Portion size selection and snack food preferences: inter-relationships between parent and child BMI

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Potential health and social outcomes due to being overweight/obese as a child:

- More school absences due to illness
- Higher risk of Type 2 diabetes
- Rates of pre-diabetes are 2.6x higher for overweight children compared to lean
- Higher rates of asthma (25.2% compared to 16.6%)
- Higher rates of obstructive sleep apnoea
- Increased cardiovascular risk factors (including high cholesterol levels, high blood sugar, and abnormal glucose tolerance)
- Psychosocial risks
- Musculoskeletal problems due to excess weight
- The list goes on…
Background – Childhood Obesity

**Psychosocial**
- Poor self-esteem
- Depression
- Eating disorders

**Neurological**
- *Pseudotumor cerebri*

**Pulmonary**
- Sleep apnoea
- Asthma
- Exercise intolerance

**Gastrointestinal**
- Gallstones
- Steatohepatitis

**Cardiovascular**
- Dyslipidaemia
- Hypertension
- Coagulopathy
- Chronic inflammation
- Endothelial dysfunction

**Renal**
- Glomerulosclerosis

**Musculoskeletal**
- Slipped capital femoral epiphysis
- Blount’s disease
- Forearm fracture
- Flat feet

**Endocrine**
- Type 2 diabetes
- Precocious puberty
- Polycystic ovary syndrome (girls)
- Hypogonadism (boys)

Complications of childhood obesity
**Portion size selection** - Little is known about how children make decisions about portion sizes

- Interesting relationship between what parents serve and what their children actually want to eat (Fisher et al, 2003)
- Increased consumption with larger portion sizes - development over time (Ebbeling, 2002)
- Foods with low expected satiation (i.e. high-energy-dense snack foods) are typically selected in larger portions (Brunstrom & Rogers, 2009)

**Snack food preference**

- Little research has looked into how preferences for snack foods develop over time, and how this might relate to child and parent BMI
Child Obesity Novel Intervention

- NBU collaboration with the Biomedical Research Unit (BRU) on the ComMando (Community Mandolean) Trial
- Child obesity intervention through the use of the Mandolean device
- Total $N = 69$ parent/child dyads
Collaboration with @Bristol

Only 9 days of data collection yielded 147 parent/child dyads!
All children had BMI ≥ 95th percentile. All study visits took place in the participants’ homes.

Parent and child weight categories (n)

<table>
<thead>
<tr>
<th></th>
<th>Lean</th>
<th>Overweight</th>
</tr>
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<tbody>
<tr>
<td>Parent</td>
<td>87</td>
<td>123</td>
</tr>
<tr>
<td>Child</td>
<td>113</td>
<td>105</td>
</tr>
</tbody>
</table>

Children and parents of all BMI categories took part in a single test session at the Science Centre.

Parent/child combined weight categories (n)

<table>
<thead>
<tr>
<th></th>
<th>Lean Parent</th>
<th>Overweight Parent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lean Child</td>
<td>59</td>
<td>51</td>
</tr>
<tr>
<td>Overweight Child</td>
<td>28</td>
<td>71</td>
</tr>
</tbody>
</table>

Total: N = 218 parent/child pairs
1. **Portion size preference**
Do overweight children report a greater preference for larger portion sizes?

2. **Snack food preference**
Do overweight children report a greater preference for high-energy-dense snack foods?

3. **Parent-child relationships**
Do relationships exist between parents and children in their beliefs about food?
Child Measures:
1. Child’s Ideal Portion
2. Child’s Maximum Portion
3. Snack Food Preferences
4. Liking

Parent Measures:
1. Parent’s estimate of Child’s Ideal Portion
2. Parent’s estimate of Child’s Maximum Portion
3. Parent’s estimate of Child’s Snack Preferences
4. Parent’s Ideal Portion
5. Familiarity
6. Meal Time Variability and TV
7. Snack Time Variability
Portion Size Preference

• Ideal portion: What would be your/your child’s **perfect** amount for dinner?
• Maximum portion: What is the **most** you/your child could eat for dinner?
Each meal had 50 images to choose from, each shown in equicaloric steps from 20kcal to 1000kcal (+/- 20kcal per image).
1. Chicken, chips and baked beans
2. Lasagne and peas
3. Chicken curry with rice
4. Macaroni cheese
5. Pizza and chips
6. Spaghetti bolognese
7. Sausage, mashed potato and peas
Snack Food Preference

- Eight snack foods of varying High- and Low- energy densities were displayed.
- Foods were ranked by parents and children for preference (1 = best, 8 = worst).

Snack foods displayed:
1. Apple
2. Banana
3. Cheese String
4. Chocolate chip cookies
5. Frube (yoghurt)
6. Grapes
7. Hula Hoops
8. Kitkat
Ideal and Maximum Portion Size Preferences by Child Weight Status

*F*(1, 213) = 4.772, *p* = 0.030

**F*(1, 205) = 4.622, *p* = 0.033
1. Overweight children report higher “ideal” portions than lean children, however they do not report a higher “maximum” portion.

2. Overweight children are reporting “ideal” portions closer to their “maximum” tolerated portion than lean children.

3. This could indicate that overweight children have a higher tolerance for feelings of fullness than their lean counterparts.
Average Snack Food Rank Discrepancy by Child and Parent Weight Status

$F(1, 3) = 9.159, \ p = 0.003$
Discrepancy on Portion Size Tasks by Child and Parent Weight Status

Ideal Portion Task Discrepancy*

<table>
<thead>
<tr>
<th>Discrepancy in kcal</th>
<th>Congruent</th>
<th>Incongruent</th>
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Maximum Portion Task Discrepancy**

<table>
<thead>
<tr>
<th>Discrepancy in kcal</th>
<th>Congruent</th>
<th>Incongruent</th>
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*F (1, 191) = 2.860, p = 0.092

**F (1, 189) = 3.766, p = 0.054
Parent-child interaction:

1. Parents of children with congruent weight status (i.e. – an overweight parent with an overweight child, or lean parent with lean child) perform with greater accuracy in determining what their child would prefer in the lunchbox snack preference task.

2. This same trend appears for congruent vs. incongruent weight statuses on the ideal and maximum portion size tasks.
Study 2: Exploring the developmental origins of beliefs about foods – (starting in July)

- Aiming to recruit a sample of 450 children aged 3 – 14 years and their parent
- Replication of current parent-child interaction finding
- Understanding how beliefs about portion and snack preferences develop through the ages
- Exploring the development of expected satiety through the ages

*The goal:* More successful, individually-tailored family interventions…
Acknowledgements

With special thanks to:
Danielle Ferriday
Becci Griggs
Jeff Brunstrom
Peter Rogers
Olivia Byrom
Julian Hamilton-Shield

This research was supported by the @Bristol Science Centre and through an NIHR-HTA programme grant (ref: 09/127/04)

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