I.F. Briefing 4

Children's Food Choices – What Neuroscience Can Tell Us

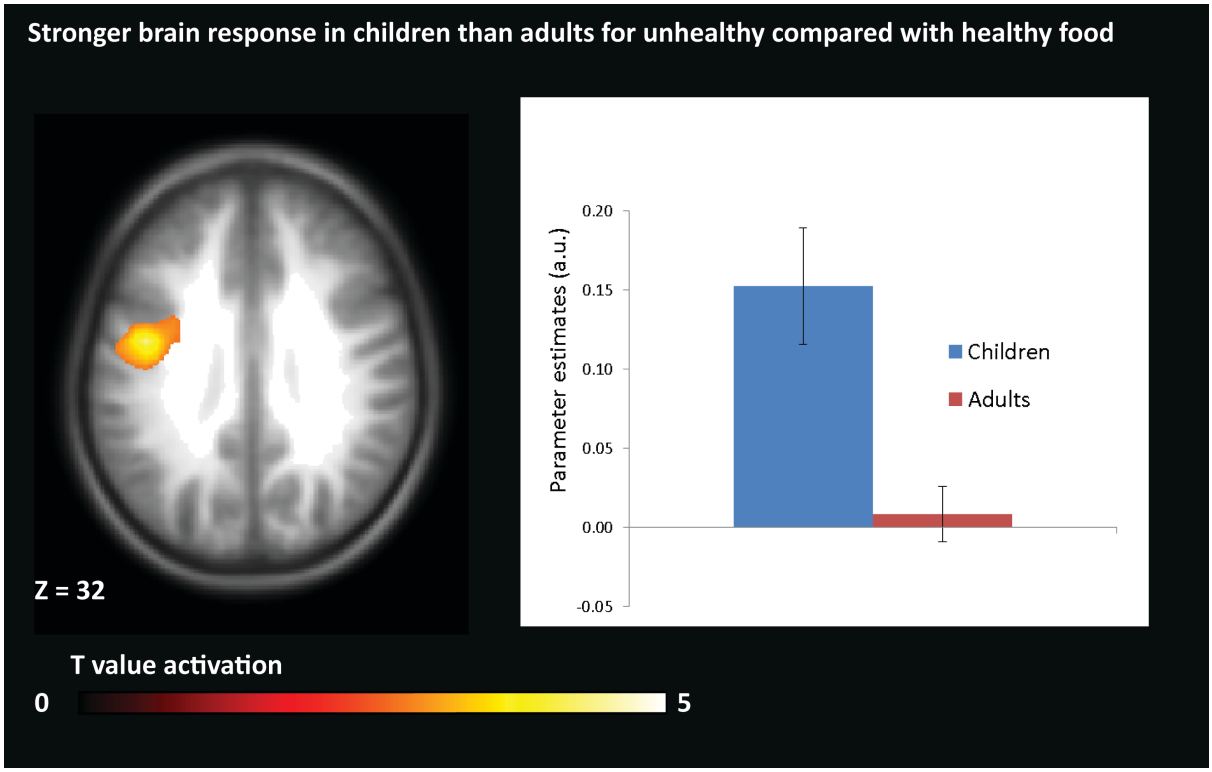
Floor van Meer (University Medical Centre Utrecht)
f.vanmeer@umcutrecht.nl

In Western society, food is all around us. The sight, smell and taste of food have an immediate effect on the appetitive network in our brain. The brains of people who are overweight or obese react differently to the sight of food than those of normal weight people. The way that the brain reacts to the sight of food has even been shown to predict weight gain, snacking behaviour, and success in a weight loss programme.

The brain's reactivity to foods is thus a relevant characteristic to determine someone's risk of gaining weight. Children are often said to be more sensitive to the sight of food than adults, and especially so for unhealthy foods. They also find it harder to make choices that go against their preferences – e.g. to choose healthier foods that they don't enjoy. However, no study has yet directly compared how children's and adults' brains react to healthy and unhealthy foods. Therefore, we examined brain reactions to healthy and unhealthy food and food choice in children and adults.

Key finding 1

The I.Family study is the first to show that children's brains are indeed more reactive to the sight of unhealthy food than adults are. Children have a stronger reaction in an area important for physical actions – such as reaching for a cookie! – than adults do when looking at unhealthy food pictures.[1]



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement No 266044

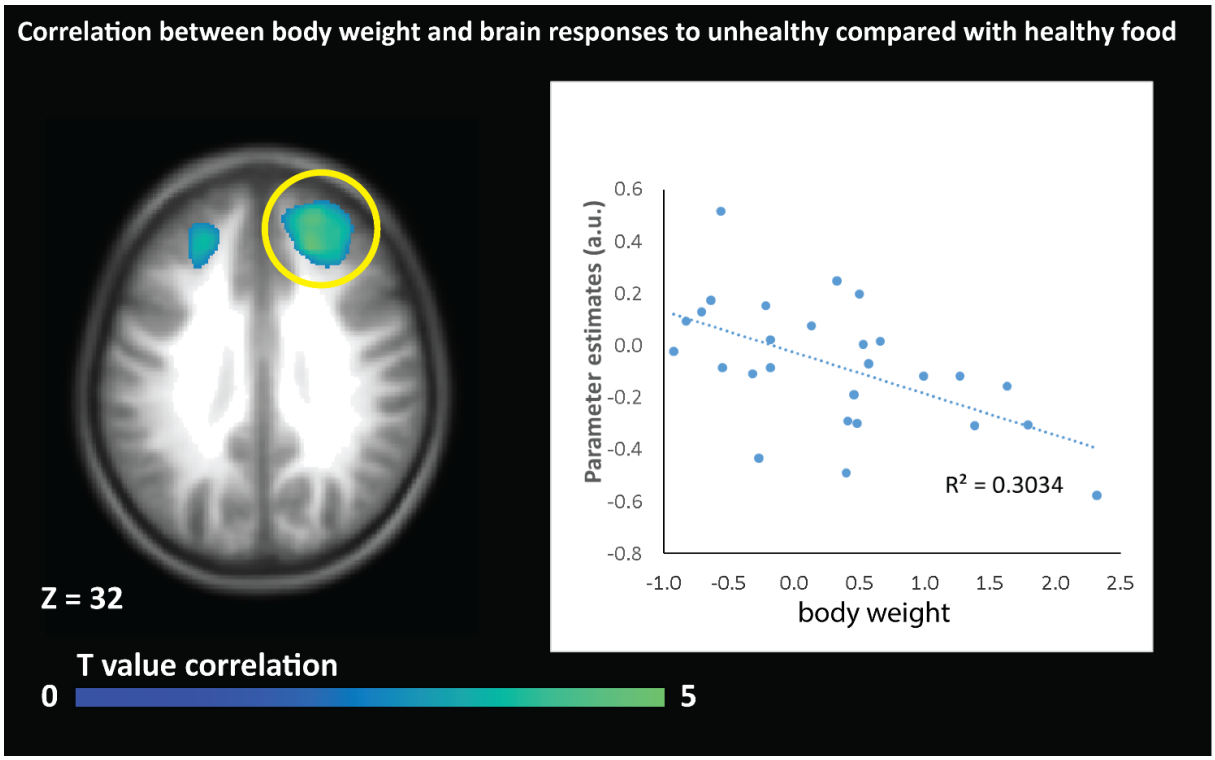
Key finding 2

Children choose what they want to eat almost entirely based on how tasty they think foods are. When deciding, their brain reacts most strongly to tasty foods. Healthiness only comes into play when children are asked to consider this. In this case, their brain reacts more strongly to healthy foods and they make healthier choices. Nonetheless, children still make less healthy choices than adults, and the brain system that underlies healthy choices in adults does not respond in the same way in children.[2]

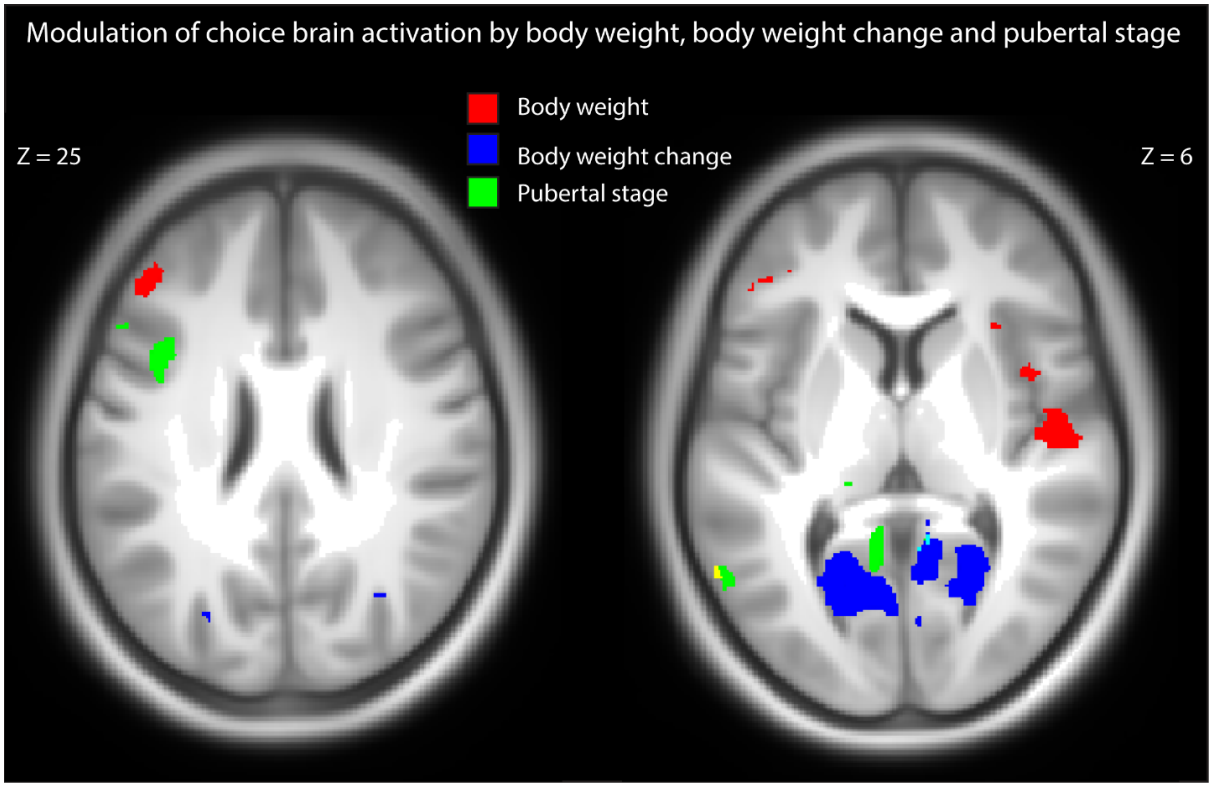
Key finding 3

Children with a higher body weight for their height have less activation in an area of the brain that is important for inhibiting responses during food viewing.[1] Furthermore, current body weight, weight change over time and pubertal stage have independent effects on brain activation during food choice. Children who have gained weight have more activation in visual areas when choosing what to eat. Older children and children with a lower body weight have more activation in an area of the brain that is important for inhibiting responses when choosing foods. These inhibition areas are among the last to fully mature. Only a longitudinal study like I.Family gives us the opportunity to look at the effects of weight change over time.

The following diagram illustrates that children with a higher body weight have less brain activation when viewing unhealthy foods in a brain area involved in inhibition.



The following illustration shows that body weight, body weight change and pubertal stage have independent effects on brain activation during food choice.



In the future we will use the genetic data and neuropsychological tests available in I.Family to unravel how hereditary factors and behavioural traits affect food-related brain activation in children.

Conclusions

1. Children are more sensitive to unhealthy food cues than adults. Overweight children are especially vulnerable, since they have less inhibitory activation in response to unhealthy foods. This has important implications for the regulation of marketing, since children are actively targeted by unhealthy food marketing. The results of this study send a clear message that we should protect children, especially overweight children, because they are most susceptible to the unhealthy food temptations all around them.
2. Since the tastiness of food is so important for children, even more than for adults, we should also think about strategies to alter children's preferences toward healthier foods. Since we prefer foods that we are used to, letting children experience healthy foods and teaching them healthy habits may help to make the healthy choice the easy choice for them.

[1] van Meer et al. 2016. Developmental Differences in the Brain Response to Unhealthy Food Cues: An fMRI Study of Children and Adults. *American Journal of Clinical Nutrition* 104: 1515–22.

[2] Based on a paper by van Meer et al, submitted for publication.