Eating and physical activity behaviours: a framework for interventions

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Acknowledgements

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  – Prof Marie Johnston, UCL and University of Aberdeen

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  – Caroline Wood, Michelle Richardson, Maartje van Stralen

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The nature of behaviour: direct implications for intervention

- **Physical activity**
  - requires *energisation*, “push”
  - begin doing things
  - create impulses
  - respond to cues

- **Healthy eating**
  - requires *self-control*, “pull”
  - avoid/stop doing things
  - resist impulses
  - *not* respond to cues
The challenge: Why don’t people behave in ways that promote health?

• Inadequate knowledge and/or skills
• Insufficient opportunity
• Motivation (desire) at key moments to engage in unhealthy behaviour is stronger than the motivation (desire) to engage in healthy behaviour
  – Because healthy behaviours are usually difficult, boring or unpleasant while unhealthy behaviours are usually enjoyable or meet immediate needs
To change behaviour, need to understand ....

- The **nature** of the behaviour
- The **context** in which behaviour is to be changed
- The range of **interventions and policies** available
- Evidence-based **techniques and mechanisms of change**
- Who needs to take action and how
What motivates behaviour change?

• **Information?**
  – Giving risk information has variable and mostly small effects on motivation and behaviour
    • 5 meta-analyses: effects of 0.15-0.26, Brewer et al, 2007
  – *Only* when accompanied with active, behavioral strategies (Albarracín et al, 2005)
  – Self-management skills essential
  – Self-efficacy most important cognitive determinant; knowledge plays no role (Dishman & Sallis, 1994)

• “Fear appeals”? 
  – Only small effects (Witte & Allen, 2000; Milne et al, 2000)
Effective principles of individual behaviour change

• **Strengthen motivation to engage in the desired behaviour**
  – Reward change
  – Develop appropriate beliefs
    • E.g. benefits of changing, others’ approval, personal relevance, confidence to change
  – Develop positive feelings about changing

• **Reduce motivation to continue with the undesired behaviour**

• **Maximise self-regulatory capacity**
  – Develop relevant skills (e.g. goal setting, monitoring, feedback)
  – Develop specific plans to change

• **Maximise supportive activities**
  – Elicit social support
  – Avoid social and other cues for current behaviour
  – Change routines and environment

*NICE Guidance for Behaviour change (2007)*
Changing behaviour

• Intervene at many levels
• simultaneously & consistently

Sources:
- NICE Guidance for Behaviour change at population, community and individual levels (2007)
- Obesity and the Economics of Prevention, OECD (2010)

Diagram from: Dahlgren and Whitehead, 1991
A framework for interventions

1. Which behaviour/s?
2. Understand the target behaviour/s
3. Consider full range of possible interventions
4. Identify specific behaviour change techniques
Which behaviours?

- Identify key specific behaviours (often several)
  - Who needs to do what differently, when, where, how?
  - Does recommended practice involve others?
Which behaviours: example of decreasing fat and sugar intake

- Government policy makers
  - Decisions about pricing, food labelling, advertising …
- Supermarket managers
  - Product placement, promotions …
- Shoppers
  - Menu planning, list making, food selection …
- Cookers
  - Menu planning, food selection, portions …
- Eaters
  - Rule making, food selection, portions …
An approach to developing behaviour change interventions

1. Select (which?)
2. Specify (precisely what?)
3. Understand (why?)
4. Intervention functions
5. BCTs
6. Mode of delivery
7. Policy categories
Understand the behaviours in context

• Why are behaviours as they are?
• What needs to change for the desired behaviour/s to occur?

• Answering this is helped by a model of behaviour
  – COM-B
The COM-B system: Behaviour occurs as an interaction between three necessary conditions

- **Capability**: Psychological or physical ability to enact the behaviour
- **Motivation**: Reflective and automatic mechanisms that activate or inhibit behaviour
- **Opportunity**: Physical and social environment that enables the behaviour

Michie et al (2011) *Implementation Science*
A framework for interventions

1. Which behaviour/s?
2. Understand the target behaviour/s
3. Consider full range of possible interventions
4. Identify specific behaviour change techniques
Need a framework for designing interventions with following criteria:

1. Comprehensive coverage
2. Coherence
3. Clear link to a model of behaviour

Useable by, and useful to, policy makers, service planners and intervention designers
Do we have such a framework?

• Systematic literature review identified 19 existing frameworks
  – none met all these criteria
• Development of new framework
  – Model of behaviour at the hub of a wheel
  – Synthesis of existing frameworks
    • 9 intervention functions
      – each include one or more behaviour change techniques
    • 7 policy categories
      – that could enable or support these interventions to occur

Behaviour at the hub .... COM-B
Interventions: activities designed to change behaviours
**Policies**: decisions made by authorities concerning interventions

### Linking COM-B to intervention functions

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## Linking COM-B to intervention functions

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An approach to developing behaviour change interventions

Use Behaviour Change Wheel to select broad categories of intervention type

Use Taxonomy of Behaviour Change Techniques to select active ingredients aimed at bringing about behaviour change
Interventions made up of Behaviour Change Techniques (BCTs)

- “Active ingredients” within the intervention designed to change behaviour
- They are
  - observable,
  - replicable and
  - irreducible components of an intervention
- Can be used alone or in combination with other BCTs
Interventions are made up of specific behaviour change techniques (BCTs)

1. General information
2. Information on consequences
3. Information about approval
4. Prompt intention formation
5. Specific goal setting
6. Graded tasks
7. Barrier identification
8. Behavioral contract
9. Review goals
10. Provide instruction
11. Model/ demonstrate
12. Prompt practice
13. Prompt monitoring
14. Provide feedback
15. Social comparison
16. Contingent rewards
17. Teach to use cues
18. Follow up prompts
19. Social comparison
20. Social support/ change
21. Role model
22. Prompt self talk
23. Relapse prevention
24. Stress management
25. Motivational interviewing
26. Time management

The person is asked to keep a record of specified behaviour/s. This could e.g. take the form of a diary or completing a questionnaire about their behaviour.

Further development

- Smoking cessation: **53** BCTs  
  *Michie et al, Annals Behavioral Medicine, 2010*
- Physical activity & healthy eating: **40** BCTs  
  *Michie et al, Psychology & Health, 2011*
- Reducing excessive alcohol use: **42** BCTs  
  *Michie et al, Addiction, 2012*
- General behaviour change: **137** BCTs  
  *Michie et al, Applied Psychology: An International Review, 2008*
- Current MRC funded study: **89** BCTs  
  [www.ucl.ac.uk/health-psychology/BCTtaxonomy](http://www.ucl.ac.uk/health-psychology/BCTtaxonomy)
Systematic reviews: allows analysis of data to identify “active ingredients”
Findings

• Interventions comprising self-monitoring with at least one other “self-regulatory” techniques (n=28)
  – compared with the other interventions (n=56)
• were twice as effective
  – effect size d=0.60 vs d=0.26
An approach to developing behaviour change interventions

- Target behaviour
  - Select (which?)
  - Specify (precisely what?)
  - Understand (why?)
- Design intervention
  - Intervention functions
  - BCTs
- Deliver intervention
  - Mode of delivery
  - Policy categories
Modes of delivery

• Face-to-face
  – Individual
  – Group

• Distance
  – Population-level
    • Mass-media: internet, TV, radio, billboard, print media, leaflet
  – Individually-tailored
    • Phone: helpline, text, app.
    • Individually accessed computer programme
Considerations when selecting interventions, mode of delivery and policy categories

• Evidence of effectiveness
• Local relevance
• Practicability
• Affordability
• Acceptability
  o public
  o professional
  o political
Summary

• Start by understanding the problem
  – Identifying the behaviours
    • Who, what, where, when
  – Understand the behaviours
    – Drawing on theories of behaviour
    – Then identify the techniques and the strategy

• Consider the full range of effective strategies to use when working with colleagues to implement guidance
For more information

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Interventions:
- **Education**: Increasing knowledge or understanding
- **Restrictions**: Using rules to reduce the opportunity to engage in the target behaviour
- **Environmental restructuring**: Changing the physical or social context
- **Modelling**: Providing an example for people to aspire to or imitate
- **Enablement**: Increasing means/reducing barriers to increase capability *(beyond education and training)* or opportunity *(beyond environmental restructuring)*
- **Training**: Imparting skills
- **Coercion**: Creating an expectation of punishment or cost
- **Incentivisation**: Creating an expectation of reward
- **Persuasion**: Using communication to induce positive or negative feelings or stimulate action
## Intervention functions

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<thead>
<tr>
<th>Intervention function</th>
<th>Definition</th>
<th>Example</th>
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<tbody>
<tr>
<td><strong>Education</strong></td>
<td>Increasing knowledge or understanding</td>
<td>Providing information to promote healthy eating</td>
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<tr>
<td><strong>Persuasion</strong></td>
<td>Using communication to induce positive or negative feelings or stimulate action</td>
<td>Using imagery to motivate increases in physical activity</td>
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<tr>
<td><strong>Incentivisation</strong></td>
<td>Creating expectation of reward</td>
<td>Using prize draws to induce attempts to stop smoking</td>
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<tr>
<td><strong>Coercion</strong></td>
<td>Creating expectation of punishment or cost</td>
<td>Raising the financial cost to reduce excessive alcohol consumption</td>
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<tr>
<td><strong>Training</strong></td>
<td>Imparting skills</td>
<td>Advanced driver training to increase safe driving</td>
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<tr>
<td><strong>Restriction</strong></td>
<td>Using rules that limit engagement in the target behaviour or competing or supporting behaviour</td>
<td>Prohibiting sales of solvents to people under 18 to reduce use for intoxication</td>
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<tr>
<td><strong>Environmental restructuring</strong></td>
<td>Changing the physical or social context</td>
<td>Providing on-screen prompts for GPs to ask about smoking behaviour</td>
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<tr>
<td><strong>Modelling</strong></td>
<td>Providing an example for people to aspire to or imitate</td>
<td>Using TV drama scenes involving safe-sex practices to increase condom use</td>
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<tr>
<td><strong>Enablement</strong></td>
<td>Increasing means/reducing barriers to increase capability or opportunity</td>
<td>Behavioural support for smoking cessation, medication for cognitive deficits, surgery to reduce obesity, prostheses to promote physical activity</td>
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<tr>
<td>Policy category</td>
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<tr>
<td>Communication / marketing</td>
<td>Using print, electronic, telephonic or broadcast media</td>
<td>Conducting mass media campaigns</td>
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<td>Guidelines</td>
<td>Creating documents that recommend or mandate practice. This includes all changes to service provision</td>
<td>Producing and disseminating treatment protocols</td>
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<tr>
<td>Fiscal</td>
<td>Using the tax system to reduce or increase the financial cost</td>
<td>Increasing duty or increasing anti-smuggling activities</td>
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<tr>
<td>Regulation</td>
<td>Establishing rules or principles of behaviour or practice</td>
<td>Establishing voluntary agreements on advertising</td>
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<tr>
<td>Legislation</td>
<td>Making or changing laws</td>
<td>Prohibiting sale or use</td>
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<tr>
<td>Environmental/social planning</td>
<td>Designing and/or controlling the physical or social environment</td>
<td>Using town planning</td>
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<tr>
<td>Service provision</td>
<td>Delivering a service</td>
<td>Establishing support services in workplaces, communities etc.</td>
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