

HabEat

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

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SEVENTH FRAMEWORK PROGRAMME**

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Identified core concepts in food habit formation

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Concerned workpackage leader: INSERM - Institut National de la santé et de la Recherche Médicale – Dr Marie-Aline Charles

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I. Objectives

The overall HabEat project seeks to identify the critical periods in the formation and breaking of food habits; the key learning mechanisms underpinning acquisition of food habits and the most effective strategies for breaking food habits. The objective of task T1.1 is to *operationalise* core concepts in food habit formation. This task represents a milestone within the project to facilitate agreement on the key components of the workpackages and follows on from a workshop held on 11/02/10. The proceedings from the presentations and ensuing discussion was tape recorded then transcribed. Presentations given by each partner have been lodged on the HabEat collaborative platform. The materials from both transcriptions and from the slide presentations was analyzed by a qualitative approach allowing careful consideration of the agreed key parameters involved in food habits, food habit formation and food habit breaking.

II. Identification of core concepts in food habit formation

Leader: University of Leeds

In order to agree the core concepts which will be applied throughout the HabEat project, task T1.1 involved a workshop in which partners discussed the definitions and meanings associated with core concepts within food habit formation including the central characteristics of food habit formation, maintenance and breaking.

The central characteristics of food habits are: what foods are eaten (**qualitative** dimension), how much is eaten (the **quantitative** dimension), when and how often they are eaten (**temporal** dimension). Characteristics of the child (**temperament**) and of the parent/caregiver (**attitudes, parenting styles**) were also considered important to the formation and breaking of food habits. The workshop involved consideration and thorough discussion of the constructs applied to food habits within the different disciplines represented by partners including psychology, epidemiology, behavioural sciences, nutrition, and sensory science. The workshop was developed to showcase and explore commonalities and differences between and within these disciplines so that the basis for common definitions and consensus within the project could be reached.

There are two main behavioural processes featured within the HabEat project. The first is the formation of food habits such as learning to like and to eat vegetables; and the second is breaking of children's food habits, for example discouraging poor eating habits and encouraging better eating habits. One of the first tasks for the project team is to conduct a systematic review of evidence on habit formation and breaking in children. However, in order to provide the best start to the project, it was decided that the team must arrive at a consensus on the terms which will be agreed as the *operational definition* of food habits for both experimental and epidemiological studies. The rationale for this type of consensus is that there is greater opportunity for translation between the systematic review, the interrogation of existing epidemiological data sets and the ongoing experimentation. There is considerable added value to the project in agreeing upon the core constructs underpinning the formation and breaking of food habits so that benefits can be pooled across work packages. These *operational definitions* feed directly into task T1.3 in identifying the relevant tools and keywords to search for within the systematic review and in task T1.4 to assist in the development of experimental hypotheses of critical periods and factors in food habit formation.

1. Core constructs

The definition of a “habit” is a behavioural pattern or routine which is repeated on a regular basis. Behaviours which occur often become habitual and as such become effortless and to some extent “sub-conscious”. Similarly, food habits depend on the repetition of food related behaviours. Habit formation is the process by which food habits are acquired. There is a link developed between an action and its context through repeatedly and consistently pairing the two. Thus, habits occur on the basis of associative learning, a certain context elicits a specific behavioural response, this response is repeated over time and the habit is formed.

By understanding the processes via which food habits are formed, this could inform the means by which food habits are then broken.

The discussion was initiated following circulation of key questions by WP1 leader. This prompted partners to consider each of the elements of how a food habit is formed, what tools partners already use and might use during the project to assess food habits, food habit formation and breaking. Presentations by partners encouraged consideration of how each partner had treated core concepts in their ongoing research. Definitions were provided by partners using an excel file, the supporting evidence underpinning these definitions was then discussed and the operational approach to be adopted for subsequent workpackages (WP1, WP2, WP3) was agreed.

The core concepts were then applied to the existing cohort studies and questions extracted from each of ALSPAC, GENERATION XXI, EDEN and EUROPREVALL. For example, elements of parental feeding practice such as breastfeeding, restrictive practices, pressure to eat, parenting style, weaning (diversification of foods offered) and other practices. These have been fed into the Task T1.2 with a synthesis of core concepts for the cohort studies.

2. Qualitative dimension

The core aspects of the qualitative dimension were identified as:

- a. the type of food (which foods families consume)
- b. sensory and nutrient variety (diversity of tastes, textures, food groups)
- c. patterning of eating episodes (whether the episode is a meal or snack as determined by the parents and/or caregivers)

Foods eaten by families and specifically by children within the family can be extracted from self-report measures used within the cohort studies. Discussion focused on the ways in which foods eaten by children differ from adults and that this should be acknowledged within the work package. Within the cohorts, qualitative aspect, such as type of food consumed, diet variety and patterning of eating episodes, are ascertained by diet records (at least 3 days including one weekend day), food frequency questionnaires (FFQ) and the nature of eating episodes (main meal vs snack) consumed each day. The sensory characteristics are possible to ascertain from questionnaires in a limited way (e.g. broad tastes such as sweet and savoury) but not always specific preparations of foods (e.g. differences in texture such as grated raw carrot or cooked carrot).

Considerable debate emerged on the ways in which habitual food intake around meals or snacks should be treated within the datasets. However, it was apparent that there are many different ways in which meals and snacks can be defined; some argue that foods eaten within specific time slots can be considered “meals” and outside these they can be considered “snacks”; but the alternative argument is that some so-called “snacks” have more energy than regular meals.

Within the laboratory setting the type of food, variety and pattern is predetermined by the experimental protocol but complemented by administration of the FFQ to assess usual diet

variety. It was agreed that where possible tools used to examine food types, variety and pattern should be the same across study types (epidemiology or laboratory) to enhance cross-talk between studies.

3. Quantitative dimension

The core characteristics of the quantitative dimension were:

- a) how much (in weight or energy)
- b) food groups (dietary and nutrient quality)
- c) portion size

For laboratory based experiments, quantities are predetermined as are food groups/portions offered. For the cohort studies (epidemiology) quantitative elements are determined by questionnaire (diet records, 24-h recalls, dietary history, food frequency questionnaire) so that the proportion of foods from food groups can be calculated. Again it was agreed that for quantitative characteristics of foods partners should use the same tools where possible, so that comparisons can be made across studies.

4. Temporal dimension

The key elements of the temporal dimension were agreed as:

- a) when in the day the foods are eaten by children (morning, lunchtime, evening)
- b) how often the food is eaten across the diet (daily, weekly, monthly, less frequently than this)
- c) when weaning occurs/occurred (early or late weaning).

For the weaning period the construct of lumpy foods was discussed. This is an important determinant of future food habits (see Coulthard et al., 2009; Northstone et al., 2001).

5. Temperament

Discussion of the child's temperament was included in relation to core constructs. It was agreed that it is important to acknowledge what factors the child brings to the eating episodes in relation to enjoyment of food, pickiness, neophobia, reluctance to try or to accept foods. For example, it is useful to have a view of the child's likes and dislikes, to know whether the child has a wide repertoire of accepted foods, as well as to gauge the pickiness/fussiness dimension. Consideration of the measures which can be used to determine temperament focused on the Child Neophobia Questionnaire (Pliner and Hobden, 1992), and on the Child Eating Behaviour Questionnaire (Wardle et al., 2001).

6. Parenting style

Notions of parenting styles from authoritative, permissive, and authoritarian in relation to feeding children were considered. It was agreed that in relation to food and feeding, decisions to breastfeed and to introduce complementary foods, employing restrictive feeding practices, applying pressure to eat and general attitudes towards eating are important to document where possible.

7. Learning

Consideration of three main forms of learning in the acquisition of food habits was undertaken. These were mere exposure (just offering the novel food with and without encouragement), flavour flavour learning and flavour nutrient learning. The notion of "mere" in mere exposure was questioned, since offering children foods to taste without encouragement is considered artificial and rather rare. It is understood that exposure is an effective means by which children acquire liking and acceptance of novel foods with many studies now showing that repeated exposure over around 10 times seems sufficient to establish liking. Learning also occurs as a function of observation and modelling. Children learn to accept novel foods in part through what they see and experience within the context

of the family, therefore, social learning is also a critical component in the acquisition of food habits,

Annex 1: List of core concepts

What	LAB	EPI
Type of food	Predetermined + FFQ	Diet record (3+ days) FFQ
Variety/sensory	Predetermined	Variety index
Patterning (meal/snack)	Determined by parents	N° feeding episodes per day
Temperament		
pickiness	Questionnaires	Questionnaires
neophobia/interest	Questionnaires	Questionnaires
How Much		
Intake (g/kcal)	Questionnaires	Questionnaires
Food groups/diet	Questionnaires	Questionnaires
Portion size	Questionnaires	Questionnaires
Sensitivity to physiological cues		
Hunger/appetite/satiety		CEBQ & BEBQ
EAH/COMPX	EAH/Compensation within Ss design	CEBQ
SSS/Satiety		
WHEN	LAB	EPI
Temporal	Pattern predetermined	
Frequency		
Sleep patterns		
Circadian rhythm	Diurnal variation	
Weaning		
Solids	questionnaire	
Chewy	Interview/ ask parents	
Age		
Early v/late	FFQ/diet records	
Liking/Choice		
Preference		Child interview (food photos Hedonic facial scale) Questionnaires
Wanting	Measure of intake	FFQ
Liking	Facial expression	Parental reports
Social context		
Eat with others	Idol/teacher modelling imitations	
Similarity of preferences	Parents' preferences (FFQ)	Parents' preferences (FFQ)

Location	TV/other activities - questionnaires	questionnaires
Learning	LAB	EPI
Forms (eg associative)		
Critical stages		FFQ
Repeated exposure		FFQ
Parenting attitudes		
Feeding styles eg. availability	Questionnaires/Filmed meal episodes	questionnaires
Authoritarian	Questionnaires/Filmed meal episodes	questionnaires

Which habits need to be broken?

1. Over eating
External signals v/ internal signals (how to influence reaction to signals)
Sensitivity to satiety
2. A low variety of food – increase variety of food intake
3. Decrease food energy density