



NEWSLETTER N°06
Spring 2013



→ Highlights :

3rd HabEat Stakeholder workshop: 13rd June 2013 in Warsaw, Poland

HabEat-VIVA workshop: 19th September 2013 in Granada, Spain

HabEat publications

HabEat dissemination

HabEat in external events



HabEat project

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

→ The 3rd HabEat stakeholder workshop

"After the first and the second stakeholder workshops held on 3rd April 2012 at the University of Leeds (UK) and on 27th September 2012 at the University of Porto, Medical School (Portugal), we are pleased to announce that the 3rd workshop open to all Stakeholders will be held on 13rd June 2013 kindly hosted by the Warsaw University of Life Sciences, Faculty of Human Nutrition and Consumer Science (Poland).

We hope to see you all in Warsaw to exchange results about the early development of eating habits and to discuss together on the implications of research findings on recommendations"

Dr Sylvie Issanchou, HabEat Coordinator

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|--------------------|---|
| 09:00-09:30 | Introduction to HabEat project and to the workshop by Dr Sylvie Issanchou - HabEat Coordinator - from INRA, Prof. Krystyna Gutkowska – Dean of the Faculty of Human Nutrition and Consumer Science, Dr Nina Pikielna and Dr Eliza Kostyra from Warsaw University of Life Sciences, Faculty of Human Nutrition and Consumer Science |
| 09:30-10:30 | Presentation by our invited speaker: "Feeding disorders - prevention and treatment" by Dr Piotr Socha from The Warsaw Children's Memorial Health Institute |
| 10:30-11:00 | Coffee break |
| 11:00-12:00 | Presentation of topic 1: "Strategies to increase vegetable intake" by Dr Gertrude Zeinstra from Wageningen UR Food & Biobased Research, Dr Annemarie Olsen from University of Copenhagen and Dr Vassiliki Costarelli from Harokopio University in Athens. |
| 12:00-12:30 | Presentation of topic 2: "What could we learn from cohort findings in HabEat?" by Dr Carla Lopes from University of Porto Medical School |
| 12:30-13:00 | Presentation of topic 3: "Adjustment of energy intake in children: relation with their weight status and with parental feeding practices" by Dr Sophie Nicklaus and Dr Sandrine Monnery-Patris from INRA, Centre des Sciences du Goût et de l'Alimentation, Dijon |
| 13:00-14:00 | Lunch |
| 14:00-16:00 | Round table/discussions |
| 16:00-16:30 | Coffee break |
| 16:30-17:00 | Feedback & Conclusions |

Registration is mandatory! Click [HERE](#) before Friday 24th May
Login: STAKEHOLDER3 - Password: WARSAW



HabEat and VIVA parallel symposium to take place on 19th September during the IUNS 20th International Congress of Nutrition in Granada

The HabEat consortium submitted a joint proposal with VIVA for a symposium on the development of early eating habits as part of the IUNS 20th Congress. We are pleased to have been selected to present and discuss results from both projects.

The programme of this congress has been developed under the slogan 'Joining cultures through nutrition' and is thus perfectly in line with HabEat and VIVA. In fact, within HabEat, results from different European cohorts are compared in order to demonstrate which early factors are impacting later children's eating behaviour whatever country they live in. VIVA compared the weaning practices in France and in the UK, and within both projects the effectiveness of different feeding practices and strategies are studied experimentally and compared between countries.

This joint HabEat and Viva symposium will take place on Thursday 19th September from 11:30 to 13:30 in Machado and Picasso Rooms

"Early diet is critical for later development - new research into changing early eating habits from HabEat and VIVA"

Speaker 1: Dr Pauline Emmett, University of Bristol, UK: "Critical periods for eating habit development; results from cohort studies in France, Portugal, Greece and UK"

Speaker 2: Prof. Marion Hetherington, University of Leeds: "Learning to like vegetables: applying learning theory to the acquisition of preferences for novel vegetables from 6 – 36m: results from HabEat and VIVA"

Speaker 3: Dr George Moschonis, University of Harokopio: "Results of the taste study: an intervention to increase vegetable liking and consumption by exposure to a variety of vegetables at weaning"

Speaker 4: Dr Gertrude Zeinstra, DLO-Food & Biobased Research: "Strategies to increase vegetable consumption in 3- to 6-years-olds: theory and practice"

Speaker 5: Dr Sophie Nicklaus, INRA: "Caloric compensation and eating in the absence of hunger in early childhood: impact of parental feeding practices"

http://icn2013.com/pages/scientific_program/parallel-symposia#thursday

Save the date and join us in the wonderful city of Granada!

During the IUNS 20th International Congress of Nutrition, there will be a number of symposia devoted to nutrition in early life, childhood and adolescence. Amongst these different symposia, the following ones are of high relevance to the work being carried out in HabEat:

- Early life nutrition intervention: Effects on long term health and function (Early Nutrition Project). Monday 16th September, 8:00-10:00, Andalucia Room
- The HELENA study on nutrition and lifestyle in adolescents. Monday 16th September, 11:30-13:30, Machado and Picasso Rooms
- Study Tackling obesity in pre-school children: First results from the ToyBox, a study, in which one HabEat partner (Harokopio University) is involved. Tuesday 17th September, 11:30-13:30, Lorca Auditorium
- ISCOLE: International Study of Childhood Obesity, Lifestyle and the Environment. Wednesday 18th September, 11:30-13:30, Lorca Auditorium
- The COHORTS collaboration: Findings from 5 birth cohorts from developing countries. Wednesday 18th September, 11:30-13:30, Room B
- FAO Project: Complementary feeding and infant health. Thursday 19th September, 8:00-10:00, Machado Room
- Early programming and nutrition in Latin America. Friday 20th September, 8:00-10:00, Andalucia Room



HabEat latest publication

Effectiveness of flavour nutrient learning and mere exposure as mechanisms to increase toddler's intake and preference for green vegetables

Victoire W.T. de Wild, Cees de Graaf, Gerry Jager
Division of Human Nutrition, Wageningen University, Bomenweg 4, 6703 HD Wageningen, The Netherlands

Appetite 64 (2013), page 89-96 - Elsevier Ltd.
<http://dx.doi.org/10.1016/j.appet.2013.01.006>

Keywords:

Flavour-nutrient learning
Young children
Repeated (mere) exposure
Food preference
Healthy dietary habits

Abstract:

Children's consumption of vegetables is still below recommendations. Since preference is the most important predictor of children's intake and most children dislike vegetables, new strategies are needed to increase their preferences for vegetables. Recent work from HabEat partners showed already the strength of repeated exposure as a mechanism to increase vegetable intake in young children. Associative learning is another learning strategy based on pairing a neutral or disliked stimulus (named 'conditioned stimulus'), such as a food, and a positive stimulus (named 'unconditioned stimulus') to induce a positive shift in response to the food even when the unconditioned stimulus is no more presented simultaneously with the food. If the unconditioned stimulus is a food or ingredient with high energy density, its positive value is due to its positive post-ingestive consequence (i.e. satiation feeling), and this associative learning is described as flavour-nutrient learning (FNL). However, findings for FNL were mixed and less support for this learning was found. Previous failures to demonstrate FNL as an effective mechanism to improve vegetables in children could be due to rejection of the test products resulting in extremely low intake levels.

Forty healthy toddlers were included in a study. Toddlers were randomly assigned to one of the two conditions. During an intervention period of 7 weeks, they consumed vegetable soups (endive and spinach) twice per week. Half of the group received a high-energy variant of one soup (e.g. HE spinach) and a low energy variant of the other (LE endive), whereas for the other half the order was reversed (HE endive, LE spinach). In order to evaluate acceptance of vegetable, we measured preference and ad libitum consumption (with a maximum of 200 g) of both vegetable products offered in low energy version, measured before, shortly after the intervention period, and two and six months following conditioning to assess longer-term effects. After completion of the intervention period, twenty-eight children (14 girls and 14 boys, age 35 months; SD \pm 8.3) met criteria for FNL to occur (i.e. they had sufficient intake of the test products during conditioning), and were included in the data analysis. Results showed a significant increase (\sim 58 g) in ad libitum intake for both vegetable soups (stable over time), but irrespective of the energy content. This indicates a robust effect of repeated exposure on intake, but no FNL. For preference, however, results showed a significant shift in liking for the vegetable soup consistently paired with high energy, supporting FNL. Taken together, these findings reflect moderate support for FNL to play a role in the development of young children's acceptance of novel vegetables into their diets. Repeated exposure proved to be a powerful mechanism to promote vegetable consumption in young children, with longer-term potential and relatively easy to implement in daily life, at home or at day care-centres.

Find the HabEat publications on our website: <http://www.habeat.eu/publications.php>



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"Vegetables and Children"
A HabEat dissemination workshop for the public sector
at the Restaurant of the Future
Wageningen University and Research Centre (WUR), the Netherlands
April 9, 2013



Thirty-seven professionals attended this workshop representing a large number of stakeholders such as paediatricians, child health centres, day care centres, schools, public health agencies, governmental institutions as well as the press. The workshop was opened by Professor Kees de Graaf, chair holder in Sensory Science and Eating Behaviour at the Division of Human Nutrition. He stressed the importance of increasing vegetable consumption in children, since their intake is far below the recommendations for all age groups. Subsequently, Dr. Valesca Kooijman (researcher at FBR and HabEat work package leader) explained the content and the aims of the HabEat project. She explained that an important target of the HabEat project is to come up with recommendations for health care professionals, policy makers and parents, thereby translating scientific outcomes into practical advice.

Coraline Barends (PhD fellow) and Dr. Gertrude Zeinstra presented results from their PhD projects. Coraline studied the effects of weaning with either vegetables or fruit on infants' acceptance and intake of fruit and vegetables, including longer term measures (at 12 and 23 months). The findings indicated a positive effect of weaning with vegetables on acceptance and intake of vegetables. This effect was still present at the age of 12 months, but not noticeable anymore at 23 months. Dr. Gertrude Zeinstra presented her earlier work on encouraging vegetable intake in 4-12 year-old children. Her work showed that Dutch children associate vegetables with dinner time, and that parents use more pressuring strategies for vegetables than for fruit. Concerning vegetable preparation, children preferred crunchy vegetables without brown-colouring due to preparation. Offering a choice of vegetables may be a promising strategy that requires more research.

During the break, participants could enjoy a buffet with soups, salads and sandwiches. One of the soups offered was a real "HabEat soup", since this green vegetable soup (see page 3 of this newsletter) was used in a toddler study by Victoire de Wild (PhD fellow).

After the break, Victoire presented two learning mechanisms: flavour-nutrient and flavour-flavour learning. Both strategies are thought to be helpful in increasing vegetable intake in 2 to 4 year-old children. After the intervention, vegetable intake increased by 50% in the study where toddlers were repeatedly offered vegetable soups with and without energy, and by 300% in the study where dried vegetable crisps were repeatedly given with a dip. This effect was mainly due to the fact that the children were repeatedly exposed to the vegetables; adding energy or a liked dip did not have an additional effect on intake. This is in line with other HabEat studies, further supporting the evidence that repeated exposure is the most powerful learning mechanism to increase vegetable intake.

Dr. Valesca Kooijman concluded the evening with a presentation of studies where the effectiveness of different strategies for increasing vegetable intake was studied among 4 to 6 year-olds. Although the children did not increase their vegetable intake after repeated exposure to a relative familiar vegetable, the children ate approximately 30 grams of the offered vegetable. Therefore, offering children vegetables as a snack during the school day is a valuable strategy to encourage their current vegetable intake. In one of these studies, a choice test was executed as a measure for children's vegetable preference: children could choose which vegetable they wanted to eat out of four different vegetables. During these choice tests, children's intake was considerably higher (~ 80 grams) than when they were offered a fixed vegetable (~ 30 grams), supporting the hypothesis that choice may have a positive effect. Imitation of a role model eating vegetables was investigated in two studies. There was no effect on the short-term, but a few positive trends appeared on the longer-term.

The audience participated actively throughout the workshop and there was a lively discussion after the presentations. Some practical issues arose such as the potential contradiction between offering a vegetable repeatedly and varying the vegetables proposed. How can this best be done in practice? Concrete and practical advice is therefore required to enable parents and caregivers to actually implement such recommendations. Furthermore, it was discussed that parents play an important role in children's eating behaviour. They should act as a role model and they should make healthy food available and accessible to their child. The professionals indicated that they were very happy to hear about the latest findings to get more insight into the process of learning to eat vegetables. It was a fruitful and inspiring evening.



The VIVA International congress at the University of St Andrews, Scotland in March 2013

“Starting early - the importance of vegetables and healthy eating habits for infants and young children”

The VIVA project funded by the European Union has arisen from a partnership between academics and industry, both interested in discovering how to promote healthy eating in the early years. This project is funded by a mobility programme to encourage knowledge transfer and exchange under the Marie Curie Industry Academia Partnerships and Pathways mechanism (EU FP7 Marie Curie IAPP 230637; RCN 90766). VIVA has enabled secondments between academics and industry to explore the importance of healthy eating in early life. It started in 2009 and will finish in 2013.

<http://www.psyc.leeds.ac.uk/10/research/biol/HumanNutrition/HARU/InfantFeeding/VIVA/>

Diets high in vegetables and fruits are considered beneficial in preventing chronic diseases. However, both European adults and children eat fewer vegetables than is recommended. Over the last decade it has become clear that food preferences and eating behaviours established in infancy track over time and set the foundation of later eating habits. Thus, introducing vegetables early is important to help infants develop healthy food preferences. The early years and especially the period when infants are introduced to solid foods provide a window of opportunity for the development of future healthy eating habits. The VIVA project covered three main themes:

1. Identifying best practice in the use of vegetables during weaning across several European countries;
2. Establishing and testing the effects of a weaning strategy and of a learning strategy (flavour-flavour and flavour-nutrient) in school age children through randomised controlled trials (RCTs) involving repeated exposure to vegetables ('Are the newly proposed strategies efficient to increase acceptance and intake of vegetables in newly weaned infants and later in school age children?');
3. Disseminating evidence on best practice to health professionals, parents and scientific peers to promote acceptance and intake of vegetables Based on the results arising from the themes 1 and 2 some of the ways to increase acceptance and intake of vegetables in infants and children will be disseminated to stakeholders through written materials (scientific papers), input to policy documents, via workshops and conferences.

As part of the VIVA project, an International Congress was organized by the partners at St Andrews University during the 600th anniversary of the University. The congress took place on March 21-22, 2013 to promote dissemination of the research from project VIVA, and to provide a platform to others from across Europe and beyond to explore state of the art evidence on infant feeding and make suggestions on how parents, health care professionals, government and industry can contribute to laying the foundations of healthy eating patterns early in life.

Thus, VIVA as well as HabEat are designed to improve the quality of food intake among very young children, the IAPP to develop an international exchange of ideas between academia and industry and HabEat to understand the psychological mechanisms which facilitate the acquisition of eating habits and those which can be exploited to break poor dietary habits. This congress was an excellent opportunity in sharing and exchange of ideas.

One hundred scientists, health care professionals, policy makers, representatives of industry and stakeholder groups participated in this VIVA congress. This international congress had been planned at the start of the project to provide a final step to the research for exchange, discussion and dissemination.

The VIVA congress focused on weaning (i.e. the introduction of complementary feeding / introduction of foods to infants) and addressed important questions such as:

- How to introduce vegetables in the diet of an infant to promote liking and intake
- What parental feeding styles contribute to vegetable acceptance
- How infants and toddlers learn about food





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During the congress, VIVA project results were disseminated through poster presentations (abstracts available online)

- It's never too late to learn – applying learning theory to improve liking and intake of vegetables in pre-school age children. J. Cecil, M. Wilson, A. Wright, C. Allais, C. Schwartz, D. Jackson, H. Weenen, M. Hetherington.
- A step-by-step introduction to vegetables at the beginning of weaning: the effects of early and repeated exposure. M. Hetherington, C. Schwartz, F. Croden, J. Madrelle, C. Vereijken, H. Weenen.
- Analysis of video recorded eating behaviours of infants: a better way to assess liking of foods by infants? J. Madrelle, C. Barends, M. Pinilo, H. Weenen, M. Hetherington.
- Complementary feeding: comparison and evaluation of national and international guidelines. C. Schwartz, P. Scholtens, A. Lalanne, H. Weenen, S. Nicklaus.
- For French mothers complementary feeding is a 'taste journey'. C. Schwartz, J. Madrelle, C. Vereijken, H. Weenen, S. Nicklaus, M. Hetherington.



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<http://www.vivacongress2013.co.uk/>

During the congress, HabEat project results were disseminated through oral and poster presentations.

Oral presentations:

- INRA: "Eating a variety of vegetables: the importance of feeding practices at weaning and onwards".

Posters:

- "An investigation into vegetable consumption in pre-school children and the role of exposure". M. Ahern, S. J. Caton, M. M. Hetherington, ULeeds.
- "Early exposure to vegetable variety on infants' liking and consumption: results of the TASTE intervention study". A. Fildes, J. Wardle, L. Cooke, UCL.
- "The effect of three social learning techniques on Dutch 4- to 6-year old children vegetable consumption". G.G. Zeinstra, V. Kooijman, DLO-FBR.
- "Repeated exposure more effective than flavour flavour learning as mechanism to increase vegetable consumption in pre-school children". V. de Wild, K. de Graaf, G. Jager, WUR.
- "Comparison of Repeated Exposure, Flavor-Flavor Learning, and Flavor-Nutrient Learning to increase artichoke intake in weaning infants". E. Remy, S. Issanchou, V. Boggio, S. Nicklaus, INRA.

"At this international congress, I presented my poster on the results of the HabEat topic "Learning to like the taste of vegetables: effects of sensory manipulations". The title of the poster was "Repeated exposure more effective than flavour-flavour learning as mechanism to increase vegetable consumption in pre-school children". We investigated the relative effectiveness of repeated exposure and flavour-flavour-learning in increasing vegetable intake and acceptance in pre-schoolers. During an intervention period of seven weeks, toddlers consumed vegetable crisps (freeze-dried red beet and parsnip) with dip sauce (tomato ketchup and white sauce) twice per week. Intake increased significantly after the intervention for both vegetables (an increase of approx. 300%) whatever the dip sauce, and this effect was persistent even six months afterwards. These results suggest a robust and persistent effect of repeated exposure but no advantage of flavour-flavour learning. In conclusion, simply offering pure vegetable tastes repeatedly is sufficient to increase acceptance and intake over time. It was a great opportunity to attend a congress with so many talented and well known people in the field from all over the world."



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HabEat at other events

Past Events:

● **HabEat at the 37th Annual Meeting of the British Feeding & Drinking Group**

On 4th & 5th April 2013, the British Feeding & Drinking Group organized its 37th annual meeting in Loughborough, UK.

Dr. Gerry Jager from Wageningen University (WUR) presented the Victoire de Wild's poster entitled: "Repeated exposure more effective than flavour-flavour learning as mechanism to increase vegetable consumption in pre-school children".

Dr. Samantha Caton from University of Leeds (ULeeds) presented the poster entitled: "Learning to like a novel vegetable: Predictors of intake of a novel vegetable in pre-school children".

● **HabEat at the XII Portuguese Congress of Food and Nutrition**

The XII Portuguese Congress of Food and Nutrition took place on 16th & 17th May 2013 in Lisbon, Portugal.

Dr Andreia Oliveira presented an oral entitled: "Confirmatory factor analysis measurement model of the food neophobia scale - adaptation to Portuguese pregnant women"



<http://www.cna.org.pt/>

Upcoming Events:

● **HabEat at the 10th Pangborn Sensory Science Symposium**

The 10th Pangborn Sensory Science Symposium will take place between 11st and 15th August 2013 in Rio de Janeiro, Brazil.

"Still coming up so I cannot share our experience yet, but I am very proud and excited that we were selected with our abstract to give an oral presentation during this congress. I understood that many abstracts were submitted and few were selected. This is a great opportunity to share results from the HabEat project. The topic of the presentation will cover the study regarding effectiveness of repeated exposure and flavour-flavour-learning in increasing vegetable intake and acceptance in pre-schoolers. I am very honoured that Professor Kees de Graaf will present our results here."



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HabEat PhD student

Wageningen University (WUR), the Netherlands

"We will be presenting, on a poster, data from the HabEat project, where we investigated effects of serving a novel vegetable to children in various serving styles; changing shape, and texture of the food. We wanted to determine if this serving style influences the outcome of an exposure intervention. The conference is very well-attended among sensory scientists all over the world, and we look very much forward to this opportunity to present our study to fellow researchers, and expect to get lots of opportunities to discuss our data, as well as the application of our findings."



Annemarie Olsen: ano@life.ku.dk

HabEat Post-doc

Københavns Universitet (UCPH), Denmark



HabEat at an EC-US symposium

“Understanding Nutrition-Related Consumer Behavior: Strategies to Promote a Lifetime of Healthy Food Choices”



A research symposium
21-22 May 2013, Ghent, Belgium

This EC-US symposium is organized by European Commission (EC), National Institutes of Health (NIH) and Foundation of the National Institutes of Health. The topic of the symposium is "Understanding Nutrition-Related Consumer Behaviour: Strategies to Promote a Lifetime of Healthy Food Choices".

“The purpose of this symposium is to highlight the state of the science and identify key research opportunities related to the determinants of healthy food choices and nutrition-related purchasing behaviors. The emphasis will be on areas of research that could significantly benefit from US-EU partnerships between academia, government, and the food and beverage industry.”

Prof. Marion Hetherington, University of Leeds, is one of the organizers of this event. Dr Sylvie Issanchou, INRA, will give a talk on “Critical periods, feeding practices, lifestyle and environmental influences on young children’s food acceptance, intake patterns and future eating habits” in Session 1 on “Impact of the early environment on the development of eating behaviours across the lifespan: What are the promoters of healthy dietary behaviours?” and thus, will present some results of the HabEat project.

Information for Parents on the HabEat web site

Some recommendations on how you can encourage your children to form healthy eating habits are now available in the “Parents’ section of the HabEat website. These recommendations are based on HabEat results and also on results of previous studies.

The information is available in French, English, Portuguese, Greek, Dutch and Danish.

<http://www.habeat.eu/>

