



# Can children aged 4–6 years evaluate their food?

A survey among children on lunches provided in day-care centers in the region of Mainz (Rhineland-Palatinate, Germany)<sup>1</sup>

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## Abstract

The aim of this pilot study was to investigate whether children from the ages of 4 to 6 years attending day-care centers are capable of expressing their satisfaction with the lunch offered at their day-care center. The practical suitability of the questions asked and the instruments used to record the satisfaction of children in this age group were also investigated. In individual interviews, 112 children from 12 day-care centers in the Mainz area were asked about their feelings and level of satiety, their taste experience at lunch, how much they liked individual foods, the basic conditions of the lunch, and how much they liked eating at the day-care center in general. The children's responses and the additional information they provided showed that it is possible to measure satisfaction with lunch in children attending day-care centers. Individual questions and instruments will need to be revised for future surveys. Recording satisfaction in this way and taking it into account would satisfy the requirement to take a participatory approach.

**Keywords:** preschool children, child nutrition, satisfaction, lunchtime, day-care

## Introduction

At the beginning of 2020, about 1.8 million children aged 4 to 6 years (i.e.  $\geq 4$  and  $< 7$  years) were attending a child day-care facility in Germany, of which about 74% (1.4 million children) used the midday meal offered there [1]. The nutrition situation in day-care centers has previously been investigated by surveying various stakeholders, but not children [2–7]. For example, in Rhineland-Palatinate, 92% of parents were satisfied with the food and drink in the day-care center and, in the parents' opinion, 96% of the children were satisfied [3]. In Thuringia, 84% of the day-care centers stated that they were "very satisfied" or "satisfied" with the catering in general and 85% said the same of the midday meal specifically [7]. Recommendations that have been put forward to improve the nutritional situation in day-care centers include increasing the participation of children [3]. There are various concerns when it comes to surveying children—for instance concerns about reproducibility and validity as well as the possibility that response behavior will be influenced by what is perceived as socially desirable [8]. However, at the same time, children are increasingly becoming an important target group in survey-based research [9]. Children influence the consumer behavior of their parents, and in some cases, children's everyday activities remain hidden from their parents [10]. When interviewing children, aspects such as possible shyness, necessary adaptations to accommodate their limited areas of experience and limitations in language skills and attention span have to be taken into account [10, 11].

## Citation

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<sup>1</sup> The content of this article is based on the final report of the 2018 "Zufriedenheit von Kita-Kindern mit der angebotenen Mittagsmahlzeit in ausgewählten Kindertageseinrichtungen in Rheinland-Pfalz" (Survey among children on lunches provided in day-care centers in Rhineland-Palatinate, Germany regarding children's satisfaction with lunch) and also deals with the methodology used in detail.

In order to find out whether children attending day-care centers are capable of expressing their level of satisfaction with the mid-day meal, the Hamburg University of Applied Sciences (HAW Hamburg) interviewed children at selected day-care facilities in Rhineland-Palatinate in a pilot study in 2018 [12].

## Methodology

### Target group

The study was aimed at children between 4 and 6 years old who attended day-care. Usually, a minimum age of 4–5 years is assumed for qualitative studies [11]. Since 7-year-olds are usually already attending school, 6 years was defined as the upper age limit.

The management staff were asked to provide additional details about the characteristics of the day-care center.

### Recruitment

With the support of the Ministry of Education of Rhineland-Palatinate, HAW Hamburg asked 164 day-care providers in the Mainz area to send the invitation to take part in the study to their day-care centers. The day-care centers contacted HAW Hamburg directly if interested [12]. The written consent of the children's legal guardians and the verbal consent of the children were required in order for the interviews to take place.

### Procedure / Implementation

In the preliminary *survey of day-care center managers* regarding the characteristics of the day-care center, the management staff received a one-page questionnaire by e-mail (see ♦ Figure 1 for the content of this), which was returned before the start of the survey of the children.

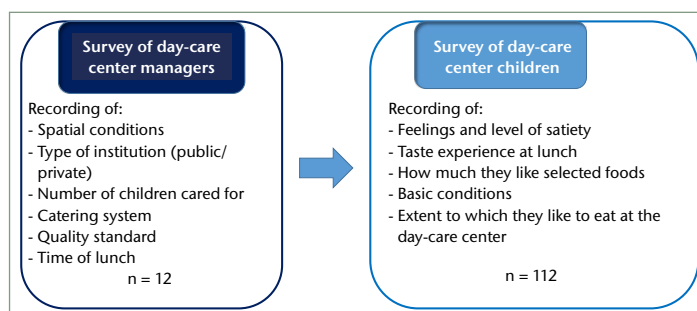


Fig. 1: Parameters recorded in the study

For the *Survey of children at the day-care center* one day-care center was visited per day and 10–15 children were interviewed during each visit. The standardized individual interviews were conducted by a researcher from HAW Hamburg (IH) in a separate room at the day-care center after lunch. In some cases, the day-care worker decided to accompany a child for the interview, mainly in the case of shyness or a language barrier.

The child sat down at the table and the interviewer informed him/her what the interview was about, and told him/her that picture cards would be used and that the conversation would be

recorded acoustically. The parents' consent to the child's participation was already in place at this point.

Provided that the child himself/herself also agreed to be interviewed, his/her gender and age were noted and the variables listed in ♦ Figure 1 were recorded. Satisfaction with the lunch that was offered was investigated based on the following aspects: taste experience at lunch, the basic conditions and the popularity of the food at the day-care center.

The children's answers were written down on a documentation form and recorded acoustically using the *Dictaphone* app. Questions that were not answered were noted as "no information given", and any problems or disruptions that occurred were documented.

At the beginning of the interview, the children used a crayon to mark their **feelings and level of satiety** on a Likert scale illustrated with emoticons or penguins (♦ Figure 2). In this way, they indicated whether they were currently "very happy", "happy", "OK", "sad" or "very sad", and whether they felt "hungry", "full and satisfied" or had "eaten too much". The meaning of the symbols was explained to the children in advance; no validation was carried out.

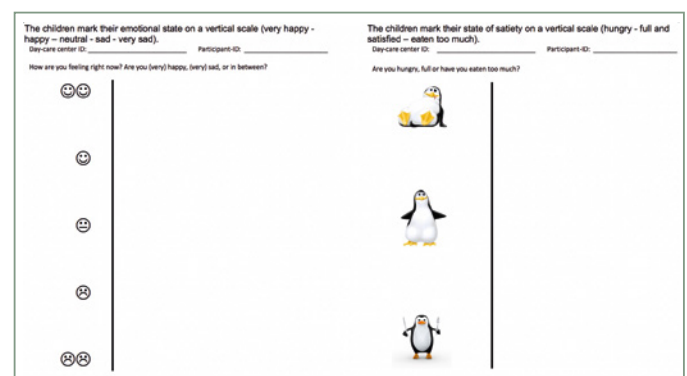


Fig. 2: Scales used to ask about feelings and level of satiety (image source for penguins: fotolia.com)

To make it easier for the children to answer the retrospective questions [11], they were given a digital photo of the dish that was served at lunch to help their recall for the questions about their **taste experience at lunch**. This put the eating of lunch back at the front of all the children's minds and created a comparable starting situation. This also allowed them to describe the components that were on their plate, and this was what the subsequent question about how much they had enjoyed the food referred to. At one day-care center where seven interviews were conducted, an alternative dish was offered that



Fig. 3: Emoticons used for evaluation

had not been photographed beforehand; at other day-care centers, some of the alternative components were missing in the photo.

As a stimulus for communication [13], the children were given laughing, neutral and sad-looking emoticons printed on cards (3-level rating scale) (♦ Figure 3). They used these to state whether they “liked” the lunch, “liked it OK” or “did not like” it.

Cards with foods printed on them were used for the questions about **how much the children liked** individual foods. The food cards depicted some of the food groups recommended for lunch in the *DGE-Qualitätsstandard für die Verpflegung in Tageseinrichtungen für Kinder (DGE Quality Standard for Catering in Nurseries)* [14] as well as some favorite and disliked foods recorded in previous studies on day-care and/or school catering [3, 15]. Since our own pretests revealed that there were some difficulties in naming the pictured foods and that only components of them were recognized and liked in some cases, this pilot study asked about the foods listed in ♦ Figure 4 individually and without side dishes. The children named the food pictured and expressed their like/dislike with the emoticon cards.

Satisfaction with the **basic conditions of the lunch** was also investigated using the emoticon cards. Topics covered included the dining room, the presence of the day-care staff, the saying of a table chant / mealtime prayer and the making food-related requests. Finally, there was an overarching question about how much the children like to eat at the day-care center (**popularity of the food at the day-care center**).

### Analysis

The data were analyzed descriptively using the statistics software IBM SPSS Statistics, version 22; categorical variables were described with absolute and relative frequencies. For continuous variables, the mean with standard deviation (SD) or median with Q1 and Q3 (in some cases also minimum/maximum) were calculated.

## Results

### Characteristics of the day-care centers

Out of 17 registered day-care centers, 12 public and independent day-care centers from the city of Mainz (n = 9) and the district of Mainz-Bingen (n = 3) took part in the study. They each cared for 60–150 children; the average was 106 children (SD 31).

Facilities were excluded from the study if they did not care for 4–6 year olds (2 day-care centers) or if they were outside the catchment area (1 day-care center). At 2 day-care centers, the survey was canceled at short notice due to a low number of consent forms from the legal guardians.

### Statements of the children at the day-care center about their satisfaction

The individual interview, which lasted an average of 11 minutes (SD 2, min–max: 9–17 minutes), was conducted with 112 children (58 boys, 54 girls). The average age was 5.1 years (SD 0.8). In 22 of the interviews (across 6 of the day-care centers), an accompanying person was present at least some of the time.

#### Feelings and level of satiety

At the time of the survey, most of the children felt “very happy” to “happy” (♦ Table 1) and mostly described themselves as “full and satisfied” (♦ Table 2). One child did not make any statement about his/her feelings or level of satiety.

very happy	happy	ok	sad	very sad
69%	14%	14%	2%	1%

Tab. 1: Feelings at the time of the interview (n = 111)

hungry	full and satisfied	ate too much, stomachache
11%	88%	1%

Tab. 2: Level of satiety at the time of the interview (n = 111)

#### Taste experience at lunch

More than three quarters of the children liked the lunch served on the day of the survey; one child did not provide any information. (♦ Table 3).

Half of the children (52%) stated that they had all the components shown in the photo on their plate. Some of the children stated that they had tried foods they disliked. Salad (n = 29) was the most frequently avoided item, followed by sauce (n = 16), vegetable side dishes (n = 10), starchy side dishes (n = 8) and meat and fish (n = 2 each).

#### Liking for selected foods

Out of the foods that were asked about, pasta, cucumber, rice, eggs and meat were popular, while mushrooms, broccoli and tomatoes were often disliked (♦ Figure 4). 44 cases were limited to a specific preparation method or variety and 6 cases to a specific part of the food only.

In 74 cases, the food pictured was not recognized, was named incorrectly or the children had forgotten the name (mainly broccoli, mushrooms, rice and meat). In 21 cases, the children had never eaten or seen the food depicted before (mainly mushrooms and broccoli).

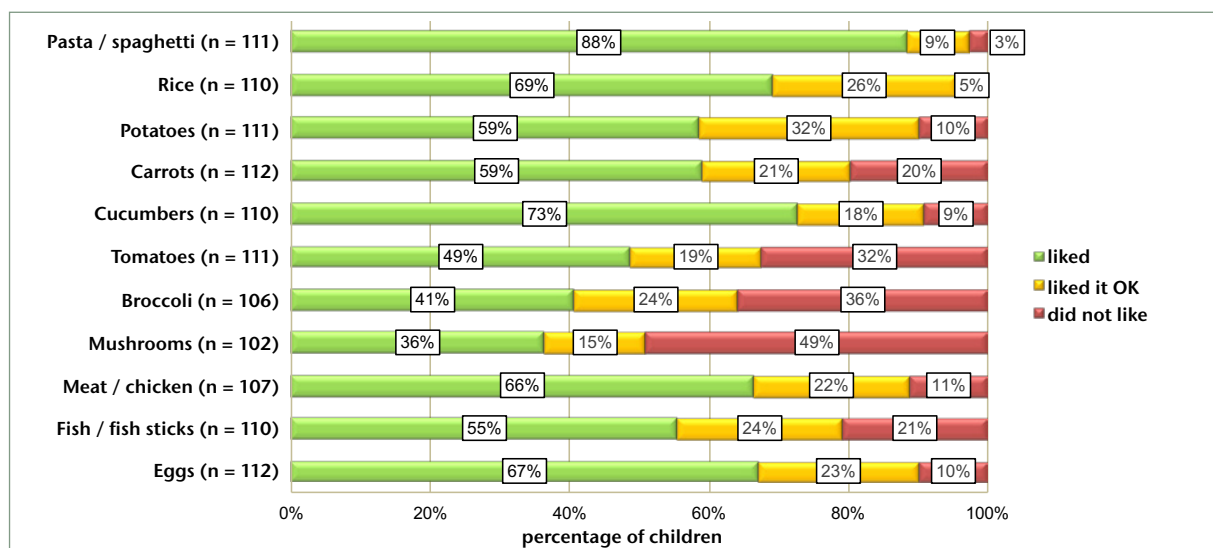


Fig. 4: Popularity of selected foods

Lunch meal (own description)	Evaluation		
	good	OK	not good
Fish with potato wedges and colorful salad	4	5	0
Fish with Spätzle (fresh pasta), sauce and spinach	9	1	0
Gnocchi with white sauce/tomato sauce and cucumber salad (in some cases tortellini instead of Gnocchi)	11	0	1
Potato and vegetable wedges with white bread and dip	2	4	0
Potatoes with quark (curd cheese) and colorful salad	5	1	0
Potato pancakes with apple sauce	11	1	1
Pasta with tomato vegetable sauce and salad	10	3	0
Turkey strips with rice and peas	4	2	1
Rice casserole with peppers and raw tomatoes	3	1	0
Spinach pizza / margherita pizza	6	1	0
Vegetarian vegetable balls with potatoes, sauce and carrot salad	7	4	0
Wholemeal pasta with bolognese/tomato and vegetable sauce and cucumber salad	13	0	0
Total	85 (77 %)	23 (21 %)	3 (3 %)

Tab. 3: How the children rated the taste of the lunch that was offered (n = 111)

#### Basic conditions of the lunch

85% of the children liked the dining room, just under 2% did not like it. Criticisms included a lack of light and space as well as a high noise level. Other statements referred to eating at the day-care center in general rather than to the dining room specifically. 95% of the children confirmed that day-care staff was present at the meal (ten of them adding the qualification "sometimes"). 5% of the children answered this question in the negative—their day-care center offered an open lunch.

19% of the children stated that they were allowed to make food requests, three of them had forgotten their request; two children did not make a statement about this.

90% of the children reported saying a chant/mealttime prayer before the meal. The majority of the children liked to say a table chant / mealttime prayer (♦ Table 4). A common reason for not liking the table chant / prayer was that it means waiting before starting the meal (n = 8).

#### Popularity of eating at the day-care center

Finally, almost 70% of the children said they liked eating at their day-care center, 23% rated it as OK and 8% said they did not like eating there. One child did not make any statement.



	Table chant / mealtime prayer said	Table chant / mealtime prayer not said
good	67	9
ok	19	0
not good	15	2

Tab. 4: How the children found saying or not saying the table chant / mealtime prayer (number of mentions)

## Discussion

The majority of the 112 children interviewed described themselves as “very happy” or “happy” and stated that they were “full and satisfied”. More than three quarters of the children thought the lunch tasted good on the day of the survey. Well-liked foods included pasta, cucumber, rice, eggs and meat, while mushrooms, broccoli and tomatoes were often disliked. Basic conditions such as the saying of a table chant / mealtime prayer were rated positively and more than two thirds enjoyed eating at the day-care center overall.

However, the focus of this study was the question of whether children attending day-care centers are capable of expressing their satisfaction with the lunch offered. Therefore, the methodology used and the level of detail in terms of content are discussed further below.

## Methodology

In certain cases, children were accompanied by day-care center staff during the interview. They translated for children from immigrant backgrounds and thus reduced communication problems. However, the possibility that this may have influenced these children’s answers cannot be ruled out. In future, if an accompanying person needs to be present, they should be present during the warm-up phase only, and should leave the room at the beginning of the interview. Since the foods and dishes commonly found in Germany, as well as their method of preparation and seasoning, likely differ from the foods and dishes children from immigrant backgrounds are accustomed to eating at home, and given that this could change their level of satisfaction, immigrant backgrounds and language barriers should be documented.

The children described the contents of their plate in detail using the photo of the lunch, but due to the way the study was planned, some individual components were missing in the photos. In future studies, it would be useful to record all alternatives offered on the day of the survey in advance so that the children can be asked about the contents of their plate in a targeted manner.

The use of the emoticon cards was quickly understood by the children and the 3-point penguin scale provided a clear and self-explanatory representation of the state of satiety. By contrast, some children spent a long time deliberating over the 5-point classification of their emotional state; it was particularly difficult for them to distinguish between “very happy” and “happy” and between “very sad” and “sad”. Symbolic rating scales with 3–5 levels are often used in interviews with children [16]; sometimes 2 or 4-point scales are used [17–19]. Scales with 3–4 levels appear to

be suitable in terms of avoiding overwhelming the children, but still allowing representation of slightly positive or slightly negative tendencies where necessary, rather than just middling tendencies. The comprehensibility of the scales should be re-examined for future studies.

The children were not always familiar with the foods they were asked about and in some cases (such as in the case of cooked rice) it was difficult for them to recognize them as pictures. Therefore, children should be asked about familiar foods that they can quickly recognize when they see a picture of them.

Some children said that they only liked or disliked foods prepared in a certain way, or that they only liked or disliked a certain variety or part of the food (e.g. the yolk or white of a cooked egg). This additional information is particularly important for menu design and should be recorded in the interview.

## Strengths and weaknesses of the methodology applied

The catchment area of the day-care centers was limited by the way the study was planned, and the number of participating facilities was relatively low at 12 in total. All the day-care centers that were invited via their day-care provider and that subsequently registered for the study were included, provided they met the inclusion criteria. The sample was therefore a positive selection.

The interviews were time-consuming for the interviewer and for some of the children. However, the interviews made it possible to adjust to individual personalities and gather additional information that more reserved children might not have expressed in front of their peer group.

## Level of detail of the results

About half of the children only selected individual components of the lunch. They may have evaluated their food differently than if they had eaten the complete lunch meal. A few of them stated that they had tried foods they did not like and a few gave additional information when evaluating the lunch they had eaten. Many children also qualified their food likes and dislikes. For example they stated their favorite preparation method or variety (e.g. they liked cooked carrots but disliked carrot salad). Therefore, the evaluation of individual components should be recorded in more detail. Overall, it was demonstrated that children do understand what “satisfaction” means as a concept. It can therefore be assumed that satis-



faction can be measured in this age group and that they are able to make concrete statements that could be incorporated into the menu design, with due consideration to age-appropriate and health-promoting nutrition. In view of this, it is worth noting that the majority of the children said they were not allowed to request specific foods, even though day-care centers have kitchens where fresh food and a broad range of foods are made and they can therefore take requests and preferences into account more easily than facilities where lunch is provided by caterers and large kitchens.

The fact that the children rated saying a table chant / mealtime prayer very positively and the fact that some also spoke very joyfully about having an elected “table boss” / “king/queen of lunch” suggests that children place a high value on their participation. Hansen et al. define participation as “the right of children to intervene in their own affairs” and explain that children also apply the knowledge they acquire in day-care to other life situations as well [20]. Therefore, in the future, additional contextual variables such as seating arrangements, behavior rules during the meal and whether the children are allowed to fill their own plates should be recorded.

The question about the presence of the day-care staff at lunch was not clearly formulated. Some children provided information about eating lunch together at the same table, others about whether they were in the dining room with them.

The question about the dining room was difficult for the children to grasp as a concept; the room was sometimes confused with the lunch itself. The evaluations should therefore be interpreted with caution. Nevertheless, the additional statements provided by some of the children demonstrated that they understood the question.

### *Strengths and weaknesses of the content of the interview*

Throughout the interview, the children provided detailed information about their lunch. They were able to express their satisfaction with lunch and explain how much they liked individual foods.

However, the questions about the basic conditions seemed to be too cognitively challenging for some of the children. As children may take these contextual conditions for granted, a suitable alternative may be to put these questions to the staff as part of the questions about the characteristics of the day-care center. This

would allow the children’s interview to focus on the lunch meal, as has been done in other studies that limited themselves questions about food preferences [17] or individual areas of questioning that can be combined, for example [19].

## Conclusion

Based on the children’s answers and the additional information they provided, it was possible to demonstrate that the children’s satisfaction with lunch at their day-care center is measurable.

However, some limitations are apparent in this non-representative study, which is why the following changes are recommended for future surveys:

- Revision of the 5-point Likert scales and testing for comprehensibility
- Asking about and photographing all alternative menu components in advance
- Selecting well-known foods that are easily recognizable in pictures to use when asking about how much the children like various foods
- More detailed recording of any participation
- Recording the basic conditions by asking the day-care center managers

The next step that will be taken is further research with the aim of developing an evaluated instrument for measuring children’s satisfaction with lunch at day-care center. To achieve this, the reproducibility of the satisfaction expressed and the question of how suitable the instruments used are for the everyday context of the day-care center must also be taken into account. It will also be necessary to determine whether the children’s responses to a trusted person differ from their responses to an external person who is unknown to them.

Bearing in mind the current focus on age-appropriate and health-promoting nutrition, regularly asking about and taking account of children’s satisfaction with lunch would satisfy the currently required participatory approach—the requirement to include all stakeholders in the sphere of activity of nutrition in day-care centers.

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### Conflicts of interest

Inga Hesse was a Hamburg University of Applied Sciences researcher involved in the „Erhebung der Verpflegungssituation in den Kindertageseinrichtungen und Schulen des Landes Rheinland-Pfalz“ (Survey of the catering situation in day-care centers and schools in Rhineland-Palatinate, Germany) (2015–2016) and the „Zufriedenheit von Kita-Kindern mit der angebotenen Mittagsmahlzeit in ausgewählten Kindertageseinrichtungen in Rheinland-Pfalz“ (Survey among children on lunches provided in day-care centers in Rhineland-Palatinate, Germany regarding children's satisfaction with lunch) (2018) presented in this article. Both of these projects were funded by the Ministry of Education of Rhineland-Palatinate.

Prof. Anette Buyken, in cooperation with the Fulda University of Applied Sciences and the Paderborn University, led the project on the „Entwicklung eines Konzepts zum Monitoring der Ernährung in Kita und Schule (KoModE)“ (Development of a concept for monitoring nutrition in day-care centers and schools (KoModE)), which was funded by the German Federal Office for Agriculture and Food. Prof. Sibylle Adam led the project for the „Zufriedenheit von Kita-Kindern mit der angebotenen Mittagsmahlzeit in ausgewählten Kindertageseinrichtungen in Rheinland-Pfalz“ (Survey among children on lunches provided in day-care centers in Rhineland-Palatinate, Germany regarding children's satisfaction with lunch) presented in this article at the Hamburg University of Applied Sciences.

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