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Critical periods, feeding practices, lifestyle and environmental influences on young children's food acceptance, intake patterns and future eating habits

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Vegetable is the food category which is the least liked by children. As liking is the main determinant of food consumption in children and as early eating habits track on during childhood and up to adulthood, it is particularly important to identify the early determinants of vegetable acceptance.

During this presentation, results of studies based on experimental and/or observational approaches and exploring the impact of breastfeeding, timing of introduction, variety of complementary foods, and parental practices on vegetable acceptance or intake will be presented.

Experimental approaches have shown that breastfeeding facilitates the initial acceptance of new foods introduced in the infants' diet^{1,2}. Two mechanisms could explain this higher initial acceptance by breastfed infants compared to formula fed infants. The first one is flavour learning due to maternal dietary intake, and thus to the exposure via mother's milk³. The second one is variety learning due to the daily variation of mother's milk flavour compared to the stable flavour of formula milks⁴. In the Opaline* cohort of more than 300 mother-infant pairs recruited in the Dijon area (France), no effect of breastfeeding was observed on the acceptance of novel vegetables offered during the first months of introduction of complementary foods⁵. Within the HabEat project* data from four European 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, were analysed. Breastfeeding duration was positively associated with later vegetable intake during childhood. This relationship between breastfeeding and later vegetable intake was observed even when the model was adjusted for maternal age, maternal education, and maternal own fruit and vegetables intake⁶.

Analyses conducted on the same data revealed that association with the age of introduction to vegetables was less consistent across the cohorts than the association with breastfeeding. Within the Opaline cohort no significant difference in acceptance of new vegetables was observed between the infants weaned before 6 months and those weaned after 6 months⁵.

Concerning texture, children introduced to lumpy solids after the age of 9 months ate, at seven years, less of many of the food groups, including fruits and vegetables, than those introduced to lumpy foods between 6 and 9 months⁷. Moreover, it was found that familiarity with different textures, especially chopped foods, was the strongest predictor of intake and liking of chopped carrots for 12-month old infants⁸.

Different experimental studies revealed that early exposure to a variety of vegetables induces a higher acceptance of the new vegetables presented to the infants^{1,9}. This positive association between early variety and vegetable acceptance during the first months of complementary feeding was also observed within Opaline⁵. At the weaning stage, an intervention aiming at offering infants a variety of vegetables was most effective in the UK, a country where mothers rarely offer vegetables as a first food¹⁰.

Some parental feeding practices were found to be associated with vegetable liking at 2 years within the Opaline cohort¹¹: the more the mothers were permissive the lower the children's vegetable liking, and the more the mothers used reward, the higher the children's vegetable acceptance. A permissive style and practices to fulfil child's desires, as well as an authoritarian style, contingent (i.e. use of reward) and coercive practices aimed at forcing children to taste rejected foods, were associated positively with children's eating difficulties¹². Thus, these results on using rewards are contradictory as those from other studies which have shown either a positive or a negative association on food acceptance. However, recent studies suggest that the use of non-food rewards or praise can be effective in encouraging children to taste new or less liked foods^{13,14}.

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This is quite important to initiate tasting as many studies have shown the effectiveness of repeated exposure for increasing vegetable intake¹⁵⁻¹⁹ even for a disliked vegetable. In infants, it was observed that after 7 exposures a vegetable, initially considered by mothers as disliked by their infant, was consumed as much as an initially liked vegetable²⁰. However, a survey conducted in one French city and in one German city indicated that most mothers offered a food that they considered as disliked by their infant no more than at three meals before giving up and deciding not to offer it again²¹.

To conclude some early determinants of healthy eating habits such as vegetable intake have been clearly identified. On the basis of these results it should be possible to give some recommendations concerning in particular weaning practices.

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