



Development and Validation of the Theoretical Domains Framework

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Acknowledgements

- Key collaborators in this work
 - Prof Marie Johnston, UCL and University of Aberdeen



– James Cane



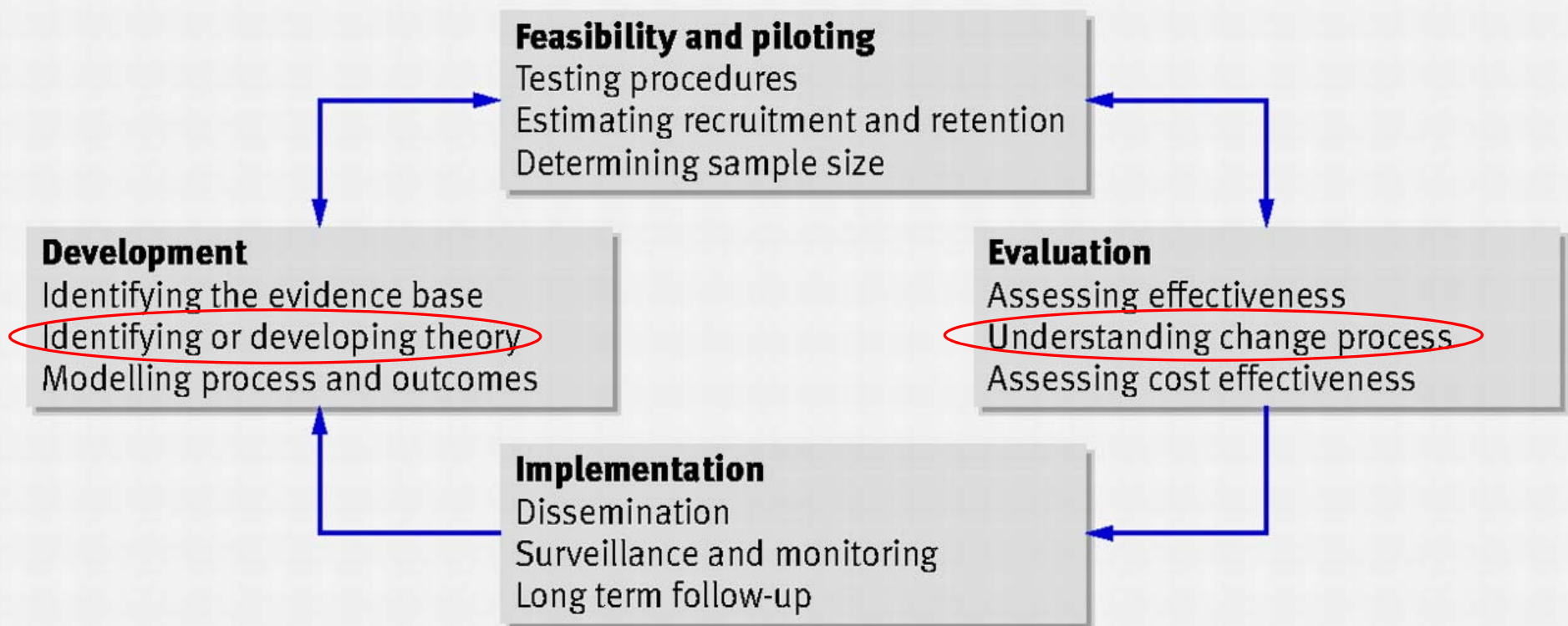
Lou Atkins

- Funder

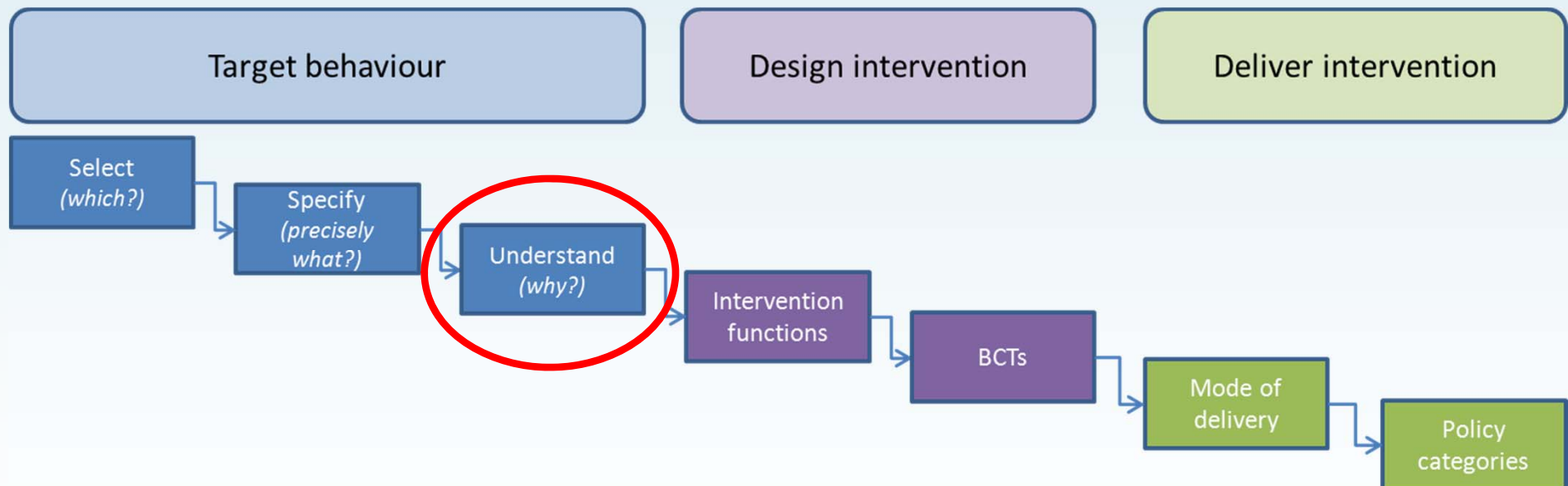


MRC Guidance for developing and evaluating complex interventions

Craig et al, 2009 *BMJ*



A method for developing behaviour change interventions



What theory? Two general approaches

- Select a specific theory or combination of theories
 - Need to **know** about theory and be able to justify selection
 - Selecting may **exclude** areas of potential importance
- Use a **comprehensive** assessment, drawing on a wide range of theory
 - **Useable** by a wide range of disciplines without a thorough knowledge of psychological theory
 - Starts broad, less likely to miss areas of potential importance

Applying theory to Knowledge Translation

- KT requires behaviour change
 - Professionals, managers, policy-makers
- There are many theories and models of behaviour and behaviour change
 - Too many, and many overlapping/redundant
- Not generally used in KT research
- Need to integrate and simplify theory to make it useable

Consensus study to make theory more usable for KT researchers

- Participants
 - 18 researchers in health psychology with an interest in theory and implementation research
 - 14 implementation researchers from UK, Netherlands and Canada
- 33 theories and 128 constructs generated
- Simplified into 12 domains of theoretical constructs
- Interview questions associated with each domain

Theories and constructs: 3 broad groups

- **Motivational:** explain behaviour of people who have not yet established intention
 - e.g. Theory of Planned Behaviour
- **Action:** explain behaviour of people who have identified a need to change
 - e.g. Operant Conditioning
- **Organisational:** explain ‘institution’ level change
 - e.g. Diffusion of Innovation

Theories identified

MOTIVATION THEORIES

- Theory of planned behaviour (+ theory of reasoned action,
- protection motivation theory, health belief model)
- Social cognitive theory
- Locus of control theories
- Social learning theory
- Social comparison theory
- Cognitive adaptation theory
- Social identity theory
- Elaboration likelihood model
- Goal theories
- Intrinsic motivation theories
- Self-determination theory
- Attribution theory
- Decision making theories (e.g. social judgment theory, “fast and frugal” model, systematic versus heuristic decision making)
- Fear arousal theory

ACTION THEORIES

- Learning theory
- Operant theory
- Modelling
- Self-regulation theory
- Implementation theory/automotive model
- Goal theory
- Volitional control theory
- Social cognitive theory
- Cognitive behaviour therapy
- Transtheoretical model
- Social identity theory

ORGANISATION THEORIES

- Effort-reward imbalance
- Demand-control model
- Diffusion theory
- Group theory (e.g. group minority theory)
- Decision making theory
- Goal theory
- Social influence
- Person situation contingency models

Results: Theoretical domains

1. Knowledge
2. Skills
3. Professional role and identity
4. Beliefs about capabilities
5. Beliefs about consequences
6. Motivation and goals
7. Memory, attention and decision processes
8. Environmental context and resources
9. Social influences
10. Emotion
11. Action plans
12. *Nature of the behaviour*

Example of one domain

- Knowledge
- Skills
- Professional role and identity
- Beliefs about capabilities
- Beliefs about consequences
- Motivation and goals
- Memory, attention and decision processes
- Environmental context and resources
- Social influences
- Emotion
- Action plans

- *Self-efficacy*
- *Control – of behaviour, and material and social environment*
- *Perceived competence*
- *Self-confidence*
- *Empowerment*
- *Self-esteem*
- *Perceived behavioural control*
- *Optimism/pessimism*

Interview questions

- Knowledge
- Skills
- Professional role and identity
- Beliefs about capabilities
- Beliefs about consequences
- Motivation and goals
- Memory, attention and decision making
- Environmental context and resources
- Social influences
- Emotion
- Action plans

How difficult or easy is it for them to do x? (prompt re. internal and external capabilities/constraints)

What problems have they encountered?

What would help them?

How confident are they that they can do x despite the difficulties?

How capable are they of maintaining x?

How well equipped/comfortable do they feel to do x?

KT 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.*

Validating the framework: would a different group of experts come up with a similar framework?

- 37 experts
 - recruited from behavioural medicine/psychology networks
 - good understanding of behaviour change theory
 - unaware of the original TDF
- 3 steps
 1. Identify optimal domain structure
 - Does this replicate original structure?
 2. Establish domain content
 - Is the content of the domains the same?
 3. Finalise domain labels
 - Do the labels given by participants match the original labels?

Validity tested using online sort tasks

- Open sort (n=19)
 - Sort constructs into groups based on their semantic similarity
 - Fuzzy Cluster Analysis
 - optimal domain structure &
 - Kendall's coefficient of concordance, W
 - reliability across experts
- Closed sort (n=18)
 - Sort constructs into the 12 labelled domains and give confidence ratings for each allocation made
 - Discriminant Content Validity (DCV): for each domain,
 - One-sample t-tests on confidence ratings &
 - ICCs reliability across raters

UCL Research - Windows Internet Explorer

http://behaviourchangesort.co.uk/surveyJames2/page4.php

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Open Sort Protocol

UCL

Assign items to categories

Items remaining: **108**

Item to allocate: Hover over box for description

Category:

Feedback:

Assign Item

Next Item

<p>1. <input type="text" value="Stages and attention"/></p> <p><input type="text" value="Enter a description"/></p> <p>C ITEM</p> <p>(1) Stages of change model (1) Attention control</p>	<p>2. <input type="text" value="Previous Behaviour"/></p> <p><input type="text" value="Any behaviour in the past"/></p> <p>C ITEM</p> <p>(5) Anticipated regret</p>	<p>3. <input type="text" value="Enter a label"/></p> <p><input type="text" value="Enter a description"/></p> <p>C ITEM</p> <p>(5) Intention (8) Anticipated regret</p>
<p>4. <input type="text" value="Enter a label"/></p> <p><input type="text" value="Enter a description"/></p> <p>C ITEM</p>	<p>5. <input type="text" value="Enter a label"/></p> <p><input type="text" value="Enter a description"/></p> <p>C ITEM</p>	<p>6. <input type="text" value="Enter a label"/></p> <p><input type="text" value="Enter a description"/></p> <p>C ITEM</p>
<p>7. <input type="text" value="Enter a label"/></p> <p><input type="text" value="Enter a description"/></p> <p>C ITEM</p>	<p>8. <input type="text" value="Enter a label"/></p> <p><input type="text" value="Enter a description"/></p> <p>C ITEM</p>	<p>9. <input type="text" value="Enter a label"/></p> <p><input type="text" value="Enter a description"/></p> <p>C ITEM</p>

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Done

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Task: Sort constructs into groups based on semantic similarity

UCL Research - Windows Internet Explorer

http://behaviourchangesort.co.uk/surveyJames/page4.php

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Closed Sort Protocol

UCL

Items remaining: **110**

Item to allocate: Hover over box for description

Contingencies:

Category: 3

Confidence: 7

Assign Item

Next Item

<p>1. Skills</p> <p>C ITEM</p>	<p>2. Social / Professional role and identity</p> <p>C ITEM</p>	<p>3. Beliefs about capabilities</p> <p>C ITEM</p> <p>(7) Practice</p>
<p>4. Beliefs about consequences</p> <p>C ITEM</p>	<p>5. Motivation and goals</p> <p>C ITEM</p> <p>(10) Moderators of the intention – behaviour gap</p>	<p>6. Memory, attention and decision processes</p> <p>C ITEM</p>
<p>7. Environmental context and resources</p> <p>C ITEM</p>	<p>8. Social influences</p> <p>C ITEM</p>	<p>9. Emotion</p> <p>C ITEM</p>
<p>10. Behavioural regulation</p>	<p>11. Nature of the behaviours</p>	<p>12. Knowledge</p>

View Instructions Download Items and Categories

Done

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Task: sort constructs into predefined domains and give confidence rating

Refined framework: 14 domains with 83 component constructs

Domain	Constructs
1. Knowledge	Knowledge (including knowledge of condition /scientific rationale), Procedural knowledge, Knowledge of task environment
2. Skills	Skills, Skills development, Competence, Ability, Interpersonal skills, Practice, Skill assessment
3. Professional Role and Identity	Professional identity, Professional role, Social identity, Identity, Professional boundaries, Professional confidence, Group identity, Leadership, Organisational commitment
4. Beliefs about Capabilities	Self-confidence, Perceived competence, Self-efficacy, Perceived behavioural control, Beliefs, Self-esteem, Empowerment, Professional confidence
5. Optimism	Optimism, Pessimism, Unrealistic optimism, Identity
6. Beliefs about Consequences	Beliefs, Outcome expectancies, Characteristics of outcome expectancies, Anticipated regret, Consequents
7. Reinforcement	Rewards (proximal / distal, valued / not valued, probable / improbable), Incentives, Punishment, Consequents, Reinforcement, Contingencies, Sanctions

Domain	Constructs
8. Intentions	Stability of intentions, Stages of change model, Transtheoretical model and stages of change
9. Goals	Goals (distal / proximal), Goal priority, Goal / target setting, Goals (autonomous / controlled), Action planning, Implementation intention
10. Memory, Attention and Decision Processes	Memory, Attention, Attention control, Decision making, Cognitive overload / tiredness
11. Environmental Context and Resources	Environmental stressors, Resources / material resources, Organisational culture / climate, Salient events / critical incidents, Person x environment interaction, Barriers and facilitators
12. Social influences	Social pressure, Social norms, Group conformity, Social comparisons, Group norms, Social support, Power, Intergroup conflict, Alienation, Group identity, Modelling
13. Emotions	Fear, Anxiety, Affect, Stress, Depression, Positive / negative affect, Burn-out
14. Behavioural Regulation	Self-monitoring, Breaking habit, Action planning

TDF, 2005	TDF, 2012
Knowledge	Knowledge
Skills	Physical skills
	Cognitive and Interpersonal skills
Memory, Attention and Decision processes	Memory, Attention and Decision processes
Action plans	Behavioural regulation
Professional/Social Role & Identity	Professional/Social Role & Identity
Beliefs about Capabilities	Beliefs about Capabilities
Beliefs about Consequences	Beliefs about Consequences
	Optimism
Motivation and goals	Intentions
	Goals
Emotion	Emotion
Environmental Context and Resources	Environmental Context and Resources
	Reinforcement
Nature of the behaviour	

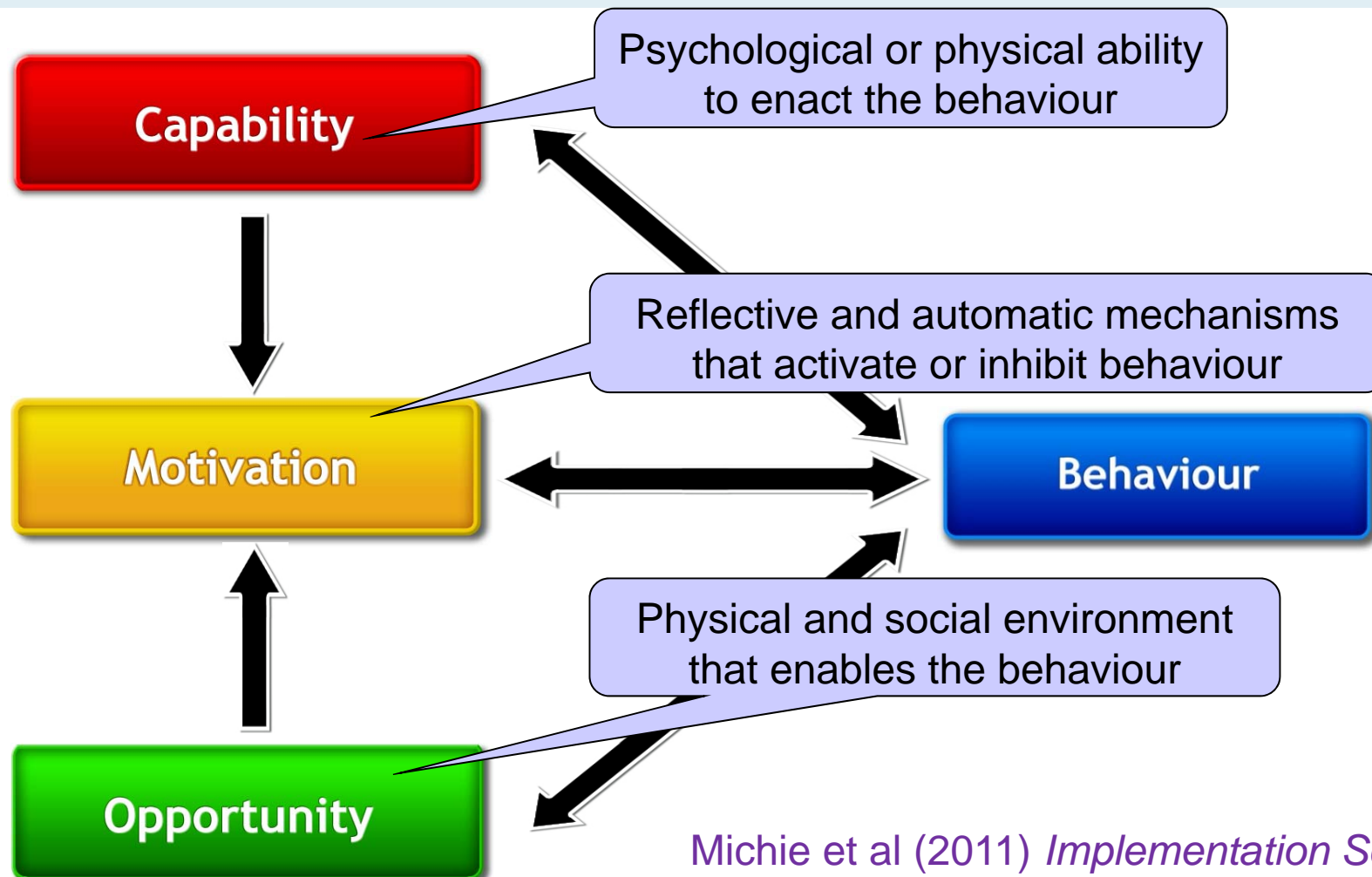
Understand the nature of behaviour **in context**

- **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**
 - TDF is a refined version of COM-B

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



Michie et al (2011) *Implementation Science*

COM-B

Theory Domains

Physical capability	Physical skills
Psychological capability	Knowledge
	Cognitive and Interpersonal skills
	Memory, Attention and Decision processes
	Behavioural regulation



Sources of behaviour



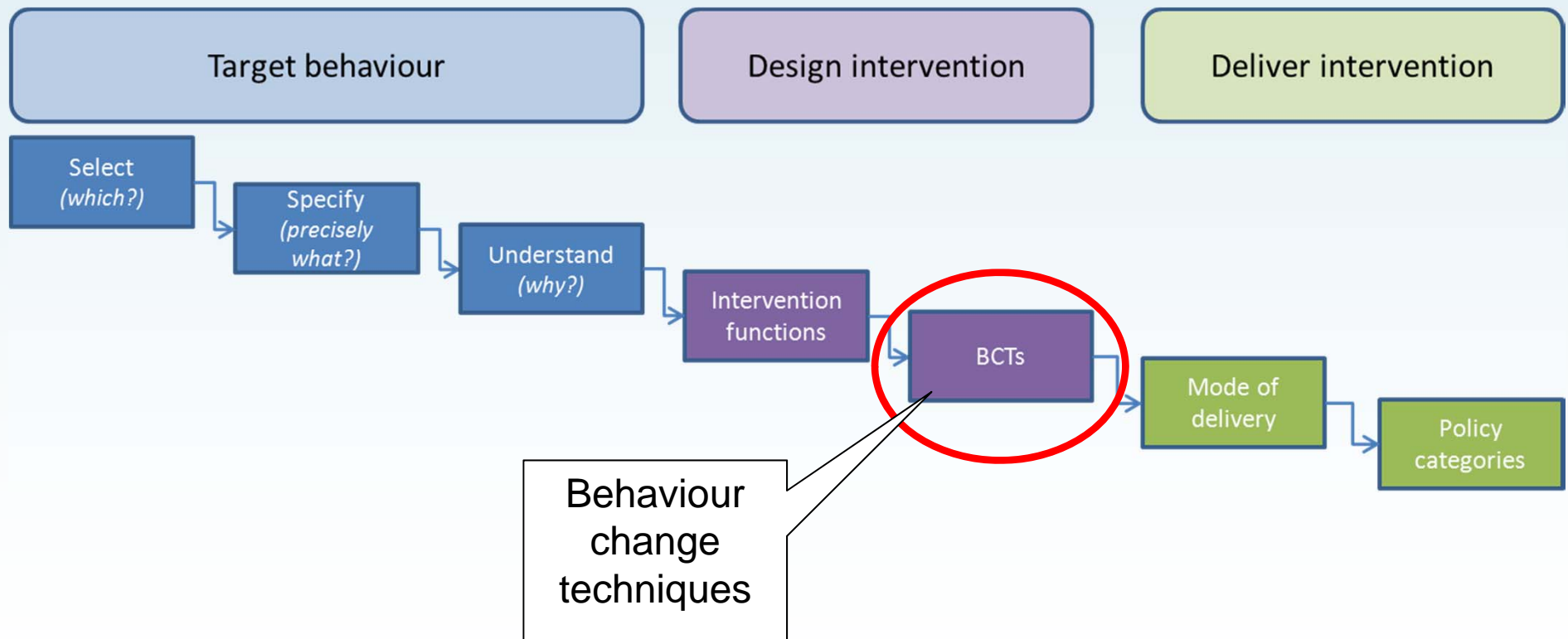
■ Sources of behaviour

■ 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

A method for developing interventions to change behaviour



Which behaviour change techniques appropriate for which domain?

- 35 techniques identified from behaviour change literature
- Independently mapped by 4 behavioural and implementation researchers
 - “Which behaviour change techniques would you use as part of an intervention to change each construct domain?”
 - 71% agreement

Technique for behaviour change											
	Social/ Professional role & identity	Knowledge	Skills	Beliefs about capabilities	Beliefs about consequences	Motivation and goals	Memory, attention, decision processes	Environment al context and resources	Social influence s	Emotion	Action planning
Goal/target specified: behaviour or outcome	1	2 1	3 2 3	1	3 1	3 3 3 3	1 1	1	1	1 1	3 2 3 3
Monitoring	1	2	3 3 3	1 2 2	1 2 2	1 2 2	1 2 2	2	1 2	2	1 1 2
Self-monitoring			2 3 3	3 3 2 3	3 2 2 2	1 3 2 1	2 2 3			2	1 3
Contract	2 1		1	1	1 1	2 3 1 2	2		3 2		2 2 2
Rewards; incentives (inc Self-evaluation)	1 2 1	1	3 3 3	2 1	2 1 2	2 3 3 3	1 1 2	1	1 2	1 2 1	2 1 1
Graded task, starting with easy tasks	1	1	3 3 2	2 2 3	2	2 3 2 2	1 2	1	1	1 1	2 1*
Increasing skills: problem solving, decision making, goal setting	1 2		3 3 3 3	2 2 3 2	1	2 3 2	1 2		1	2	3 1
Stress management	1		1 2	1 1 1	1	1 2 1	1 2 1		1	3 3 2 1	1
Coping skills	1		2/3 3 1	2 2 2	1	1	1 1		1 1	3 2 2	1/2
Rehearsal of relevant skills	1		3 3 3 3	2 3 2		2 1	2 1			3 2	3 1 1

Conclusions

- Validation
 - Good support for basic structure. Minor modifications
 - Strengthened evidence for the structure and content of the domains
 - Increases confidence in the usefulness of the TDF as a method for making a comprehensive assessment of implementation and other behaviour problems
- Links to other intervention tools
 - Elaboration of COM-B, links to Behaviour Change Wheel (*Michie et al, Implementation Science, 2011*)
 - Behaviour change techniques (*Michie et al, 2013*)