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Life (without sweets) would be black and white: Exploring primary school children's views on eating practices and sugar consumption

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ABSTRACT

Considering the growing concern over the health consequences of excessive sugar consumption among children, it has become crucial to design effective and age-appropriate interventions. While existing research has provided relevant insights into sugar consumption from the perspective of adults (e.g., parents), the perspectives of children themselves have received relatively little empirical attention. The current study aimed at exploring how children navigate the often-conflicting individual and contextual influences that shape their eating behaviors. Following a qualitative approach, we explored primary school children's views on their motivations for consuming sugar, the situations/contexts in which sugary foods and drinks are more accessible, the perceived roles of family and school, and their attitudes toward dietary change. Six focus groups were conducted across two schools, involving 44 fourth-grade students. The resulting recordings were transcribed verbatim and subject to content analysis. The findings suggest children were able to identify sugar sources and recognize potential health consequences of their intake. However, sugar consumption remains driven by a strong sensory and hedonic attraction to sweets. The insights emerging from this discussion were further synthesized into barriers and facilitators of sugar intake according to the dimensions of capability, opportunity, and motivation of the COM-B framework. These findings indicate that intake can be facilitated (or hindered) by capability (e.g., knowledge of sugar sources), opportunity (e.g., family influences, related learning at school), and motivation (e.g., sensory appeal, affective attachment to sweets). This study informs future research and interventions on sugar consumption among children, adding valuable insights from their own perspectives.

1. Introduction

Inadequate eating habits are a significant risk factor for chronic disease vulnerability (World Health Organization, 2025). Excessive sugar intake, in particular, has received considerable attention due to its links with excessive weight and adverse health outcomes, including dental caries and type 2 diabetes (World Health Organization, 2015). These concerns are particularly relevant in the case of free sugars, which include sugars added either industrially or by the end consumer, as opposed to those naturally present in fruits, vegetables, and dairy products (Mela & Woolner, 2018). A notable issue associated with high free sugar intake is micronutrient dilution, whereby greater consumption of sugar is accompanied by a reduced intake of essential micronutrients (Gibson, 2001, 2007). To date, this effect has been documented in both children and adolescents (Fujiwara et al., 2021; Wong et al., 2019), as well as in adults (Fujiwara et al., 2020; Mok et al., 2018). According to a recent systematic review, the majority of studies report a negative relationship between added and free sugar intake and overall dietary quality, particularly with respect to key nutrients such as fiber, vitamin D, calcium, potassium, and sodium (Cara et al., 2024). Considering this evidence, it becomes essential to ensure that free sugar consumption remains within a healthy range.

The World Health Organization recommends limiting the intake of free sugars to less than 10% (ideally 5%) of total daily energy intake across all age groups (WHO, 2015). Nevertheless, adherence to these guidelines remains limited. Data show that sugar consumption frequently exceeds recommended thresholds, particularly among children and adolescents (Fisberg et al., 2018; Lara-Castor et al., 2024; Ooi et al., 2022; Rippin et al., 2019; Walton et al., 2023). Despite growing awareness of the consequences of free sugar intake, global data suggest that most countries have not yet shown significant trends toward sugar reduction (Della Corte et al., 2021). Importantly, beyond the total sugar

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intake levels, one should also look at the sources from which it derives. Evidence from a European study, for instance, revealed that children obtain a larger share of their total and added sugar intake from sweetened foods and beverages than from more nutrient-dense options such as fruits, vegetables, or dairy products (Azaïs-Braesco et al., 2017). Similarly, in the US, sweetened beverages and bakery goods are among the top sources of added sugar intake, and these sources remain similar among more and less frequent consumers (Bailey et al., 2018).

To address the challenges posed by excessive sugar consumption among young people, it is crucial to develop a comprehensive understanding of the factors that influence their dietary choices. Recognizing the pivotal role of parents' attitudes and norms in shaping children's eating habits (Bestle et al., 2025; Yee et al., 2017), much of the existing research has focused on parents as key participants in this process. In the case of sugar, research has explored dimensions such as parental practices (Mumena, 2021; Park et al., 2015; Prada, Saraiva, Godinho, et al., 2021; Van De Gaar et al., 2017; van der Horst et al., 2007), knowledge (Jústiz et al., 2020; Mori et al., 2024; Mumena, 2021; Prada et al., 2020; Tang et al., 2020), attitudes (Bogart et al., 2017; Qiu et al., 2021; Tang et al., 2020; Van De Gaar et al., 2017), consumption patterns (Bogart et al., 2017; Lundeen et al., 2018; Zahid et al., 2017; Zhang et al., 2022), among others. While adults play a crucial role in shaping children's eating habits through their behaviors, practices, and the foods they make available (Larsen et al., 2015), a full understanding of eating patterns would be incomplete without considering children's own perspectives.

One often neglected aspect is that children are active agents in their food choices (Fox & Timmer, 2020). Early in development, they may exhibit taste preferences (such as liking sweet and disliking bitter and sour sensations) that reflect biological predispositions with implications for the types of foods they seek or prefer (Ventura & Worobey, 2013). Individual differences in these sensory preferences may influence food choices (Cattaneo et al., 2019; Drewnowski, 1997), though this relationship is not linear, particularly when it comes to sweet food consumption (Lanfer et al., 2012; Mennella et al., 2014). Food neophobia is yet another example of child-driven behavior that can shape dietary choices. It reflects a tendency to reject unfamiliar sensory attributes, which can be challenging to overcome and has important implications for dietary quality (Dovey et al., 2008), such as a less varied diet, with fewer fruits and vegetables, and greater intake of nutrient-poor foods (Cooke et al., 2006; Perry et al., 2015). Similarly, children with highly restrictive food preferences – commonly referred to as fussy or picky eaters (Dovey et al., 2008; Rydell et al., 1995; Taylor et al., 2015) – consistently reject certain foods or specific sensory properties, leading to lower dietary variety (Carruth et al., 1998; del Campo et al., 2025). Additionally, picky eating has been associated with a higher intake of sweetened foods and beverages, which may compromise overall dietary quality (Li et al., 2022).

As children grow older, they tend to become increasingly autonomous and less susceptible to parental influence. While parents' choices, displayed behaviors, and feeding practices are highly influential for children, parents are also influenced and responsive to children's preferences and individual characteristics (Birch et al., 2007; Studer-Perez & Musher-Eizenman, 2023). In some food choice situations, children may even attempt to actively influence their parents' behavior to meet their own needs or desires. Grocery shopping provides an illustrative example, as children often seek to affect purchasing decisions by voicing preferences or negotiating for particular items (Haselhoff et al., 2014; Pettersson et al., 2004). This highlights a more reciprocal and participatory dynamic, grounded in mutual influence rather than simple compliance with parent-led practices. Including children's perspectives in research is therefore a natural extension of this view, as it provides valuable insight into the everyday dynamics that shape their choices, including how they navigate preferences and respond to influences from caregivers, peers, and the broader environment.

Previous research suggests that children can reliably discuss their food choices, despite the relatively limited number of studies examining their perspectives directly (Waddingham et al., 2018). One systematic review of qualitative studies further highlighted the value of qualitative research with children and adolescents, indicating that it offers complementary insights into the factors shaping food choices that quantitative approaches alone cannot fully capture (Krølner et al., 2011). Qualitative approaches have been widely used to explore the multilevel determinants of food-related behaviors, including barriers and facilitators of dietary preferences and choices (Aslanyan & Demirchyan, 2024; Gilmour et al., 2020; Waddingham et al., 2015), as well as more specific eating behaviors such as fruit and vegetable consumption (Helgegren et al., 2025; Krølner et al., 2011), fiber intake (Donin et al., 2024), and adherence to alternative protein sources (Anant et al., 2025). In the case of sugar intake, research has largely focused on sugar-sweetened beverage consumption among older children and adolescents (Battram et al., 2016; Sylvetsky et al., 2019; Wang et al., 2022), leaving the perspectives of primary school children comparatively underexplored.

1.1. Aims of the study

The current study aims to address this research gap by exploring the perspectives of primary school children on eating habits and sugar consumption. It focuses on the primary-school age as a particularly relevant period, marked by increased responsibility and control over food choices, as well as higher involvement in procuring and preparing food (Fox & Timmer, 2020). The focus on this age group is further justified by evidence that many food preferences and eating patterns are formed during childhood (Ventura & Worobey, 2013) and tend to persist into adulthood (Dubois et al., 2022). To gain a comprehensive understanding of children's first-hand experiences with food and sugar intake, we adopted a qualitative approach based on focus groups with primary school students. Specifically, we explored their motivations for consuming sugar, the situations/contexts in which sugary foods and drinks are more accessible, how they perceive the role of family and school in shaping their eating choices, and how they position themselves regarding changing their dietary patterns.

Our approach to data collection and analysis was guided by the COM-B framework, which posits that human behavior depends on three domains: capability, opportunity, and motivation (Michie et al., 2011, 2014; West & Michie, 2020). According to this framework, capability refers to the psychological (knowledge, behavioral regulation) and physical (skills, dexterity) factors needed for a behavior; opportunity includes social (influences, norms) and physical (resources, availability) factors that support it; and motivation involves reflective (goals, beliefs) and automatic (emotions, reinforcement) processes that drive the behavior. By adopting such a comprehensive framework, we ensured that personal and environmental factors were considered when attempting to understand and ultimately modulate a complex behavioral outcome such as sugar intake reduction.

2. Method

2.1. Participants

The sample included 44 fourth-grade students (24 girls, 20 boys) aged 9-13 years ($M = 9.57$, $SD = 0.79$). Participants were recruited from two public schools in the Sintra district, Portugal. At the end of the focus group, participants received a sticker as a reward for their participation. Moreover, the schools received gift cards for purchasing materials related to sports and physical activity. The amount awarded to each school was 2.5 € per participant. There was no drop-out in this study.

2.2. Instruments

The focus groups followed a semi-structured script and were organized into three main segments: ice-breaking, eating habits, and sugar

consumption. Before the discussion began, one researcher welcomed the participants and explained the purpose and structure of the session. The ice-breaking phase involved introducing the two researchers involved in the focus groups. To facilitate rapport, the researchers introduced themselves by sharing their names, occupations, and favorite foods. The children were then asked to present themselves by sharing their first names, ages, and favorite foods. Children's stated preferences provided a natural segue into the second part of the discussion, which began with questions about the reasons behind their food choices. Subsequent questions explored their views on healthy eating, their preferred sources of information, and their involvement in food-related decisions (see Table 1). The final and central part of the discussion focused on sugar consumption, including preferences for sugary foods, the social contexts in which these foods are encountered, perspectives on sugar consumption, and efforts to reduce sugar among children. The focus group script included questions tapping aspects of capability (e.g., knowledge about sugar sources), opportunity (e.g., social influences and contexts for sugar consumption), and motivation (e.g., factors associated with liking sweets). Although the script was extensively refined through multiple rounds of discussion among the research team, no pilot testing was conducted. All questions and follow-up prompts used in the sessions are detailed in Table 1.

2.3. Procedures

This study was approved by the Ethics Committee of CIS-Iscte (approval 24/010). The research is part of a broader project about sugar consumption in school-aged children. The project was presented to a municipality belonging to the Lisbon district, which subsequently designated two schools to participate. Within each school, coordinators selected potential participants from different classrooms to maximize the heterogeneity of the sample (purposive sampling). Students formed up to three groups per school, each consisting of no more than eight children (final group sizes ranged from five to eight participants).

Written informed consent was obtained from the legal guardians before data collection. The caregivers were informed of the study's goals and procedures, specifically the audio recording of the focus groups. Data collection was conducted in classroom settings within the school context. The sessions were facilitated by two researchers, with one moderating the discussion and the other assisting with note-taking. The second researcher also contributed when appropriate by providing additional prompts or seeking clarification as needed. Leading the discussion was the first author (D. Guedes, PhD, male), a researcher trained in psychology with experience with qualitative data collection. The researchers introduced themselves at the beginning of each session and disclosed the goals of the discussion: exploring children's perspectives on their eating habits and sugar intake. The sessions took between 45 and 60 min. Only the participants and researchers were present during the focus groups.

The focus groups were audio-recorded. Before starting the recording, participants were informed that the researcher would ask them questions about their opinions on eating. It was explained that the discussion would be recorded to ensure no important information was missed. Participants were then asked for their assent before the recording began. No repeat focus groups were conducted, and no additional sessions were held after the research team determined that data saturation had been achieved.

2.4. Analytic strategy

All interviews were transcribed verbatim and analyzed using qualitative content analysis in MAXQDA 24 using a bottom-up approach. The coding process was data-driven, aiming to identify response patterns across the dataset. A preliminary coding tree was developed and iteratively refined through discussion among the research team. One author led the subsequent analysis, applying the set of codes to the raw data. Subsequently, the remaining authors critically reviewed all of the codes and supporting quotations. Any improvements to this coding scheme, namely, the subordinate codes, were discussed among the research team. Given the sample characteristics, the transcripts were not returned to participants for comment or correction, and no feedback was requested on the findings.

The final coding scheme is presented in Supplementary Table 1 (*General Perspectives on Food and Healthy Eating*) and 2 (*Children's Perspectives on Sugar Consumption*). Frequencies of codes are reported to indicate how commonly different themes were mentioned in this dataset, not to reflect their relative importance or generalizability.

To provide a practical overview of potential barriers and facilitators to sugar reduction, we identified all themes discussed as potentially related to difficulties in managing consumption or otherwise as factors that promote lower intake levels. These factors were subsequently categorized into the core domains of capability, opportunity, and motivation, based on the COM-B framework (Michie et al., 2011, 2014; West & Michie, 2020).

3. Results

3.1. Perspectives on food and healthy eating

Supplementary Table 1 presents the absolute frequency of mentions for each category regarding students' general perspectives on food and healthy eating. A brief overview of the coding categories is also

Table 1
Overview of the focus group script.

Block 1. Eating habits
1. Thinking about the foods you just mentioned [i.e., favorite foods], what do you think makes you like some foods and not others?
2. Now let's talk about healthy eating. In your opinion, which foods are good for your health?
3. And which foods are bad for your health?
4. Where do you learn about which foods you should or shouldn't eat?
5. Who usually decides what you eat? [For example, at lunch and dinner? And for snacks?]
6. When you go to the supermarket with adults, do you usually share your opinion about the foods they buy?
Block 2. Sugar
1. Some of you mentioned sweet foods.
1a. In your opinion, what kinds of foods have a lot of sugar?
1 b. And which foods have little sugar?
2. You mentioned different sweet foods. Generally, do you like sweet foods? What do you think makes you like or dislike sweets?
3. In what situations do you usually eat sweets?
4. In your opinion, can children your age eat these foods with a lot of sugar?
5. At home, what do people usually say to you about sugar?
6. At school, what do people usually say to you about sugar?
7. If you had to eat fewer sugary foods, would it be easy or difficult for you? Why?
8. If you had to help a friend eat fewer sugary foods, what ideas would you suggest?

presented in Fig. 1.

According to these results, sensory aspects appear pivotal for **food likes**. There were several mentions ($n = 8$) of aspects related to food preparation (e.g., "if it's something to be cooked, if it's well cooked it's very good. But I prefer my steak rare" – girl, 10) and seasoning ("they have a bucket of chicken there that's really good and also has spicy sauce. Really good … 'Caliente'" – boy, 9). Taste was the most commonly cited sensory attribute driving liking ($n = 8$; e.g., "the sushi that I like is because of the taste" – boy, 10). There were also mentions of visual aspects ($n = 4$), including color ($n = 2$) and shape ($n = 2$), as well as textural aspects ($n = 6$), such as crunchiness ($n = 2$) and softness ($n = 1$). Some participants also alluded to foods from specific brands ($n = 4$), specifically, fast-food chains (e.g., "I like hamburgers because the meat is really good and it's from McDonald's" – girl, 9).

Similarly, children elaborated on their **food dislikes,** also largely in sensory terms. Again, taste was the most commonly cited aspect (e.g., "the fish … it has a strange taste, and I don't really like the taste of fish" – girl, 10), appearing in 22 comments. There were also mentions of texture ($n = 8$; e.g., "mushrooms seem like they are more or less hard, but they're not hard"), and preparation/seasoning ($n = 3$; e.g., "what they put at school … they don't put anything at all, not even vinegar. Not even olive oil" – girl, 9).

When asked to identify **healthy foods**, participants most frequently mentioned vegetables ($n = 20$), followed by fruits ($n = 8$), and cereals ($n = 5$; e.g., bread). In contrast, **unhealthy foods** were commonly associated with sugary items ($n = 28$). More specifically, these included references to cakes, biscuits, and desserts ($n = 9$), candies and chocolate ($n = 8$), and sugary drinks ($n = 8$). Other health concerns included fat ($n = 6$; e.g., "foods with a lot of oil" – boy, 9), salt ($n = 5$), and fast foods ($n = 5$; e.g., hamburgers).

Learning about food healthiness appeared to occur mainly at school and at home. The school context was mentioned several times ($n = 12$), with some participants highlighting the role of teachers ($n = 5$). Parents were also frequently cited as sources of influence ($n = 13$), either by educating children about the benefits of certain foods ($n = 4$; e.g., "my dad said if I eat potatoes I will get muscles" – boy, 9) or by modeling healthy behaviors ($n = 1$; e.g., "Because my mom makes a lot of recipes (…) she makes healthy things" – girl, 10). Parents were also commonly identified as decision-makers regarding children's **food choices** ($n = 13$). However, a larger number of children reported being responsible for their own food choices ($n = 20$), though some of these cases involved selecting from parent-provided options or responding to parents' requests for suggestions ($n = 6$).

3.2. Sugar consumption: from knowledge to practice

Supplementary Table 2 presents the absolute frequency of mentions for each category, and a synthesis of codes is presented in Fig. 2. According to these data, products such as candies ($n = 19$), cakes and biscuits ($n = 12$), chocolates ($n = 11$), soft drinks ($n = 10$), sweet snacks ($n = 4$), and desserts ($n = 3$) were identified as **foods with sugar**. When asked to identify **low sugar foods**, the most common responses were fruits ($n = 8$) and vegetables ($n = 5$), followed by savory snacks ($n = 2$) and water ($n = 2$).

The discussion surrounding motives for **liking sweets** prompted mentions of several enablers, with the most common being related to sensory aspects ($n = 21$), such as taste ($n = 14$), texture ($n = 3$), and visual aspect ($n = 3$). The centrality of taste is reflected in some of the justifications provided by children, such as enjoying sweets merely because they are sweet (e.g., "Because things are sweet. It's because children really like sweet things. It's children's taste" – girl, not identified).

Participants also mentioned specific **situational/contextual** enablers, such as attending parties or watching a movie ($n = 3$) or receiving sweets as rewards ($n = 3$). Their natural desire for sweets ($n = 3$) was also mentioned, as one participant put it, "a child's love is sweets" (girl, 9). In this context, some participants also mentioned health-related barriers, such as excessive sugar content and its potential health consequences ($n = 5$), as well as taste barriers ($n = 5$). While some of these barriers referred to excessive sweetness (e.g., "some make me feel a bit queasy because they have too much sugar" – girl, 9), others referred to other taste aspects found in sweet food items, such as chocolate (e.g., "I only dislike one type of chocolate because it's bitter" – boy, 9).

Different situations, contexts, or social agents facilitate access to sweets. Regarding the situations, the most frequent mentions were, by far, special occasions such as birthdays, Christmas, and Easter ($n = 26$). For instance, one participant stated, "I don't eat a lot of chocolate because I already started having acne (…), but when I go to a party I don't care, I'm going to eat it" (girl, 10 years old).

The **people** who usually provide them with sweets are more frequently parents ($n = 11$; "my mother hides sweets all over the house (…) Of course I find them" – boy, 9), though other family members were also mentioned ($n = 10$), especially grandparents ("If your grandmothers don't ever give you sweets … they're not really your grandmothers. Grandmothers always give sweets" – girl, 9). In some cases, participants reported being able to access sweets independently ($n = 6$; e.g., "sometimes when I have money, I go buy them by myself" – girl, 10).

The **places** where sweets are available to children were most frequently cafés, restaurants, and alike ($n = 14$; "I only eat [sweets] when my father is on vacation. He takes us to a restaurant to eat" – girl, 13). Other less frequent mentions included the domestic environment ($n = 6$), establishments near the school ($n = 4$), or the supermarket ($n = 3$). In one of the schools, there were frequent mentions throughout the focus group of a shop located in front of the school, where many students went to buy foods that were not available on school premises. When asked to describe this place, which children refer to by the owner's first name, one participant described it as a "café that has more sweets than food" (girl, 9).

When exploring the topic of **childhood sugar intake**, specifically if children should be given access to sweets, the majority of children commented on the potential health consequences of excessive sugar intake ($n = 9$; e.g., "because if we have too much sugar in our blood, we can develop some diseases" – girl, 10), and there were also references to

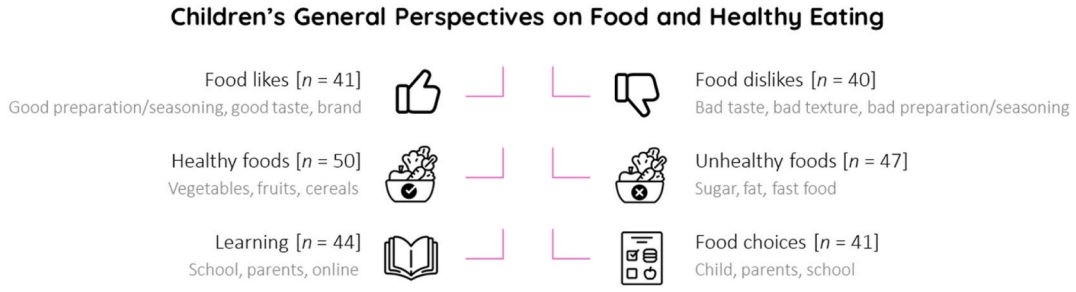


Fig. 1. Synthesis of codes used in the analysis of general perspectives on food and healthy eating.

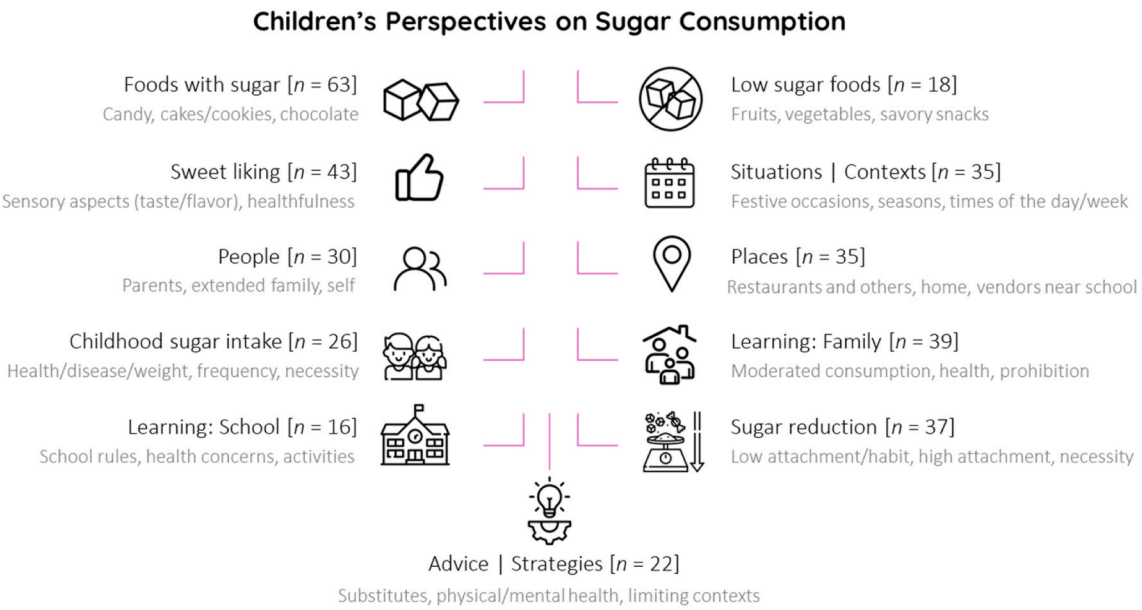


Fig. 2. Synthesis of codes used in the analysis of Children's perspectives on sugar consumption.

the need of having moderate consumption ($n = 5$; "we also need to vary things. If it's not in excess" – girl, 10). Some participants also mentioned that sugar was necessary for normal body functioning ($n = 4$; e.g., "to live … to breathe" – girl, 10). On a similar vein, one participant expressed her ambivalence regarding the health consequences of sugar intake: "In my opinion, no, but also yes, because we need to have some sugar in our blood, but not too much" (girl, 9). At another point of the discussion, one participant mentioned a similar ambivalence: "A lot of sugar is bad. A little is not so bad. But we need it … Then we get confused" (girl, 10).

Health aspects were central to the participants' learning about sugar, both at the **family** and the **school** contexts. In the **family** context, most participants specifically mentioned moderate consumption patterns ($n = 15$), in which sugar is not banned; rather, its consumption is encouraged within certain limits. One participant explained that "the only rule at home is that you can eat all the fruit and things that don't have too much sugar. (…) And the things with more sugar are just once in a while." (girl, 9). Moderation is naturally intertwined with health, as mentioned by one participant recalling one time when she helped mom bake a cake: "I poured an excessive amount of sugar, and mom said to be alert because we cannot add too much sugar to the cake because that's bad for you" (girl, 10). Health consequences were mentioned by several participants ($n = 12$). For example, some reported learning about diseases (e.g., diabetes) and other possible negative outcomes of excessive sugar intake from family members (e.g., "my grandfather lost a leg due to diabetes" - boy, 9; "don't eat sugar because it can kill you" - boy, 9).

At **school**, some participants recall specific activities related to the topic ($n = 4$). For instance, one participant mentions one activity where students discovered "how much sugar is in each type [of soda]" (boy, 9). Other participants mentioned school norms related with sugar ($n = 4$; "In 'junk food' day we can bring whatever sweets we like. Otherwise, we have to bring healthy foods" – girl, 10). Health concerns are also common topics surrounding sugar consumption ($n = 4$; e.g., "The teacher usually says that too much sugar is never good for you" – girl, 9).

When asked about the difficulties of **sugar reduction**, there was an almost even split between students who found it easy ($n = 14$) and those who found it challenging ($n = 13$). Among those who expressed lower attachment to sweets, there were mentions of hedonic reasons (e.g., "it's easy because I don't like sweets that much" – boy, 9) or habits and routines (e.g., "no, because now I'm less used to eating sweets" – girl, 9). In contrast, those less receptive to reducing sugar consumption showed signs of strong affective attachment. For instance, one participant described the rewarding aspect of sugar consumption by saying, "Life (without sweets) would be black and white" (boy, 9). Another participant referred to the entrenched habit of sweet consumption: "For me, it would be really hard. I can't go even a second without eating something sweet" (boy, 9). In one case, sugar intake was described as something not susceptible to change: "for me to stop eating sweets … I think I'd have to be born again" (girl, 10). The same participant later expressed the idea that it was too late to change: "I'm already 10 years old, that's enough already. I just can't live without sweets anymore." Others mentioned the bodily needs leading to the difficulties in reducing intake ($n = 4$; e.g., "because sometimes the arteries and the blood also need sugar (…) and if we don't have it, the blood will start showing signs that something's wrong" – girl, 10). Low availability at home was also seen as a facilitator for reducing sugar intake ($n = 4$; e.g., "to me it wouldn't be hard because in my house there are no sweets" – girl, not identified).

When asked to propose **advice/strategies** to mitigate excessive sugar consumption, various strategies were proposed. The most common pathways involved substitution ($n = 6$; e.g., "giving more fruit than candies" – boy, 9), and alluding to the health aspects associated with consumption ($n = 4$), both physical (e.g., "I'd tell him the worst things that could happen if he continued eating sweets (…) [such as] loosing teeth, getting diabetes, stomachache, diarrhea" – girl, 10) or psychological ("Because the brain controls our whole body. So, if they help us with our mental health, they will help us control ourselves" – girl, 10).

Based on insights from the focus groups, we present a summary of the main barriers and facilitators to reducing sugar intake in Table 2. The table includes themes linked to sugar intake, mentioned by at least two participants, and that may support or hinder efforts to reduce sugar intake.

4. Discussion

Reducing sugar intake among children remains a key public health priority, given the associations between excessive sugar consumption and various health outcomes (World Health Organization, 2015). This qualitative study aimed to map children's perceptions of sugar consumption, identify possible barriers and facilitators to reducing sugar intake, and gather insights informed by their own perspectives. This contributes to the existing literature on the topic, which encompasses the perspectives of other stakeholders, such as parents (e.g., Prada,

Table 2
Summary of barriers and facilitators of sugar intake reduction.

	Capacity	Opportunity	Motivation
Facilitators	• Knowledge of common sugar sources • Knowledge of healthy foods • Awareness of moderate consumption • Knowledge of sugar-related health problems • Awareness of high-sugar foods as unhealthy	• Family moderation practices • Family health awareness • School health orientation	• Health motivations • Unpleasant taste (e.g., too sweet) • Low attachment/ habits
Barriers	• Lack of knowledge of less common sugar sources • Perception of sugar consumption as a bodily need	• Celebrations/ festive occasions • Weekends/ vacations • Access to money • Parental provision • Family provision • Going to restaurants, cafés, and pastry shops • Having sweets at home • Vendors outside the school • Resistance to parental restrictions	• Enjoyment of the taste of sweet foods • Rejection of bitter/sour tastes • Enjoyment of the texture of sugary foods • Visual aspect of sugary foods • Desire for sweets • Sweets given as rewards • High attachment/ affective involvement

Saraiva, Godinho, et al., 2021) and teachers (e.g., Brazão et al., 2026).

According to our findings, children appeared to recognize sugar as a significant health concern. For example, when asked to identify unhealthy foods, most of the mentioned items could be categorized as high-sugar sources (e.g., cakes, chocolates), and participants were generally able to identify health consequences of excessive consumption, indicating a general understanding that sugar is potentially harmful. This aligns with previous studies showing that school-aged children can acknowledge the negative consequences of sugar consumption (e.g., Battram et al., 2016). However, for children to achieve adequate consumption levels, it is essential that they correctly recognize the sources of sugar in their diet. Although participants in our sample readily identified the most obvious sources, such as candy, chocolate, and soft drinks, they overlooked other relevant sources. This gap is particularly important in light of research indicating that a substantial proportion of children's free sugar intake comes from less recognized sources, including fruit juices and dairy products (Graffe et al., 2020; Sosa et al., 2024). The widespread presence of "hidden sugars" may also shape this consumption pattern, namely the added sugars in many processed foods that are not easily identified by consumers, particularly in products marketed to children (Boulton et al., 2016). Breakfast cereals, for example, often contain sugar levels that exceed dietary recommendations. According to a study analyzing breakfast cereals on the Portuguese marketplace, sugar was among the top three ingredients in more than 85% of products in this category (Prada, Saraiva, Viegas, et al., 2021). The fact that most participants in our study overlooked less common sugar sources may indicate that, while children may be aware of common sources of sugar, their capacity to regulate intake may be challenged by a food environment in which added sugars are frequently present in less obvious forms.

Another challenge in this regard relates to how the role of sugar in health is communicated to children. While some participants referred to diseases associated with excessive sugar consumption, others simultaneously expressed the belief that the body needs sugar. This duality may reflect inconsistent messaging in their environments about what constitutes healthy eating, highlighting the need to improve health-related communication, including at home and in schools. This may require a more nuanced understanding of diet, where sugar is not entirely bad, but rather something that can exist in the context of a balanced diet, while also emphasizing the importance of its source. Although many participants reported receiving guidance from parents to consume sugar in moderation, others described more extreme messages (e.g., "sugar can kill you"), echoing previous research in which parents framed sugar as "evil" or "poison" (Prada, Saraiva, Godinho, et al., 2021). While such approaches may be well-intended attempts to discourage overconsumption, evidence suggests that finding a moderate path between the extremes (total restriction versus absence of rules) may be more successful in promoting healthy eating habits (Gibson et al., 2012; Hübner & Bartelmeβ, 2024).

Since many children in this age range are gaining autonomy in their decision-making related to food, understanding their own attitudes is of major importance. According to our findings, there appear to be two opposing stances regarding sugar intake. For some participants, limiting sugar intake was perceived as easy, generally due to low availability of sugary foods at home or a general lack of habit. This finding is consistent with previous research that highlights the role of the home environment and children's dietary habits (Bassul et al., 2020; Santiago-Torres et al., 2014). In contrast, other participants described a strong affective bond with sugary foods, associating them with positive affective states and their consumption as an integral part of childhood. The strong attachment to sugary foods has previously been described in the literature as resulting from the interplay between innate taste preferences and a lack of exposure to healthy foods during early childhood (Mennella et al., 2016). Addressing these factors to support healthier consumption patterns will likely require attention to the broader environmental influences that shape children's dietary behaviors. Although many children acknowledged that sugar may harm their health, they still expressed a strong desire for sweets, largely due to their sensory appeal, particularly the taste. The tension between long-term health goals and the pursuit of immediate gratification can be particularly challenging for anyone, but especially during childhood. At this developmental stage, the incomplete maturation of executive cognitive functions may limit children's ability to inhibit impulses and delay gratification, making it harder to suppress motivations to consume highly palatable foods (Riggs et al., 2010). It is worth noting how some participants, despite their young age, viewed sugar consumption as a deeply ingrained habit that is difficult to change. Although this topic warrants further research, it suggests that efforts to promote dietary changes may need to begin earlier in development.

The present study identified several barriers and facilitators of children's sugar consumption operating across multiple levels of influence, from individual to contextual factors. Interpreting these behavioral determinants through the COM-B domains of capability, opportunity, and motivation provides a more comprehensive understanding of children's sugar consumption while informing intervention design. The findings suggest that reducing excessive sugar consumption requires addressing individual-level factors, including knowledge about sugar and its sources, attitudes toward sugar, awareness of its health consequences (capability), as well as health and hedonic motivations and taste preferences (motivation). At the same time, participants described numerous contextual influences that facilitate sugar consumption, particularly family and school practices, as well as the widespread availability and accessibility of sugary foods (opportunity).

These findings suggest that reducing excessive sugar intake requires coordinated action, targeting not only individual determinants but also the environments in which food choices are made. Although many of the influences identified in this study relate to more immediate contexts, such as the family and school environments, they are also embedded within broader societal and cultural norms (De Cosmi et al., 2017). For example, children's association of sugary foods with celebrations and

childhood experiences reflects the symbolic role that sweet foods often play in social life (Mason, 2018). This social role of sugary foods is captured by the concept of socialized treats: sugar-rich foods consumed on birthdays, at festive occasions, and at other social gatherings (Christensen et al., 2022).

These broader influences are sustained, in part, by social norms regarding which foods are considered appropriate, desirable, or healthy (Bélanger-Gravel et al., 2022; Drolet-Labelle et al., 2025). Consequently, interventions aimed at reducing children's sugar intake should extend beyond individual behavior change to include strategies that reshape food environments and social norms. Public policies can play an important role in this process. In the Portuguese context, several policies are currently in place that limit, for instance, the availability of sugary foods at schools or the presence of food-related advertisements in school surroundings. However, although promising, these measures have been challenged by compliance issues, which may limit their efficacy (Gregório et al., 2024; Gregório & Lima, 2023). Moreover, as mentioned in the focus group, the school's offerings are frequently in competition with vendors outside the school premises that sell foods forbidden by school regulations (see also Melo et al., 2013).

In sum, this study highlights the complexity of children's perceptions regarding sugar consumption. While awareness of health risks exists, it is often accompanied by gaps in understanding and emotional attachments that complicate efforts to change behavior. These findings illustrate a "sugar dilemma," in which concerns about health coexist with the pleasure and symbolic value associated with sugary foods (Moura & Aschemann-Witzel, 2021). Public health interventions should aim to support children in developing a balanced and accurate understanding of sugar (e.g., Guedes & Prada, 2025), while also addressing the affective and environmental factors that shape their eating behaviors.

4.1. Limitations

This study provides important qualitative insights into how children perceive and make sense of sugar consumption. However, some limitations should be acknowledged. First, the qualitative nature of the research, while valuable for exploring children's views in depth, also limits the generalizability of the findings. The results provide a broad understanding of potential patterns and meanings; however, the interpretation of the findings, particularly the frequency data, requires caution. Future research would benefit from incorporating quantitative approaches to assess the prevalence of the identified perceptions and behaviors across larger, more diverse samples.

Second, the sample was limited to a relatively small group of children from two schools within a single school district. While this allowed for a focused, contextually grounded exploration, the findings may reflect local school cultures, teaching practices, or community norms that do not necessarily represent the experiences of children in other regions or educational settings.

Finally, to facilitate a more concise and feasible discussion, we focused our attention on "sweets", a broad and heterogeneous term that encompasses a variety of sugary foods and drinks. Although efforts were made to clarify that we were referring to high-sugar products (excluding naturally sweet items like fruit), this category still includes a wide range of products, with varying hedonic values. Future studies could benefit from distinguishing more clearly between specific subtypes of sugary products (e.g., chocolates, cakes, biscuits, and candy) to better understand how children perceive and relate to them.

5. Conclusions

The present study offers insights into the perspectives of primary school children on healthy eating and sugar consumption. By focusing directly on children's views, it complements existing research that has been predominantly based on the perspectives of adults, such as parents and teachers. These findings contribute to a more comprehensive understanding of how children perceive sugar intake, its barriers, and facilitators. As such, they can help inform future research and interventions, making them more responsive to children's knowledge, attitudes, and everyday experiences.

CRediT authorship contribution statement

David Guedes: Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Magda Saraiva:** Writing – review & editing, Methodology, Conceptualization, Formal analysis. **Margarida V. Garrido:** Writing – review & editing, Methodology, Conceptualization, Formal analysis. **Marília Prada:** Writing – review & editing, Methodology, Conceptualization, Formal analysis.

Ethics declaration

Written informed consent to take part in the study and to publish the article has been obtained from all participants or their legal representatives. The privacy rights of participants have been observed.

This study was performed in compliance with relevant laws, regulatory frameworks and guidelines where the research took place. This study was approved by the Ethics Committee of CIS-Iscte. (Approval No. Approval 24/010)

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Declaration of competing interest

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

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.appet.2026.108786.

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