Received: 12 December 2019 | Revised: 22 August 2020 | Accepted: 26 August 2020

DOI: 10.1111/ijcs.12616

ORIGINAL ARTICLE

International Journal of Consumer Studies WILEY

'Would you like to eat an insect?'—Children's perceptions of and thoughts about eating insects

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Funding information
Stiftelsen för Kunskaps- och Kompetensutveckling, Grant/Award Number: 20170141

Abstract

Interest in eating insects has increased in Western countries; however, substantial challenges exist regarding acceptability and cultural ideas. Researchers have widely studied the acceptance of eating insects, but few studies have focused on children's thoughts. The aim of this study is to explore young children's perceptions about eating insects and how this insight might help understanding of ways to increase the willingness to eat insects. Three focus group interviews were conducted with children aged 4–5 years in a public preschool in Sweden. Each focus group consisted of four to five children; in total 13 (eight girls and five boys) participated. In exploring their perceptions of eating insects, the children were balancing between fantasy and reality, and between curiosity and fear, showing many, sometimes contradictory, emotions and relationships to insects as food. The children expressed a clear normative picture of what was considered food, illustrated by ideas about insects being something that are not allowed to eat. They were also concerned about whether the insect was dead before being eaten. Using children's fantasy and curiosity for new things, experimenting with insect-based products and ingredients in well-known dishes and contexts, and discussing different ways of eating them, acceptance of eating insects might increase.

KEYWORDS

acceptance, entomophagy, familiarity, focus groups, neophobia

1 | INTRODUCTION

In many parts of the world, eating insects and by doing so practicing entomophagy, has been part of human dietary habits for thousands of years. In several African countries, in South and East Asia, and in South and Central America, more than 2000 edible insect species are consumed by humans as food (Van Huis et al., 2013). However, in most Western societies, eating insects has been seen as repulsive (Looy & Wood, 2006; Ruby, Rozin, & Chan, 2015), where insects are more often categorized as 'non-food' (Fallon & Rosin, 1983; Ramos-Elorduy, 1997). Despite this, the interest in exploring insects as food has increased during recent years, not least as a result of the ongoing discussions about how to tackle global challenges related to sustainable food and meat consumption (Hartmann & Siegrist, 2017; Van Huis et al., 2013). However, there are several challenges or barriers to introducing insects as a human food item to take into consideration (Hjerris, Gamborg, & Röcklinsberg, 2016; Van Huis, Dicke, & Van Loon, 2015). The legislation in relation to novel foods

(EU 2015/2283), which includes insects, has made national interpretations possible regarding what is considered and is not considered to be food. In European countries like Denmark and Finland, but also Holland and in the United Kingdom it is legal to commercially produce and sell insects as human food. In other countries like Sweden, Ireland, Iceland and Italy, it is still forbidden to sell insects as food. Moreover, there are substantial challenges to be considered in relation to consuming insects based on acceptability and cultural ideas of food (Last, 2014; Looy, Dunkel, & Wood, 2014; Pitt & Shockley, 2014) both in countries where it is legal and where it is still illegal, which is also a strong argument for exploring the perceptions of insects as food among young children.

The socialization of what is food and not food, and what food is considered 'good' or 'bad', 'healthy' or 'unhealthy', starts early during childhood (e.g., see, Lafraire, Rioux, Giboreau, & Picard, 2016). This can be expressed verbally and visually by parents in injunctions such as 'do not put that in your mouth' or 'do not eat that insect' when the young child curiously looks at a little bug or a worm crawling in the grass. However, children and especially young children, are often curious and keen to explore the world and test new things by putting them in their mouths. In general, children are more amenable when it comes to changing food habits (WHO, 2005). For example, Mitsuhashi (2010) found in his study that infants showed a willingness to eat bugs. Moreover many children show resistance to or even fear of, trying new and unknown foods (Pliner & Salvy, 2006). This exemplifies the tension between neophilia and neophobia, which in many aspects characterizes children's relationships to food and eating but is also part of understanding the dilemma of being *an omnivore* (Fischler, 1980). These aspects are important to acknowledge regarding our relationship to insects as food. This will also help our understanding of how these aspects might be managed in a social and cultural context to increase acceptance and how and why insects can be part of a future food and meal culture. A great deal of research has studied the acceptance of eating insects from various perspectives (Fischer & Steenbekkers, 2018; Hartmann, Shi, Giusto, & Siegrist, 2015; Megido et al., 2016; Orsi, Voege, & Stranieri, 2019; Tan et al., 2015), however, only a few studies have focused on or even included, children's thoughts (see, e.g., Geertsen, 2019). The aim of this paper is to explore young children's perceptions of eating insects and how this insight might increase the understanding of ways to increase the willingness to eat insects.

2 | EATING INSECTS—BEING IN THE INTERSECTION BETWEEN FOOD AND NON-FOOD

Food is, to a large extent, socially and culturally defined. What is considered food and not food varies between as well as within cultures and has changed during various periods in history. Many studies that take their point of departure from a European and/or North American context have shown that insects are often seen as 'non-food' and that eating insects is associated with feelings of disgust and aversion, and they are, therefore, regarded as something that is inappropriate to eat (La Barbera, Verneau, Amato, & Grunert, 2018; Nonaka, 2009; Tan, Fischer, Van Trijp, & Stieger, 2016). In relation to this, insects have been described as pests and something that should be eradicated (Gjerris, Gamborg, & Röcklinsberg, 2016). Food sociologist Mary Douglas (1966/2002) has earlier reflected on these cultural dimensions of food, which have been further explored in her well-known concepts of *purity* and *danger*. Purity, on the one hand, is defined as what is culturally expected and in accordance with current societal norms, whereas danger, on the other hand, symbolizes what might be polluting and harmful, threatening the norms and values in a society (and should, therefore, be avoided). Our ideas about what is pure and what is considered polluting or dangerous are based on a complex food symbolic system and the difference between them might often be marginal. Insects are not just placed at the intersection between food and non-food, but are also balancing between being symbols of danger and pollution in terms of not being in accordance with societal ideas of what is considered food and purity, which is being an accepted and representative part of the food culture.

However and importantly, there are cultural barriers behind the negative attitudes towards eating insects that have to be acknowledged, which are relevant in the attempt to find strategies to overcome these (Looy et al., 2014). In order to increase the acceptance of eating insects, the importance of exposure, availability and familiarity are recurring (Hartmann et al., 2015; Looy et al., 2014). For example, serving insects as part of an already familiar dish has been shown to increase acceptance, but also the insect not being served as a whole insect (Van Huis, Van Gurp, & Dicke, 2014). Education and increased knowledge of the actual possibilities for eating insects and why they can be eaten, as well as how they can be cooked, are some of the strategies mentioned to help increase acceptance (Barsics et al., 2017; Lensvelt & Steenbekkers, 2014; Looy et al., 2014). In relation to Douglas' concept of danger, increased knowledge might also be seen as a driving force to change societal norms and conventions (Douglas 1966/2002). However, ultimately the willingness to actually eat insects has been shown to be a strong determinant for acceptance (Verbeke, 2015).

3 | CHILDREN AS OMNIVORES—MANAGING NEOPHOBIA AND NEOPHILIA

It is well known that humans, like many other species, are omnivores, in the sense that we *can* eat a lot of things, but also that we *must* have a varied diet. However, as omnivores, we do *not* eat all the things we could eat, but instead are often quite restrictive in what is considered to be edible or not. Culture is important for guiding food choice and food intake, even though culture should not be understood as static since this change over time and between groups (Pliner & Salvy, 2006). However, being an omnivore has not only been an evolutionary advantage, it has also been connected with severe risks. As defined by the concept of *the omnivore's paradox*

(Fischler, 1980) and more recently discussed in terms of *the omnivore's dilemma* (Pollan, 2006), the need to eat different foods also implies the potential risk of choosing something harmful and dangerous. This, according to Fischler, tends to create anxiety in our relationship to food and eating.

As omnivores, we are predisposed to learning to eat new and initially unknown food, which also implies a constant need to manage the relationship between neophobia, which is the fear and insecurity of eating unfamiliar food and neophilia, defined as the curiosity and joy in trying and eating new foods. In several studies, neophobia has been shown to be an important factor in the negative attitudes towards insects as food (Verbeke, 2015). Young children are often restrictive in trying new food, but also curious and interested in investigating the unknown. Already as 2–3 year olds, children often start to categorize food and eating and at around 3 years of age, an ability to start defining food as healthy and helping you to grow is often seen (Anliker, Laus, Samonds, & Beal, 1990; Lafraire, Rioux, Roque, Giboreau, & Picard, 2016; Tatlow-Golden, Hennessy, Dean, & Hollywood, 2013). Moreover, children learn about food and establish attitudes towards food and eating within the social contexts they are part of (Atik & Ozdamar Ertekin, 2013). Both preschool and school are important socialization arenas for learning about food, but also for trying other foods, unknown flavours and establishing new preferences (Van Cauwenberghe et al., 2010; Wiseman & Harris, 2015). Previous studies have shown that, by watching other people eat certain food in a familiar context, neophobia can be managed and the willingness to try new foods increased (Pliner & Stallberg-White, 2000). The knowledge on how young children think about eating insects makes a valuable contribution to the existing knowledge and may increase our understanding on how children reason about new and unknown food and how they navigate between neophobia and neophilia.

4 | MATERIALS AND METHODS

This study was part of a larger project titled 'Insects—a Culinary and Sustainable Delicacy', aimed at increasing the knowledge and acceptance of insects as food. In the present study, three focus group interviews were conducted with children aged 4–5 years in a public preschool in Sweden. Focus groups as a method is often used when the aim is to explore attitudes, ideas and thoughts among consumers and different populations segments (see, e.g., Atik & Ozdamar Ertekin, 2013). Previous studies have also used focus groups in investigating consumer perceptions and acceptance of eating insects (Gallen, Pantin-Sohir, & Peyrat-Guillard, 2019; Stull et al., 2018; Tan et al., 2015). The preschool in the study included children from 1–5 years of age and was divided into one section with children who were 1–2 years old and one with children 3–5 years old. The focus groups were conducted at the section with older children (3–5 years). The focus groups consisted of four to five children in each group and in total 13 children (eight girls and five boys) participated. Four of the children came from other ethnic backgrounds and a few of these had difficulties expressing themselves verbally in Swedish. Each focus group lasted for approximately 30 min. One pedagogue from the preschool participated passively during the focus groups.

During the focus groups the children were asked questions about their views, ideas and thoughts about insects as food. Initially the children were asked if they considered insects possible to eat, what they thought about eating them and if anyone had tasted an insect. They were also asked if they could name any insects. After these more general questions a large piece of paper was presented with three smiley figures drawn at the top—one happy face, one sad face and one in between. Eight pictures illustrating both whole insects and well-known products and dishes where insects were used as ingredients functioned as *triggers* for the discussions with the children. The pictures consisted of a grasshopper as a whole insect, dried mealworms, a pasta dish, bread, meatballs, a burger, a chocolate cake and a pizza with grasshoppers, crickets and mealworms as a topping (see, Figure 1).

The pictures were shown to the children and they were encouraged to say if they recognized the insects and what they thought and felt about them, but also how they imagined eating them. The pictures were shown one at the time to the children during the focus groups and the children were informed that different kinds of insects were ingredients in the specific product or dish. The children were asked to put the picture under one of the smiley figures. The pictures were often moved back and forth between the different smiley figures as the children negotiated with each other concerning the ability to eat the insect, product or dish. They were also asked whether they thought there was a difference between eating a whole insect and eating insects as part of a product or dish. The questions also concerned their view of insects as food in the future and the taste and shape of them. They were also asked if they believed there was someone eating insects today in other parts of the world and what would be the motives to eat insects in other cultures. The discussions also concerned the importance of the place and the context for whether or not the children would try to eat insects. Additionally, a small plastic jar with dried mealworms was used in combination with the picture of the mealworms. Combining focus groups with visual prompts is often recommend when interacting with young children (Hilppö, Lipponen, Kumpulainen, & Rajala, 2017; Pimlott-Wilson, 2012). The use of pictures in combination with the smiley figures encouraged interactivity with the children and facilitated communication, particularly apparent with the children who had limited abilities to speak Swedish, but is was also a way of keeping them focused on the task.

The focus groups were audio-recorded and transcribed with a focus on what was said and how this was expressed, including comments and notes about physical reactions and responses when discussing the topic of eating insects and while looking at the pictures. The placement of the pictures on the paper was photographed and integrated into the analysis of the material, being used to help in further understanding how the children perceived eating insects. The material was analysed using a thematic analysis framework presented by Braun and Clarke (2006) as an inspiration. However, the qualitative research process is

FIGURE 1 Pictures of insects, as well as products and dishes with insects as an ingredient

an ongoing, iterative process, starting already during the data collection. The transcripts were thoroughly read several times in order to find relevant codes that were later ordered into central themes. Based on the aim of the study, four main themes were identified from the analysis summarizing the children's perceptions of and thoughts about eating insects *as: Between fantasy and reality; Between curiosity and fear; Dead or alive? and 'You are not allowed to eat them'*.

5 | ETHICAL CONSIDERATIONS

There are several ethical issues to consider when including children in research. Probably the most important and critical, issue is the one concerning the ability to give consent (Banister & Booth, 2005; Hill, 2005). It is of particular importance that the child is given the information in a suitable format and that he or she understands that it is possible to withdraw participation at any time (Banister & Booth, 2005; Hill, 2005); the children should understand what they have accepted to participate in. As pointed out by Hill (2005, p. 69) *'even pre-school children may be given very simple explanations'* of what is going to happen. Moreover, it is important that the researcher tries to *limit* the 'authority image' through the choice of setting, the use of language and the seating (Hill, 2005). In this study, the preschool was a familiar place, as was the room where the focus groups took place, which was otherwise used as a separate play room for the children.

Initially, the preschool was asked about interest in participating in this explorative study. All parents of 4- to 5-year-old children were informed by an information letter and they were asked to sign a letter of consent stating if their child was allowed to participate or not. All parents of the children of the relevant age group gave consent for participation. The children were then informed about the study and what was going to be discussed and they all gave their oral consent prior to the focus groups. Most of the children seemed very engaged from the beginning and they expressed joy and excitement about participation. Guidelines from the Swedish Research Council (2017) were followed during the research process.

6 | RESULTS

6.1 | Between fantasy and reality

The children were constantly balancing between fantasy and reality when talking about insects and they were often alternating

between various contexts when trying to express their thoughts about eating insects in various forms. They were initially asked what insects they knew about and many of the children could name several insects and talked about them with great enthusiasm. They explained where they had seen them and with whom. In their descriptions, different stories and connections to other contexts were made.

Interviewer: Do you know of any insects?
Child: Spiders (2 of the girls say at the same time).
Child: Centipedes (another girl in the group says).
Child: My older sister has a fake spider (and then, the children point at a fake spider in the play room where the focus group was taking place).

There were several examples of stories about insects, often showing the children's fascination with insects and, as in the example below, their flying abilities.

Child: You know, I like bugs and ladybirds
Interviewer: You do. What is good about them?
Child: That they can fly. That they do this (he is showing how to fly with his arms) *and they fly when it is windy outside.*

Another child started to talk about her gerbils at home, that they eat worms and that her older sister gets really scared when she is shown the worms. Questions about the taste of insects, but also what they would like the insects to taste of if they were to eat them, further revealed how the children were including fantasy in their ideas. When asking the children what they thought grasshoppers taste like, some just responded 'insect' and then, explained that it probably did not taste good and at the same time pulled an ugly face. They also used the colour of the insect to guess what a specific insect might taste like.

Interviewer: Do you think it tastes sour, sweet or salty?
Child: Not salty. Pepper. Pepper is brown and so is the insect

In another of the focus groups, the children expressed imaginative tastes when discussing the taste of insects. One child exclaimed that she would like insects to taste like sweets if she was to eat them. In the group, the children talked about different ideal tastes of insects.

Interviewer: What do you think it tastes like?
Child 1: Strawberry
Interviewer: Do you think it tastes like strawberry?

Yes! The other children agree
(…)

Interviewer: Would you like it to taste like strawberry?
Child 2: Yes, sweet strawberry

6.2 | Between curiosity and fear

When thinking about insects, the children were also balancing between, on the one hand, curiosity for example, in terms of their ability to fly and also escape and, on the other hand, fear and insecurity. Some children expressed how they thought the insects shown in the pictures were cute and wanted to take care of them.

Child 1: We think they are cute and we want to take care of them
Child 2: But if we take them they will just fly away from our hand

Both children laugh a little

Interviewer: Yes, they might escape
Child 1: But we will be careful, we won't scare them in any way
Interviewer: So you want to take care of them?
Child 1: Yes, we can put them in a cage

The feelings of fear and insecurity about insects were expressed both in relation to eating them and in relation to insects being nasty creatures. Several children described how they thought that insects were scary, even when just hearing the word. However, as the child below expressed, it was worse when looking at them.

Child: They are scary
Interviewer: What is scary?
Child: When you look at them
Interviewer: Ok. So if you can't see them it is ok?
Child: Mmm. I am really afraid of insects

The children were really fascinated when looking at the little plastic jar containing the mealworms and asked if they were 'real' insects. However, at the same time they expressed feeling fear at even touching the jar. Some of the children did not seem to understand that they were actually dead and dried, since one girl suddenly shouted, *'One is dead!'*

Another child also clearly expressed her fear of insects.

Child: I'm afraid
Interviewer: What makes you afraid?
Child: That they jump. I don't like it

However, some children had other opinions. To the question of whether it was possible to eat insects, two children replied 'yes' simultaneously, which was then further clarified: *'Some insects, like snails which I have tried. With the shell'*. Referring to something familiar, well-known and already tested facilitated the idea of eating food perceived by the children as rather strange. When talking about the different products and dishes in the pictures, most children accepted the chocolate cake, even though it was made of flour from mealworms, as long as there was plenty of chocolate in it. However, it was apparent that the children constantly shifted between and elaborated on, ideas of the dishes presented being

acceptable or even delicious and pulling a distorted face when being informed that there were either meal worms or crickets included in the ingredients, for example, saying *'I think it looks good, but I don't know if a dare'*, or when stating that *'it is cute, but I am a little afraid'*.

6.3 | 'You are not allowed to eat them'

Young children often already have clear ideas of what is food and what is not, and what is allowed to be put in the mouth or not, but also what is considered good to eat. When shown the picture of the pasta dish, the children instantly stated that this was 'food', in comparison to the grasshopper and the flour worms that they had seen in previous pictures. Moreover, most children immediately said 'no' when asked whether or not it was possible to eat insects. This was primarily based on feelings of disgust as well as a fear of insects and a belief that insects would probably taste bad. Negative attitudes towards and rejection of the consumption of insects were also expressed in terms of what was perceived as being *allowed* to eat, where insects were clearly stated as something you were not allowed to eat.

Interviewer: Can you eat a grasshopper?

No, all the children answer at the same time.

Child: No, you are not allowed to

When talking about eating worms, the children in the same focus group once again argued that this was not allowed.

Interviewer: Have any of you tasted a worm any time?
Child: You are not allowed to eat worms, they will live in your stomach

This was also related to ideas among the children about what might happen if you (accidently) ate an insect. In another focus group, the children talked about eating spiders and what might happen if you ate them.

Child 3: But not spiders
Interviewer: Not spiders?
Child 3: No, because then you get stomach ache
Child 2: I have seen it in a movie and then they had a spider and they ate it… and it was a human being
Interviewer: Ok, what happened then?
Child 2: She didn't die

This also implies that the children have rather clear normative perceptions of what is food and what is not, but also what is allowed and ideas of what might happen if you accidently eat an insect.

6.4 | Dead or alive?

When imagining eating insects, many of the children were also preoccupied with the notion of whether the insects were dead or alive when eaten. In one focus group, the children looked terrified when being informed that it is actually possible to eat a grasshopper.

Child: What!? But not alive?

When talking about the grasshopper in another focus group, the importance of the grasshopper being dead was also considered important:

Interviewer: So you can eat it, you mean?
Child: Well, not alive, only a dead one

The same reaction was expressed when discussing the possibility of eating mealworms, clarifying the importance of the insect being dead before consumption. It also showed how the children could negotiate regarding the conditions necessary for eating insects.

Child 1: Only when they are dead (say two of the children)
Child 2: But I don't want to eat them (another child says)
Child 1: But when they are dead you can eat them

When being shown the picture of the pasta dish, most children in all the focus groups thought it looked good at first sight. However, after telling them that the pasta was made with flour from crickets, many expressed resistance at first, but some later decided that it might anyway be edible. In one of the focus groups, the children were preoccupied with whether the crickets in the pasta were dead and they looked carefully at the picture. They were also interested in whether the crickets' legs and feelers were thorny, as if this would impact the pasta in some way.

Child: In the pasta? Are they dead?
Interviewer: Yes. It is not in one piece so you can't see it

The children laugh a bit

Child: Are they sharp? (one child asks and points at the leg of the grasshopper in another picture).
Interviewer: I don't know, maybe a little thorny
Child: What is that long thing over there?
Interviewer: That's the feelers

The children laugh a bit again.

When looking at the picture of the meatballs, the children in one focus group again started to discuss whether the insects, as part of the meatballs, were dead or alive. After the interviewer explained

the ingredients in the meatballs, the children responded that it was still alright to eat them. However, one child added:

Child: As long as they are dead and the eyes are dead, then you can eat them

When imagining the insect alive, some children were preoccupied with more practical aspects of how to handle as well as catch the insect, in order to be able to eat it. For example, they talked about the need to put the insect, for example a spider, in a small cage so that it would be safe and not run away.

Child: It is probably really hard to catch?
Interviewer: Probably it is. Do you think it will jump away?
Child: Yes
Interviewer: And you must not step on it

The importance of the insect being dead or alive was crucial in understanding the children's perceptions of whether it was possible and acceptable, to eat insects or not.

7 | DISCUSSION

Our relationship with food is culturally defined and embraces many emotions and this is especially apparent when discussing food that is unknown or items that are not perceived as human food in a specific cultural setting. Emotions such as curiosity, fear, anxiety, fantasy, care, disgust and happiness can be expressed. These relationships are well explored in the literature but achieve an even more apparent embodied expression regarding the concept of insects as food. Moreover, there are a multitude of factors that affect consumption, some leading to acceptance and others leading to rejection (Geertsen, 2019). From a Western perspective, discussions of insects as food are rather new and even though it has become legal to produce and sell insects as human food in many European countries during the last decade, insects are still alien to our culinary culture and often defined as disgusting, or even repulsive (Looy et al., 2014). In Sweden, as the cultural context for this study, it is still forbidden to produce and sell insects, contributing to transforming insects into food in people's minds even more difficult.

In exploring young children's perceptions of eating insects in this study, four main themes emerged in the analysis of the focus group interviews with the children. *Balancing between curiosity and fear* was apparent, symbolizing the inherent tension between neophobia and neophilia. This was exemplified by the ambivalence in imagining eating this new food, but also in approaching an animal creature previously known as something that is *not* eaten. Feelings of fascination, but also care and protection, were mixed with feelings of fear, disgust and insecurity. However and interestingly, previous research has found that there seems to be differences in the reactions of fear depending on if the insects were flying or crawling, also stating that fear and disgust might be understood as separate emotions in relation to eating insects (Breuer, Scglegel, Kauf, & Rupf, 2015). Moreover, the children's perceptions of insects in the study were often related to fantasy, expressed in the theme *'Between fantasy and reality'*. This implies that children have many relationships to insects as food, but also insects as animals, that seem to be important to consider (Cole & Stewart, 2016; Shipley & Bixler, 2017). As has been stated when discussing the paradox of being an omnivore (Fischler, 1980), the relationship between neophobia and neophilia is often managed in the social and cultural context, implying that a new social behaviour in relation to food is best accepted in a well-known social context. In school, as well as in a preschool setting, children learn about food and form attitudes towards known and unknown foods (Atik & Ozdamar Ertekin, 2013). These are also well-known settings for managing neophobia. When discussing insects as food, the children in the study often negotiated and tried to convince each other in the group to think in a certain way regarding the possibility of eating insects. Increased interest in and acceptance of insects among children can be stimulated in these social contexts.

Balancing between perceptions of insects as being possible to eat or not must also be understood in relation to cultural norms and values about food and eating. *'The classification of something as food means it is understood as something made to become part of who we are'* (Lupton, 1996, p. 17). Food categorization starts early in life, even though a more complex food rejection taxonomy is developed in middle childhood (Fallon, Rozin, & Pliner, 1984) and what is considered food or not food, what is good, healthy as well as forbidden, are all cultural skills learned as part of the food socialization during childhood (see, e.g., Lafraire, Rioux, Roque, et al., 2016). In the theme *'You are not allowed to eat them'*, the children clearly expressed this normative component of food and eating. The importance of the insect being dead in order to be edible, as part of the theme *'Dead or alive'*, was another expression of our cultural ideas about the necessary attributes of food. The children's current relationship to insects was seeing them alive, jumping, crawling or flying, which was also apparent in their ideas of how to practically transform them into food. Incorporating new food in one's body, as well as in a cultural food classification system, means that previous norms and ideas are always, to some extent, questioned, negotiated, redefined or altered. Based on the arguments made by Douglas (1966/2002), considering insects as food might be seen as *an anomaly*, something that confronts current ways of thinking about and categorizing food. An anomaly is often seen as something polluting and possibly dangerous, yet important to manage in order to maintain societal order. Knowledge is often seen as one essential factor in being able to change societal norms and conventions, and re-order social categories in relation to food and eating (Douglas 1966/2002).

Previous studies related to insects as food have also pointed to the positive effects of increased knowledge about why insects should be included as food and how they could be used, cooked and integrated into our way of thinking about food (Barsics et al., 2017; Lensvelt & Steenbekkers, 2014; Looy et al., 2014). In a recent study, it was emphasized that many of the identified barriers to eating insects could be overcome by, for instance, providing information about the

origin of edible insects as well as talking about insects in a more positive way. This could, for example, include making food with insects more appealing by incorporating insects in familiar and liked dishes, as well as ensuring that the insects are processed before reaching the consumers (Geertsen, 2019). When asking the children in the study whether or not humans can eat insects, the most common and immediate answer to that question was 'no', which expressed a lack of consciousness about the fact that insects actually can be eaten, but was also an indication of the social norms consolidated at an early age. Early discussions about insects being possible food, as part of a re-socialization and re-categorization process, might make the idea of insects as food more familiar to young children and enhance the possibility for future consumers of insects. However, as is also included in the concept *'the insectivore's dilemma'* (Deroy, Reade, & Spence, 2015), it is seldom enough to inform about the sensible aspects of eating insects based on their nutritional and sustainability values when the option is not considered appealing. The importance of social norms in the (un)willingness to eat insects has been stated in previous research and, accordingly, the urge to focus on these aspects in order to increase acceptance of eating insects (Jensen & Lieberoth, 2019). There might be positive intentions to eat insects based on for example favourable effects on the health and the environment, but also hedonic motives when looking at a cake baked with flour from mealworms. However, barriers such as disgust and unfamiliarity might prevent the actual tasting and integration of insects as part of the diet (Menozzi, Sogari, Veneziani, Simoni, & Mora, 2017). Still, research has indicated that information about the benefits of eating insects may increase *long-term intention* by consumers to eat insects and this intention might then carry over into behaviour (Verneau et al., 2016). Managing the inner conflict in relation to eating insects is necessary, including focusing on elements that would make insect-based food more appealing.

Food variety, defined as the number of foods liked or consumed by a child, tends to decrease from the age of 2–4 years with an increased pickiness (Carruth, Ziegler, Gordon, & Barr, 2004) and neophobia as a response (Cashdan, 1994). Therefore, as previously suggested, introducing new food items is often more likely to succeed if they can be incorporated as part of previously eaten and familiar dishes (Anzman-Frasca, Savage, Marini, Fisher, & Birch, 2012; Geertsen, 2019). This is especially crucial when introducing new foods to young children (Birch & Marlin, 1982). Previous studies related to the acceptance of insects as food have also pointed to the positive effects of incorporating insects into familiar food items and, by doing so, integrating the conventional with the more controversial in order to manage neophobia and negative attitudes (Hartmann et al., 2015). For example, in the study by Homann, Ayieko, Konyole, and Roos (2017) the introduction of biscuits with crickets for school children, with an attempt to increase the nutritional value of the food eaten, was highly accepted. In general, the children in this study were more positive when imagining eating insects as part of a well-known dish rather than seeing them intact. However, they still expressed insecurity after they were told what was in the dish, except for the chocolate cake. Yet, it is important to relate this to children's overall knowledge of food ingredients. Most children in the study did not know what was in the bread or the meatballs they usually ate in preschool or at home. When asking the children what was in the meatballs presented in one of the pictures, the children responded 'meat' without being able to define what kind of meat. When explaining that there were insects in the meatballs, the children started to react negatively, which should also encourage us to reflect on whether or not the same reaction would be generated if the children were told that there was meat from a cow and at the same time showing them a picture of a cow. This further indicates the paradox of familiarity that seems to be important to acknowledge when discussing new, unknown foods with young children. The need for increased knowledge must to be balanced, as well as understood, in terms of knowing enough but not too much. This also relates to the ethical discussions by Hjerris et al. (2016), stating that eating other animals requires some kind of mental distance to the animal itself. So, in increasing our knowledge about insects as food and, by doing so, increasing familiarity with insect-based products, we also need to not become too familiar.

Previous studies have pointed at the importance of curiosity in trying insect-based products (Sogari, Menozzi, & Mora, 2017, 2019). Using children's fantasy, imagination and curiosity for new things, experimenting with insect-based products and ingredients in well-known tastes, dishes and contexts and while doing so, discussing different ways of eating them, the acceptance of eating insects might increase. It is also in these well-known contexts that the paradox of being an omnivore and the tension between neophobia and neophilia, can be managed. Considering the limited focus on children in previous studies related to perceptions about eating insects, there is a need for more research focusing on, but also integrating, children in understanding and developing ideas for our future food. As part of this, it is of specific interest to investigate in more depth how children understand different kinds of food and in doing so, include different age groups, both younger children and adolescents. This could be of interests as food for older children and teenagers, to an increased extent, becomes a marker of identity and social belongings. Adolescence is a period in life where the food repertoire often widens as a result of social and cognitive influences (TonNu, MacLeod, & Barthelemy, 1996). Previous research has also stated the important role of the school as well as preschool to both form and impact children's food behaviour, aiming at reducing food neophobia and increase the willingness to try new food (see e.g., Part & Cho, 2016). However, earlier studies have also indicated the limited knowledge and experience of preschool teachers regarding food (Sepp, Abrahamsson, & Fjellström, 2006; Sepp & Höijer, 2016), which might impact the overall possibilities to talk about and experimenting around novel food together with the children. Therefore, future research needs to further focus on the role of the school and preschool in both understanding attitudes and promoting acceptance of sustainable food in general and novel food, including insects, in specific. When it regards novel food, this knowledge is still limited. Based on this it would be of relevance to include preschool teachers as well as caregivers in future studies as important for acceptability

of eating insects among children (see, also Laar et al., 2017), including how this knowledge about novel food and insects as future food can be implemented. Using ethnographic methods and participatory approaches a deeper understanding of what is food and how 'food becomes food' might be gained, as well as in what products, dishes, social and physical meal contexts insects can be included. The knowledge on children's attitudes and perceptions on insects as food, as future consumers, might as well have implications for policy makers on different levels, including forming ideas about sustainable food consumption and how insects as well as new food items in general might be integrated in people's everyday food habits.

The study limitations primarily concern the limited number of focus groups and children participating in the study, as well as only one preschool being included. However, to the best of our knowledge, the understanding of young children's views and perceptions of insects as food in a Western context is extremely limited. There is a large amount of knowledge regarding neophobia and resistance to trying new foods among children, however not in the context of insects. Therefore, this research, despite its limitations, makes an important contribution to our understanding of insects as food from young children's perspectives.

8 | CONCLUSION

This study taking place in Swedish cultural context, has highlighted how children's thoughts about eating insects are filled with normative ideas and emotions about what it is possible to eat as well as what one is allowed to eat. The young children in this study often integrated fantasy and imaginative ideas of what an insect would taste like, or what taste would be preferable. They were also preoccupied with the notion of the insects as living creatures and the problems that might emerge when trying to catch and eat, a flying animal. They were constantly balancing between the curiosity of insects as animals and whether or not it would be possible to eat them and the fear of even touching them. The study indicated the importance of integrating insects in well-known dishes or products that are already appreciated, as well as in a familiar social context, to increase the acceptance of eating insects. It is further essential to acknowledge the curiosity and imagination of young children in experimenting with new food. The tension between neophobia and neophilia is well known, however, by taking the starting point in young children's curiosity and imagination for insects as food, not only knowledge but also interest in insects as food might increase. This can also promote new ideas about insects as future food in terms of taste and appearance of products and dishes, but also about the social and physical contexts of insect consumption.

ACKNOWLEDGEMENTS

The authors thank all the children and the preschool that participated in the study. The study was conducted within the project 'Insects—a culinary and sustainable delicacy', funded by the KK-foundation, Sweden, grant number 20170141.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

All authors participated in the conception and design of the study. The first author collected all data, made the formal analysis and interpreted the results. The first author was responsible for original draft preparation while all authors have been actively involved in writing, editing and critically reviewing the manuscript. All authors have given their approval of publishing this version and have agreed to be accountable for all aspects in the work.

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How to cite this article: Nyberg M, Olsson V, Wendin K. 'Would you like to eat an insect?'—Children's perceptions of and thoughts about eating insects. *Int J Consum Stud*. 2020;00:1–11. https://doi.org/10.1111/ijcs.12616