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Applying and Building Theory for Behaviour Change

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This session


1. Introduction to
 - the Behaviour Change Wheel
 - the Theoretical Domains Framework
2. Application to implementation problem
 - identify intervention functions and policies
 - select behaviour change techniques for the intervention



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Introduction

- Applying behavioural science
 - Understanding **behaviour** in context as the starting point for interventions
 - The importance of **theory**
 - A **systematic method** for designing interventions to change behaviour



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)

Source: Dahlgren and Whitehead, 1991

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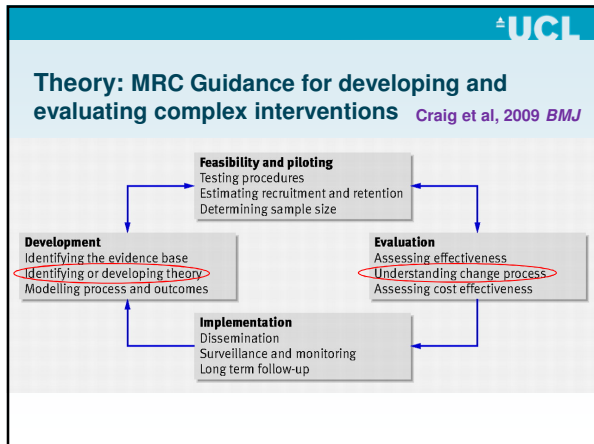
How to improve interventions?

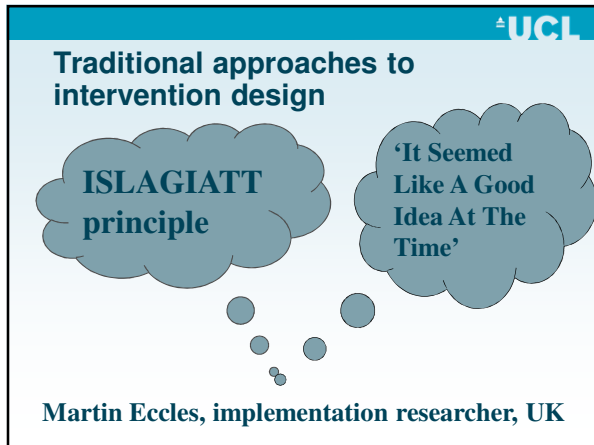
- Understand effective interventions
 - why they **vary** across behaviour, population and setting (moderators)
 - their **mechanisms of action** (mediators)
- This requires
 - a **theoretical** understanding
 - Not just whether they were effective, but why
 - knowing **what** the intervention was
 - Precise specification of its content
- Designing more effective interventions
 - A **systematic method informed by theory**

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TIDieR: Template for Intervention Description and Replication (Hoffman et al, BMJ, 2014)

- WHY: rationale, theory**
- WHAT: Materials and procedure**
- WHO PROVIDED**
- HOW: Mode of delivery**
- WHERE**
- WHEN and HOW MUCH**
- TAILORING**
- MODIFICATIONS: during the course of the study**
- HOW WELL: Planned (inc assessment of fidelity) and actual delivery**





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What is theory?

Multidisciplinary consensus definition

"A set of concepts and/or statements which specify how **phenomena relate** to each other.

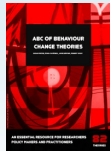
Theory provides an **organising description** of a system that accounts for what is known, and **explains and predicts** phenomena."

Applying theory to intervention design and evaluation: Why?

- Provides a framework to facilitate
 - accumulation of evidence
 - communication across research groups
- Identifies barriers and facilitators to change
 - and what needs to change
- Identifies mechanisms of action
 - evidence that can be used to
 - understand processes
 - design and improve interventions

Applying theory to intervention design and evaluation

- Apply formal theory
 - 83 theories of behaviour change identified in cross-disciplinary review
 - Theory Coding Scheme
 - Michie & Prestwich, 2010, Health Psych



OR

- Use an integrative theoretical framework
 - Behaviour Change Wheel, Michie et al, 2011
 - Theoretical Domains Framework, Cane et al, 2012



Applying the Behaviour Change Wheel to intervention design

- Start by understanding target behaviour in context
 - COM-B model
- Then link to
 - intervention functions,
 - policies,
 - behaviour change techniques

Understand the behaviour in context

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



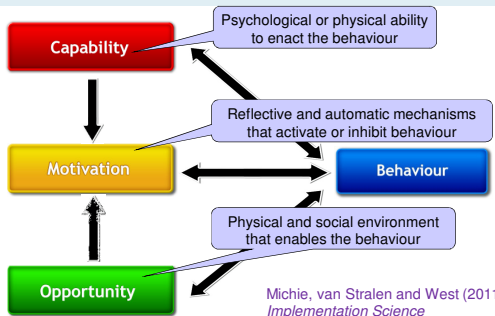
- Answering this is helped by a model of behaviour
– COM-B

A thought experiment

For behaviour to change, what three conditions need to exist?



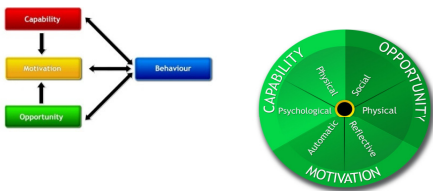
The COM-B system: Behaviour occurs as an interaction between three necessary drivers



Designing effective interventions

1. Understand the **behaviour** you are trying to change
 - Make a “behavioural diagnosis”
2. Consider the **full range of options** open to you
3. Use a **systematic method** for selecting behaviour change techniques
4. Evaluate interventions so it is possible to **accumulate evidence** to inform future interventions

Start with understanding the behaviour in context

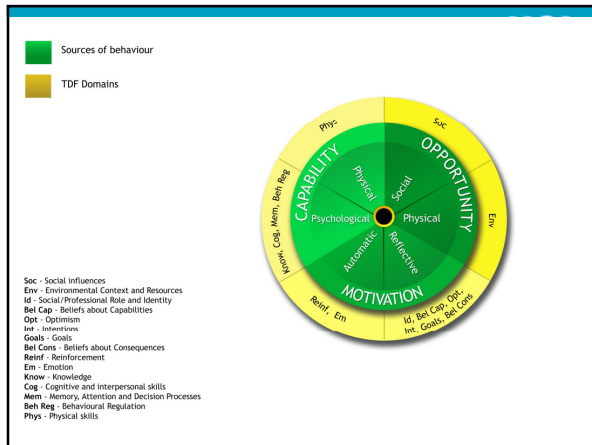


Elaboration of COM-B: Theory Domains Framework

- To make theory more usable for implementation researchers
 - 18 researchers in health psychology
 - 14 implementation researchers from UK, Netherlands and Canada
- Generated and synthesised 33 theories and 128 constructs
- into 14 domains (11 originally)

Michie et al (2005) Making psychological theory useful for implementing evidence based practice: a consensus approach, *Quality and Safety in Health Care*
 Cane et al (2011) Validation of the theoretical domains framework for use in behaviour change and implementation research, *Implementation Science*

COM-B	Theory Domains
Physical capability	Physical skills
Psychological capability	Knowledge
	Cognitive and Interpersonal skills
	Memory, Attention and Decision processes
	Behavioural regulation



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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

McKenzie et al (2008) IMPLEMENTING a clinical practice guideline for acute low back pain evidence-based management in general practice (IMPLEMENT): cluster randomised controlled trial study protocol, *Implementation Science* 3:11.

Used the Theory Domains Framework

- Comprehensive theoretically-based “diagnosis” of the implementation problem
- Provides basis for designing intervention

French, Green, O'Connor, MacKenzie, Francis, Michie, Buchbinder, Schattner, Spike, Grimshaw.

Developing theory-informed behaviour change interventions to implement evidence into practice: a systematic approach using the Theoretical Domains Framework. *Implementation Science*, 2012; 7, 38.

Assessing the problem

Theoretical assessment of implementation problem

- Theory domain questions about the 2 GP behaviours
- 11 Focus Groups of 42 GPs
- Thematic analysis: barriers & enablers, GP & patient perspective



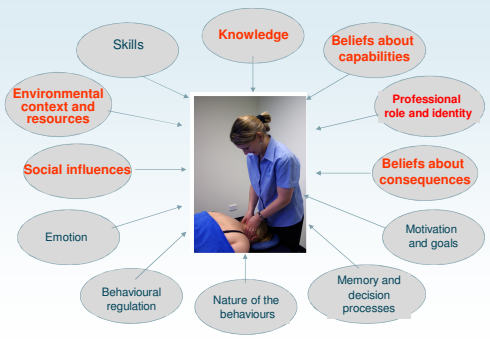
Surveys based on interviews

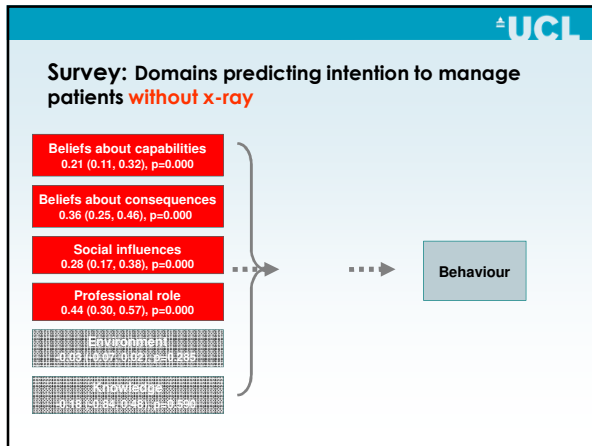
Intervention development: Matrix of domains and techniques

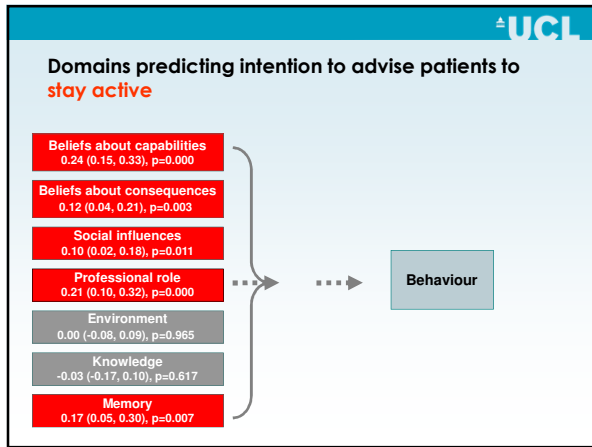
Evaluation in cluster RCT



Interviews: Domains in which problems identified







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Using theory to develop interventions


Franch et al. *Implementation Science* 2013, 8:18
<http://www.implementation-science.com/content/8/1/18>

METHODOLOGY Open Access







Developing theory-informed behaviour change interventions to implement evidence into practice: a systematic approach using the Theoretical Domains Framework


Simon D Franch^{1*}, Sally E Green¹, Denise A O'Connor², Jarvini E McKenzie³, Jill Francis³, Susan Michie⁴, Rachelle Buxton^{1,5}, Peter Schatner⁶, Neil Spivey⁶ and Jeremy M Grimshaw⁷

Abstract
Background: There is little systematic operational guidance about how best to develop complex interventions to reduce the gap between practice and evidence. This article is one in a series of articles documenting the development and use of the Theoretical Domains Framework (TDF) to advance the science of implementation research.
Methods: The intervention was developed considering three main components: theory, evidence and practical issues. We used a four-step approach, consisting of guiding questions, to direct the choice of the most appropriate components of an implementation intervention (who needs to do what, differently/using a theoretical framework, when barriers and enablers need to be addressed? Which intervention components (behaviour change techniques and modes of delivery) could overcome the modifiable barriers and enhance the enablers? And how can behaviour change be measured and understood?).
Results: A complex implementation intervention was designed that aimed to improve acute low back pain management in primary care. We used the TDF to identify the barriers and enablers to the uptake of evidence into practice and to guide the choice of intervention components. These components were then combined into a cohesive intervention. The intervention was delivered as two facilitated interactive small group workshops. We also produced a DVD to distribute to all participants in the intervention group. We chose outcome measures in order to assess the mediating mechanisms of behaviour change.
Conclusions: We have illustrated a four-step systematic method for developing an intervention designed to change clinical practice based on a theoretical framework. The method of development provides a systematic framework that could be used by others developing complex implementation interventions. While this framework should be flexibly adjusted and refined to suit other contexts and settings, we believe that the four-step process should be maintained as the primary framework to guide researchers through a comprehensive intervention development process.



Sample of interventions using this approach


<p>Australia </p> <ul style="list-style-type: none"> Improving implementation of guidelines for acute low back pain in primary care <ul style="list-style-type: none"> – McKenzie et al. Diagnosis and post-diagnosis management of people with dementia <ul style="list-style-type: none"> – Green et al. Implementing preconception care guidelines in the general practice setting <ul style="list-style-type: none"> – Mazza et al. <p>Canada </p> <ul style="list-style-type: none"> Chiropractors compliance with diagnostic imaging guideline recommendations for spine disorders <ul style="list-style-type: none"> – Bussieres et al. <p>Finland </p> <ul style="list-style-type: none"> Guidelines on tobacco and nicotine dependency treatment <ul style="list-style-type: none"> – Kinnunan et al. 	<p>Ireland </p> <ul style="list-style-type: none"> Primary care practitioners' HPV-related behaviours <ul style="list-style-type: none"> – McSherry et al. <p>Netherlands </p> <ul style="list-style-type: none"> Blood transfusion management in elective hip and knee arthroplasties <ul style="list-style-type: none"> – Voorn et al. <p>UK </p> <ul style="list-style-type: none"> Physicians' transfusion practice <ul style="list-style-type: none"> – Eccles et al. Hospital staff hand hygiene <ul style="list-style-type: none"> – Sheldon et al. A suite of dental guidelines across Scotland <ul style="list-style-type: none"> – Clarkson et al.
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Practical exercise 1

- Implementation problem: *Primary care providers not referring patients to DPP*
- What needs to shift?
 - COM-B/ Theoretical Domains Framework
- What are likely to be needed to create the shift?
 - intervention functions and policy categories

[materials needed – print out of the Behaviour Change Wheel; list of TDF domains]

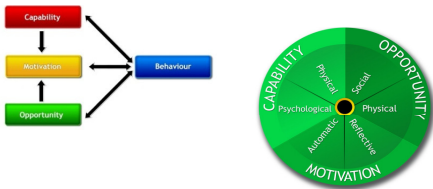


Session 2

A theoretical basis for designing effective interventions

1. Understand the **behaviour** you are trying to change
 - Make a theory-based “behavioural diagnosis”
2. Consider the **full range of options** open to you
3. Use a **systematic method** to select behaviour change techniques
4. Evaluate interventions so it is possible to **accumulate evidence** to inform future interventions

Start with understanding the behaviour in context



Consider the full range of options: frameworks are helpful

- Need a framework that is
 - **Comprehensive**
 - So you don't miss options that
 - **Coherent**
 - So you can have a consistent intervention design
 - **Linked to** *Useable by, and useful to, policy makers, service planners and intervention designers*
 - So that it is grounded in behavioural science

Useable by, and useful to, policy makers, service planners and intervention designers

Do we have such a framework?

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

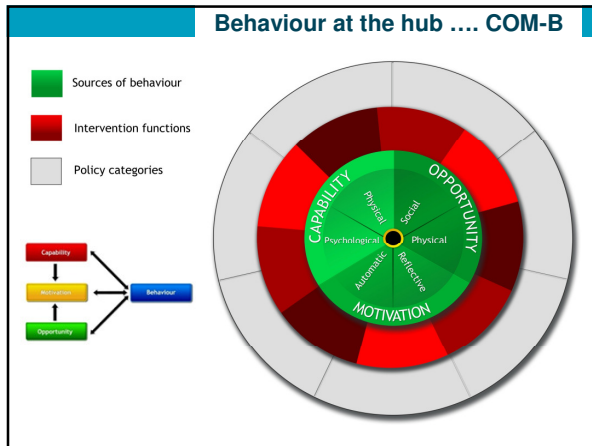
Michie et al (2011) The Behaviour Change Wheel: a new method for characterising and designing behaviour change interventions, *Implementation Science*

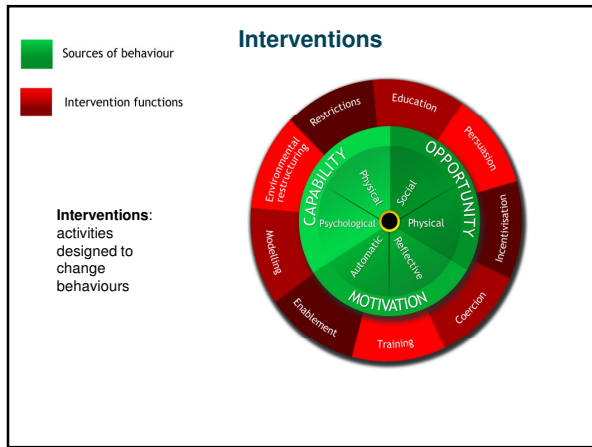


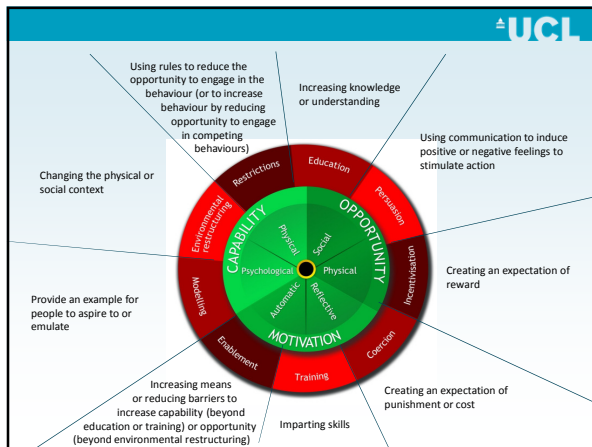
Frameworks included in systematic review

- **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
- **7. Intervention Mapping** Bartholomew *et al.* (2011) Protocol for a systematic development of theory- and evidence-based interventions
- **8. People and places framework** Maibach *et al.* (2007) Framework that explains how communication and marketing can be used to advance public health
- **9. Public health: ethical issues** Nuffield Council on Bioethics (2007) Ladder of interventions by government, industry, organisations and individuals to promote public health.

- **10. Injury control framework** Geller *et al.* (1990) Heuristic framework for categorising and evaluating behaviour change strategies aimed at controlling injuries
- **11. Implementation taxonomy** Leeman *et al.* (2007) Theory-based taxonomy of methods for implementing change in practice
- **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 prescribing 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







Use the Behaviour Change Wheel to ...

1. Design interventions and policies
2. "Retrofit" – identify what is in current interventions and policies
3. Provide a framework for evaluation
 - How are interventions working?
4. Structure systematic reviews

Which intervention functions should be used?

	Educ	Pers	Incen	Coer	Train	Res	Envir	Mod	Enabl
Cap Phys									
Cap Psy									
Opp Phys									
Opp Soc									
Mot Aut									
Mot Ref									

Which policy categories should be used?

	Ed	Pers	Inc	Coer	Tra	Res	Envr	Mod	Ena
Com									
Guid									
Fisc									
Reg									
Leg									
Envir									
Serv									

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**Given intervention function/s,
which techniques?**

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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

BCT
Taxonomy

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 F. Eccles, MD · James Cairns, PhD · Caroline E. Wood, PhD

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Abstract
Background: CONSORT guidelines recommend reporting of behavior change interventions with a minimum of 10 active ingredients in an operational description. However, inconsistent descriptions by BCTs was one method of classifying behavior change interventions with a minimum of 10 active ingredients. This resulted in 93 BCTs clustered into 16 groups, of the 26 BCTs occurring at least five times, 23 had adjusted logits of 0.00 or above.
Methods: 14 experts rated labels and 23 BCTs from six published classifications. Another 18 experts grouped BCTs.
Conclusions: “BCT taxonomy v1,” an extensive taxonomy of 93 conceptually 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/s12688-013-0406-6) contains supplementary material, which is available to authorized users.

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**93 item BCT Taxonomy v1,
Annals of Behavioral Medicine, 2013**

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BCT Taxonomy v1: 93 items in 16 groupings

Peer	Grouping and BCTs	Peer	Grouping and BCTs	Peer	Grouping and BCTs
1	1. Goals and planning 1.1. Goal setting (behavior) 1.2. Problem solving 1.3. Goal setting (outcome) 1.4. Action planning 1.5. Review behavior goal(s) 1.6. Discrepancy between current behavior and goal 1.7. Review outcome goal(s)	8	6. Comparison of behaviour 6.1. Demonstration of the behavior 6.2. Social comparison 6.3. Information about others' approval	16	12. Antecedents 12.1. Restructuring the physical environment 12.2. Restructuring the social environment 12.3. Avoidance/reducing exposure to cues for the behavior 12.4. Distraction 12.5. Adding objects to the
		9	7. Associations 7.1. Rewards/punishment		

No.	Label	Definition	Examples
1. Goals and planning			
1.1	Goal setting (behavior)	Set or agree on a goal defined in terms of the behavior to be achieved <i>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</i>	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

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Considerations when selecting behaviour change techniques: The APEASE criteria

- **A**ffordability
- **P**racticability
- **E**ffectiveness/cost-effectiveness
- **A**ceptability
 - public
 - professional
 - political
- **S**ide-effects/safety
- **E**quality








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Use the Behaviour Change Wheel to ...

1. “Retrofit” – **identify** what is in current interventions and policies
2. Provide a framework for **evaluation**
 - How are interventions working?
3. Structure **systematic reviews**
4. **Design** interventions and policies

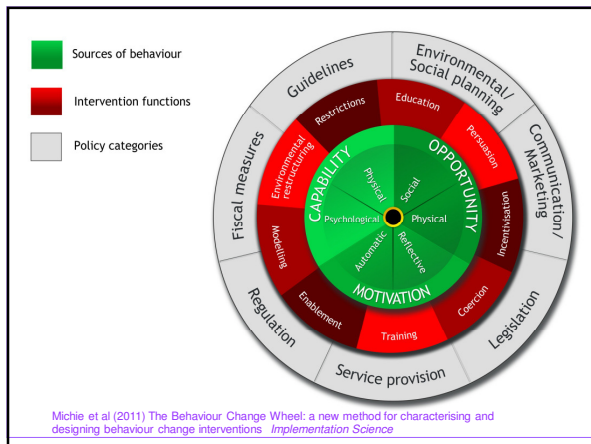
BCW used in very varied ways ... 2013

- International Red Cross to train volunteers 
- Projects to improve paediatric health care in Kenya 
- A method for improving colorectal screening practices in the USA 
- An organisational intervention tool in the Netherlands 
- A weight management clinic in the UK 
- An internet intervention to improve condom use

Practical exercise 2

- Implementation problem: *Primary care providers not referring patients to DPP*
- Following your behavioural analysis from Practical Exercise 1 (COM-B/TDF), what are likely to be needed to increase referral rates?
 - intervention functions and policy categories
 - [behaviour change techniques]

[materials needed – print out of the Behaviour Change Wheel;]



Acknowledgements

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- Key funders



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