

RECOMMENDATIONS FOR FUTURE RESEARCH

Researchers from HabEat identified some gaps that need to be answered by future research. Here is a summary of these recommendations:

- To understand if breastfeeding duration is related to higher diet quality in early childhood (as shown in our European cohorts) in populations from low and middle-income countries, where breastfeeding duration is longer in disadvantaged rather than in advantaged families.
- To confirm that the association of breastfeeding with higher diet quality persists throughout childhood and to clarify the effect of maternal diet during breastfeeding.
- To explore the effect on a healthier diet in childhood of other aspects of complementary feeding than timing including food variety during the complementary feeding period, and use of home-prepared vs. ready-prepared baby foods.
- To study the determinants of child eating difficulties, how parents adapt their feeding practices in response to these difficulties, and how these adaptations shape the future eating habits of the child.
- To further understand why a specific group of children (identified in HabEat experiments) do not respond to repeated exposure by increasing their intake of a food.
- To replicate in larger population samples with different cultural eating habits and socio-economic status the finding that repeated exposure to a variety of single vegetables at the start of complementary feeding results in better acceptance of an unfamiliar vegetable. In addition the longer-term impact of such interventions remains to be established.
- To explore the optimal serving size and the optimal frequency of the repeated exposure technique for increasing intake of a novel vegetable and of a relatively familiar vegetable.
- To further explore the effect of positive restriction of healthy foods (vegetables) on children's intake, which means that a role model eats the vegetable enthusiastically whereas the children cannot or are not allowed to eat it at that moment.
- To investigate whether role modelling strategies in a home situation are effective for increasing intake of relatively familiar vegetables (rather than in a school setting as was tested in HabEat).
- To test whether children eat fewer vegetables at home in the evening if they receive additional vegetables at school.
- To investigate in larger samples of different age groups (including toddlers) whether offering a choice of vegetables may be an effective strategy to increase consumption of relatively familiar vegetables.
- To explore ways of increasing vegetable intake in children who are non-vegetable likers/low-vegetable likers.
- To investigate whether children helping with vegetable preparation repeatedly (rather than just once as tested in HabEat), or in the home-setting, or in children over 6 years has a beneficial effect on vegetable intake.
- To perform research on other health-promoting foods often rejected by children, such as fish and whole-grain cereals.



Evidence-based recommendations for the formation of healthy eating habits in children from infancy to 6 years old.

HabEat aimed to identify strategies to promote healthy eating habits in infants and young children. We investigated strategies to facilitate preferences for healthy foods, particularly vegetables, and examined the impact of individual differences in child eating behaviour and parental feeding practices.



References from HabEat already published:

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4. de Lauzon-Guillain B, Jones L, Oliveira A, Moschonis G, Betoko A, Lopes C, Moreira P, Manios Y, Papadopoulou NG, Emmett P & Charles MA (2013). The influence of early feeding practices on fruit and vegetable intake among preschool children in 4 European birth cohorts. *Am J Clin Nutr*, 98, 804-812. doi: 10.3945/ajcn.112.057026
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7. de Wild VW, de Graaf C & Jager G (2014). Efficacy of repeated exposure and flavour-flavour learning to increase preschooler's vegetable intake and acceptance. *Pediatr Obes*, in press.
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9. Nicklaus S & Remy E (2013). Early origins of overeating: Tracking between early food habits and later eating patterns. *Current Obesity Reports*, 2, 179-184. doi: 10.1007/s13679-013-0055-x
10. Pauperio A, Severo M, Lopes C, Moreira P, Cooke L & Oliveira A (2014). Could the Food Neophobia Scale be adapted to pregnant women? A confirmatory factor analysis in a Portuguese sample. *Appetite*, 75, 110-116. doi: 10.1016/j.appet.2013.12.023
11. Remy E, Issanchou S, Chabanet C & Nicklaus S (2013). Repeated exposure of infants at complementary feeding to a vegetable puree increases acceptance as effectively as flavor-flavor learning and more effectively than flavor-nutrient learning. *J Nutr*, 143, 1194-1200. doi: 10.3945/jn.113.175646

This document presents the findings from HabEat based on the analyses of data from birth cohort studies and experimental work among infants, toddlers and children up to 6 years of age. HabEat has developed recommendations for both policy makers and stakeholders, which promote the formation of healthy eating habits.



The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/ 2007-2013) under the grant agreement n.FP7-245012-HabEat.

BREASTFEEDING AND COMPLEMENTARY FEEDING

Breast milk is the best food for infants. Among its many advantages, HabEat found evidence that it may facilitate the consumption of vegetables and fruit and a greater variety of healthy foods in later childhood. This may be the result of exposure to flavours from the mother's diet changing the taste of the breast milk.

Recommendation

Continued efforts should be made to encourage breastfeeding.

The complementary feeding period is a 'window of opportunity' when an infant is particularly receptive to a variety of foods with different flavours and textures. It is important that infants are introduced to a variety of different vegetables in the complementary feeding period as HabEat found some evidence that this increases later acceptance of novel foods. Familiarity with many different vegetables is likely to lead to the consumption of a greater variety of vegetables and fruit, as the child grows.

HabEat has shown that introducing a variety of single plain vegetables to infants can increase acceptance of a novel vegetable.

HabEat has also shown that repeating the exposure to the same vegetable can increase acceptance of that vegetable. If it is refused at first it should be offered again after a few days. The number of tastings needed will depend on the age and eating temperament of the individual child and on the particular vegetable. As many as 8 exposures may be necessary and can be carried out in both home and childcare settings.

HabEat found that infants accept novel vegetables more readily than older children (aged 2 to 6 years).

HabEat has shown that children (aged 4 to 36 months) who are less enthusiastic eaters needed more exposures to accept a novel vegetable. These children consumed less of the vegetable at the beginning but their intake increased with exposure.

Recommendation

Introduce plain vegetables as first foods in the complementary feeding period and use repeated exposure to a variety of vegetables to increase acceptance of vegetables.

FEEDING YOUNG CHILDREN (AGED 2 TO 6 YEARS)

Children are more likely to become neophobic and picky (refuse novel but also familiar foods) between the ages of 2 and 6 years and at this stage it is more difficult to achieve acceptance of a novel vegetable. HabEat has shown that repeated exposure to a plain novel vegetable increases intake in children of this age.

Offering several different serving styles (sticks, grated, squares etc.) of vegetables may be effective in increasing intake, as this influenced liking and intake among young children in HabEat.

HabEat found that offering children more than one vegetable to choose may increase their intake of vegetables. Other HabEat studies have shown that offering the same (relatively familiar) vegetable twice per week may lead to boredom and diminish intake of that vegetable.

HabEat did not find evidence that, for children aged 4 to 6 years, helping to prepare vegetables on one occasion in a restaurant setting was effective in increasing their intake of a relatively familiar vegetable. Neither the child's teacher nor a cartoon character acting as a role model was effective in increasing intake of a relatively familiar vegetable in a class-room setting.

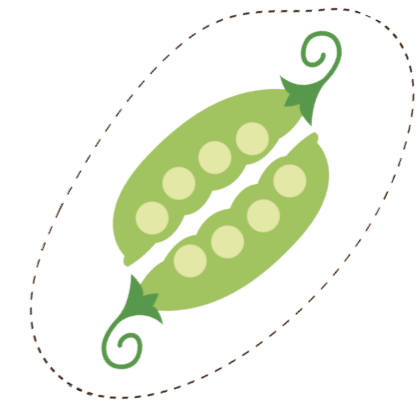
Recommendation

Use repeated exposure to a novel vegetable to help a child learn to enjoy the taste of that vegetable. When possible offer children a choice of two or more vegetables.

Children described by their parents as 'difficult eaters' were found by HabEat to eat less vegetables and fruit and a less varied diet at 4-5 years of age than children who were not described as difficult.

Recommendation

Parents should persist in offering children who are 'difficult eaters' a variety of food and textures to help them learn to like a range of foods.

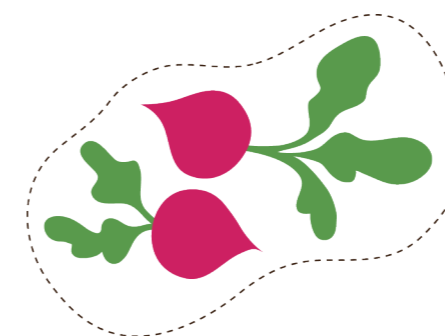


FOOD INTAKE REGULATION AND PARENTAL FEEDING PRACTICES

HabEat found that parents who used 'Food as a reward' were more likely to have children (aged 3 to 6 years) who ate in the absence of hunger than parents who did not use this feeding practice.

Recommendation

Food should be offered to a child in response to their feelings of hunger, and not used as reward for a good behaviour or for any other reason.



HabEat found that when children (aged 3 to 6 years) ate a preload of energy-dense food less than one hour before a meal, they ate less during the meal. However, at the meal, children adjusted their food intake only partially for the energy ingested from the preload. Therefore their overall average energy intake was higher with the preload than when only the meal was eaten.

HabEat found that when energy-dense foods were available freely after a meal, most children (aged 3 to 6 years) ate in the absence of hunger and consumed extra energy.

Recommendation

Avoid offering energy-dense snacks before or after meals. If children are hungry before a meal, vegetables could be offered as a snack/appetizer.

