- Eating customs / Infants

How healthy eating habits can start before a baby's birth

STUDY: VEGETABLE SMELLS ARE REMEMBERED FROM THE WOMB

Cambridge News · 13 May 2026 · By STEPHEN BEECH, SWNS newsdesk@cambridge-news.co.uk @CambsLive

TODDLERS can remember vegetable smells from the womb, according to a new study.



Three-year-olds are less likely to react negatively to the smell of vegetables they were repeatedly exposed to before birth, say scientists. They believe their findings could help establish healthier eating habits in children.

The Durham University-led research team examined the facial reactions of three-year-olds to the non-bitter smell of carrot or the bitter smell of kale.

The experiment followed two previous studies when the researchers recorded the reactions of the same children to carrot or kale - first before birth using ultrasound, and then in the weeks after birth.

The team found that the three-year-olds whose mothers had taken carrot powder capsules as part of a controlled experiment when pregnant were less likely to show negative facial reactions towards the smell of carrot. Similarly, those whose mums had taken kale powder capsules while pregnant reacted less negatively to the smell of kale.

The researchers say their latest findings – in the journal Developmental Psychobiology – support the argument that exposure to flavours in late pregnancy can result in long-lasting odour or flavour memory in children.

They say the study also suggests that experiencing bitter or non-bitter flavours before birth can shape taste likes or dislikes after being born.

Lead author Professor Nadja Reissland, of Durham University's department of psychology, said: "We first observed these children before they were born, at 32 and 36 weeks gestation, using ultrasound scans and then again at about three weeks of age before observing them once more at age three. Each time, we coded their facial expressions when exposed to the carrot or kale flavour or smell.

"What we see over time is that the children are still more favourable to the vegetables they were exposed to while they were in the womb. From this we can suggest that being exposed to a particular flavour in late pregnancy can result in long-lasting flavour or odour memory in children, potentially shaping their food preferences years after birth."

For the latest study, the research team followed 12 three-year-olds who had taken part in the pre-birth and new-born studies. Each child's mother had taken either carrot or kale capsules while pregnant.

Wet cotton swabs dipped in either carrot or kale powder were held under each child's nose. Their reaction to the different smells was captured on video. The children did not taste the swabs.

The researchers then analysed the footage to examine the children's facial reactions – either "laughter face" or "cry face" – and compared those with the reactions seen before birth and when they were newborns.

In the pre-birth study, foetuses exposed to the carrot flavour showed more "laughterface" responses while those exposed to the kale flavour showed more "cry-face" responses.

When studying the children at three weeks, those whose mums took carrot powder capsules while pregnant were more likely to react favourably to the smell of carrot. And babies whose mothers took kale powder capsules while pregnant reacted more positively to the smell of kale post-birth.

In the latest study, when looking at the children at three, the researchers found a "significantly reduced" rate of negative facial expressions in response to the odour the children had been exposed to in the womb. They say it indicates the sensory experience of babies in the womb continues to influence how they respond later.

Co-author Dr Beyza Ustun-Elayan, of Cambridge University and Radboud University Medical Centre in the Netherlands, said: "These findings open up new ways of thinking about early dietary interventions, suggesting that flavours from the maternal diet during pregnancy may quietly shape children's responses to foods years later."

These findings open up new ways of thinking about dietary interventions. Dr Beyza Ustun-Elayan