Habeat NEWSLETTER

NEWSLETTER N°04
Summer 2012

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HabEat project
Determining factors and critical periods in food Habit formation and breaking in Early childhood: a multidisciplinary approach

HabEat stakeholder workshop n°1

Results of the work carried out in HabEat are expected not only to increase our knowledge of food habit formation in early childhood but also to be used for drawing up guidelines for stakeholders. Consequently, it is important to make sure that HabEat scientists and stakeholders interact from as early as possible within the project and not just once the project is drawing to a close. It is also important to interact with stakeholders from a large number of EU regions to ensure that the guidelines are relevant for all EU countries.

In this context HabEat had planned to hold the first stakeholder workshop targeting East European countries on 3rd November 2011 at the Warsaw University of Life Sciences, Faculty of Human Nutrition and Consumer Sciences (Poland). Unfortunately the workshop could not take place due to the unexpected closure of Warsaw airport and has now been rescheduled on mid June 2013.

So, the first stakeholder workshop was held on 3rd April 2012 at the University of Leeds in United Kingdom. The event targeted Western European countries and involved directly all stakeholders (including 39% academic researchers, 18% childcare professionals, 12% health professionals, 15% food industry and in particular baby food industry, 8% students, 3% parents, 1% journalist and 1% policy makers…).
This workshop provided us with the opportunity to interact with scientists who are not directly involved in HabEat but work in the same field. In particular, for this first workshop, Dr Camille Schwartz (Institut Paul Bocuse Research Center, France) gave a talk on “International and national weaning feeding guidelines: strengths and weaknesses”. Unfortunately, Prof. Berthold V. Koletzko (Dr. von Hauner Children's Hospital, University of Munich Medical Centre, Germany) presentation was cancelled. Then, three key questions concerning food habit formation was debated on with the audience after a short introduction. The first issue was regarding the age to start complementary feeding, the duration of breastfeeding and the impact of these two factors on a child's food habits/preference. Dr Marie-Aline Charles (INSERM) addressed these points presenting the initial results of analyses of data from four European cohorts. Dr Sophie Nicklaus (INRA) introduced the second issue regarding which strategy could be the most effective in ensuring optimal food acceptance at weaning. Dr Pauline Emmett (University of Bristol) introduced the third question regarding the quantitative dimension of food habits, i.e. how much food is eaten. It focused on the quantities served, maternal attention and responses to child hunger and satiation cues all in relation to child's food habits and was introduced. These three key questions were discussed in small groups and the chairs of each session made a feed-back presentation during the plenary session that followed. Finally, we were very pleased to welcome Dr Marie-Laure Frelut (Secretary of the European Child Obesity Group) who concluded the workshop. We are pleased to present to you here in this Newsletter the main feed-back arising from this first stakeholder workshop.

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International and national weaning feeding guidelines: Strengths and weaknesses

By Camille Schwartz, PhD
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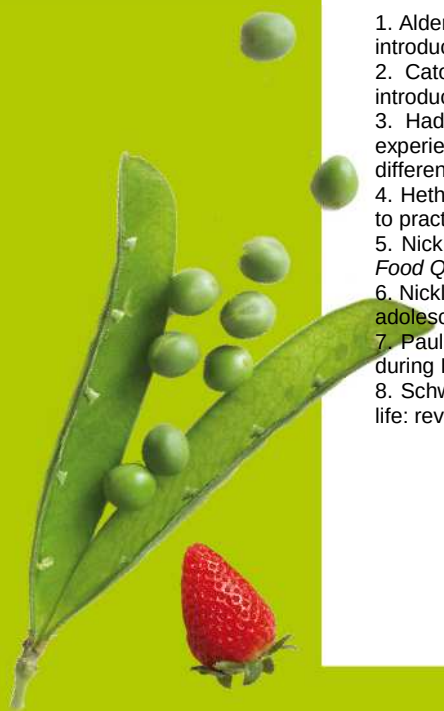
Given that early food preferences and eating habits follow us into adulthood (Nicklaus, Boggio, Chabanet, & Issanchou, 2004, 2005), encouraging healthy eating habits early in life is a means of preventing the onset of diet-related diseases like obesity later in life (e.g. Paul et al., 2009). The developmental course experienced by a child in becoming autonomous in feeding is punctuated by critical time points in the acquisition of eating habits. Weaning/complementary feeding which is the gradual introduction of foods other than milk (e.g. breast milk or infant formulas) is one of these particular stages. Ultimately, weaning is aimed at introducing the child to the same foods as those eaten by the family. This time point is crucial not only in the development of eating habits from a nutritional and behavioural perspective but also from an emotional point of view. Parents seek guidance on how to ensure a healthy diet for their children. National and international guidelines have thus been developed to support parents while going through this process.
The objective of this presentation was 3-fold. The first objective was to compare and evaluate to what extent selected international and national weaning guidelines cover recent scientific evidence addressing the establishment of healthy eating habits (Schwartz et al., 2011). The second objective was to give some insights into actual parental practices and parents' perception of guidelines (e.g. Hetherington et al., 2011). Finally, the last objective was to encourage debate by discussing some possible ways of improving current weaning guidelines. Concerning the comparative analysis of selected international and national guidelines, it appeared that generally all guidelines cover most of the topics identified as important by scientific literature. Nevertheless, some of the national guidelines were found to be incomplete. These guidelines could be improved if updated with the latest scientific evidence regarding the development of healthy eating habits (Schwartz et al., 2011). For example, emphasizing the positive impact of repeated exposure and of introducing variety from weaning onwards would be an improvement. The way to implement the concept of responsive feeding deserves more attention. The potential impact of parental practices could be clarified (Schwartz et al., 2011). Regarding actual parental practices (e.g. Alder et al, 2004; Caton et al., 2011; Haddinott et al., NHS Scotland, 2010; Hetherington et al., 2011), it appeared that there is a discrepancy between guidelines and actual practices. Mothers reported inconsistencies between different sources of information. They also reported too much rigidity in guidelines (Caton et al., 2011). As a consequence they sometimes deviate from guidelines and define their own strategy. They justify this because mothers "know best" (Alder et al, 2004), and "every baby is different" (Caton et al., 2011). When developing and/or updating feeding recommendations, these observations and parents' perception should be kept in mind by policy makers. Beyond the content of guidelines, when and how these guidelines are delivered are also of importance and then must be also questioned.

1. Alder, Williams, Anderson, Forsyth, Florey, & van der Velde, (2004). What influences the timing of the introduction of solid food to infants? *British Journal of Nutrition*, 92, 527–531.
2. Caton, Ahern, & Hetherington (2011). Vegetables by Stealth: an exploratory study investigating the introduction of vegetables in the weaning period. *Appetite*, 57, 816-825.
3. Haddinott, Craig, Britten, & McInnes (2010). A prospective study exploring the early infant feeding experiences of parents and their significant others during the first 6 months of life: what would make a difference? Published by NHS Health Scotland.
4. Hetherington, Cecil, Jackson, & Schwartz, C. (2011). Feeding infants and young children: from guidelines to practice. *Appetite*, 57, 791-795.
5. Nicklaus, Boggio, Chabanet, & Issanchou. (2004). A prospective study of food preferences in childhood. *Food Quality and Preference,* 15, 805-818.
6. Nicklaus, Boggio, Chabanet, & Issanchou. (2005). A prospective study of food variety seeking in childhood, adolescence and early adult life. *Appetite*, 44, 289–297.
7. Paul, Bartok, Downs, Stifter, Ventura, & Birch. (2009). Opportunities for the primary prevention of obesity during Infancy. *Advances in Pediatrics,* 56, 107-133.
8. Schwartz, Scholtens, Lalanne, Weenen, & Nicklaus (2011). Development of healthy eating habits early in life: review of recent evidence and selected guidelines. *Appetite*, 57, 796-807.



TOPIC N°1
"EARLY PARENTAL FEEDING PRACTICES AND LATER FRUIT AND VEGETABLE INTAKES"

Chaired by Dr Marie-Aline Charles and Dr Blandine de Lauzon-Guillain (INSERM, France)

The objective of task 1.4 in the HabEat project was to identify the critical periods/factors in the development of food habits and preferences. As fruit and vegetable intake is the objective of several studies in other WPs, it was decided to first explore the association between early parental feeding practices (breastfeeding duration and age of introduction of fruits and vegetables in the infant diet) and usual fruit and vegetable intake after the age of two years. Results were presented and discussed during the workshop.

The analyses were based on four European cohorts:

- the British Avon Longitudinal Study of Parents and Children (ALSPAC) study, including 7269 newborns, whose mothers were recruited between 1991 and 1992 early in pregnancy, with data on both weaning period and fruit and vegetable intake at 2, 3, 4, 7, 9 and 13 years.
- the French EDEN study, including 1296 newborns, whose mothers were recruited between 2003 and 2005 early in pregnancy, with data on both weaning period and fruit and vegetable intake at 2 and 3 years.
- the Portuguese Generation XXI Birth Cohort, including 556 newborns, recruited at birth between 2005 and 2006, with data on both weaning period and fruit and vegetable intake at 4 years.
- the Greek EUROPREVALL study, including 800 newborns, whose mothers have been recruited between 2005 and 2007 in pregnancy, with data on both weaning period and fruit and vegetable intake at 2 years.

Fruit and vegetable intakes were assessed from food frequency questionnaires in each cohort. Fruit intake was exclusive of jams/jellies and fruit juice. Vegetable intake was exclusive of legumes and potatoes. We decided to use common cut-offs for fruit and vegetables intake across the four cohorts (>1/d vs. ≤1/d for fruit and for vegetables considered separately).

Breastfeeding duration was very different across European cohorts (See figure 1) with longer duration in the Generation XXI cohort and shorter duration in the EDEN cohort. Similarly, we found different weaning patterns across the cohorts (See figure 2): in the ALSPAC study, foods other than milk were introduced mostly around 3 months of age, in GENERATION XXI around 4 months, in EUROPREVALL around 5 months. In the EDEN study, we did not find a preferred age for introduction of foods other than milk.

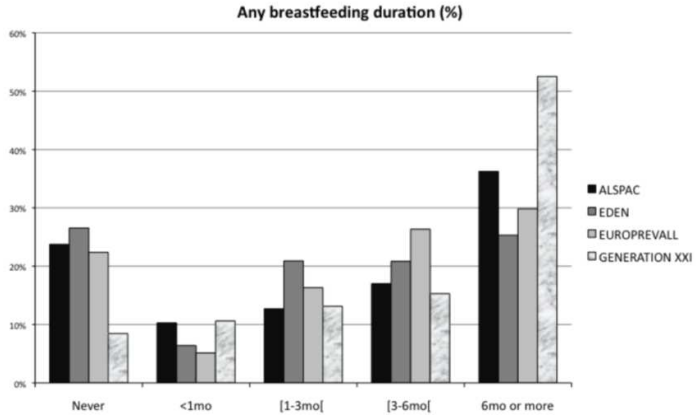


Figure 1: Any breastfeeding duration in the four European cohorts

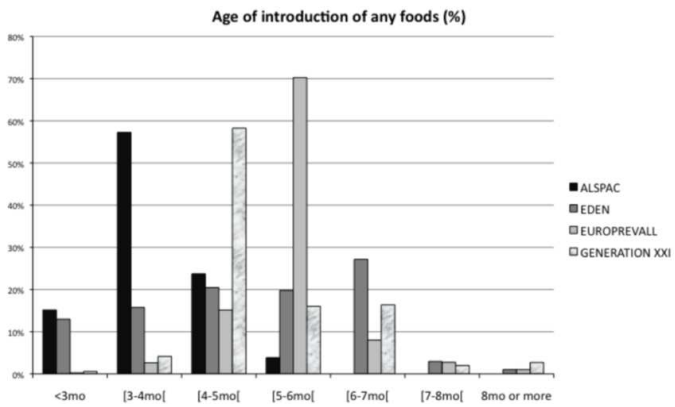


Figure 2: Age of introduction of any food other than milk in the four European cohorts.

TOPIC N°1:
Early parental feeding practices and later fruit and vegetable intake

Fruit and vegetable intake in early childhood varied across cohorts (Table 1) with an average of less than 1 vegetable per day in the EUROPREVALL study and more than 3 vegetables per day in the GENERATION XXI cohort.

	Serving/ day	
	Fruits	Vegetables
	Mean (SD)	Mean (SD)
ALSPAC (2y)	1.2 (0.7)	1.2 (0.6)
EDEN (2y)	1.4 (0.8)	1.1 (0.7)
EUROPREVALL (2yr)	1.1 (0.5)	0.7 (0.4)
GENERATION XXI (4 yr)	1.7 (0.8)	3.3 (1.3)

Table 1: Fruit and vegetable intake in the four European cohorts

Any breastfeeding duration was positively associated with later fruit intake, with a consistent link across cohorts between breastfeeding for more than 6 months and higher fruit intake, except in the EUROPREVALL study. We found similar results with later vegetable intake in all cohorts.
After adjustment for all confounders, later introduction of fruit (Figure 3) appeared less clearly related to fruit intake. A late introduction seemed to be related to lower fruit intake in the ALSPAC cohort, but not at all ages of the follow-up and this trend was not found in the other cohorts. A late introduction of vegetables tended to be more consistently related to lower vegetable intake (Figure 4), except in the EUROPREVALL study.

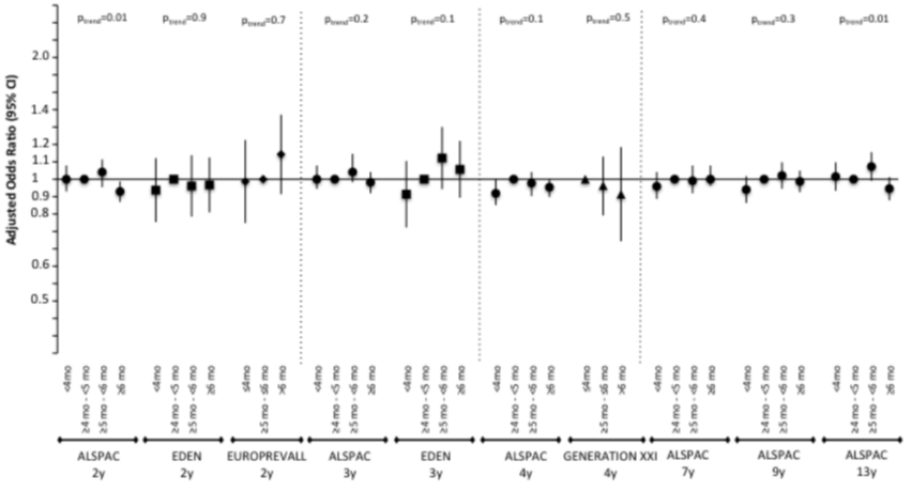


Figure 3: Age of introduction to fruit and high fruit intake in the four European cohorts

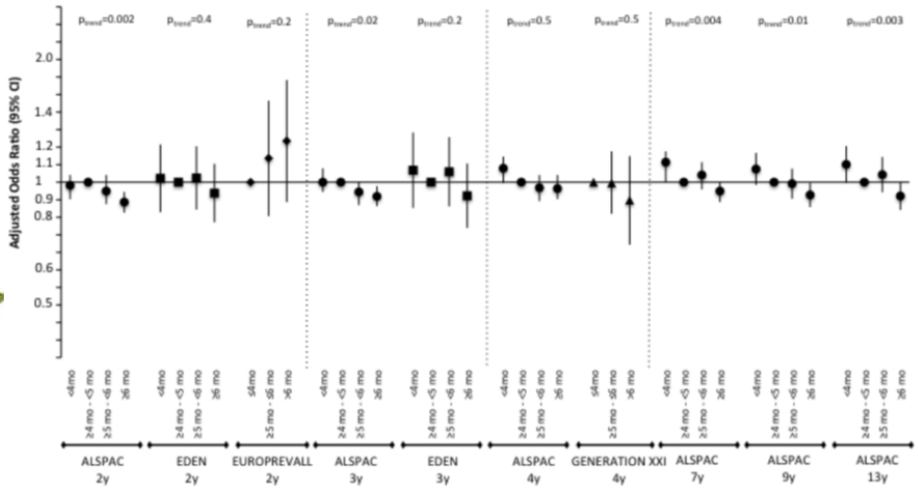


Figure 4: Age of introduction to vegetables and high vegetable intake in the four European cohorts

TOPIC N°1:
Early parental feeding practices and later fruit and vegetable intake

Conclusion:

The duration of breastfeeding was positively related to later fruit and vegetable intake, consistently across the cohorts, suggesting a positive influence of breastfeeding on later fruit and vegetables acceptance. The inconsistent association between timing of complementary feeding and later fruit and vegetable intake suggested rather a country-specific effect related to late or early weaning (as the weaning age differs considerably between countries) and not a direct effect of the weaning age itself.

Issues arising during the discussion with the three successive groups of stakeholders:

Stakeholders underlined that breastfeeding mothers could also have more health conscious feeding practices. We acknowledge that this could partly explain the association. However, we adjusted all analyses in terms of maternal education level, maternal smoking during pregnancy and maternal fruit and vegetable intake during pregnancy to take into account a healthier lifestyle. This adjustment did not strongly affect the results, suggesting that the duration of breastfeeding remained related to later fruit and vegetable intake, independently of the health conscious behaviour of mothers.

Stakeholders hypothesized that the positive association between breastfeeding duration and vegetable intake could be due to the fact that formula milk tends to have a sweet taste, and that infants exposed to this sweet taste are less likely to accept vegetables later. However, other stakeholders pointed out that breast milk is also very sweet.

Stakeholders asked whether a longer breastfeeding period could be related to a later return to work and therefore more time from mothers to cook vegetables. We did not adjust infant age at maternal return to work, as this data was not available in all cohorts. As the association between breastfeeding duration and later fruit and vegetable intake was similar across 4 countries with different durations of maternity leave, we assumed that this association was not explained by later maternal return to work. Moreover, the association was linear and not found only for very long breastfeeding periods. However, it could be interesting to take this data into account when possible.

As emphasized by stakeholders, it seems that both the frequency of fruit and vegetable intake during lactation and the variety of flavour exposure in breast milk could provide the link between breastfeeding and later fruit and vegetable acceptance. Another point is that before six months there is no need for extra energy than that gained from milk; therefore the beginning of weaning may be the right time to introduce a lot of flavours.

Stakeholders asked whether the effect of longer breastfeeding on later vegetable intake was seen mainly in breastfeeding mothers with a high vegetable consumption. We adjusted the analyses for maternal vegetable intake but to answer completely this comment, the interaction between the duration of breastfeeding and the mother's vegetable consumption needs to be tested.

Concerning the weaning period, the variety in the diet may probably be considered as more important than the age at weaning itself. Children with timely introduction to solid foods but with a low variety of foods proposed could be difficult to feed. Unfortunately, it was not possible to assess the number of exposures to fruit and vegetables during neither the weaning period nor the variety in fruit and vegetables proposed. The challenge for the baby food industry may be to have more and more variety in texture and flavours in ready-prepared baby foods.

As regards the relationship between the age of introduction of vegetables and later vegetable intake in childhood, there appears to be a trend towards higher intake in case of early introduction in all studies except the Europrevall study. However, it was argued that we should trust for the 3 other cohorts which are based on a larger number of individuals.

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TOPIC N°2

"WHICH FACTORS PROMOTE THE HIGHEST FOOD ACCEPTANCE AT WEANING?"

Chaired by Dr Sophie Nicklaus (INRA, France) and Ms Samantha Caton (University of Leeds, UK)

The key questions selected for discussion during the workshop were the following:

- Which is (are) the most efficient approach(es) for weaning?
- What are the current guidelines for weaning?
- Which approach(es) lead(s) to the greatest overall acceptance of a large variety of foods?
- Does the efficiency of these approaches to infant feeding depend on the food offered or the "type" of child?

In the presentation conjointly given by Dr. Sophie Nicklaus, Centre des Sciences du Goût et de l'Alimentation, INRA and by Dr. Samantha Caton, University of Leeds, some results from previously published studies and from HabEat studies were presented.
The following points were given specific emphasis:
How do infants learn to consume new foods at the beginning of the weaning period, i.e. during the first year?

- "Priming" with food flavours
  - In utero
  - Breast feeding
- Repeated exposure
  - Role of flavour
  - Role of consequences of ingestion
- Role of exposure to a variety of foods

Concerning the study of priming with food flavours, results from studies conducted by Dr J. Mennella were discussed (Mennella et al., Pediatrics, 2001). These results suggest the role of exposure to the flavours of foods from the mother's diet in biological fluids such as from the amniotic fluid and from milk, which both may contain some flavours from the mother's diet. Exposure to these flavours may impact an infant's eating behavior at weaning enhancing his/her acceptance of certain foods. More generally, as demonstrated by the study of Dr. H. Hausner from the University of Copenhagen (Hausner et al., 2010, Clinical Nutrition), the positive effect of breastfeeding on food acceptance at the beginning of weaning may be more related to the variety of flavour exposure in breast milk rather than a direct impact of exposure to one particular flavour (Figure 1).

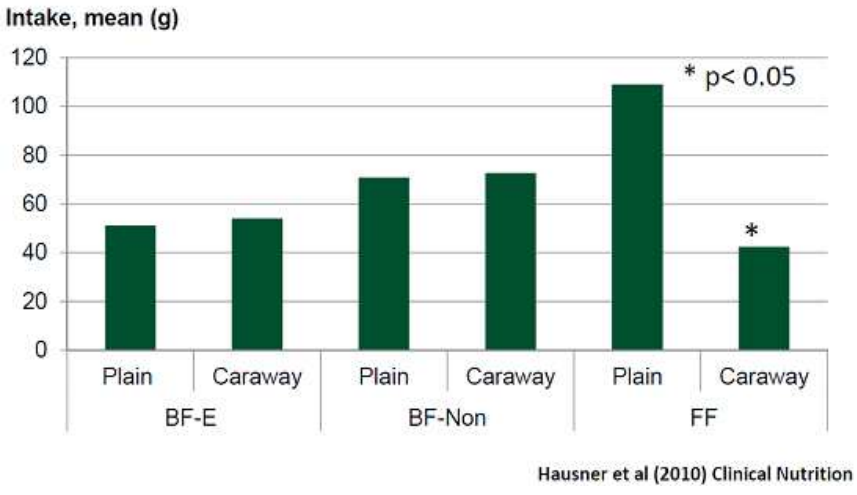

Figure 1: Acceptance of new foods (plan or caraway-flavoured potato purée) in breast-fed infants whose mothers consumed the caraway flavour (BF-E), in breast-fed infants whose mothers did not consume the caraway flavour (BF-Non) and in bottle-fed infants (FF)

TOPIC N°2
Which factors promote the highest food acceptance at weaning?

Concerning the role of repeated exposure, results from a study conducted by Dr. A. Maier were reported (Maier et al., 2007, Food Quality and Preference). These results are displayed in figure 2; they clearly show that even a disliked vegetable may be consumed by infants at the age of weaning after repeated exposure.

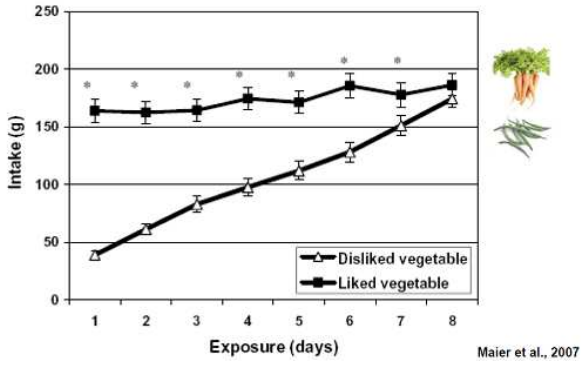

Figure 2: Effect of repeated exposure on the acceptance of an initially disliked vegetable and on an initially liked vegetable

Concerning the role of "taste" and the consequences of the ingestion of a food, results of a study conducted by E. Rémy from the Centre des Sciences du Goût et de l'Alimentation – INRA, were presented to show the powerful impact of repeated exposure to a vegetable not outweighed by the strategy of adding of sugar or energy to the same model food (Rémy et al., in prep), as illustrated in figure 3.

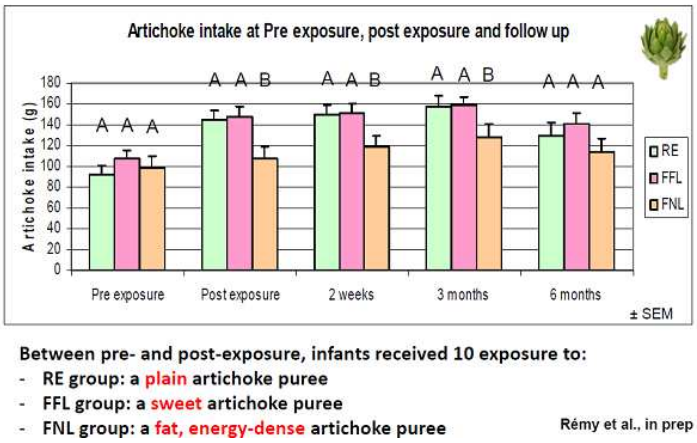

Figure 3: Comparison of 3 mechanisms of learning on vegetable acceptance at weaning: repeated exposure, flavour-flavour learning and flavour-nutrient learning

Finally, the positive impact of exposure to a variety of foods on the acceptance of a new food at the beginning of weaning was also discussed and illustrated by a study of Dr. A. Maier (Maier et al., 2008, Clinical Nutrition).

Issues arising during the discussion with the three successive groups of stakeholders:

The issue of baby-led weaning (BLW) was raised and a number of nursery staff reported that they had adopted this in their nurseries and that it had been implemented very successfully with a number of the children "eating better" compared to the more traditional approach of spoon feeding the children. During this session many nursery practitioners and health care providers advocated the use of baby-led weaning suggesting that it had a positive effect on encouraging self-regulation of food intake and the types of foods eaten in nurseries. Anecdotally, it was reported that a greater variety of foods were consumed by infants who were introduced to solids via BLW. One of the drawbacks mentioned was that parents quite often do not continue with BLW in the home environment or during holiday breaks from nursery when this technique is implemented in a day-care setting. This highlighted the need for nurseries to interact with parents when implementing such techniques.

TOPIC N°2
Which factors promote the highest food acceptance at weaning?

There was some discussion regarding the type of foods suitable for BLW and it appeared that this issue may need further clarification.
In addition to the many anecdotal advantages of BLW, the issue of the family diet was discussed. Questions were raised about whether or not BLW was advantageous when the family diet was of low nutrient quality. Overall it was suggested that the family diet needs to be relatively healthy for BLW to have advantages over the more traditional methods of weaning. However, it was highlighted that BLW might be advantageous for those infants who are growth faltering regardless of the nutrient quality of their usual diet. It was discussed that with regards to infants with a low body weight, quite often the parent(s) demonstrate higher levels of anxiety regarding feeding, and that BLW regardless of the types of foods offered might serve to promote a more "relaxed" feeding environment, if the child essentially takes control of the "how much is consumed" aspect of the meal. Once BLW has been established anxiety should be reduced at meal times and then parents can be then better advised as to which are the best foods to offer their child.
The disadvantages of BLW were also discussed. It was discussed that BLW was related to socioeconomic status with a greater proportion of middle-class mothers adopting this technique. This technique quite often results in food wastage and it was discussed that this method is not likely to be adopted by all mothers due to amount of food wasted and the financial implications. Under these conditions repeated exposure and variety of intake might be the most important message to convey to mothers.
The environment in which a child is fed was also highlighted as playing a critical role in food acceptance, with parents, caregivers and nursery practitioners serving as key role models. Discussion focused on the importance of the family diet and the idea that meals should be ideally taken together with all family members eating the same foods.
The importance of convivial eating and making meal times pleasant with no distractions such as having the TV on during meal times were deemed important. It was generally accepted that parents need more guidance on creating a more positive atmosphere during meal times.
Weaning guidelines were discussed and the groups pointed out that several pieces of key information were missing. During this session it was mentioned that mothers should be made explicitly aware of the "additional" advantages of breast feeding. Currently UK mothers are only given information regarding the immunological benefits of breast feeding but are not educated on the effects of breast feeding on later food acceptance or on self-regulation. Additionally, mothers should be given more explicit instructions on the benefits of repeated exposure during the weaning period.

Summary:

Three key areas were discussed during the sessions:

1. Baby-led weaning and how this might provide an alternative to more traditional methods of weaning infants on to solid foods. The advantages being that the infant decides how much to consume. In order for BLW to be successful, the infant must be able to grasp foods and orientate them towards the mouth. Therefore, BLW encourages mothers to wait until the recommended age of 6 months before they might start to wean their child. The disadvantages were also discussed (outlined above). However, it was acknowledged that there is no clear evidence that suggests that BLW confers an advantage over more traditional methods of weaning.

2. The feeding environment – it emerged from discussions that the environment is extremely important during meal times. It was suggested that parents be provided with more information reading the optimal conditions in which children should be offered their meals. In addition, parents should be provided with more information regarding responsive feeding.

3. Modification of weaning guidelines - Parents and caregivers should be provided with more information on repeated exposure and the advantages of breast feeding on taste acceptance and self regulation.

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TOPIC N°3

"How does the relationship between parent and child affect eating behaviours and food intake?"

Chaired by Dr Pauline Emmett and Dr Louise Jones (University of Bristol, UK)

Understanding children's eating attitudes and behaviour is important in terms of children's health. Parents can have a significant influence on a child's development of food preferences and habits. Sourcing evidence from the UK Infant Feeding survey 2005 http://www.ic.nhs.uk/pubs/ifs2005 and the ALSPAC cohort http://www.bristol.ac.uk/alspac/ we report how parent's decisions about how they feed their child may have an effect on the child's eating patterns and behaviours. Pauline Emmett, an experienced nutritionist and dietician, and Louise Jones, a research nutritionist, gave the presentation and facilitated discussion for three different groups.
Cues that an infant may give to a mother about feeding were discussed and evidence was shown that mothers are concerned infants may be hungry or not satisfied and that this often leads to introduction of solid foods at an earlier age than advised. In the UK parents are advised to breast feed or formula feed exclusively for the first 6 months. In the UK feeding survey 2005 parents were asked what factors influenced them in the decision on the timing of complementary feeding. The most prevalent reason for introducing solids into a baby's diet was a perception that their baby was no longer satisfied with their milk feeds. The large majority of mothers who had begun solids by the time their baby was three months old (77%) based this decision on a perception that baby was no longer satisfied with milk feeds. In contrast, those who introduced their babies to solids later were far more likely than early weaners to have based their decision on professional advice. The timing of weaning was investigated in ALSPAC also. Parents were asked at 4 weeks if they perceived that their child was hungry/not satisfied after a feed, 84% of infants whose parents stated they were always hungry/not satisfied at 4 weeks were weaned at or before 3 months.

In the discussion it was suggested that doubts about how much to feed a child may be raised because specific amounts are suggested on packaging for formula feeding which lead parents to try to achieve that amount even when their child does not want it or regardless of the child's own growth patterns. It was also suggested that mother's who are breast feeding are undermined because these suggested volumes seem to be much greater than their child appears to obtain from the breast. In the discussion it was also identified by health professionals that there may be a gap in the provision of help given to parents at the complementary feeding stage.
Appetites are governed by intrinsic and extrinsic cues. Intrinsic cues tell us roughly how much food and energy we need to consume. Extrinsic cues are events that happen around us, such as social cues, which may lead a person to eat when not hungry. Extrinsic cues may lead to 'emotional eating'. It is important that children learn to listen to their own intrinsic cues and learn to control their appetite. Parents should allow children's intrinsic cues to develop; encouraging children to finish what is on the plate can override the cues. However findings indicate that parents may be more concerned about children not eating enough (up to 33%) than they were about them overeating (up to 4%), see table 1.

	15 Months		24 Months	
	Not eaten Sufficient	Over-eating	Not eaten Sufficient	Over-eating
Greatly concerned	731 (6.7)	29 (0.3)	638 (6.2)	26 (0.3)
A bit concerned	2644 (24.2)	401 (3.7)	2825 (27.3)	256 (2.5)
Not concerned	2778 (25.5)	1807 (16.6)	3224 (31.2)	1452 (14.1)
Did not happen	4759 (43.6)	8628 (79.4)	3659 (35.4)	8585 (83.2)

Table 1: Parents opinions on child's food intake at 15 months and 24 months

Topic n°3: How does the relationship between parent and child affect eating behaviours and food intake?

This may lead parents to take actions which could override a child's internal cues.
Despite parent's concerns there was no evidence in ALSPAC toddlers of a difference in energy intake between those with worried parents than those without; it may be therefore that parents are worried unnecessarily. The infant and toddler forum website has very good information that could help to support parents and professionals working with parents http://www.infantandtoddlerforum.org/.

Toddlers need to eat regularly if they are to obtain enough energy and nutrients however it is important to plan nutritious meals and snacks and allow children to not finish their plate if they indicate that they are full. There were some parents who use food as a reward or comforter and this can distort how the child relates to that food. Serving foods as a reward or comforter can make them seem desirable and increase preference for these foods. In ALSPAC parents were asked 'how often do you use foods to stop your child crying or fussing', see table 2.

	18 months	30 months
= 1 times /day	769 (7.5%)	436 (4.3%)
Several times/week	1597 (15.6%)	1312 (12.8%)
Rarely	5533 (54.1%)	5423 (52.9%)
Never	2322 (22.7%)	3079 (30%)

Table 2: The frequency parents used food to stop child 'crying or fussing' at 18 & 30 months

The types of foods used for this purpose tend to be high in sugar and that this is reflected in the diets of children fed in this way.
Parents can act as role models for children, ALSPAC showed that if a mother ate more fruit and vegetables so did her child, see table 3.

Maternal Intake	Child's mean vegetable intake (g)	Child's mean fruit intake (g)
Low intake	61g	98
Medium intake	64g	130
High intake	73g	178

Table 3: Child's mean intake of fruit and vegetables (g) according to their mother's tertile of intake

In the new National Diet and Nutrition Survey for 2008/09 young children are eating more fruit http://www.food.gov.uk/multimedia/pdfs/publication/ndnsreport0809.pdf. This extra fruit is being eaten at school or play group and has been provided by the government to children of 4/5 years. There was no evidence that more fruit is being eaten in the home. This came up in discussion in several of the groups. There were many initiatives talked about as taking place in local communities around the Leeds area. Many people were working with the parents and children to enhance cooking skills and increase knowledge about food and anecdotally the work seemed to be very successful. Unfortunately however there was very little systematic evaluation of the effectiveness of these projects being undertaken. The main consensus is that parents are key in helping children develop healthy eating habits. It is important to work with parents and explore their behaviours and educate the parents about what is best for their young child.

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Focus on WP2: Exploring key learning mechanisms and individual variations

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This research workpackage focuses on the early introduction of vegetables to infants since it is known that early exposure benefits children by increasing the likelihood that infants will develop a liking for new vegetable tastes and thus set the foundations for food preferences later in life. Current weaning guidelines lack information on the most effective ways to introduce vegetables into the diets of young infants. To address this issue WP2.1 led by Dr Lucy Cooke (University College London) with colleagues in Portugal (Faculdade de Medicina da Universidade do Porto) and Greece (Harokopia University) aimed to investigate the impact of parental guidance on early exposure to a variety of vegetables and fruits during the weaning period on later acceptance of these foods. Preliminary findings suggest that early exposure to a variety of vegetables results in increased liking and intake of vegetables at 6m follow-up compared to those infants who were not exposed to a variety of vegetables early on. WP2.2 led by Prof. Marion Hetherington (ULeeds) aims to investigate which are the best strategies for promoting vegetable intake in pre-school children. Similar studies were carried out in the UK (University of Leeds), Denmark (University of Copenhagen - see below for a more detailed presentation of this study) and France (INRA) using flavour-flavour learning (combining a novel vegetable with an already liked flavor), flavor-nutrient learning (adding extra energy by adding a little oil to vegetables) with repeated exposure (simply offering the vegetables to the children). In these studies the target vegetable chosen was artichoke because this was a relatively novel vegetable to children of this age. Across all three countries the most effective technique was repeated exposure. Similar findings were found in preschool children in the Netherlands (University of Wageningen) who were offered either a low energy or a high energy novel vegetable soup (endive or spinach). As part of WP2.3, researchers at INRA (France) examined the effects of adding a very small amount of salt or nutmeg to a novel vegetable (salsify). The results show again that repeated exposure is the most effective technique in increasing the intake of a novel vegetable, with little added benefit to acceptance when adding seasonings such as salt or spice or additional energy (oil). It seems that the most effective method of encouraging young children to “eat up their greens” is simply by ensuring that they receive plenty of exposure to these vegetables over time.

“Mere exposure and flavour–flavour learning increase 2–3 year-old children’s acceptance of a novel vegetable”

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Vegetable consumption is low among many children, but can possibly be increased using various types of learning strategies. This study compared the efficacy of 3 different learning strategies in changing children’s intake of a novel vegetable: mere exposure, flavour–flavour and flavour–nutrient learning. An unmodified artichoke purée was served to all the children involved before testing the 3 different strategies mentioned above and the amount of purée eaten was measured. Then the children were divided into 3 groups with one group being exposed 10 times to respectively unmodified purée (mere exposure, n = 32), another group exposed to a sweetened purée (flavour–flavour learning, n = 33) and the third group exposed to an energy dense purée with added fat (flavour–nutrient learning, n = 39). The unmodified and sweet purée contained approximately 200 kJ/100 g and the energy dense purée 580 kJ/100 g. The *unmodified purée* was served again after the exposure period as well as 3 and 6 months after the last exposure to monitor long-term effects of learning.

We found that the intake of purée increased using the mere exposure and flavour–flavour strategies but was unchanged using the flavour–nutrient strategy. Mere exposure changed children’s intake by the 5th exposure and flavour–flavour learning by the 10th. Mere exposure led to the largest increase in intake of unmodified purée in the tests after the exposure period (tests right after exposure and at 3 and 6 months). Children following flavour–flavour learning consumed more of the sweet purée than of unmodified purée in the follow-up periods.

About 30–40% of the children showed no increase in acceptance at all and have been categorized as non-eaters.

The results of this study imply that mere exposure and flavour–flavour learning were the most powerful strategies for changing 2–3 year-old children’s acceptance of a novel vegetable, even though a substantial number of children are non-eaters and thus resistant to these types of exposure learning. It is important to understand what makes a child a non-eater, since a non-eater runs a higher risk of developing inappropriate eating behaviours.

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HabEat partner babies!

HabEat next stakeholder workshops

HabEat second stakeholder workshop

The second stakeholder workshop will be held on 27th September 2012 at the University of Porto Medical School in Portugal.

HabEat third stakeholder workshop

The third stakeholder workshop will be held on mid-June 2013 at the Warsaw University of Life Sciences in Poland.

HabEat in recent and future external events

Joint Programming Initiative conference: A Healthy Diet for a Healthy Life

The partner INRA made an oral presentation at the conference held on 14th June 2012 in The Hague in The Netherlands.
https://www.healthydietforhealthylife.eu/

5th European Conference on Sensory and Consumer Research 'A Sense of Inspiration'

The partner INRA will present a poster at the conference to be held on 9-12 September 2012 in Bern in Switzerland.
http://www.eurosense.elsevier.com/

Annual Conference of the Society for the Study of Ingestive Behaviour

The partners INRA and ULeeds will make a poster and an oral presentation at the conference to be held on 10-14 July 2012 in Zurich in Switzerland.

www.habeat.eu

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