Which behaviour change approach should I choose?
An introduction to the Behaviour Change Wheel

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Acknowledgements

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  - Prof Robert West, University College London
  - Prof Marie Johnston, UCL and University of Aberdeen

- Funders

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Sustaining the environment depends on changing behaviour

- Improve the environment
  - Reduce litter, stop illegal dumping, reduce carbon emissions
- Reduce waste
  - Avoid waste, reuse, recycle
  - Change extraction, use & disposal of materials & fuels
  - Use energy more efficiently
  - Insulate buildings, use energy-efficient appliances & technologies, turn down thermostats, switch off lights, wear warmer/cooler clothing, change mode of transport

Every one of these requires multiple behaviours at multiple levels – individual, organisational, state/national.
A system for designing effective behaviour change interventions

1. Identify the target behaviour/s

2. Understand the target behaviour/s in context

3. Consider full range of possible intervention functions

4. Identify specific behaviour change techniques
An approach to developing behaviour change interventions

- Select (which?)
- Specify (precisely what?)
- Understand (why?)
- Intervention functions
- BCTs
- Mode of delivery
- Policy categories
Which behaviours?

- Identify key specific behaviours
  - **Who** needs to do
    - what differently,
    - when,
    - where,
    - how?
  - Behaviours are often contingent on other people’s behaviours
Example … hand hygiene in hospital staff

- Nurses and doctors
  - Cleaning hands in identified situations
- Infection control nurses
  - Conducting audits and feeding back results
- Staff responsible for distributing alcohol handrub
  - Ensuring that dispensers contain alcohol handrub

For each of these, **who** needs to do

- **what**
- **when**
- **where**
- **how?**
1. Use smaller waste bins

2. Use recycling bins more frequently

3. Composting or worm farming

For each of these, who needs to do what, when, where, how?
Example: Townsville Residential Energy Demand Program (TRED Program)

- Identified 240 separate behaviours
  - Reducing Electricity Consumption
    - Hot Water Systems - 24
    - Kitchen Appliances - 53
    - Entertainment Equipment - 18
    - Laundry Appliances and Bathroom - 28
    - Pools, Hot Tubs and Saunas - 7
    - Heating & Cooling – 40
    - Lighting - 17
  - Complimenting Energy Efficiency Behaviours with Onsite Generation - 7
  - Options for House Construction and Retrofit - 24
  - Additional Behaviours related to housing construction - 13
Which behaviours to target?

• Each behaviour assessed based on its
  – likely impact if undertaken
    • E.g. the energy demand reduction from changing an incandescent light bulb to a compact florescent lamp
  – likelihood that such a behaviour will be implemented in the community
    • cost, technical complexity, aesthetics etc
    • preference, acceptibility

• Other factors to consider
  – Spillover/generalisability to other behaviours and people
An approach to developing behaviour change interventions
Understand the behaviour **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*
Motivation: reflective and automatic

Beliefs about what is good and bad, conscious intentions, decisions and plans

Emotional responses, desires, impulses and habits resulting from associative learning and physiological states

Reflective-Impulsive Model, Strack & Deutsch, 2004
PRIME Theory of Motivation, West, 2006
Reflective – “the head”

A Polo is £9,790.
Honestly, a Polo is £9,790.
It’s true, a Polo is £9,790.
No really, a Polo is £9,790.
Trust us, a Polo is £9,790.
Look, a Polo is £9,790.
No joke, a Polo is £9,790.
Seriously, a Polo is £9,790.

Automatic – “the heart”
Motivation – push and pull
Behaviour is in the moment; at any one moment, there are many choices

- Shall I lie here, watch TV, drink wine, eat popcorn?

  - Battle of impulses and inhibitions “in the moment”
    - Put the popcorn out of reach?
    - Put the TV off?
    - Do what I said I’d do – go to the gym?
Impulses Inhibitions

Wants and needs

“I want to wake up in the morning feeling fresh”

“I need to avoid putting on any more weight”

Beliefs about things being good or bad

“I intend to go to the gym tonight”

“I feel better when I have done exercise”

Plans

“My plan is not to drink in the week”

“I know I drink more than is good for me”

Wants and needs

Behaviour

Impulses

Inhibitions

PRIME theory, West, 2005
COM-B analysis: home composting

- **Capability**
  - Do people know how to compost?

- **Opportunity**
  - Do households have compost bins?
    - If not, price, availability, accessibility

- **Motivation**
  - Do people plan to use them?
  - Do people believe they are a good thing
    - For themselves, for others, for the environment
  - Do people want to use them?
    - Incentives, disincentives
  - Have people developed a habit of using them?
“I want to be a good, responsible person”

“I need to avoid getting fined”

“I intend to stop throwing paper in the general rubbish”

“It is selfish to use the easiest method for rubbish disposal”

Beliefs about things being good or bad

Plans

“Recycling saves money and resources”

“My plan is to always recycle”

Wants and needs

Impulses

Inhibitions

PRIME theory, West, 2005
A system for designing effective behaviour change interventions

1. Identify the target behaviour/s
2. Understand the target behaviour/s in context
3. Consider full range of possible intervention functions
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 review identified 19 frameworks to classify behaviour change interventions.
- Addressed behaviours relating to health, environment, culture change, social marketing etc.
- Evaluated using 3 criteria:

<table>
<thead>
<tr>
<th>Model of behaviour</th>
<th>Based on a model of behaviour or behaviour change</th>
<th>7/19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coherence</td>
<td>Is structured logically and coherently</td>
<td>3/19</td>
</tr>
<tr>
<td>Comprehensiveness</td>
<td>Covers all types of interventions</td>
<td>0/19</td>
</tr>
</tbody>
</table>
Frameworks included in systematic review

1. **Epicure taxonomy** West (2006) Taxonomy of approaches designed to influence behaviour patterns
2. **Culture capital framework** Knott *et al.* (2008) Framework of knowledge about culture change, offering practical tools for policymaking
3. **EPOC taxonomy of interventions** Cochrane Effective Practice and Organisation of Care Review Group (EPOC) (2010) Checklist to guide systematic literature reviewers about the types of information to extract from primary studies
4. **RURU: Intervention implementation taxonomy** Walter *et al.* (2003) Taxonomy covering a wide range of policy, practice and organisational targets aimed at increasing impact of research
5. **MINDSPACE** Institute for Government and Cabinet Office (2010) Checklist for policy-makers aimed at changing or shaping behaviour
6. **Taxonomy of behaviour change techniques** Abraham *et al.* (2010) Taxonomy of behaviour change techniques grouped by change targets
8. **People and places framework** Maibach *et al.* (2007) Framework that explains how communication and marketing can be used to advance public health
• **10. Injury control framework** Geller *et al.* (1990) Heuristic framework for categorising and evaluating behaviour change strategies aimed at controlling injuries


• **12. Legal framework** Perdue *et al.* (2005) Conceptual framework for identifying possible legal strategies used for preventing cardiovascular diseases

• **13. PETeR** White (in prep.) Comprehensive and universally applicable model or taxonomy of health

• **14. DEFRA’s 4E model** DEFRA (2008) Process model for policy makers aimed at promoting pro-environmental behaviours in accordance with social marketing principles

• **15. STD/HIV framework** Cohen and Scribner (2000) Taxonomy to expand the scope of interventions that can be used to prevent STD and HIV transmission

• **16. Framework on public policy in physical activity** Dunton *et al.* (2010) Taxonomy aimed at understanding how and why policies successfully impact on behaviour change

• **17. Intervention framework for retail pharmacies** Goel *et al.* (1996) Framework that presents factors that may affect retail pharmacy describing and strategies for behaviour change to improve appropriateness of prescribing

• **18. Environmental policy framework** Vlek (2000) A taxonomy of major environmental problems, their different levels and global spheres of impact, and conceptual modelling of environmental problem-solving

• **19. Population Services International (PSI) framework** PSI (2004) A conceptual framework to guide and help conduct research on social marketing interventions
Synthesis into an integrated 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

Understand the behaviour
Sources of behaviour

Intervention functions

Policy categories

Behaviour at the hub .... COM-B

CAPABILITY
- Physical
- Psychological
- Automatic
- Social

OPPORTUNITY
- Physical
- Reflective

MOTIVATION
- Psychological
- Social
Interventions: activities designed to change behaviours
## Intervention functions

<table>
<thead>
<tr>
<th>Intervention function</th>
<th>Definition</th>
<th>Health examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>Increasing knowledge or understanding</td>
<td>Providing information to promote healthy eating</td>
</tr>
<tr>
<td>Persuasion</td>
<td>Using communication to induce positive or negative feelings or stimulate action</td>
<td>Using imagery to motivate increases in physical activity</td>
</tr>
<tr>
<td>Incentivisation</td>
<td>Creating expectation of reward</td>
<td>Using prize draws to induce attempts to stop smoking</td>
</tr>
<tr>
<td>Coercion</td>
<td>Creating expectation of punishment or cost</td>
<td>Raising the financial cost to reduce excessive alcohol consumption</td>
</tr>
<tr>
<td>Training</td>
<td>Imparting skills</td>
<td>Advanced driver training to increase safe driving</td>
</tr>
<tr>
<td>Restriction</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>
</tr>
<tr>
<td>Environmental restructuring</td>
<td>Changing the physical or social context</td>
<td>Providing on-screen prompts for GPs to ask about smoking behaviour</td>
</tr>
<tr>
<td>Modelling</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>
</tr>
<tr>
<td>Enablement</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>
</tr>
</tbody>
</table>
Intervention functions

Policies: decisions made by authorities concerning interventions

## Policy categories

<table>
<thead>
<tr>
<th>Policy category</th>
<th>Example</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication / marketing</td>
<td>Using print, electronic, telephonic or broadcast media</td>
<td>Conducting mass media campaigns</td>
</tr>
<tr>
<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>
</tr>
<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>
</tr>
<tr>
<td>Regulation</td>
<td>Establishing rules or principles of behaviour or practice</td>
<td>Establishing voluntary agreements on advertising</td>
</tr>
<tr>
<td>Legislation</td>
<td>Making or changing laws</td>
<td>Prohibiting sale or use</td>
</tr>
<tr>
<td>Environmental/ social planning</td>
<td>Designing and/or controlling the physical or social environment</td>
<td>Using town planning</td>
</tr>
<tr>
<td>Service provision</td>
<td>Delivering a service</td>
<td>Establishing support services in workplaces, communities etc.</td>
</tr>
</tbody>
</table>
### Selecting interventions and policies

<table>
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<tr>
<th>Restriction</th>
<th>Environmental restructuring</th>
<th>Modelling</th>
<th>Persuasion</th>
<th>Incentivisation</th>
<th>Coercion</th>
<th>Education</th>
<th>Training</th>
<th>Enablement</th>
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An approach to developing behaviour change interventions

Use **Behaviour Change Wheel** to select broad intervention functions

Use **Behaviour Change Techniques** to populate intervention functions; design mode of delivery
Intervention design

Intervention functions

Behaviour change techniques
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

Involves detailed planning of what the person will do including, at least, a very specific definition of the behaviour e.g., frequency (such as how many times a day/week), intensity (e.g., speed) or duration (e.g., for how long for). In addition, at least one of the following contexts i.e., where, when, how or with whom must be specified. This could include identification of sub-goals or preparatory behaviours and/or specific contexts in which the behaviour will be performed.

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.

“Taxonomies” of BCTs

- Physical activity/healthy eating/mixed: 26 BCTs
  Abraham & Michie, 2008

- Physical activity & healthy eating: 40 BCTs
  Michie et al, Psychology & Health, 2011

- Smoking cessation: 53 BCTs
  Michie et al, Annals behavioral Medicine, 2010

- Reducing excessive alcohol use: 42 BCTs
  Michie et al, Addiction, 2012

- Condom use: 47 BCTs
  Abraham et al, 2012

- General behaviour change: 137 BCTs

- Competence framework: 89 BCTs
  Dixon & Johnston, 2011

93 item BCT Taxonomy v1, under review
STUDY PROTOCOL

Strengthening evaluation and implementation by specifying components of behaviour change interventions: a study protocol

Susan Michie¹*, Charles Abraham², Martin P Eccles³, Jill J Francis⁴, Wendy Hardeman⁵, Marie Johnston¹

Website:  www.ucl.ac.uk/health-psychology/BCTtaxonomy/index.php
Or Google: BCT Taxonomy

Email: BCTTaxonomy@ucl.ac.uk
Social norms = group-held beliefs about how members should behave in a given context

<table>
<thead>
<tr>
<th>Function from BCW</th>
<th>Techniques from 93 item taxonomy</th>
</tr>
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<tbody>
<tr>
<td>Persuasion</td>
<td>Information about others’ approval</td>
</tr>
<tr>
<td>Incentivisation (approval)</td>
<td>Social comparison</td>
</tr>
<tr>
<td>Coercion (disapproval)</td>
<td>Restructuring of social environment</td>
</tr>
<tr>
<td>Modelling (observational learning)</td>
<td>Modelling of the behaviour</td>
</tr>
<tr>
<td></td>
<td>Social reward</td>
</tr>
<tr>
<td></td>
<td>Vicarious reinforcement</td>
</tr>
<tr>
<td></td>
<td>Punishment</td>
</tr>
<tr>
<td></td>
<td>Anticipation of future rewards or removal of punishment</td>
</tr>
</tbody>
</table>
Modes of delivery: how the BCTs are delivered

- **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 designing interventions and selecting behaviour change techniques

- Evidence of effectiveness
- Local relevance
- Practicability
- Affordability
- Acceptability
  - public
  - professional
  - political
An example: increasing hand hygiene in hospital staff

- 5000 die a year in the UK, others disabled, due to hospital acquired infections (e.g. MRSA)
- Disinfecting hands effective in preventing infection
- Specific guidelines for clinical practice
- Poorly implemented
  - on average 40% occasions (5%-81%)
• **Opportunity**
  – Alcohol hand rub beside every bed

• **Motivation**
  – Persuasive posters
  – Encouraging patients to ask

• **Capability**
  – Train staff to set goals, observe their behaviour, develop action plans on the basis of feedback

  • *Developed at UCL, based on behavioural theory*
MONTHLY FEEDBACK INTERVENTION
Co-ordinated by infection control team

Observe two staff member’s behaviour for 20 minutes
Give immediate verbal feedback

*Full compliance* = certificate for use at staff appraisal

*< full compliance* = immediate goal-setting and action planning regarding observed non-compliance & repeat observation next month

= individual level component
MONTHLY FEEDBACK INTERVENTION
Co-ordinated by infection control team

Observe two staff member’s behaviour for 20 minutes

Give immediate verbal feedback

Full compliance = certificate for use at staff appraisal

OR

< full compliance = immediate goal-setting and action planning regarding observed non-compliance & repeat observation next month

Observe one group of staff members for 20 minutes

Feedback displayed, and given at ward meeting

Praise for compliance

OR

< full compliance = ward level goal-setting and action planning regarding observed non-compliance/s
Findings: 60 wards in 16 hospitals in England

- Use of soap and alcohol hand rub tripled from 21.8 to 59.8 ml per patient bed day
- Rates of MRSA bacteraemia and C difficile infection decreased
  - Stone, Fuller, Savage, Cookson et al, BMJ, 2012
- Giving 1-1 feedback led to staff being 13-18% more likely to clean their hands
  - Fuller, Michie, Savage, McAteer et al, PLoS One, 2012
Summary

• Start by understanding the problem
  – Identifying the behaviours
    • Who, what, where, when
  – Understand the behaviours
    – COM-B
    – Then identify the intervention strategy

• Consider the full range of effective interventions and supporting policies

• Identify behaviour change techniques and mode/s of delivery
For more information

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www.ucl.ac.uk/health-psychology/people/michie

Health Psychology Research Group, 2011