Symposium

Improving the application of theories of behavior change to the development of interventions
What are theories for?

To reduce muddle, model processes and guide ‘meddling’

Marie Johnston
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UKSBM 2014 Symposium: Improving the application of theories of behaviour change to the development of interventions
Theories in behavioural medicine

• Increasingly used
• Why?
  – Fashionable?
  – Rewarding? MRC complex Interventions guidance recommends their use
  – Better ... ?
    • Explanations of behaviour
    • Explanations of how/why interventions do/don’t work
    • Interventions

‘what use are facts without theory’  Darwin

‘Experience without theory is blind, but theory without experience is mere intellectual play’  Immanuel Kant
Schematic of ‘behavioural medicine’

*atheoretical accumulation of evidence*

![Diagram showing the relationship between 'behaviour' and 'health outcomes']
1a. Using theory to reduce the ‘muddle’

*defining the variables (V\_1 V\_2 V\_3 ......)*

**Theory**

"a set of concepts and/or statements with specification of how phenomena relate to each other"

1b. Using theory to reduce the ‘muddle’

cumulative evidence

Defining the variables allows evidence to be cumulative e.g. systematic reviews may detect which variables are predictive.
Reducing muddle

1. using theory to make sense of the evidence

Making sense of large complex bodies of evidence: e.g. explaining response to illness

- Common Sense Model specifies
  - Illness beliefs: consequences, control/cure, identity, time-line, (cause)
  - Coping Responses: e.g. avoidance, reappraisal, expressing emotions, problem focus

- Theory-based systematic review with meta-analysis
  - Identifies which illness beliefs are associated with which responses

<table>
<thead>
<tr>
<th>Coping</th>
<th>consequences</th>
<th>control/cure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoidance/denial</td>
<td>16</td>
<td>-0.04†</td>
</tr>
<tr>
<td>Cognitive reappraisal</td>
<td>12</td>
<td>0.20*</td>
</tr>
<tr>
<td>Expressing emotions</td>
<td>14</td>
<td>0.12</td>
</tr>
<tr>
<td>Problem focused coping – generic</td>
<td>15</td>
<td>0.12*</td>
</tr>
<tr>
<td>Problem focused coping – specific</td>
<td>13</td>
<td>-0.02†</td>
</tr>
<tr>
<td>Doctor’s visits³</td>
<td>5</td>
<td>-0.08†*</td>
</tr>
<tr>
<td>Seeking social support</td>
<td>13</td>
<td>0.05†</td>
</tr>
</tbody>
</table>

2. **using theory to model the process:**

   explaining and predicting behaviour

   relationships between the variables and outcome

---

Theory

"a set of concepts and/or statements with specification of how phenomena relate to each other"
2. using theory to model the process:
explaining and predicting behaviour
relationships between the variables ($V_1 V_2 V_3 .....$)
2. **using theory to model the process**

*relationships in the Theory of Planned Behaviour* (simplified)

The **Theory of Planned Behaviour** proposes:
- **attitudes** and **perceived control** work through **intention** in predicting behaviour
- **Perceived control** additionally predicts behaviour directly

Model of the process explains behaviour and may provide a basis for ‘meddling’ i.e. for intervention. TPB suggests that intervention should be directed at changing attitudes and/or perceived control.
3. Using theory to ‘Meddle’

i.e. *to guide interventions to change behaviour*

[requires causal relationships]

**Theory**

"a set of concepts and/or statements with specification of how phenomena relate to each other"
Implicit vs Explicit theory in intervention development

• Underlying every intervention is some kind of theory - implicit or explicit

• Problem of ‘implicit’ theory - cannot
  – detect when it is incompatible with evidence
  – test it – and so adapt or reject
  – accumulate evidence

ISLAGIATT principle

‘It Seemed Like A Good Idea At The Time’
Implicit theory: Emotions

- Use of fear arousal to change behaviour
  - e.g. early AIDS campaign
- But ...fear may result in ...
  - motivation to act ...or
  - avoidance
- Theory, supported by evidence, that fear arousal is not effective in changing behaviour without a plan or ability to change e.g. 1965 study of tetanus injections – action plans


Conclusions

Theory is useful for:

- Reducing muddle
  - Defining concepts and variables
  - Accumulating evidence
- Modelling the process
  - Specifying relationships
  - Explain and predict behaviour
- Guiding ‘meddling’
  - Specifying causal relationships
  - Identify points for intervention
  - Basis for process modelling

Caveat

Need for theory that is ‘good’:

- Evidence-based
- Usable/operationalisable
- Testable
- Parsimonious
- Measured and implemented appropriately
- Relevant for the behaviour and situation investigated

Theory

"a set of concepts and/or statements with specification of how phenomena relate to each other"
What are theories for?

*To reduce muddle, model processes and guide ‘meddling’*

Marie Johnston

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UKSBM 2014 Symposium: Improving the application of theories of behaviour change to the development of interventions
Integrating constructs across 83 theories of behaviour change: Development of a method

Susan Michie
Robert West, Kate Sheals, Rachel Carey, Lauren Connell
University College London

@SusanMichie

UKSBM, Nottingham, 2014
MRC Guidance for developing and evaluating complex interventions

Craig et al, 2009 BMJ

Development
- Identifying the evidence base
- Identifying or developing theory
- Modelling process and outcomes

Feasibility and piloting
- Testing procedures
- Estimating recruitment and retention
- Determining sample size

Evaluation
- Assessing effectiveness
- Understanding change process
- Assessing cost effectiveness

Implementation
- Dissemination
- Surveillance and monitoring
- Long term follow-up
What is theory?

“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.”
Health Psychology Review
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/rhpr20

Theories of behaviour and behaviour change across the social and behavioural sciences: a scoping review
Rachel Davis\textsuperscript{a}, Rona Campbell\textsuperscript{b}, Zoe Hildon\textsuperscript{a}, Lorna Hobbs\textsuperscript{a} & Susan Michie\textsuperscript{a}

• Cross-disciplinary literature review
  – Advisory group across psychology, sociology, anthropology and economics
Method

- **Systematic search**
  - of electronic databases, consultation, web searching, searching of reference lists and hand searching of key behavioural science journals
  - Inclusion criteria
    - met definitions of theory and behaviour with individual behaviour as outcome
- developed a list of agreed criteria for judging the quality/usefulness of the theories

Davis et al, *Health Psychology Review, 2014*
Findings

• 83 theories
  – Summary of original description
  – List of constructs
  – Network diagram of source theories
  – Future: Searchable website

www.behaviourchangetheories.com
1. Action Theory Model of Consumption  
2. Affective Events Theory  
3. Aids Risk Reduction Model  
4. Behavioural-Ecological Model of Adolescent Aids Prevention  
5. CEOS Theory  
6. Change Theory  
7. Classical Conditioning  
8. COM-B System  
9. Consumption as Social Practices  
10. Containment Theory  
11. Control Theory  
12. Differential Association Theory  
13. Diffusion of Innovations  
14. Ecological Model for Preventing Type 2 Diabetes in Minority Youth  
15. Extended Information Processing Model  
16. Extended Parallel Processing Model  
17. Feedback Intervention Theory  
18. Focus Theory of Normative Conduct  
19. General Theory of Crime  
20. General Theory of Deviant Behaviour  
21. Goal Directed Theory  
22. Goal-Framing Theory  
23. Goal Setting Theory  
24. Health Action Process Approach  
25. Health Behaviour Goal Model  
26. Health Behaviour Internalisation Model  
27. Health Belief Model  
28. Health Promotion Model  
29. I-Change Model  
30. Information-Motivation-Behavioural Skills Model  
31. Information-Motivation-Behavioural Skills Model of Adherence  
32. Integrated Theoretical Model for Alcohol and Other Drug Abuse Prevention  
33. Integrated Theory of Drinking Behaviour  
34. Integrated Theory of Health Behaviour Change  
35. Integrative Model of Behavioural Prediction  
36. Integrative Model of Factors Influencing Smoking Behaviour  
37. Integrative Model of Health Attitude and Behaviour Change  
38. Integrative Model of Factors Influencing Smoking And Attitude And Health Behaviour Change  
39. Model of Pro-Environmental Behaviour  
40. Motivation-Opportunities-Abilities Model  
41. Needs-Opportunities-Abilities Model  
42. Norm Activation Theory
43. Operant Learning Theory
44. Precaution Adoption Process Model
45. Pressure System Model
46. PRIME Theory
47. Problem Behaviour Theory
48. Prospect Theory
49. Protection Motivation Theory
50. Prototype Willingness Model
51. Rational Addiction Model
52. Reflective Impulsive Model
53. Regulatory Fit Theory
54. Relapse Prevention Model
55. Risk as Feelings Theory
56. Self-Determination Theory
57. Self-Efficacy Theory
58. Self-Regulation Theory
59. Six Staged Model of Communication Effects
60. Social Action Theory (1)
61. Social Action Theory (2)
62. Social Change Theory
63. Social Cognitive Theory
64. Social Consensus Model of Health Education
65. Social Development Model
66. Social Ecological Model of Behaviour Change
67. Social Ecological Model of Walking
68. Social Identity Theory
69. Social Influence Model of Consumer Participation
70. Social Learning Theory
71. Social Norms Theory
72. Systems Model of Health Behaviour Change
73. Technology Acceptance Model 1, 2 & 3
74. Temporal Self-Regulation Theory
75. Terror Management Theory
76. Terror Management Health Model
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
Example of constructs: Social Cognitive Theory (Bandura, 1986)

- Triadic reciprocality
  - Behaviour
  - Personal and cognitive factors
  - Environment

- Basic capabilities
  - Symbolising capability
  - Forethought capability
  - Vicarious capability
  - Self-regulatory capability
  - Self-reflective capability
    - Perceived self-efficacy
In doing the review, we observed that ....

- **Theories**
  - often poorly described
  - most are partial accounts
    - 3 of the 83 identified set out to be integrative
  - much overlap of constructs between theories

- **Constructs**
  - often poorly described
  - many appear the same or similar
  - lack of correspondence between labels and definitions
  - relationships between constructs poorly specified
Study aims

1. Define the component constructs of 83 theories of behaviour change
2. Develop a method to articulate the possible relationships between constructs
3. Create a digital database that is capable of representing the complexity of relationships between constructs within and across theories
Method

1. **Constructs** extracted from theory sources
   - guided by consensus definition

2. **Definitions** generated
   - from theory sources, dictionaries and expert consensus
   - checked with theory authors
     - or theory experts where no theory author available

3. **Types of relationships** between constructs generated
   - expert consensus
Results: Constructs and definitions

• 1724 constructs
  – mean 21, range 5-91

• Definitions
  – 34 responses (40 theories)
    • 29 authors of original theory
    • 5 theory experts (where contacting author was not possible)

• Suggested changes
  – 34: Minor changes e.g. wording, syntax of label or definition
  – 13: Addition or removal of constructs
## Self-efficacy: Example of variation in construct definitions across theories

<table>
<thead>
<tr>
<th>Theory</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEOS Theory</td>
<td>The moment to moment, subjective perception of one's capability for performance in a given setting or ability to attain desired results in a particular situation</td>
</tr>
<tr>
<td>Extended Parallel Processing Model</td>
<td>Perceptions of one's ability to take a recommended protective action</td>
</tr>
<tr>
<td>Goal Setting Theory</td>
<td>Beliefs about whether one is capable of attaining a goal</td>
</tr>
<tr>
<td>Health Action Process Approach</td>
<td>Beliefs about one's ability to adopt a new behaviour (Action Self-Efficacy)</td>
</tr>
<tr>
<td>Relapse Prevention Model</td>
<td>Beliefs about one's ability to cope with high risk situations</td>
</tr>
<tr>
<td>Self-efficacy Theory</td>
<td>Belief that one is capable of carrying out a specific behaviour that will lead to desired outcomes</td>
</tr>
<tr>
<td>Six Staged Model of Communication</td>
<td>The degree to which one believes that one can control one's future</td>
</tr>
<tr>
<td>Effects</td>
<td></td>
</tr>
</tbody>
</table>
Results: Relationships between constructs

- 2 across theories
  - Indistinguishable
  - Similar

- 11 within theories
  - Influences
    - positive, negative or non-specific direction of influence
  - Is influenced by
    - positive, negative or non-specific direction of influence
  - Subset/type of
  - Superset
  - Part of
  - Contains
  - Acts in concert with
Illustration of ‘influence’ relationships: Theory of Planned Behaviour

- Attitude
- Subjective Norm
- Perceived Behavioural Control
- Intention

Attitude has a positive influence on Intention.
Intention is positively influenced by Subjective Norm.
Subjective Norm has a positive influence on Perceived Behavioural Control.
Perceived Behavioural Control is positively influenced by Intention.
Intention is positively influenced by Attitude.
Attitude has a positive influence on Subjective Norm.
Subjective Norm is positively influenced by Perceived Behavioural Control.
Perceived Behavioural Control has a positive influence on Intention.
Variations in construct relationships across theories

While definitions for a construct across theories may be same/similar, their relationships with other constructs within each theory may vary

<table>
<thead>
<tr>
<th>Theory</th>
<th>Self-Efficacy (relationships within theory)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extended Parallel Processing Model</td>
<td>Subset of efficacy&lt;br&gt;Works in concert with response efficacy and perceived threat&lt;br&gt;Has a positive influence on message acceptance</td>
</tr>
<tr>
<td>Health Action Process Approach</td>
<td>Superset of action-, maintenance-, and recovery-self-efficacy&lt;br&gt;Has a positive influence on intention, initiation and maintenance</td>
</tr>
<tr>
<td>Self-Efficacy Theory</td>
<td>Is influenced by performance accomplishments, vicarious experience, verbal persuasion and emotional arousal&lt;br&gt;Has a positive influence on behaviour</td>
</tr>
</tbody>
</table>
Results: Database

• Database arrived at was relational
• Consists of 3 linked tables
  – construct definitions
  – relationship definitions
  – relationships
• Next step
  – Pilot and evaluate to specify relationships and evaluate for
    • efficiency and flexibility.
## Improving reporting: A preliminary template

<table>
<thead>
<tr>
<th>Name</th>
<th>What is the name of the theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brief summary</td>
<td>What is the theory about and what are its main propositions?</td>
</tr>
<tr>
<td>Scope</td>
<td>What phenomena does the theory seek to explain?</td>
</tr>
<tr>
<td>Target</td>
<td>Is the theory about individuals, populations, or social structures</td>
</tr>
<tr>
<td>Type</td>
<td>What broad type of theory is it? (statistical, realist, dynamic, narrative)</td>
</tr>
<tr>
<td>Rationale</td>
<td>Why is the theory needed and how does the theory improve on any previous theories?</td>
</tr>
<tr>
<td>Constructs</td>
<td>What are the elements of the theory, indicating in each case whether they are hypothetical constructs?</td>
</tr>
<tr>
<td>Relationships</td>
<td>How are the elements of the theory related to each other?</td>
</tr>
<tr>
<td>Provenance</td>
<td>What theories does it draw on and how?</td>
</tr>
<tr>
<td>Similarity</td>
<td>What theories is this theory most like?</td>
</tr>
<tr>
<td>Complementarity</td>
<td>What theories can this one be used alongside?</td>
</tr>
<tr>
<td>Operationalisation</td>
<td>How, if at all, are the constructs measured or identified?</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>What specific hypotheses does the theory make and how do these differ from other theories?</td>
</tr>
</tbody>
</table>
The long-term vision: Building an Ontology of Behaviour Change

• A structure that systematically represents and organises the essential elements of behaviour change interventions
  – Codifies our collective knowledge
  – Reflects consensus on concepts, terms, relationships
  – Specifies and formalises them

• We have begun this work for behaviour change techniques
  – Now for theory …
For more information

• Book
  – www.behaviourchangetheories.com
  – Davis et al, 2014, Health Psychology Review

• Susan Michie
  – s.michie@ucl.ac.uk
An Investigation of the Interconnectedness of Behaviour Change Theories: Developing a Methodology Using Network Analysis

Heather L. Gainforth
Robert West
Susan Michie
Use of Behaviour Change Theories is Limited

- Behaviour change interventions often designed without reference to theory
  - 36% of preventative health behaviour papers
  - 20% of implementation studies

- Published research is dominated by a small subset of theories
  - Transtheoretical Model (27.5%), Social Cognitive Model (27.5%), and the Health Belief Model (20%)

Several Behaviour Change Theories Exist

• Sheer number of overlapping theories and constructs:
  
  – 33 theories and 128 explanatory constructs deemed as relevant to studying the implementation of evidence based practice

  – 83 theories with many similarities and numerous overlapping constructs

  (Michie et al., Qual Saf Health Care, 2005; Davis et al., Health Psychology Review, 2014)

• Need to understand how theories relate to each other in terms of derivation
Using Network Analysis to Understand Theory Derivation

• Research approach that aims to describe, explore and understand the structural and relational aspects of a group or network

(Luke & Harris, Ann Rev Public Health, 2007)
Using Network Analysis to Understand Theory Derivation

- Used to understand:
  - How or if reported connections exist among theories
  - Theories that informed the development of other theories
  - Theories that informed by a number of other theories

(Luke & Harris, Ann Rev Public Health, 2007)
Purpose

To conduct a network analysis describing the explicit derivation of 83 theories of behaviour change identified in a scoping review.
Design & Materials

- N = 83 theories of behaviour and behaviour change identified in a scoping review
  
  (Davis et al., Health Psychology Review, 2014)

- A manuscript of the theory as originally described by the theory developer(s)
Data Extraction Protocol

1. Read summary of theory

2. Read original published article

3. Extracted names of contributing theories
   - As explicitly stated by authors
Analysis

Reliability of Data Extraction

- Adjusted Kappa statistic (i.e. PABAK)
  - Acceptable across all coding rounds (Kappa = 0.68 ± 0.41; PABAK = 0.99±0.03)

Network Analysis

- UCINET v6 and NETDRAW software
- Measures:
  - network density
  - degree centrality (out-degree and in-degree)
122 Connections Between the 83 Theories

Degree Centrality = 1.8%
Network Density

Do connections exist between theories in the network? If so, how?

• The number of connections in the network as a proportion of all possible ties within the network.

• Examined across three date ranges:
  1) 1922 – 1985 (27 theories)
  2) 1922 – 1999 (54 theories)
  3) 1922 – 2014 (83 theories)
1922-1985: 21 connections Between 27 Theories

Degree Centrality = 3.0%
1922-1999: 66 connections Between 53 Theories

Degree Centrality = 2.3%
1922 – 2014: 122 Connections Between 83 Theories

Degree Centrality = 1.8%
Degree Centrality

Which theories informed the development of other theories?

Which theories informed by other theories?

- Extent to which a theory occupies a central position

- Accounting for publication dates:
  - Percent out- and in-degree scores
  - Raw degree score/# of published theories
Degree Centrality

- Informed 1 or 2 theories (Mean = 1.47±3.69 contributions)
- Informed by 1 or 2 theories (Mean = 1.47±1.61 contributing theories)
- 36% of theories were not informed by any other theory
- 42% were informed by 1 or 2
Theories that Informed Other Theories

• On average, theories informed 2.5% of theories possible at date of publication (range: 0 - 33%).

• Most frequently informing theories:
  - Health Belief Model contributed to 19%
  - Social Cognitive Theory contributed to 23%
  - Theory of Planned Behavior contributed to 30%
  - Self-Efficacy Theory contributed to 33%
Theories informed by other theories

• On average, theories were informed by 6% of other theories available at time of publication (range: 0 - 50%).

• Informed by the highest number of theories available at the time of publication:
  – Integrative Model of Health Attitude and Behavior Change (19%)
  – Health Belief Model (25%)
  – Protection Motivation Theory (33%)
  – Social Learning Theory (50%)
  – Operant Learning Theory (50%)
Key Findings

• Most theories appear to be explicitly informed by very few prior theories.

• Central theories that informed other theories focus on individual-level, reflective motivational factors:
  – Social Cognitive Theory
  – Health Belief Model
  – Theory of Planned Behaviour
  – Self-Efficacy Theory
Improving Theory & Its Reporting

1. Reporting of theory derivation
   - Likely wider influences that were not captured
   - Need for guidelines for theory development

2. Selection and development of theory

(Michie, West, Campbell, Brown & Gainforth, 2014)
THANK YOU

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@hgainforth

Funding:

www.behaviourchangetheories.com
Use of theory to develop digital smoking cessation interventions for pregnant women

Symposium
UKSBM 2014, Nottingham

Aleksandra Herbec, MSc
Ildiko Tombor, Jamie Brown, Emma Beard,
Benjamin Gardner, Susan Michie, & Robert West
University College London
Why use theory?

1) Theory provides mechanisms of action and suggests important intervention targets and components

2) Mixed evidence for the effectiveness of use of theory in interventions (Webb et al., 2010)

3) Advancing behavioural science requires:
   • a good understanding of how to apply theories
   • appropriate evaluation of theories and principles
Use of the theory in previous interventions

StopAdvisor
(Brown, 2012, Michie, 2012)

Theory-informed 4-week cessation intervention modelled on Stop Smoking Services

PRIME Theory of Motivation
(West, 2006). 19 Principles identified
a) Motivation (8 principles)
b) Self-regulatory capacity and skills (3 principles)
c) Adjuvant activities (1 principle)
d) Engagement (7 principles)

- Evidence on effectiveness of BCTs
  - E.g. Shabab & McEwen, 2009, other reviews and observational data from the NHS Stop Smoking Services
- Usability testing
Development of MumsQuit (for pregnancy)

- Based on StopAdvisor
  - the same theory & principles (PRIME)
  - identical intervention structure
  - content and design minimally targeted to pregnancy

- Developed using LifeGuide open-source software (Hare, et al., 2009)
Examples of use of theory

(West, 2006).
1. Principles maximising motivation

- Establish a clear mental image of the goal (becoming a non-smoker)

Committing to being a non-smoker

Please read the commitment below very carefully, and then think about making this promise to yourself.

When you are ready, click 'make my commitment'.

StopAdvisor Agreement

I, , commit to giving up smoking. From this day forward I will not have another cigarette, not even a puff. I commit to being a non-smoker.

Make my commitment
1. Principles maximising motivation

- Establish a clear mental image of the goal (becoming a non-smoker)
- Foster identity that will support adhering to the ‘not-a-puff’ rule

StopAdvisor

[Image of a doctor and a pregnant belly]

Your progress

, it is day since you quit smoking.

The average smoker spends £ 4.64 a day on cigarettes, which means you’ve probably saved about £ since you quit.

StopAdvisor Extras

Relaxation videos
2. Principles maximising self-regulatory skills

- Advice to avoid smoking cues and reduce stress

**StopAdvisor**

Relaxation techniques can help with cravings.

Click below for audio clips that guide you through two different techniques - one for the body (left) and one for the mind (right). Not only will they reduce stress which can bring on cravings, but they will help you to 'ride out' the cravings too.

If you've been having bad cravings, we may have already recommended these to you. **But you can use them any time you feel the need.**
3. Principles promoting adjuvant activities

- Support with medication use (nicotine replacement therapy)
4. Principles promoting engagement

- Clear expectations towards the intervention and its use
4. Principles promoting engagement

- Clear expectations towards the intervention and its use
- Minimum demand on the user
Theory - Advantages for Digital Interventions

- An excellent and very important framework and anchor
- Guides the approach and focus
- Identifies key constructs and intervention targets
- Outlines mechanism of action
- Ensures intervention synergy
Theory - Advantages for Digital Interventions

- An excellent and very important framework and anchor
- Guides the approach and focus
- Identifies key constructs and intervention targets
- Outlines mechanism of action
- Ensures intervention synergy

Additionally (e.g. PRIME Theory)
- May suggest delivery and engagement strategies
- Informs intervention flow
Challenges to use of theory I

- May not be comprehensive enough to inform the entire intervention
- Or not specific enough to inform targeting
  - need for appropriate formative research (Behaviour Change Wheel and behavioural analysis; Michie et al., 2014)
  - incorporate multiple sources of information
Challenges to use of theory I

• May not be comprehensive enough to inform the entire intervention
• Or not specific enough to inform targeting
  ➢ need for appropriate formative research (Behaviour Change Wheel and behavioural analysis; Michie et al., 2014)
  ➢ incorporate multiple sources of information
• Multiple delivery methods available
  ➢ more research needed into how to deliver it best in the context of digital interventions
Insights from MumsQuit Evaluation

Herbec et al., 2014a; Herbec et al., 2014b
Insights from MumsQuit Evaluation

MumsQuit

RCT

Qualitative Interviews

Likely overall effectiveness

Engagement level

Needs of pregnant women, e.g.:
- to be understood as a pregnant woman who wants to quit smoking
- to be supported on a daily basis

Suggestions for improvements:
- Highly tailored support with medication use
- Support with cravings
- Social support

Herbec et al., 2014a; Herbec et al., 2014b
Challenges to use of theory II

- May not be comprehensive enough to inform the entire intervention
- Is not specific enough to inform targeting
  - need for appropriate formative research (Behaviour Change Wheel and behavioural analysis; Michie et al., 2014)
  - incorporate multiple sources of information
- Multiple delivery methods available
  - more research needed into how to deliver it best in the context of digital interventions
- Effectiveness of theory-informed intervention components not yet fully established
  - need for novel evaluation methods
SmokefreeBaby App – test-bed programme

**PRIME Theory of Motivation**

**COM-B model (Michie et al., 2011)**

**Qualitative Research**

**Evidence & Guidelines**

**Evaluated in a factorial design**

Lead: Ildiko Tombor
Factors shaping digital interventions

- complex and rapidly changing environment
- multiple *complimentary* or *competing* sources of information and expertise
- factors beyond control
Factors shaping digital interventions

- complex and rapidly changing environment
- multiple *complimentary* or *competing* sources of information and expertise
- factors beyond control
Factors shaping digital interventions

- complex and rapidly changing environment
- multiple *complimentary* or *competing* sources of information and expertise
- factors beyond control

Diagram:
- Theory
- Best clinical practice & guidelines
- Empirical evidence
- Behavioural analysis
- Preferences & needs of the target population
- User Experience & Design expertise
- Resources, software, hardware, time
Conclusions

- Digital interventions are shaped by multiple factors

- Theory can ensure synergy, inform the overarching intervention framework and help identify key constructs

- Development of appropriately tailored and targeted behaviour change intervention requires a highly iterative process

<table>
<thead>
<tr>
<th>Theory</th>
<th>Qualitative data</th>
<th>Quantitative data</th>
</tr>
</thead>
<tbody>
<tr>
<td>User testing</td>
<td>Other sources of information</td>
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Acknowledgements

- **UKSBM** for giving us a chance to present

- The research team is part of the **UCL Tobacco and Alcohol Research Group** and **CRUK Health Behaviour Research Centre**

- **Aleksandra Herbec** is funded by British Heart Foundation 4-year PhD Studentship

- **Stop Advisor Research Team**: Robert West, Susan Michie, Jamie Brown, Andy McEwen, Ben Gardner Sood, Lion Shahab, John Stapleton, Adam Geraghty, Sascha Miller, Judy Joseph & Lucy Yardley. **Collaborators**: Elizabeth Murray. **Graphic designer**: Matthew West. **Writing consultant**: Claire Dowie. **Collaborator on debugging**: Daniel West

- Stop Advisor project is funded by phase 3 grant from the National Prevention Research Initiative (G0802035; www.npri.org.uk). Relevant Funding Partners are (in alphabetical order): Alzheimer’s Research Trust; Alzheimer’s Society; Biotechnology and Biological Sciences Research Council; British Heart Foundation; Cancer Research UK; Chief Scientist Office, Scottish Government Health Directorate; Department of Health; Diabetes UK; Economic and Social Research Council; Engineering and Physical Sciences Research Council; Health & Social Care Research & Development Office for Northern Ireland; Medical Research Council; The Stroke Association; Welsh Assembly Government

- **LifeGuide Research Team** (lifeguideonline.org/)
References


Thank you

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