



Project acronym: EDULIA

Project title: BRINGING DOWN BARRIERS TO CHILDREN'S HEALTHY EATING

Grant number: H2020 - MSCA - ITN - 2017: Project no. 764985

Coordinator: NOFIMA, Norway

Website: [www.edulia.eu](http://www.edulia.eu)

## Deliverable D7.4:

Report on experimental nudging study exploring the influence of a selected nudge on parental healthy eating behaviour as well as children's healthy eating behaviour

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Dissemination level: PU

Deliverable type: Report

Approval Task/WP: 25 May 2021

Approval Supervisory board: xx May 2021

Submission date: xx May 2021





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## Executive summary

**Introduction:** Previous mixed-method cross-country research investigating parents shed light on the constraints to healthy eating in the family food environment. One of the biggest challenges reported by mothers was their partner and child's unwillingness to try unfamiliar food. We thus conducted a short intervention to address the issue through a nudge strategy involving the exposure of unfamiliar vegetables and spices to fathers and their children.

**Methods:** Fifteen fathers and their children were exposed to four unfamiliar vegetables (Brussels sprouts, kale, spinach, celeriac) and two spices (curcuma and ginger). The exposure occurred by picture visualization, learning about food's origin (picture book reading) and sensorial experience (sensory session and home cooking). All activities happened in the families' homes and were guided online by the researchers.

**Results and Conclusion:** The online intervention seems to be a promising approach to nudge fathers' and children's willingness to try unfamiliar foods. The positive attitudes towards unfamiliar foods seem to expand to foods beyond the ones chosen for the project. The favourable outcomes of the activities are worthy exploring in larger samples given the feasibility and relatively low cost of the intervention.





## Background

Nudges are defined as a “liberty-preserving approaches that steer people in particular directions, but that also allow them to go their own way” (Sunstein, 2014). Results from a review and meta-analysis demonstrated that Nudge Theory provides insights for effective public health tool in encouraging healthier eating choices (Arno & Thomas, 2016). For example, nudging strategies that make the healthy food choice easy and fun have proved to be an effective way of increasing the consumption of healthy foods (Sunstein, 2014). Nevertheless, the influence of nudging strategies on new parents’ and children’s dietary habits is yet to be more comprehensively understood. We propose that applied nudges involving aspects such as simplification, exposure to certain foods and behaviours, precommitment strategies and reminders (Sunstein, 2014), are useful tools to help families to eat healthier.

A recent study has demonstrated the effectiveness of a self-nudge strategy, which is an action that people voluntarily take to remind/probe themselves to perform a certain desired behaviour. In the study of Torma, Aschemann-Witzel & Thøgersen (2018) the authors explored how signing up for an organic box scheme subscription acted a self-nudging strategy for consumers to increase voluntarily their consumption of organic foods (Torma, Aschemann-Witzel, & Thøgersen, 2018).

In this report, we describe how the concepts of nudge and self-nudge helped fathers to try unfamiliar foods together with their children. The mere enrolment in the intervention might be considered as a self-nudge strategy (precommitment action) and the intervention acting as a nudge in itself (exposing to healthy foods and reminding participants of the desired behaviour).

## Nudge strategy applied to the family food environment

Prior mixed-method research investigating parents in three countries (France, Denmark and Uruguay) shed light on the constraints to healthy eating in the family food environment. Most of the challenges shared by parents involved multifaceted social-cognitive factors including time poverty, traditional gender roles and practices, family members preferences and negative attitudes towards nutrition advice (Moura & Aschemann-Witzel, 2020, 2021; Moura, Vidal, Girona, & Ares, 2021). Cultural issues at the family level are of importance, such as the lack of fathers’ engagement with families’ healthy eating and food-related activities. This particular issue was pointed out by mothers especially in Denmark and Uruguay and was recognized as a barrier to healthier eating (Moura & Aschemann-Witzel, 2020; Moura et al., 2021).





Since the “burden” of (healthy) meals’ preparation relies mostly on women, feelings of stress and time pressure challenges the provision of nutritious meals in the household. Mothers expressed that cooking has become a burden after the birth of a child, due to increased time pressure as a consequence of a busier lifestyle. In addition, the lack of partner’s and child’s willingness to try new healthy foods, discourages mothers in their efforts to prepare diverse healthy meals.

*“I think before [having children] we ate a lot of different things and a lot of vegetables. And now we adapt the food much more to what the kids like.” (Mother of 2)*

*“Participant: I mean, I like new and exciting food, but my boyfriend doesn’t really like it, he just likes normal, traditional, Danish food. So, there can be some challenges.*

*Interviewer: So he does not like to try new foods?*

*Participant: Yes, exactly. That puts a limit on me.”*  
(Mother of 2)

Excerpt from Moura & Aschemann-Witzel (2020).

A high time pressure combined with children’s and fathers’ unwillingness to taste new foods can result in decreased cooking enjoyment and decreased dietary diversity in the household. Meal patterns after parenthood were described as “boring” and “with fewer spices” (Moura & Aschemann-Witzel, 2020).

On this backdrop, we propose an intervention targeting at father and child’s unwillingness to try new healthy foods. The nudging approach was employed for the development of a booklet showing pictures of vegetables and spices usually disliked by children (and their fathers) (Appendix). Four vegetables (kale, spinach, celeriac, Brussels sprouts) and two spices (curcuma and ginger) were chosen based upon observation in a Danish kindergarten. The exposure to pictures of foods has proved to be an effective nudge approach to increase the acceptance of those foods (Heath, Houston-Price, & Kennedy, 2014; Houston-Price, Butler, & Shiba, 2009). The main principle behind this approach is that our food preferences is intrinsic to what we are exposed to, visually, since young ages. In addition, the intervention included the preparation of the unfamiliar vegetables to nudge their consumption by fathers and children.

Engaging fathers in the food intervention was an attempt to nudge them into giving higher importance to the family’s healthy eating practices and behaviours. We apply a “cognitive oriented” nudge strategy by enhancing the visual exposure to unfamiliar foods and also an





“affectively oriented” strategy by seeking to influence how families feel about unfamiliar foods (by showing that it can be fun to cook and eat them together) (Cadario & Chandon, 2020).

Our approach involved practical activities focusing at sensorial aspects of healthy foods, as opposed to nutrition concepts. This strategy aligns to the needs and wants mothers reported on social media, where they expressed negative attitudes towards nutrition advice and classical nutrition counselling and guidelines (Moura & Aschemann-Witzel, 2021). Indeed, hands-on activities such as cooking programs and taste exposure interventions have yielded the best outcomes in promoting children’s’ fruits and vegetables consumption, compared to nutrition education (Dazeley, Houston-Price, & Hill, 2012; DeCosta, Møller, Frøst, & Olsen, 2017; Nekitsing, Hetherington, & Blundell-Birtill, 2018).

The main goal of the present study is thus to nudge fathers and their young children to taste unfamiliar foods through picture exposure combined with sensory activities. The applied intervention brings in context (the family food environment) to a higher extent than more “context neutral” classical nudging approaches. As argued by Meder, Fleischhut, & Osman “Sometimes, a simple nudge-like intervention may be sufficient to promote a certain behaviour because the environment is prepared for the intended behaviour to emerge.” We thus answer to a call to investigate nudge strategies “beyond the confines of the choice architecture.” (Meder, Fleischhut, & Osman, 2018, p. 42).

In the next section we describe the intervention methods in more detail.

## Methods

### Participants

**Inclusion criteria:** Fathers of young child(ren) (2-4 years old) who live together with the child(ren). Screening questions were applied to select fathers who were not the main responsible for cooking in the home and that were averse to trying new foods. These latter inclusion criteria were also applied to the children.

**Exclusion criteria:** Food allergies, diseases that potentially affect food intake of vegetables and spices (e.g. gastrointestinal diseases). Fathers who are the main responsible for food-related activities in the household were excluded.





Fifteen families with young children (between 2 and 4 years old) from a consumers' panel of the Danish dairy company Arla Foods Amba were selected to join the study (based on the above criteria). Father's age varied between 27-46 years old and mothers between 26-40 years old. Except to two families, all the others declared satisfactory financial situation and to have a university degree (for both parents).

## Book development

The content of the book was developed by the lead researcher (Andreia F. Moura) based on literature review of children's book with similar purpose (Heath et al., 2014; Nekitsing, Blundell-Birtill, Cockroft, Fildes, & Hetherington, 2019). Following previously employed methodologies, the book included one large photograph of each food and several smaller photographs showing how the foods grow, what they look like inside and what the prepared foods might look like, with sentences for fathers to read (Appendix) (Heath et al., 2014; Houston-Price et al., 2009).

The content and language were reviewed by the other researchers (Jessica Aschemann-Witzel and Alice Grønhøj), by a professional pedagogue with working experience in Danish kindergartens (Thomas Witzel) and by the Danish marketing agency Kidvertising (specialized in advertising for children), which also developed the pictures and translated the content from English to Danish.

## Procedure

The procedure was threefold: 1) Picture book reading, 2) Sensory session and 3) Cooking and tasting recipes with the selected vegetables and spices.

Fathers were asked to read the picture book (Appendix) the minimum of three times a week during three weeks. They registered the reading frequency at the end of the book. In complement to the book reading, father and child participated in one guided sensory session to explore the four vegetables (Brussels sprouts, spinach, celeriac, kale) and the two spices (curcuma, ginger). The session was guided online (due to the covid pandemic restrictions) by the main researcher (Andreia F. Moura) and a research assistant Danish speaker (Amanda Vidabaek). Table 1 shows the description of the sensory activity.

Table 1. Description of sensory session conducted with father and child

### Sensory session: Discovering vegetables and spices (individual session: father and child)

#### Sound

- ✓ Listen to the vegetable name, tapping, squeezing the vegetable to hear a sound





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- ✓ Listen to the noise made when the food is snapped or squeezed

#### Sight

- ✓ Look at different versions of the vegetable and describe the colour
- ✓ Compare the difference between the outside of the whole food and the inside of the food after it has been cut open
- ✓ Find items around the house that match the color of each food
- ✓ Draw a picture of each food

#### Touch

- ✓ Feel the texture by hand and fingers, feeling of the different forms
- ✓ Feel the texture of the outside of the whole foods
- ✓ Feel the texture of the foods after they've been chopped up
- ✓ Compare the texture of the chopped up foods before and after they have been cooked

#### Smell

- ✓ Pick and sniff the different forms
- ✓ Smell the cooked food
- ✓ Compare the smells of the cooked and uncooked food

#### Tasting (mouth feel, if the child is willing to)

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Finally, families received a meal box with ingredients for the father to prepare four recipes that included the vegetables and spices, as described in Table 2.

Table 2. Recipes with the vegetables and spices included in the picture book

Main ingredient	Recipe
Brussels sprouts	Brussels sprouts gratin
Spinach and ginger	Green smoothie
Celeriac and curcuma	Spaghetti sauce
Kale	Kale chips in the oven

## Outcome evaluation

The main expected outcomes were assessed qualitatively in an interview with the entire family at the end of the intervention. A qualitative approach was chosen due to the importance of perceptions, thoughts, emotions, meanings and evaluations of participants' experiences during and after the activities. Furthermore, qualitative methods are frequently chosen as the best approach to conduct program evaluation (Harris et al., 2009). Table 3 summarizes the questioning routes that guided the interview with the families.







Table 3. Questioning routes for the evaluative interview

### Questioning routes

[Child] Did you enjoy reading the book with daddy?

[Child] What did you like/dislike the most about it?

[Same questions about the sensory session and tasting the food prepared by the father]

[Father] Could you tell how your experience in participating in the activities was?

*If necessary:* How is your willingness to try new vegetables and spices? Do you perceive a change (or not) after your participation in the project?

[Mother] Could you tell how your experience in having your family participating in the activities was?

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## Results

The vast majority of the children enjoyed the book reading and the other activities (sensory session and tasting meals with the vegetables prepared by the daddy). Their interest for the book, the activities and for the meals surprised the parents, who initially thought that a book without famous characters could retain their child's attention.

*"In the beginning I was like "he [son] will never get into it [reading the book]", and then I just lay it [the book] on the bed on his blanket and yeah, he took it eventually."* (Father)

*"When I first saw the book, I thought that it was a bit poor, I thought the quality of it was not what I expected, and I looked into it and I thought, well this isn't a child's book. Then when I read it the first time, she [daughter] was actually quite into it, and I thought "okay, well, for some reason this actually works for her"".* (Father)

Parents were also surprised by the fact that looking at the pictures of the vegetables in the book increased child's willingness to try them.

*"Reading the book has made [daughter] more interested in the vegetables we used in the recipes. And I was surprised by it."* (Father)

*"Interviewer: Could you tell how your experience in having your family participating in the activities was?"*

*Mother: I think it was working well with the book, actually. Especially in the beginning when the book was new. It was more exiting for [daughter] to hear about the vegetables. I think at the end of this period she has heard it so many times that it was maybe not exciting anymore. And she was interested in the dishes that were made, and also tried tasting them, but it was not something she would eat a lot of, but just the courage to taste was impressive."* (Mother)





The willingness to try the vegetables and spices extended to foods not included in the book, as explained by one father:

*“After the activities [book reading and sensory session] [daughter] has remembered how we showed her the different vegetables and it has changed some behavior in her around all kinds of foods. She now expresses wanting to taste various foods in any dish we make.”*

Fathers themselves (with one exception) also enjoyed the experience of trying new foods.

*“Especially, you know, I had a prejudice towards Brussel sprouts that I didn’t like them. So, it was good to try eating them and finding out that it was okay, that I actually liked the recipe.”*

*“I was kind of surprised how good it actually tasted with the kale chips. That was a good thing to experience. So perhaps I will experiment more...”*

*“I think overall it was a very positive experience, and I think the taste was also surprisingly good.”*

Fathers also expressed that the willingness to try unfamiliar foods expanded to foods that were not included in the activities. This favourable outcome was best explained by one father who told that after participating in the activities he became more attentive to “unusual” vegetables appearing in the pamphlet of a supermarket:

*“I think we also started noticing, like, I took a picture of, not a newspaper but an article from Menu, one of the shops around here, and they advertise with all these green vegetables as well as... Brussels sprouts and kale and all those, which I just found a bit, let’s say, wouldn’t normally look for them. But maybe because I’ve been speaking to you, and doing these activities then it’s just suddenly something that’s catching my eye. [...] When we were looking through the adverts from the local shops, something has triggered, because otherwise I wouldn’t notice that they had got kale in the menu, they had gotten Brussels sprouts and then so... it [the participation in the project] has done something.”*

Overall, the book reading was a fun experience for both father and child.

*“It was very interesting. I think it was quite nice to read together with [daughter]. And she was very engaged and especially the animals and the kids in the book, she was very... She liked them. So, I think it was very nice. Yeah, I liked it very much.” (Father)*

*It was really good, a good feeling. We used it for after we had dinner, we read the book, before she was put to sleep. That kind of relaxing feeling, used it as a tool. It was really good. (Father)*

Just a few fathers (total of two) considered the book to be written in a “too advanced” language, and in a format that was not “catchy” for children.





*I didn't feel it was made for children 2-4 years old. It was difficult reading it for the children. I had to make them attentive to the book... It didn't catch them. It was very grown-up language.*  
(Father)

Most of the parents expressed to feel motivated to keep trying new vegetables in the home, as explained by the following quote of a father:

*Even though he [son] is very young [2 years old], I will try to expose him to more exotic vegetables, and then prepare them in different ways with different kind of dressings or processing to make them more... or less raw. [...] So I think that would... I wouldn't have given him Brussels sprouts or spinach, so the different kinds of vegetables really inspired us, and I hope that I can keep on exposing him to that.*

The mothers (in most of the cases) reported that they were the ones who subscribed the family to participate in order to increase vegetables' diversity in the household. This confirms the nature of the self-nudge aspect of the intervention, considering the family as a unit nudging itself to change a behaviour. From the fathers' side, the commitment they took when accepting to be part of the intervention, and the actual participation in the activities might also be considered as self-nudge towards familiarizing with a higher variety of foods.

## Conclusion

Using picture book (combined with one sensory session and home cooking) is a promising nudge (with potential to be a self-nudge) strategy to increase child and father's willingness to try unfamiliar vegetables and spices and the intention to keep including those foods in family meals. Although it should be further explored with quantitative and longitudinal methods, this nudge strategy appears as a low-cost simple alternative to optimize healthy foods' variety in the family food environment. The simplicity of the approach is an asset for its application virtually, not requiring high human resources and being suitable for the pandemic situation.





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## Appendix: Oscar and Sophie's vegetable friends – picture book

