food companies to better target their product development for consumers of different cultural backgrounds, which can be of added value (de Mooij, 2010). This data could also help national health care institutes to draw up more effective recommendations on children's' diet in order to face the obesity epidemic. Besides, this research is of relevance for other researchers in cultural and social science.

6.4.2 Research considerations and recommendations

This study described the values and value conflicts of mothers of four different cultures when providing snacks to their young children. The original idea for the set-up of this study was to conduct focus group discussions instead of semi-structured interviews as it was believed that this technique would give more, or other information about the topic as the participants could brainstorm and exchange ideas. Regrettably, many mothers, and especially Dutch mothers, were not comfortable to join focus group discussions regarding their snack giving behavior and experienced value conflicts. They were afraid to be judged by the other mothers about their specific decisions and value conflicts. This has methodological implications. This issue shows that the topic is both very relevant and sensitive. It also shows that focus group discussion is maybe a desirable method, but hard to realize for more sensitive experienced topics. The mothers in this study were mainly highly educated. As education has an influence on the snack giving behavior and its considerations of Dutch mothers (Damen *et al.*, submitted), this can be the case for mothers with other cultural backgrounds as well.

This explorative study on values and value conflicts of mothers of different cultures demonstrated that all mothers experience health-related value conflicts when providing snacks to their young children. However, the type of values that conflict with health differ between the cultures. Mothers of different cultures also report different values playing a

role while providing a snack to their young children. Dutch mothers highly value health and convenience. Polish mothers value health and organic and natural snacks. Italian mothers highly value the preference of their child and the brand of the snack. Indonesian mothers highly valued the preference of their child as well as religion. To further explore the topic, it is recommended to conduct the study in more different countries to ascertain which health-related value conflicts of mothers of other cultures experience, which values are relevant for these mothers and how they can be connected to the cultural differences among countries.

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CHAPTER 7

Mothers' considerations in snack choice for their children: differences between the North and the South of Italy.

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ABSTRACT

This study describes differences in considerations and value conflicts between mothers living in the North and the South of Italy during snack provision to their 2-7-year-old children. Semi-structured interviews with 20 mothers living in the North and 20 mothers living in the South of Italy were conducted. Participants matched on educational level and weight status. Mothers' considerations in snack provision were grouped into four key themes: health-related, child-related, time-related, and product-related. North Italian mothers showed more health-related considerations while providing a snack compared to mothers living in the South. In case mothers from the South mentioned healthiness as a consideration, it was often related to giving energy. The child-related key theme revealed that a snack needs to be liked by the child, otherwise Italian mothers do not provide it. For the time-related key theme, differences were small between North and South Italian mothers. The product-related key theme showed the brand to be more important for South Italian mothers. Mothers from the North of Italy experienced more value conflicts, all related to health. The current studied showed that even within the same country, geographical differences in mothers' considerations and value conflicts for providing snacks exist. This implies that snack choice, considerations and values seem to be influenced by tradition and family culture.

7.1 INTRODUCTION

Over the last decades, childhood obesity has been increasing in the United States and in Europe (Ogden *et al.*, 2014; Wijnhoven *et al.*, 2014). When obese or overweight children become adults, there is a higher chance that their weight problems remain (Sing *et al.*, 2008) which could lead to health problems, also later in life as considered by Reilly and Kelly (2011), Tyson and Frank (2018) and Flodmark (2018).

In Italy, overweight and obesity among children are highly prevalent too (Wijnhoven *et al.*, 2013; Spinelli *et al.*, 2019; Lauria *et al.*, 2019) and show striking differences between the North and the South of the country (Nardone *et al.*, 2018). Several studies reported the prevalence of overweight and obesity to be higher in the South compared to the North of Italy (Gallus *et al.*, 2013; Brunello and Labartino, 2014; Mancini *et al.*, 2016). The difference is particularly present among primary school children (Binkin *et al.*, 2010; Lazzeri *et al.*, 2014; Menghetti *et al.*, 2015), as illustrated in Figure 7.1.

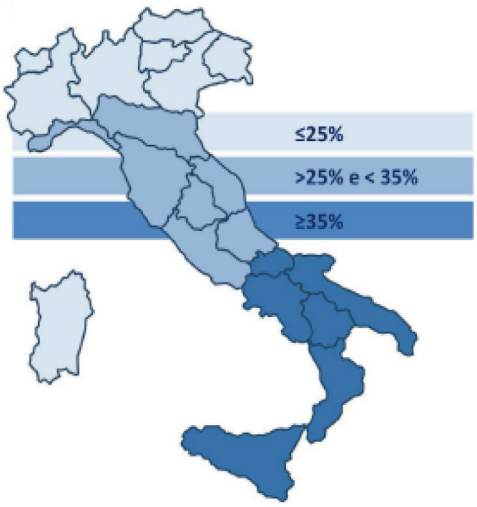

Figure 7.1. Prevalence of overweight and obesity in 8-9-year-old children in the different regions of Italy (Nardone *et al.*, 2018).

The contribution of frequent intake of energy-dense snacks by children (Larson and Story, 2013; Dunford and Popkin, 2018) on the development of childhood overweight has been often quoted (Piernas and Popkin, 2010; Pearson *et al.*, 2011; Boots *et al.*, 2015; Fisher *et al.*, 2015). Pearson *et al.* (2011) showed the relationship between snack intake, tv-viewing and obesity in a longitudinal study. As children's dietary behavior tracks into adulthood (Mikillä

et al 2005; Craigie *et al.*, 2011), it is important to know how snacks provided to children are chosen. The role of mothers is very important in the development of children's dietary behavior (Holsten *et al.*, 2012; Hardcastle and Blake, 2016; Jones, 2018). Even though the role of fathers is becoming more prominent in food choice over the last years (Khandpur *et al.*, 2014; Fielding-Singh, 2017), mothers are often the main providers of snacks to their children (Rosenkranz and Dzewaltowski, 2008, Walsh *et al.*, 2015). Also in Italy, the mother is the main parent involved in food choice for the children as stated by Finistrella *et al.* (2012) and Squeri *et al.* (2018).

Considerations people take into account when making food choices are so-called values (Connors *et al.*, 2001). When these considerations are not aligned, value conflicts occur (Furst *et al.*, 1996; Connors *et al.*, 2001). Mothers also experience these value conflicts while making snack choices for their children (Damen *et al.*, 2019a; Damen *et al.*, 2020a). Mothers prefer to make healthy food choices for their children (Johnson *et al.*, 2011; Carnell *et al.*, 2011; Walsh *et al.*, 2015; Machín *et al.*, 2016; Damen *et al.*, 2019b) as well as choices preferred by their children (Russel *et al.*, 2015; Boak *et al.*, 2016; Meers *et al.*, 2016; Wijtzes *et al.*, 2017; Damen *et al.*, 2019b). These two considerations do not always lead to the same choice (Luomala *et al.*, 2004; Damen *et al.*, 2020a). Also, Italian mothers experience this value conflict between health and preference of their child. Moreover, the value conflict between health and social environment is another value conflict Italian mothers experience while providing snacks to their children aged 2-7 years (Damen *et al.*, 2019a).

Previous research has also demonstrated that Italian mothers value the preference of their child above the healthiness of the snack (Damen *et al.*, 2019a). Besides, the brand is an important consideration taken into account while choosing a snack. However, while analyzing that dataset, there was an indication that mothers from the North of Italy showed different considerations in snack providing to be important compared to mothers from the South. Moreover, these differences also seemed to be present for experienced value conflicts. As this possible regional effect was not studied explicitly in the previous paper, we explored the differences in snack choice considerations and value conflicts for North versus South Italian mothers in a new study. In the current study, we attempted to keep the level of educational attainment, working status and weight status equal between the participants of the two regions, to make sure these differences would not affect our outcomes.

7.2 METHODS

7.2.1 Study design

Twenty mothers living in the North of Italy (Parma) and twenty mothers living in the South of Italy (Naples) participated in the study. All mothers were selected based on having at least one child between two and seven years old. Moreover, in the selection of the mothers we attempted to keep the educational attainment, working status and weight status of the mothers from the North and the South of Italy comparable, to avoid influence of these factors on the results. However, we did not explicitly monitor these criteria during recruitment. Social media and snowball sampling (Zarantonello and Luomala, 2011; Barros da Silva *et al.*, 2018) were used to recruit participants. Mothers were recruited in Parma (North) and Naples (South) province, particularly at daycare centers. Interviews took place between December 2017 and March 2018.

Semi-structured interviews were held to examine mothers' considerations and experienced value conflicts while providing a snack to their children. Snacks were defined as all foods, either healthy or unhealthy, eaten in between the regular meals, based on definitions used in previous studies (Ovaskainen *et al.*, 2010; Hartmann *et al.*, 2013; Duffey *et al.*, 2014; Damen *et al.*, 2019a). Value conflicts were explained to the mothers as difficult moments while providing a snack to their children. The research was piloted with two mothers of the target group, who were not involved in the study. Minor changes to the interview guide were made based on the results of the pilot study. Interviews, which lasted about 45 minutes, were conducted by native speakers and were digitally recorded. Interviews were conducted by two different interviewers, *i.e.* one interviewer in the North and the other interviewer in the South. For this purpose, an interview guide was developed comparable with previous research (Damen *et al.*, 2019a) in order to maintain consistency in interviewing (Bryman, 2016). The interview guide is presented in Table 7.1. A grounded theory approach was used for systematic data collection (Charmaz, 2014) and the data were analyzed inductively. The study had an explorative character because the current insights from literature were too limited to accurately design a quantitative research. All mothers provided information about their number of children, age of their children as well as their own age. Moreover, they reported their height and weight and that of their children.

All mothers provided informed consent before participating in the study and each mother received a gift voucher as compensation. To ensure anonymity, each participant was given a unique code, including a number and a code for the region they came from (NIT for North and SIT for South).

Table 7.1. Interview guide.

Interview guide
General snack providing
Could you explain a typical day of eating for your child? Could you tell something about the providing of snacks to your children? - Do you have a certain pattern (week/weekend, the moment of the day, other...) - Are there specific situations for providing a snack? What type of snacks do you provide? - How much do you provide? (portion size) - Do you have habits in snack providing? - Where do you give the snacks? (place at home) Are there any traditional snacks in your region?
Reasons for providing a snack
What are your reasons for providing a snack for your child? What is the most ideal snack that can be given to children of this age? - What characteristics make it a perfect combination for a snack?
Value conflicts
What are difficult moments in providing snacks to your children for you? - Why are these moments difficult for you? - How do you deal with such moments? - How do you feel about it? - Can you give examples?

7.2.2 Data Analysis

Interviews were transcribed, translated into English by two of the co-authors, and qualitatively analyzed using the software program MAXQDA (version 18). Two researchers, including the first author, independently developed code labels for all considerations and value conflicts mentioned by the mothers. Subsequently, they coded the translated interviews and compared and discussed their assigned codes until consensus on the used codes was attained. Data saturation was reached after analyzing 12 interviews with mothers living in the North and 14 interviews with mothers living in the South. No new codes had to be added to the interviews and no new results appeared in the last 8 and 6 interviews with mothers from respectively the North and the South. The coded considerations and value conflicts mentioned were comparable with those found in our previous research (Damen *et al.*, 2019a). Therefore, we grouped the considerations according to the key themes defined in that study. The key themes include health-related, child-related, time-related, and product-related considerations. All considerations that relate to the healthiness of the product or to healthy behavior of the mother were categorized in the key theme health-related. All considerations that connect to the child were categorized in the child-related key theme. The time-related key theme includes both considerations of convenience and making own food. All considerations that were associated with the product itself were included in the product-related key theme (Damen *et al.*, 2019a). If a mother mentioned a consideration

several times during the interview, it counted only once because the intention was to identify variation in types of considerations rather than assessing the frequency as a way to quantify considerations per mother. However, we used the number of mothers reporting a similar consideration as a measure to select the most relevant considerations. Only those considerations that were mentioned by at least 5 mothers in one of the two groups were included in the key themes. The consideration healthiness, belonging to the health-related key-theme, revealed different more nuanced considerations (such as not too much sugar, no additives, needs to give energy, not too much fat, having good ingredients, not too much salt), that have been grouped into sub-constructs. These sub-constructs were also analyzed and presented per region. For the other considerations, no sub-constructs were observed as they were well delineated. Value conflicts were analyzed throughout the entire data-set, including, but not limited to, the specific question on difficult moments (Table 7.2).

7.3 RESULTS

7.3.1 Participant characteristics

Table 7.2 shows an overview of the demographic information of the mothers from both regions. The average age of participating mothers living in the North of Italy was 39.2 years, ranging from 28-48 years, the average age of mothers living in the South of Italy was 37.5 years, with a range from 30-45 years. Most of the participants were highly educated with a bachelor's degree or higher. As we recruited particularly at daycare centers, in each region all but one mothers were employed. Moreover, also the self-reported weight status of the mothers as well as of the children were comparable between both regions. The average number of children was 1.7 in the North and 1.5 in the South.

7.3.2 Considerations in snack providing

Table 7.3 presents the considerations of the North and South Italian mothers when providing a snack to their children aged 2-7 years, categorized in the key themes health-related, child-related, time-related and product-related. Mothers in the North mentioned in total 126 considerations, whereas mothers in the South gave 80 considerations.

Table 7.2. Participants' characteristics per region.

	North Italy (n = 20)	**South Italy** (n = 20)
Average age mothers, years (range)	39.2 (28-48)	37.5 (30-45)
Education		
Lower than BSc, number	3	4
BSc or higher, number	17	16
Mothers' weight status		
BMI < 18.5 kg/m^2, underweight	1	1
BMI 18.5-24.9 kg/m^2, normal weight	16	15
BMI 25-30 kg/m^2, overweight	1	1
BMI >30 kg/m^2, obese	2	3
Number of mothers employed	19	19
The average number of children	1.7	1.5
1 child	8	11
2 children	11	9
3 children	1	0
Average age children, years (range)	4.4 (2-7)	5.1 (3-7)
Children's weight status*		
Percentile <5th, underweight	1	0
Percentile 5th-85th, normal weight	15	13
Percentile 85th-95th, overweight	2	4
Percentile >95th, obese	2	3

**Percentiles of weight status for the children were calculated using the growth charts provided by the World Health Organization for boys and girls between 2 and 5 years old.*

Health-related considerations

All but one mother from the North of Italy mentioned health as a consideration while providing a snack to their children (Table 7.3).

> *"First of all, a snack needs to be healthy, that's obvious" [NIT38].*

Mothers from the South of Italy mentioned less often health as a consideration, they valued the preference of their child above healthiness and mentioned that a healthy eating pattern could be developed later in life.

"There are mothers who are very careful about choosing a healthy snack, but I think this is not right. As they are children, I think they could eat what they want, there will be time later to be careful about what to eat" [SIT16].

"I do not think healthiness is important for a snack, I give my son a snack because he asks for it. Obviously, if he asks for fruit or orange juice I am happier but I think he is young and he has so much time to change his preferences" [SIT10].

Table 7.3. Considerations for snack selection of mothers for their young children: number of mothers who mentioned a consideration at least once and percentage of the total number of occurrences for all considerations per region.

Key themes	Considerations	**North Italy** (n = 20)	**South Italy** (n = 20)
Health-related	Healthiness	**19** (15%)	7 (9%)
	Natural / fresh / organic	**12** (10%)	4 (5%)
	Variety	**14** (11%)	1 (1%)
	Portion size (need to be small)	10 (8%)	3 (4%)
	Balance / moderation	5 (4%)	1 (1%)
Child-related	Child's preference	**20** (16%)	**20** (25%)
	Freedom for child / not forcing to eat	6 (5%)	8 (10%)
	Health status of the child	4 (3%)	5 (6%)
Time-related	Convenience	**14** (11%)	10 (13%)
	Making own food	9 (7%)	6 (8%)
Product-related	Brand	6 (5%)	**11** (14%)
	Price	7 (6%)	4 (5%)
	Total number of occurrences	126 (100%)	80 (100%)

Considerations mentioned by more than half of the mothers in a region are bold.

Table 7.4 indicates that mothers from the North of Italy were more specific in defining their health considerations. Overall, more mothers from the North than from the South of Italy, mentioned the sub-constructs of healthiness like 'no additives', 'not too much fat' and 'not too much sugar'. On the other hand, when mothers from the South mentioned healthiness as a consideration, relatively more mothers mentioned the less specific sub-construct 'having good ingredients'. In addition, the sub-construct 'needs to give energy' was also mentioned more often by mothers from the South.

"Children spend a lot of energy and I think that they need the same energy from food, therefore I give snacks" [SIT04].

For the health-related considerations, we see that more North Italian mothers mentioned natural/fresh/organic than South Italian mothers. In addition, North Italian mothers often mentioned variety as a consideration (Table 7.3).

"Obviously, it is necessary to vary the snacks you provide; only a variety of foods gives you good health. A snack adds to the variety of what my child eats" [NIT37].

Portion size, another consideration belonging the health-related key theme, was also mostly mentioned by the North Italian mothers.

"In my opinion, the portions you give need to be small" [NIT48].

Table 7.4. Number of mothers who mentioned each sub-construct at least once and the percentage of the total number of sub-constructs for all considerations per region.

Sub-constructs of consideration healthiness	North Italy (n = 19)	South Italy (n = 7)
Not too much sugar	**13** (31%)	5 (24%)
No additives	9 (21%)	1 (5%)
Needs to give energy	7 (17%)	7 (33%)
Not too much fat	6 (14%)	1 (5%)
Having good ingredients	5 (12%)	7 (33%)
Not too much salt	2 (5%)	0 (0%)
Total number of occurrences	42	21

Child-related considerations

The preference of the child is very important for both North and South Italian mothers, they all mentioned this consideration as relevant in snack providing. This preference of the child can be for a certain product or even for a certain brand. For South Italian mothers, this is the consideration they mentioned most largely above the health consideration (Table 7.3).

"If my son does not like the snack he does not eat it. It is impossible to give fruit to him because he hates fruits. So, unfortunately, I have to give him something that is not healthy" [SIT01].

"I would like to give a healthy snacks, at the same time I realize that if the snack itself is not desirable, he will not eat it at the end" [NIT35].

The Italian mothers did not often mention the health status of the child. In addition, freedom for the child by not forcing it to eat specific snacks is mentioned by mothers of both regions.

"I do not oblige my children to eat something because I think it is good; if they do not want it, they do not want it" [NIT39].

"I think that children should be free to choose what to eat. It is good to explain to them what is a good choice, but it is good too that they eat what they like" [SIT11].

Time-related considerations

Convenience is the most mentioned consideration in the time-related key theme. Both North and South Italian mothers mentioned this consideration to be important in snack providing to their 2-7-year-old children.

"For me, it is important that a snack is pre-packed because I have no time to prepare something myself" [SIT10].

"Because all mothers have little time, we tend to take something quick and fast. For example, many times packaged crisps" [NIT42].

The opposite of convenience is making own food. Especially when more time is available, like at the weekends, this is a consideration taken into account while providing snacks.

"During the weekend we have more time available, and then I often make a homemade cake. So, then they eat for a snack a cake made by me, so no pre-packaged product" [NIT36].

Product-related considerations

More than half of the South Italian mothers mentioned brand as an important consideration; it is their second most mentioned consideration, after the preference of their child (Table 7.3). North Italian mothers also mention this consideration, but less often.

"For me, the brand is important because it is equivalent to quality. Price is not that important to me" [SIT04].

7.3.3 Value conflicts

All mothers from the North of Italy reported experiencing value conflicts, while mothers from the South of Italy reported value conflicts less often. When mothers experienced value conflicts, they were always health-related, see Table 7.5.

Table 7.5. Frequency of value conflicts mothers from the North and South of Italy experience while providing snacks to their children aged 2-7 years.

Value conflict	North Italy (n = 20)	South Italy (n = 20)
Health vs. the child's preference	13	8
Health vs social environment	15	5
No conflict, because the child gets everything he/she wants	0	6

The value conflict mentioned most often is the conflict between the healthiness of the snack and the preference of the child. Italian mothers highly valued the preference of their child, but they would also like to provide healthy snacks. When these values were not in line, value conflicts could appear. Mothers from the North of Italy more often experienced these value conflicts compared to mothers in the South.

> *"It would be better to give some focaccia, or some crackers or biscuits, but my children like chocolate better so it is a lost battle. What would be perfect for me and is healthier is not appreciated" [NIT36].*

> *"It becomes difficult when you want to give a healthy snack and the child does not want it" [NIT44].*

Another value conflict mentioned often is between health and social environment. When other people are around, like other children, grandparents or spouses, these conflicts arise.

> *"The grandparents definitely influence the snacks the children eat. They gave them pre-packaged ice-cream right after lunch. For me, this is not a good practice" [NIT48].*

> *"When we are with others that are eating differently my son starts to complain. In summer when we enjoy holidays with my partner's family, there are his cousins that eat many unhealthy snacks. Then it becomes tough for me because my son starts comparing and he says: 'why can he eat this and I not?'. Therefore, I allowed him to eat the snack too. It made me nervous and feeling bad" [NIT45].*

What is remarkable is that quite some mothers from the South of Italy mentioned not to experience any value conflict, because they provide their child with any snack he or she wants.

> *"I do not have that problem, because I give my son whatever he wants..." [SIT10].*

> *"Because I work a lot, I spend not that much time with my son and for that reason when I am with him, I give him all he wants. I have spoiled him. Therefore, I have no conflicts with my son because I give him all he asks, but I know I am wrong... However, at the same time, it is difficult to change this because he is used to it now" [SIT18].*

7.4 DISCUSSION

Italy is a country with a great disparity of development between the Northern and Southern region (Ruggiero, *et al.*, 1999; Ichino and Maggi, 2000). In their food culture, strong regional differences are present too, for example, the morning snack in the North of Italy often consists of fruit, while in the South a filled sandwich is more often consumed as a snack in the mornings (Nardone *et al.*, 2015). These differences could be caused by cultural characteristics and their historical roots (Cook and Crang, 1996). Our study revealed differences between mothers living in the North and the South of Italy in their considerations and value conflicts while providing snacks to their 2-7-year-old children. These differences between the mothers from the North and the South of Italy imply differences in regional culture. Minkov and Hofstede (2014) investigated regional cultures across Europe and confirmed the presence of groups with their own regional cultures, within a national culture, although their study did not cover Italy. For the present study, with its modest sample sizes, inferences about regional cultures can thus only be made with care.

7.4.1 Considerations in snack providing

North Italian mothers mentioned health-related considerations and their sub-constructs more often as relevant in snack providing compared to mothers living in the South. This is in line with the results of the study by Nardone *et al.* (2015) on the dietary habits of children, showing that unhealthy dietary habits were more common among children living in the South of Italy compared to children living in the North. In a study by Pizzo *et al.* (2010), it was seen that the prevalence of dental caries was high among South Italian children; one of the reasons for this was the high consumption of sweet snacks. One could tentatively draw links with regional cultures. According to Hofstede et al (2010), Italian culture is individualistic (as

opposed to collectivistic) and restrained (as opposed to indulgent). This is in line with the considerations by mothers from the North, such as the healthiness of the snack and small portions (Table 7.2). Although no formal data are available on the Hofstede dimensions for the two regions, it is felt that the South has a more collectivistic and indulgent culture, closer to the patterns of *e.g.* Greece and Spain. This fits the answers from South Italian mothers: give the child what it wants. Specifically, it seems that in the North of Italy children's snack choice is conceptualized more as something related to individual health and choice, while in the South snack giving is seen more in relational terms, as a sign of warmth and belonging. This could indicate, in terms of Hofstede's dimensions of culture, that the culture in the South is more collectivistic and less restrained than the North.

The health-related consideration natural/fresh/organic was also mentioned more often by the North Italian mothers to be relevant in snack provision for their young children, compared to mothers from the South. Likewise, Filippini *et al.* (2018) mentioned that the Italian procurement of organic food is still more prevalent in the North of Italy than in the South. Also, Vassalo *et al.* (2016) found that consumers in the North of Italy had a stronger intention to buy organic foods compared to consumers in the South. Furthermore, mothers from the North of Italy mentioned variety, another health-related consideration, more often to be relevant compared to mothers from the South. Variety is considered by the mother as a way to give a healthier diet to her child and therefore fits well in the individualistic culture. A healthy diet is focusing on the individual, rather than on the group. In a collectivistic culture, it is more about relationships and comforting your child, in an individualistic culture it is on doing the best for the individual, in this situation the mothers' child (Hofstede *et al.*, 2010). In addition, de Mooij (2010) found that across Europe, intention to vary food choice correlates with the individualism of that country's culture, which is in line with our assumption that mothers from the North of Italy are maybe more individualistic compared to mothers from the South.

All mothers in this study mentioned the preference of the child to be important in snack choice, which was the same for the Italian sample in our previous study (Damen *et al.*, 2019a). If a child does not like the snack, Italian mothers mentioned they would not provide it; the preference of their child is key in providing a snack. An explanation for this could be that the mothers would like to indulge their child. Additionally, Mascarello *et al.* (2015) observed that Italian consumers overall highly value the taste of their food products, which could be another explanation for the importance of the child's preference in mothers' snack provision.

The time-related considerations convenience and making own foods are mentioned a bit more often by mothers living in the North of Italy, however, when looking at the percentages, this difference disappears. However, Casini *et al.* (2013) found that young people with children living in the North of Italy increased their use of ready to eat and easy to prepare products compared to what young parents did ten years earlier, which shows a more convenient way of consumption over the years.

The brand is the consideration showing differences between North and South Italian mothers in the product-related key theme. More South Italian mothers mentioned brand as a consideration to provide a snack compared to North Italian mothers. Mascarello *et al.* (2015) also mentioned the brand to be an important value in food choice for Italians, however, no clear difference between the regions was seen in that study. Pirani *et al.* (2018) also highlighted the pervasive influence of the brand on Italian family life. That brand is more often mentioned as a consideration could also be explained by the fact that Italy is an uncertainty avoiding culture (Hofstede *et al.*, 2010), which highly values familiar things including food. Tiozzo *et al.* (2017) stated that Italians often do not trust the foods they consume. As well-known brands could be seen as familiar and safe to Italian mothers (Damen *et al.*, 2019a), this could explain their high scores on the consideration brand.

7.4.2 Value conflicts

Mothers living in the North and South of Italy also differ in the value conflicts they experience. Mothers in the North mentioned experiencing value conflicts more often. These conflicts were all related to health. Health versus child's preference is the value conflict mentioned most often in total by the Italian mothers. Hayter *et al.* (2015) found that parents often come across differences between what they actually provide their children and what they would ideally like to provide. The conflict between health and indulgence is the value conflict most frequently occurring in food choice (Luomala *et al.*, 2004; Damen *et al.*, 2019a; Damen *et al.*, 2020a). Also, Pescud and Pettigrew (2014) reported that mothers experienced more feelings of guilt when the food was unhealthier.

The value conflict health versus social environment was often mentioned by the Italian mothers in the current study. They mostly mentioned this social environment to be family members. The opinion of the family members is much taken into account in Italy (León and Migliavacca, 2013; Crocetti *et al.*, 2014; Tobío, 2017). Phull *et al.* (2015) mentioned conviviality (*i.e.* the pleasure of eating together) as a cornerstone of the food culture in Italy. Boak *et al.* (2016) also reported that the presence of family members could have an influence on the foods mothers provide to their children. The presence of older siblings

could also have an influence on the snacks provided (Damen *et al.*, 2020b). Similarly, some studies mentioned that mothers could experience difficulties in the provision of snacks when family members like grandparents were around (Herman *et al.*, 2012; Walsh *et al.* 2015).

A noticeable result is that the South Italian mothers quite often mentioned that they did not experience value conflicts at all because they provided their child with every snack it desired. They also mentioned the preference of their child, as expressed in percentage, more often compared to mothers from the North (Table 7.2). An explanation for this could be that South Italian mothers are more indulgent (Hofstede *et al.*, 2010); this seems to be reflected in their snack provision. In addition, it seems that South Italian mothers prioritize a good relationship with their child above an individual theme like healthiness of their child, which could have its background in the more collectivistic culture of South Italy. Lo Cricchio *et al.* (2019) described that South Italian mothers highly valued affection in raising their children, which could be in line with these results.

7.4.3 Research considerations and recommendations

Differences in educational level and working status are present between the two regions (Ichino and Maggi, 2000; Odoardi and Muratore, 2019). Therefore, we did choose to attempt the level of educational attainment and working status equal between the participants, to make sure these differences would not affect our outcomes, as educational attainment can have an influence on snack choice considerations of mothers (Damen *et al.*, 2019b). Furthermore, we attempt to have no differences in weight status (BMI) between the mothers and their children of both regions, as the prevalence of overweight and obesity is higher in the South of Italy compared to the North (Gallus *et al.*, 2013; Brunello and Labartino, 2014; Mancini *et al.*, 2016). However, since the mothers reported their weight themselves, it is possible that some of them have underestimated their weight, particularly those who are overweight as found in the review of Gorber *et al.* (2007) and by Opichka and Smith (2018).

Some limitations according to this study need to be mentioned. Interviews were conducted in the native language of the participants, which could be seen as a positive aspect because participants could express themselves best in the native language. However, for analyzing the interviews, all data were translated into English which may have led to some loss of detail and interpretation. Besides, interviews were conducted by two different interviewers, but they used a structured interview guide, which was thoroughly explained before the study started, which should minimize differences in interviewing (Bryman, 2016).

The observed differences in considerations and value conflicts of North and South Italian mothers for providing snacks to their 2-7-year-old children might lead to differences in the types of snacks provided to the children. Especially the differences in health-related considerations between mothers living in the North and South of Italy could imply that children in the South of Italy are provided with less healthy snacks. The study of Menghetti *et al.* (2015) found that an unhealthy diet, including consumption of sweetened and salted snacks, was associated with higher obesity rates of children aged 6-17 years in the South of Italy. In the current study, we did not observe differences in body weight of the children, which could be caused by the young age of the children, so the effect on their weight does not yet appear. Although we recognize the complexity and multiplicity of the factors underpinning obesity, we cannot exclude that the differences in considerations and value conflicts between mothers of the North and South of Italy may partly contribute to the different rates of overweight and obesity as reported for the two regions in other studies (Binkin *et al.*, 2010; Lazzeri *et al.*, 2014; Menghetti *et al.*, 2015).

7.5. CONCLUSION

To the best of our knowledge, no studies have been conducted previously that specifically focused on the differences in considerations and value conflicts of mothers living in the North and South of Italy, while providing snacks to their children aged 2-7 years. Our study indicated that overall, the Italian mothers only provided a snack when the child likes it. North Italian mothers revealed more health-related considerations when providing a snack, whereas mothers from the South considered healthiness as giving energy. The Northern Italian mothers overall experienced more value conflicts, which were all health-related. Apparently, even within the same country, with equal advertisement pressure, availability and familiarity of snacks, geographical differences among mothers' considerations and value conflicts for providing snacks exist. Our study provided indications that considerations and value conflicts when mothers provide a snack to their child can be also influenced by tradition and family culture. Future research in other European countries could help to strengthen these indications. A follow up deductive study could be designed to verify the outcomes of the current explorative study.

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CHAPTER 8

Mothers choose a snack for their 2-7-year-old children based on different health perceptions.

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ABSTRACT

Healthiness is an often-reported consideration related to the snack choice of mothers for their children. Mothers' perceived healthiness of a certain snack could be diverse and different compared to the actual nutritional healthiness of that specific snack. The provision of snacks to children is a recurrent occasion of mothers for whom the universal value of caring for their children's health is important. Cookies were selected as a snack for this study aiming to identify mothers' healthiness perception of snacks provided to their young children. Diary studies and in-depth interviews with 22 Dutch mothers were conducted. During the interviews, four different types of cookies were presented and discussed. All mothers mentioned health as a consideration while providing snacks both in the interviews and in the diaries. For more than two-thirds of the mothers, health was the most important consideration. Three types of mothers were defined according to healthiness perception: "product mothers", who related the healthiness of a snack to the intrinsic product properties, the "balancing mothers" who related the healthiness of the snack to the whole diet and the context, and the "not that important mothers", for whom the healthiness of a snack was not that relevant because the healthy foods were already eaten during the main meals. The results of this study could be used for efficient communication to help mothers meet children's dietary requirements and they could be relevant for the design of new snack products.

8.1 INTRODUCTION

Food choice is a frequent human behavior, which is influenced by many factors and their interactions (Köster, 2009). Health is an often-reported consideration related to the food choice of consumers (Grunert, 2006; Cunha *et al.*, 2018). When children are young, their mothers are, among others, of importance in the food and snack choice for their children (Rosenkranz and Dzewaltowski, 2008; Holsten *et al.*, 2012; Walsh *et al.*, 2015), as mothers are the main persons responsible for food provision (Hardcastle and Blake, 2016; Jones, 2018). As dietary behavior tracks into adulthood (Mikillä et al 2005; Craigie *et al.*, 2011), it is important that mothers make healthy food choices for their children.

Not only for food choice in general, but also more specific for mothers' choice of snacks for their children, health is mentioned as an important consideration (Carnell *et al.*, 2011; Damen *et al.*, 2019a; Damen *et al.*, 2019b; Damen *et al.*, 2020c. When mothers had difficult moments in snack providing, or experienced feelings of guilt because of the snacks they gave, this was often related to health (Damen *et al.*, 2019a; Damen *et al.*, 2020a). The consumption of energy-dense snacks is highly prevalent among children (Larson and Story, 2013; Gevers *et al.*, 2016; Dunford and Popkin, 2018). However, a study of Hartmann *et al.* (2013) showed that the consumption of snacks was positively associated with the intake of both sweets and fruits. In our previous study, it was also shown that snacks perceived as healthy, as well as more unhealthy, were provided by mothers as a snack to their young children (Damen *et al.*, 2019b). The consumption of healthier, less-energy dense, and smaller snacks could positively influence the dietary intake of children and be of interest in developing more healthy eating patterns of children (Deming *et al.*, 2017; Kachurak *et al.*, 2019; Xue, *et al.*, 2019).

Healthy eating is often associated with eating fruits and vegetables (Falk *et al.*, 2001; Lake *et al.*, 2007; Bisogni *et al.*, 2012). Healthy eating is also expressed in terms of the characteristics of the food, like low in sugar, low in fat, containing fibers or vitamins (Falk *et al.*, 2001; Bisogni *et al.*, 2012; Bucher *et al.*, 2016), or the way in which products are produced or processed (Falk *et al.*, 2001; Bisogni *et al.*, 2012). In addition, a balanced diet is another reoccurring theme in the perception of healthy eating (Falk *et al.*, 2001; Paquette, 2005; Lake *et al.*, 2007; Croker *et al.*, 2009; Bisogni *et al.*, 2012).

Our previous studies showed that mothers' perceived healthiness of a certain snack could be diverse and may differ from the health perception of experts of a that specific snack. One mother mentioned apple pie to be a healthy choice, "because it contains fruit" (Damen *et*

al., 2019b), another mother mentioned as a consideration to provide a snack that "it needs to be healthy, like potato chips" (Damen *et al.*, 2019a). In another study done by Pescud and Pettigrew (2014), a mother justified giving her children food from McDonald's because the cheese and egg in it were healthy components. Bisogni *et al.* (2012) also mentioned that researchers acknowledge that consumers may view healthy foods differently compared to experts. This discrepancy poses quite a problem because if mothers give their child an unhealthy snack while being convinced it is a healthy one, children could develop an unhealthy snacking pattern which in turn could cause them to be more vulnerable to overweight.

Whether a snack was perceived as healthy or unhealthy also depended on the comparison with other products (Damen *et al.*, 2019b), so it is a relative concept. When cookies were judged as healthy, this was often because those mothers compared it with candy. This was also observed in the study of Sulistyawati *et al.* (2019) on the health perception of dried mango; when dried mango was compared with fresh mango, it was seen as an unhealthy option, while comparing dried mango with candy made it a healthier option. Moreover, Adams and Savage (2017), found that children's health perception of snacks depended on the product category they compared the snack with.

The provision of snacks to children is a recurrent occasion of mothers in which the universal value of caring for their children's health is important. Therefore, the aim of this study is to identify mothers' health perception of snacks provided to their young children. To achieve this aim, diary studies and in-depth interviews with 22 Dutch mothers were conducted. During the interviews, four different types of cookies were presented and discussed. The insights obtained from this study could be useful for new product development of (healthy) snacks, as well as be of use in the design of interventions to help mothers meeting children's dietary requirements.

8.2 METHOD

8.2.1 Study design

Food and motivation diaries, as well as semi-structured interviews with 22 Dutch mothers, were used to reveal the health perception of snacks provided by mothers to their 2 or 3 years old children. These two different qualitative data collection methods allow for within-method triangulation, to enhance the validity of the results (Thurmond, 2001; Denzin, 2017). The following definition of snacks is used in this study and explained to the mothers: "all

foods, excluding beverages, healthy and unhealthy, consumed in between regular meals", based on definitions used in previous studies (Hartmann *et al.*, 2013; Duffey *et al.*, 2014; Kachurak *et al.*, 2019; Xue *et al.*, 2019).

Diary research

Data on mothers' snack provision and the related considerations were collected by food and motivation diaries according to previous research (Patterson, 2005; Damen *et al.*, 2019a). The mothers kept the diary for 8 consecutive days in October 2019. Mothers were asked to fill in the diary for their child aged 2 or 3 years. The diaries were kept using Qualtrics survey software (www.qualtrics.com, 2019). Every morning, a link with access to the diary of that specific day was sent to the mothers. If the diary was not completed by 20:30 hrs. in the evening, mothers received an additional email as a reminder. Mothers could decide themselves to report the snacks provided all at once at the end of the day, or to report them immediately after the moment they provided the snack. Mothers received a paper notebook before the study started to have to possibility to note the snacks provided.

Semi-structured interviews

For the semi-structured interviews, an interview guide was developed and used to maintain consistency in interviewing, see for details Table 8.1. Three researchers carried out the interviews which were recorded digitally. Interviews were taken at a time and place convenient for the participant. Most of the time, the interviews took place at the participant's home, in the other cases the interviews took place at Wageningen University. The interviews were piloted with four mothers of the target group, who were not involved in the study. This was done to check the flow of the interview guide as well as to align the way of interviewing between the three researchers (Malmqvist *et al.*, 2019). Minor changes to the interview guide were made based on the results of the pilot study.

First, participants were asked general questions on their snack providing, followed by general questions about the healthiness of snacks. Next, four different types of cookies were presented and discussed. Cookies were chosen because this snack is often provided by Dutch mothers and because it could be perceived by the mother as both a healthy or an unhealthy snack. The information about the cookies is presented in Table 8.2. We selected cookies targeted at children, different in portion size, ingredients, claims on the packaging and being organic or not.

Table 8.1. Interview guide.

Interview guide
General snack providing
Could you tell something about the providing of snacks to your children?
- Do you follow a certain pattern in providing snacks (week/weekend, the moment of the day, other...)
What type of snacks do you provide? -How much do you provide? (portion size) - What is the reason to (or not to) provide a snack? Which considerations do you have to give your child a snack? - What is important for you at the moment of providing a snack?
Healthiness of snacks
What is in your opinion a healthy snack for your child? - If the fruit is mentioned: is there a difference in healthiness between different types of fruit? -To what extent could a cookie be a healthy snack? Why? Or why not? - To what extent could a candy be a healthy snack? Why? Or why not? How important is it for you that a snack you give to your child is a healthy snack? - How do you feel if you provide your child with a healthy snack? - How do you feel if you provide your child with an unhealthy snack? When do you choose to provide a healthy snack for your child? When do you choose to provide an unhealthy snack for your child?
Cookies
If cookies are not mentioned before: do you also give cookies as a snack? If cookies are mentioned before: what is your reason to give cookies as a snack? **Now the four types of cookie products are provided all at once, we discuss all four products one by one with the following questions.* What is your first impression of the product? - Do you take the statements on the package into account in this? Do you think this product is a healthy product? Why do you think so? What do you think of the portion size of this product? - How important is portion size when you provide a snack to your child? Which of these four products is in your opinion the healthiest? - Which one the least healthy?

8.2.2 Recruitment and selection of participants

To recruit participants, social media, posters at day-care centers and supermarkets in the Netherlands and snowball sampling (Lauder *et al.*, 2018; Rousou *et al.*, 2019; Allen *et al.*, 2019) were used. A selection questionnaire was developed to find participants according to the criteria set for the target group. These criteria were that the child did not suffer from a food allergy or chronic disease (*e.g.* diabetes). Moreover, the mothers needed to have an only or oldest child of 2 or 3 years old. We choose for this age range because we know from previous research that mothers of children aged 2-3 years more often provided a snack because of health-related considerations, compared to mothers of children aged 4-5 years and 6-7 years (Damen *et al.*, 2019b). If the mother had a younger child too, this child had to be below 1 year of age to minimize the sibling influence on snacks provided (Damen *et al.*, 2020b).

Table 8.2. Cookies discussed with the mothers.

	Product 1	**Product 2**	**Product 3**	**Product 4**
Product name	Trouwe Vriendjes	Letterkoekjes	Chocokoeko's	Spoorzoeker
Description	'Trouwe Vriendjes' Vanilla Cookies	Organic 'Letterkoekjes' sweetened with apple	Organic 'Chocokoeko's' with cocoa	'Spoorzoeker' Cookies
Brand	Verkade	De Kleine Keuken	De Kleine Keuken	Fred & Ed (Royal Smilde)
Information and claims on front	1 biscuit: 194 kJ, 46 kcal, 9 x 2 cookies	No palm fat included, Sweetened with apple, No refined sugars, Of whole grains, Organic, From 12 months, Four sachets to share, 4 x 8 cookies	No palm fat included, No refined sugar, Of whole grains, Organic, 8 x 2 cookies	63 kcal per biscuit, 12 x single-portion package, Wow! Spiced cookies with chocolate cream!
Portion size	2 cookies in a sachet (19.4 gram)	8 cookies in a sachet (20 gram)	2 cookies in a sachet (18.75 gram)	1 biscuit in a sachet (13 gram)
Ingredients	Wheat flour, sugar, palm fat, dried glucose syrup, lactose and milk protein, salt, emulsifier (E472e), sodium carbonate, aroma.	Whole grain, apple concentrate, vegetable oils, rye, spelt flower, oat, raising agent, vitamin B1.	Whole grain, spelt flour, coco blossom sugar, apple concentrate, butter, rice flour, sunflower oil, cacao powder, raising agent.	Wheat flour, sugar, palm fat, whole egg powder, 'speculaas' spices, rapeseed oil, full milk powder, skimmed-milk powder, raising agent: E500, E335, E503, fat-reduced cocoa powder, caramelized sugar, salt, cacao mass, glucose syrup, emulsifier: lecithin.
Nutrition table (per portion*)				
Energy	92	89	80	63
Fat	3.4g	3.0g	2.5g	2.9g
Saturated fat	1.6g	0.7g	1.1g	1.4g
Carbs	14g	13.2g	11.8g	8.3g
Of which sugar	3.8g	3.3g	3.6g	3.8g
Fiber	0.6g	0.9g	1.3g	0.3g
Protein	1.4g	1.7g	1.7g	0.9g
Salt	0.14g	0.1g	0.2g	0.07

***** portion is defined as what is included in 1 package (sachet).

Another criterion was that the minimal educational attainment of the mothers was Bachelor's degree because we know from the same previous research (Damen *et al.*, 2019b) that mothers with a Bachelor's degree or higher, seem to be more health-conscious compared to mothers with lower educational attainment. This is also confirmed in other studies (Bargiota *et al.*, 2013; Ansem *et al.*, 2014; Vilela *et al.*, 2015; Emmet and Jones, 2015; Durão *et al.*, 2017). The last criterion was that the mothers had the intention to keep the diary for the full 8 days and were willing to participate in an interview at the end of the study. Twenty-four out of 41 respondents of the selection questionnaire did meet the inclusion criteria and were included in the study. Seventeen mothers did not meet these criteria and were not selected to participate in the study.

8.2.3 Ethical procedure

Ethical approval for the study was gained from the Social Science Ethics Committee of Wageningen University (CoC: 09215846). All mothers provided informed consent before participating in the study. The informed consent form explained that the study was about snacks they provide to their children, however, the exact goal on the health perception of snacks provided by mothers to their 2-3 years old children, was not explained beforehand to not influence the answers of the mothers. It was also explained to the mothers that they could stop at any moment with the diary or interview without giving a reason and that all their answers would be handled anonymously. After finalizing the diary as well as the interview, the goal of the study was explained, and each mother received a 40-euro gift voucher as compensation. To ensure anonymity while analyzing the data, each participant was given a unique number, so no names were displayed.

8.2.4 Data analysis

In total, 22 mothers completed the research, as 2 mothers did not finalize the diary study. Data from the diaries and the transcribed data from the interviews were imported in the software program MaxQDA version 18 (www.maxqda.com). This program was used to organize and code the qualitative data. Diaries and interviews were coded independently, for each research method new code labels were used. Coding of the diaries was done by the first author and was checked by a second researcher. Coding of the interviews was independently done by three researchers, including the first author. To obtain consistency in coding, code labels were compared, and differences were discussed until consensus was reached. Data saturation was reached after analyzing 18 interviews, as no new codes were generated based on additional interviews. After grouping the codes, the codes appeared to fit in the table of considerations of our previous research (Damen *et al.*, 2019b). However,

three extra considerations were added to the existing table, *i.e.* balance/moderation, learn to eat healthy and sustainable.

8.3 RESULTS

The participating mothers (n = 22) all lived in the Netherlands and were of Dutch origin. All had a child of 2 or 3 years old; when they had a younger child too (n = 15), this child was younger than 12 months. The average age of the mothers was 33.5 years (SD 3.1 years), ranging from 23-39 years. All mothers were higher educated with a Bachelor's degree or higher and all had a paid job, working on average 28.6 hours a week.

8.3.1 Semi-structured interviews

Table 8.3 presents the considerations mothers mentioned in the interview to be relevant while providing a snack to their 2 or 3-year-old child. The considerations are grouped into 6 categories, *i.e.* health-related considerations, the influence of the child, habit-related considerations, strategies, external influence, and other considerations. The table also shows the results of the diary study which will be discussed in paragraph 8.3.2. A split is made between three groups of mothers, *i.e.* "product mothers", "balancing mother" and "not that important mothers" these groups will be explained in depth later in this paragraph.

The mothers were unanimous on the consideration of health, which was mentioned by all mothers (n = 22).

> *"When giving a snack, it is important for me to make choices as healthy as possible" [Mother 22].*

Moreover, reasons related to health are also mentioned by all mothers (n = 22). These reasons could be seen as subcategories for the overall term health. For example, mothers explain that they expect a snack to be low in sugar, high in fiber, or not bad for dental health.

> *"For me, it is important that a snack does not contain too much sugar and too much salt" [Mother 5].*

Another frequent consideration was habit (n =20) which was mentioned in relation to eating fruit on a fixed moment during the day (n = 16), mostly as a morning snack (n = 14).

Table 8.3. Categories of mothers' considerations for providing a snack, definitions and number of mothers mentioning the consideration in the interviews and the diaries.

Overall category	Considerations	Definition	Interview				Diary			
			Product mothers (n=9)	Balancing mothers (n=11)	Not that important mothers (n=2)	Total (n=22)	Product mothers (n=9)	Balancing mothers (n=11)	Not that important mothers (n=2)	Total (n=22)
Health-related	Healthy	The mother is judging it as healthy.	9	11	2	22	9	11	2	22
	Reasons related to health/ nutritional value	Health and nutritional value. For example, high in fiber, low in sugar and rules according to healthy foods.	9	11	2	22	8	9	2	19
	Justify (unhealthy) snacks	Defending the snack given. These are mostly used for unhealthier snacks.	4	7	0	11	6	11	2	19
	Variation	Diversity in the products within one product category.	8	8	2	18	4	6	0	10
	Learn to eat healthily	The mother wants her child to learn to eat healthily	6	7	2	15	1	2	0	3
	Balance/moderation	Diversity in the eating pattern, over a day or over a week	5	11	1	17	0	0	0	0
Influence child	Child preference	Liking of the snack by the child.	7	11	2	20	8	11	2	21
	Child asked	The child asking for a particular snack.	6	9	1	16	8	10	1	19
	Child choose him/herself	The child could choose him/ herself, including the choice from a limited number of options.	3	6	1	10	7	7	1	15

Habit-related	Habit	Daily routine and 'because we always do it like this'.	9	10	1	20	9	9	1	19
	Moment of the day/week	A specific moment of the day or day of the week.	7	9	0	16	6	9	0	15
External influence	Everyone gets it, so also the child	Everyone (in the setting of that moment) gets the particular snack and therefore the child also gets it.	5	6	0	11	6	7	2	15
	Party/visit of others	A party or visit of others.	5	5	0	10	3	5	1	9
	Influence of mother	The mother is eating or liking the snack.	7	2	1	10	4	4	1	9
	Influence of others	Influence of others including grandparents, friends of the children etc.	5	3	0	8	3	7	0	10
Strategies	Convenience	Convenience of preparing, eating or taking away.	5	10	1	16	9	9	1	19
	Satisfy the child's hunger/ filling	Providing a snack to satisfy the hunger of the child.	8	10	1	19	4	3	2	9
	Rewarding/indulging/ comforting/calming	Rewarding, indulging, comforting or calming the child; to influence the mood of the child.	8	5	1	14	6	3	1	10
	Bridge time to dinner	Span time to eating dinner.	2	6	2	10	5	6	0	11
Other	Sociable	The nice moments when eating a snack together	5	8	2	15	2	4	0	6
	On the go	Snacks prepared or packed for on the go.	7	5	1	13	1	5	0	6
	Sustainability	Good for the environment, sustainable	6	7	2	15	0	0	0	0
	Availability	The availability of the snack at home, or the unavailability of the desired snack.	2	0	1	3	5	2	0	7

> *"Every day in the morning, very structured, we give fruit, we never skip that. In the afternoon, the snack could change; in the morning it is always fruit" [Mother 13].*

Preference of the child (n = 20) is another consideration mentioned often by the mothers (Table 8.3). If the child does not like the snack it will not be eaten, therefore mothers mentioned the preference of their child as a consideration.

> *"I prefer that a cookie is a whole grain, with no refined sugar added. However, when she does not like it, she will not eat it and giving it doesn't make any sense anymore" [Mother 3].*

Many mothers mentioned providing a snack to satisfy their child's hunger (n = 19). They argued that three main meals during the day are not enough and that a snack is needed to satisfy the hunger in-between meals.

> *"Sometimes he also gets a sandwich as a snack. Breakfast is often not enough for him, so then he will get a sandwich between breakfast and lunch, to satisfy his hunger" [Mother 7].*

Variety (n = 18) and balance/moderation (n = 17) are also mentioned by the mothers, see Table 8.3. Mothers mean with variation that they want to vary within a certain product category. For example, when giving fruit they do not want to give a banana every day but prefer to give also other types of fruit, so their children eat varied. Balance/moderation is about variety in snacks over the day or over a week. For example, when an unhealthy snack is eaten earlier during the day, mothers mentioned preferring to provide a healthier snack later that day.

Health perception of snacks

All mothers mentioned health as a consideration while providing a snack. When mothers were asked to choose one consideration to be most important of all relevant considerations, more than two-third (n = 16) mentioned health.

> *"The most important is that a snack is healthy, with enough nutrients so she could play. So, no candy" [Mother 3].*

However, during the interview about what encompasses a healthy snack, mothers sometimes struggle in describing a healthy snack.

"The most important is that it is healthy. But you could argue about what is healthy of course" [Mother 2].

Fruit (n = 20) and vegetables (n = 12) were often mentioned when the mothers were asked which snack they see as healthy. All mothers indicated candy as an unhealthy snack. In some cases, cookies were seen as a healthy snack, depending on the ingredients and size.

"I think cookies could be a healthy snack if they contain whole wheat flour and oatmeal. At least it is healthier compared to a chocolate cookie" [Mother 17].

When examining the question of what defines a healthy snack, all three types of answers were given. Some mothers (n = 9) talked about intrinsic product properties in relation to health. They stated that every snack they provided must be as healthy as possible, for example with low sugar, low fat, no additives and high in fiber. When the snack to be provided is perceived as an unhealthier snack, they tried to give the most healthy option of the snack. We entitled this group of mothers as "product mothers".

"A snack needs to be healthy, not too fat, not too salty and not too much sugar" [Mother 11].

On the other hand, another group of mothers (n = 11) related the healthiness of the snack to the context in which the snack was provided. The healthiness of the snack was assessed considering its context and balanced according to other snacks provided. For example, when in the morning the child had eaten fruit, a chocolate cookie provided in the afternoon was seen as a proper choice. However, when in the morning already unhealthy snacks were consumed, the same chocolate cookie in the afternoon would not be given. This balancing behavior was mentioned to be done over the day, but also over a whole week. These mothers were entitled as "balancing mothers".

"We do not have rules on what my daughter is allowed to eat or not. If we have a party and there are crisps, she is allowed to eat them. When it is summertime and she wants to enjoy an ice-cream, it is fine for me. There are not many foods she is not allowed to eat. It is more about the balance of healthy and unhealthy snacks over a day" [Mother 1];

"It is all about balance, seen over a period. We just had holidays and after that, we had a weekend with family. In those weeks more, as well as unhealthier snacks are

eaten. Therefore, I will try to provide healthier snacks in the coming week" [Mother 19].

There was only a small number of mothers (n = 2) who said that health was not that important when providing a snack. In their opinion, healthy foods are already consumed during the main meals. Snacks were for enjoyment and indulgence and not to be healthy. We entitled these mothers the "not that important mothers".

"Healthiness of the snack is not that important to me. This because the main meals are for healthy eating and the snacks are to enjoy, she could get whatever she wants" [Mother 17].

Examining the subcategories of healthiness (Table 8.4) clearly reveals the division of the mothers into the three differently entitled groups, "product mothers", "balancing mothers", and "not that important mothers". Table 8.4 shows the number of mothers per subcategory of the healthiness consideration.

The "product mothers" mentioned more often intrinsic product characteristics, such as vitamins (n = 7), not too much fat (n = 8), nutrients (n = 6), no additives (n = 6) and not too much salt (n = 3), to be important compared to the "balancing mothers". No chocolate is stated more by the "balancing mothers" as a characteristic of a healthy snack. The consideration not too much sugar is mentioned by all mothers as healthy, independent of the groups they are categorized in.

Table 8.4. Number of mothers per subcategory of healthiness consideration per group of mothers.

Subcategories of healthiness consideration	**Product mothers** (n = 9)	**Balancing mothers** (n = 11)	**Not that important mothers** (n = 2)	**Total** (n = 22)
Not too much sugar	9	11	2	22
Vitamins	7	6	0	13
Not too much fat	8	2	0	10
Nutrients	6	4	0	10
No additives	6	2	0	8
Fibers	2	3	1	6
No chocolate	1	4	1	6
Organic is healthier	2	2	1	5
Not too much salt	3	2	0	5

Considerations to provide a snack, differences between the groups

When comparing the "product mothers" and the "balancing mothers" on the considerations to provide a snack, many differences between the two groups are found as presented in Table 8.3. The most obvious difference is for the health-related consideration balance/ moderation; all "balancing mothers" (n = 11) mentioned this consideration compared to only half of the "product mothers" (n = 5).

In the overall category influence child, the "balancing mothers" more often indicated the preference of their child (n = 11) as a consideration to provide a snack. Also, they mentioned that their child could choose the snack him/herself more often (n = 6) compared to the "product mothers" (n = 3). In the overall category external influence, the "product mothers" indicated more often their own influence (n = 7) to be relevant in snack providing compared to the "balancing mothers".

Convenience is a consideration belonging to the overall category strategies. The majority of the "balancing mothers" (n = 10) mentioned convenience, whereas, only half of the "product mothers" mentioned this consideration to be relevant (n = 5). One of the balancing mothers explained it as follows:

> *"Healthy snacks often take a lot of time to prepare, which I do not always have. So, when I need to go to work I am very busy and then I will give her ready to eat fruit puree instead of freshly cut fruit" [Mother 9].*

Over half of the "balancing mothers" mentioned the strategy of bridging time to dinner (n = 6) compared to only a small number of "product mothers" (n = 2). Moreover, the consideration sociable was also stated more often (n = 8) by the "balancing mothers" compared to the "product mothers" (n = 5).

> *"The sociable aspect of snacking is also important to me, I also mentioned it in the diary. In my opinion, it is important to create nice moments together, which they remember when they are grown up. For us it is drinking coffee, eating a cookie and reading a book together as a family in the evening" [Mother 1].*

The consideration rewarding/indulging/comforting/calming, which belongs to the overall category strategies, is mentioned by the majority of the "product mothers" (n = 8) compared to less than half of the "balancing mothers" (n = 5).

"Keeping her quiet so I could do other things, is another reason to provide a snack" [Mother 13].

In the category other, the "product mothers" (n = 7) stated more often to prepare snacks for on the go compared to "balancing mothers' (n = 5).

8.3.2 Diary research

Mothers reported the snacks they provided to their 2 or 3-year-old child for 8 days. On average, they provided 1.7 snacks a day. The snacks provided are divided into 9 product categories, see Table 8.5.

All mothers provided fruit, this was mostly as a morning snack. Also, cookies were often provided by the mothers as a snack. Bread products, as well as rice crackers, breadsticks and raisins are regularly provided. For these two product categories, differences between the "product" mothers and "balance" mothers are observed. More "product" mothers provided these types of products. When looking at pie and pastry, crisps, and other salty snacks we see these were more given by the "balance" mothers compared to the "product" mothers. Vegetables are provided not that often in total, however more than half of the "product" mothers provided vegetables as a snack.

The considerations to provide a snack reported by the mothers in the diaries are comparable with the considerations explained in the interviews. A few differences are present of which the difference for the consideration balance/moderation is most clear, which is mostly mentioned by the "balancing mothers". In the diaries, this consideration is not mentioned at all. This effect is also seen for the considerations learn to eat healthy and consideration sustainability.

Moreover, all "balancing mothers" (n = 11) justified unhealthy snacks in the diary, while only two-thirds of the "product mothers" did. Besides, "balancing mothers" mentioned the influence of others more often (n = 7) compared to the "product mothers" (n = 3). In the interviews, this difference was the other way around. Rewarding/indulging/comforting/calming was mentioned more often by the "product mothers" (n = 6) compared to the "balancing mothers" (n = 3); this effect was also seen in the diaries. Besides, "product mothers" more often (n = 5) provided a snack because of the consideration availability compared to the "balancing mothers" (n = 2).

"He wanted a cookie, but I did not have it at home anymore. Therefore, I gave him some tomatoes because they were available, and he liked them too" [Mother 16].

Table 8.5. Products provided by the groups of mothers.

Product category	Description	Product mothers (n = 9)	Balancing mothers (n = 11)	Not that important mothers (n = 2)	Total (n = 22)
Fruits	All fruits like apple, banana, grapes, kiwi, berries, etc. Fruit smoothies, pre-peeled and pre-sliced fruit, and ready to eat bags with fruit puree.	9	11	2	22
Cookies	All cookies including muesli and cereal bars, and cake.	8	8	2	18
Bread products	All bread products like sandwiches, currant bun, gingerbread, cracker, croissant etc.	8	7	1	16
Rice crackers, breadsticks and raisins	Rice crackers, breadsticks and raisins. These products are seen as typical products for (young) children in the Netherlands. They are perceived as a healthier option for a cookie or candy and recommended by the youth health care organizations in the Netherlands.	6	5	1	12
Candy	All candies like lollypops, marshmallows, liquorice, chocolate and peppermints.	5	6	1	12
Pie and pastry	All pies and pastry-like apple pie, cream puffs, apple turnover, etc.	2	6	2	10
Crisps	All crisps.	2	7	0	9
Vegetables	All vegetables including olives and pickles.	5	3	0	8
Savory snacks	All savory snacks like popcorn, sausage, cheese, nuts, fries etc.	2	4	0	6

8.3.3 Product focus: cookies

After the general part of the interview, mothers were provided with four types of cookies to discuss the topic of snack providing and healthiness of snacks for specific products, available on the market. First, mothers were asked their first impression of the cookies, based on the package (Table 8.6), this first impression could include more than one statement.

For the Letterkoekjes and the Chocokoeko's, which are both of the same brand, mothers mentioned the claims no refined sugars (n = 17 and n = 10), organic (n = 8 and n = 8), whole wheat flour (n = 16 and n = 9) and no palm fat (n = 17 and n = 10) as the first impression. For the Letterkoekjes, mothers said that they are sweetened with apple (n = 11). Mothers also remarked spontaneously to know the brand (n = 8 and n = 8). The Letterkoekjes and Chocokoeko's are also indicated as relatively healthy cookies (n = 5 and n = 8) or it was explained that the brand implied healthiness (n = 8 and n = 6).

Table 8.6. Mothers' first impression of the cookies.

	Chocokoeko's				Letterkoekjes				Spoorzoeker				Vekade				Total
	Product mothers (n = 9)	Balancing mothers (n = 11)	Not that important mothers (n = 2)	All mothers (n = 22)	Product mothers (n = 9)	Balancing mothers (n = 11)	Not that important mothers (n = 2)	All mothers (n = 22)	Product mothers (n = 9)	Balancing mothers (n = 11)	Not that important mothers (n = 2)	All mothers (n = 22)	Product mothers (n = 9)	Balancing mothers (n = 11)	Not that important mothers (n = 2)	All mothers (n = 22)	
Attractive for children					3	2	1	6	5	6	1	12	2	9	2	13	31
How it is packed	4	5	1	10	4	2	0	6	3	4	1	8	2	4	0	6	30
No palm fat	7	8	2	17	4	5	1	10									27
No refined sugars	7	9	1	17	3	6	1	10									27
Whole wheat flower	7	7	2	16	5	3	1	9									25
I know the brand	4	4	0	8	4	4	0	8					0	2	1	3	19
Organic	4	5	0	9	1	6	0	7									16
Claims imply healthiness	2	5	1	8	1	4	1	6									14
Relatively healthy	2	3	0	5	3	4	1	8					0	1	0	1	14
Marketing targeted at children									4	4	0	8	4	2	0	6	14
Calories on package									3	8	0	11	0	2	0	2	13
Chocolate	0	1	1	2					5	3	2	10					12
Sweetened with apple					4	6	1	11									11
Good taste					1	0	0	1	2	2	2	6	1	1	0	2	9
With a lot of sugar					0	1	0	1	3	1	1	5	2	0	0	2	8
Vanilla													3	3	0	6	6

> *"I think cookies are never a healthy snack. However, because these cookies (Letterkoekjes) are organic and naturally sweetened they seem healthier to me compared to the other cookies. That is also what this brand wants to pretend" [Mother 14].*

Marketing targeted at children is explicitly mentioned for the Spoorzoeker cookies (n = 8) and the Verkade (n = 6) cookies. Moreover, mothers pointed out that these products are attractive for children (n = 12 and n = 13). For the Spoorzoeker cookies, the calories on the package (n = 11) and the chocolate (n = 10) were remarked as a first impression by the mothers.

> *"I think my daughter would love this cookie (Spoorzoeker) because it contains chocolate" [Mother 3];*

> *"In my opinion, this cookie (Spoorzoeker) is not suitable for a 2.5 years old child, as there is a bit of chocolate on top and for sure it contains sugar, which is both unhealthy" [Mother 12].*

How the cookies are packed is commented for all cookies as a first impression. The Chocokoeko's and the Verkade cookies are packed per 2, the Spoorzoeker cookie is packed per 1 cookie and the Letterkoekjes are in a bag with eight small cookies. When discussing the portion size in-depth with the mothers (data not presented), many of them prefer the cookies to be packed per one (n = 17). When the cookies are packed per 2 many mothers say to only provide one of the two (n = 15). The bags with 8 cookies are mentioned as a too big portion by most of the mothers (n = 19).

Healthiness perception of cookies

Table 8.7 presents the healthiness perception of the four types of cookies for the mothers. When comparing the cookies on their healthiness perception clear differences are found between the four products. The majority of the mothers mentioned the Spoorzoeker cookies (n = 21) to be not healthy. Likewise, the Verkade is mentioned by more than two-thirds of the mothers (n = 16) to be unhealthy. For the Chocokoeko's (n = 9) and the Letterkoekjes (n = 8), this is mentioned less often.

> *"This (Spoorzoeker) is an unhealthy cookie with the sugar crystals on top and the chocolate" [Mother 18].*

Table 8.7. (Un)Healthiness perception cookies.

	Chocokoeko's				Letterkoekjes				Spoorzoeker				Vekade				Total
	Product mothers (n = 9)	Balancing mothers (n = 11)	Not that important mothers (n = 2)	All mothers (n = 22)	Product mothers (n = 9)	Balancing mothers (n = 11)	Not that important mothers (n = 2)	All mothers (n = 22)	Product mothers (n = 9)	Balancing mothers (n = 11)	Not that important mothers (n = 2)	All mothers (n = 22)	Product mothers (n = 9)	Balancing mothers (n = 11)	Not that important mothers (n = 2)	All mothers (n = 22)	
Not healthy	3	6	0	9	2	6	0	8	8	11	2	21	7	8	1	16	54
Relatively healthy	9	7	2	18	4	7	2	13					1	4	1	6	37
A lot of sugar	2	2	0	4					6	4	1	11	5	2	1	8	23
Whole wheat flour	7	3	2	12	6	6	1	13									25
Chocolate is less healthy	2	2	0	4					5	5	2	12					16
Sugar crystals on top									4	8	2	14					14
No refined sugars	5	2	2	9	3	1	1	5									14
No palm fat	4	1	2	7	4	1	0	5									12
Sweetened with apple					4	6	0	10									10
Less sugar, so healthier	0	2	0	2	5	0	0	5					1	0	0	1	8
Claims imply healthiness	0	2	1	3	2	1	1	4									7
A lot of fat	0	1	0	1					2	2	0	4	2	1	0	3	7
Lots of calories									2	5	0	7					7
No whole wheat flour									1	0	0	1	4	1	0	5	6

Negative perceptions are in Italic

The Chocokoeko's (n = 18) and the Letterkoekjes (n = 13) are mentioned often to be relatively healthy. When a cookie contains chocolate (or only cocoa), mothers stated that this is less healthy; for the Chocokoeko's this is mentioned by 4 mothers, for the Spoorzoeker by 12 mothers. Additionally, mothers stressed for the Spoorzoeker cookies that it contains no whole wheat flour (n = 7) and that it contains a lot of sugar (n = 11). For the Chocokoeko's and the Letterkoekjes the claims of no refined sugars (n = 9 and n= 5), no palm fat (n = 7 and n = 5), and whole wheat flour (n = 12 and n = 13) were declared as more healthy aspects of the product.

> *"I think this cookie (Letterkoekjes) is healthy, for sure because it contains whole wheat flour and because it does not contain refined sugars, of which I do not know what it means, I have to say, but it seems to be important to be mentioned that it is not in. No palm fat does also make no sense to me, but this seems to be good, otherwise, it is not presented on the package" [Mother 21].*

When comparing the "balancing mothers" with the "product mothers", it is seen that the "product mothers" more often mentioned the intrinsic product properties while describing the healthiness of the products. "Balancing mothers" more often just said that the cookie is not healthy without describing in depth the why. This effect becomes most clear with the Chocokoeko's and the Letterkoekjes, which are by almost all mothers (n = 21) perceived as the healthiest cookies of all four. These results are comparable with the differences for the subcategories of healthiness described in section 8.3.1.

Which cookies do the mothers choose to keep?

When the interview about the cookies was finished, the mothers were told that they could keep those cookies which they would like to keep. The researcher explained they could pick one package, or that they could take more than one or all if they would like to have the cookies. The results are presented in Table 8.8.

More than half of the mothers kept all the cookies (n = 13), of these mothers, most (n = 8) belong to the group of "balancing mothers". Also, all the mothers of the "not that important" group (n = 2) kept all cookies. Only three "product mothers" took all cookies and two of them explained to not give the cookies to their children, but to share them at work or to eat the cookies themselves. The balancing mothers provided no reasons why they took all the cookies. The "product mothers" chose more often to only keep the healthier perceived cookies of the Kleine Keuken brand (n = 5) compared to the "balancing mothers" (n = 2).

Table 8.8. The cookies selected and kept by the mothers.

	Product mothers (n = 9)	**Balancing mothers** (n = 11)	**Not that important mothers** (n = 2)	**Total** (n = 22)
All cookies	3	8	2	13
Letterkoekjes	2	2	0	4
Chocokoeko's	2	0	0	2
Letterkoekjes and Chocokoeko's	1	0	0	1
Verkade	0	1	0	1
Spoorzoeker	1	0	0	1

8.4 DISCUSSION

This study described mothers' health perception of snacks provided to their young children. All mothers in the interviews, as well as in the diaries, mentioned health as a consideration while providing snacks to their child. For more than two-thirds of all mothers, health was the most important consideration. Moreover, also when talking about the cookies, health was mentioned often. Many studies revealed health to be an important driver in food choice (*e.g.* Furst *et al.*, 1996; Pollard *et al.*, 1998; Bailey *et al.*, 2018; Cunha *et al.*, 2018; Criss *et al.*, 2019). When becoming a parent, health will be even more important in the food choice process (Bisogni *et al.*, 2012). Parents commonly have two sets of healthy eating definitions, that could be quite different from each other, one counting for themselves, one for their children (Falk *et al.*, 2001). In the study of Carnell *et al.* (2011) on feeding behaviors and underlying motivations of mothers with children aged 3-5 years, health was stated as an important motivation in food choice. Moreover, the study of Machín *et al.* (2016) among low-income mothers of children aged 1-5 years revealed that mothers gave more importance to the healthiness of the food when selecting the foods for their children than for the adults living in their household. Johnson *et al.* (2011), Walsh *et al.* (2015), and Zobrist *et al.* (2018) also identified health as an important diver for mothers' food choice.

In the current study, fruit and vegetables were mentioned by many of the mothers as a healthy snack. Health as a motive to choose fruit and vegetables was also found in studies of Eikenberry and Smith (2004), Paquette (2005), Phan and Chambers (2016), Appleton *et al.* (2017), and Verain *et al.* (2020). Candy was unanimously mentioned by the mothers in the current study as an unhealthy snack, which is confirmed by studies of Bucher and Siegrist (2015), Phan and Chambers (2016), Bucher *et al.* (2016), and Lusk (2019).

When defining a healthy snack, three types of mothers were distinguished in the current research. The "product" mothers, who related intrinsic product properties of a specific product to the healthiness of a product, the "balancing mothers" who related the healthiness of the snack to the whole diet and the context, and the "not that important" mothers, for whom the healthiness of a snack was not that relevant because healthy foods were already eaten during the main meals. When discussing the cookies in the current research, the differences between the groups became very clear too. Consumers in research by Lusk (2019), about defining consumers perception of healthy food, showed the same distinction between product properties and a balance of different products in the diet. Half of the respondents believed an individual food could be seen as healthy, while the other consumers believed healthiness was an outcome of the overall diet. In the review of Kairey *et al.* (2018), 6 out of 28 studies reported parents to balance the intake of certain food groups as a primary feeding goal, however this was all related to portion size.

Relating the healthiness of a product to the intrinsic product properties is reported in many more studies. In a study of Carels *et al.*, (2006), consumers mentioned unhealthy foods to be low in nutrients, high in fat, sugar and salt compared to healthy foods. Likewise, Bisogni (2012) reported that consumers focus on fat, sugar, salt, fibers and vitamins while defining the healthiness of a food product. Bucher *et al.* (2016) found sugar and fat content as negative predictors of healthiness ratings for food products.

Defining healthiness as a balance between all products consumed during a day or a week is also found in the literature. In a study by Croker *et al.* (2009) mothers mentioned the importance of variety and balance as part of a healthy diet. They mentioned that small quantities of foods high in fat or sugar could be part of a healthy diet. They clearly stated that they assessed the healthiness of their child's diet on a daily or weekly basis, not on individual foods or snacks. Likewise, in the study of Jallinoja *et al.* (2010) consumers seek a balance between healthy eating and pleasure, which is often expressed by unhealthy treats. Moreover, in a study by Falk *et al.* (2001), balance is mentioned most as being important for healthy eating.

8.4.1 Methodological considerations

The considerations to provide a snack mentioned by the mothers in both diaries and interviews were mostly comparable. However, there is a difference for the consideration balance/moderation which was often mentioned during the interviews, but not mentioned at all in the diaries. This is a very logical result which supports the importance of using

different methods of data collection. Diaries are measuring the moment itself of providing a snack, while the semi-structured interviews are more focusing on the whole process. While being interviewed on snack providing, mothers think of it in a more general way, which could cause other considerations to be relevant to mention. In addition, a diary study gives the opportunity to measure all snack moments during the day for a longer period, which is not possible with in-depth interviews. Using diaries also minimizes the time between the experience and the reporting of the experience, which reduces retrospection and thus the chance of retrospection bias (Bolger *et al.*, 2003).

On average, mothers reported in the diaries to provide 1.7 snacks a day, over 8 days. This average seems quite low, which is caused by the fact that not all mothers provided a snack each day. This could be because the mother was not always at home, others provided the snacks (*e.g.* the father, grandparents), or because the child was not at home or had eaten its snacks somewhere else. Another implication of keeping diaries is that it could influence the behavior of the participants, as they are aware they have to record what they do and how they act (Subar *et al.*, 2015). Because of the longer time the diary ran, we expect this effect to be small as mothers get used to recording their behavior.

8.5 CONCLUSIONS

The current study provided a first insight into the health perception of snacks mothers provided to their young children. All mothers mentioned health as a consideration while providing snacks to their child, both in the interviews and in the diaries. The current explorative study revealed three types of mothers when defining a healthy snack: “product mothers”, who related intrinsic product properties of a specific product to the healthiness of that product, the “balancing mothers” who related the healthiness of the snack to the whole diet and the context, and the “not that important” mothers, for whom the healthiness of a snack was not that relevant.

Understanding how mothers perceive the healthiness of snacks could be relevant for the design of new, as well as for the reformulation of existing snack products. In addition, the results of this empirical study could be used for efficient communication with the goal of setting up new or improving existing interventions to help mothers meet children’s dietary requirements. Future research could be expanded to other persons related to snack providing to young children, *e.g.* fathers or grandparents. Also snacks consumed at day-care centers could be an interesting step for further research. In addition, this explorative

research could be used to develop a “health-perception” questionnaire, which could be used to group mothers in the three different groups, which could be useful for better targeting interventions related to improving of children’s dietary behavior. Moreover, the health perception of mothers while providing snacks in relation to the naturalness perception of the snack, or the portion size, could be of interest for further research too.

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CHAPTER 9

General discussion

GENERAL DISCUSSION

9.1 BACKGROUND

Snacking is highly prevalent among children (Hess and Slavin, 2014; Gevers *et al.*, 2016; Wang *et al.*, 2018; Dunford and Popkin 2018). The consumption of energy-dense snacks is one of the reasons contributing to childhood obesity (Piernas and Popkin, 2010; Pearson *et al.*, 2011; Boots *et al.*, 2015; Fisher *et al.*, 2015), which is a serious public health issue (WHO, 2016) and often tracks into adulthood (Singh *et al.*, 2008; Nicklaus, 2016; Simmonds *et al.*, 2016). However, as snacks are an important factor in children's daily food intake, healthier, smaller, and less-energy-dense snacks could help to positively influence the dietary intake of children (Kachurak *et al.*, 2019; Xue, *et al.*, 2019; Loth *et al.*, 2020b). As mothers are mainly responsible for providing foods to their young children (Hardcastle and Blake, 2016; Taillie, 2018; Rahill *et al.*, 2020), the overall aim of this thesis was to identify and provide insights into mothers' considerations and value conflicts while providing snacks to their 2 to 7 years old children.

This discussion starts with a description of the main findings, followed by theoretical implications, methodological considerations and implications for practice. Finally, future perspectives and the main conclusions are presented.

9.2 MAIN FINDINGS

To identify mothers' considerations and value conflicts while providing snacks to their 2-7-year-old children, a diverse set of qualitative studies was conducted. The next three paragraphs describe the main findings of these qualitative studies according to the three key themes covering this thesis: mothers' snack choices for their 2-7-year-old children, mothers' considerations while providing these snacks, and value conflicts experienced during providing of the snack.

9.2.1 Mothers' snack choices

An overview of how the results related to mothers' snack choice are covered in the thesis chapters is presented in Table 9.1.

The actual snacks provided by the mothers in the current study are measured with diary studies. Chapter 2 describes a 13-day dairy study with 136 Dutch mothers and Chapter 8

describes an 8-day dairy study with 22 Dutch mothers. Both diary studies revealed that fruit is the most frequently given snack, followed by cookies. Fruit is a snack mainly provided in the mornings (Chapters 2, 5, and 8). Cookies and candies were more provided in the afternoon. Other types of snacks provided are bread products, rice crackers breadsticks and raisins, pie and pastry, crisps, vegetables, and savory snacks.

Table 9.1. How the results on mothers' snack choice are covered in the thesis chapters.

		Main research findings on mothers' snack choice				
Chapter	**Description**	Differences in snacks provided to subgroups	Link with coercive control and overprotection	Fruit mainly provided as a snack, followed by cookies	Fruit provided in the morning	Cookies and candy provided in the afternoon
2	Diary study, split in subgroups (n = 136)	X		X	X	X
3	Diary study, combined with CGPG (n = 136)		X			
4	Diary study, interviews, value conflicts (n = 136)					
5	Interviews, first vs not-first child (n = 17)	X			X	X
6	Interviews, 4 countries (n = 67)					
7	Interviews, North vs South Italy (n = 40)					
8	Diary study, interviews, healthiness perception (n = 22)			X	X	X

The study in Chapter 2 demonstrated that higher educated mothers gave more vegetables and rice crackers, bread sticks and raisins, and fewer crisps to their children compared to the lower educated mothers. Mothers of children in the age group of 2-3 years more often provided fruit and rice crackers, bread sticks and raisins, and less candy compared to mothers of children in the older age groups. Children aged 6-7 more often got vegetables. Mothers of first children provided fewer snacks in total compared to mothers of not-first children. Moreover, mothers of first children more often provided products that generally are perceived to be healthier compared to mothers of not-first children, this difference was confirmed by the study reported in Chapter 5.

The snacks provided by the mothers as reported in Chapter 2, were linked to the key constructs of general parenting as shown in Chapter 3. Results gave the first indication that in the group of mothers who scored relatively higher on the key construct coercive control

more mothers provided unhealthy products, like candies and cookies, and fewer mothers provided vegetables, compared to mothers who scored lower on coercive control. A higher score on coercive control combined with a higher score on overprotection was associated with fewer mothers providing unhealthy products like cookies and candies.

9.2.2 Mothers' considerations in snack providing

Table 9.2 presents how the results related to mothers' considerations in snack choice are covered in the thesis chapters.

Table 9.2. How the results on mothers' considerations in snack choice are covered in the thesis chapters.

		Main research findings on mothers' considerations in snack providing			
Chapter	**Description**	Differences in considerations for subgroups	Considerations not linked to general parenting	Cultural differences in considerations	Health and preference of the child most often mentioned
2	Diary study, split in subgroups (n = 136)	X			X
3	Diary study, combined with CGPG (n = 136)		X		
4	Diary study, interviews, value conflicts (n = 136)				
5	Interviews, first vs not-first child (n = 17)	X			
6	Interviews, 4 countries (n = 67)		X		X
7	Interviews, North vs South Italy (n = 40)	X			X
8	Diary study, interviews, healthiness perception (n = 22)				X

Mothers reported many considerations to be relevant in providing a snack to their 2-7-year-old child. The healthiness of the snack was the consideration reported most often by the mothers in the studies described in Chapters 2, 6, and 8. In the study comparing Northern and Southern Italian mothers (Chapter 7), the consideration health was mentioned by almost all mothers living in the North, but less often by mothers living in the South. In Chapter 7, the consideration child's preference was most often reported by the Italian mothers, which confirms the results of the Italian mothers in Chapter 6, but it was also frequently mentioned by the mothers of the studies in Chapters 2 and 8. Cultural differences were also observed in the considerations (Chapter 6). Convenience was very important for Dutch mothers, valuing organic food was typical for Polish mothers, religion played a role

for Indonesian mothers, while Italian mothers placed more value on brand compared to the mothers in the other countries.

The study in Chapter 2 showed that higher educated mothers and mothers of first children in the household more frequently used reasons related to (relative) healthiness and variation as a consideration to provide a snack, while lower educated mothers more often justified their (unhealthy) snack choice and more often provided a snack to reward, indulge, comfort or calm their child compared to the higher educated mothers. Mothers of children in the youngest age group more often provided a snack because it was healthy or because everyone gets it.

9.2.3 Experienced value conflicts

Table 9.3 presents the relationship between the thesis chapters and the results on mothers' value conflicts when providing a snack.

Table 9.3. How the results on mothers' value conflicts in snack providing are covered in the thesis chapters.

		Main research findings on mothers' value conflicts in snack providing			
Chapter	**Description**	Value conflicts mostly health related	Main conflicts: health vs unhealthy/ convenience/ social environment	Cultural differences in value conflicts	Value conflicts not linked to general parenting
2	Diary study, split in subgroups (n = 136)				
3	Diary study, combined with CGPG (n = 136)				X
4	Diary study, interviews, value conflicts (n = 136)	X	X		
5	Interviews, first vs not-first child (n = 17)				
6	Interviews, 4 countries (n = 67)	X	X	X	
7	Interviews, North vs South Italy (n = 40)	X	X		
8	Diary study, interviews, healthiness perception (n = 22)				

Value conflicts while providing snacks to their 2-7-year-old children were experienced by almost all mothers (Chapters 4 and 6). The conflicts of healthy versus unhealthy snacks, health versus convenience, and health versus social environment (influence of others) were mentioned to be most relevant. Mothers experienced most value conflicts when they

provided snacks perceived as unhealthy. Consequently, the experienced value conflicts were mainly health-related. However, the type of considerations that conflict with health differs between cultures (Chapter 6). Even within one country differences in value conflicts were found, but still all were related to health (Chapter 7). Mothers from the North of Italy experienced more value conflicts compared to mothers from the South of Italy. Remarkably, some mothers from the South of Italy mentioned not to experience any value conflict, because they provide their child with just any snack he or she wants (Chapter 7).

Although Chapter 3 revealed that more mothers who scored relatively higher on the key construct of general parenting coercive control provided unhealthy products, no relationship between coercive control (or the other key constructs of general parenting) and the value conflicts experienced by the mothers were found. Besides, no link between mothers' educational attainment and value conflicts experienced was found (Chapter 4). Other relationships were determined in Chapter 4; mothers of younger children more often experienced value conflicts when providing a snack. Besides, mothers of first-born children experienced slightly more value conflicts compared with mothers of not-first children in the household which could explain the differences in mothers' snack choice for their youngest child and their oldest child when he or she was of the same age as found in Chapter 5.

The study in Chapter 8 provided insight into mothers' health perception of different snacks for children. The mothers could be categorized into three groups based on their health perception. The "product mothers" relate the healthiness of a snack to its intrinsic product properties and prefer every snack provided to be as healthy as possible. The "balance mothers" relate healthiness to the overall diet and therefore do not mind if a single snack is unhealthy. The "not that important mothers" think that healthiness of a snack is not that relevant. Whether or not these mothers experienced value conflicts was not studied. However, it is expected that the mothers of the different groups will differ in number and type of value conflicts experienced, as they also perceive the healthiness of snacks differently.

9.3 INTERPRETATION OF THE RESULTS

This paragraph starts with the description of the model of mothers' snack choice, considerations, and value conflicts which is adapted from Holsten *et al.* (2012) and based on the outcomes of this PhD research. In the following paragraphs, the main findings of this thesis are discussed and interpreted in view of this model. The discussion addresses considerations and value conflicts in snack choice, influence of others on the snacks provided, and health perceptions of snacks.

9.3.1 Model of mothers' snack choice, considerations and value conflicts

Young children consume food mainly in the home environment (Kral and Rauh, 2010; Kueppers *et al.*, 2018), which makes the home an important setting for developing eating and food choice behavior (Wit *et al.*, 2015). Figure 9.1, shows an adapted version of the house-shaped model of Holsten *et al.*, (2012) tailored to the situation of mothers proving snacks to young children. The model presents the relation between considerations, value conflicts, and mothers' snack choice for their 2-7-year-old children.

The mother is the main component in the model, presented at the top of the house. Characteristics of the mothers found in this study to be important include educational attainment, general parenting, health perception, and culture. Before the mother provides a snack, she has different types of considerations to either or not provide the snack. These considerations include also topics which are presented in the original model as characteristics of the parent, like time pressure (consideration: convenience) and family preferences (consideration: child preference). Because the different considerations in snack providing could be conflicting, the possibility exists that value conflicts in snack providing occur. The characteristics of the child are limited in this model, as the model is about mothers' snack choice. The age groups of the child and being the first or not-first child in the household are added as relevant characteristics of the child.

9.3.2 Considerations and value conflicts in snack choice

The groups of considerations mothers use while providing snacks found in this thesis (Chapters 2, 6, 7, and 8) are health-related, child-related (influence child), habit-related, product-related, external influence (influence of others), and strategies (Figure 9.1). The considerations related to external influence and health are discussed in-depth in paragraphs 9.3.3 and 9.3.4.

The main child-related considerations are 'child's preference', 'child asks', and 'child could choose him/herself'. Studies of Carnell *et al.* (2011), Holsten *et al.* (2012), Meers *et al.* (2016), and Boak *et al.* (2016) also showed that the preference of the child influences mothers' food choice for her children. Giving a snack when a child asks for is also reported in studies of Carnell *et al.* (2011), Nepper and Chai (2016), and Shan *et al.* (2018) and is often related to unhealthier snacks. Letting the child choose the snack him/herself is more reported for the older children, as confirmed by Patrick and Nicklaus (2005), Warren *et al.* (2008), and by Jacquier *et al.* (2017) who reported older children to have more autonomous dietary behaviors. The "balancing mothers" (Chapter 8) more often mentioned the child-related considerations 'preference of the child' and 'child could choose the snack him/herself'.

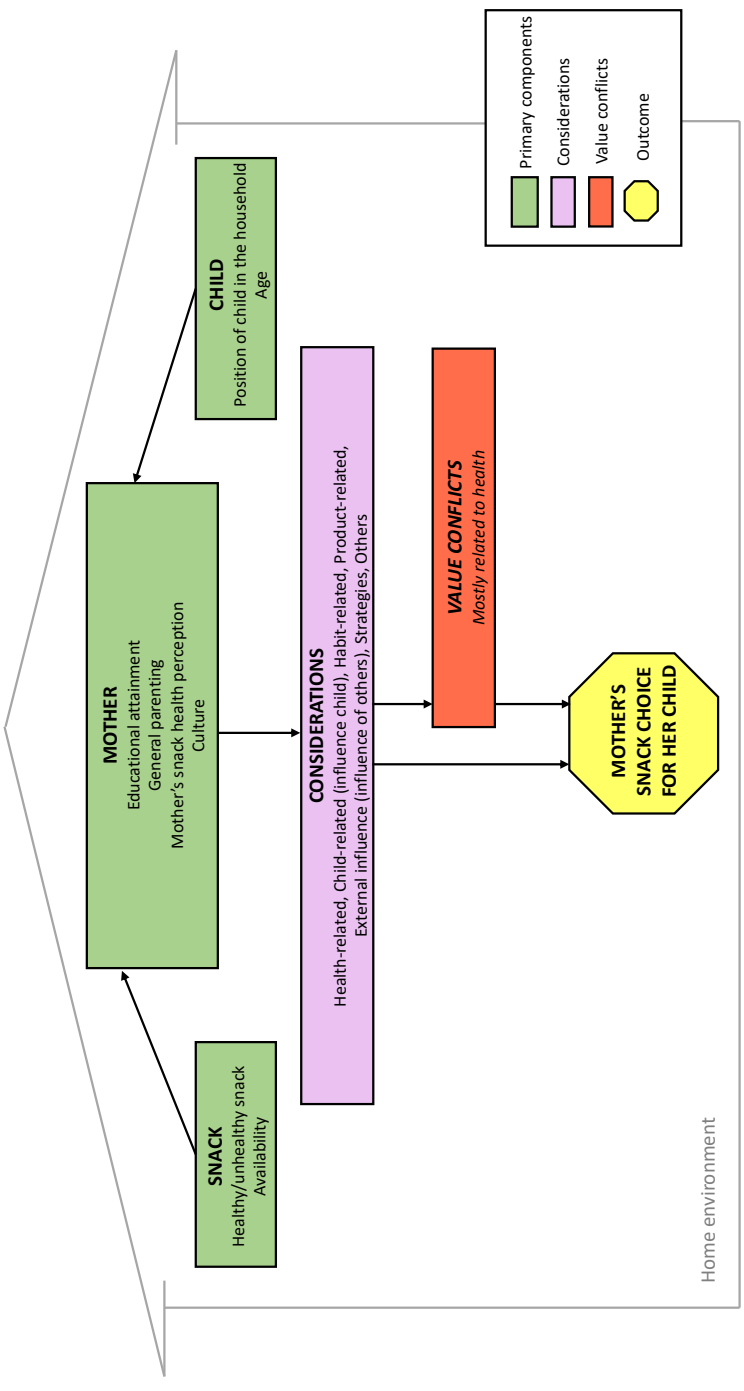

Figure 9.1. Model of mothers' snack choice, considerations, and value conflicts for her 2-7-year-old children (adapted from Holsten *et al.*, 2012).

The habit-related considerations include habit and moment of the day/week (Chapters 2 and 8). Habits play a major role in the consumption of fruits and vegetables by children (Reinaerts *et al.*, 2007; Albani *et al.*, 2018) and adults (Guillaumie *et al.*, 2010). In this thesis, the consumption of fruit is also highly habit-related as in all studies with Dutch mothers' fruit was often consumed as a morning snack (Chapters 2, 5, 6, and 8), cookies and candies were often provided in the afternoon. Habits also play a role in unhealthy dietary patterns and are difficult to change (Lim *et al.*, 2020).

The most important product-related considerations were the extrinsic properties price and brand and were dependent on the culture of the mothers (Chapters 6 and 7). The most mentioned strategy (Chapter 2), was the category rewarding/indulging/comforting/calming and was more often mentioned by lower educated mothers compared to higher educated mothers which is in contrast with the study by Raaijmakers *et al.* (2014). Saxton *et al.* (2009) found no effects of maternal education on using food as a reward but found a negative relation between maternal education and using food to comfort their children.

Universal considerations in snack providing seem to exist among mothers; all mothers, irrespective of the country they live in, mentioned healthiness and preference of the child as important considerations (Chapter 6). Likewise, several studies revealed that health affected mothers' food choice of mothers from, for example, Canada (Walsh *et al.*, 2015), the USA (Johnson *et al.*, 2011), Uruguay (Machín *et al.*, 2016), Senegal (Zobrist *et al.*, 2018) and the UK (Carnell *et al.*, 2011). Moreover, mothers from the USA (Evans *et al.*, 2011; Meers *et al.*, 2016; Colón-Ramos *et al.*, 2017), Indonesia (Rachmi *et al.*, 2018), Australia (Russel *et al.*, 2015; Boak *et al.*, 2016) and the UK (Carnell *et al.*, 2011) reported child preference to be important in food choice for their children. However, some considerations seem to be culture-specific, like convenience for Dutch mothers and organic for Polish mothers, which was also found by Markovina *et al.* (2015). For Italian mothers, the brand was an often-mentioned consideration as also reported by Mascarello *et al.* (2015) and Pirani *et al.* (2018). Therefore, culture is added as a characteristic of the mother in the model, see Figure 9.1.

Higher educated mothers gave more vegetables and rice crackers, bread sticks and raisins, and fewer crisps to their children compared to the lower educated mothers (Chapter 2). This is in line with results from studies of Cribb *et al.*, (2011), Goulding *et al.* (2015), and Kristiansen *et al.* (2017). Moreover, higher educated mothers, compared to lower educated mothers, more frequently used reasons related to (relative) healthiness and variation when choosing a snack. This could implicate that higher educated mothers may be more health-conscious compared to lower educated mothers, as reported by numerous previous studies

(*e.g.* Kant and Graubard, 2013; Ansem *et al.*, 2014; Saldiva *et al.*, 2014; Emmett & Jones, 2015; Durão *et al.*, 2017; Gutiérrez-Camacho *et al.*, 2019; Vilela *et al.*, 2020; Desbouyes *et al.*, 2020). However, from this thesis, this could not be concluded with certainty, because we did not measure health-consciousness as such. Surprisingly, higher educated mothers did not experience more value conflicts compared to lower educated mothers (Chapter 4). This result was unexpected because most value conflicts experienced were related to health. As higher educated mothers seem to be more health-conscious, it was expected that they therefore also would experience more value conflicts.

Furthermore, the study showed that mothers of first children in the household revealed more health-conscious behavior compared to mothers of not-first children (Chapter 2). This was also reported a study of Smith *et al.* (2011) in which first children got more vegetables compared to not-first children. Vennerød *et al.* (2017) showed that children with older siblings got more sweet snacks. Mothers of first children also experienced more value conflicts when providing snacks to their children aged 2–7 years (Chapter 4).

The experienced value conflicts (Chapters 4, 6, and 7) were mainly related to health (Figure 9.1). Mothers experienced most value conflicts when they provided snacks perceived as unhealthy, which is also reported by Ruiter *et al.* (2019). Okada (2005) and Pescud and Pettigrew (2014), reported that people feel guiltier about eating indulgent foods than they feel about healthy foods. Luomala *et al.* (2004) concluded that one of the most common value conflicts in food choice is the conflict between health and indulgence. Moreover, Hayter *et al.* (2015) showed that there are differences in what parents would like to feed their children and what they actually provide. This is also seen in this thesis and could be explained by the different considerations playing a role while providing snacks.

9.3.3 Influence of others on the snacks provided

In Figure 9.1, the influence of others is represented in the consideration “external influences”. Young children usually do not pick snacks themselves but receive a snack from their caregivers (Ventura and Worobey, 2013; Jacquier *et al.*, 2017), which are often the mothers (Rosenkranz and Dzewaltowski, 2008; Cawley and Liu, 2012; Walsh *et al.*, 2015). Consequently, mothers are the main responsible for providing foods to their young children (Lipowska *et al.*, 2018; Jones, 2018; Taillie, 2018; Mehta *et al.*, 2019; Rahill *et al.*, 2020) and therefore chosen to be the target group of the current thesis. However, the role of other persons in providing foods and snacks to young children becomes more relevant (Gubbels *et al.*, 2015; Pulgaron *et al.*, 2016; Seward *et al.*, 2017). That the role of other persons becomes more relevant, is also observed in the diary studies of Chapters 2 and 8 were the average

number of snacks provided by the mothers turned out to be a bit low, which was caused by the fact that not all mothers provided a snack themselves each day. One of the reasons for this was because others, like fathers or grandparents, also provided snacks to the children.

Chapters 4, 6, and 7 found that mothers experienced value conflicts related to health versus the food provided by the fathers. Fathers have an increasing role in the food provision, including the snack provision (Khandpur *et al.*, 2014; Khandpur *et al.*, 2016; Litchford *et al.*, 2020), but still do less than mothers (Hook, 2010; Pulley *et al.*, 2014; Berge *et al.*, 2016; Mackendrick and Pristavec, 2019; Rahill *et al.*, 2020; Jansen *et al.*, 2020). In addition, while mothers try to provide a healthy diet to their children (Carnell *et al.*, 2011; Mehta *et al.*, 2019), some studies revealed that fathers are less concerned or able to arrange a healthy diet (Tanner *et al.*, 2014; Thullen *et al.*, 2016; Fielding-Singh, 2017), which could be the reason for the value conflicts experienced by the mother.

Moreover, Chapters 4, 6 and 7 revealed that mothers experienced value conflicts related to health and the snacks provided by grandparents. While the fathers are having the strongest influence of all other persons on what the mothers provide as food to her children (Cameron *et al.*, 2019), grandparents are of influence too as they are often involved as secondary caregivers for their grandchildren (Jappens and van Bavel, 2012; Pulgaron *et al.*, 2016). In this role, they are more often responsible for the provision of foods, including snacks, to young children (Bell *et al.*, 2018; Jongenelis *et al.*, 2020). This could be challenging for the mothers as the current food environment differs from the prior generations, which could cause another perspective on food provision rules and healthy eating (Farrow, 2014; Li *et al.*, 2015; Eli *et al.*, 2016). Moreover, as grandparents usually only care for their grandchildren for a limited time, they could believe that the everyday dietary rules of the mother are not applicable (Roberts and Pettigrew, 2010), which could be a reason for the value conflicts experienced by mothers.

One of the situations in which the social environment (Figure 9.1) becomes obvious is on special occasions. At visits or during parties, many other people are around which influences mothers' snack choices. The consideration to provide a snack "because everyone gets it, so also my child" was most prevalent during visits or parties (Chapters 2 and 8). This is in line with Levinson *et al.* (1992) who stated that celebrations expose considerations that can remain hidden in everyday consumer behavior. Verhoeven *et al.* (2015), identifying the reasons for the consumption of unhealthy snacks, reported eating unhealthy snacks because of a party as the most mentioned reason by participants. In addition, Shan *et al.* (2018) reported that parents provide treat foods, defined as high-energy foods in the absence of hunger, at

celebrations. Chapter 2 revealed similar results as the consideration party or visit was mostly mentioned while providing crisps, pie and pastry. As a result, mothers experienced conflicts related to unhealthy snacks at parties or visits (Chapter 4). Likewise, Pescud and Pettigrew (2014) reported that parents experience feelings of guilt associated with the provision of large quantities of unhealthy foods on special occasions such as parties.

Figure 9.1 shows that also the presence of (older) siblings in the household is of influence on the snack choice of mothers for their 2-7-year-old children (Chapters 2 and 5). Mothers of first children showed more health-conscious food behavior compared to mothers of not-first children (Chapter 2) which is confirmed in Chapter 5. Various other studies confirmed these differences in the dietary behavior between oldest and youngest siblings (Northstone and Emmett, 2005; Fisk *et al.*, 2011; Smith *et al.*, 2011; Vilela *et al.*, 2015; Vennerød *et al.*, 2017). Other studies even suggested that the youngest child in the household was more likely to be overweight or obese compared to the middle or oldest child (Ochiai *et al.*, 2012; Haugaard *et al.*, 2013; Mosli *et al.*, 2015; Mosli *et al.*, 2016).

9.3.4 Health perceptions of snacks

Mothers' health perception of snacks is an important characteristic influencing her snack choice (Figure 9.1). Health is a reoccurring theme in all chapters of this thesis, as illustrated in figure 9.2. More in detail, in Chapter 2 it is the most mentioned consideration to provide a snack. In Chapter 3 the key construct of parental style coercive control is linked to the provision of unhealthy snacks by mothers. Chapter 4 shows that many value conflicts were related to health. In Chapter 5, the youngest child received more and unhealthier snacks at an earlier age compared to the first child at that age in the household. In Chapter 6, the consideration health was the most mentioned consideration in total and all value conflicts were related to health. Chapter 7 shows that North Italian mothers seem to be more health consciousness, also in this chapter all value conflicts were related to health. The health-related results (Figure 9.2) demonstrate the relevance in mothers' snack providing behavior. Therefore, the study of Chapter 8 focused on the health perception of mothers while choosing a snack for their children.

Various chapters already provide some insights into mothers' health perceptions of the snacks provided. Fruit and vegetables are in most cases perceived as healthy snacks (Chapters 2, 3, 5, 6, 7, and 8). Health as a consideration to choose fruit and vegetables is often found in literature (*e.g.* Paquette, 2005; Russel *et al.*, 2015; Phan and Chambers, 2016; Appleton *et al.*, 2017; Verain *et al.*, 2020). Candy was mostly perceived as an unhealthy snack (Chapters 2, 3, 5, 6, and 8) which is confirmed by studies of Bucher and Siegrist (2015), Phan and

Chambers (2016), Bucher *et al.* (2016) and Lusk (2019). The (un)healthiness perception of fruit, vegetables, and candies is crystal clear. However, often it is more complicated whether a snack is perceived as healthy or unhealthy. It also depends on the comparison with other products (Chapters 2 and 8), which makes health a relative concept. The perceived healthiness of a product depends on the product it is compared with, which is also found in studies of Adams and Savage (2017) and Sulistyawati *et al.* (2019).

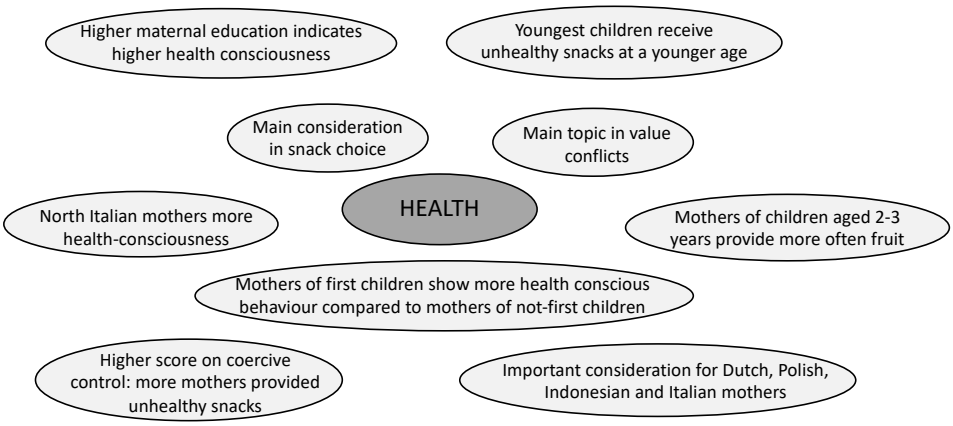

Figure 9.2. Main results according to health.

Consumers also link health to the intrinsic product properties of the snack, as reported by Carels *et al.* (2006), Bisogni *et al.* (2012), Bucher *et al.* (2016), and Schlinkert *et al.* (2020). In our study (Chapter 8), we could distinguish three groups of mothers in defining healthy snacks. The first group included the "product mothers", who related intrinsic product properties of a specific product to the healthiness of a product. Linking the intrinsic product properties to health was also found in Chapters 2, 6, and 7 in which the subconstructs of healthiness were analyzed. The second group of mothers defined healthy foods is in the context of all foods consumed. These mothers were defined in Chapter 8 as the "balancing mothers" who related the healthiness of the snack to the whole diet and the context. This is also seen in literature; for some consumers, healthiness is an outcome of the overall diet and does not lie in single products (Falk *et al.*, 2001; Croker *et al.*, 2009; Jallinoja *et al.*, 2010; Lusk, 2019). In Chapter 8, a small group of mothers mentioned health as not that important when providing a snack. In their opinion, healthy foods are already consumed during the main meals. Snacks are for enjoyment and indulgence and not meant to be healthy. Likewise, Davison *et al.* (2015), Fisher *et al.* (2015) and Loth *et al.* (2020a) reported that parents are relatively flexible towards the type and quality of snack foods provided to

their children, as they have fewer and less strict rules for snacking compared to main meals. Knowing mothers' health perception is of importance for product development as well as for health interventions.

9.4 METHODOLOGICAL CONSIDERATIONS

Qualitative research methods were applied to investigate mothers' considerations and value conflicts in snack choices for their 2-7-year-old children. At the very beginning of the thesis project focus group discussion was determined to be the desired method to use, as this method would easily give detailed information about the topic as participants could discuss and exchange ideas in the group (Hennink *et al.*, 2020). However, many mothers did not feel comfortable by joining a focus group discussion about their snack choices, considerations, and value conflicts. They were afraid to be judged by the other mothers about their specific choices, considerations, and conflicts. This issue shows that the topic of snack choice for children aged 2-7 years is a sensitive topic, for which focus group discussion is hard to realize and could give data which are not objective (Hennink *et al.*, 2020). Therefore, semi-structured interviews were chosen to gather information on value conflicts and considerations in snack choice of mothers (Chapters 4, 5, 6, 7, and 8).

To investigate the actual snack choice of mothers for their 2-7-year-old children, diary research was used and reported in Chapters 2 and 8. Running a food and motivation diary is an appropriate method to gain insights into considerations mothers have while providing a snack to their young children because it measures their behavior in a natural context. The validity of the diary data increases compared to semi-structured interviews alone because it allows measuring all snack moments during the day for a longer period, which is not possible in semi-structured interviews. Using diaries also minimizes the time between the experience and the reporting of the experience, which reduces the chance of less reliable data due to retrospection (Bolger *et al.*, 2003). The diary study in Chapter 2 ran for 13 days with 136 mothers, which was quite long and not reported before for this topic. Diary studies are common in the field of consumer research, but the duration of data collection is often shorter, and a smaller number of participants is involved (Carnell *et al.*, 2011; Elliston *et al.*, 2017; Reale *et al.*, 2018). To succeed in running a diary for this long time with so many participants it was necessary to keep participants highly involved. This was done by sending reminders when the diary was not filled in, and by the continuous availability of the researcher for questions and remarks during the full period of the study. Running a diary could also influence the behavior of the participants as they know they have to record what

they do (Subar *et al.*, 2015). However, the long reporting in the diary is expected to have limited this effect as participants will get used to recording their behavior.

In Chapters 5 and 8, we combined the outcomes of a diary study with semi-structured interviews. These two qualitative data collection methods allow for triangulation to enhance the validity of the results (Flick, 2004; Denzin, 2017). Diaries enable reporting the immediate moment of providing a snack, while the semi-structured interviews focus on the overall process, which could result in some cases in other outcomes. For example, in the diaries, only 56% of the mothers reported value conflicts, while in the interviews almost all mothers mentioned experiencing value conflicts. Moreover, the value conflict "child asks, mother says no" is not reported in the dairy, as the snack is not provided in the end, in the interview this value conflict is reported. However, in most cases, the two methods confirm their results, which improves validity.

Chapters 2 and 8 grouped mothers' considerations into six overall categories: health-related, influence of the child, habit-related, strategies, external influence, and other considerations. Chapter 6 grouped the considerations in health-related, child-related, time-related, and product-related considerations. Because of the inductive way of data-gathering nuanced differences appeared which led to slightly different categories. Also the methods used (diary included or not) and the target group of the study (mothers of different cultures included or not) are of influence on these results.

Chapter 3 included the General Comprehensive Parenting Questionnaire (GCPQ) to link the five key constructs of general parenting with the snacks provided by the mothers. More recently, the Comprehensive Snack Parenting Questionnaire (CSPQ) (Gevers *et al.*, 2018) and the Parenting around SNAcking Questionnaire (P-SNAQ) (Davison *et al.*, 2018) became available, which would be relevant as well to link parenting with snack giving behavior, considerations and value conflicts experienced by mothers.

This thesis showed that qualitative methods are required to gain insights into the considerations and value conflicts of mothers while providing snacks to their young children. Running a food and motivation diary with a large number of participants and for a longer duration, yielded a rich data set. Combining these diaries with interviews complements and validates the data.

9.5 IMPLICATIONS FOR PRACTICE

This paragraph describes the implications of the current thesis for practitioners in health interventions and new product development.

9.5.1 Information for health interventions

The understanding gained in this thesis on the considerations and value conflicts of mothers while providing a snack to their children could help to improve interventions to promote more healthy choices. To promote healthier eating behavior among children it is of importance to know the most prevalent reasons to consume and provide unhealthy snacks (Verhoeven *et al.*, 2015) as the type of health intervention should depend on the considerations mothers have while providing snacks to their children (Cleobury and Tapper, 2014). In the current thesis, it is demonstrated that health is an important consideration in snack providing, so these mothers seem to be aware of the importance of healthy snack providing to their children. However, other considerations are reported to be relevant as well, like the preferences of the child, time-constraints and external influences. Besides, certain strategies used by mothers like comforting or rewarding a child with snack foods could influence healthy dietary habits. For the set-up of health interventions, these considerations are important to consider because they are highly relevant for the mothers' snack choice for their children. Moreover, this thesis shows that it is important to consider the different groups of mothers while designing interventions. This is because educational attainment of the mother (Chapter 2), age group of the child (Chapters 2 and 4) and presence of older siblings in the household (Chapters 2 and 5) also influenced the types of snacks provided, the considerations and the value conflicts experienced by the mothers.

9.5.2 Snack product development

For the development of foods, it is of importance to take consumers' needs and wishes into account to be successful in the market (Linneman *et al.*, 2006; MacFie, 2007; Lesschaeve and Bruwer, 2010). Therefore, the insights on the type of snacks provided, the considerations, and value conflicts experienced by mothers of children aged 2-7 years could be of support in the design of new snack products. If important considerations, like for example health, convenience, preference of the child could all be combined in one snack this would be of great value. This could also reduce value conflicts experienced by the mothers, as they do not have to choose between certain considerations, which are important to them as also reported in the research of Mai and Hoffman (2015). Moreover, the results on the considerations of mothers of different countries are of importance for product development. It is relevant to know that there seem to be universal and more country-specific considerations to choose

a snack, which could be of help to target new products better to each country. Therefore, product developers must not only focus on the general needs and wishes of the consumers, but also take into account the underlying considerations and value conflicts while designing new snack products. The information on considerations and value conflicts could also be of importance for marketing and positioning of newly developed snack products.

9.6 FUTURE RESEARCH

This thesis gained insight into mothers' considerations and value conflicts when giving snacks using qualitative research methods. A quantitative survey could check the reliability of these insights, a large group of mothers should be included in such a study and the results on the subgroups found in this thesis (educational attainment of the mother, first child or not-first child, and the age groups of the child) could be checked. Moreover, other aspects could be included such as the social-economic status of families. This was not included in the current study, but there were some indications that this plays a role in considerations to provide a snack.

Another method to check the reliability of the results of the current study is the set-up of a longitudinal study. Following parents for a longer period can confirm the current findings and provide insight into possible changes over time. In this thesis, in Chapter 5, the interviews were partly retrospective, which shed some light on changes over time. Mothers had to tell about situations of some years ago when their oldest child was 2–3-years-old. To diminish the retrospective effect a longitudinal set-up of the study could be a solution. Such a longitudinal study could also focus on differences between the age groups 2-3, 4-5, and 6-7 years within one family over time which could also provide relevant insights.

The current research focused on mothers and cannot be generalized to fathers, as they have different approaches to child-rearing (Hallers-Haalboom *et al.*, 2016) as well as child feeding (Khandpur *et al.*, 2016; Tan *et al.*, 2019). It could be of interest for further research to include fathers as a target group as well, to identify more factors for the development of more comprehensive health interventions capturing the whole family.

The last study of this thesis focused on health perception of snacks. The study was conducted among mothers of children aged 2-3 years, with no older siblings. Three groups of mothers were distinguished according to their health perception of snacks: "product mothers", "balancing mothers", and "not that important mothers". These three groups are the result

of a qualitative, explorative study, among a small target group. Therefore, the existence of these groups needs to be validated. This could be done by setting up a quantitative survey among mothers with young children, covering a broader age range. If these three groups are present, and still appear to be relevant, even for a broader age range, snack choices, considerations, and value conflicts could be linked to the different groups. This could be of relevance to provide better information for health interventions and to better steer product development.

Moreover, the cultural dimensions of Hofstede (Hofstede *et al.*, 2010) as explored in Chapter 6, could be a meaningful framework for explaining considerations as well as value conflicts in snack giving behavior of mothers. It is expected that mothers from countries with comparable dimension scores as the mothers from the countries in Chapter 6, will mention comparable considerations as important in snack giving and experience similar value conflicts. For example, mothers from the Scandinavian countries like Norway and Sweden are expected to use comparable considerations and experience comparable value conflicts as the Dutch mothers do. However, future research could verify this by conducting a similar study in more different countries to ascertain which health-related value conflicts mothers in other cultures experience, which values are relevant for these mothers, and how these can be connected to the cultural differences among countries. Chapter 7 indicated that considerations and value conflicts when mothers provide a snack to their child can be also influenced by tradition and family culture. Future research in other countries could help to strengthen these indications.

9.7 MAIN CONCLUSIONS

The research presented in this thesis contributes to a better understanding of mothers' considerations and experienced value conflicts while providing snacks to their 2-to-7-year-old children. In these explorative, qualitative studies we found consistent findings related to considerations and value conflicts.

Fruit was the most frequently given snack by mothers, followed by cookies. Differences in snacks provided were present for subgroups according to maternal education, first or not-first child in the household, and age group of the children. The key constructs of general parenting coercive control and overprotection were positively linked to the number of mothers who provided as healthy perceived snacks. Mothers' reported considerations to be relevant in providing a snack could be grouped into the overall categories health-

related, child-related (influence of the child), habit-related, strategies (including time-related considerations), product-related, external influence, and other considerations. The healthiness of the snack was the consideration reported most often by the mothers, followed by the preference of the child. Cultural differences were also observed in the considerations, as well as differences in considerations within one country (Italy). Also, differences in considerations between the subgroups of maternal education, first or not-first child in the household, and age groups of the children were found. Value conflicts while providing snacks to their 2-7-year-old children were experienced by almost all mothers. Mothers experienced most value conflicts when they provided snacks which they perceived as unhealthy. Consequently, experienced value conflicts were mainly related to health. The type of considerations that conflict with health differs between countries, and also between the North and the South of Italy. No link between the key constructs of general parenting and value conflicts were found. Mothers could be divided into three groups according to their health perception. The “product mothers” relate the healthiness of a snack to intrinsic product properties and prefer every snack provided to be as healthy as possible. The “balance mothers” relate healthiness to the overall diet and therefore do not mind if a single snack is unhealthy. The “not that important mothers” think that for a snack healthiness is not that relevant since they see a snack for indulgence and a meal for healthy food. The results obtained in this research could be relevant for providing information for health interventions and for new product development.

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Summary

SUMMARY

Nowadays, childhood obesity is a severe public health issue and has a high chance to track into adulthood. One of the behaviors contributing to childhood obesity is the consumption of energy-dense snacks which is highly prevalent among young children. Young children consume foods and snacks mainly in the home environment, which makes it an important setting. As mothers are mainly responsible for providing foods to their young children, the overall aim of this thesis was to identify and provide insights into mothers' considerations and value conflicts while providing snacks to their 2 to 7 years old children.

Chapter 1, the general introduction, describes the problem definition including background information on childhood obesity and snacking. Moreover, the chosen target group, relevant food choice models, background on considerations, and conflicts in food choice, and influencing factors are presented. This chapter ends with a section on qualitative research, as it is the main method used in this thesis followed by the rationale and the outline of the thesis.

The study in Chapter 2 describes snack choices and the related considerations of mothers with young children in the home environment. If snack choices and considerations are related to maternal education, childbirth order, and age groups of the children is also investigated. A food and motivation diary study with 136 Dutch mothers of young children aged 2-7 years was conducted for 13 days. Fruits, cookies and candy were the most frequently provided snacks; healthiness of the snack and child preference were the most mentioned considerations. Considerations were grouped in six overall categories: health-related, the influence of the child, habit-related, strategies, external influence, and other considerations. Higher educated mothers and mothers of first children showed more health-conscious behavior. Lower educated mothers more often justified their (unhealthy) snack choice.

The study in Chapter 3 explores how the key constructs of general parenting (nurturance, structure, behavioral control, overprotection, and coercive control) relate to mothers' snack choice for their children aged 2-7 years. To understand children's snacking habits, snack choices of parents are essential to consider. General parenting is one of the important factors that can influence the development of healthy eating patterns and weight status among children. The Dutch version of the validated Comprehensive General Parenting Questionnaire (CGPQ) was used to assess the key constructs of general parenting. The 13-day diary study with the 136 Dutch mothers was used to measure the snacks mothers provided their children aged 2-4 years and 5-7 years. For both groups of mothers in our

sample, differences were found on the scores of coercive control and overprotection. No differences between the mothers were present on the key constructs behavioral control, nurturance, and structure. Results Indicate that more mothers who scored relatively higher on coercive control provided unhealthy products (like candy and cookies), whereas fewer mothers provided vegetables compared to mothers who scored lower on coercive control. A higher score on coercive control combined with a higher score on overprotection was associated with fewer mothers providing unhealthy products like cookies and candies.

Chapter 4 focuses on value conflicts. Value conflicts appear when people experience struggles, doubts, and feelings of guilt when making food choices. This study provides insight into value conflicts, which mothers may experience while providing snacks to their young children. Possible value conflicts Dutch mothers (n = 136) experience, while providing snacks to their 2-7-year-old children, were investigated using the food and motivation diaries and semi-structured interviews. Differences between mothers' educational level, first versus not-first child, and the differences in age of the children were considered. Results showed that the younger the children, the more value conflicts the mothers experienced. Mothers experienced most value conflicts when they provided snacks perceived as unhealthy. This study elicits six main value conflicts, namely, conflicts between healthy and unhealthy snacks; between healthy and convenient snacks; conflicts related to providing snacks just before dinner; related to influence of others; conflicts when the child asks but the mother says "no"; and conflicts related to many unhealthy snacks at parties or visits.

The diary study of Chapter 2 indicated that mothers of first children showed more health-conscious food choice behavior than mothers of not-first children. Chapter 5 presents the validation of these observations; the differences in mothers' snack choice for their youngest child at 2-3 years compared to their oldest child when he/she was of the same age were investigated with semi-structured interviews. Moreover, the reasons for these differences were identified. A grounded theory approach was used for data collection and analysis. Semi-structured interviews were carried out with 17 Dutch mothers with two or three children. All mothers indicated differences between snacks provided to their youngest child (2-3 years) and their oldest child when it was of the same age. Most frequently mentioned differences were that the youngest children receive unhealthy snacks at a younger age, the structure regarding snack providing was more fixed, and the youngest children received less age-specific snacks. Most frequently mentioned reasons for these differences were role-modeling, the novelty of the first-born, availability of other types of snacks at home, and school hours of the oldest child. The study provided insights into the possible role of siblings in shaping snack consumption.

The study in Chapter 6 investigates the snack choice, considerations, and value conflicts of mothers from four different countries and relates it to national culture. Semi-structured interviews with 67 mothers of 2-7-year-old children divided over 4 national cultures (Dutch, Polish, Indonesian, and Italian) were conducted. Questions were asked about their considerations and value conflicts when providing a snack to their young children. Four key themes could be distinguished to cluster the mentioned considerations. The health-related key theme included all considerations that are associated with the healthiness of the product, the child-related key theme included all considerations that connect to the child, the time-related key theme included the consideration convenience and the product-related key theme included all considerations that were associated with the product itself. Dutch and Polish mothers mostly valued the healthiness of the snack, whereas Indonesian and Italian mothers mostly valued the preference of their child. Data also showed specific prevalence between considerations and nationalities: convenience was very important for Dutch mothers, valuing organic food was typical for Polish mothers, religion played a role for Indonesian mothers, while Italian mothers placed more value on brand compared to the mothers of other cultures. In all cultures, the value conflicts mentioned were mainly related to health.

The results of Chapter 6 indicated that mothers from the North of Italy showed different considerations and value conflicts in snack providing than mothers from the South of Italy. Chapter 7 explores this possible regional effect using semi-structured interviews with mothers from the North (n = 20) of Italy versus mothers from the South (n = 20) of Italy. Participants matched on educational level and weight status. Mothers' considerations in snack provision were grouped into the same four key themes: health-related, child-related, time-related, and product-related. North Italian mothers showed more health-related considerations while providing a snack compared to mothers living in the South. In case mothers from the South mentioned healthiness as a consideration, it was often related to giving energy. The child-related key theme revealed that a snack needs to be liked by the child, otherwise Italian mothers did not provide it. For the time-related key theme, differences were small between North and South Italian mothers. The product-related key theme showed the brand to be more important for South Italian mothers. Mothers from the North of Italy experienced more value conflicts, all related to health. The current studied showed that even within the same country, geographical differences in mothers' considerations and value conflicts for providing snacks exist. This implies that snack choice, considerations and values seem to be influenced by tradition and family culture.

Chapter 8 investigates mothers' health perception of snacks provided. Healthiness was an often-reported consideration related to the snack choice of mothers for their children. Mothers' perceived healthiness of a certain snack could be diverse and differ from the actual nutritional healthiness of that specific snack. Cookies were selected as a snack for this study aiming to identify mothers' healthiness perception of snacks provided to their young children. Diary studies and in-depth interviews with 22 Dutch mothers were conducted. During the interviews, four different types of cookies were presented and discussed. All mothers mentioned health as a consideration while providing snacks both in the interviews and in the diaries. For more than two-thirds of the mothers, health was the most important consideration. Three types of mothers were defined according to healthiness perception: "product mothers", who related the healthiness of a snack to the intrinsic product properties, the "balancing mothers" who related the healthiness of the snack to the whole diet and the context, and the "not that important mothers", for whom the healthiness of a snack was not that relevant because the healthy foods were already eaten during the main meals.

Finally, Chapter 9, the general discussion of this thesis, reflects on the methodological considerations, the main findings, and their implications.

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About the author

ABOUT THE AUTHOR

Femke Brouwer-Damen was born on January 1st 1984 in Wouw, the Netherlands. In 2002, she graduated from high school (Norbertus College, Roosendaal, gymnasium) and started her BSc Management, Economics and Consumer Studies at the Wageningen University. This BSc was completed in 2005 with a thesis on consumer behavior and knowledge related to freezing and defrosting meat at home.

In 2005, Femke continued with both the MSc Consumer studies and the MSc Food Quality Management. Her thesis for the MSc Consumer studies was about consumer appreciation of high-pressure processed carrots and was completed in June 2006. After her first thesis, Femke went for an internship to Leatherhead Food Research in the UK where she worked at the Consumer and Sensory Insight department. This internship was followed by her second thesis for the MSc Food Quality Management which was about practices of consumers regarding food and their quality perception. The relationship between the experience of the food design team and the actual practices and perceptions of the consumer was part of this thesis as well. In January 2007, she obtained her master degree Consumer Studies followed by her master degree in Food Quality Management in July 2007.

After completing her MSc, she started working at the Research and Development department of FrieslandCampina where she worked for 8.5 years on several positions related to consumer and sensory research. In 2016 Femke started her PhD project at the Food Quality and Design group at Wageningen University and studied mothers' considerations and value conflicts while providing snacks to their 2-7-year-old children. The results of her PhD research are presented in this thesis.

Femke can be contacted by email: femke_damen@hotmail.com

LIST OF PUBLICATIONS

Damen, F.W.M., Luning, P.A., Fogliano, V., Steenbekkers, L.P.A. Mothers choose a snack for their 2-7 year old children based on different health perceptions. *(submitted, under review)*.

Hofstede, G.J., Franco, E., **Damen, F.W.M.**, Fogliano, V. Healthy snacks from mom? An agent-based model of snackification in three countries *(submitted, under review).*

Damen, F.W.M., Luning, P.A., Pellegrini, N., Vitaglione, P., Hofstede, G.J., Fogliano, V., Steenbekkers, L.P.A. (2020). Mothers' considerations in snack choice for their children: differences between the North and the South of Italy. *Food Quality and Preference,* 85, 103965.

Damen, F.W.M., Steenbekkers, L.P.A., de Vaal, M.T., Kampen, J.K., Fogliano, V., Luning, P.A. (2020). General parenting and mothers' snack giving behavior to their children aged 2-7. *Food Quality and Preference,* 85, 103961.

Damen, F.W.M., Steenbekkers, L.P.A., Fogliano, V., Luning, P.A. (2020). Youngest versus oldest child: why does mothers' snack choice differ? *Appetite*, 144, 104455.

Damen, F.W.M., Steenbekkers, L.P.A., Fogliano, V., Luning, P.A. (2020). Value conflicts in mothers' snack choice for their 2-7 years old children. *Maternal and Child Nutrition*, 16(1), e12860.

Damen, F.W.M., Luning, P.A., Fogliano, V., & Steenbekkers, L.P.A. (2019). What influences mothers' snack choices for their children aged 2-7? *Food Quality and Preference,* 74, pp 10-20.

Damen, F.W.M., Hofstede, G.J., Steenbekkers, L.P.A., Vitaglione, P., Pellegrini, N., Fogliano, V. & Luning, P.A. (2019). Values and value conflicts in snack providing of Dutch, Polish, Indonesian and Italian mothers. *Food Research International,* 115, pp 554-561.

Damen, F.W.M., van Kleef, E., Agostoni, C., Almiron-Roig, E. (2017). Portion control opportunities in children's diet. *Food Technology*, 71(11), pp 44-51.

Damen, F.W.M. & Steenbekkers, L.P.A. (2007). Consumer behaviour and knowledge related to freezing and defrosting meat at home: an exploratory study. *British Food Journal,* 109(7), pp 511-518.

OVERVIEW OF COMPLETED TRAINING ACTIVITIES

Discipline specific activities	
Agent based modelling course, WUR, INF	2016
Half a year project meetings Ferrero[b]	2016-end
4th International Conference on Nutrition & Growth[b]	2017
Multi-methods symposium Radboud University	2018
Sensory perception and food preference course, VLAG	2018
13th Pangborn Sensory Science Symposium[a]	2019
Symposium Pioneering Nutrition, WUR, HNE	2019
General courses	
Information literacy, WUR Library	2016
Bridging across cultural differences, WGS	2016
Research ethics seminar (ethics in human subjects), WGS	2017
PhD workshop carousel, WGS	2017
Supervising thesis students, WGS	2017
Scientific writing, WGS	2017
Poster and pitching, WGS	2018
Start to teach, WGS	2019
Brain friendly working, WGS	2019
Critical thinking and argumentation, WGS	2019
Reviewing a scientific manuscript, WGS	2019
Optional courses and activities	
Preparation of research proposal	2016
Group meetings FQD[b,]	2016-2020
PhD study tour, Italy[b]	2016

[a] *Poster presentation*

[b] *Oral presentation*

Colophon

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