



ECOG: "The place of fruit and vegetable in childhood obesity prevention" January 12th 2021

'Promoting vegetable intake in preschool children: barriers and potential solutions'

Dr Sam Caton

Public health, School of Health and Related Research University of Sheffield



The University Of Sheffield. Institute for Sustainable Food.





Question:

How many portions of fruit and vegetables do you usually consume per day?

a) 0-2
b) 3
c) 4
d) 5 or more





What's so special about vegetables?

- Low in energy density (Kcal/g)
- Nutrient dense: vegetables contain complex mixture of phytochemicals, fibre and vitamins.
- Significant health benefits:
 - Obesity, diabetes, coronary disease, stroke, certain cancers, dementia, and all cause mortality, effects of mental health, cognitive performance.
- Significant impact on human and planetary health <u>IF WE CAN GET PEOPLE</u> <u>TO EAT THEM!</u>



The problem...



- Current UK guidelines: "5 a day" (400g) (DoH / WHO) Adults: 80g Children: 40g
- Health survey for England (2018)
 - Both adults and children are not consuming sufficient amounts of fruits and vegetables.
 - In the UK 82% of children 5-15 years do not consume recommended 5 a day.
 - Average child eats \leq 3 portions of F&V a day.
 - 9% of children that consume no F&V a day (HSE 2016).
- Habitual diets contain too much meat and discretionary items.



Barriers: Why don't children eat sufficient amounts of vegetables?

- Cost: NDNS (2008/9-2016/17) Intake of fruits and veg increase with income.
- Availability in the home and schools.
- Abundance of alternative foods.
- Report not liking them: texture, appearance, energy density, taste (bitter).



Taste





Neonatal response to taste

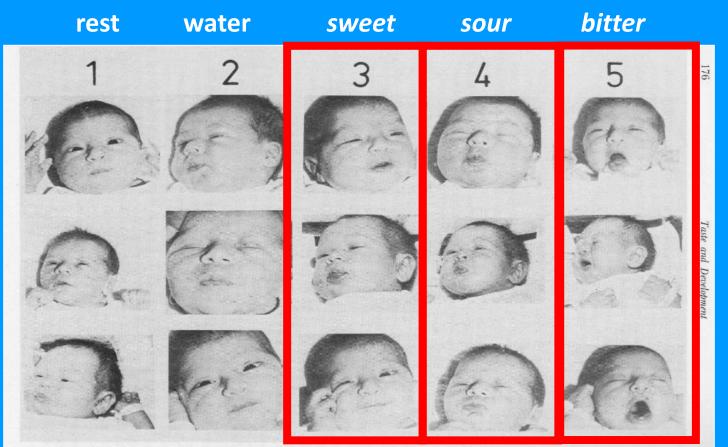
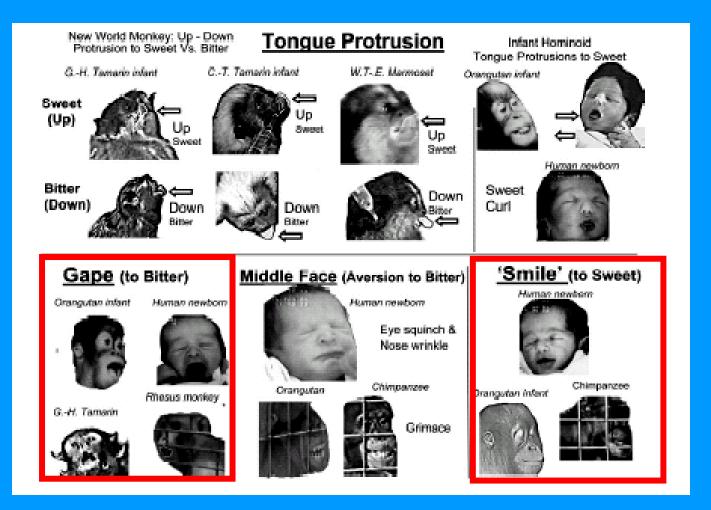


Figure 13–1. Typical features of the Gustofacial Response, recorded in neonate infants between birth and the first feeding. 1: Resting face. 2: Reaction to distilled water (control). 3: Response to sweet stimulus. 4: Lip-pursing, response to sour stimulus. 5: Response to bitter stimulus. STEINER, 1977



Positive hedonic and aversive facial expressions to taste



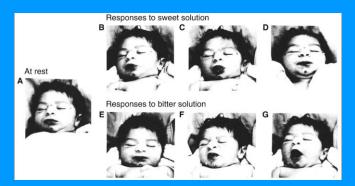


Innate preference for sweet tastes

• Infants demonstrate hedonic responses to sweet and aversive reactions to bitter, sour and salty.

• Therefore, infants must learn to like non-sweet tastes.

• How do we learn to like?



Ganchrow et al. Infant behaviour and development (1983)



Old wives' tales and strange smelling newborns...

Reports that some newborns had very distinct smells

Early case studies from Israeli hospital: 4 newborns with distinct odours similar to the odour of the last meal that the mothers consumed (Hauser et al. 1985)

In utero exposure

Flavour transmission in breast milk

Short communications

Eur J Pediatr (1985) 144:403

Peculiar odours in newborns and maternal prenatal ingestion of spicy food

Discussion

G.J. Hauser, D. Chitavat, L. Berns, D. Braver and B. Muhlbauer

Department of Neonatology, Serlin Maternity Hospital (Hakirya), Tel-Aviv Medical Center, Tel-Aviv, Israel

Abstract. A peculiar odour in an infant Jewish extraction. Upon examination may raise the possibility of several important syndromes. Four cases of newborn infants with peculiar smells are described. In two, the sharp odour was identified as cumin, one smelled of fenugreek and one of curry. All these babies were born to mothers who ingested spicy food prior to delivery. In one case, the foul smelling amniotic fluid led to a spurious suspicion of amniotitis.

Key words: Odours - Newborn - Amniotitis

immediately following delivery the physical findings were within normal limits except for the pungent odour of cumin (cumin cyminum), a spice commonly used in oriental cuisine. The hospital course was uneventful for both infants. The mothers reported having eaten "schug", a sharp tasting combination of spices containing cumin, garlic, salt, oil and pepper, in the days prior to delivery.

Case 3. This was a normal term newborn infant born to a mother of Yemenite-Jewish extraction. He had a sharp odour smelling babies. Physicians caring for

mediate postnatal period may attract our attention and suggest the diagnosis of a disease. This, in turn, may lead to the use of unnecessary blood tests, cultures and, sometimes, antibiotic therapy, as in our case 4. Bartley et al. [1] also reported a 9-day-old boy whose urine and entire body smelled of maple syrup. Multiple urinary and blood tests ruled out the diagnosis of maple syrup disease. After further questioning, the mother stated that she had administered a supernatant of fenugreek seeds to the infant as a folk remedy. In this case, the spice was directly administered to the baby. In our cases, however, the spices were absorbed from the maternal gastrointestinal tract and transfered to the amniotic fluid, where they were swallowed by the fetus

Peculiar odours in newborns in the im-

Our observations add another entity to the list of possible actiologies of odd-



Potential solutions: Introduce vegetables early

- Use of vegetables in the weaning (complementary feeding) period
- Vegetables by Stealth (hide them!)
- "I just keep offering them"



Research report

Vegetables by stealth. An exploratory study investigating the introduction of vegetables in the weaning period

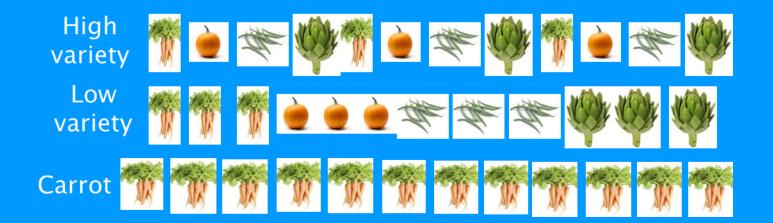
Samantha J. Caton^{*}, Sara M. Ahern, Marion M. Hetherington University of Leeds, Institute of Psychological Sciences, United Kingstom



Potential solutions: What can we do about it?

Repeated exposure

- Grounded in the "mere exposure effect" (Zajonc, 1968)
- "Learned safety hypothesis" in food preference development (Rozin and Kalat, 1971)
- 10-15 exposures (Birch & Marlin, 1982)





Repeated exposure

- Repeated exposure is consistently effective at increasing intake
- Not all children respond the same
- Younger children <2y more accepting, less fussy
- Older children >2y less accepting, more fussy
- Repeated exposure is STILL effective for fussy children

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Repeated exposure with variety

- Variety promotes food intake (Raynor & Vaadiveloo 2018)
- Repeated exposure was effective
- Effect of variety was mixed



The effects of repeated exposure and variety on vegetable intake in preschool children

Sara M. Ahern^a, Samantha J. Caton^b, Pam Blundell-Birttill^c, Marion M. Hetherington^{C,*} ^a margient lawates for Handh Research, Bradford Royal Informary, Bendford, 1009 640, United Kingdom ^b School of Phytokogy, University of Schöffeld, Schöf



MDPI

Article

Can Reduced Intake Associated with Downsizing a High Energy Dense Meal Item be Offset by Increased Vegetable Variety in 3–5-year-old Children?

Sharon A. Carstairs ^{1,*}⁽⁹⁾, Samantha J. Caton ²⁽⁹⁾, Pam Blundell-Birtill ³⁽⁹⁾, Barbara J. Rolls ⁴, Marion M. Hetherington ³⁽⁹⁾ and Joanne E. Cecil ¹

- ¹ Population and Behavioral Sciences, School of Medicine, University of St Andrews,
- St Andrews KY16 9TF, UK; jc100@st-andrews.ac.uk
- ² School of Health and Related Research (ScHARR), University of Sheffield, Sheffield S1 4DA, UK; s.caton@sheffield.ac.uk
- 3 Cabool of Parahology University of Loads Loads LC2 OFF UK a histill@loads as uk (DD_D)



Swap high energy dense snacks for fruits and vegetables

- Recruited parents of preschool children
- Replace all high energy dense snacks with fruit and vegetables OR half all high energy dense snacks
- Vegetable intake was increased in the replacement group (half a portion per day)







Article

The Feasibility and Acceptability of Two Methods of Snack Portion Control in United Kingdom (UK) Preschool Children: Reduction and Replacement

Sophie Reale ¹⁽⁰⁾, Colette M. Kearney ¹⁽⁰⁾, Marion M. Hetherington ²⁽⁰⁾, Fiona Croden ², Joanne E. Cecil ³, Sharon A. Carstairs ³⁽⁰⁾, Barbara J. Rolls ⁴ and Samantha J. Caton ^{1,*}

¹ School of Health and Related Research (ScHARR), University of Sheffield, Sheffield S1 4DA, UK; slreale1@sheffield.ac.uk (S.R.); c.kearney@sheffield.ac.uk (C.M.K.)



Other evidence-based methods of getting children to eat (more) vegetables

Tangible rewards



Offer choice / varying preparation methods



Gardening/ education



Eating as a family (modelling)





Larger portion sizes

Wider food environment solutions: Advertising, price, policy, guidelines...



Lots of ways to promote vegetable intake in children...

- Lessons learned:
 - Understand the learning process (Paroch *et al.* Front Psychol. 2017, Nekitsing *et al.* Appetite 2018)
 - Introduce vegetables early
 - Engage with the wider food system
- More research on promotion of vegetable intake in lower-income populations
 - Address issue of waste
- Address the problem on a global scale
- Seek to improve adults diets





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University of Leeds



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- Dr Pam Blundell-Birtill

University of St Andrews



- Dr Jo Cecil
- Dr Sharon Carstairs

Thank you for listening. **Questions?**

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Twitter: @Samantha.caton



Email: s.caton@Sheffield.ac.uk



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