Symposium

From theory-inspired to theory-based interventions: Linking behaviour change techniques to their mechanisms of action

Chair: Marijn de Bruin

Presenters: Susan Michie, Rachel Carey, Marie Johnston, Alex Rothman

Discussants: Mike Kelly & Karina Davidson

@UCLTaxonomy
Symposium Overview

1. The application of theory to designing and evaluating interventions to change behaviour
   – Susan Michie

2. Links between behaviour change techniques and mechanisms of action: Evidence from the published literature
   – Rachel Carey

3. Links between behaviour change techniques and mechanisms of action: Examining experts’ consensus
   – Marie Johnston

4. Does expert consensus reflect the literature? Triangulation of results from the Theories and Techniques Project
   – Alex Rothman

5. Discussion
   – Mike Kelly and Karina Davidson
The application of theory to designing and evaluating interventions to change behaviour

Susan Michie\(^1\)
Marie Johnston\(^2\), Alex Rothman\(^3\), Mike Kelly\(^4\), Marijn de Bruin\(^2\), Rachel Carey\(^1\), Lauren Connell\(^1\)

@SusanMichie

European Health Psychology Society - BPS Division of Health Psychology Conference
Aberdeen, August 2016.
Background

• Recent advances in behavioural science methods
  – e.g. Improved methods for standardising reporting of interventions
    • TIDieR framework for intervention reporting (Hoffman et al, *BMJ*, 2014)
    • Behaviour change techniques (Michie et al, *HTA*, 2015)

• Some promising interventions to change behaviour
  – but effects tend to be modest and variable

• Systematic accumulation of evidence slow
How can we improve?

• Increased recognition of the need for systematic application of theory to the design of behavioural interventions e.g.
  – MRC guidance for complex interventions (Craig et al, 2008)

Theory provides a framework to structure thinking, guide research, facilitate accumulation of evidence

Identifies constructs to target, helps understand the processes of change underlying effective interventions
Key Concepts & Definitions for our studies

- **Behaviour Change Techniques (BCTs)**: Potentially active ingredients within an intervention designed to change behaviour.

- **Mechanism(s) of Action (MoAs)**: Process(es) through which a BCT affects behaviour.

- **Behaviour**: Anything a person does in response to internal or external events.
Examples of Key Concepts

**Behaviour Change Techniques (BCTs)**
- e.g. Prompts & Cues

**Mechanism(s) of Action (MoAs)**
- e.g. Memory, Attention & Decision Processes

**Behaviour**
- e.g. Medication adherence
Why link BCTs to their theoretical mechanisms of action?

1. To design interventions based on theory

2. For effective interventions, to understand their possible mechanisms of action
Current state of theory use
Example from systematic review:

Does Theory Influence the Effectiveness of Health Behavior Interventions? Meta-Analysis

Andrew Prestwich
Institute of Psychological Sciences, University of Leeds

Craig Whittington
University College London

Falko F. Sniehotta
Institute of Health and Society, Newcastle University

Stephan U. Dombrowski
Institute of Health and Society, Newcastle University

Lizzie Rogers
Institute of Psychological Sciences, University of Leeds

Susan Michie
University College London

- 190 studies; interventions analysed by
  - Theory Coding Scheme (Michie & Prestwich, Health Psy, 2010)
  - Behaviour Change Techniques (Michie et al, HTA 2015)
Current state of theory use
Findings from systematic review (Prestwich et al, 2013)

• 107 (56%) used theory, i.e. almost half did not
• Where theory used, partially & inconsistently

- 90% studies: BCTs not linked to theoretical constructs
- 91% studies: constructs not targeted by BCTs
Findings from our literature synthesis
(Study 1, 2016, next presentation)

Methods
• 974 intervention papers screened for hypothesised links between BCTs & mechanisms of action (MoAs)

Findings
• 697 (72%): No explicit link reported
• Of those hypothesising a link (n=277),
  • 14% did not mention any theoretical basis for the intervention
  • a further 13% mentioned theory but without specifying how theory was applied to intervention development/evaluation
Literature suggests a need for …

… A transparent, agreed method for identifying hypothesised links between BCTs and mechanisms of action (MoAs)
Theories and Techniques of Behaviour Change Project
Overview of project

Aim:
• To identify *hypothesised* links between intervention content (i.e. BCTs) and
  – (i) mechanisms of action (MoAs) and
  – (ii) theories

Two data sources:
  1. Published reports of interventions
  2. Expert consensus
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 1:** Published Explicit Links
Identified BCT-MoA links from published interventions

**Study 2:** Expert-Agreed Explicit Links
Identified BCT-MoA links through consensus methods

**Study 3:** Integrated Matrix of Explicit Links
Developing matrix of BCT-MoA links using data from S1 & S2

**Study 4:** Published Implicit Links
Identified links between groups of BCTs and behavioural theories
# International Advisory Board

## 42 members from 10 countries

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
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<td>Utrecht University</td>
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<td>Larry An</td>
<td>University of Michigan</td>
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<td>Ron Borland</td>
<td>Cancer Council Victoria</td>
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<td>Blair Johnson</td>
<td>University of Connecticut</td>
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<td>Robert Kaplan</td>
<td>National Institutes of Health</td>
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<td>Abby King</td>
<td>Stanford University</td>
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<td>William Klein</td>
<td>National Cancer Institute (NIH)</td>
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<td>Kai Larsen</td>
<td>University of Colorado</td>
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<td>Aleksandra Luszczynska</td>
<td>University of Social Sciences &amp; Humanities/University of Colorado</td>
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<td>University of Colorado Denver</td>
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<td>Robin Mermelstein</td>
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<td>Miquel Porta</td>
<td>Universitat Autònoma de Barcelona</td>
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<td>William Riley</td>
<td>National Cancer Institute (NIH)</td>
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<td>Robert Ruiter</td>
<td>Maastricht University</td>
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<td>Ralf Schwarzer</td>
<td>Freie Universität Berlin</td>
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<td>Northwestern University</td>
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<td>Robert West</td>
<td>University College London</td>
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<td>Reinout Wiers</td>
<td>University of Amsterdam</td>
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<td>Danny Wight</td>
<td>University of Glasgow</td>
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<td>David Williams</td>
<td>Brown University</td>
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<td>Sally Wyke</td>
<td>University of Glasgow</td>
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<td>Marco Yzer</td>
<td>University of Minnesota</td>
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Links between behaviour change techniques and mechanisms of action: Evidence from the published intervention literature

Rachel Carey¹
Marie Johnston², Alex Rothman³, Mike Kelly⁴, Marijn de Bruin², Rachel Carey¹, Lauren Connell¹, Susan Michie¹

@rach_carey

European Health Psychology Society - BPS Division of Health Psychology Conference
Aberdeen, August 2016.
Study 1: Published explicit links

Aim

• To identify links between behaviour change techniques (BCTs) and mechanisms of action (MoAs), as explicitly hypothesised in published behaviour change interventions
**Methods: Screening papers**

- 974 published interventions were:
  - Collated through:
    - Contacting behaviour change experts
    - Conducting electronic forward-searches
    - Reviewing relevant reference lists
  - Included if:
    - Peer-reviewed intervention (protocol or evaluation) paper
    - BCT hypothesised to have effect on behaviour through MoA
  - **277** explicitly hypothesised a BCT-MoA link and were included

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1 BCT Taxonomies, e.g. BCTTv1, Michie et al, 2013; Theory Coding Scheme, Michie & Prestwich, 2010; Theoretical Domains Framework, Cane et al, 2012
Methods: Data Extraction

- General information extracted on
  - Study type, target behaviour, underpinning theory.
- All BCTs coded using BCTTv1 \(^1\)
- Hypothesised links to MoAs coded using iteratively-developed coding guidelines
- For each link, information extracted on:
  - Explicitness, precision, empirical evaluation

\(^1\)Michie et al, 2013
Example of link extraction (from text)

- ‘Self-efficacy [...] and outcome expectations [...] are important determinants of health behaviour change’; ‘information designed to increase self-efficacy included […] tips for addressing barriers to FV consumption’¹

- ‘Does the change of attitudes towards older adults have an impact on change in physical activity levels thereafter?’; ‘False beliefs or misconceptions of ageing were raised and corrected by informing participants about recent scientific results’²

¹Ahluwalia et al. (2007); ²Wolff et al. (2014)
Example of link extraction (from table)

1 Duncan et al. (2012); 2 Steinmo et al. (2015)
Findings: Descriptive statistics

- **77 BCTs**: 26 not linked to any MoA in any paper

- **2639 BCT-MoA links**
  - Approx. 10 links per paper ($SD = 13.80$)
  - 33% required some inference to code
  - Majority (88%) were linked as *groups* of BCTs or MoAs
  - Minority (9%) had been empirically tested
Findings: Frequently linked BCTs & MoAs

<table>
<thead>
<tr>
<th>Behaviour Change Technique</th>
<th>Number of times linked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instruction on how to perform the behaviour</td>
<td>182</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>177</td>
</tr>
<tr>
<td>Demonstration of Behaviour</td>
<td>142</td>
</tr>
<tr>
<td>Information about Health Consequences</td>
<td>136</td>
</tr>
<tr>
<td>Social Support (Unspecified)</td>
<td>134</td>
</tr>
</tbody>
</table>
### Findings:
Frequently linked BCTs & MoAs

<table>
<thead>
<tr>
<th>Mechanism of Action</th>
<th>Number of times linked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beliefs about Capabilities</td>
<td>733</td>
</tr>
<tr>
<td>Intention</td>
<td>318</td>
</tr>
<tr>
<td>Skills</td>
<td>174</td>
</tr>
<tr>
<td>Beliefs about Consequences</td>
<td>170</td>
</tr>
<tr>
<td>Knowledge</td>
<td>131</td>
</tr>
</tbody>
</table>

BCT Theory

STUDY ONE
Published Explicit Links

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Findings: Significant links

- Series of binomial tests conducted on the data
- Expected frequency used for comparison was calculated for each individual link as:
  - Probability BCT A was coded × probability MoA B was coded.
- \( p \) value = index of the likelihood that observed frequency of hypothesised link occurred more often than would be expected compared to chance.
- Using this method, we identified 84 significant links, covering 51 BCTs
### Example of significant links

<table>
<thead>
<tr>
<th>Behaviour Change Technique</th>
<th>Mechanism of Action</th>
<th># Papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback on Behaviour</td>
<td>Subjective Norms**</td>
<td>19</td>
</tr>
<tr>
<td>Self-Monitoring of Behaviour</td>
<td>Behavioural Regulation**</td>
<td>18</td>
</tr>
<tr>
<td>Social Support (Unspecified)</td>
<td>Social Influences**</td>
<td>34</td>
</tr>
<tr>
<td>Information about Health Consequences</td>
<td>Knowledge**</td>
<td>18</td>
</tr>
<tr>
<td>Pros and Cons</td>
<td>Attitude towards the Behaviour**</td>
<td>9</td>
</tr>
<tr>
<td>Behavioural Practice/Rehearsal</td>
<td>Skills**</td>
<td>24</td>
</tr>
<tr>
<td>Graded Tasks</td>
<td>Beliefs about Capabilities**</td>
<td>28</td>
</tr>
</tbody>
</table>

**$p < .001$**
Mechanisms of action linked to frequently coded BCTs

**BCTs**
- Instruction on how to perform behaviour
- Problem Solving
- Demonstration of Behaviour

**MoAs**
- Knowledge*
- Skills*
- Beliefs about Capabilities*
- Social Learning / Imitation*

*p < .05
BCTs linked to frequently coded MoAs

BCTs

- Behavioural Practice/Rehearsal*
- Reduce Negative Emotions*
- Verbal Persuasion about Capability**
- Demonstration of the Behaviour**
- Graded Tasks**
- Self-talk*
- Focus on Past Success**

MoA

Beliefs about Capabilities

*p < .05; **p < .001
Output: Study 1 Heat Map

Data are represented in heat maps to indicate the relative frequency with which each **BCT** is hypothesised to link to each **MoA**.
Summary & Conclusions

• Need for intervention reports to more explicitly state causal sequences hypothesised to underlie intervention effects i.e. 
  BCT $\rightarrow$ MoA $\rightarrow$ behaviour

• Significant links identified for 51 BCTs, but 26 BCTs coded and not linked to MoAs

• More analyses can be conducted on the extracted data - will make datasets available to facilitate this

Thank you to the volunteers & interns who helped with BCT coding!
Links between behaviour change techniques and mechanisms of action: Examining experts’ consensus

Marie Johnston²
Lauren Connell¹, Alex Rothman³, Mike Kelly⁴, Marijn de Bruin², Rachel Carey¹, Susan Michie¹

@MarieJohnstonx

European Health Psychology Society - BPS Division of Health Psychology Conference
Aberdeen, August 2016.
Study 2 Aim

• To use consensus methodology to identify links between behaviour change techniques (BCTs) and mechanisms of action (MoAs), as hypothesised by experts in the field
Methods: Identifying a set of BCTs

- To minimise burden on participants, 61 (of 93) BCTs were selected from BCTTv1.
  - The BCTs selected were those identified more than twice in 40 systematically selected interventions covering a range of contexts\(^1\)

\(^1\)Michie, Wood, Johnston, et al., 2015
Methods: Identifying a Set of MoAs

MoAs from Theoretical Domains Framework\(^1\)
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 change\(^2\)
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

\(^1\)Cane et al., 2012; \(^2\)Michie et al., 2014
Methods: Participants & Study Design

• 105 experts randomly allocated to 5 groups:
  1) Round 1: Rated links between BCTs and MoAs (Qualtrics)
     • Response options: Definitely Yes, Probably Yes, Uncertain/Don’t Know, Probably No, Definitely No
  2) Round 2: Discussed most uncertain/disagreed links (Loomio)
  3) Round 3: Provided final ratings for all links (Qualtrics)
Methods: Final round ratings

• **101** experts (96%) participated in Round 3 and answered the following question:
  
  – When [BCT X] is effective in changing behaviour, does it do so by changing [MoA Y]?

<table>
<thead>
<tr>
<th>Definitely Yes</th>
<th>Possibly</th>
<th>Uncertain/Don’t Know</th>
<th>Definitely No</th>
</tr>
</thead>
</table>
Findings: Overview

- Of 1,586 BCT-MoA links (61 BCTs x 26 MoAs) considered by experts:
  - **90** BCT → MoA links agreed (≥80% of experts rated ‘definitely yes’)
    - 51 of 61 BCTs had at least one definite link to an MoA
    - 21 of 26 MoAs had at least one definite link to a BCT
  - **464** BCT → MoA ‘non-links’ agreed (≥80% of experts rated ‘definitely no’)
    - E.g. 95% experts rated ‘definitely no’ link between Action Planning and Subjective Norms
Findings: 100% Agreement

100% of experts agreed on the following 10 BCT-MoA links:

<table>
<thead>
<tr>
<th>Behaviour Change Technique</th>
<th>Mechanism of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving</td>
<td>Behavioural Regulation</td>
</tr>
<tr>
<td>Goal Setting (Outcome)</td>
<td>Goals</td>
</tr>
<tr>
<td>Discrepancy between Current Behaviour and Goal</td>
<td>Feedback Processes</td>
</tr>
<tr>
<td>Social Comparison</td>
<td>Social Influences</td>
</tr>
<tr>
<td>Prompts &amp; Cues</td>
<td>Behavioural Cueing</td>
</tr>
<tr>
<td>Comparative Imagining of Future Outcomes</td>
<td>Beliefs about Consequences</td>
</tr>
<tr>
<td>Social Reward</td>
<td>Reinforcement</td>
</tr>
<tr>
<td>Incentive (Outcome)</td>
<td>Motivation</td>
</tr>
<tr>
<td>Conserving Mental Resources</td>
<td>Memory, Attention and Decision Processes</td>
</tr>
<tr>
<td>Verbal Persuasion about Capability</td>
<td>Beliefs about Capabilities</td>
</tr>
</tbody>
</table>
MoAs linked to frequent BCTs

**BCTs**

- Goal Setting (Behaviour)
- Problem Solving
- Information about Health Consequences

**MoAs**

- Goals**
- Intention**
- Motivation*
- Beliefs about Capabilities**
- Behavioural Regulation**
- Knowledge*
- Beliefs about Consequences**
- Perceived Susceptibility*

* >80% experts; ** >90% experts
Many BCTs linked to one MoA

BCTs

Information about Health Consequences**

Salience of Consequences*

Pros and Cons**

Comparative Imagining of Future Outcomes**

Incentive (Outcome)**

Information about Emotional Consequences**

Reward (Outcome)*

Information about Social & Environmental Consequences**

MoA

Beliefs about Consequences

* >80% experts; ** >90% experts
Data are represented in heat maps to indicate the relative frequency with which each **BCT** is linked by experts to each **MoA**.

### BCT-MoA Heat Map

<table>
<thead>
<tr>
<th>BCT</th>
<th>MoA</th>
<th>BCT</th>
<th>MoA</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

**BCTs** and **MoAs** are shown in the heat map, with the intensity of the color indicating the frequency of the linkages.

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Findings: Disagreement & Uncertainty

- **>1000 links not agreed (<80% agreement)**
  - Some ‘marginal’ evidence, e.g. Self-talk (BCT) → Motivation (MoA):
    - 79% experts rated ‘Definitely Yes’ linked
    - 5% experts rated ‘Definitely No’, not linked
  - Some evidence of disagreement, e.g. Habit Formation (BCT) → Skills (MoA):
    - 45% experts rated ‘Definitely Yes’ linked
    - 40% experts rated ‘Definitely No’, not linked
Summary & Conclusions

• Clear consensus about presence or absence of 544 links, but:
  – Some uncertainty & disagreement remaining
  – 10 BCTs for which experts did not agree on any MoA (e.g. Action Planning, Behaviour Substitution, and Credible Source)

Thank you to the 105 experts for their time and dedication to this work!
Does expert consensus reflect the literature? Triangulation of results from the Theories and Techniques Project

Alex Rothman
Marie Johnston, Mike Kelly, Marijn de Bruin, Rachel Carey, Lauren Connell, Susan Michie

European Health Psychology Society - BPS Division of Health Psychology Conference Aberdeen, August 2016.
Study 3 Aim

• To evaluate the agreement and differences between published interventions and expert consensus and produce an integrated matrix of hypothesised BCT – MoA links
What do we mean by ‘triangulation’?

- Research that uses multiple methods or data sources to develop a comprehensive understanding of phenomena (see Patton, 1999) – helps build confidence in findings

Findings compared & integrated

- Literature synthesis
- Expert consensus

Triangulation
Methods: Triangulating the data

- BCT-MoA links from literature synthesis (where $p < .05$) and expert consensus (where $\geq 80\%$ experts agreed) were compared and categorised into:

<table>
<thead>
<tr>
<th>Categorisation</th>
<th># links</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence of link in both studies</td>
<td>36</td>
<td>Information about Health Consequences $\rightarrow$ Perceived Susceptibility</td>
</tr>
<tr>
<td>No evidence of link in Study 1, evidence of ‘no link’ in Study 2</td>
<td>461</td>
<td>Problem Solving $\rightarrow$ Reinforcement</td>
</tr>
<tr>
<td>No evidence in Study 1, no strong evidence (either way) in Study 2</td>
<td>904</td>
<td>Goal Setting (Outcome) $\rightarrow$ Beliefs about Consequences</td>
</tr>
<tr>
<td>Inconsistencies and marginal evidence</td>
<td>185</td>
<td>Social Reward $\rightarrow$ Motivation</td>
</tr>
</tbody>
</table>
Methods: Expert consensus exercise

Round 1

• Experts (n = 16) provided numerical ratings on 185 links based on the data from Studies 1 and 2

<table>
<thead>
<tr>
<th>Literature Synthesis</th>
<th>Expert Consensus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency (# papers)</td>
<td>p value</td>
</tr>
<tr>
<td>1</td>
<td>.62</td>
</tr>
</tbody>
</table>

| Frequency (# papers) | p value | % Experts (Yes) | % Experts (Possibly) | % Experts (Don't Know) | % Experts (No) |
| 1                    | .35     | 79               | 21                  | 0                    | 0               |

“When this BCT changes behaviour, do the data suggest it does so by changing this MoA?”
Methods: Expert consensus exercise

Round 2

- Experts participated in online discussion, exchanged views about most uncertain/disagreed links
  - “Based on the data from literature synthesis and expert consensus, experts in Round 1 of the current study were very uncertain about the link between [BCT X] and [MoA Y]. Please use this thread to share your views about this BCT-mechanism of action link.”
Methods: Final round ratings

Round 3

- Experts provided final numerical ratings drawing on both data and expert views

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<table>
<thead>
<tr>
<th>Behaviour Change Technique</th>
<th>Mechanism of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.3 Avoidance/Reducing Exposure to Cues</td>
<td>Behavioural Cueing</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Literature Synthesis Study</th>
<th>Previous Expert Consensus Study (n = 21)</th>
<th>Current Expert Consensus Study (Round 1) (n = 16)</th>
<th>Group’s Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency (# papers)</td>
<td>% Experts (Yes)</td>
<td>% Experts (Possibly)</td>
<td>% Experts (Don’t Know)</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>95</td>
<td>5</td>
</tr>
</tbody>
</table>

When [BCT X] changes behaviour, is it likely to do so by changing [MoA Y]?

Definitely Yes
Uncertain/Don’t Know
Definitely No

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Preliminary findings: Expert consensus

• Example from online expert discussion:
  Salience of Consequences \(\rightarrow\) Subjective Norms

  – “This does not make intuitive sense to me [...] so I find it interesting that 8 papers hypothesised this link. Perhaps it depends on the context - e.g. where consequences are made more salient via highlighting social aspects of consequences then perhaps this might make sense”.
Preliminary findings: Expert consensus

- After Study 2, there were 10 BCTs for which experts did not agree on any MoA
- Experts in Study 3 have identified MoAs for a number of these BCTs
  - e.g. Action Planning → Behavioural Cueing (100% of experts* rating definitely yes)

* N = 9; data collection still ongoing
Examples of agreed links

<table>
<thead>
<tr>
<th>Type of Inconsistency from Studies 1 &amp; 2</th>
<th>Example of data from Study 3</th>
<th>% experts*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence of link in Study 1, disagreement about link in Study 2</td>
<td>Self-Monitoring of Behaviour → Behavioural Regulation</td>
<td>88% rated ‘definitely yes’</td>
</tr>
<tr>
<td>Evidence of link in Study 1 and ‘definitely no’ link in Study 2</td>
<td>Information about Emotional Consequences → Social Influences</td>
<td>89% rated ‘definitely no’</td>
</tr>
</tbody>
</table>

* N = 9; data collection still ongoing
Summary & Conclusions

• Identifying hypothesised BCT-MoA links, informed by both literature synthesis and expert consensus, contributes to behavioural science by:
  1. Helping in development of theory-based interventions
  2. Advancing our understanding of intervention effects
  3. Supporting possibilities for testing or refining theories

Thank you to the 16 experts for their time and dedication to this work!
Future Directions

- Aim is to translate the heat maps of hypothesised links to an interactive online tool for researchers and intervention designers to use.
- Further work:
  - Need for empirical testing of agreed hypothesised links.
  - About to start: Development of an ‘ontology’ of behaviour change interventions, specifying relationships between BCTs, MoAs, modes of delivery, populations, settings and types of behaviour. See www.humanbehaviourchange.org.
From theory-inspired to theory-based interventions: Linking behaviour change techniques to their mechanisms of action

Discussion: Mike Kelly & Karina Davidson

European Health Psychology Society - BPS Division of Health Psychology Conference
Aberdeen, August 2016.