

Behaviour Change Techniques and Theories: How to analyse the content and mechanisms of action of behaviour change interventions in published articles?

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Cochrane Austria, Dec 2017



Why do we need to improve analysis of behaviour change interventions?

- Some promising interventions to change behaviour
 - but effects tend to be modest and variable
- Systematic accumulation of evidence slow
- Recent advances in behavioural science methods e.g.
 - Behaviour change techniques (Michie et al, 2013, 2015)
 - Linking techniques to theory (Michie et al, 2016)
 - Behaviour Change Wheel (Michie et al, 2011)



The problem of poor descriptions ...

- Vague and lacking detail; use of inconsistent and varying terminology
- We need language that is understood by all, with the same terms used for the same things
- Without this, we are limited in our ability to
 - replicate,
 - implement effective interventions,
 - evaluate or
 - improve interventions

Reporting guidelines/ tools helpful



Reporting Examples

Submit Example

If you find an example of good reporting, login here

Welcome to the CONSORT Statement Website

CONSORT, which stands for Consolidated Reporting of Trials, encompasses various initiatives developed by the CONSORT Group to alleviate the problems of reporting of randomized controlled trials (RCTs).

News

Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide

Tammy C Hoffmann *associate professor of clinical epidemiology*¹, Paul P Glasziou *director and*

Behaviour change techniques: the evaluation of a taxonomic method and describing behaviour change interventions (a suite of five studies involving consensus methods, randomised controlled trials and analysis of qualitative data)

Susan Michie, Caroline E Wood, Marie Johnston, Charles Abraham, Jill J Francis and Wendy Hardeman



Reporting intervention content: behaviour change techniques (BCTs)

- “Active ingredients” within an intervention designed to change behaviour
- They are
 - discrete, low-level components of an intervention that on their own have potential to change behaviour
 - observable and replicable

Michie S, Johnston M, Carey R. (2016). Behavior change techniques. In Turner, JR. (Ed.) *Encyclopedia of Behavioral Medicine*. Springer New York.



BCT Taxonomy v1

- Developed by 400 experts from 12 countries
- **Clearly labelled, well defined, distinct, precise;** can be used with confidence by a range of disciplines and countries
- **Hierarchically organised** to improve ease of use
- Applies to an **extensive** range of behaviour change interventions



BCT Taxonomy v1: 93 items in 16 groupings

Page	Grouping and BCTs	Page	Grouping and BCTs	Page	Grouping and BCTs
1	1. Goals and planning	8	6. Comparison of behaviour	16	12. Antecedents
	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) 1.8. Behavioral contract 1.9. Commitment		6.1. Demonstration of the behavior 6.2. Social comparison 6.3. Information about others' approval		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 environment 12.6. Body changes
		9	7. Associations		
			7.1. Prompts/cues 7.2. Cue signalling reward 7.3. Reduce prompts/cues		

No.	Label	Definition	Examples
1. Goals and planning			
1.1	<i>Goal setting (behavior)</i>	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

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
CPsychol · Charles Abraham, DPhil, CPsychol · Jill
Wendy Hardeman, PhD · Martin P. Eccles, MSc
Caroline E. Wood, PhD

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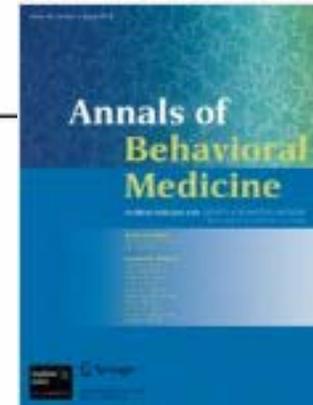
Background Reporting of behavior change interventions (BCIs) is inconsistent and incomplete. *Objectives* The primary objective of this study is to develop an extensive, consensually agreed hierarchically structured taxonomy of techniques [behavior change techniques (BCTs)] used in behavior change interventions. *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

Full programme of work, 5 studies,
Health Technology Assessment (2016)

based on 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.



BCTTv1 Developments

Online Training:

www.bct-taxonomy.com

Feedback on BCTTv1:

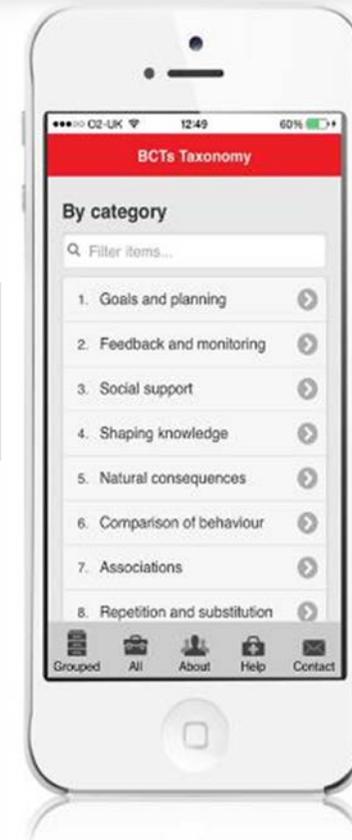
www.ucl.ac.uk/behaviour-change-techniques/BCTTv1Feedback

BCTTv1 App:

Search for 'BCT Taxonomy'

Database of BCTTv1-coded interventions

www.bct-taxonomy.com/interventions



Changing behaviour: the big question



Human Behaviour-
Change Project

*What works,
compared with what,
for what behaviours,
how well, for how long,
with whom, in what setting,
and why?*

The Human Behaviour-Change Project

Participating
organisations



www.humanbehaviourchange.org

 @HBCProject

A Collaborative
Award funded
by the

wellcometrust

The collaboration



Human Behaviour-
Change Project

	Behavioural science	Computer science	System architecture
<i>Grant-holders</i>	Susan Michie ¹ Marie Johnston ³ Robert West ¹ Mike Kelly ⁴	John Shawe-Taylor ¹ Pol MacAonghusa ²	James Thomas ¹
<i>Researchers</i>	Alison Wright ¹ Ailbhe Finnerty ¹ Marta Marques ¹ Emma Norris ¹	Debasis Ganguly ² Lea Deleris ²	Alison O'Mara-Eves ¹ Gillian Stokes ¹ Patrick O'Driscoll ¹

Project Manager: Rebecca Jones¹; *Administrator:* Candice Moore¹; *Consultants:* Janna Hastings, Julian Everett
PhD Students: Paulina Schenk¹, Anneliese Arno¹, Gaurav Singh¹, Tobias Baumann¹

¹UCL ²IBM Research Dublin ³Aberdeen University ⁴Cambridge University

Changing behaviour: the big question



Human Behaviour-
Change Project

*What works,
compared with what,
for what behaviours,
how well, for how long,
with whom, in what setting,
and why?*



Human Behaviour-
Change Project

First step: organise knowledge into an
ontology

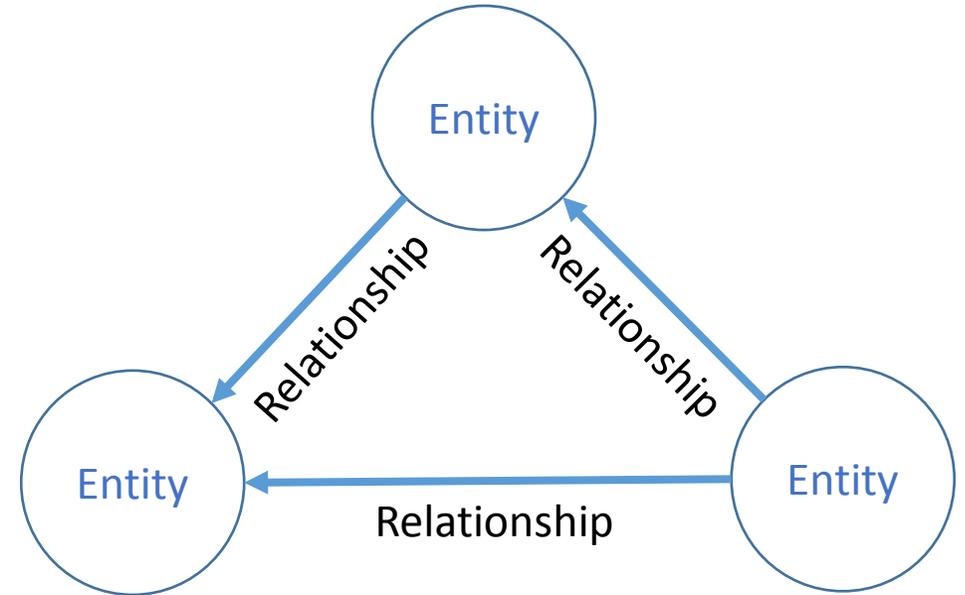
Ontology



Human Behaviour-
Change Project

In information science, a system for representing knowledge in the form of:

1. A set of unique identifiers of 'entities'
2. Labels and definitions for these
3. Specification of relationships between them ('is a', 'part of', 'positively influences' ...)

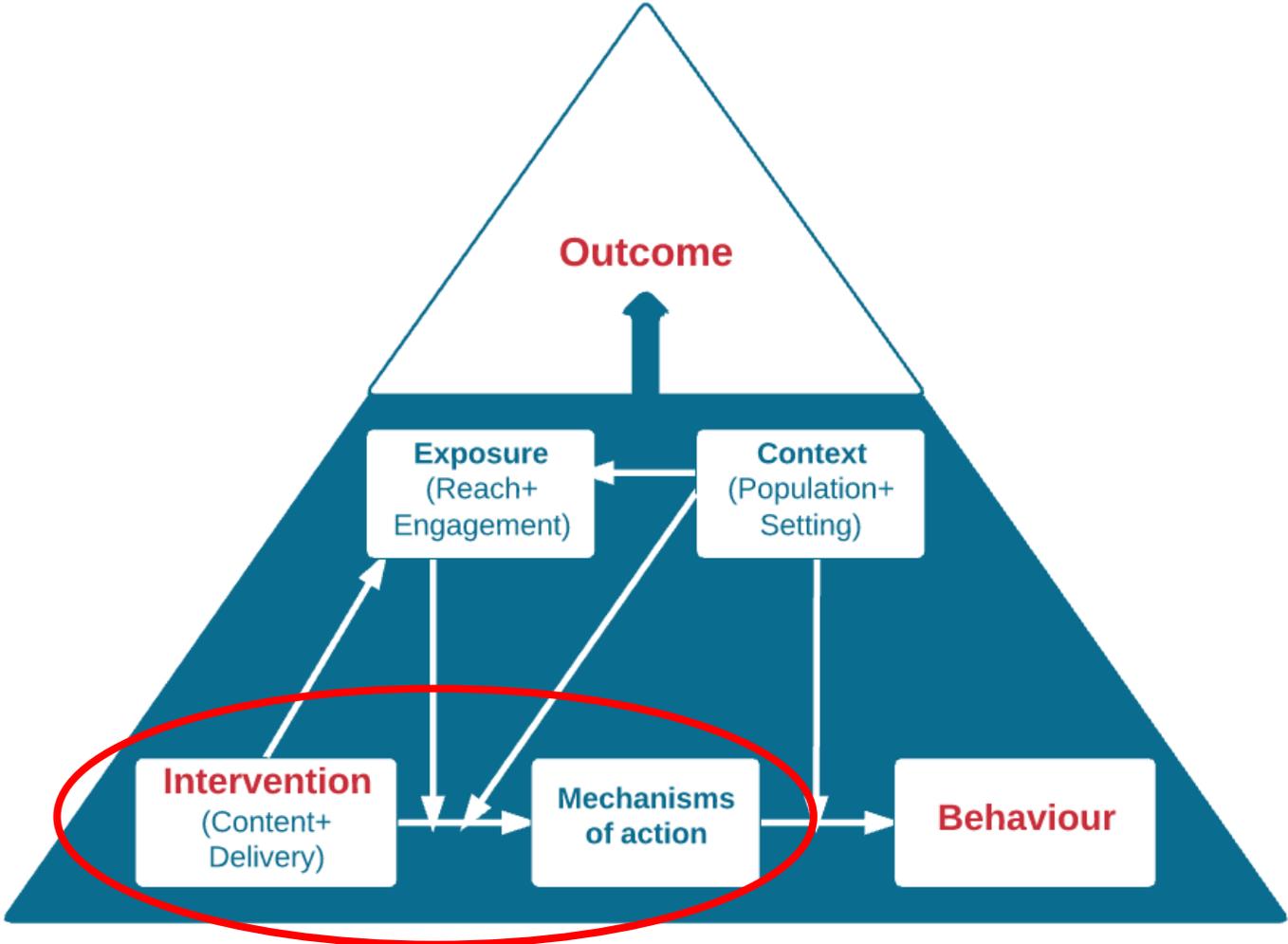


Arp R, Smith B, & Spear AD (2015). Building ontologies with basic formal ontology. Cambridge: MIT Press.

Top-level Behaviour Change Intervention Ontology



Human Behaviour-
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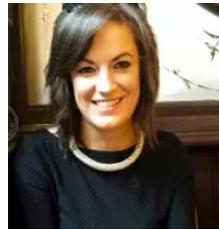
Taxonomies/ontologies being developed for...



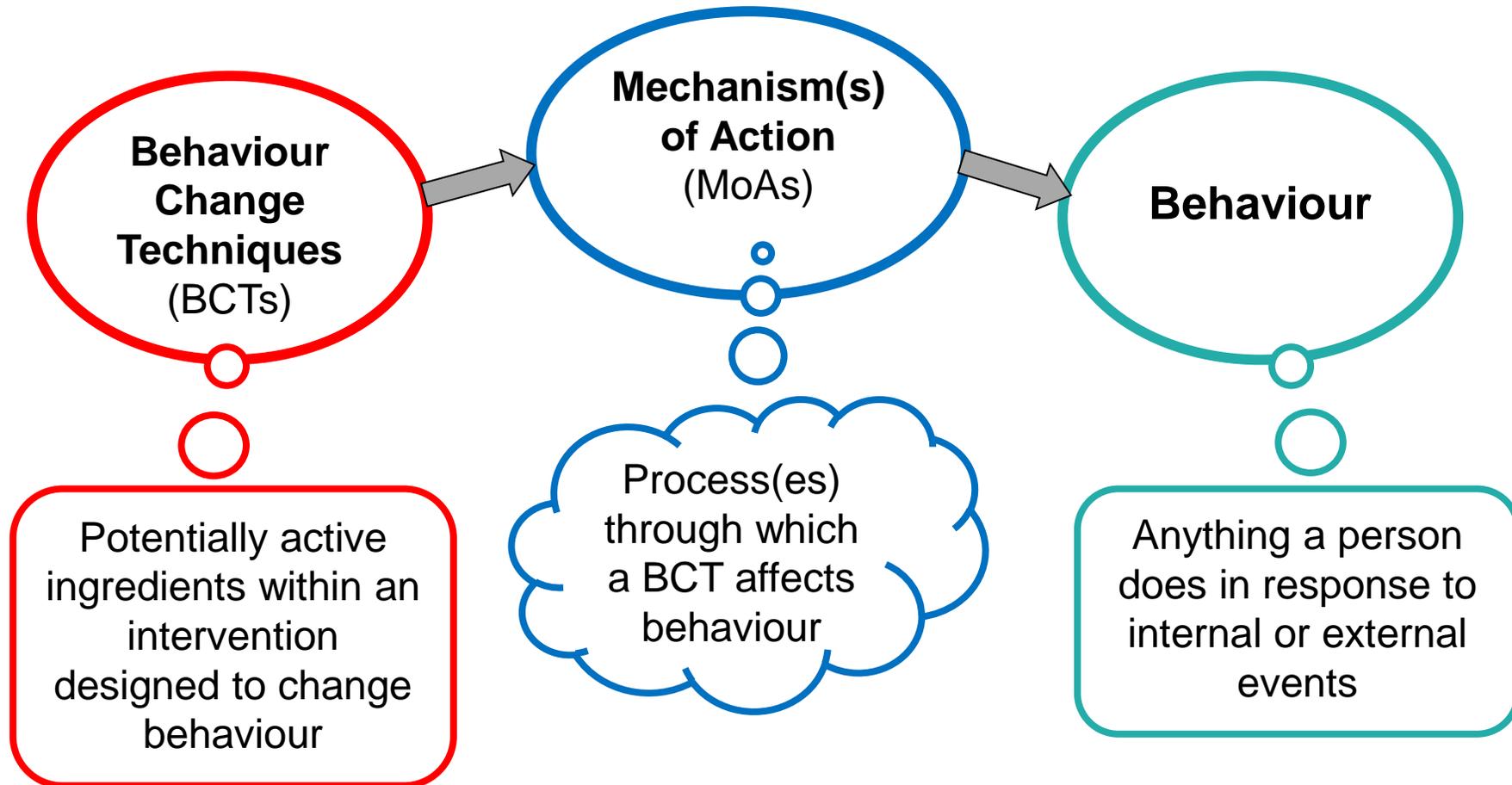
Human Behaviour-
Change Project

- Mode of delivery
 - How the intervention is delivered: 4-level hierarchy.
Top level includes information, substance delivery, environment
- Target behaviour
- Target population
- Intervention setting
- Mechanisms of action
 - Processes by which change occurs

Theories and Techniques of Behaviour Change Project



Key Concepts & Definitions



Rationale



- Need for intervention reports to more explicitly state causal sequences hypothesised to underlie intervention effects i.e. **BCT** → **MoA** → **behaviour**
- Identifying hypothesised **BCT-MoA** links contributes to:
 1. Informing development of theory-based interventions
 2. Synthesising evidence
 3. Advancing understanding of intervention effects
 4. Supporting possibilities for testing & refining theories



Protocol Paper

Annals of Behavioral Medicine, 2016

ann. behav. med.

DOI 10.1007/s12160-016-9816-6

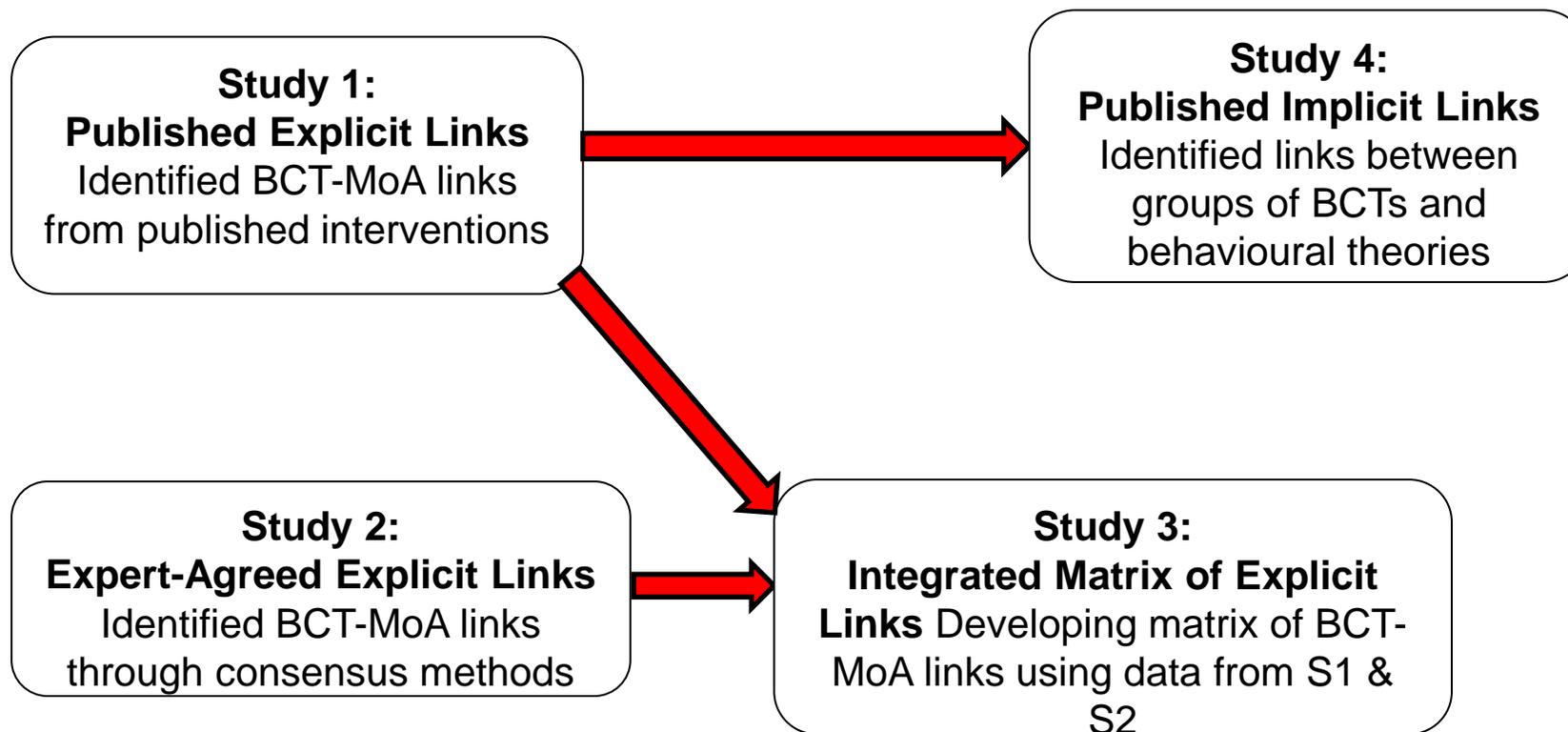


ORIGINAL ARTICLE

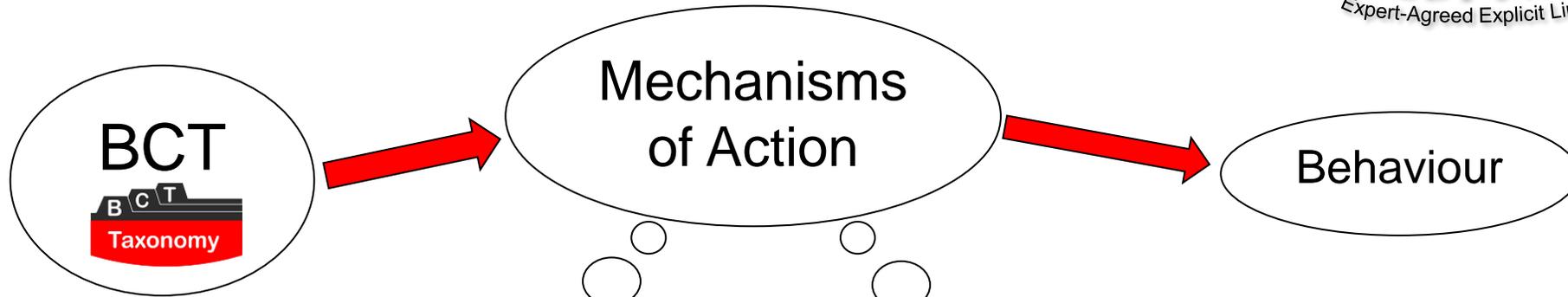
From Theory-Inspired to Theory-Based Interventions: A Protocol for Developing and Testing a Methodology for Linking Behaviour Change Techniques to Theoretical Mechanisms of Action

Susan Michie, PhD¹ • Rachel N. Carey, PhD¹ • Marie Johnston, PhD² •
Alexander J. Rothman, PhD³ • Marijn de Bruin, PhD² • Michael P. Kelly, PhD⁴ •
Lauren E. Connell, PhD¹

Summary of four studies



Study 2 Methods: Identifying a Set of MoAs



MoAs from Theoretical Domains Framework¹

1. Knowledge
2. Skills
3. Social/Professional Role & Identity
4. Beliefs about Capabilities
5. Optimism
6. Beliefs about Consequences
7. Reinforcement
8. Intentions
9. Goals
10. Memory, Attention & Decision Processes
11. Environmental Context & Resources
12. Social Influences
13. Emotion
14. Behavioural Regulation

Additional MoAs from 83 theories of behaviour change²

15. (Societal) Norms
16. Subjective Norms
17. Attitude towards the Behaviour
18. Motivation
19. Self-image
20. Needs
21. Values
22. Feedback Processes
23. Social Learning/Imitation
24. Behavioural Cueing
25. General Attitudes/Beliefs
26. Perceived Susceptibility

Current tools and work

- Heat maps of hypothesised links are being translated to an **interactive online tool** for researchers and intervention designers
- Collaborations in developing and applying Behaviour Change Intervention Ontology
 - NICE and Cochrane via James Thomas
- See www.humanbehaviourchange.org



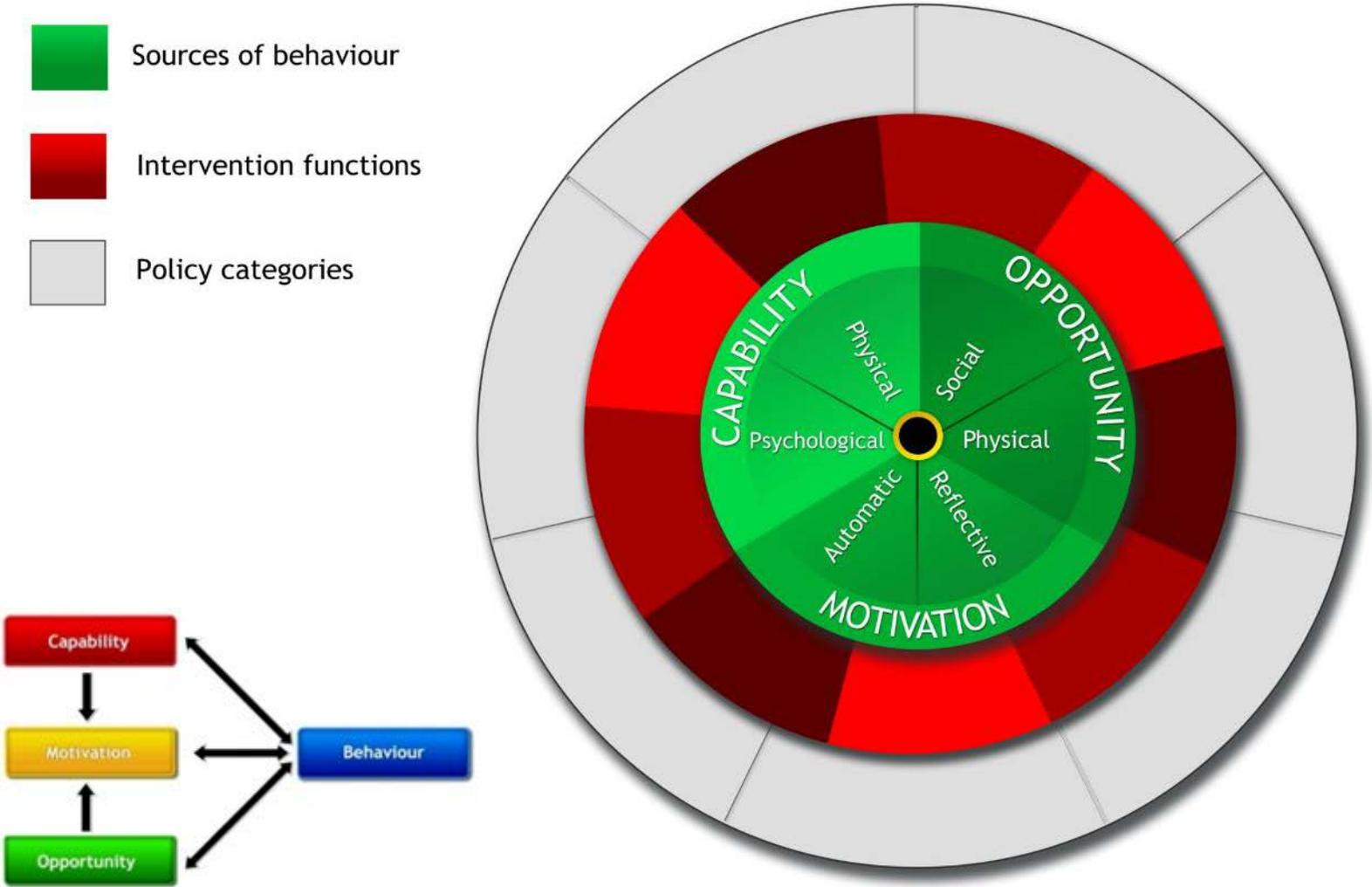
Finally.... Example of integrative framework: the Behaviour Change Wheel

- Systematic literature review identified 19 frameworks of behaviour change interventions
 - related to health, environment, culture change, social marketing etc.
- None met criteria of coherent, comprehensive & linked to model of behaviour
- So Developed a synthesis of the 19 frameworks

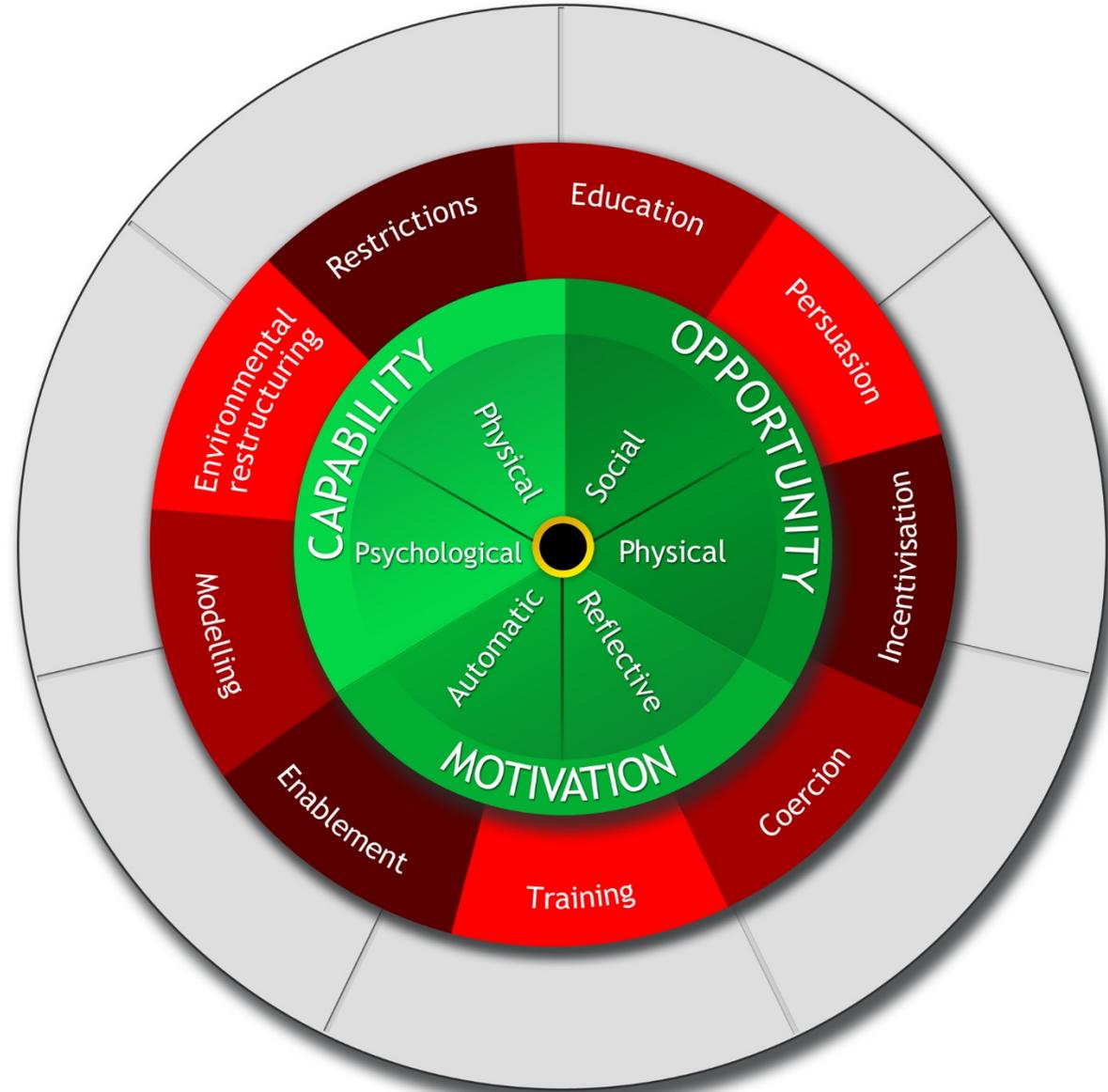
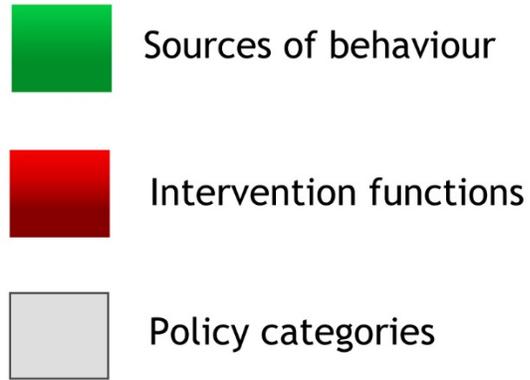


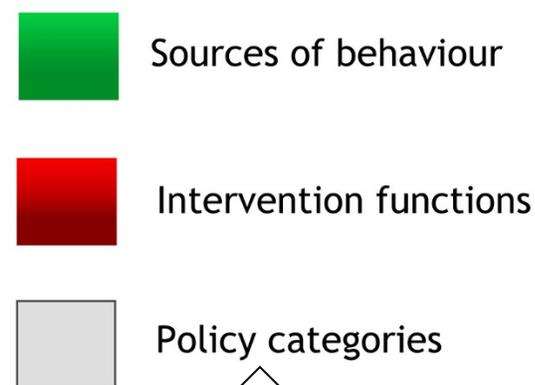
Michie et al (2011) The Behaviour Change Wheel: a new method for characterising and designing behaviour change interventions, *Implementation Science*.

Behaviour at the hub COM-B

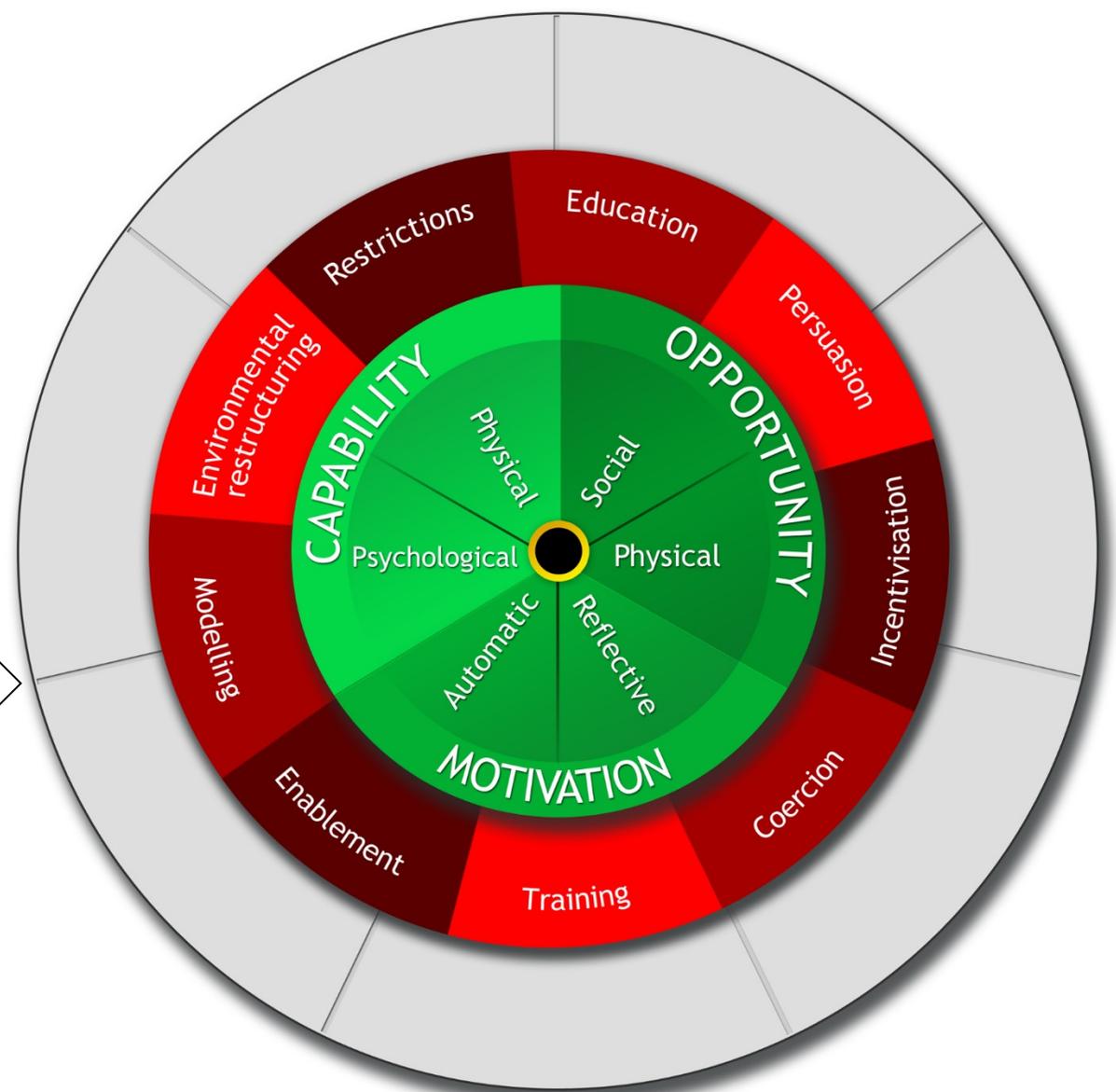
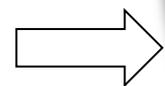


Nine intervention functions

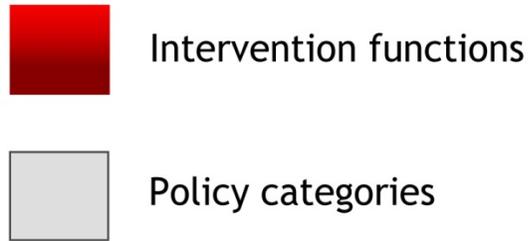




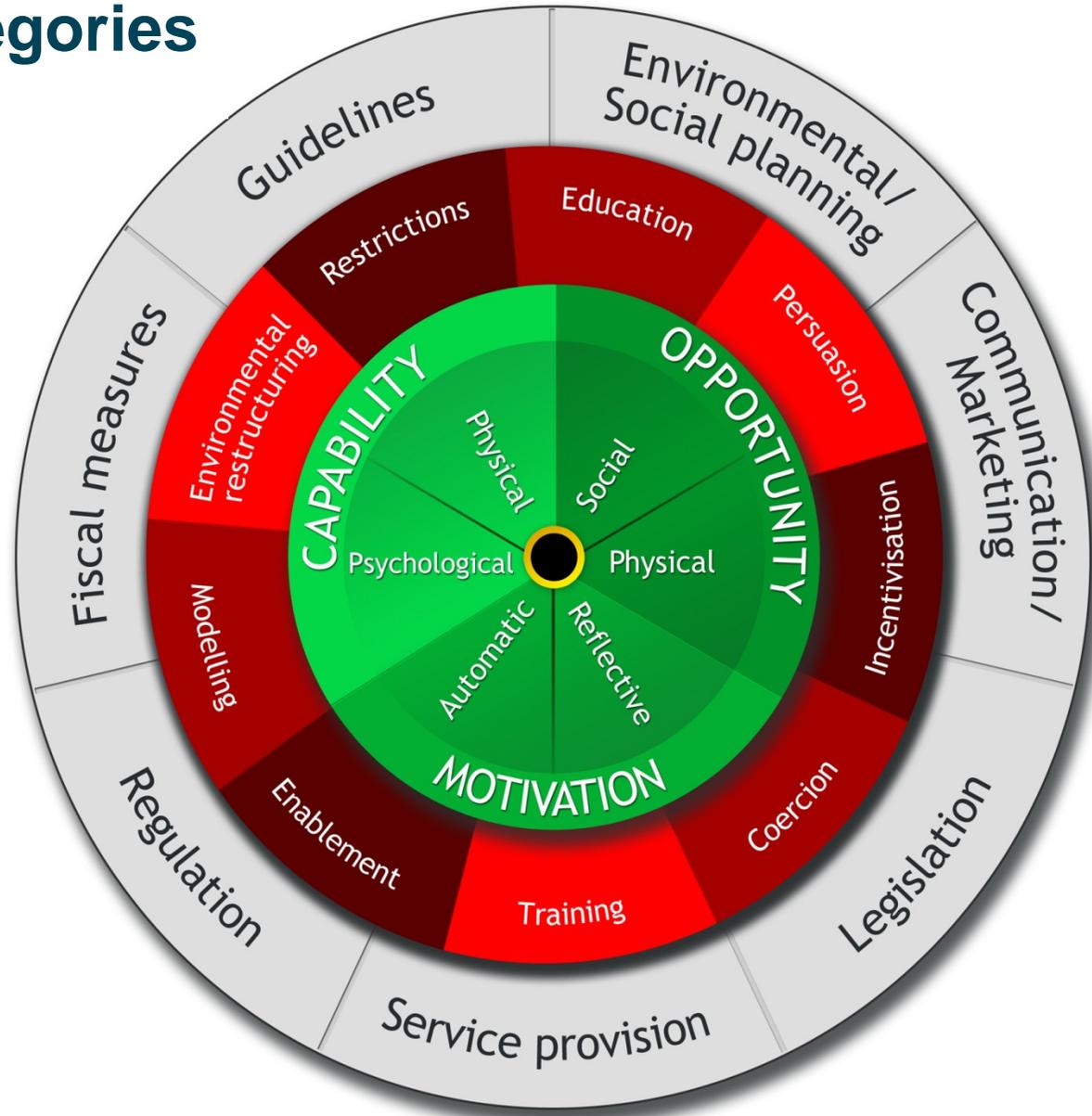
Add policies to maintain change **long-term**



Seven policies categories



Policies:
decisions
made by
authorities
concerning
interventions



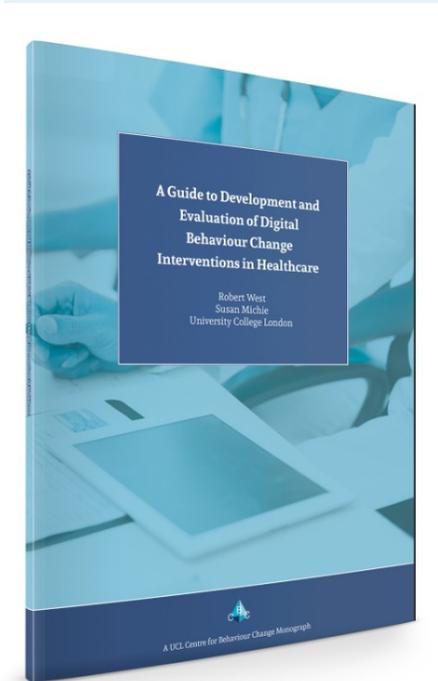
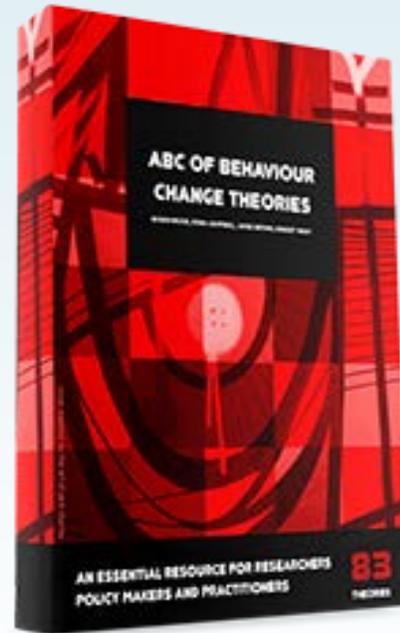
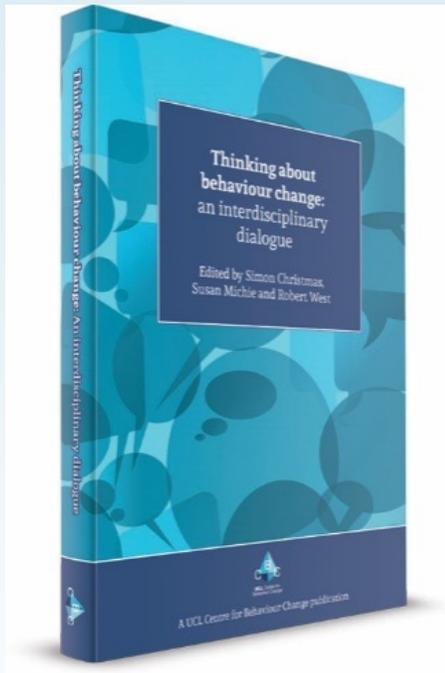
Behaviour Change Wheel been used to ...

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



For more information

www.ucl.ac.uk/behaviour-change



All proceeds from CBC teaching, training, books and products go to further development