The Behaviour Change Wheel: a new method for characterising and designing behaviour change interventions

Susan Michie
Professor of Health Psychology
Director of Centre for Behaviour Change
University College London

@SusanMichie

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This talk

• Implementation as behaviour
• The Behaviour Change Wheel
  – Making a behavioural diagnosis using COM-B
  – Linking diagnosis to intervention functions and policies
  – Linking to specify behaviour change techniques
• Examples of guideline implementation
  – Improving hospital staff hand hygiene
  – Local government
Why focus on behaviour?

• Interventions to improve implementation of evidence-based practice
  – have achieved modest and variable success
• Improving implementation depends on changing the behaviour of
  – professionals,
  – managers,
  – commissioners and
  – others working within and with the care system
Effective interventions

• Intervene at many levels
• simultaneously & consistently

NICE Guidance for Behaviour change at population, community and individual levels (2007)

Update for Behaviour change: individual level (2014)
How to design an intervention that is likely to be effective?
Traditional approaches to intervention design

ISLAGIATT principle

‘It Seemed Like A Good Idea At The Time’

Martin Eccles, implementation researcher, UK
A systematic method …

1. Understand the behaviour you are trying to change
2. Use a framework that points to the types of intervention that are likely to be effective
3. Consider the full range of options open to you
4. Use a systematic method for selecting behaviour change techniques
Key steps in intervention design...

1. Identify your target behaviour **precisely**
   - Who need to do what, when, where, how

2. Recognise that behaviours are part of a **system**
   - Of other behaviours within and between people

3. Make a “**behavioural diagnosis**”
   - A good behavioural diagnosis is more likely to lead to effective interventions

4. The most effective interventions target many levels simultaneously
   - The **Behaviour Change Wheel** is a comprehensive framework for designing interventions
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 hand rub
  - Ensuring that dispensers contain alcohol hand rub
  - For each of these, who needs to do what, when, where, how?
1. Which behaviour to start with?

• Questions to ask yourself
  – If I change this, what is the likely impact?
  – How easy is it to bring about change?
  – Preference, acceptability, cost?
  – Spillover/generalisability to other behaviours and people?
2. 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
  - Behaviour is part of a system and itself is a system
A thought experiment

For behaviour to change, what three conditions need to exist?
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*
2004-2011
led by Sheldon Stone

- Opportunity
  - Alcohol hand rub beside every bed
- Motivation
  - Persuasive posters
  - Encouraging patients to ask
- Capability
  - No intervention
Capability

• Nurses have the capability to clean their hands
  – But not to
    • pay attention to this behaviour over other competing behaviours
    • develop routines for noticing when the behaviour does not occur, and plans for acting in future

• Train staff to set goals, observe their behaviour, develop action plans on the basis of feedback
  • Developed at UCL, based on behavioural theory
Understand target behaviour

1. Define problem in behavioural terms
2. Select target behaviour (what you will change to address the problem)
3. Specify target behaviour (what, where, when, how, with whom, in what context...)
4. Understand what needs to change to achieve target behaviour (COM-B and TDF)

Design intervention

Identify:
5. Intervention functions
6. Behaviour Change Techniques

Deliver intervention

Select:
7. Mode of delivery
8. Policy categories
3. Make the “behavioural diagnosis”
4. Intervening: Consider all the options

- Frameworks make life easier
  - good frameworks make you more effective

- Need a framework that is:
  - Comprehensive
    - So you don’t miss options that might be effective
  - Coherent
    - So you have a systematic method for intervention design
  - Linked to a model of behaviour
    - So that you can draw on behavioural science
Do we have such a framework?

- Systematic literature review identified 19 frameworks of behaviour change interventions
  - related to many domains e.g. health, environment, culture change, social marketing
- None met all these three criteria
- So …. Developed a synthesis of the 19 frameworks


www.behaviourchangewheel.com
Behaviour at the hub .... COM-B
Interventions: activities designed to change behaviours
From diagnosis to intervention

- Make a ‘diagnosis’ of the problem i.e. the behaviour to be changed
  - Profile of what needs to change using COM-B
- Identify intervention functions
  - using matrix of COM-B x 9 intervention functions
- Identify policy categories
  - using matrix of intervention functions x policy categories
- Select specify behaviour change techniques
Design: which intervention functions to use?

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Hand Hygiene example: Capability

- Nurses have the capability to clean their hands
  - But not to
    - pay **attention** to this behaviour over other competing behaviours
    - develop **routines** for noticing when the behaviour does not occur, and **plans** for acting in future
## Selecting relevant intervention functions

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<th>Persuasion</th>
<th>Incentivisation</th>
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<th>Training</th>
<th>Restriction</th>
<th>Environmental restructuring</th>
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Intervention to increase: Capability

- **Train** staff to
  - set goals and
  - make action plans
- **Enable:**
  - observe their behaviour and give feedback
  - support development of action plans

- *Based on behavioural theory (Control 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

Or

Observe one group of staff members for 20 minutes

Feedback displayed, and given at ward meeting

Praise for compliance

< full compliance = ward level goal-setting and action planning regarding observed non-compliance/s

Or

= individual level component

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

- = individual level component

- = group level component

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< 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
Intervention functions

Which policy categories should be used?

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Elaboration of COM-B: Theoretical Domains Framework


Cane et al (2011) Validation of the theoretical domains framework for use in behaviour change and implementation research, *Implementation Science*
Sources of behaviour

TDF Domains

Soc - Social influences
Env - Environmental Context and Resources
Id - Social/Professional Role and Identity
Bel Cap - Beliefs about Capabilities
Opt - Optimism
Int - Intentions
Goals - Goals
Bel Cons - Beliefs about Consequences
Reinf - Reinforcement
Em - Emotion
Know - Knowledge
Cog - Cognitive and interpersonal skills
Mem - Memory, Attention and Decision Processes
Beh Reg - Behavioural Regulation
Phys - Physical skills
Use the Behaviour Change Wheel to …

1. **Design** interventions and policies
   - COM-B links to intervention functions link to behaviour change techniques
2. “Retrofit” – **identify** what is in current interventions and policies
3. Provide a framework for **evaluation**
   - How are interventions working?
4. Structure **systematic reviews**
Some applications of Behaviour Change Wheel

India
- Smartphone app to reduce cardiovascular disease risk

Kenya
- Improve paediatric health care

Netherlands
- An organisational intervention tool

Thailand
- Preventing melioidosis

USA
- Improving colorectal cancer screening
- Providing long-acting reversible contraception to adolescents
- Improve parenting practices for children with challenging behaviour

UK
- Smartphone app for parents of overweight children
- Promote recycling behaviours in university staff and students
- Reduce cardiovascular disease risk in people with severe mental illness
- Improve management of postnatal depression
- Smartphone app to promote attentive eating
- Internet intervention to promote condom use

International Red Cross
- Train volunteers
Understand target behaviour

1. Define problem in behavioural terms
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7. Mode of delivery
8. Policy categories
Interventions are made up of many behaviour change techniques

= discrete, low-level components of interventions that on their own have potential to change behaviour
An early reliable taxonomy to change frequently used behaviours

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. Behavioural contract
9. Review goals
10. Provide instruction
11. Model/ demonstrate
12. Prompt practice
13. Prompt monitoring
14. Provide feedback
15. General encouragement
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.

Abraham & Michie, 2008, *Health Psychology*
The Behavior Change Technique Taxonomy (v1) of 93 Hierarchically Clustered Techniques: Building an International Consensus for the Reporting of Behavior Change Interventions

Susan Michie, DPhil, CPsychol · Michelle Richardson, PhD · Marie Johnston, PhD, CPsychol · Charles Abraham, DPhil, CPsychol · Jill Francis, PhD, CPsychol · Wendy Hardeman, PhD · Martin P. Eccles, MD · James Cane, PhD · Caroline E. Wood, PhD

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Abstract

Background CONSORT guidelines for reporting of behavior change interventions were developed to allow comparisons of different interventions. Consensus was the method used for developing these guidelines. The purpose of this project was to develop a taxonomy of 93 behavior change techniques (BCTs) that would aid in the development and reporting of behavior change interventions.

Objectives

The objective of this project was to develop a comprehensive taxonomy of BCTs that would aid in the development and reporting of behavior change interventions.

Methods

A group of 14 experts rated 24 BCTs from six published classification systems. Another 18 experts grouped BCTs into 16 families. This resulted in 93 BCTs clustered into 16 groups. Of the 26 BCTs occurring at least five times, 23 had adjusted kappas of 0.60 or above.

Conclusions

“BCT taxonomy v1,” an extensive taxonomy of 93 consensually agreed, distinct BCTs, offers a step change as a method for specifying interventions, but we anticipate further development and evaluation based on international, interdisciplinary consensus.
# BCT Taxonomy v1: 93 items in 16 groupings

<table>
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<tr>
<th>Page</th>
<th>Grouping and BCTs</th>
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<td>1. Goals and planning</td>
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<td>1.2. Problem solving</td>
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<td>1.3. Goal setting (outcome)</td>
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<td>1.4. Action planning</td>
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<td>1.5. Review behavior goal(s)</td>
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<td>1.7. Review outcome goal(s)</td>
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<td>6. Comparison of behavior</td>
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<td>6.1. Demonstration of the behavior</td>
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<td>6.2. Social comparison</td>
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<td>7. Associations</td>
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<td>12.2. Restructuring the social environment</td>
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<td>12.3. Avoidance/reducing exposure to cues for the behavior</td>
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<td>12.4. Distraction</td>
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<td>12.5. Adding objects to the environment</td>
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## 1. Goals and planning

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<tr>
<th>No.</th>
<th>Label</th>
<th>Definition</th>
<th>Examples</th>
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<tr>
<td>1.1</td>
<td>Goal setting (behavior)</td>
<td>Set or agree on a goal defined in terms of the behavior to be achieved. Note: only code goal-setting if there is sufficient evidence that goal set as part of intervention; if goal unspecified or a behavioral outcome, code 1.3, Goal setting (outcome); if the goal defines a specific context, frequency, duration or intensity for the behavior, also code 1.4, Action planning.</td>
<td>Agree on a daily walking goal (e.g. 3 miles) with the person and reach agreement about the goal. Set the goal of eating 5 pieces of fruit per day as specified in public health guidelines.</td>
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</table>
BCT methodology provides an agreed, standard method to:

- **Describe** interventions as accurately as possible
  - Replicate interventions in research to build evidence
  - Implement effective interventions
- **Design** interventions
  - Translate general intervention functions into specific BCTs
- **Evaluate** e.g. in factorial designs
  - Identify active ingredients (what)
  - Investigate mechanisms of action (how)
- **Synthesise** published reports in systematic reviews
The BCTTv1 smartphone app

- Fully searchable version of BCTTv1
- Search by BCT label, BCT grouping or alphabetically
- Increases familiarity with the taxonomy
- Increases speed and recall of BCT labels and definitions

Search for: BCTs

Search for: BCTs*

bcts.23.co.uk*

* You'll need an internet connection to use the app
Welcome
The Behaviour Change Technique Taxonomy – a resource for intervention designers, researchers, practitioners, systematic reviews and all those wishing to communicate the content of behaviour change interventions.

Login
New User?

email
password
login

Tasks and session materials made a great combination

Tutorial trainee, Cambridge UK

www.bct-taxonomy.com
Which behaviour change techniques to select?
Local context: The APEASE criteria

- Affordability
- Practicability
- Effectiveness/cost-effectiveness
- Acceptability
  - public
  - professional
  - political
- Side-effects/safety
- Equality

www.behaviourchangewheel.com
Maintaining behaviour change

• Changing behaviour is hard
  – Maintaining that change is harder

• Effective strategies
  – Don’t rely on individual choice and decision-making
  – Do rely on the environment and making behaviour automatic
    • environmental support and prompts
    • building routines
    • feedback
    • rewards and incentives
How is local government using evidence?

Aims

1. To investigate how evidence-based guidelines are received and implemented in local government

2. To identify institutional, individual and systemic barriers and facilitators to implementation

3. To investigate data and mechanisms for monitoring and evaluating the process of implementation
Barriers to the use of NICE guidance – COM-B

**Capability**
- Lack of awareness/knowledge
- Evidence lacks detail to support expenditure decisions

“I felt it was incumbent on NICE to say, not only do we think this is cost effective but we realise you've got a fixed budget… we think this is more cost-effective than something you currently do… And they never did that.”

*Director of PH, C*

**Opportunity**
- Volume of evidence difficult to digest
- Guidance not applicable or specific enough for local context
- Need for translation to local context

“I get a bit embarrassed, to go to somebody, and they go, well show me what the guidance is like, and I’m like, I’m looking at it, thinking, how can I condense this, so that it looks less?”

*PH Officer, B*

**Motivation**
- View that research doesn’t apply in real world
- Premium not given to evidence-based guidance

“There's not the same premium put on use of evidence as there used to be… there's other factors that trump evidence in decision making.”

*PH Officer, D*
Guideline implementation: “reversing the pipeline”

- Evidence-based medicine model
  - Research evidence $\rightarrow$ recommendations $\rightarrow$ implementation

- UK study of evidence in local government (2014-15)
  - Little culture of using research evidence
  - Culture of localism
  - Political incentives, short-termism

- For evidence to inform practice, need to reverse engineer the process
  - Local needs $\rightarrow$ types of recommendation $\rightarrow$ relevant evidence suitably presented $\rightarrow$ implementation
In summary .... To change behaviour ....

- Start by understanding the problem
  - Identify the behaviours to change
    - Who, what, where, when
  - Understand the behaviours
    - COM-B
    - Before designing the intervention

- Consider the full range of effective interventions and supporting policies

- Select and implement appropriate behaviour change techniques
And evaluate …..

• ….. so it is possible to accumulate evidence to inform future interventions

• Plan evaluation in advance using a theoretical framework to increase understanding of
  – mechanisms of action
  – reasons for variation
Acknowledgements

• Key collaborators in this work
  – Prof Robert West, UCL
  – Prof Marie Johnston, Aberdeen
  – Health Psychology Research Group

• Key funders
For more information

• Susan Michie
  – s.michie@ucl.ac.uk

• Books
  – www.behaviourchangewheel.com
  – www.behaviourchangetheories.com

• UCL Centre for Behaviour Change
  – www.ucl.ac.uk/behaviour-change

All proceeds from CBC teaching, training, books and products go to further development
ADDITIONAL SLIDES IF NEEDED
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


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


Using rules to reduce the opportunity to engage in the behaviour (or to increase behaviour by reducing opportunity to engage in competing behaviours)

Increasing knowledge or understanding

Using communication to induce positive or negative feelings to stimulate action

Creating an expectation of reward

Creating an expectation of punishment or cost

Changing the physical or social context

Provide an example for people to aspire to or emulate

Increasing means or reducing barriers to increase capability (beyond education or training) or opportunity (beyond environmental restructuring)

Imparting skills

Training

Imparting knowledge

Persuasion

Incentivisation

Coercion

Enablement

Modelling

Environmental restructuring

Restrictions

Education
Creating documents that recommend or mandate practice. This includes all changes to service provision.

Using the tax system to reduce or increase the financial cost.

Establishing rules or principles of behaviour or practice.

Delivering a service.

Making or changing laws.

Using print, electronic, telephonic or broadcast media.

Designing and/or controlling the physical or social environment.
## Selecting interventions and policies

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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>
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Theoretical Domains Framework

- **Soc** - Social influences
- **Env** - Environmental Context and Resources
- **Id** - Social/Professional Role and Identity
- **Bel Cap** - Beliefs about Capabilities
- **Opt** - Optimism
- **Int** - Intentions
- **Goals** - Goals
- **Bel Cons** - Beliefs about Consequences
- **Reinf** - Reinforcement
- **Em** - Emotion
- **Know** - Knowledge
- **Cog** - Cognitive and interpersonal skills
- **Mem** - Memory, Attention and Decision Processes
- **Beh Reg** - Behavioural Regulation
- **Phys** - Physical skills