Psychological factors in childhood obesity

Claus Vögele
Prevalence of obesity in Europe and North-America

Janssen et al., 2005
The obesity epidemic starts here
Significance of the problem: Prevalence in Germany

KIGGS, 2007
Time trends in childhood and adolescent obesity in England from 1995 to 2007 and projections of prevalence to 2015

Stamatakis et al., 2010

Figure 1  Moving averages of obesity prevalence in children and adolescents living in England between 1995 and 2007.
Figure 2 Extrapolation of percentage obese children (aged 2–10 years) in England, by sex and social class.
1. Psychological factors contributing to development and maintenance of obesity

• Eating behaviour / food preferences
• Physical (in)activity
• Family environment
• Stress and negative affect
• Sleep duration (-)
Eating Behaviour

Physical (in)activity

Genetics/ Fetal Priming

Body weight regulation

+ 5% p.d.

- 5% p.d.

+ 5 kg per Year

+ 5% p.d.
The biological predisposition to obesity: beyond the thrifty genotype scenario

Bouchard, 2007

Diagram:
- Social environment
- Built environment
- Obesogenic environment
- Obesogenic behavior
- Biological predisposition
- Positive energy balance
- Weight gain
- Eating Behaviour
- Physical activity
- Stress
- Sleep duration
Widespread innate reactions (across species) to sweet, sour and bitter tastants in neonate mammals (except cats – obligate carnivores)
Eating is a primary need

- ... it is necessary for survival.

- ... it is governed by biological mechanisms regulating hunger and satiety.

- ... food preferences, i.e. what is good or bad for us, are innate

- .. but are also affected by learning.
Factors affecting the development of eating behaviour

- Education/Information
- Internal cues ............ External cues
- Evolutionary programme
- Imprinting
- Genetic preferences
- Culture: habit/availability

In utero | Birth | Infant | Toddler | School child | Adolescent
The family environment (parental behaviour / control)
Trends in food portion sizes from nationally representative data on 63 380 individuals aged 2 years and older between 1977 and 1998 in the USA.*

Portion size affects total energy intake in children.

Why?

Experimental studies (e.g. Orlet Fisher et al., 2003) have shown that children do not re-adjust their energy intake accordingly (by eating less) after a bigger entree.

So how much parental control is beneficial?
Children were presented with a range of 8 different snack foods, 4 classified as unhealthy (chocolate, crisps, cake, biscuits) and 4 classified as healthy (yoghurt, fresh fruit, raw vegetables, cereal bar) and asked to rank them according to their liking.

“Out of these, please choose which snack you would like most right now.”

“Now, out of the rest, which would be your next best favourite”. Etc.

*Vögele et al., 2007*
Snack Ranking
Children of normal-weight mothers

Ranking Condition

Liked 5

Disliked 2

Rank (Mean ± SE)

On Own With Mum

Healthy Snacks

Unhealthy Snacks
On Own With Mum

Ranking Condition

<table>
<thead>
<tr>
<th>Rank (Mean ± SE)</th>
<th>Healthy Snacks</th>
<th>Unhealthy Snacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liked 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disliked 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Snack Ranking
Children of overweight mothers

Ranking Condition

On Own With Mum
Daily hassles and emotional eating in obese adolescents: the role of ruminative thinking

Kubiak et al., Appetite (2008)

Elektronic diary over 7 days
Daily hassles and emotional eating in obese adolescents: the role of ruminative thinking

Kubiak et al., Appetite (2008)

Table 1
Random-intercept mixed regression (381 observations, N = 16): final model

<table>
<thead>
<tr>
<th></th>
<th>b</th>
<th>S.E. b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.46</td>
<td>0.67</td>
</tr>
<tr>
<td>Daily hassle</td>
<td>−0.18</td>
<td>0.60</td>
</tr>
<tr>
<td>Negative affect</td>
<td>−0.04</td>
<td>0.03</td>
</tr>
<tr>
<td>Negative affect × hassle</td>
<td>0.21</td>
<td>0.96</td>
</tr>
<tr>
<td>Rumination × hassle</td>
<td>0.42</td>
<td>0.17</td>
</tr>
</tbody>
</table>

ψ = 0.96; θ = 2.57; log likelihood −912.16, χ²(4) = 23.57, p < 0.01, where ψ is between-person variance θ is within-person variance. *Note:* Bold values represent p < 0.05.

A narrative review of psychological and educational strategies applied to young children's eating behaviours aimed at reducing obesity risk.

*Obesity Reviews.*
Decline in levels of physical activity in adolescence

Kimm et al., Lancet, 2005
Is this related to BMI?

2005

Kimm et al., Lancet,
### Top 5 leisure time activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage of available time spent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watch TV/DVD/Video</td>
<td>16,3</td>
</tr>
<tr>
<td>Play with friends</td>
<td>10,4</td>
</tr>
<tr>
<td>Relax/Sleep/Take a bath</td>
<td>9,6</td>
</tr>
<tr>
<td>Computer/Video games/Internet</td>
<td>7,6</td>
</tr>
<tr>
<td>Reading</td>
<td>6,5</td>
</tr>
</tbody>
</table>
Predictors of physical activity intentions in school children.

Chater, Vögele & Worrell, 2007

\[ N = 529 \text{ 7-10 year old children (259 boys, 269 girls)} \]

- Self efficacy
- Perceived importance of physical activity
- Outcome expectancy
- Mother’s behaviour

\[ R^2: .38 \]
Physical activity and dietary intake of children aged 9-11 years and the influence of peers on these behaviours: a one-year follow-up.
Copping et al., 2010

Significant positive correlation between no. of steps per day (pedometer) and:

- Peer acceptance  
  \[ r=0.111; \ p=0.049 \]
- Friends taking part in P.A. or exercise with me  
  \[ r=0.121; \ p=0.029 \]
- Friends discussing P.A. or exercise with me  
  \[ r=0.116; \ p=0.036 \]

No such correlations were evident for dietary behaviour!

How do young children acquire physical activity behaviour? A review.
2. Psychological consequences of childhood obesity

- Reduced quality of life
- Social seclusion
- Increased risk for psychopathology
# Quality of life in overweight/obese children

## Overview

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>De Beer et al., 2005</td>
<td>31 obese (12-18 yrs), 62 age/sex matched normal-weight</td>
<td>lower HRQoL in obese, partially explained by obesity-related comorbidity</td>
</tr>
<tr>
<td>Friedlander et al., 2003</td>
<td>371 (8-11 yrs), 17.5% overweight</td>
<td>lower self-esteem, physical functioning and psychosocial health in overweight</td>
</tr>
<tr>
<td>Janicke et al., 2007</td>
<td>96 overweight (12.8 yrs)</td>
<td>Effect of peer victimisation a. parent distress on QoL is mediated by depression</td>
</tr>
<tr>
<td>Pinhas-Hamiel et al., 2006</td>
<td>182 (48.3% overweight/obese)</td>
<td>Physical/social domains of HRQoL lower in obese, not emotional or school domains</td>
</tr>
<tr>
<td>Swallen et al., 2005</td>
<td>4743 (13.1% overweight or obese)</td>
<td>lower general and physical health QoL in overweight/obese, no difference in psychosocial outcomes</td>
</tr>
<tr>
<td>Williams et al., 2007</td>
<td>1456 (24.5% overweight/obese)</td>
<td>lower HRQoL in overweight or obese, linear association with BMI, smaller effect than in clinical sample</td>
</tr>
<tr>
<td>Zeller &amp; Modi, 2006</td>
<td>166 obese (12.7 yrs)</td>
<td>HRQoL is predicted by depression, perceived social support, SES, zBMI</td>
</tr>
</tbody>
</table>
Health-related quality of life in obese children and adolescents

Tsiros et al., 2009

**Figure 3** Relationship between mean body mass index (BMI) and pediatric-reported or parent/proxy-reported total Pediatric Quality of Life Inventory (PedsQL) score.
Overweight and its impact on health-related quality of life in children and adolescents

Ottava et al., 2011

![Graph showing HRQoL (Mean) for Normal weight and Overweight in Physical well-being, Self-perception, and Social acceptance & bullying with p-values 0.015***, 0.025***, and 0.005*** respectively.](image-url)
Weight relative to height

Body Mass Index (BMI)
## Body image, diet and physical activity in 9-10 year old children.

*Vögele & Woodward (2005)*

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td></td>
</tr>
<tr>
<td>I have tried in the past to lose weight (%)</td>
<td>30.5</td>
<td>34.3</td>
<td>32.3</td>
</tr>
<tr>
<td>I am currently on a diet to lose weight (%)</td>
<td>24.9</td>
<td>21.8</td>
<td>23.5</td>
</tr>
<tr>
<td>I am always trying to diet (%)</td>
<td>20.7</td>
<td>11.5</td>
<td>16.1</td>
</tr>
</tbody>
</table>
What predicts body dissatisfaction?¹

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$\beta$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>.35</td>
<td>.01</td>
</tr>
<tr>
<td>&quot;I feel too fat&quot;</td>
<td>.39</td>
<td>.001</td>
</tr>
<tr>
<td>&quot;My mum is overweight&quot;</td>
<td>.13</td>
<td>.05</td>
</tr>
</tbody>
</table>

¹ Explained variance: 47% (p < .01)  
²: only 13% were overweight
Risk factor for eating disorders
Method

What would you like to look like?  What do you look like?
Vögele et al.: n = 428 school children (7-11 Jahre)

- **Gender**
  - **BMI**:
    - **Body Dissatisfaction**: $R^2 = 0.22$
    - **Quality of Life**: $R^2 = 0.04$
  - **Dieting behaviour**: $R^2 = 0.26$

Chi-Square = 0.94, df = 2, P-value = 0.62, RMSEA = 0.00, SRMR = 0.020, CFI = 1.00
A Meta-Analytic Review of Obesity Prevention Programs for Children and Adolescents

Stice et al., 2006
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