Changing behaviour to improve health

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This talk

1. The role of behaviour in health
2. Why we need a science of behaviour change
3. Applying a scientifically derived model of behaviour and behaviour change
4. Improving the evidence-base using behaviour change taxonomies.
Behavioural influences on health: Global

Lim et al 2012 Lancet 380 2224
Behavioural influences on health: Global

Behaviour change is of critical importance in addressing all of these

Lim et al 2012 Lancet 380 2224
Behavioural influences on health: Clinic

**Primary and secondary prevention**

- Reduction of sitting behaviour, poor occupational back care practices.
- Avoidance of physical activity as a strategy for managing pain.

Adherence

- Poor implementation of evidence-based guidance
- Netherlands: 30-40% of patients did not receive 'evidence-based' health care
  Grol et al, 2001
- US: 20-25% received care that was unnecessary or even harmful
  Schuster et al, 2005

Delivery of evidence-based care
Behavioural influences on health: Clinic

**Primary and secondary prevention**
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- Low level of engagement in self-directed rehabilitation exercises.
- Over-use of pain medication

References:
- Grol et al, 2001
- Schuster et al, 2005
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So, if behaviour is so important to health, why is it that we are not very good at changing it?
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Do we give behavioural interventions the same degree of attention and scientific scrutiny as pharmacological or surgical interventions?

Need to stop designing interventions on the ISLAGIATT Principle!
So, if behaviour is so important to health, why is it that we are not very good at changing it?

Do we give behavioural interventions the same degree of attention and scientific scrutiny as pharmacological or surgical interventions?

It Seemed Like A Good Idea At The Time!
A science of behaviour change requires at least the following:

- A methodology for designing, delivering and evaluating behaviour change interventions.
- A comprehensive theory of behaviour
- A replicable way of understanding what is inside complex behaviour change interventions.
Methodology of behaviour change

1. Identify outcomes
2. Identify behavioural determinants
3. Understand the behaviour: COM-B
4. Design and deliver the intervention
5. Evaluate the impact
A not untypical scenario

- Julie
- 60 years old
- 3 protruding discs in the spine
- Severe pain, extremely limited mobility, living in one room
- Physically deconditioned
- Depressed
- No progress in community physiotherapy because of pain and panic during rehabilitation
Methodology of behaviour change

1. Decide on the desired outcome
   - Increased mobility, social engagement and improvement in mood

2. Identify behavioural determinants of that outcome
   - Rehabilitative exercises in warm water to build strength and increase range of movement
Methodology of behaviour change

Identify outcomes

Identify behavioural determinants

Understand the behaviour
Chaos (in) theories!

- Systematic review of theories of behaviour in social and behavioural sciences:
  - 83 theories
    - List of constructs
      - 1738; mean 19, range 5-84
    - Network diagram of source theories
    - Future: Searchable website

Davis et al, *Health Psychology Review*, 2014
Michie et al, [www.behaviourochangetheories.com](http://www.behaviourochangetheories.com), 2014
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77. Theory of Interpersonal Behaviour
78. Theory of Normative Social Behaviour
79. Theory of Planned Behaviour
80. Theory of Triadic Influence
81. Transcontextual Model of Motivation
82. Transtheoretical Model of Behaviour Change
83. Value Belief Norm Theory
The COM-B system: Behaviour occurs as an interaction between three necessary conditions
The behavioural diagnosis

Understand the behaviour: Behavioural Diagnosis using COM-B
Capability: does Julie possess the physical and psychological skills and abilities to do the behaviour?

Physical

• *Will the exercises increase her pain levels to such a degree that she will not be able to do them?*

Psychological:

• *Does Julie understand what exercises she needs to do and why she needs to do them? How will she interpret the pain of ‘improvement’ from the pain of ‘damage’*
Opportunity: what needs to change in the external physical and social environment to make it easy for Julie to do this behaviour?

Physical

• *Is there an accessible warm water hydrotherapy pool nearby? Is there a funding agreement to let her use it? How is she going to get there?*

Social:

• *Does anyone like Julie use this facility? Or is it full of young women in lycra doing crazy things?*

• *Does Julie come from a culture that accepts that this form of intervention is the solution to pain?*
**Motivation:** What are the conscious and unconscious drivers for Julie to adopt or resist performing these behaviours?

Automatic (largely outside of awareness)

- **Fear:** Julie has learned to associate movement with pain and this increases arousal and propensity for panic during exercises.

Reflective (largely conscious):

- **Belief about change:** does Julie believe that she is able to do this behaviour and that things can change?

- **Identity:** Julie often breaks down in sessions and says that she is ‘a decrepit old woman’
### COM-B Domain

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**Physical**: needs pain relief for early stages of treatment

**Psychological**: Needs clear information about the likely consequences of treatment and how to manage them.

Written treatment plan. Ability to contact physio if worried.

**Opportunity**

**Physical**: pool is 30 minute drive away and currently not able to drive. Friend to drive her to the gym and go in and do the exercises also.

**Social**: fear of looking out of place and judged.

**Motivation**

**Automatic**: fear of pain and panic attacks

Instruction on how to manage pain and panic attacks.

**Reflective**

**Identity**: 'I am a frail old woman now'

Reframe: 'I am a strong woman who needs to be there for my kids”

**Beliefs about change**: 'This is not going to work'

Buddy system in the hydrotherapy pool. 'It worked for her!
# From diagnosis to intervention

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Why this approach and not others?

• **Systematic;** based on everything we know might influence a behaviour, not just ‘clinical intuition’

• **Systemic;** it acknowledges that interventions to support one area have knock on effects in others (e.g. making available pain medication increases motivation), allowing for virtual cycles to develop

• **Contextual;** acknowledges that the environment is a powerful source of behaviour change
Example: GPs managing low back pain:

*Australia*

The implementation problem:

1. **Too frequent referral** for lumbar X-rays
2. **Too infrequent recommendation** to stay active

Designing better behaviour change interventions
### Descriptions of “behavioural counselling” in two interventions

<table>
<thead>
<tr>
<th>Title of journal article</th>
<th>Description of “behavioural counselling”</th>
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<td>The impact of <em>behavioural counselling</em> on stage of change fat intake, physical activity, and cigarette smoking in adults at increased risk of coronary heart disease</td>
<td>“educating patients about the benefits of lifestyle change, encouraging them, and suggesting what changes could be made” <em>(Steptoe et al. AJPH 2001)</em></td>
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<td>Effects of internet <em>behavioural counselling</em> on weight loss in adults at risk for Type 2 diabetes</td>
<td>“feedback on self-monitoring record, reinforcement, recommendations for change, answers to questions, and general support” <em>(Tate et al. JAMA 2003)</em></td>
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Content of the intervention: 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
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 call for precise reporting of behavior change interventions: we need rigorous methods of characterizing active content of interventions with precision and specificity.
Objectives The objective of this study is to develop an extensive, consensually agreed hierarchically structured taxonomy of techniques [behavior change techniques (BCTs)] used in behavior change interventions.
Methods In a Delphi-type exercise, 14 experts rated labels and definitions of 124 BCTs from six published classification systems. Another 18 experts grouped BCTs according to similarity of active ingredients in an open-sort task. Inter-rater agreement amongst six researchers coding 85 intervention descriptions by BCTs was assessed.
Results 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.

Electronic supplementary material The online version of this article (doi:10.1007/s12160-013-9486-6) contains supplementary material, which is available to authorized users.

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M. Richardson
Institute of Cancer Research, Sutton, UK
# BCT Taxonomy v1: 93 items in 16 groupings

### Grouping and BCTs

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### Examples

**1.1 Goal setting (behavior)**

*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.*

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.
The BCTTv1 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
BCT methodology provides an agreed, standard method to

• **Describe** interventions as accurately as possible
  – Replicate interventions in research to build evidence
  – Implement effective interventions
• **Evaluate** e.g. in factorial designs
  – Identify *active ingredients* (what)
  – Investigate *mechanisms of action* (how)
• **Synthesise** published reports in systematic reviews
• **Design** interventions
  – Translate general intervention functions into specific BCTs
Using BCT Taxonomy to improve outcomes of PA interventions

- Meta-analyses of PA intervention studies generally report very small effect sizes (0.31sd; Hillsdon et al., 2005).

- Even when interventions have an impact, they rarely achieve levels consistent with guidance.

- Need for greater clarity about what is effective and ineffective in PA interventions.
BCT’s in PA Interventions (Healthy Population)

- Self-efficacy commonly believed to be an important mediator in the pathway to increased physical activity (Bauman et al., 2012).

- Large significant correlation between changes in self-efficacy and physical activity behaviour.

- Systematic reviews show that the following BCT’s influence self-efficacy in healthy weight individuals:
  - Action planning
  - Reinforcing effort or progress towards behavioural goals
  - Provide instruction

BCT’s in PA Interventions (Obese Population)

• When similar taxonomy applied to the meta-analysis of individuals who are obese, a different profile occurs.

• Self-efficacy does not predict physical activity!

• BCT’s associated with increased physical activity in obese populations:
  – Prompt self-monitoring of behavioural outcomes (weight loss)
  – Plan social support (social change)

Oleander et al. (2013). IJBNPA, 10:29
Implications for designing interventions

• Why does self-efficacy not increase physical activity in obese individuals?
  – Physical activity without dietary change is unlikely to lead to weight loss, and many obese individuals will have experienced this time and time again.

• Don’t focus on building self-efficacy in interventions to increase physical activity in obese individuals

• Use behaviour change techniques that are associated with developing greater social support in the context of measuring weight status.

• Research based on COM-B and BCT Taxonomy can help generate interventions with greater precision.
### Sample of interventions using this approach

#### Australia
- Improving implementation of guidelines for acute low back pain in primary care
  - McKenzie et al.
- Diagnosis and post-diagnosis management of people with dementia
  - Green et al.
- Implementing preconception care guidelines in the general practice setting
  - Mazza et al.

#### Canada
- Chiropractors compliance with diagnostic imaging guideline recommendations for spine disorders
  - Bussieres et al.

#### Finland
- Guidelines on tobacco and nicotine dependency treatment
  - Kinnunan et al.

#### Ireland
- Primary care practitioners' HPV-related behaviours
  - McSherry et al.

#### Netherlands
- Blood transfusion management in elective hip and knee arthroplasties
  - Voorn et al.

#### UK
- Physicians’ transfusion practice
  - Eccles et al.
- Hospital staff hand hygiene
  - Sheldon et al.
- A suite of dental guidelines across Scotland
  - Clarkson et al.

Michie et al. >150 citations (Web of Knowledge)
In summary

• Behaviour change is of enormous importance to health and wellbeing.

• The emerging science of behaviour change has the potential to capitalise on biomedical approaches and will help us to improve patient outcomes by:
  – Helping patients to change their behaviour
  – Helping health professionals to support patients more effectively with behaviour change
  – Creating a health and social care environment that supports patients more effectively to change behaviour.
Thankyou for your attention!

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