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"Flavor, fun, and vitamins"? Consumers' lay beliefs about child-oriented food products

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ABSTRACT

Health experts and consumer protection agencies have been expressing concerns about the nutritional quality and marketing of child-oriented food products for years, and political debates on child-targeted food marketing are currently happening around the world. At the same time, systematic research on laypeople's views on the topic is still scarce. However, knowing what these consumers think is highly important, as lay beliefs can affect food decision-making and consumption. We address this gap with two online studies. In Study 1 ($N = 444$ parents and non-parents), we develop an instrument measuring lay beliefs about child-oriented food products consisting of three scales: Nutrition-Related Concerns, Convenience, and Healthiness. We find small effects of socio-demographic factors on beliefs and observe meaningful relationships between beliefs and (i) thinking style and (ii) food purchase motives (e.g., visual appeal and convenience). In Study 2 ($N = 571$ parents), we validate the factor structure of the instrument by means of CFA and find that lay beliefs about Healthiness and Convenience predict self-reported purchase of child-oriented food products. With our research, we extend current knowledge on laypeople's perceptions of child-oriented food products and provide an instrument with good psychometric properties that can be applied in future studies. Our research offers valuable insights for policy-makers and producers who wish to meet the actual demands of consumers.

1. Introduction

Tasty, convenient, fun to eat—with their colorful, attractive packaging, and unusual flavors and shapes, child-oriented food products and beverages have not only managed to become an indispensable part of many kindergarten and school lunchboxes but have also turned into a very lucrative business. With a compound average growth rate of 6.8%, the global market for such products—valued at US$ 127.4 billion in 2022—is projected to reach US$ 216.4 billion by the year 2030 (Research and Markets, 2023). Health and nutrition experts have been observing this trend with growing concern, considering the poor nutritional quality of most child-targeted products (Düren & Kersting, 2003; World Health Organization, 2023 (WHO), 2023). Responding to the calls of experts for stricter legislations concerning child-directed food marketing activities, governments around the world are introducing tighter regulations (e.g., UK; Department of Health and Social Care, 2021), or are discussing their introduction (e.g., Germany; Federal Ministry of Food and Agriculture, 2023).

Less clear, however, is the view of regular consumers on the topic. While a lot of studies have been conducted with consumers on parental feeding practices and food choices (e.g., Carnell et al., 2011; Oellingrath et al., 2012), only a handful of studies have looked at how regular consumers perceive child-oriented food products. Additionally, past research has mainly focused on very circumscribed aspects of the subject, such as specific marketing practices (e.g., Dens et al., 2007) or singular product categories (Longacre et al., 2017). As a result, they provide limited insights into the perspective of regular consumers. Other studiesoffering a more holistic view by covering a wider range of aspects related to child-oriented food products are usually of a qualitative nature and also come with limitations, such as relying on relatively small, rather specific samples (e.g., Abrams et al., 2015; Den Hoed & Elliott, 2013). At this point in time and to our knowledge, a systematic and comprehensive assessment of consumers' perceptions of and assumptions about child-oriented food products is still missing. We argue that this is problematic, as lay beliefs can affect cognitive, motivational, and even behavioral consumer processes (Briñol et al., 2015; Deval et al., 2013; Yarar & Orth, 2018).

With two quantitative studies and a total sample size of 1,015 non-

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expert consumers, we aim to fill the research gaps outlined. In Study 1 ($N = 444$ parents and non-parents), we look at consumers' general beliefs about child-oriented food products. Taking into account the lack of previous research, we first develop an instrument to assess these beliefs, followed by an investigation of relationships between beliefs and socio-demographic characteristics, thinking style, and food choice motives. In Study 2 ($N = 571$ parents), we validate our newly developed scales by conducting confirmatory factor analysis. Further highlighting the practical relevance of the issue at hand, we examine and demonstrate the effects of lay beliefs on self-reported purchase frequency of child-oriented food products.

This research meaningfully contributes to and extends current consumer and marketing literature in various ways. First and foremost, we provide an instrument of sound psychometric quality measuring consumers' lay beliefs about child-oriented food products. By covering various aspects at once, such as nutrition-related concerns, healthiness, and packaging design, we also offer a more holistic view of the topic compared to studies exclusively focusing on singular product attributes or marketing strategies. Importantly, we include the aspect of convenience. Despite having been established as a central motive for food purchases and consumption, convenience has mostly been overlooked by past research on child-oriented food products. As a further strength of our research, we investigate how consumer-related factors—socio-demographic characteristics, thinking style, and food choice motives—influence the perception of food products targeted at children. Additionally, we do not limit our studies to parents but also compare their perspectives with that of consumers who do not (yet) have children of their own, as they can still be involved in the provision of food to children, influence public discourse, and engage in political activities. Our research also has practical implications. By learning what regular, non-expert consumers think about child-oriented food products, we might be able to make predictions about their reaction to persuasion attempts—both by (their) children as well as marketers—and their purchase behavior. Finally, this research has implications for public and consumer policy. For instance, the instrument we provide can be used in the context of food- and nutrition-related prevention and intervention programs to assess consumers' current awareness and perceptions of child-oriented food products, to track changes in perceptions over time, and to potentially inform predictions about public acceptance of planned changes in legislation.

2. Theoretical and empirical background

2.1. Definition of child-oriented food products

In contrast to products specifically intended for infants and toddlers (e.g., infant formular or baby jar food), which are legally defined and must comply with strict regulations concerning formulation, production, and marketing in the EU (Commission Directive 2006/15/EC; Regulation 609/2013; Regulation 127/2016), food products aimed at children of about 3+ years (and their parents) do not form a separate product category. Rather, these products are treated like any other product, as the term "child-oriented food product" (or synonyms) does not exist from a legal perspective. Considering the lack of a clear definition, labels and working definitions in the scientific literature on "fun food" (e.g., Elliott, 2008) or "children's food" (e.g., Fitzhugh & Lobstein, 2000) vary, depending on the context and purpose of the research. Elliott (2019), for example, defines child-targeted food products as "products containing: the world 'child' or 'kid' in the brand or product name; appeals to fun or play on the package; links with children's popular culture; or child-friendly graphics or games" (p. 2). Additional (visual) aspects typical of child-oriented food products frequently mentioned in scoping reviews and studies on the topic[1] are unusual shapes of the packaging or product (e.g., Elliott, 2008; Hawkes, 2010), such as a bear-shaped bottle or star-shaped cereals; strong or unusual colors of the packaging or product (e.g., Den Hoed & Elliott, 2013; Elliott, 2008; Hawkes, 2010); and convenience and portability (e.g., Hawkes, 2010; Lapierre et al., 2017), i.e., consumption on the go is facilitated by the packaging or product, for instance, by inclusion of a straw or by extended freshness after opening.

In the context of our research, we define child-oriented food products as food products and beverages primarily targeted at children due to certain packaging and product characteristics (see above), predominantly consumed by children already able to eat solid food. In line with past research (Elliott, 2008, 2012, 2019), we do not include obvious "junk" or "fast food" and sweets in our definition, i.e., products that are clearly unhealthy and should not be consumed on a daily basis. Rather, we focus on product categories typically considered to be part of a regular, comparably balanced diet, like dairy products (e.g., yogurt, yogurt drinks), toppings for bread (e.g., sliced sausage, cheese), breakfast cereals (e.g., muesli, granola), or beverages. Furthermore, and in line with other researchers (e.g., Elliott, 2019; Mehta et al., 2012), we specifically exclude products for infants, babies, and toddlers, as the marketing and production (including product formulation and nutrient thresholds) of these products are regulated by law in Europe (Commission Directive 2006/125/EC; Regulation 609/2013; Regulation 127/2016), where our research was conducted.

2.2. Experts' view

From a health and nutrition perspective, child-oriented food products do not have an advantage over other products, as children's nutritional needs can be easily met with "regular" food (Bavarian Health and Food Safety Authority, 2022). On the contrary—in the discussion on the development of childhood overweight, obesity, and associated health issues, child-oriented marketing, in general, and food products, in specific, have been proposed as a risk or contributing factor (Boyland et al., 2022; Harris et al., 2009). In fact, nutrient-profiling studies conducted in several countries (e.g., Germany: Düren & Kersting, 2003; Canada: Elliott, 2019; UK: Fitzhugh & Lobstein, 2000; USA: Harris et al., 2009) have repeatedly demonstrated that the majority of food products marketed to children contain alarmingly high levels of sugar, fat, and/or sodium, also contributing to an excessive caloric intake due to their often high energy density. In a recent scoping review covering various parts of the world (e.g., Chile, New Zealand, Spain, UK), between 41% and 97% of child-targeted food products were classified as unhealthy, depending on the methods and models used for classification (Elliott & Truman, 2020, p. 1). Food products for children have also been criticized for containing additives, such as natural and artificial sweeteners, aromas, flavor enhancers, preservatives, and coloring (Düren & Kersting, 2003; Fitzhugh & Lobstein, 2000; Harris et al., 2009).

Other major points of critique concern tactics used to promote these products to children. Although food brands are increasingly targeting children online (Hurwitz et al., 2017), more traditional marketing practices, like attractive, child-friendly packaging design (in-store) and TV advertisements (out-of-store) remain very prevalent. They can also be quite powerful, as they have been linked to "nagging" or "pestering", i.e., repeated, persistent purchase requests made by children (Calderon et al., 2017). In order to better protect children—a target group often not yet able to identify and/or to resist persuasion attempts (Büttner et al.,

[1] Please note that the authors cited here in relation to specific (visual) aspects also mention additional aspects; e.g., Elliott's (2008) definition of child-oriented food products is *not* limited to unusual shapes, and Den Hoed and Elliott's (2013) definition is *not* restricted to strong or unusual colors.

2014; Mau et al., 2019)—from advertising influences, experts have long been calling for stricter regulations (e.g., EU Pledge, 2023; WHO, 2023).

In an attempt to also appeal to parents and other caregivers responsible for grocery shopping, brands nowadays frequently use health and nutrition claims to promote child-oriented food products, such as "low fat" or "a good source of calcium for healthy bones" (Chacon et al., 2013; Mehta et al., 2012). While these claims are oftentimes misleading (Aerts & Smits, 2019; Lapierre et al., 2017) and sometimes even incorrect (Pulker et al., 2018), some child-oriented food products indeed contain high levels of vitamins and minerals, partly due to non-mandatory fortification chosen by manufacturers (Tarasuk, 2014). In a recent analysis of child-oriented food products in Brazil, for example, Martins et al. (2024, p. 212) found that approximately 27% of all products ($n = 5{,}620$) were fortified, most frequently with vitamin A (32% of all products), vitamin B_3 (24% of products), and calcium or iron (34% of products). Seemingly positive at first, this might actually be problematic, as consuming several fortified products a day over an extended period of time may even result in an accidental overdose of vitamins and micronutrients and adverse health effects (although additional research is highly needed; Martins et al., 2024; Tarasuk, 2014). Further complicating the matter, most of the time, daily recommended intake values (DRVs or DVs; often expressed in %) provided alongside nutrition labels on the packaging of most child-oriented food products refer to requirements of an average adult, being based on a diet of 2,000 calories a day[2] (U.S. Food and Drug Administration, 2023). Considering that children's nutritional needs can differ greatly from those of adults, depending on factors like sex, age, and developmental stage (Faizan & Rouster, 2022), specifications such as "provides 35% of calcium needed on a daily basis" on child-oriented products, thus are, de facto, not informative.

Briefly summarizing the literature discussed above, one can say that experts perceive child-oriented food products as unnecessary at best and harmful at worst; that marketing communications promoting such products are often exploitative and misleading; and that experts believe that stricter regulations are required. While objective evaluations and expert opinions on food products targeted at children are definitively indispensable, looking at the topic from a consumer perspective is equally important on the way to finding an acceptable way to tackle the issue.

2.3. *Laypeople's views*

At this point, it is unclear whether the information provided by experts actually reaches regular consumers, and even if it does, how they make sense of it and how they integrate it with the positive portray of child-oriented products painted by marketers and producers. Why does it matter what laypeople (in our context: regular consumers), think? Lay theories, also "naïve" (e.g., Briñol et al., 2015; Deval et al., 2013), "subjective" (e.g., Faltermaier et al., 1998), or "implicit theories" (e.g., Dweck et al., 1995), are sets of beliefs and assumptions about circumscribed aspects of everyday life (Dweck et al., 1995; Furnham, 1988). Lay and scientific theories can overlap and have similarities. For instance, both serve the purpose of making sense of the world (Furnham, 1988). On the other hand, they can differ on dimensions like explicitness and coherence. Contrary to scientific theories, lay theories may also include implicit and even contradictory beliefs (Furnham, 1988), and may depend on socio-demographic variables (Wang et al., 2010; Yarar and Orth, 2018).

Importantly, lay beliefs can significantly affect consumers in various ways. They can be predictive of information processing and decision-making (Briñol et al., 2015; Deval et al., 2013) and even actual behavior and lifestyle (Faltermaier et al., 1998; Wang et al., 2010). In the context of healthy nutrition, for example, Yarar and Orth (2018) found that lay theories affect which information sources consumers trust and use, where they shop for food, and what food they consume.

To our knowledge, very few studies have been conducted specifically addressing consumers' lay beliefs about child-oriented food products (a noteworthy exception: Den Hoed & Elliott, 2013). The majority of previous studies focused mostly on child-targeted *marketing*, either focusing on the marketing of "regular" (i.e., not child-specific) unhealthy food products (e.g., Cornwell et al., 2021), on specific marketing techniques like TV advertising (e.g., Dens et al., 2007; Longacre et al., 2017), or on the marketing of specific product categories (e.g., beverages: Harris & Pomeranz, 2021; cereals: Longacre et al., 2017). What most of these studies show is that parents generally consider child-targeted marketing as somewhat unethical or even exploitative and that they disapprove of it (with a few exceptions, e.g., some parents in a study by Elliott, 2013).

Far fewer studies explicitly addressed child-oriented food *products*. As aptly pointed out in a study on child-oriented food products and their packaging by Den Hoed and Elliott (2013) a decade ago, "When it comes to supermarket *foods* and *food packaging* [emphasis added] specifically, (…) little is known about parents' views" (2013, p. 203). Of the few studies on child-oriented food products or their packaging conducted with regular consumers, the majority use a qualitative approach. Abrams et al. (2015), for instance, conducted focus groups with primary caretakers of preschoolers and showed that they at least partly relied on on-pack visuals (e.g., images of fruit) and verbal packaging claims (e.g., "natural", "fat free") when choosing between different child-oriented fruit snacks for their children. Parents also admitted to sometimes simply choosing options with a "healthier look", not because they really believed these options to *be* healthier, but to justify their decisions to themselves (Abrams et al., 2015). Another qualitative study revealed that socio-demographic factors, too, can shape parents' perceptions (Elliott, 2013): Educational background, for example, affected parents' arguments for and against regulations for child-oriented supermarket foods.

While these qualitative studies are definitely indispensable in gaining a deeper understanding of the topic under consideration, they also come with a few limitations. For example, due to the immense effort of collecting and analyzing qualitative data, they usually have to rely on comparatively small, often very specific samples—in most cases, only or predominantly mothers (e.g., Abrams et al., 2015; Den Hoed & Elliott, 2013; Tang et al., 2020). We believe that listening to the voices of fathers, on the one hand, and non-parents, on the other, is important as well, considering that they can still be responsible for providing snacks and meals to and for children. Non-parents, for instance, can interact with children in the role of a sibling, uncle, aunt, babysitter, or nanny. Additionally, non-parental consumers can still influence public discourse and participate in political activities pertaining to the topic of child-oriented food products.

One further shortcoming of most studies that have been conducted concerns the specific aspects they cover. While advertising practices and healthiness have been addressed repeatedly, positive aspects like convenience of child-oriented products have mostly been neglected (with very few exceptions, e.g., Tang et al., 2020). This is surprising, considering that (1) marketers frequently emphasize the practicality of such products with on-pack claims pertaining to features like portability or resealability; (2) consumers regularly and specifically refer to such features in their (online) product reviews (examples see Supplement 1); and (3) convenience, in general, is a very central motive for consumers' (and parents') food choices (Carnell et al., 2011; Renner et al., 2012). For instance, some consumers feel that child-oriented food products can encourage children to try new food (e.g., Den Hoed & Elliott, 2013) and to eat vegetables and other healthy food (e.g., Enax et al., 2015), or to get picky eaters to eat at least *something* (e.g., Den Hoed & Elliott, 2013). Additionally, some consumers apparently perceive pre-packaged

[2] In contrast, the DVs given on products for infants and toddlers have to be age-appropriate, as stricter labelling rules apply to these products (depending on the country/geographic region; e.g., EU: Regulation 609/2013 and Regulation 127/2016).

child-oriented snacks as useful for determining serving size or controlling portions (e.g., Tang et al., 2020).

2.4. The current research

To our knowledge, as of yet, a systematic, comprehensive, and large-scale assessment of the perspective of consumers on child-oriented food products is still missing. We intend to close this gap. In two large, quantitative online studies, we aim to answer the following research questions (RQs):

(RQ1). How do laypeople perceive child-oriented food products? What are their beliefs about various aspects of child-oriented food products (e.g., nutritional properties, healthiness, and convenience)?

(RQ2). How do socio-demographic, psychological, and eating-related variables affect these perceptions?

(RQ3). How do lay beliefs on child-oriented food products relate to self-reported purchase of such products?

Given the scarcity of research on the topic of regular consumers' perceptions of food products for children, we adopted an exploratory approach. Following considerable preparatory work (additional information see Supplement 2), comprising an extensive literature review, qualitative interviews, store visits (online and offline), and scanning positive and negative consumer reviews, we first developed a large pool of items covering various product-related aspects. Using a large, diverse consumer sample ($N = 444$), we then applied these items in Study 1 to answer questions 1 and 2. Based on the results of Principial Component Analyses (PCAs), we formed three scales and investigated how they relate to socio-demographic characteristics, thinking style, and people's motives behind food choices. We included thinking style because previous research has demonstrated that a rational thinking style goes along with a more thorough analysis of nutritional information than an experiential-intuitive thinking style (Ares et al., 2014). Hence, we expected thinking style to also influence lay beliefs about child-oriented food products such that rationally (vs. intuitively) thinking consumers are more critical of food products for children. Focusing on parents of children younger than 13 years ($N = 571$) in Study 2, we replicated the factor structure of our newly developed instrument with a confirmatory factor analysis (CFA). Furthermore, we investigated the relationships between consumers' perceptions of child-oriented food products and self-reported purchase behavior, thus answering question 3. Both studies were approved by the university department's ethics committee and conducted with different consumer samples. Due to limitations of space, we provide additional details to the research presented here in two Supplements. Supplement 1 contains the original Child-oriented Food Products Questionnaire (CoFP-Q) we developed, including information on sources used as inspiration in the process of item generation. In Supplement 2, we provide additional information on methods and results for both studies.

3. Study 1

Study 1 was conducted as an online study. Given the limitated amount of previous quantitative research on the topic, our goal was to first develop an instrument which we could then use to (1) measure consumers' beliefs about child-oriented food products (RQ1) and (2) investigate how these perceptions relate to socio-demographic characteristics, thinking style, and eating-related variables (RQ2).

3.1. Method

3.1.1. Sample

Participants were recruited by a commercial provider of online samples and financially compensated. To cover the perspectives of a wide range of consumers and to be able to investigate potential effects of socio-demographic characteristics, the sample included parents and non-parents aged between 18 and 69 years.[3] Experts, i.e., consumers with either a degree or professional training, previous or current employment in a health- or nutrition-related field (e.g., dietitian, nurse, pediatrician, or any other medical doctor), were not eligible for participation, as we were only interested in laypeople's perceptions of child-oriented food products. Overall, 502 non-expert consumers participated in the study. Based on our pre-determined criteria to ensure data quality,[4] data of 58 participants were excluded. The final sample thus comprised $N = 444$ consumers. Detailed sample characteristics can be obtained from Table 1.

Table 1
Sample characteristics for study 1 ($N = 444$ parents and non-parents) and study 2 (N = 571 parents of at least one child aged < 13 years).

	Study 1	Study 2
	% (*n*)	% (*n*)
Gender		
Female	51.4 (228)	51.7 (295)
Male	48.6 (216)	48.3 (276)
Age group [a]		
18–19 years	7.4 (33)	0.2 (1)
20–29 years	17.6 (78)	6.3 (36)
30–39 years	18.7 (83)	45.9 (262)
40–49 years	18.5 (82)	35.9 (205)
50–59 years	18.0 (80)	9.3 (53)
60 years and older	19.8 (88)	2.4 (14)
Parental status		
Parents	59.9 (266)	100.0 (571)
Non-parents	40.1 (178)	–
Maximum level of education (ISCED 2011) [b]		
Level 0 or 1	0.2 (1)	0.0 (0)
Level 2	14.5 (64)	31.2 (178)
Level 3 or 4	58.3 (259)	20.4 (117)
Level 6 or 7	25.7 (114)	41.7 (238)
Level 8	1.1 (5)	5.8 (33)
Other	0.2 (1)	0.9 (5)
Current occupation		
Pupil, student, or in training	14.6 (65)	1.4 (8)
Employee or civil servant	54.3 (241)	77.4 (442)
Self-employed or freelance work	3.6 (16)	7.7 (44)
Homemaker or job-seeking	8.8 (39)	9.5 (54)
Retired	16.4 (73)	1.9 (11)
Other	2.3 (10)	2.1 (12)
Net household income (in €) [c]		
Lower than 1,000	7.4 (33)	–
1,000 to < 2,000	19.4 (86)	–
2,000 to < 3,000	22.3 (99)	–
3,000 to < 4,000	21.6 (96)	–
4,000 and more	18.7 (83)	–
Not indicated	10.6 (47)	–

[a] Study 1: $M = 43.0$ years ($SD = 15.3$); Study 2: $M = 39.8$ years ($SD = 8.7$).
[b] ISCED = International Standard Classification of Education (Federal Ministry of Education and Research, 2016); levels: 0 = early childhood, 1 = primary, 2 = lower secondary, 3 = upper secondary, 4 = post-secondary non-tertiary, 5 = short-cycle tertiary education (not represented in our samples), 6 = Bachelor/equivalent, 7 = Master/equivalent, 8 = Doctoral/equivalent.
[c] Due to a technical error, net household income was not recorded in Study 2.

[3] Initially, our sample had included persons between 14 and 69 years of age. Following suggestions from a reviewer, we excluded persons younger than 18 years ($n = 49$). We also conducted analyses for Study 1 for the initial sample (14–69 years) and obtained comparable results.

[4] fulfilling one or more pre-determined exclusion criteria: duration of participation ≤ 5th or ≥ 95th percentile (i.e., ≤ 187 or ≥ 1,324 s); interrupted participation; incorrect responses to two interspersed control questions; zero variation in responses to items concerning child-oriented food products.

3.1.2. Measures and Procedure

In the following section, we provide information on the central measures and variables assessed in the study (in order of appearance). Details, including variables measured for control or exploratory purposes and going beyond the scope of this paper, can be obtained from Table S2.1 in Supplement 2.

3.1.2.1. Socio-Demographic Data. After having given informed consent, participants provided information on socio-demographic variables (e.g., gender, age, parental status).

3.1.2.2. Child-Oriented Food Products Questionnaire (CoFP-Q). Participants were then provided with our definition of child-oriented food products—i.e., food products and beverages that, due to certain packaging and product characteristics, predominantly target children and are mainly consumed by children aged between approximately three and 12 years. Participants were given examples of product categories *included* (e.g., cheese, juice, yogurt) and explicitly *excluded* from this definition (e.g., baby and toddler food, sweets, chips; a verbatim definition and instructions are reported in Supplement 1). Consumers were instructed to refer to this definition throughout the questionnaire. Next, they answered the 40 items measuring lay beliefs about child-oriented food products we had developed based on our preparatory work. Covering diverse aspects related to child-oriented products, such as nutritional properties, healthiness, packaging design, appeal to children and parents, regulations, etc., these items offer a comprehensive understanding of the topic. All 40 items were measured on 7-point scales (1 = *do not agree at all*, 7 = *completely agree*) and presented in randomized order. The full list of items can be obtained from the Appendix (Tables A1 and A2). Participants then reported on their purchase frequency of child-oriented food products (1 = *never*, 7 = *daily*). Due to high similarities with results for Study 2, results for purchase frequency are reported alongside results for Study 2 in section 4.3.3 Purchase Frequency of Child-Oriented Food Products (Table 5).

3.1.2.3. Food- and Diet-Related Questions. Afterwards, subjects rated items of eight selected subscales of the short version of The Eating Motivation Survey (TEMS; Renner et al., 2012). Originally consisting of 15 subscales, the TEMS measures consumers' motives behind their everyday food choices and consumption. For our purposes, we changed the original item stem from "I eat what I eat …" to "When I purchase food for my family, I buy food that …". We selected the following eight subscales: (1) Liking (α = .87), (2) Health (α = .81), (3) Natural Concerns (α = .80), (4) Visual Appeal (α = .77), (5) Price (α = .81), (6) Convenience (α = .88), (7) Weight Control (α = .83), and (8) Habit (α = .86). Each subscale consisted of three items, and items were measured on 7-point Likert scales (1 = *does not apply at all*, 7 = *completely applies*). Next, participants reported on several eating- and diet-related variables included for control purposes (e.g., diet type; body size and weight, used to calculate BMI). As these variables did not affect our findings, they will not be discussed further.

3.1.2.4. Thinking Style: Rational Experiential Inventory (REI). For the assessment of thinking style, a short version of the Rational Experiential Inventory (REI; Epstein et al., 1996; German version by Keller et al., 2000) was used. Consisting of two separate scales, the REI measures an individual's Need for Cognition (5 items; α = .74) and Faith in Intuition (5 items, α = .75). Items were measured on 5-point Likert scales (1 = *does not apply at all*, 5 = *completely applies*).

At the end of the study, participants answered a few additional exploratory and socio-demographic questions, were thanked, and debriefed.

3.2. Data analyses

In the following, we report the central analyses. Additional analyses conducted for control and exploratory purposes, including results, are reported in Supplement 2. All analyses were conducted with SPSS Statistics (Version 29.0).

In a first step, we looked at descriptive statistics for all items and variables. In the process of scale-building, we correlated all 40 items of the CoFP-Q with each other, followed by a PCA on the 40 items. We used orthogonal rotation (method: direct oblimin, delta value 0, Kaiser normalization), as we did not assume strictly independent factors (Field, 2009). A Kaiser-Meyer-Olkin measure of KMO = .923 verified sampling adequacy (Field, 2009). Bartlett's test of sphericity was significant as well, $\chi^2(780) = 8{,}878.02$, $p < .001$, indicating that item correlations were sufficiently large to conduct PCA. All diagonal elements of the anti-image correlation matrix had values ≥ .628, thus exceeding the recommended threshold of ≥ .500 (Field, 2009). The initial factor solution produced seven factors with Eigenvalues greater than 1, explaining 58.33% of variance. However, this solution was not satisfactory, neither from a statistical view (e.g., high cross-loadings of items) nor from the perspective of interpretability. To increase psychometric quality and interpretability, we therefore removed 18 items that could not be meaningfully allocated to one factor, either because of substantial cross-loadings (i.e., ≥ 300; 10 items) or because they complicated factor interpretability, as they, content-wise, clearly did not fit with the other items of the factor (8 items). We also removed one item forming a single-item factor (explaining only 2.55% of overall variance). Of the remaining 21 items, two had cross-loadings of > .300. However, we decided to retain these two items, as they both loaded visibly higher on one factor (which was not the case for the other 10 items removed because of cross-loadings) and fit well with the other items of the respective factor. Next, we repeated the PCA with the 21 items, and removed one additional item that exhibited low communality (i.e., .277) and factor loading (i.e., 397). The final PCA, conducted with 20 items, fulfilled statistical criteria (i.e., KMO = .922; values of all diagonal elements of the anti-image correlation matrix ≥ .817; significant Bartlett's test of sphericity, $\chi^2(190) = 4{,}675.48$, $p < .001$) and allowed for a meaningful interpretation of factors. We then correlated the scales we had built based on the factor solution with each other. To investigate potential effects of socio-demographic variables on lay beliefs about child-oriented food products, we looked at descriptive statistics of items and scales for the whole sample and specific groups (e.g., females, males, different education and income levels). We then conducted several ANOVAs with the newly developed scales as dependent variables and varying factors as independent variables: (1) parental status and gender; (2) education level; (3) income level. To follow up on significant main and interactive effects, we conducted *t*-tests and Games-Howell post-hoc tests. We further conducted correlation analyses for our developed scales with thinking style and food choice motives.

3.3. Results

3.3.1. Lay beliefs on child-oriented food products (scale-building)

A full correlation table for the 20 items included in the final PCA model is presented in Table S2.2 in Supplement 2. Based on Kaiser's criterium and supported by the scree plot, we extracted three factors with Eigenvalues greater than 1, explaining 59.04% of overall variance. All factor loadings were ≥ |.536| and all cross-loadings ≤ |.314|. The three factors showed good internal consistencies with αs ≥ .82.

Factor 1, *Nutrition-Related Concerns* (NC) included nine items relating to concerns about nutritional quality (e.g., high levels of fat, sugar), additives (e.g., flavor enhancers, preservatives), degree of food processing, and the contribution of child-oriented food products to child obesity (α = .90). Factor 2, *Convenience* (C; α = .82), was formed by five items covering aspects of child-oriented food products that facilitate food preparation or eating situations (e.g., requiring little preparation,

suitable for being consumed on the go). Finally, the six items forming Factor 3 (α = .88), *Healthiness* (H), reflected consumers' perceptions of the healthiness, naturalness, and vitamin and mineral content of child-oriented food products. Descriptive statistics for all items—items included in the scales (Table A1) as well as additional, separate items (A1 to A20; Table A2)—for both studies are reported in the Appendix. Results of the PCA are displayed in Table 2.

Looking at the mean values and standard deviations of the three factors (Table A1) and keeping in mind the potential value range of 1–7, we can deduce that consumers participating in our study showed some nutrition-related concerns about child-oriented food products (M = 5.02, SD = 1.05). They also perceived such products as not particularly healthy (M = 3.41, SD = 1.33) and as moderately convenient (M = 4.75, SD = 1.06).

As far as relationships between the three factors were concerned, we observed a weak negative relationship between Nutrition-Related Concerns and Convenience, $r(442) = -.146$, $p = .002$, and substantial correlations between Healthiness and (1) Convenience, $r(442) = .529$, $p < .001$, and (2) Nutrition-Related Concerns, $r(442) = -.553$, $p < .001$.[5] For exploratory purposes, we also correlated the additional, separate items not included in the scales (A1-20) with our three scales. The results are reported in Supplement 2 (Tables S2.3 and S2.4).

Table 2
Results of principal component analysis for items of the child-oriented food products questionnaire (CoFP-Q), study 1 (N = 444 parents and non-parents).

Items		Factor Loadings		
		1	2	3
Factor 1: Nutrition-Related Concerns				
NC1	Most CoFP [a] contain a lot of fat	**−.87**	−.14	.17
NC2	Most CoFP contain a lot of sodium	**−.79**	−.16	.20
NC3	Most CoFP contain a lot of sugar	**−.74**	.12	−.21
NC4	Most CoFP are highly processed	**−.69**	.11	−.20
NC5	Most CoFP contain a lot of preservatives	**−.72**	.03	−.14
NC6	Most CoFP are high in calories	**−.70**	.10	−.05
NC7	Most CoFP contain artificial coloring	**−.73**	.01	−.10
NC8	Most CoFP contain a lot of flavor enhancers	**−.66**	.01	−.03
NC9	CoFP are partly to blame for the increase in child obesity	**−.66**	.00	−.20
Factor 2: Convenience (C)				
C1	The packaging designs of CoFP convey that eating is enjoyable	−.02	**.80**	−.10
C2	CoFP are convenient because they require little preparation	.05	**.77**	−.03
C3	CoFP are convenient because you can eat or drink them on the go	.09	**.75**	.03
C4	CoFP teach children that eating is something to enjoy	.03	**.71**	.10
C5	Because of CoFP, children also eat food they wouldn't normally eat	−.09	**.50**	**.31**
C6	CoFP reduce quarreling about eating, as children like eating them	−.13	**.57**	**.31**
Factor 3: Healthiness (H)				
H1	Most CoFP are completely natural	.13	−.07	**.82**
H2	Most CoFP are healthy	.18	.08	**.76**
H3	Most CoFP contain a lot of vitamins and minerals	.07	.15	**.69**
H4	CoFP are part of a healthy diet	−.01	.08	**.74**
H5	CoFP are adapted to children's dietary needs	.16	.19	**.67**
Eigenvalues		7.42	3.30	1.25
% of variance explained		37.08	16.94	6.23

Notes. Rotation method: direct oblimin (delta = 0). Factor loadings ≥ |.300| in bold.

[a] CoFP = child-oriented food products. Abbreviation only used here due to limitations of space; original items included the full term.

3.3.2. Effects of gender and parental status on lay beliefs about child-oriented food products

Due to limitations of space, we will concentrate on the most important findings here. However, descriptive values and more detailed results are reported in Supplement S2 (section Effects of Socio-Demographic Variables on Lay Beliefs, Tables S2.5 and S2.6). For perceived Healthiness, we obtained a significant main effect of parental status, $F(1, 440) = 4.14$, $p = .041$, $\eta_p^2 = .01$, as well as a marginally significant interaction effect, $F(1, 440) = 3.64$, $p = .057$, $\eta_p^2 = .01$. As determined by follow-up t-tests, fathers perceived child-oriented food products as significantly healthier than childless males, $t(214) = 2.87$, $p = .005$, $d = .39$, and as marginally healthier than childless females, $t(204) = 1.79$, $p = .076$, $d = .25$, and mothers, $t(264) = 1.88$, $p = .062$, $d = .23$ (all other group comparisons: $ps \geq .300$). For Convenience and Nutrition-Related Concerns, on the other hand, we did not find any effects of parental status, gender, or of the interaction (all $Fs < 2.45$, all $ps \geq .119$). Results are displayed in Fig. 1.

3.3.3. Effects of education and income levels on lay beliefs about child-oriented food products

Next, we investigated the effects of (1) education and (2) income levels on lay beliefs. Again, we focus on the most interesting results. Additional details, including descriptive values for consumers with different educational attainments and incomes, and full results of ANOVAs and post-hoc tests, are reported in Supplement 2 (section Effects of Socio-Demographic Variables on Lay Beliefs).

Considering that very few participants in our sample had an ISCED-Level of 0 or 1 (n = 29), we formed one group including ISCED-Levels 0–2 (n = 65). A second group included ISCED-Levels 3–4 (n = 259) and a third group ISCED-Levels 6–8 (n = 119).[6] Education level affected Convenience, $F(2, 440) = 2.39$, $p = .038$, $\eta_p^2 = .02$, with slightly lower perceptions for ISCED-Levels 6–8 compared to Levels 3–4 ($p = .058$; all other $ps \geq .278$). Education also slightly affected Nutrition-Related Concerns, $F(2, 440) = 2.85$, $p = .059$, $\eta_p^2 = .01$, with higher concerns for ISCED-Levels 6–8 than 3–4 ($p = .019$; all other $ps \geq .167$). Perceptions of Healthiness were not affected by education level, $F(2, 440) = 1.14$, $p = .322$. The results are displayed in Fig. 2 (a).

For comparisons concerning income level (n = 397; 47 missing), we formed four groups of approximately equal size: (1) income < 2,000 € (n = 119); (2) 2,000 € to < 3,000 € (n = 99); (3) 3,000 to < 4,000 € (n = 96); (4) 4,000 € and higher (n = 83). Income level significantly affected consumers' Nutrition-Related Concerns, $F(3, 396) = 4.33$, $p = .005$, $\eta_p^2 = .03$, perceptions of Healthiness, $F(3, 396) = 3.70$, $p = .012$, $\eta_p^2 = .03$, and perceptions of Convenience of child-oriented food products, $F(3, 396) = 2.88$, $p = .036$, $\eta_p^2 = .02$. As revealed by post-hoc tests, consumers with the highest income (i.e., ≥ 4,000 €) tended to have higher Nutrition-Related Concerns (vs. all other income groups: $ps \leq .030$; all other $ps \geq .971$) and perceived child-oriented food products as less healthy (vs. 2,000 to < 3,000 €: $p = .030$; vs. 3,000 to 4,000 €: $p = .009$; all other $ps \geq .238$) and as less convenient than consumers with lower incomes (vs. < 2,000 €: $p = .087$; vs. 3,000 to 4,000 €: $p = .032$). Results are displayed in Fig. 2 (b).

3.3.4. Relationships between lay beliefs on child-oriented food products and thinking style

We further looked at thinking style as a factor potentially influencing consumers' perceptions of child-oriented food products (Table 3). Consumers who put more Faith in Intuition also perceived child-

[5] Although these correlation coefficients are comparatively high, we want to note that our research focused on getting insights into laypeople's perspectives on child-oriented food products. Scale development was not our pre-determined goal but rather a by-product of our research activities.

[6] N = 442 for education level (n = 2 "other education level", not included in the analysis); level 5 was not represented in our sample. Details on the ISCED-classification are reported in the notes to Table 2.

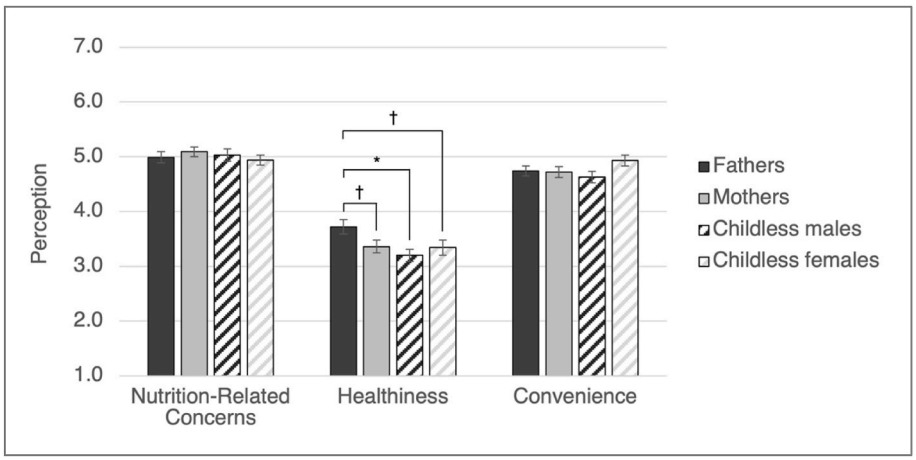

Fig. 1. *Lay beliefs on child-oriented food products, depending on parental status and gender (study 1,* n = *444).*
Notes. Significant group differences (follow-up *t*-tests) are indicated. All other group comparisons: *ps* ≥ .161. Full results are reported in Supplement S2 (section Effects of Socio-Demographic Variables on Lay Beliefs, Tables S2.5 and S2.6)
†*p* < .10.*p* < .05.

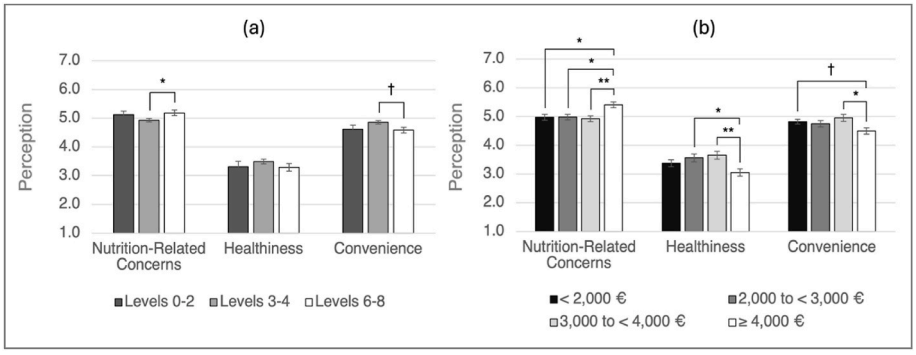

Fig. 2. *Lay beliefs on child-oriented food products, depending on (a) education level and (b) income (study 1).*
Notes. (a) Education level according to ISCED classification (*n* = 442; *n* = 2 with Level "other" not included). Level 5 was not represented in the sample. (b) Income: *n* = 397 (*n* = 47 missing). Significant group differences (post-hoc tests: Games-Howell) are indicated. Detailed results see Supplement 2 (Section Education and Income Level).
*p < .05. **p < .01.

Table 3
Pearson correlations of scales of the child-oriented food products questionnaire (CoFP-Q) with thinking style and food purchase motives for study 1 (N = 444 parents and non-parents).

	Pearson Correlation Coefficients		
	Nutrition-Related Concerns	Healthiness	Convenience
Thinking Style (REI)			
Need for Cognition	.02	−.16**	−.13*
Faith in Intuition	.10	.15**	.23**
Food Choice Motives (TEMS)			
Visual Appeal	−.26**	.51**	.41**
Convenience	−.06	.25**	.21**
Liking	.02	.13*	.27**
Habit	.04	.15**	.24**
Price	.05	.11*	.26**
Health	.09	.12*	.20**
Weight Control	.12**	.17**	.15**
Natural Concerns	.07	.11*	.16**

Notes. REI = Rational Experiential Inventory (Epstein et al., 1996; German version by Keller et al., 2000). TEMS = The Eating Motivation Survey (Renner et al., 2012).
*p < .05. **p < .01.

oriented products as healthier and more convenient. Need for Cognition, on the other hand, was weakly, negatively associated with both Healthiness and Convenience. Nutrition-Related Concerns were not correlated with thinking styles (*ps* ≥ .054).

3.3.5. Relationships between lay beliefs on child-oriented food products and food choice motives

In a next step, we looked at the relationships between lay beliefs, as measured with our three scales, and motives behind food purchases for the family, as measured with several subscales of the TEMS. Results of correlation analyses are displayed in Table 3. Interestingly, the motive most strongly correlated with lay beliefs was TEMS-Visual Appeal: Consumers who considered child-oriented food products as more convenient, as healthier, and who expressed lower nutrition-related concerns generally seemed to place higher importance on presentation (i.e., attractive packaging, shelf placement, having previously encountered a product in the context of marketing) when purchasing food for the family. Whereas perceived Convenience and Healthiness of child-oriented products were also significantly associated with all other TEMS-motives included in our study (i.e., TEMS-Convenience, -Health, -Natural Concerns, -Liking, -Weight Control, -Habit, and -Price), Nutrition-Related Concerns about child-oriented products were related to only one other TEMS-motive: Weight Control.

3.4. Discussion

Using a large, diverse consumer sample consisting of parents and childless consumers in Study 1, we developed an instrument to assess lay beliefs on various aspects of child-oriented food products. The three scales obtained by PCA—Nutrition-Related Concerns, Healthiness, and Convenience—showed good internal consistencies and meaningful associations with variables like food choice motives. Importantly, the two scales Nutrition-Related Concerns (covering aspects such as high processing, fat, sugar, and calorie content) and Healthiness (covering aspects such as high vitamin and mineral content and adaptation to children's nutritional needs) were only moderately correlated. Seemingly counterintuitive, we can offer several explanations for this interesting and noteworthy result. First, our sample consisted exclusively of laypeople, i.e., non-experts, who apparently differ in their views from experts, for which one would probably expect an almost perfect negative relationship between nutrition-related concerns and healthiness. As pointed out in the literature (e.g., Furnham, 1988), laypeople can have contradictory beliefs about one and the same subject and can show an astounding "flexibility" in the use of concepts or constructs to accommodate contrasting views or to justify their behavior (e.g., Deval et al., 2013; Khare & Chowdhury, 2015). In a study by Saulais et al. (2023) with regular consumers, for example, the relationship between the degree of processing and perceived healthiness of food products was neither linear nor straightforward but depended on factors such as product (sub)category. Comparably, Brownbill and colleagues (2020) found that laypeople distinguish between "ingredients harmful to health (and) properties beneficial to health" (p. 1) in their conceptualization of healthfulness. The authors also point out that "consumers often focus more on added nutrients than unhealthy ingredients and that added nutrients can be seen to counteract the effect of unhealthy ingredients" (Brownbill et al., 2020, p. 7). Finally, although child-oriented food products often contain high amounts of sugar and fat (items included in the scale NC), they can still contain high (or even excessive) amounts of vitamins and/or minerals (item included in the scale H) due to fortification (e.g., Martins et al., 2024). Taken together, these considerations support our decision to maintain Nutrition-Related Concerns and Healthiness as separate factors.

Overall, we can say that regular consumers were apparently not naïve when it came to the nutritional quality and healthiness of child-oriented food products. At the same time, consumers perceived these products as rather convenient, again highlighting the importance of convenience in the context of food decision-making and consumption. Concerning socio-demographic variables, we found small effects of education and income levels on lay beliefs. Interestingly, parental status and gender, by themselves, seemed play a minor role for perceptions of child-oriented food products. We only observed effects on perceptions when looking at parental status and gender together, and even these effects were relatively small.

4. Study 2

The aims of Study 2 (online) were two-fold. First, we wanted to further validate the instrument on lay beliefs about child-oriented food products we had developed in Study 1 by conducting a CFA. Second, we wanted to investigate whether consumers' perceptions—as measured with our scales—could predict purchase frequency of such products, and thus, provide answers to RQ3. Given that the issue of purchase is presumably more important to parents than non-parents, we included only parents in Study 2.

4.1. Method

4.1.1. Sample

Parents were recruited by the same commercial provider of online samples used in Study 1 and financially compensated. Criteria of eligibility were a minimum age of 18 years; being a parent to at least one child younger than 13 years; no professional training, degree, previous or current occupation in a health- or nutrition-related field (i.e., being a non-expert); and not having participated in Study 1. Of the 657 participants who completed the online study, we excluded 63 based on our pre-determined criteria (same as in Study 1, see footnote 4). Detailed characteristics of the final sample are displayed in Table 1.

4.1.2. Measures and Procedure

Participants first provided socio-demographic data, followed by a few choice tasks (due to technical issues, these data were not recorded correctly and could not be analyzed; they are thus not reported). Next, they responded to the 40 items of the CoFP-Q, consisting of our three previously developed scales Nutrition-Related Concerns ($\alpha = .90$), Healthiness ($\alpha = .91$), Convenience ($\alpha = .87$), and 20 additional, separate items covering further aspects pertaining to child-oriented food products, such as legal regulations and packaging design. In addition, we included one item measuring participants' overall impression of child-oriented food products (7-point semantic differential, *very negative–very positive*) in Study 2. Next, participants reported on purchase frequency of child-oriented food products (same as in Study 1). Finally, participants answered a few additional questions for exploratory and control purposes (e.g., diet- and eating related questions). The full questionnaire is provided in Supplement 2 (Table S2.7).

4.2. Data analyses

SPSS Statistics (Version 29.0) was used for all analyses except from CFAs, which were conducted with R Statistical Software (version 4.1.1.; R Core Team, 2021), package 'lavaan' (version .6.16; Rosseel, 2012).

First, we looked at descriptive statistics of the CoFP-Q-items and scales. To investigate potential effects of gender on lay beliefs about child-oriented food products, we also conducted *t*-tests. Next, we conducted correlation analyses on the CoFP-Q-items, followed by CFAs to test whether we could replicate the factor structure we observed in Study 1. We opted for weighted least squares means and variance adjusted (WLSMV) as estimator, i.e., maximum likelihood (ML) estimation with robust standard errors and mean- and variance adjusted test statistics (scale-shifted approach). This estimation method is recommended if assumptions about multivariate normality are violated and has been shown to outperform other methods such as ML, robust ML (MLR), or means and variance adjusted ML (MLMV) (e.g., Finch & French, 2015; Tarka, 2017). In a first step, we tested our hypothesized model—consisting of the three factors we had obtained by PCA in Study 1: (1) Nutrition-Related Concerns, (2) Healthiness, and (3) Convenience. To evaluate goodness-of-fit, we followed common recommendations in the literature, i.e., a Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) of $\geq .920$ (Hair et al., 2014); a root mean square error of approximation (RMSEA) of $\leq .06$ (Hu & Bentler, 1999); and a standardized root mean square residual (SRMR) of $\leq .08$ (Hu & Bentler, 1999). As the χ^2 statistic, another commonly reported fit index, is highly sample size-dependent, we also calculated the χ^2/df ratio. Ideally, this ratio should fall below a threshold of 2–5 (e.g., Bollen & Long, 1993). We further looked at standardized loadings of indicators on their associated factors, aiming for loadings of $\geq .500$ (Hair et al., 2014). We then tested several alternative models to assess relative model fit by comparing the models' fit indices discussed above as well as the Akaike information criterium (AIC) and the sample-size adjusted Bayesian information criterium (SABIC), with lower AIC- and SABIC-values indicating better model fit. To assess measurement equivalence, we further tested all models (hypothesized and alternatives) on two randomly drawn subsamples ($n_1 = 277$; $n_2 = 308$), as well as separately for both females ($n = 295$) and males ($n = 276$). As a robustness check, we also repeated our analyses using alternative estimators (i.e., ML, MLR, MLMV). As an indicator of criterion-related validity, we correlated the three CoFP-scales with selected socio-demographic variables and self-reported purchase

frequency of child-oriented food products, followed by multiple linear regression analyses (method: enter) with purchase frequency as outcome variable. In model 1, we used age and gender as predictors. In model 2, we further included our newly developed CoFP-scales Healthiness, Convenience, and Nutrition-Related Concerns as predictors.

4.3. Results

4.3.1. Lay beliefs on child-oriented food Products—Descriptive statistics and gender differences

On a descriptive level, consumers had moderate nutrition-related concerns and perceived child-oriented food products as moderately convenient and not particularly healthy (see Table A1). Interestingly, we obtained almost identical values compared to Study 1—for the scales as well as for individual items (see Tables A1 and A2)—despite using very different samples (i.e., Study 1: parents and non-parents; Study 2: only parents).

As far as gender differences were concerned, we found that fathers perceived child-oriented food products as significantly healthier than mothers and had marginally higher nutrition-related concerns. Perceived convenience, on the other hand, was not affected by gender. Descriptive statistics and results of *t*-tests are reported in Table 4.

4.3.2. CFAs

After correlating all 20 items included in the CFA model (see Table S2.8 in Supplement 2), we conducted the CFA, testing our hypothesized model consisting of the three factors obtained by PCA in Study 1: (1) Nutrition-Related Concerns, (2) Healthiness, and (3) Convenience. All goodness-of-fit indices were in line with recommended cut-off values, suggesting a good model fit: robust CFI = .996, robust TLI = .995, robust RMSEA = .038 (90% confidence interval: [.032; .045]), and SRMR = .051. As expected, the sample-size dependent χ^2 statistic was significant, $\chi^2(167) = 314.54$, $p < .001$. However, with a value of 1.88, the χ^2/df ratio was lower than 2, further supporting our model. Finally, standardized loadings of indicators on their associated factors were $\geq$ .604 for all indicators, thus exceeding the recommended threshold of .500. A graphical representation of the model (including unstandardized path coefficients, errors, and covariances between latent variables) is displayed in Fig. 3.

Concerning relative model fit, the hypothesized model outperformed all alternative models, not only indicated by better values for CFI, TLI, RMSEA, and SRMR, but also lower AIC- (i.e., 35,693.89) and SABIC-values (36,744.32). We obtained very similar results when testing the models with the two randomly drawn subsamples as well as separately with females and males, strongly suggesting measurement equivalence (Table S2.9 in Supplement 2). The robustness of our findings was further supported when repeating all analyses with alternative estimators (ML, MLR, MLMV; Tables S2.10 to S2.12 in Supplement 2). As revealed by Pearson correlation analyses, perceived Healthiness was weakly correlated with Nutrition-Related Concerns, $r(571) = -.282$, $p < .001$, and moderately to highly with Convenience, $r(571) = .669$, $p < .001$. Convenience and Nutrition-Related Concerns were not associated, $r(571) = -.028$, $p = .510$.

Table 4
Descriptive statistics of CoFP-q-scales and results of T-Tests to assess gender-specific differences (study 2, N = 571 parents).

	Mothers ($n = 295$)		Fathers ($n = 276$)		$t(569)$	d
	M	*SD*	*M*	*SD*		
Nutrition-Related Concerns	4.81	1.08	4.98	1.00	1.96	–
Healthiness	3.47	1.37	3.75	1.48	−2.34*	−0.20
Convenience	4.64	1.21	4.63	1.19	0.13	–

*$p < .01$.

Table 5
Pearson correlations between purchase frequency of child-oriented food products and scales of the child-oriented food products questionnaire (CoFP-Q), and selected socio-demographic variables for studies 1 and 2.

	Purchase Frequency [a]		
	Study 1		Study 2
	Non-Parents	Parents	
CoFP-Q-Scales			
Nutrition-Related Concerns	−.09	−.27***	−.24***
Healthiness	.20*	.51***	.67***
Convenience	.21**	.41***	.59***
Selected Socio-Demographic Variables			
Age	−.23***	−.53***	−.21***
Gender [b]	.20**	.05	−.03

*$p < .05$. **$p < .01$. ***$p < .001$.
[a] Study 1: $n = 395$ parents and non-parents ($n = 49$ missing values); Study 2: $N = 571$ parents.
[b] 0 = male, 1 = female.

4.3.3. Purchase frequency of child-oriented food products

Speaking to validity of our scales, we observed significant correlations with purchase frequency. Importantly, we obtained rather similar correlation patterns in both studies (Table 5): Purchase frequency was positively associated with lay beliefs about Healthiness and Convenience, and negatively with Nutrition-Related Concerns and consumers' age, with higher correlations for parents (in both studies) compared to non-parents (Study 1). In Study 1, purchase frequency was also related to gender for consumers without children—i.e., childless females reported purchasing such products slightly more frequently than childless males.

Going beyond correlations, we also conducted regression analyses in Study 2. As can be obtained from Table 6, the model including participant's age, gender, and all three scales (model 2), accounted for 49.6% of variance in purchase frequency of child-oriented food products. All three scales emerged as significant predictors, with Healthiness being the strongest ($\beta = .44$), followed by Convenience ($\beta = .27$). Although the predictor Nutrition-Related Concerns ($\beta = -.10$) was also significant, it affected purchase frequency far less strongly. While participants' gender was not a significant predictor ($p = .583$), participant's age was: Probably due to its association with children's age, parents' age significantly decreased purchase frequency (i.e., older parents having older children who presumably consume such products less often or in lower amounts), $\beta = -.08$, $p < .001$.

4.4. Discussion

In Study 2, we aimed to validate our newly developed scales measuring lay beliefs about child-oriented food products and to investigate how these beliefs are associated with purchase behavior (RQ3). Indeed, we were able to replicate the factor structure of our instrument with CFA, both with the whole sample as well as various subsamples. Furthermore, we obtained almost identical descriptive values for scales and corresponding items in Studies 1 and 2, despite using very different samples (i.e., Study 1: mixed sample; Study 2: only parents of children up to 12 years old). Importantly, we also showed that consumers' concerns and assumptions about aspects such as nutritional quality, healthiness, and convenience significantly predicted self-reported purchase frequency. Interestingly, perceived healthiness and convenience of child-oriented food products were much stronger predictors compared to nutrition-related concerns.

5. General discussion

5.1. Summary

Over the last years, a lot of research has been conducted with and by

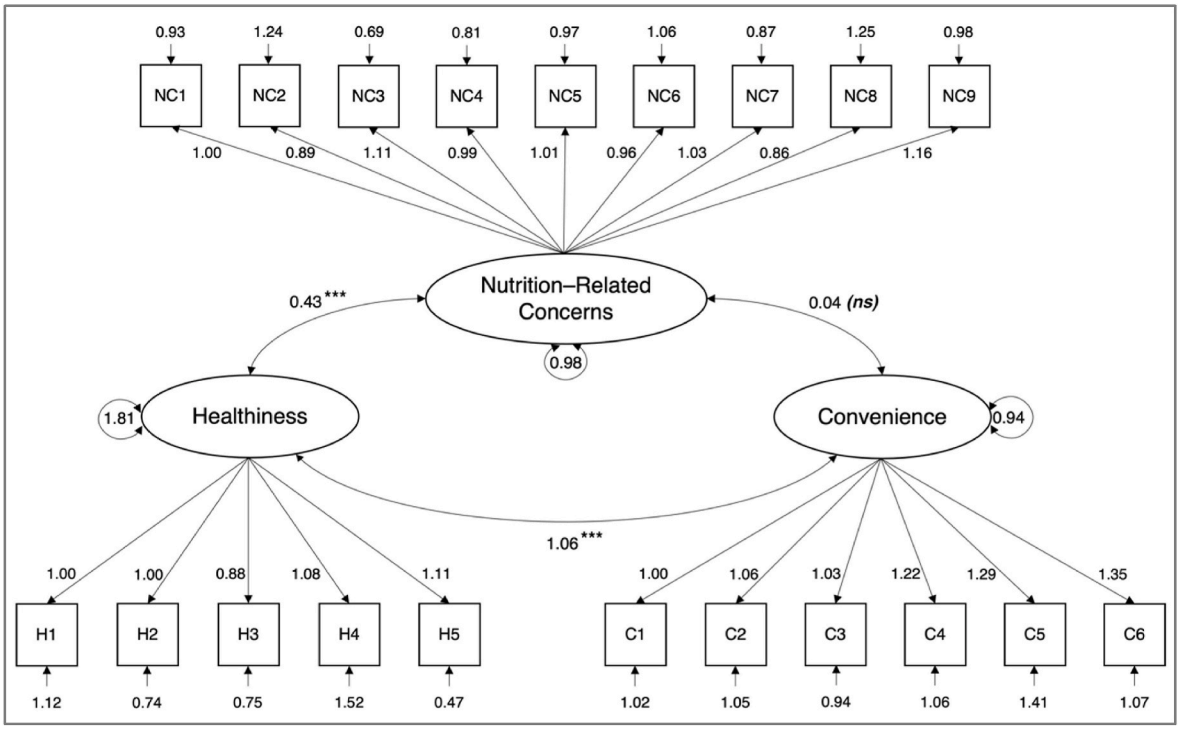

Fig. 3. Path *m*odel of CFA results (Estimation Method: WLSMV) for study 2 (N = *571)*.
Notes. Single-headed arrows: unstandardized path coefficients and errors. Double-headed arrows: covariances between latent variables. All coefficients and covariances are significant at ***$p < .001$ (except for covariance of Nutrition-Related Concerns and Convenience, *ns*).

health and nutrition experts on the topic of child-oriented food marketing in general, and to a lesser extent, child-oriented food products. While experts unanimously and heavily criticize these products for their poor nutritional quality and call for stricter regulations of child-targeted marketing, less is known about the view of regular, non-expert consumers. Based on rigorous preparatory work, we address several limitations of previous research in two large online studies. With our research, we offer a comprehensive, systematic analysis of regular consumers' beliefs about child-oriented food products, not only covering relevant aspects of the topic that have mostly been neglected so far (e.g., perceptions of convenience), but also listening to non-parents. As they, too, can be responsible for feeding other people's children and as they, too, can shape public discourse on the topic, their voices should not be ignored. Importantly, we further contribute to the literature by providing an instrument of good psychometric quality that cannot only be used in scientific research but can also be applied in the context of public health policy. Finally, our insights may also be of value to other stakeholders, such as interested consumers, on the one hand, and producers and marketers wishing to meet consumers' actual demands when it comes to child-oriented food products and their promotion, on the other hand.

Answering our first research question about consumers' perceptions of child-oriented food products, we can say that parents and non-parents seem to show concerns about nutritional properties and healthiness of these products. In line with results of nutrient-profiling studies (e.g., Chacon et al., 2013; Elliott, 2019), for instance, regular consumers think that child-targeted products often contain a lot of sugar, calories, fat, and sodium. Furthermore, they are at least moderately worried about ingredients like flavor enhancers, preservatives, and artificial colors. In contrast to many previous studies on child-oriented food products, we also explicitly address the issue of convenience. We find that consumers, on average, perceive these products as at least moderately convenient and are seemingly appreciative of aspects that make eating situations with children a bit easier.

Another major goal of Study 1 was to investigate how factors like socio-demographic characteristics, thinking style, and food purchase motives affect lay beliefs about child-oriented food products (RQ2). Regarding the first part of the question, we observe some small interactive effects of parental status and gender on perceptions of healthiness. We find that fathers perceive child-oriented food products as slightly healthier than consumers without kids and mothers, a result we replicated in Study 2. Although gender roles have been shifting over time, in most families, mothers are still mainly responsible for grocery shopping and meal and snack preparation for kids (e.g., Fernandez et al., 2019), and studies have found that females perceive themselves as more knowledgeable about nutrition than males (e.g., Krause et al., 2018). Therefore, it is possible that fathers are simply more trusting of the health claims frequently displayed on child-oriented food products (although we can only speculate at this point). Comparable to research on the effects of socio-economic status on family food purchases (Daniel, 2016), parental health literacy, and dietary behavior (de Buhr & Tannen, 2020), we observed some effects of education and income levels on lay beliefs: Consumers with the highest income and educational attainment showed a tendency of being more critical, of perceiving child-oriented products as slightly less convenient and healthy, and of being more concerned about the products' nutritional quality. However, the effects are small and should be followed up in future studies.

Additionally, we found modest effects of thinking style on lay beliefs. Consumers who placed more faith in their intuition seemed to perceive child-oriented food products as slightly healthier and more convenient. Contrarily, consumers with a higher need for cognition were more skeptical about the healthiness of child-oriented food products. This also lines up with findings of Ares and colleagues (2014) who used eye-tracking methodology to assess effects of thinking style on visual attention and choice. They found that compared to consumers who preferred an intuitive-experiential thinking style, consumers who relied more on analytical-rational thinking engaged in deeper processing and paid more visual attention to nutritional information on yogurt labels.

Compatible with these results are our findings on food choice motives. Of all motives assessed in Study 1, visual appeal was most closely related to lay beliefs about child-oriented products: Consumers who generally paid more attention to how products are presented and promoted when engaging in grocery shopping for their family also considered child-oriented products as healthier and more practical. Moreover, they appeared to be less worried about the nutritional quality of such food items. The same was true for the motive of convenience: Consumers for whom convenience, in general, was a more central motive for family food purchases also perceived child-oriented food products as healthier and more convenient. These findings seem very plausible, keeping in mind that food brands and marketers regularly promote the practicality and healthiness of child-oriented food products by systematically using visuals, labels, and verbal claims.

Answering research question 3, we observe that consumers' beliefs also played a role when it came to the purchase of child-targeted food products. In both studies, perceived healthiness and, to a slightly lesser extent, convenience, actually predicted consumers' purchase frequency of such products. This result is in line with past research by Oellingrath et al. (2012), who found that after sensory appeal, the motives most important for parental food choices were health, convenience, and natural content.

5.2. Societal and practical implications

Apart from meaningfully extending the literature, our research has several practical and societal implications. Given the oftentimes unfavorable nutrient profile of child-oriented food products, the fact that these products are obviously quite popular with children—and partly, also their parents—makes the issue at hand clearly one of public health concern. On a positive note, consumers in our study did not seem to be completely gullible as far as the nutritional quality and healthiness of child-targeted products are concerned. Nevertheless, some consumers appeared to be more easily persuaded by health and nutrition claims. By targeting these consumers and adapting campaigns to their information needs, tailored public health initiatives may be more successful than generic, "one-fits-all"-approaches (e.g., Eyles & Mhurchu, 2009) in

Table 6
Results of multiple linear regression analyses of scales of the child-oriented food product questionnaire (CoFP-scales), Parent's age, and Parent's gender on purchase frequency (study 2, N = 571 parents).

	B	*SE*	95% CI of *B*	β	R^2	ΔR^2
Model 1					.05	.05***
Constant	5.95***	0.44	[5.09; 6.82]			
Age	−0.05	0.01	[-0.06; −0.03]	−.21***		
Gender [a]	−0.27	0.14	[-0.54; 0.00]	−.08		
Model 2					.50	.45***
Constant	1.66***	0.47	[0.75; 2.57]			
Age	−0.02**	0.01	[-0.03; −0.01]	−.08**		
Gender [a]	−0.06	0.10	[-0.26; 0.15]	−.02		
Healthiness	0.51***	0.05	[0.41; 0.61]	.44***		
Convenience	0.38***	0.06	[0.27; 0.49]	.28***		
Nutrition-Related Concerns	−0.15**	0.05	[-0.25; −0.05]	−.10**		

Notes. Corrected R^2. Method: enter.
*$p < .05$. **$p < .01$. ***$p < .001$.
[a] 0 = male, 1 = female.

clarifying existing misconceptions, further helping consumers to make healthier choices for their kids. On the other hand, most consumers in our studies—even those who seemed to have their concerns about the potential negative (health) effects of these products—reported purchasing them. Considering the very busy, if not even stressful everyday life with children, some consumers probably trade lack of quality for convenience, so health and food literacy, by themselves, may just not be enough (see, for instance, Pocock et al., 2010). These consumers might benefit more from activities aimed at fostering knowledge and necessary skills for preparing quick and easy to make snacks and meals without compromising on healthiness.

One way to identify specific needs of different consumer groups could be to use the instrument on lay beliefs about child-oriented food products we provide. The three scales Healthiness, Nutrition-Related Concerns, and Convenience we developed based on extensive, methodically rigorous work demonstrate good internal consistency, have high face validity, and meaningfully relate to relevant external criteria like purchase frequency.

Our research also offers valuable insights for policy makers in charge of regulations for child-targeted food marketing, in general, and of child-oriented food products, in specific. On the one hand, our scales can be used to assess current perceptions of child-oriented food products in the wider public, thus be informative for making predictions about public acceptance and support of political endeavors aimed at strengthening present legislations. On the other hand, our instrument can be used to track changes in these perceptions over time, thus be helpful in identifying whether (further) changes in legislations are needed.

5.3. Limitations and future directions

We will now briefly discuss a few limitations that can serve as starting points for future research. Considering that we applied a cross-sectional approach, we cannot make reliable predictions about possible long-term effects of the lay beliefs studied. For instance, longitudinal studies could investigate whether and how lay beliefs on child-oriented food products affect outcomes like overall diet quality and development of child weight or BMI. Researchers may also follow up on potential effects of socio-demographic characteristics, offering additional insights into how differences in laypeople's walks of life shape beliefs.

One other limitation of our studies is that we looked at lay beliefs in general (i.e., as separate beliefs about certain aspects) but did not investigate specific theories (i.e., sets of beliefs or belief systems). Thus, future research could apply clustering approaches to identify and characterize certain consumer segments holding different lay theories and further explore how these theories relate to behavior. Another limitation is that we relied on self-reports and did not observe actual choices or purchase behavior. Although we do not assume that participants intentionally falsified their accounts, studies have shown that (parental) reports sometimes significantly deviate from observable behavior (e.g., Gram, 2010). Future research might therefore benefit from including choice tasks and could investigate how consumers' lay beliefs relate to choices between regular and child-oriented food products. Such research could also examine which factors moderate the importance of consumers' lay beliefs during choice tasks. Relatedly, studies could explore lay beliefs in conjunction with actual purchases, offline as well as online. Also of interest would be a systematic comparison of regular consumers, like those surveyed in our studies, to health and nutrition experts, like dietitians, pediatricians, and pediatric nurses, whom we specifically excluded.

6. Conclusion

Although of high importance and topicality, the issue of child-oriented food products as seen from the perspective of average consumers has not received a lot of scholarly attention. We meaningfully contribute to and extend past research with two quantitative studies using large, diverse consumer samples. We find that regular consumers perceive child-oriented food products as moderately convenient, but not as particularly healthy, showing moderate concerns about the nutritional quality of these products. Importantly, we also find that these beliefs partly explain purchase frequency. Our research has important implications for various stakeholders, like policy makers and interested consumers, and can be of value for researchers in the field.

CRediT authorship contribution statement

Raphaela E. Bruckdorfer: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Oliver B. Büttner:** Writing – review & editing, Supervision, Funding acquisition, Conceptualization. **Gunnar Mau:** Writing – review & editing, Funding acquisition, Conceptualization.

Ethical statement

The research conducted received ethical approval from the ethics committee of the Faculty of Engineering, Department of Computer Science and Applied Cognitive Science, University of Duisburg-Essen (approval ID study 1: 1909WPBR0364; approval ID study 2: 2007WPBO2709).

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Declaration of competing interest

None to declare.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.appet.2024.107773.

APPENDIX

Table A1
Descriptive statistics for scales and corresponding items of the child-oriented food products questionnaire (CoFP-Q) for studies 1 (N = 444 parents, non-Parents) and 2 (N = 571 parents)

Item		Study 1	Study 2
		M (SD)	*M* (SD)
Nutrition-Related Concerns (NC)		5.0 (1.1)	4.9 (1.0)
NC1	Most CoFP [a] contain a lot of fat	4.7 (1.4)	4.6 (1.4)
NC2	Most CoFP contain a lot of sodium	4.4 (1.3)	4.5 (1.4)
NC3	Most CoFP contain a lot of sugar	5.6 (1.3)	5.4 (1.4)
NC4	Most CoFP are highly processed	5.3 (1.4)	5.2 (1.3)
NC5	Most CoFP contain a lot of preservatives	4.9 (1.3)	4.7 (1.4)
NC6	Most CoFP are high in calories	5.1 (1.4)	5.0 (1.4)
NC7	Most CoFP contain artificial coloring	5.1 (1.4)	4.8 (1.4)
NC8	Most CoFP contain a lot of flavor enhancers	5.1 (1.4)	4.8 (1.4)
NC9	CoFP are partly to blame for the increase in child obesity	5.1 (1.6)	5.1 (1.5)
Convenience (C)		**4.7 (1.1)**	**4.6 (1.2)**
C1	The packaging designs of CoFP convey that eating is enjoyable	5.2 (1.3)	5.1 (1.4)
C2	CoFP are convenient because they require little preparation	4.9 (1.3)	4.8 (1.4)
C3	CoFP are convenient because you can eat or drink them on the go	5.0 (1.4)	4.9 (1.4)
C4	CoFP teach children that eating is something to enjoy	4.7 (1.5)	4.5 (1.6)
C5	Because of CoFP, children also eat food they wouldn't normally eat	4.2 (1.6)	4.2 (1.7)
C6	CoFP reduce quarreling about eating, as children like eating them	4.5 (1.6)	4.2 (1.7)
Healthiness (H)		**3.4 (1.3)**	**3.4 (1.3)**
H1	Most CoFP are completely natural	2.9 (1.6)	3.1 (1.7)
H2	Most CoFP are healthy	3.3 (1.5)	3.5 (1.6)
H3	Most CoFP contain a lot of vitamins and minerals	3.8 (1.4)	4.0 (1.5)
H4	CoFP are part of a healthy diet	3.2 (1.8)	3.5 (1.9)
H5	CoFP are adapted to children's dietary needs	3.8 (1.6)	3.9 (1.6)

[a] CoFP = child-oriented food products. In the original questionnaire, this term is spelled out (abbreviation only used here due to limitations of space).

Table A2
Descriptive statistics for additional ttems (A1-20) of the child-oriented food products questionnaire (CoFP-Q) for studies 1 (N = 493 parents, non-parents) and 2 (N = 571 parents)

Item		Study 1	Study 2
		M (SD)	*M* (SD)
A1	CoFP [a] often appear to be healthier than they really are	5.6 (1.4)	5.6 (1.4)
A2	CoFP facilitate everyday life with children	4.0 (1.7)	4.1 (1.7)
A3	Children prefer the taste of CoFP over that of other, comparable food products	4.2 (1.7)	4.0 (1.7)
A4	Packaging of CoFP is very robust and can withstand a lot	4.0 (1.4)	4.1 (1.4)
A5	Among other things, CoFP can be recognized by cartoon characters or animals depicted on the packaging	5.8 (1.2)	5.9 (1.2)
A6	Packaging of CoFP is designed in a way that directly captures children's attention in the supermarket	5.9 (1.1)	5.9 (1.1)
A7	Packaging of CoFP is designed in a way that it appeals to children	6.1 (1.1)	6.1 (1.1)
A8	Packaging of CoFP is designed in a way that it also appeals to parents	4.7 (1.5)	4.7 (1.5)
A9	Packaging sizes of CoFP are adapted to children's needs	4.5 (1.5)	4.6 (1.5)
A10	Compared to other food products, CoFP have smaller packaging sizes	5.0 (1.5)	5.1 (1.4)
A11	CoFP lead to more "pestering" of children during shopping	5.0 (1.6)	4.9 (1.8)
A12	Shopping with children would be easier if CoFP did not exist	4.7 (1.6)	4.3 (1.8)
A13	CoFP are regular food products, only in other shapes or packaging	4.6 (1.6)	4.7 (1.5)
A14	CoFP and regular food products differ only in appearance	4.6 (1.6)	4.5 (1.6)
A15	CoFP are more expensive than other, comparable food products	5.7 (1.2)	5.5 (1.3)
A16	Children do not need specific CoFP	5.4 (1.8)	5.2 (1.7)
A17	Production and marketing of CoFP are sufficiently regulated by law	3.5 (1.6)	3.6 (1.7)
A18	Producers of CoFP are aware of their responsibility	3.5 (1.7)	3.6 (1.7)
A19	What you buy is your own responsibility, so we do not need special legal regulations for CoFP	3.8 (2.0)	3.7 (2.0)
A20	One reads and hears a lot of contradictory things about the topic of CoFP	4.5 (1.6)	4.7 (1.6)

[a] CoFP = child-oriented food products. In the original questionnaire, this term is spelled out (abbreviation only used here due to limitations of space).

Data availability

The data supporting the findings of the research presented here are available from the first author upon reasonable request.

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