Habeat NEWSLETTER

NEWSLETTER N°05
Autumn 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°2

After the first stakeholder workshop which was held on the 3rd April 2012 at the University of Leeds (UK), we were welcomed on the 27th September at the University of Porto (Portugal), Medical School for the second stakeholder workshop. Henrique Barros, Head of the Department of Clinical Epidemiology, Predictive Medicine and Public Health, on behalf of the University of Porto Medical School, gave the welcome to the participants, highlighting the key role of academic institutions in producing and translating scientific-based evidence to stakeholders and to the general public.

The morning session, devoted to presentations by invited speakers and by HabEat partners, was open to a large audience. There were 121 attendees, and in particular a large proportion of students and health professionals (see figure 1a). The attendees came from 11 countries, and not surprisingly there was a large proportion (69%) of Portuguese. The afternoon session was devoted to exchanges and thus was open to a smaller audience. Fifty-one attendees, half being academic researchers and half stakeholders with different positions (see figure 1b), participated in the discussions.

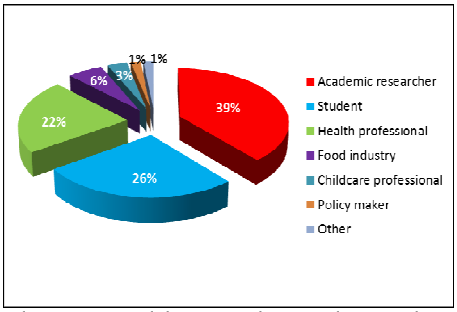
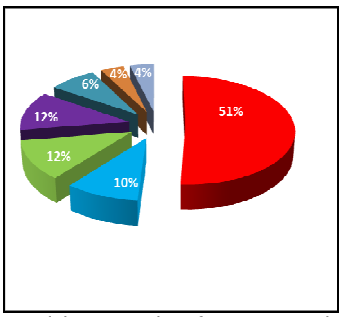


Figure 1a: Participants to the morning session



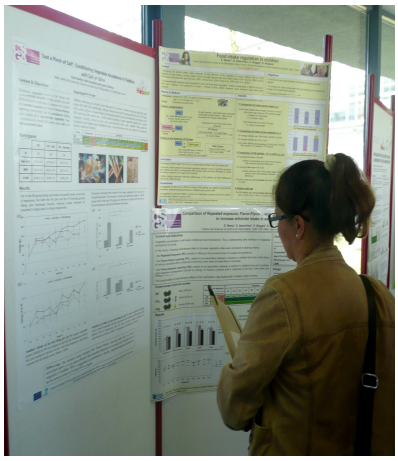
1b: Participants to the afternoon session

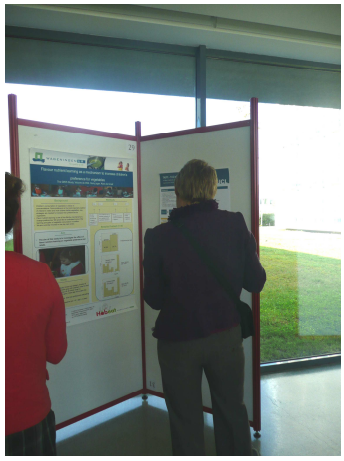
After a general presentation of the project, I handed over to the speakers. Two presentations focused on the complementary feeding period. One of our invited speakers, Dr Margherita Caroli presented the diversity of practices. She also pointed out that there is a large diversity of sources of information which were not always based on the most recent scientific evidence. She insisted on the need to draw up coherent and consistent guidelines (see page 5). Dr Lucy Cooke's talk focused on the impact of variety at the beginning of weaning on later new food acceptance. After presenting results already published, she gave first results of the 'Taste Study', an intervention conducted within HabEat to investigate the impact of parental guidance on early exposure to a variety of vegetables and fruits on later infant's liking and consumption of fruit and vegetables (see page 7). Prof. Marion Hetherington's talk focused on learning to like vegetables. She presented different strategies that can be used and the underlying mechanisms. Then, she gave different results from HabEat studies illustrating the importance of repeated exposure but also that some children do not learn easily to like vegetables (see page 9). The talk given by the other invited speaker, Dr Gillian Harris was very complementary. In fact, she presented the different practices adopted by parents to modify their child's eating behaviour. She presented results outlining those effective practices and those less effective and even counter-productive practices. She also pointed out that the efficacy of some practices differs according to the individual child's eating 'problem' (see page 3).

Dr Lucy Cooke and Prof. Marion Hetherington concluded their talk by presenting key findings from previous studies and from HabEat, each finding being related to a practical implication. These two series of implications were discussed during the afternoon session. The discussions were organized using an approach similar to the World Café Method. Each participant discussed each of the two series of implications during two 30 minute session with different moderators and different participants at each session. Thus, people with different backgrounds and different positions had the opportunity to exchange their experience, views and ideas. The discussions were very fruitful and convergent standpoints came out from the discussions; they were summarized by one chair for each series of implications and are presented in this newsletter (see page 11). Finally, Dr Pedro Graça and Dr Margherita Caroli concluded the workshop (see page 14).

Dr Sylvie Issanchou

HabEat Coordinator





During breaks and lunch, participants discovered a little bit more about HabEat experiments by looking at the 7 posters that were presented.

Parental feeding practices and child eating behaviour

By Gillian Harris, School of Psychology, University of Birmingham

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Parents report a number of feeding practices that they use to try and modify their child's eating behaviour. Those parents, who are anxious about their child's weight, either underweight or overweight, and the range of foods taken, will often try strategies which may not always be successful in modifying the child's intake. Some parental reports of successful strategies do accord with research that has been carried out in the field, however, areas are highlighted that still need to be subject to further research in order to establish the optimal intervention programme or feeding practice.

Common practices amongst parents who are concerned about their child's eating pattern are, coercive or forceful feeding, bribery (or reward strategies), pressure to eat, restriction of 'unhealthy' foods, hiding or disguising 'healthy' food to obtain intake, and distraction (which has a wide ranging definition). Practices which parents do not consciously adopt but which might be used to promote the consumption of desirable foods by less anxious and therefore less demanding parents, might be those of modelling, exposure to foods, and prompting to eat. The practices that parents might use, whether or not parents find these practices successful, and research findings pertaining to these practices, will be reviewed.

Parents are not usually aware that they use modelling or exposure techniques to establish food preferences and optimise intake, in that most of our food preferences are established by these means, and there is extensive research at different stages throughout childhood which demonstrates the effectiveness of exposure (Birch et al. 1997; Wardle et al. 2003) and modelling (Hendy, 1999, Hendy, 2002) by a range of different role models. Parents will report that they eat the foods that they want their child to eat, have family meals so that food is seen by the child, and engage the child in helping to prepare food. Children with limited food range intake are also reported as trying a new food if they see someone else, usually another child; first eat the food; and this accords with the literature. However, parents also describe how their own dysfunctional eating behaviour might affect the child's preferences and intake; this also is supported by research (Lumeng & Burke, 2006).

Coercive or forceful feeding practices are usually described as unsuccessful in modifying the intake of an underweight or limited range child; these practices lead to an aversive response without any improvement in intake (Harris & Booth, 1992) and can lead to subsequent food refusal especially in the fussy child (Powell et al. 2011). Hiding or disguising food is similarly often reported as unsuccessful especially with a 'fussy' child; there is however little research into this strategy, and just how small a piece of mushroom has to be for it not to be noticed by the discerning toddler. Recent research into contamination in the toddler years (Brown & Harris, 2012) would seem to indicate a clear disgust response at this age, with food that has been touched by a disliked food being clearly rejected. This rejection was not however observed in all of the toddlers tested. It would seem therefore that some child factors such as sensory sensitivity, might determine the success of specific feeding practices (Coulthard & Blissett, 2009).

Pressure to eat and the restriction of 'unhealthy' foods also differ in their efficacy according to both the nature of the child and the nature of the feeding 'problem'. Pressure to eat is usually described as unsuccessful in underweight and 'fussy' children (Galloway et al. 2005), but may lead to overeating in overweight children via the pressure to finish meals or portions. Where pressure is no more than prompting to eat then the strategy may well be effective, again in all but the extremely fussy child (Bennett & Blissett, in press). The effect of the restriction of unhealthy foods is also determined by the extent and the nature of the restriction. Extreme restriction of desired foods can lead to disinhibited consumption of the foods when they are available (Fisher & Birch, 1999), but it has been suggested some sensible restriction is necessary in the diets of children without feeding dysfunction in order to maintain intake of healthy foods (Blissett, 2011).

Parental feeding practices and child eating behaviour

by Dr G. Harris

Distraction and reward strategies are used most frequently by parents who are overtly attempting to change their child's intake, and might be reported by them as either effective or not effective according to, the type of reward and distraction used, the nature of the child and of the problem being addressed. The literature similarly reports some conflicting findings on the use of rewards (Cooke et al. 2011); the consensus being that tangible rewards might be useful in increasing intake and in prompting the tasting of new foods in some circumstances. The techniques described are those of operant conditioning, there is, however, no research into the effectiveness of a common parental practice, classical conditioning; pairing eating with either attention or some form of desirable distraction. What little research there is on distraction concentrates on the pairing of television with eating, concluding that in older children this leads to over eating. In younger children, however, it might appear that such distraction leads to lower consumption (Stanley & Harris; in preparation).

In conclusion, parental strategies would seem to differ in their effectiveness according to child factors and the nature of the problem addressed and the degree to which the strategy is implemented. Some areas for further research have been highlighted.

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Complementary feeding: a European puzzle

By Margherita Caroli MD PhD, Maria Anna Tomaselli RD, Maria Cammisa MD
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Childhood obesity prevalence has reached unsustainable levels in Europe with an increased number of earlier-onset cases (1). Early nutrition is one of the major contributors to this high prevalence in infancy and is also considered to be crucial for development of persistent obesity in later life.
The aim of this talk is to present an overview of complementary feeding patterns across European countries.
Age of introducing complementary foods: Most infants in Europe are introduced to solid foods before 6 months of age contrary to the WHO recommendation. By the age of 5 months a large percentage of infants have already been introduced to a number of solid foods. The commonest profile for early introduction of solid foods have been shown to be mothers that smoke, are young, have not breastfed and low on the socio-economic scale.

Food intake: The foods most frequently introduced as first solids are fruit and cereals followed by other foods that vary widely depending on the country of residence and the type of feeding of the babies in question (2-4). However, recent and large studies on nutrient intake data after 6 months of age in infants with no chronic disease are lacking in European countries (5).

Nutrient intake and acute metabolic effects: Not enough up-to-date information is available in Europe in terms of infants' nutrient intake during complementary feeding, as well as on the potential acute metabolic effect of complementary feeding (6).

Parents' sources of information about complementary feeding and social and commercial influences on family practices. Websites, e-forums and blogs on complementary feeding are widespread on the web, as well as in books. Half of these sites recommend starting complementary foods at 4-6 months of age. These sites often suggest meals and menus which are nutritionally incorrect, being too rich in proteins and energy as compared to the WHO recommendations (7, 8).

A special complementary feeding practice referred to as “Baby-led-weaning” (BLW) is now rapidly emerging. BLW is most common in England and Italy, to counteract the traditional weaning model considered too prescriptive and industrial baby food-oriented. Baby-led-weaning (BLW) is based on the principle that babies, from the beginning of complementary feeding should be allowed to eat whatever food they wish (regular family foods included) in normal shape (9). Even though BLW is claimed to have a positive impact on obesity prevention (10) such effect has not been documented objectively. The claim that BLW would improve families’ eating habits by providing nutritious foods to the infant has been rejected by a recent study (11). No nutrient intake and metabolic data are available on BLW, and the nutritional evaluation of the recipes suggested in a book on baby-led-weaning, even using the most conservative approach has revealed an excess of protein and saturated fats (12). Thus, before considering BLW as the most natural model to introduce solid foods and the most suitable approach to prevent NCDs (non communicable diseases), more data need to be obtained on the real food and nutrient intake as well as on BLW metabolic effects in this group of children.

Conclusions
Feeding practices for 6 to 12 month old infants’ are subject to strong pressure by baby food producers, as well as by self-help groups, that tend to create in parents expectations and behaviour which go far beyond the real needs of their infants. Such expectations and advice in terms of both quantity and quality of the food they offer can trigger, especially in less culturally rich families, eating behaviours resulting in metabolic and psycho-social relational processes likely to have a negative impact on the development of food habits favouring a good health and psychological status.

Complementary feeding: a European puzzle

by Dr M. Caroli et al.

The current scenario in terms of our understanding of complementary feeding in Europe opens several new research avenues. Among others the most urgent are:

1- Obtain data on overweight prevalence in infants and toddlers in European countries using similar protocols;
2- Obtain information on food and nutrient intake of infants and toddlers in different European countries;
3- Provide data on the acute metabolic effects of nutrient intake at this age;
4- Draw up coherent and consistent guidelines for complementary feeding;
5- Obtain data on the reasons why families decide to practice a specific weaning model;
6- Devise new communication modalities with families by means of the information media made available, including the web, blogs and the like.

Not using and not improving our current knowledge of nutrition to improve children's health represents a clear infringement of children's rights.

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The advantages of variety at the beginning of weaning

By Lucy Cooke, University College London, UK

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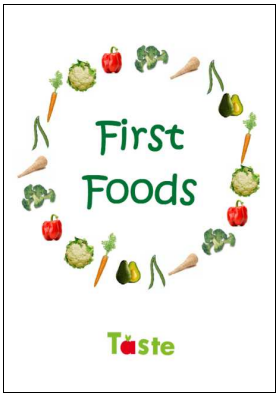
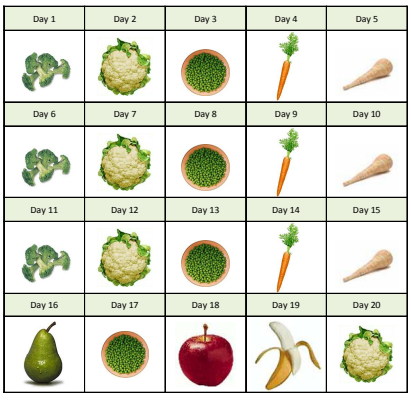
As omnivores, humans have versatile physiological systems able to chew and digest a wide variety of foods. Consuming a sufficient variety of foods is essential to meet macro and micro-nutrient needs and serves to enhance the pleasure of eating. From the earliest stages of life, humans are exposed to the varied flavours of their mothers' diet, firstly through swallowing amniotic fluid whilst in utero and later via breast-milk. This early experience of flavour variety seems to prepare breast-fed infants for future dietary diversity and facilitates acceptance of complementary foods at the weaning stage (Mennella, Jagnow et al. 2001). Formula-fed infants are generally slower to accept novel flavours, perhaps because they become accustomed to the uniform taste of formula milk (Maier, Chabanet et al. 2008).

Experimental research has repeatedly demonstrated that exposure to a variety of vegetables during weaning results in greater acceptance of novel vegetables, and some researchers have observed a generalisation of this effect to other foods-types such as meat (Gerrish and Mennella 2001). In contrast with the commonly repeated advice to try a new food on three consecutive occasions before offering something new, research findings indicate changing what is offered daily is most effective in encouraging willingness to try new foods (Maier et al. 2008). A growing body of research suggests a combination of variety both between and within meals may be most effective of all (Mennella, Nicklaus et al. 2008).

As well as variety of flavour, varying the texture of foods offered is recommended after the age of 6 months. In one study, children who had been offered 'lumpy foods' before the age of 7 months were perceived by their mothers as easier to feed in later childhood than those introduced later (Northstone, Emmett et al. 2001). It seems that there may be sensitive periods in an infant's life when acceptance of a) novel tastes and b) more complex textures, is especially heightened. These are thought to be from 4-6 months for the former and from 6-12 months for the latter (Harris, 1993). Taken together with evidence of that food preferences may track from infancy into childhood and beyond (Nicklaus, Boggio et al. 2005; Cox, Skinner et al. 1997), providing a wide variety of flavours at the beginning of weaning has the potential to impact positively on lifelong health and wellbeing.

The HabEat project includes a number of studies in which the impact of early dietary diversity is examined and two tasks in particular have provided further confirmation of its beneficial effects. The aim of the TASTE study was to investigate the impact of providing guidance to parents on early exposure to a variety of vegetables on infants liking and intake of novel fruits and vegetables assessed in taste tests. Almost 300 mother-child dyads from the UK, Greece and Portugal took part in this randomised controlled trial comparing the intervention with a control group receiving usual care. Delivered in a home visit by a researcher, the intervention comprised guidance in offering a daily-changing variety of single vegetables only for the first 15 days of weaning together with a colourful explanatory leaflet.





Taste leaflet sample pages

The advantages of variety at the beginning of weaning

by L. Cooke

Preliminary results show a positive effect of the intervention on infants' acceptance of an unfamiliar vegetable at 1 month post-intervention in the UK and to a lesser extent in Greece, but no effect in the Portuguese sample. This may be because typical weaning practices in Portugal more closely resemble those promoted in the intervention than in the UK or Greece, with a variety of vegetable soups being offered as first foods. As a result, differences between intervention and control groups would have been minimal. Further follow-ups at 6 and 9 months post-intervention are in progress. In a second study carried out in France, infants had tried nearly 6 vegetables on average at the start of the study. For every additional vegetable previously tried, infants consumed approximately 8 grams more artichoke puree in a taste test, clearly demonstrating the positive impact of early exposure to variety on later food acceptance.

If the effect of variety in the diet is to encourage consumption, then it is clear that there may be a side effect of over-consumption. This is not so problematic if the foods in question are vegetables, but could be potentially harmful if they are energy-dense, low-nutrient snacks foods, for example. Both animals and humans tend to gain weight and body fat when offered a range of palatable foods rather than a single food (Rolls, Van Duijvenvoorde et al. 1984; Treit, Spetch et al. 1987) which may have implications for the prevention of weight gain or, weight loss and weight maintenance interventions of the future (Raynor 2012).

In summary, a variety of flavours, especially vegetables, early in life may set the pattern for a varied diet in later life, vital for optimum health and well-being. Vegetables are well-accepted as first foods, and offering a range of them early in weaning facilitates the introduction of novel vegetables, as well as other food types. These findings should inform the development of official weaning guidelines, which in many countries remain unclear or contradictory.

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Learning to like vegetables – what we have learned from the HabEat project on ways to improve children's food habits

By Marion Hetherington, Samantha Caton and Sara Ahern. University of Leeds

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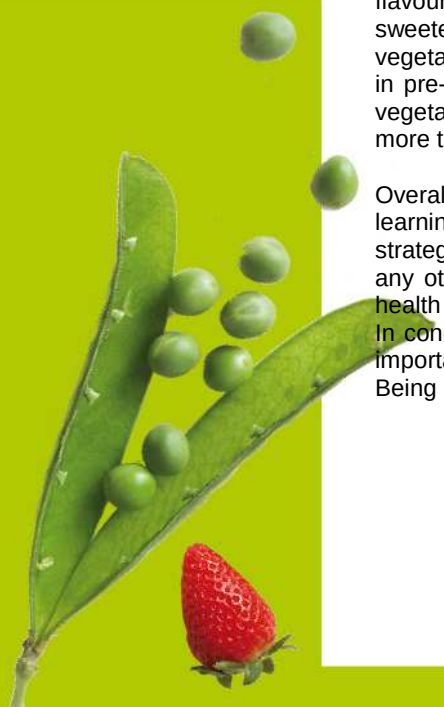
Vegetables are considered essential to a healthy diet. They are low in energy density, high in nutrients and contain antioxidant compounds that reduce the risk of disease. In some ways, vegetables are an ideal food – low calorie and with potential health benefits if eaten consistently as part of a healthy diet. However, few children across Europe eat the recommended amount of vegetables in their habitual diet. Many children do not like the taste of vegetables especially given their relatively bitter taste compared to fruit; and this dislike is evident at birth. Children are growing and require energy, thus they tend to prefer foods which are energy dense. Vegetables have large water content and so may be disliked because of the bitter taste and low energy density. However, children can acquire a liking for vegetables through experience and a variety of different kinds of experiences have been investigated within the HabEat project from learning through taste exposure to imitation of a role model; and from adding seasoning like salt, sugar or nutmeg to novel vegetables to offering variety and choice of vegetable. It is clear from experiments using different forms of learning that a novel food might be preferred if it delivers a benefit to the child such as added energy or if the taste of a novel food is masked or improved by the addition of an already liked flavour. Thus, mothers often describe how they will give vegetables to their children with sauces including ketchup (see Caton et al. 2011). Strategies such as these (repeating taste exposure, adding energy, adding flavour) have been tested systematically in a series of studies across the EU partners within HabEat. For example, the power of repeated exposure has been investigated in weanlings by partners in France, UK, Portugal and Greece (e.g. Remy et al. 2012; Fildes et al. 2012).

Also a study using the same novel or target vegetable (artichoke) and the same control vegetable (carrot) a study in England, Denmark and France examined the relative efficacy of repeated exposure (RE), flavour-flavour learning (FFL) and flavour-nutrient learning (FNL) across different age groups and settings in both promoting liking and increasing intake of target vegetables. Repeated exposure involves offering a relatively pure taste of the target vegetable over 8-10 exposures; whilst FFL involves pairing the target with an already liked flavour such as sweet or salty over the same number of exposures; and FNL involves adding energy to the target over the same number of exposures (Caton et al. 2012). Overall, repeated exposure appears to be the most effective technique for increasing intake of a novel vegetable in pre-school children ; however, adding sweetness (flavour-flavour learning) has been shown to be effective in increasing intake in young children including weanlings (Hausner et al. 2012; Remy et al. 2012). In contrast partners across the three sites have not found any additional benefit of providing energy to the artichoke to improve intake; indeed a greater number of children aged 1 – 3 years than would be expected by chance elected not to eat the food offered when assigned to the flavour nutrient condition. It is possible that this version was liked less than the plain and the sweetened artichoke. In contrast, partners at the University of Wageningen added energy to vegetable soups (endive or spinach) and found that added energy increased liking but not intake in pre-school children. Thus flavour nutrient learning appears to improve preference of a novel vegetable soup consistently paired with higher energy density; but does not promote intake any more than repeated exposure.

Overall, the findings to date suggest that offering vegetables consistently appears to facilitate learning and promotes intake of novel vegetables. Repeated exposure might be an appealing strategy for parents, carers and health care professionals since it does not require the addition of any other ingredients. Also repeated exposure to vegetables is likely to be endorsed in public health messages since concerns about salt, sugar and added energy can be allayed or avoided. In conclusion, the findings of the HabEat project provide simple but strong messages about the importance of providing repeated exposure to novel vegetables to encourage their acceptance. Being persistent and positive helps children to like their vegetables.



Learning to like vegetables – what we have learned from the HabEat project on ways to improve children's food habits

by M. Hetherington et al.

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	Pre-test		2/5 D	Exposure										2/5 D	Post-test		2 W	Durability of the effect			
Test n	1	2		3	4	5	6	7	8	9	10	11	12		13	14		15	16	17	18
R_{exp}	R_{exp}	Co		R_{exp}	R_{exp}	R_{exp}	R_{exp}	R_{exp}	R_{exp}	R_{exp}	R_{exp}	R_{exp}	R_{exp}		R_{exp}	Co		R_{exp}	R_{exp}	R_{exp}	Co
FFL	R_{exp}	Co		FFL	FFL	FFL	FFL	FFL	FFL	FFL	FFL	FFL	FFL		R_{exp}	Co		R_{exp}	R_{exp}	R_{exp}	Co
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Offered as a mid morning/ afternoon snack in nursery
Pre-test 200g (2 pots)
Exposures 100g (1 pot)

Diagram illustrating design of experiments replicated in three countries (UK, FR, DK). In this diagram the plain artichoke is displayed as Rexp, the control vegetable (carrot) as Co, the flavour-flavour learning (FFL with added sweetness) and the flavour-nutrient learning (FNL with added energy from oil).

Discussion session

Two series of implications were discussed. The first one concerned 'early introduction of variety', the second one concerned 'learning to like vegetables'. For each series, the discussions were initiated via the following questions:

- What do you think about such a recommendation?
- Are there any potential adverse/undesirable effects?
- Are there any potential ethical constraints?
- Are current practices very different from this recommendation?
- If yes, what difficulties would mothers/parents/caregivers have in following this recommendation? How to help parents to overcome this difficulty?

Discussion on the findings and implications concerning early variety

Moderators of the discussion groups:

Helen Hausner (UCPH) & Sophie Nicklaus (INRA)

Louise Jones (UNIBRIS) & Andreia Oliveira (UPORTO)

Carla Lopes (UPORTO) & Sara Ahern (ULeeds)

1. **Finding:** Flavour learning begins *in utero*
   Implication: Mothers should be advised to consume a varied and healthy diet during pregnancy

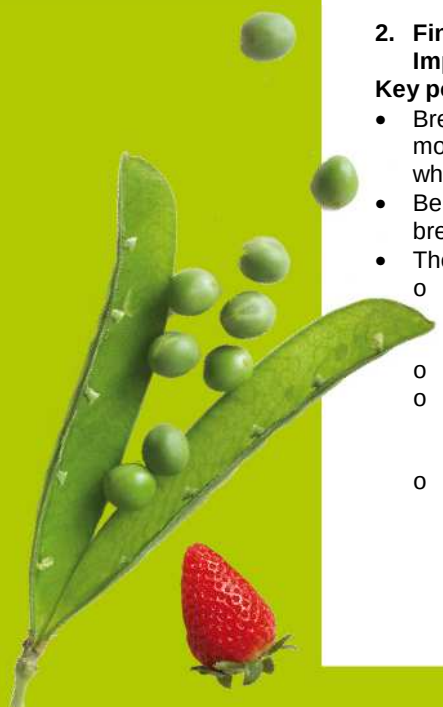
Key points of discussion:

- A healthy diet with wide food variety should be recommended to improve both maternal and foetus health. However, currently there is insufficient evidence to support the health benefits of eating a large variety of foods.
- Pregnant women should be reminded not to overeat i.e. not eat for two.
- Recommendations to avoid certain foods during pregnancy and lactation should be avoided as very other they are based on myths rather than facts and differ between cultures. In Portugal for example breastfeeding mothers are frequently recommended to avoid certain foods (e.g. garlic, raw onion), while in Denmark intake of strawberries and chocolate is unadvised. Hence, recommendations for food intake and eating during pregnancy and breastfeeding should be based on scientific-evidence and not based on a given doctor's point of view or 'local' myths.
- To overcome such misunderstandings and ensure that the general public are better informed, health care professionals should have a more thorough training in nutrition.

2. **Finding:** Breastfed babies accept novel foods more readily than those who are formula fed
   Implication: Promote this argument so as to encourage breastfeeding

Key points of discussion:

- Breastfeeding should be encouraged even if non-exclusive. When introducing solid foods mothers should be advised to continue breastfeeding. It is not a question of either or/ black or white i.e. exclusively one or the other.
- Beneficial effects of breastfeeding are due both to the composition of the milk, but also to the breastfeeding context (the close contact between mother and child).
- There seem to be very different breastfeeding rates among the European countries:
  - Promoting breastfeeding in countries with high breastfeeding rates should be restrained as mothers who cannot breastfeed feel guilty and do not need more information on the positive effects;
  - In UK there is already a lot of pressure in attempt to promote breastfeeding;
  - In Portugal, the breastfeeding rates drops after 1 month, because the mother's doubt that the milk can satiate the baby well enough (" the milk is not filling enough"). The mothers need to be certain that the milk can satiate the baby until the age of 4/6 months.
  - Overall, breastfeeding needs to be promoted more actively in most European countries except in some countries such as the Scandinavian countries where the breastfeeding rate is high and the duration of breastfeeding is long.



Discussion on the findings and implications concerning early variety

3. **Finding:** Four to six month old infants are highly receptive to new tastes.
   Implication: Delaying weaning until 6 months may risk missing out on this sensitive period.

Key points of discussion:

- Debate was over whether the benefits of exclusive breastfeeding for 6 months outweigh the advantages offered by introducing new foods between 4 and 6 months when the infant is highly receptive. This is still a very controversial topic.
- Delegates wanted to know how fixed this window of opportunity (easy acceptance of new tastes) is and it was agreed that evidence needs to be clarified before new guidelines are created.
- Delegates discussed what effects the age of weaning has and highlighted that this information needs to be clarified. Evidence has suggested that weaning before 6 months can reduce the risk of developing allergies; on the other hand, if weaning is delayed beyond 6 months this could lead to malnutrition.
- The WHO recommendations of exclusive breastfeeding for 6 months make reference to developing countries and delegates raised the question as to whether these recommendations are appropriate for developed countries and whether specific guidelines for developed countries are needed. A need for a clear review of evidence was identified.
- A need for further longitudinal studies that examine the consequences of introducing vegetables earlier than 6 months was identified.
- There is a need to communicate on the potential sensory benefits of breastfeeding: the breastfed infant is exposed to varied tastes and thus could be more willing to accept new tastes at weaning.

4. **Finding:** Frequent change in weaning foods is most effective.
   Implication: Advice should be to give small amounts of different foods every day (just to 'taste') since the risk of allergic reactions to common vegetables is minimal.

Key points of discussion:

- While it was agreed that the idea of varying tastes makes sense and is achievable the question was raised as to why the recommendation is in very small portions as some children are hungry and can eat more.
- Delegates raised the issue of allergies and whether the idea of small quantities of novel foods is necessary to reduce allergic reactions. It was agreed that if an allergic reaction is to happen it is as likely to happen with a small amount.
- It was agreed that this may be a too conservative position and that the recommendation could be rephrased to exclude the term 'small amount'.
- Promotion of variety in some countries may be difficult particularly if this goes against cultural practices (e.g. Germany, Denmark…).
- UK delegates highlighted that there is less professional guidance given in the UK and that mothers want and need some clear and prescriptive guidelines. Less contradictory, more consistent advice may help to build confidence as regards health visitors.
- Delegates highlighted that it would be better not to have very formal guidelines but sentences such as 'Don't be afraid to give a variety of foods'.

5. **Finding:** Vegetables are well accepted and positive effects of exposure can be generalised to other foods.
   Implication: Use vegetables as first foods.

Key points of discussion:

- There was a request to rephrase the following recommendation "Start complementary feeding with vegetables (instead of fruit or cereals) as this may promote higher acceptance of vegetables later".
- It was raised that it should depend on the child's own growth curve, and that advice should be sought from a health care professional as to what is best for the child.
- Although vegetables are a good first food, babies have a high demand for iron and zinc that vegetables do not provide. Therefore vegetables alone would not be sufficient for a breastfed baby. However, formula milk is fortified with these nutrients so would suffice for a formula fed baby.

Discussion on the findings and implications concerning learning to like vegetables

Moderators of the discussion groups:

Sam Caton (ULeeds) & Annemarie Olsen (UCPH)

Marion Hetherington (ULeeds) & Per Møller (UCPH)

Pauline Emmett (UNIBRIS) & Sylvie Issanchou (INRA)

1. **Finding:** Repeated exposure is sufficient to promote intake of a novel vegetable across age groups.
   Implication: Parents should be advised to offer repeated exposure to their infants when introducing a novel vegetable.

Key points of discussion:

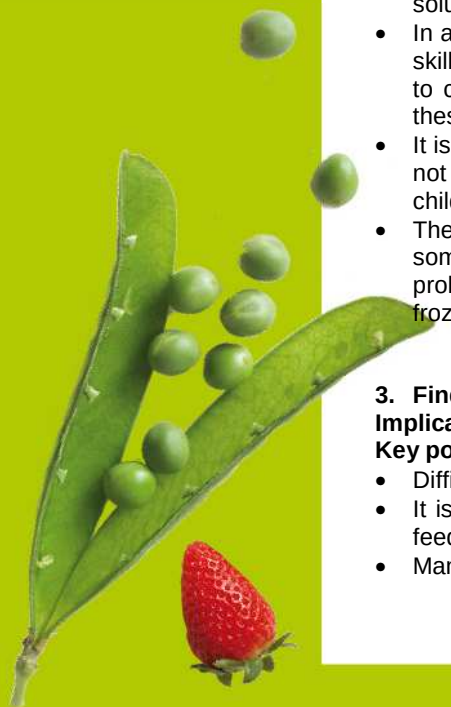
- Parents and also caregivers should be educated not to give up offering healthy foods, especially vegetables.
- Mothers with low social-economic status should be particularly targeted as regards the benefits of repeated exposure in order to improve their child's regular diet.
- The repeated exposure message should feature in the pre-school setting to make sure that the message has continuity between the home and nursery.
- Nursery staff should receive some basic nutrition training in order to understand the importance of repeated exposure.
- It is probably good to offer again a food which is initially refused, but probably not every day.

2. **Finding:** Vegetable consumption at home appears to promote learning to like novel vegetables, specifically at weaning.

Implication: Families can be encouraged to eat more vegetables at home so that availability is high. Modelling is possible and learning is facilitated.

Key points of discussion:

- Delegates agreed that this is the right approach, but very hard to apply. They discussed what could be the best period for educating families.
- Pregnancy seems to be the optimal time not only to improve the regular diet of the mother but also to educate her on the effectiveness of repeated exposure. During this time it is thought that the mother will be most receptive to new information. Mothers should be exposed to this message yet again when her child is approaching weaning age.
- The message regarding improving the regular diet needs to be continuous and should also be targeted at the whole family. Nutrition education in schools would also provide a longer-term solution.
- In addition to making recommendations, parents and caregivers need to be equipped with the skills to cook and prepare vegetables for their children. So, it was suggested to invite mothers to cookery courses during pregnancy and encourage them to bring their husband along to these courses.
- It is important to emphasize to families the importance they have as a model. Most parents do not realize that what they do themselves and that their eating behaviour is affecting their children.
- The issue of the price of vegetables was raised. Due to economic problems, it is possible that some families could not respond to these messages and feel excluded. This is an ethical problem. However, it is important to show parents that some less expensive options (e.g. frozen vegetables instead of fresh ones) could be chosen.



3. **Finding:** Younger children were more receptive to intervention than older children.

Implication: Start early, offer vegetables at weaning and be positive, persistent and patient.

Key points of discussion:

- Difficulty in weaning could be due to the fact that the principles of weaning are not explained.
- It is important to convince mothers that there are some key times that affect the success of feeding. Explain that a particular effort should be made at certain key periods.
- Many parents are afraid and inexperienced and need guidance.

Discussion on the findings and implications concerning 'learning to like vegetables'

4. **Finding:** Individual differences in "readiness" to like novel vegetables appear in early life.
   Implication: Parents and carers should be sensitive to individual differences and introduce vegetables to the diet accordingly.

Key points of discussion:

- Parents could be better educated about children's facial responses and food rejection. It is important to emphasize to parents that a 'grimace' is not necessarily a sign of refusal. This could be done for instance through educational videos at YouTube.
- Helping parents to understand that rejection is normal and that repetition and persistence are key, will allow parents to grow in confidence and encourage them to persevere.
- A lot of health professionals are concerned about growth but not so much about reactions to different foods and how to deal with food refusal.
- It could be useful invite parents to participate in discussions groups where they can meet and exchanges ideas and experience.
- It is important to emphasize to parents not to force feed a meal.
- In preparing guidelines give clear recommendations on how to deal with persistent refusals.

General discussion

General points of discussion on how to communicate and on the different and most efficient ways to disseminate recommendations

- Messages to parents and caregivers should be simple and easy to understand. More detailed information could be given in a second stage if parents require it.
- Simple strategies need to be offered to parents, caregivers and other individuals responsible for feeding children.
- Communication style should take into account that (most) mothers do not care about science – they care about their child. Sometimes it can facilitate parent's openness to the communication if it focuses on something which is important to them (e.g. vegetables and cancer prevention rather than obesity).
- Parents may prefer directive recommendations that are food-specific for example as it is reassuring but this is not what we want to deliver. This is why recommendations must go via health professionals and be adapted to the family situation. However, parents seek information from different sources, in particular internet. So, it is important that new media deliver consistent messages.
- Social media and TV advertising were identified as possible new ways of disseminating recommendations.
- Parents should be able to find information online using popular search engines, and the information should be available from a credible source - for instance from paediatric societies. Many parents are afraid and inexperienced and need guidance. Many people talk about feeding issues online without having sufficient knowledge on the subject and this is a real problem (e.g. parental instructions and videos on baby-led weaning).
- Supermarkets should also be used to disseminate messages about weaning practices.
- It was pointed out that in most countries there is a lack of education as regards nutrition and eating behaviour issues among health professionals. Child care providers also need training.

Conclusions

In conclusion to the workshop, Dr Pedro Graça (Directorate-General of Health, Ministry of Health, Portugal) insisted on the following needs:

- The need to involve health professionals and create consensus with them as a source of credible information in the era of internet.
- The need to involve parents giving them information and skills to solve problems that will arise.
- The need to involve and reach lower social groups where fruits and vegetables do not give an immediate reward of energy or protein.
- The need to give special attention to nurseries and other places where children spend decisive years. Often, these places have shortage of human resources and budget to adopt new practices and guidelines.

Finally, Dr Margherita Caroli gave the paediatrician's point of view:

- There is a need for the paediatricians to have a deeper knowledge of general nutrition concerning infants up to 2 years of age. This should include their ability to give practical tips to parents.
- There is a need to stress that stimulating the consumption of fruit and vegetables is extremely positive for children's health.
- There is a need to share and train parents on the most effective techniques to form healthy eating habits in children starting from a very early age on.
- There is a need for paediatricians to learn how to use new media to communicate with parents.
- It is fundamental to keep working on continuing nutritional education addressed to professionals, parents, and children.

HabEat in recent external events

Opaline meeting: "Understanding the early development of food preferences and eating behaviour in children"

On October 18-19th the Opaline workshop was held at the CSGA (Centre des Sciences du Goût et de l'Alimentation) in Dijon, France. The aim of this workshop was to exchange views, ideas and data about the development of food preferences and eating behaviour in children. This was the opportunity to present results from the OPALINE study which was conducted in Dijon, and to welcome scientists from other countries to present their research work.
There were 70 participants, 46 being academic researchers and 24 from the food industry.
One of the invited speakers was Blandine de Lauzon-Guillain from INSERM, who presented results from HabEat. Her talk concerned one of the analyses conducted on data from four cohorts (the British Avon Longitudinal Study of Parents and Children (ALSPAC), the French EDEN study, the Portuguese Generation XXI Birth Cohort, and the Greek EUROPREVALL study) to examine whether early feeding practices influence fruit and vegetable intake in preschool children (see Newsletter N°04, Summer 2012, page 3). Sylvie Issanchou from INRA gave some insight into the HabEat project, presenting the partners, the background, the main aims, some studies conducted within this project and some results. Moreover, three HabEat posters were displayed during the workshop:

- Development of new tools to assess parental feeding practices and child's self-regulation, and child's food liking by D. Thiébaud *et al.* (WP1).
- Comparison of repeated exposure, flavour-flavour learning, flavour-nutrient learning to increase artichoke intake in weaning infants by E. Remy *et al.* (WP2).
- Food intake regulation in children: relation to age by E. Remy *et al.* (WP3).

http://www.opaline-dijon.fr/workshop_2012.html

PALINE

Funded by ANR

Feeding Disorders Conference

Partner UCL made an oral presentation "Early exposure to vegetable variety on infants' liking and consumption: preliminary results of the TASTE intervention study" during the Feeding Disorders Conference held at the Institute of Child Health in London, UK on 6-7th November.

TEDx event in Porto

Created in the spirit of Ted's mission, ideas worth spreading, the TEDx programme is designed to give communities, organizations and individuals the opportunity to stimulate dialogue through TED-like experiences at the local level. On 24th November, in Porto, Portugal (http://www.tedxboavista.com/), partner UPORTO presented a communication focusing on nutrition (A different look at nutrition) and this was also an opportunity to present briefly the HabEat objectives and to strength the importance of pregnancy and early infancy in the development of food habits and eating patterns.

HabEat next stakeholder workshop

HabEat third stakeholder workshop

The third stakeholder workshop open to all will be held on Thursday 13th June 2013 at the Warsaw University of Life Sciences in Poland.

HabEat in future external events

VIVA international congress: "V is for vegetable: applying learning theory to liking and intake of vegetables - how can science contribute to healthy eating habits in the youngest and beyond?"

Partners INRA, WUR and UCL will make oral and poster presentations at the congress to be held on 21-22nd March 2013 at the University of St Andrews in Scotland, UK. http://www.vivacongress2013.co.uk/

"Early diet is critical for later development - new research into changing early eating habits from HABEAT and VIVA" workshop to be held on 19th September 2013 from 11:30 to 13:30 in Granada, Spain, during the IUNS 20th International Congress of Nutrition

The following partners will make oral presentations:
- Dr Pauline Emmett, UNIBRIS: "Critical periods for eating habit development; results from cohort studies in France, Portugal, Greece and UK"
- Dr George Moschonis, HUA: "Results of the TASTE study: an intervention to increase vegetable liking and consumption by exposure to a variety of vegetables at the beginning of complementary feeding"
- Prof. Marion Hetherington, ULeeds: "Learning to like vegetables: applying learning theory to the acquisition of preferences for novel vegetables from 6 – 36 months"
- Dr Valesca Kooijman, DLO-FBR: "Increasing vegetable consumption by social learning in 3 to 6-year-olds: theory and practice"
- Dr Sophie Nicklaus, INRA: "Caloric compensation and eating in the absence of hunger in early childhood: impact of parental feeding practices"

http://www.icn2013.com/

"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"