



# Nudging in daycare catering

## An overview of interventions to promote healthy eating

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### Abstract

The importance of catering in daycare setting in terms of shaping nutrition and eating habits is increasing and is of key importance for the prevention of obesity and nutrition-related health consequences. Nudging activities are an effective tool to support healthy food choices. A compilation and recommendations on nudging in daycare centers are lacking so far. An analysis of existing nudging concepts and their transfer to the daycare setting, taking into account all parties involved (daycare staff, daycare provider, catering companies) and the simple implementation in everyday (daycare) life, shows that both food-related and environment-based nudges can positively influence food choices and acceptance as well as the amount of health-promoting food such as fruit and vegetables consumed. Furthermore, participatory approaches and the involvement of peers and daycare staff have great potential.

**Keywords:** daycare setting, communal catering, daycare catering, nudging, nutritional behavior

### Introduction

Currently, there are more than 2.6 million children between the ages of 3 and 6 cared for in daycare centers in Germany. About every third child (34%) spends more than seven hours a day in a childcare facility [1]. With increasing care time, the need for adequate catering and the responsibility on the part of the responsible parties (daycare staff, daycare provider, catering companies) to meet a health-promoting diet and eating culture also increases. Foods high in energy, sugar, and fat as well as unfavorable dietary habits are significant predictors for the development of overweight and obesity in childhood [2]. According to a survey conducted by the Robert Koch-Institute, 2 million children in Germany are overweight, 800,000 of them obese [3]. Although a good third of daycare centers take nutritional standards such as the DGE quality standard into account when implementing the meals offered, 36.4% and 42.3% of the daycare centers do not have a catering concept yet [4, 5]. Meals often do not meet the nutritional needs of children and the proportion of vegetables, salad and raw foods is not sufficiently covered [6, 7]. Thereby the offered foods and beverages as well as the eating environment influence and shape children's eating behavior. In addition to genetic factors, learned eating habits in particular contribute which preferences children develop and maintain into adulthood. This makes the daycare center an educational and formative place for the child and its future nutritional behavior [8, 9]. Examples from company and school canteens show that small, targeted impulses, so-called nudges, can be used to support a health-promoting diet [10, 11]. It seems logical to integrate such actions into the daily eating routine at an early stage and to use the advantages of the daycare setting.

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## Objective and definition of terms: nudging in the daycare setting

Nudging as an overriding term, and the actions based on it, have their origin in behavioral economics. Light nudges are intended to induce people to change their behavior intuitively, i.e. unconsciously and automatically, in a beneficial way [12]. In recent years, nudging has also gained importance in the area of nutrition. The overarching goal here is to increase the demand for the health-promoting option and/or decrease the demand for less-promoting options [13]. For community catering this means the targeted, guiding support of a diet that meets needs and requirements and a subsequently hoped-for health-promoting dietary imprint and its long-term internalization and generalization. For the daycare setting, with focus on the 3- to 6-year-old age group, this includes increasing the acceptance and consumption of fresh plant-based foods (fruits, vegetables, salads) and less familiar products so far or products with optimized nutritional value, as well as experiencing different flavors and textural properties (early sensory experiences). According to the definition of nudging, nudges should fulfill three conditions: Nudges should not restrict choice, they should be transparent, and they should serve the welfare of the individual or society, i.e. they should be ethically and morally justifiable [12]. In general, behavioral changes can be caused by both behavioral and environmental preventive actions [14]. Because nudges change individual health behavior as well as physical and social factors that influence choice and environment, nudges link behavioral and environmental prevention and thus either fall into one category or the other, depending on how they are expressed [15, 16]. In the long-term implementation of health-promoting actions they often cannot be clearly assigned to nudging or other approaches. Especially in the daycare

setting, corresponding actions are rarely explicitly called nudging or are assigned to this approach.

The aim of this article is to present nudging approaches that have already been effective in the catering area as well as examining new nudging approaches for their relevance and feasibility in the daycare setting, and to point out recommendations and additional comments for the parties involved in daycare catering.

## Methodological approach: commentary and potential analysis of nudging concepts in daycare setting

The TIPPME scheme [17] and the version adapted to the eating behavior of children and adolescents [18] are used as a basis for identifying possible nudging approaches in daycare catering. Accordingly, nudging actions can change both the **arrangement** (availability and placement) as well as the **characteristics** (presentation, size, and cue stimuli or information) to thereby initiate a desired change in behavior. Especially in the daycare setting, social interactions such as the influence of peers (child-child-interactions) or pedagogical staff play an important role [19, 20]. Therefore, for the selection of relevant nudges in the daycare setting, both food-related and **related items**, the **broad environment**, as well as the **parties involved** are considered (♦ Figure 1). The latter can have an influence on consumption via psycho-social factors as well as via food preparation and are therefore, contrary to previous definitions, assigned to nudging actions in the sense of "social-interacting nudges".

Based on a literature search without time restrictions, relevant literature databases (SpringerLink, WileyOnline, FSTA) as well as Google Scholar were searched until October 2021 for proven approaches from the living environments of daycare and school catering, company catering as well as from the family environment and their possible applications in the daycare setting were examined in a two-staged process.

Based on the criteria listed in the box, the research results reviewed were filtered according to their potential for implementation in the setting of a daycare center, whereby in the further selection exclusively approaches were

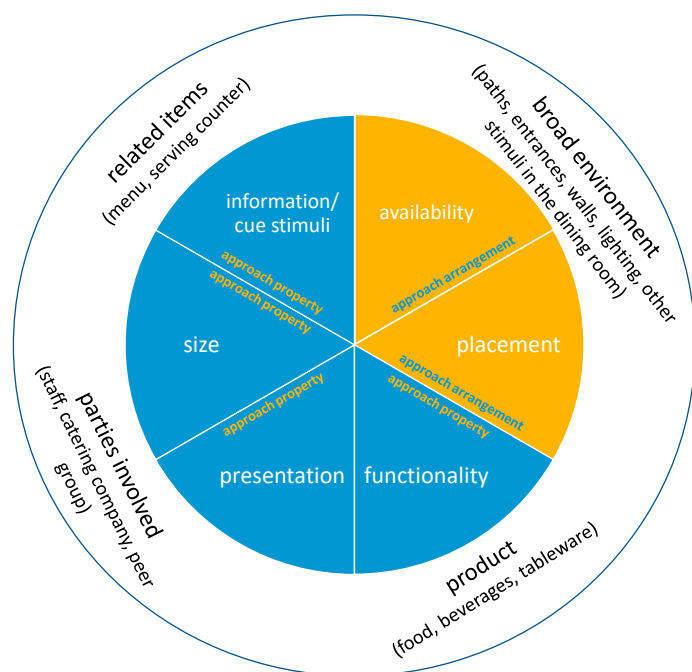


Fig. 1: Overview of analyzed nudging approaches for the daycare setting according to the TIPPME scheme (own representation, among others according to [17, 18])



selected and pursued that had proven successful in studies and that met at least three of the criteria listed in the box for feasibility in daycare setting:

#### Criteria for feasibility of nudges in daycare setting

- 1) feasibility in joined food consumption at single tables
- 2) easy implementation in the existing everyday daycare setting (implementation by means of the available resources, namely staff, material, infrastructure)
- 3) suitability for children in the age of 3–6 years
- 4) promotion of participation
- 5) low investment costs (< 5 € one-time investment costs per child)

In a second step, the potentially suitable nudging actions were discussed with the daycare management and the pedagogical staff from six selected daycare centers in the federal state Baden-Württemberg, Germany and their applicability and feasibility in the daycare setting were reflected with a focus on the practicability in everyday daycare life.

## Results and discussion

### Nudging concepts for a health promoting eating behavior in daycare centers

♦ Table 1 shows an overview of possible actions to support a health-promoting eating behavior in daycare centers, clustered according to the TIPMEE scheme, taking into account the responsible parties involved.

In the following, examples of proven nudging actions with a high potential for direct implementation in the daycare setting for each nudging approach are listed.

#### *Nudging actions with a food focus*

Repeated exposure to new or disliked foods can increase food acceptance in infancy and childhood [21, 22]. In the case of vegetables, an offering without other competing foods as an appetizer before the main meal can additionally increase vegetable consumption [33, 34]. An easy access and a visually appealing and varied presentation of health-promoting foods can also encourage its selection/consumption (♦ Figure 2). For example, it is a good idea to prepare raw vegetables on a plate with different kinds of vegetables as well as shapes and colors and place these in the middle of group tables in daycare centers, so that every child has free access (♦ Figure 3). Studies show that visually appealing foods, such as those in animal shapes, are preferred [38]. There is also the opportunity to actively involve the children in food preparation (e.g., washing, cutting, arranging the vegetables), thereby promoting not only the acceptance of the food but also the participation of the children. Beside shapes, colors also show an influence

on acceptance. Color-assorted vegetable plates are preferred to mixed-color versions [39].

#### *Nudging actions by associated items (direct environment)*

Besides food-related nudges, changes in the nearby environment, such as in the menu layout, can also help to positively influence children's diets. An attractive dish naming, for example "grass-green frog soup" instead of "pea soup" increases eating interest [51, 52]. In order for the children to inform themselves about the meal offer, an illustrated menu can also arouse their interest [50] (♦ Figure 4). In addition, the illustrated dishes and foods can contribute to nutritional education and can also be implemented in a participatory way – for example by crafting or painting the food and determining the order and/or selection. Another way of promoting a healthy diet can be implemented by information or advice. For the daycare setting, the playful inclusion of information by, for example, sensory experiments or handicraft activities on nutritional topics can be used. Mustonen et al. (2010) show that children are more open towards new, unfamiliar foods after sensory training [54].

The way foods are served and the opportunities for participation influence the perception of meals as well. In many daycare centers the eating situation is highly structured and children have little influence on the type and amount of food on their plates [55]. In this context, the self-determined selection and portioning of food can encourage children in their eating behavior and, in addition, help them to acquire a sense of hunger and saturation [56]. The placement of foods in the table center of table fellowships or self-service buffets allow food components and portion sizes to be selected individually and are therefore preferable to non-participatory serving systems [31].

#### *Nudging actions of the wider eating environment*

It is not only the direct eating environment that influences eating behavior and food choices. The design of the dining room also unconsciously influences (eating) behavior by the type of lighting, room color, room temperature, or room size, as well as the arrangement of tables/table fellowships. Even small changes that can be implemented with little effort are showing effects. Creating a pleasant, inviting dining atmosphere reduces stress and hectic during meals and draws the focus on



Nudging approach	Nudging measure	Parties involved
<b>Change of arrangement</b>		
<b>Availability</b> increase or decrease offer, variety or number (local and/or temporal)	regularly offering unfamiliar foods with constant repetition <sup>a</sup> [21, 22]	daycare center, catering company
	combination of raw vegetables with a dip or dressing <sup>a, b</sup> [23, 24]	daycare center, catering company
	preparing vegetables in different ways (e.g., raw, steamed, fried) <sup>b</sup> [25]	daycare center, catering company
	establishing fruit, vegetable and beverage breaks <sup>b</sup> [26]	daycare center
	offering samples of healthy foods <sup>b</sup> [13, 27]	daycare center
	offering fruit and unsweetened dairy products as dessert <sup>c</sup>	daycare center, catering company
	offering water and unsweetened teas as standard beverages and flavoring them occasionally by adding fresh herbs (mint, lemon balm) or fruits (lemon, orange), for example <sup>b</sup> [28]	daycare center
	placing unsweetened beverages freely accessible at all times <sup>b</sup> [27, 29]	daycare center
	installation of a water dispenser or drinking oasis <sup>a</sup> [30]	daycare center
	separated dining room or separation of the dining places by room dividers or curtains <sup>b</sup> [28]	daycare provider
<b>Placement</b> improve or worsen position, proximity, accessibility	placing healthy foods and beverages well visible and easily accessible, e.g. in the middle of the table <sup>a</sup> [31]	daycare center
	preparing raw food/fruit bowls or plates <sup>b</sup> [27]	daycare center
	offering popular vegetables together with less popular or unfamiliar vegetables <sup>b</sup> [32]	daycare center, catering company
	serving vegetables/salad without competing foods before lunch as an appetizer <sup>b</sup> [33, 34]	daycare center
<b>Change of properties</b>		
<b>Functionality</b> improve or worsen functionality or design	using colorful coasters for drinking cups and craft/paint them together with the children <sup>c</sup>	daycare center
	having meals in small table fellowships <sup>b</sup> [35]	daycare center
	placing "omnivores" and picky children at one table <sup>b</sup> [19, 36]	daycare center
	separating meals from the rest of the activities, e.g. by setting the tables together or exercising eating rituals (song, chant) <sup>b</sup> [28]	daycare center
<b>Presentation</b> improve or worsen sensory perceptible properties/attractiveness	using child-friendly and appealing tableware such as ladles in an appealing shape (e.g. animal shape) or colorful cups/plates <sup>b</sup> [37]	daycare center, daycare provider
	offering colorful fruit and vegetable motives, e.g., vegetable arrangements as an animal, sun, or flower <sup>a, b</sup> [38, 39]	daycare center, catering company
	changing the shape of e.g. vegetables, fruit, whole-grain bread by e.g. cookie cutters or cutting method (splits, rings, etc.) <sup>b</sup> [40, 41]	daycare center, catering company
	creation of a pleasant eating atmosphere through warm room colors (light yellow or pastel shades), wall and window pictures and table decorations (e.g. placemats) <sup>b</sup> [42]	daycare provider, daycare center
	bright, but indirect lighting, e.g. by fairy lights <sup>b</sup> [43]	daycare provider, daycare center
<b>Size</b> increase or decrease quantity or shape	offering fruits/vegetables in cut form <sup>b</sup> [40, 41]	daycare center
	increasing portion sizes of healthy components such as salad and vegetables <sup>a, b</sup> [44–46]	daycare center, catering company
	using smaller dishes (bowls) for desserts, larger dishes for fruit or vegetables <sup>b</sup> [24, 47]	daycare provider
	creating sufficient space at tables and in the dining area, e.g., by eating shifts <sup>b</sup> [35]	daycare provider, daycare center
<b>Information/cue stimuli</b> attach or remove slogans, symbols or pictures with information or cues	involving children in food selection and preparation <sup>a</sup> [48]	daycare center
	motivating children to try foods <sup>a, b</sup> [20, 49]	daycare center
	highlighting healthy foods and beverages, e.g., through colorful stickers/smiley <sup>a, b</sup> [10, 50]	daycare center
	finding attractive, imaginative names for dishes together with the children <sup>b</sup> [51–53]	daycare center, catering company
	displaying an illustrated menu of foods on offer <sup>b</sup> [50]	daycare center, catering company
	marking paths to beverage stations with footprints or arrows on the floor or wall <sup>b</sup> [27]	daycare center, daycare provider

Tab. 1: Nudging actions for health-promoting eating behavior in daycare centers with assignment of the responsible parties involved

■ **product:** food and beverages as well as packaging and tableware

■ **associated items/objects:** menus, food serving

■ **broader environment:** paths, accesses, stimuli in the dining room

<sup>a</sup> proven approach from other living environments; <sup>b</sup> proven approach from daycare/school; <sup>c</sup> not proven approach





Fig. 2: Implementation examples for an appealing design of vegetables and whole grain bread



Fig. 3: Implementation examples for color sorted raw vegetable food plates in appealing shapes

the shared food: small groups of tables as well as bright indirect lighting with 200–300 lux, e.g. by self-made lanterns or fairy lights, contribute to a relaxed indoor climate [35, 43, 57]. The separation of mealtimes from the rest of the day and the consumption in a separate dining room are conducive conditions [28]. If the circumstances are not given, room dividers or rituals (a song or a saying at the table) which herald the mealtimes and clearly separate them from the rest of the day, ensure that the focus stays on the meals during mealtime.

#### *“Nudging” by involved parties and social interactions*

Children learn by observing and imitating the behavior of their role models and reference persons. This concerns both the attitude towards dishes (acceptance/rejection) and the behavior at the table – the way and what is eaten – and the interaction with other people. By the participation of the pedagogical staff in the meals (“pedagogical bite”) as well as a positive attitude towards dishes and foods by e.g. positive statements, the willingness of children to try new foods can be positively reinforced [20, 49]. Studies in daycare centers show that negative facial expressions, gestures, and corresponding statements of the pedagogical staff have the opposite effect. Besides the pedagogical staff, other children in particular, so-called peers, do play a role. When assembling the table fellowship, targeted placement of children with different food pat-

tern preferences can influence the food selection and acceptance [19, 36].

#### **Nudging in daycare centers – meaning in practice**

The nudging approaches described above affect all parties involved in daycare catering, i.e., daycare providers, pedagogical staff, housekeeping staff, and catering companies [28], and are applicable to breakfast, lunch and snacks. By indirectly teaching practical and nutrition-related skills as well as involving children in implementation, the nudges presented do justice to children's nutritional education and participation, in addition to support a health-promoting diet. Besides the foods and beverages offered the eating environment and reference persons have a lasting influence on children's eating behavior [8, 58]. Because of their role model function pedagogical staff in particular can play an important role in children's nutritional behavior in the daycare setting and promote the acceptance of new foods by participating in shared meals [20, 49, 59]. While these approaches can be more time-consuming, they offer a great deal of responsibility and participation to children. Although the presented nudging concepts are based on scientifically proven approaches or practical trials from other living environments, there is a lack of empirical data confirming the potential of the application in the daycare setting especially with regard to the long-term effect. The other approaches to the broader environment outlined in ♦ Table 1, which include constructional changes in particular, imply challenges and hurdles to implementation and



Fig. 4: Illustrated menu at the entrance door to the dining room



therefore need to be taken into account at the facility planning stage.

## Conclusion

The listed approaches provide an overview of nudging examples that can be implemented easily and inexpensively in everyday life and the existing daycare environment, so children are “nudged” to put the health-promoting choices into practice and internalize them. The enlargement of the nudging focus on social interactions, particularly the options shown for pedagogical staff and peers but also catering providers to have an influence, illustrate the necessity of holistic approaches based on catering concepts and point out the chances that can also be expanded through a regular exchange of experience between the parties involved as well as further and advanced training. In addition to a health-promoting, appealing, and needs-based food offer and its realization in the dining room, a long-term successful implementation of a balanced, child-friendly, and sustainable diet also requires the involvement of the children by nutritional education and participation actions and the anchoring in existing daily routines.

### Conflict of Interest

The authors declare no conflict of interest.

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