Behaviour Change by Design

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Behaviour Change by Design

I The Problem

II Understanding Behaviour

III Behaviour Change by Design: example of excessive food consumption

IV Acceptability to Government, Public and Industry
I The Problem

- 63% deaths worldwide are due to:
  
  *Cancer, Cardiovascular disease, Diabetes, Respiratory Disease*

- Key causes

- Eliminating these major risk factors will prevent:
  
  - 75% of diabetes and cardiovascular disease
  - 40% of cancers
  
  AND reduce health inequalities by about 50%
II  Understanding Behaviour

“Essentially, all models are wrong but some are useful.” George E.P. Box (1987)

<table>
<thead>
<tr>
<th>Dual Process Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conscious vs Non-conscious</td>
</tr>
<tr>
<td>Cold vs Hot</td>
</tr>
<tr>
<td>Goal-directed vs Stimulus driven</td>
</tr>
<tr>
<td>System 2 vs System 1</td>
</tr>
<tr>
<td>Reflective vs Impulsive</td>
</tr>
</tbody>
</table>
Why doesn’t information (usually) change behaviour?

Effective Information

Ineffective Information

Motivation
- Threat not seen as great enough
- Certain current pleasure more motivating than Uncertain future gain

Behaviour
- Intend to change our behaviour but...
  - Environments have a strong influences on much of our behaviour
  - Weak ability to inhibit immediate, habitual or routine responses
Changing Behaviour

Teach people to...

Resist Environment

Change Environment

Individual – level Interventions

Population-level intervention
Why might targeting non-conscious processes work?

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“Why ninety-nine hundredths or, possibly, nine hundred and ninety-nine thousandths of our activity is purely automatic and habitual, from our rising in the morning to our lying down each night.”

William James (1899)
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IV  Acceptability to Government, Public and Industry
Targeting non-conscious processes... by changing environments

Hollands, Shemilt, Marteau, Jebb, Kelly, Nakamura, Suhrcke, Ogilvie BMC Public Health 2013
Costs of Obesity in England & Globally

- We spend more each year on the treatment of obesity and diabetes than we do on the police, fire service and judicial system combined (McKinsey 2014).

- It was estimated that the NHS in England spent £5.1 billion on overweight and obesity-related ill-health in 2014/15.8 (Scarborough 2011 updated in Childhood Obesity Plan 2016)

- 10% of NHS spending is on diabetes (Diabetes UK 2012)
### III Behaviour Change by Design
The Evidence for Tackling Obesity

#### Exhibit E3
There is considerable scope to have high impact on obesity in a cost-effective way
Cost-effectiveness and impact of obesity levers, United Kingdom

<table>
<thead>
<tr>
<th>Intervention group¹</th>
<th>Estimated impact across full population (thousand DALYs saved)</th>
<th>Estimated average cost per DALY (€)</th>
<th>Strength of evidence rating²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portion control</td>
<td>2,126</td>
<td>400</td>
<td>Sufficient evidence for weight change</td>
</tr>
<tr>
<td>Reformulation</td>
<td>1,709</td>
<td>2,000</td>
<td>Limited evidence for weight change</td>
</tr>
<tr>
<td>High calorie food/beverage availability</td>
<td>1,137</td>
<td>2,000</td>
<td>Limited evidence for behavior change</td>
</tr>
<tr>
<td>Weight-management programs</td>
<td>967</td>
<td>1,300</td>
<td>Logic based on parallel evidence</td>
</tr>
<tr>
<td>Parental education</td>
<td>962</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>School curriculum</td>
<td>888</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthy meals</td>
<td>868</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery</td>
<td>615</td>
<td>14,000</td>
<td></td>
</tr>
<tr>
<td>Labeling</td>
<td>575</td>
<td>10,000</td>
<td></td>
</tr>
<tr>
<td>Price promotions</td>
<td>561</td>
<td>2,000</td>
<td></td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>430</td>
<td>2,000</td>
<td></td>
</tr>
<tr>
<td>Media restrictions</td>
<td>401</td>
<td>5,800</td>
<td></td>
</tr>
<tr>
<td>10% tax on high-sugar/ high-fat products³</td>
<td>203</td>
<td>1,800</td>
<td></td>
</tr>
<tr>
<td>Workplace wellness</td>
<td>139</td>
<td>1,800</td>
<td></td>
</tr>
<tr>
<td>Active transport²</td>
<td>67</td>
<td>2,700</td>
<td></td>
</tr>
<tr>
<td>Public-health campaigns</td>
<td>49</td>
<td>31,000</td>
<td></td>
</tr>
</tbody>
</table>

¹: Intervention group
²: Strength of evidence rating

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McKinsey Global Institute
November 2014

Overcoming obesity: An initial economic analysis

Discussion paper

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**UNIVERSITY OF CAMBRIDGE**

**BHRU** Behaviour and Health Research Unit
Changing Micro-Physical Environments

i. Size

THE NEW (AB)NORMAL

Portion sizes have been growing. So have we. The average restaurant meal today is more than four times larger than in the 1950s. And adults are, on average, 26 pounds heavier. If we want to eat healthy, there are things we can do for ourselves and our community. Order the smaller meals on the menu, split a meal with a friend, eat half and take the rest home. We can also ask the managers at our favorite restaurants to offer smaller meals.

INCREASES IN PORTION SIZES

1993 vs NOW

STEAK AND KIDNEY PIE (short crust, individual)

1993
Weight: 160g
Calories: 425 kcal

NOW
Weight: 240g
Calories: 640 kcal

50% INCREASE

SLICE OF WHITE BREAD (large loaf, medium thickness)

1993
Weight: 36g
Calories: 85 kcal

NOW
Weight: 40g
Calories: 95 kcal

11% INCREASE

CHICKEN CURRY WITH RICE (frozen)

1993
Weight: 260g
Calories: 305 kcal

NOW
Weight: 395g
Calories: 460 kcal

52% INCREASE

FROM THE BREAD ALONE, HAVING A SANDWICH FOR LUNCH EVERY DAY IS EQUAL TO 7,300 CALORIES A YEAR MORE THAN IN 1993
i. Size: Systematic Review

i. To estimate the effects of manipulating different portion, package or tableware sizes on selection or consumption of:

   food, alcohol or tobacco products

N=72 studies: 69 0 3

ii. To estimate the extent to which these effects may be modified by characteristics of the study, the intervention and the participants

Protocol: Hollands et al., 2014
### i. Size: effect on food consumption

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Outcome</th>
<th>Comparisons</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larger size vs. smaller size</td>
<td>Consumption</td>
<td>92 from 61 studies (6711 participants)</td>
<td>Small to moderate increase SMD: 0.37 (95% CI: 0.29 to 0.45) – Moderate quality evidence</td>
</tr>
</tbody>
</table>

Effects unrelated to body weight or gender.

**IF** sustained across the whole diet (i.e. all foods on all occasions), size of effect suggests that making sizes smaller across the whole diet could reduce daily energy consumed from food by:

- up to 16% in UK adults = 279 cal/day
- up to 8.5% in UK children
- up to 29% in US adults

i. Portion size effect: Evidence “largely outside of awareness”: Bottomless soup bowl experiments

Refilled vs. Normal bowls:
- Ate 73% more soup (14.7 vs. 8.4 ozs)
- Perceived ate same (5.4 vs. 5.4 ozs)
- Rated fullness same (5.1 vs. 5.7)

Wansink, Painter & North
*Obesity Research* 2005
Policy Options: Downsizing our Food Environments

What?

- Smaller default sizing for food and drinks and tableware sizes for energy dense foods and drinks
- Add new smaller sizes
- Place larger portions less prominently, e.g., not at tills/aisle ends
- Demarcate single portion sizes in packaging through wrapping or visual cues
- Restrict non-absolute pricing
- Restrict price promotions on large portions

Where?

Commercial AND Public Sector Environments

How?

Voluntary Agreements AND Regulation

Who?

Policy Makers AND Public

Marteau et al. *Downsizing* BMJ 2015
Availability of Fast Food Outlets

\[ y = 2.451x + 34.129 \]
\[ R^2 = 0.5423 \]

**Environmental exposure setting**

- **Home**
  - Q1 (0)
  - Q2 (1-2)
  - Q3 (3-14)
  - Q4 (15-47)

- **Work**
  - Q1 (0-2)
  - Q2 (3-9)
  - Q3 (10-23)
  - Q4 (24-65)

- **Commuting**
  - Q1 (0-1)
  - Q2 (1-5)
  - Q3 (5-14)
  - Q4 (15-93)

- **Home + work + commuting**
  - Q1 (0-13)
  - Q2 (14-30)
  - Q3 (31-48)
  - Q4 (49-165)

**Difference in body mass index relative to Q1**

- ✓
- ★
- ★
- ★
- ★
- ★

*Burgoine et al BMJ 2014*
Proximity: Sales on Aisle Ends

Effect sizes equivalent to decrease in price per volume of:

- Beer: 4% (£0.17);
- Wine: 6% (£0.40);
- Spirits: 9% (£1.17);
- Fizzy drinks: 22% (£0.27);
- Coffee: 36% (£0.96);
- Tea: 62% (£1.19)

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Policy options for changing behaviour

- **Eliminate choice**: regulate to eliminate choice entirely.
- **Restrict choice**: regulate to restrict the options available to people.
- **Guide choice through disincentives**: use financial or other disincentives to influence people to not pursue certain activities.
- **Guide choice through incentives**: use financial and other incentives to guide people to pursue certain activities.
- **Guide choice through changing the default**: make ‘healthier’ choices the default option for people.
- **Enable choice**: enable people to change their behaviours.
- **Provide information**: inform and educate people.
- **Do nothing or simply monitor the current situation**.

Greater levels of intervention lead to greater effectiveness but lower acceptability.
Acceptability of interventions to reduce consumption of sugary drinks

![Bar chart showing acceptability percentages for different factors.]

<table>
<thead>
<tr>
<th>Effectiveness</th>
<th>Size</th>
<th>Shape</th>
<th>Location</th>
<th>Taxation</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.14 ***</td>
<td>1.64 ***</td>
<td>1.81 ***</td>
<td>2.18 ***</td>
<td>1.83 ***</td>
</tr>
<tr>
<td>Attributions: environment</td>
<td>.40 ***</td>
<td>.09</td>
<td>.47 ***</td>
<td>.25</td>
<td>.55 ***</td>
</tr>
<tr>
<td>Attributions: willpower</td>
<td>-.01</td>
<td>.08</td>
<td>.14</td>
<td>.04</td>
<td>.18</td>
</tr>
<tr>
<td>Trust in government</td>
<td>.06</td>
<td>.18</td>
<td>-.06</td>
<td>.07</td>
<td>-.38</td>
</tr>
<tr>
<td>Political orientation</td>
<td>-.08</td>
<td>-.09</td>
<td>-.06</td>
<td>-.02</td>
<td>-.12</td>
</tr>
</tbody>
</table>

Public acceptability in the UK and USA of nudging to reduce obesity: the example of reducing sugar-sweetened beverage consumption. Petrescu, Hollands and Marteau PLoS ONE 2016
Food Industry Activity

- **Message framing**
  - Industry economic value
  - Personal responsibility

- **Policy substitution**
  - Advocate self-regulation

- **Constituency building**
  - Partnering with health organisations
Thanks!

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- Susan Jebb

RAND EUROPE
- Peter Burge
- Tom Ling

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V What can local authorities do?