



HabEat

Determining factors and critical periods in food habit formation and breaking in early childhood: a multidisciplinary approach

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Dissemination level: CO. The summary will be Public. The references of the papers, the abstracts and the links to the journal will be added to the public summary after any paper related to the data presented in this deliverable has been accepted for publication.

Executive Summary

Children's vegetable intake is below the recommendations in many European countries. Therefore, Work Package 3 of the HabEat project investigated the effectiveness of four different strategies that aimed to increase children's vegetable intake. Ten studies were conducted among two- to six-year-old children in real-life settings in Denmark, Greece and The Netherlands. Another study was executed in France and did not focus on children's vegetable consumption but on food intake regulation. The aim of this report is to compare the efficacy of the different relearning or habit breaking strategies that have been applied in Work Package 3.

First, the main results that have been reported in the previous Deliverable reports are summarized. Then, an overview is provided of the number of non-eaters in each vegetable study. Thirdly, the Greek and Dutch data of the Imitation studies (Task T3.3.1) were combined and joint analyses were performed. Also the Danish and Greek data of the choice-offering studies (Task 3.3.2) were combined for joint analyses. The Danish repeated exposure study (Task T3.2) was further investigated by comparing the repeated exposure effect for each experimental group and by exploring transfer effects to other vegetables sharing similar properties as the target vegetable Chinese Radish. Finally, challenges and facilitating factors during execution of the intervention studies are described and suggestions for execution of future studies are provided.

Work Package 3 has shown that repeated exposure is an effective strategy to increase intake and liking of an unfamiliar vegetable, whereas repeated exposure to a familiar vegetable is not sufficient to increase intake. These studies of Task 3.2 also showed that serving style of the vegetables influenced children's acceptance and this may be an important avenue for further research. In the Danish study, the increase in intake did not differ per experimental group. There was some evidence for transfer of the learning effect to other shapes of the same vegetable (Chinese Radish). Furthermore, there was no clear evidence for a transfer of the learning effect to other vegetables with similar sensory properties, which may be explained by the fact that between the vegetables, little overlap in sensory properties was experienced.

Imitation strategies in a classroom setting did not increase children's intake of a relatively familiar vegetable. But interestingly, when children could choose one out of four vegetables during the choice tests in these imitation studies, their vegetable intake was 2-3 times higher than during the other intervention sessions, suggesting that this may be a promising approach. The joint analyses showed that data of both countries cannot be merged, since

effects may differ per country. The joint analyses also add to our observation that various individual, situational and cultural factors may have played a role. The results suggest that different processes with counteracting effects are occurring simultaneously: role modelling effects of child idol and teacher (+), boredom effects (-) and negative peer modelling effects (-). It seems that depending on the situation and the individual factors of the children, one of these processes is strongest.

Choice-offering seems to have potential to positively contribute to children's vegetable intake. The joint analyses confirm that it is a conditional effect and therefore certain groups may benefit more from choice-offering than others. Cultural and situational factors, the type of vegetable, age of the child and vegetable liking prior to the study seem to be moderating factors.

As has been reported previously (D11), participation in a vegetable preparation session together with an enthusiastic chef-cook did not increase children's vegetable intake in the meal afterwards. Nevertheless, there was some evidence that it might maintain children's involvement in food-related activities.

As has been reported previously (D9), 3-6-year-old children tend to overeat in challenging situations: they were not able to fully compensate when eating a snack before a lunch and ate in the absence of hunger when offered palatable foods after a lunch. New analyses were conducted on the results of the intervention programme that taught children to focus on their internal cues of hunger and fullness. These did not demonstrate an effect of the intervention on children's eating behaviour in the two challenging situations previously described.

In the vegetable studies, the number of non-eaters (children that ate less than 10 grams on the different sessions) varied between 2% and 80% for the experimental groups. These children seemed unresponsive to the intervention and new strategies are needed to convince them to start eating (more) vegetables. Other challenging factors that were encountered during the execution of the experiments were retrieving completed informed consent forms and questionnaires from parents, keeping the school/nursery staff motivated throughout the experiment, implementing the intervention within the well-defined school day rhythms without disturbing these rhythms too much, suiting these young children's attention span and understanding capacities, involving low socio-economic families, the occurrence of different influential factors outside the intervention program and the high numbers of absenteeism at Greek nursery schools. Factors that facilitated execution of the experiments were presence of an experienced researcher as key person during each visit, the same group of research assistants during each visit, reminders for parents and caretakers via different channels, a

good relationship with the head and teachers of the school or nursery, inclusion of familiarisation sessions for the children and training and support for the teachers, and a small reimbursement for Danish and French parents to thank them for their participation. Based on these experiences, recommendations for future experiments are to invest in good relationships with the school or nursery staff, to organize regular meetings or interesting activities to keep the school staff motivated, to have one key contact person per school or nursery who can assist in planning and in reminding the parents, to organize information evenings for parents to inform them and help them understanding the study procedures, to provide parents with the option to complete a questionnaire on paper or via the internet and to include additional sessions when there is a lot of absenteeism to compensate this.

To conclude, the most effective strategy for increasing 3-5-year-old children's intake of vegetables is by using repeated exposure for novel vegetables. When familiar vegetables are used, choice-offering may be promising, but this effect does not seem to be very robust. It may also be helpful to vary with serving style of the vegetables to influence children's intake. Future research should extend our findings by focusing on how intake of familiar vegetables can be encouraged, and how non-eaters can be convinced to start eating (a larger quantity of) vegetables. One interesting avenue may be to create an additional vegetable eating moment, especially in countries where vegetables are eaten only during dinner time. Furthermore, it would be useful to investigate the effect of the different vegetable-stimulating strategies also in other settings, in older children and with other vegetables. The results of Work Package 3 have shown multiple moderating factors (setting, vegetable type, frequency of intervention activities, cultural habits and child characteristics such as age and vegetable liking) that may help shaping further research. Finally, the practical execution of the intervention studies has yielded valuable insights for future research with young children.