Behaviour change at the intersection between health psychology and implementation science

Justin Presseau PhD
Assistant Professor, University of Ottawa
Scientist, Ottawa Hospital Research Institute
Lead, Psychology and Health Research Group

@JPresseau ohri.ca/pahrg

Nov 25th, 2019
DISCLOSURES

Funding sources of research presented today

No industry ties or funding

Note: some research presented today based on preliminary and as yet unpublished data
Overview

- Health psychology and implementation science approaches to
  - Health behaviour change in patients and the public
  - Health provider behaviour change to promote implementing evidence into practice

- Highlight three behaviour change methodological tools

- Evidence of what works to change behaviour:
  - What does the trial evidence tell us?
  - Two behaviour change strategies
  - The role of routines and automaticity
  - Example of clinical area of application (diabetes care)
The evidence that motivates what I do

Almost half actual causes of death due to behaviour

- Tobacco
- Poor diet/Physical inactivity
- Alcohol consumption
- Motor vehicles
- Firearms
- Sexual behavior
- Illicit drug use

Percentage (of all deaths)

$100$ billion/year investment in biomedical and health research

"One of the most consistent findings from clinical and health services research is the failure to translate research in practice or policy"  

- 30-40% of people do not receive care according to current scientific evidence
- 20-25% of healthcare provided is not needed and potentially harmful

"All breakthrough, no follow-through"

Behaviour change is centrally important for patients/populations and health professionals

When you’re a psychologist…

… everything looks like behaviour
Not only the behaviour of patients/public
A behaviour change approach to implementation

Guideline
Technique
Medication
Intervention
Policy
Technology

Someone in the healthcare system’s behaviour need(s) to change

Implementation can be unpacked into the behaviours of those who need to change
- Draw on decades of research in psychology about determinants of behaviour and effective ways of changing behaviour... and applying those to clinicians themselves
- Rigorously evaluate whether the strategy drives practice change
What is Implementation Science?

- “[t]he scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice”¹

- Interdisciplinary scientific study of:
  - Determinants, processes and outcomes of implementation in healthcare
  - Methods for promoting the uptake of research evidence into routine practice in clinical, community and policy contexts

- Goal: develop a generalizable empirical and theoretical basis to optimize implementation activities to improve the healthcare provided to patients and the public

¹Eccles and Mittman (2006) *Implementation Science*
Producing, synthesizing and disseminating evidence: Necessary but usually not sufficient

Knowledge creation funnel produces:

- Systematic reviews
- Guidelines for health behaviours for the public
- Clinical practice guidelines
- Decision Aids
- Policy briefs

but… producing, publishing and disseminating is essential, doing so **does not guarantee change/uptake**

My work: a focus on the ‘Action Cycle’ to help bridge evidence-behaviour gaps
Three tools for three questions: AACT, TDF, BCTTv1

1. **Who needs to do what, differently, when and where?**

2. **Which theory-informed factors determine their behaviour?**

3. **Which strategies can be effectively used to target those factors?**
Who needs to do *what, differently, when, and where*
1. **Who needs to do what, differently, when, and where**

**WHO**

- Family Doc
- Nurse/NP
- Public
- Patient
- Psychologist
- Pharmacist
- Surgeon
Who needs to do **what**, differently, **when**, and **where**

**WHO**

- Family Doc
- Nurse/NP
- Public
- Patient
- Psychologist
- Surgeon
- Pharmacist
- Administrators
- Dept Head
- CEO
1. **Who needs to do what, differently, when, and where**

**WHAT** (specific, observable behaviours)

- **Health professional**
  - Ordering test
  - Communicating
  - Referring
  - Scanning
  - Prescribing
  - Examining
  - Providing advice
  - Washing hands

- **Dept. Head/Lead**
  - Setting policy
  - Providing infrastructure

- **Patients**
  - Taking medication
  - Exercise
  - Healthy eating
  - etc
AACTT: A tool for specifying behaviours

Fishbein (1967) proposed the TACT principle:

- **Target** with and for whom action is directed
- **Action** being performed
- **Context** in which action is performed
- **Time** during which the action is performed

**An Extension: Actor** performing the behaviour when the Action is performed with/for someone else (e.g. doctor, nurse)

**Specifying the AACTT**: Sets a foundation for understanding and measuring the behaviour to *change* and its **barriers and enablers**
Specifying the AACTT

<table>
<thead>
<tr>
<th><strong>Action</strong></th>
<th>Specify the <em>behaviour</em> that needs to change, in terms that can be observed or measured</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Use alcohol-based hand gel</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Actor</strong></th>
<th>Specify the person/people that <em>do(es)</em> or <em>could do</em> the action targeted</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Staff physicians</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Context</strong></th>
<th>Specify the physical location, emotional context, or social setting <em>in which</em> the action is performed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient rooms and hallways</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Target</strong></th>
<th>Specify the person/people <em>with</em>/<em>for whom</em> the action is performed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patients receiving care at the hospital</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Time</strong></th>
<th>Specify <em>when</em> the action is performed (the time/date/frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before and after touching a patient</strong></td>
<td></td>
</tr>
</tbody>
</table>
### Specifying the AACTT

<table>
<thead>
<tr>
<th><strong>Action</strong></th>
<th>Specify the <em>behaviour</em> that needs to change, in terms that can be observed or measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use alcohol-based hand gel</td>
<td>Provide alcohol-based hand gel at point of care</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Actor</strong></th>
<th>Specify the person/people that <em>do</em> (es) or <em>could</em> do the action targeted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff physicians</td>
<td>Hospital administrator</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Context</strong></th>
<th>Specify the physical location, emotional context, or social setting <em>in which</em> the action is performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient rooms and hallways</td>
<td>In own office</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Target</strong></th>
<th>Specify the person/people <em>with</em> or <em>for whom</em> the action is performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients receiving care at the hospital</td>
<td>Staff Physicians</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Time</strong></th>
<th>Specify <em>when</em> the action is performed (the time/date/frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before and after touching a patient</td>
<td>Initial setup + monthly supply</td>
</tr>
</tbody>
</table>
Now that we have identified the behaviour: Identifying the problem: evidence-practice gaps

- What do we know about discrepancies between what evidence products suggest and the care that is actually provided?

Potential sources of evidence of gaps in care:
- National/international organisations (e.g. WHO)
- Research papers seeking to quantify the gaps in particular settings or jurisdictions,
- Local audits, observations, case notes
Evidence-practice gap identified... how to address it?

Most frequently used model of change in the literature: **ISLAGIATT** model

(It Seemed Like A Good Idea At The Time)

An expensive version of trial and error
Some potential problems with ISLAGIATT

Inefficient

Does not build on what we already know

- Can lead to re-inventing the round wheel (waste of resources)
- Can lead to re-inventing the square wheel (repeating what does not work)

Insufficient

- May miss important factors

Unscientific

- Based on implicit idea of what drives change (may or may not be supported by evidence)
- Implicit ideas undermine replication and evidence accumulation
Evidence-practice gap identified… now what?

Traditional approach (ISLAGIATT)
• Set a meeting
• Brainstorm solutions
• Someone decides on a solution
• Implement solution
• Hope it works

Science-based approach
• Before jumping to a solution, understand the problem in depth
• Select evidenced strategies fit to the problem
• Use theory to build cumulative evidence
Addressing evidence-behaviour gaps

1. Who needs to do *what, differently, when and where*?

2. What factors determine whether or not they do it?

3. Which strategies can be effectively used to target those factors?

(French et al., 2012)

Theoretical Domains Framework
Beyond ISLAGIATT: advantages of behavioural theory

- More efficient: build on what we already know
- Shared understanding through shared language
- Beyond intuitive/insufficient approaches
- Suggests intervention strategies
- Cumulative evidence
Which theory should we choose?

“There is nothing more practical than a good theory”
Identify barriers + enablers using the Theoretical Domains Framework (TDF)

- Decades of research about modifiable determinants of behaviour
- TDF distills: 33 theories (128 constructs) into 14 domains that may explain health-related behaviour change\(^1,2\)
- Used for understanding barriers and enablers to behaviour change in healthcare professionals (and patients and the public)
- Applicable to any AACTT
- Informs selection and tailoring of behaviour change interventions

\(^1\)Michie et al, 2005; \(^2\)Cane et al 2012; \(^3\)Atkins et al 2017
Screen for barriers + enablers using the Theoretical Domains Framework

<table>
<thead>
<tr>
<th>TDF Domains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
</tr>
<tr>
<td>Skills</td>
</tr>
<tr>
<td>Memory, attention &amp; decision processes</td>
</tr>
<tr>
<td>Behavioural regulation</td>
</tr>
<tr>
<td>Environmental context &amp; resources</td>
</tr>
<tr>
<td>Social Influences</td>
</tr>
<tr>
<td>Beliefs about capabilities</td>
</tr>
<tr>
<td>Intention</td>
</tr>
<tr>
<td>Goals</td>
</tr>
<tr>
<td>Social/professional role &amp; identity</td>
</tr>
<tr>
<td>Beliefs about consequences</td>
</tr>
<tr>
<td>Reinforcement</td>
</tr>
<tr>
<td>Optimism</td>
</tr>
<tr>
<td>Emotion</td>
</tr>
</tbody>
</table>

1Michie et al, 2005; 2Cane et al 2012; 3 Atkins et al 2017
Addressing evidence-behaviour gaps

1. *Who needs to do what, differently, when and where?*

2. *What factors determine whether or not they do it?*

3. *Which strategies can be effectively used to target those factors?*

(French et al., 2012)
What strategies do healthcare organizations typically use to implement change?

Develop and disseminate clinical practice guidelines

Foundationally important for synthesizing evidence of what works (and doesn’t work) and making recommendations… but may not be enough to change practice
3. What strategies do healthcare organizations typically use to implement change?

Throw everything at the problem and see what sticks

**Absolute effect size**

N = 56  63  46  28  16

Number of interventions in treatment group
What strategies do healthcare organizations typically use to implement change?

Favourite solutions
3 Ok then… which strategies to select?

✓ No magic bullets: select strategies that work best for specific barriers/enablers
✓ Distinguish ‘what’ is delivered from ‘who’ or ‘how’ it is delivered
✓ Be explicit using shared scientific language to ensure clarity and replication to avoid different terms for same meaning and different meaning for same term
  ✓ Consider using a taxonomy
3. Behaviour change techniques taxonomy (Michie et al 2013)

- 93 techniques within 16 categories focusing on **behaviour change**
- Linked to behaviour change theory
Feedback on Behaviour

Monitor and provide informative or evaluative feedback on performance of the behavior (e.g. form, frequency, duration, intensity)

Note: if Biofeedback, code only 2.6, Biofeedback and not 2.2, Feedback on behavior; if feedback is on outcome(s) of behavior, code 2.7, Feedback on outcome(s) of behavior; if there is no clear evidence that feedback was given, code 2.1, Monitoring of behavior by others without feedback; if feedback on behaviour is evaluative e.g. praise, also code 10.4, Social reward

Inform the person of how many steps they walked each day (as recorded on a pedometer) or how many calories they ate each day (based on a food consumption questionnaire).
Two strategies for changing behaviour

- Implementation Intentions
- Audit and Feedback

Clinical settings applying behaviour change

- Diabetes care and management
Behaviour change strategy 1

Implementation Intentions for health behaviour change

Randomized controlled trials of action planning and coping planning interventions for health behaviour change: A Cochrane systematic review and meta-analysis

New Year’s Resolutions for 2009

1. Lose weight again
2. Get fit next year—and cigarettes! drink less
3. Give up alcohol find job
4. Stand up to boss
5. Be nicer to my wife
6. Sort out junk in shed
The challenge of the ‘inclined abstainer’

<table>
<thead>
<tr>
<th>Intend to exercise</th>
<th>Act</th>
<th>Abstain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclined Actor</td>
<td>Inclined Abstainer</td>
<td></td>
</tr>
<tr>
<td>Disinclined Actor</td>
<td>Disinclined Abstainer</td>
<td></td>
</tr>
</tbody>
</table>

Orbell & Sheeran, 1998; Sheeran, 2002;
A Case Study: Cardiac Rehab

Who:
People recovering from a heart attack (in cardiac rehab)

Recommendations:
Do moderate exercise 3x per week for > 30 mins each time after discharge from hospital

30 second task
With the person next to you, estimate:

Out of 100 patients 4 months after discharge, how many were...
- Inclined actors?
- Inclined abstainers?
- Disinclined actors?
- Disinclined abstainers?

Intention

Intend to exercise
- Inclined Actor
- Inclined Abstainer

Do not intend to exercise
- Disinclined Actor
- Disinclined Abstainer

Behaviour 4 months following discharge

Act | Abstain
--- | ---
Inclined Actor | Inclined Abstainer
Disinclined Actor | Disinclined Abstainer
### A Case Study¹: Cardiac Rehab

**Who:**
People recovering from a heart attack (in cardiac rehab)

**Recommendations:**
Do moderate exercise 3x per week for > 30 mins each time after discharge from hospital

---

Out of 100 patients 4 months after discharge, how many were...
- Inclined actors?
- Inclined abstainers?
- Disinclined actors?
- Disinclined abstainers?

<table>
<thead>
<tr>
<th>Intention</th>
<th>Act</th>
<th>Abstain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intend to exercise</td>
<td>53 inclined actors</td>
<td>39 inclined abstainers</td>
</tr>
<tr>
<td>Do not intend to exercise</td>
<td>0 disinclined actors</td>
<td>8 disinclined abstainers</td>
</tr>
</tbody>
</table>

(Orbell & Sheeran, 1998; Sheeran, 2002; data based on Sniehotta, Scholz & Schwarzer, 2005)
Motivation is important but often not enough

- The strategies and techniques used to improve motivation may not be enough to help move into action.
How to bridge the intention-behaviour gap?
Background

Intention is not necessarily a sufficient condition for behaviour change\(^1\)

- Rubicon Model of Action Phases\(^2\): Distinguishes motivation (‘why’) from volition (‘when and how’)

- Now integrated in contemporary behaviour change theories\(^3,4,5\)
- Includes volitional self-regulatory techniques: conditional planning
  - Implementation intentions (If-Then plans)
  - **Action Planning** (When, Where, How)
  - **Coping Planning** (Anticipate barrier, plan alternative)

- Past 20 years: increase in RCTs of conditional planning interventions to bridge the intention-behaviour gap in health behaviours

---

\(^1\) Orbell & Sheeran 1998; \(^2\) Heckhausen & Gollwitzer 1987; \(^3\) Schwarzer 2008; \(^4\) de Vries et al 2005; \(^5\) Hagger & Chatzisarantis 2014
Intention: I want to do some physical activity

Action Plan:
_______ (when)
_______ (where)
_______ (how)

(write it down!)
Coping plans to deal with barriers ahead of time

- Anticipate barriers and obstacles to act
- Prepare alternatives (if X happens, then I will do Y to ensure I do the action I intended to)

“Think of reasons that might come up that might stop you from doing physical activity at the time and place you planned to, and write one in the IF below:

IF ____________________________

Now plan what you will do differently when you encounter that IF:

THEN I WILL _____________________
# Existing systematic reviews

<table>
<thead>
<tr>
<th>Authors (year)</th>
<th>Behaviour</th>
<th>N and effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gollwitzer &amp; Sheeran (2006)</td>
<td>Any</td>
<td>$n=94; \quad d = 0.65$</td>
</tr>
<tr>
<td>Bélanger-Gravel et al (2011)</td>
<td>Physical Activity</td>
<td>$n=26; \quad d = 0.24$</td>
</tr>
<tr>
<td>Adriaanse et al (2011)</td>
<td>Health Eating</td>
<td>$n=11; \quad d = 0.51$</td>
</tr>
<tr>
<td></td>
<td>Unhealthy Eating</td>
<td>$n=8; \quad d = 0.29$</td>
</tr>
<tr>
<td>Carraro &amp; Gaudreau (2013)</td>
<td>Physical Activity</td>
<td>$n=21; \quad d = 0.12$</td>
</tr>
<tr>
<td>Kwasnicka et al (2013)</td>
<td>CP any health behaviour</td>
<td>$n=11; \quad d = n/a$</td>
</tr>
<tr>
<td>Cooke &amp; Lowe (2016)</td>
<td>Alcohol consumption</td>
<td>$n=9; \quad d = 0.21$</td>
</tr>
</tbody>
</table>

- **Unclear:** Effects across all health behaviours
- **Unclear:** Distinction between AP, CP, and AP+CP combined
- **Unclear:** Length to follow-up
- **Unclear:** Objective vs self-report behaviour outcome
Eligibility criteria & sources

**Aim:** conduct a Cochrane review of conditional planning interventions for health behaviour change across *all* health behaviours

- **Participants:** Adults
- **Studies:** RCTs; Real-world health behaviour
- **Intervention:** Participants randomized to form *Action* and/or *Coping* Plan
  - Coded instructions to participants to either *AP*, *CP*, or *AP+CP* using definitions from key theories and BCTTv1¹
  - Used taxonomy for excluding studies that claim *AP* but are actually e.g. Goal Setting (Behaviour) or Goal Setting (Outcome)
- **Primary outcome:** Any health behaviour

¹Michie et al 2013
Recommendations re: implementation intentions

- Planning interventions are cheap, low burden, scalable, patient/person-centred, helping people do what they want\(^1\)
- Potential to move beyond trials into routine healthcare delivery...but we need more and better evidence

We need...

... **Less self-report**: only 25 trials with objective outcome; need more objective behaviour outcomes
... **Tests on other health behaviours**: beyond physical activity and eating
... **No more short-term trials (<1 month)**: need to understand effects at 12+ months
... **More tests** of **Coping Planning** and **AP+CP**: factorial trials

\(^1\)Hagger & Luszczynska 2013
Implications for changing health professional behaviour?

- What is one of the most common intervention for health professionals in Canada? CPD/CME
What is the broader evidence for implementation interventions (changing healthcare practices)?
What do we know from Cochrane reviews about interventions to change professional practice?

- Cochrane Effective Practice and Organisation of Care (EPOC) undertakes systematic reviews to improve healthcare systems and healthcare delivery
- Currently 217 reviews/protocols
  - We know quite a bit!
  - Many reviews of randomised and cluster randomized trials

epoc.cochrane.org/epo-reviews
What do we know from Cochrane reviews about interventions to change professional practice?

<table>
<thead>
<tr>
<th>Implementation strategy</th>
<th>studies</th>
<th>↑ performance</th>
<th>IQR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic paper reminders</td>
<td>32</td>
<td>11%</td>
<td>7-20%</td>
</tr>
<tr>
<td>On-screen point of care reminders</td>
<td>28</td>
<td>4%</td>
<td>1-19%</td>
</tr>
<tr>
<td>Printed educational materials</td>
<td>7</td>
<td>2%</td>
<td>0-11%</td>
</tr>
<tr>
<td>Audit and Feedback</td>
<td>140</td>
<td>4%</td>
<td>1-16%</td>
</tr>
<tr>
<td>Meetings and workshops</td>
<td>81</td>
<td>6%</td>
<td>2-16%</td>
</tr>
<tr>
<td>Educational outreach visits</td>
<td>69</td>
<td>6%</td>
<td>3-9%</td>
</tr>
<tr>
<td>Local Opinion Leaders</td>
<td>24</td>
<td>11%</td>
<td>4-15%</td>
</tr>
<tr>
<td>Strategies to change organizational culture</td>
<td>0</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Tailored interventions to address determinants of practice</td>
<td>32</td>
<td>OR=1.56</td>
<td>95%CI 1.27-1.93</td>
</tr>
</tbody>
</table>

- Small effects at population level may be important
- Wide variability of effect; What explains variability?
- Many strategies are methods of delivery rather than techniques; need to unpack

1Arditi (2002); 2Giguere (2012); 3Shojania (2009); 4Ivers (2012); 5Forsetlund (2009); 6O’Brien (2007); 7Flodgren (2019); 8Parmelli (2011); 9Baker (2015)
Behaviour change strategy 2

Audit and Feedback for health professional behaviour change
Audit and Feedback

What is Audit and Feedback?
Using routinely recorded health care professional performance data to highlight discrepancies between standard of care and actual care

- **Audit**: data on healthcare professional activities (e.g. specific care provided)
- **Feedback**: provide results back to health professionals or teams +/- comparison to self, others, or benchmark

Audit and Feedback: What we know

- Very/increasingly common strategy in healthcare

- Cochrane review: 140 trials of A&F
  - Median improvement +4% (IQR 1-16%)

- A&F seems to work better when:
  - Low baseline performance
  - Feedback provided by colleague/supervisor
  - Provided more than once
  - Given verbally and in writing
  - **Includes clear goals and an action plan**

- Effect sizes have not changed despite dozens of new trials: need to understand what accounts for range of effects

Ivers et al (2012, 2014)
Not all A&F created equal

Currently coding A&F trials in the review w/ BCT taxonomy to:

- Use generalizable labels to promote a shared language
- Tease apart core elements of an A&F intervention to better understand its active ingredients
- Design novel A&F to move away from ‘business as usual’
In the meantime: 15 recommendations for better A&F

- Provide multiple times
- Feedback as soon as possible
- Individual rather than general data
- Clear comparators that reinforce desired behaviour change
- Action perceived as priority for recipients
- Action that can improve and under recipients’ control
- Recommend specific action
- Tailor feedback interventions based on situation-specific barriers
- Closely link visual display and summary message
- Be presented in multiple ways
- Minimize cognitive load
- Address barriers that prevent use of the feedback
- Provide short, actionable messages followed by more detail
- Address credibility of the information
- Encourage social construction of feedback rather than passive delivery
Example: Encouraging family docs to access feedback

- Ontario family docs have access to online A&F that details patients due for cancer screening… but underused

- Partnered with Cancer Care Ontario who already provided emails and the A&F tool

- 2x2x2 factorial trial testing 3 different BCTs in the emails:
  - Anticipated regret to address motivation via emotion
  - Material incentive to address motivation (external)
  - Problem solving (coping planning) to address intention-behaviour gap

- Outcomes: access of tool + screening attendance

- Randomized 5449 family docs (only difference was different BCTs in email)

- Problem solving email:
  - Fewer accessed their A&F (RR = 0.87, 95%CI 0.79-0.96)
  - But of those that did: +0.3% increase in cervical cancer screening (95%CI 0.1-0.6)
  - If true: using a behavioural science approach to tweak the email might have led to 7568 more patients screened for cervical cancer in 4 months
Accounting for automaticity and routines in clinical behaviour
Prescribe for blood pressure to achieve <140/80 mmHg

We could not ask for a better ‘laboratory’ for understanding non-reflective processes

✓ Stable physical setting
✓ Social and physical cues
✓ Audio, visual and olfactory cues
✓ Repeated, frequent behaviour
✓ Time pressure

Strack & Deutch (2004); Evans (2008); Hoffman et al; Sladek et al; Nilsen et al (2012)
The relationship between habit and healthcare professional behaviour in clinical practice: a systematic review and meta-analysis

Sebastian Potthoff, Othman Rasul, Falko F. Sniehotta, Marta Marques, Fiona Beyer, Richard Thomson, Leah Avery and Justin Presseau

Aims: Identify studies assessing clinicians’ habit and behaviour separately and determine the strength of association between habit and health professional behaviour

- 9 studies
- Designs: 8 correlational (6 cross-sectional, 2 prospective), 1 RCT
- Total sample size: 2,392 clinicians (GPs, GDPs, and nurses)
Prescribe for blood pressure to achieve <140/80 mmHg

Prescribe for glycemic control when Hb1c is >8%

Provide diabetes-related education

Self-management advice

Examine feet

Provide weight advice

Intention

Action Planning

Coping Planning

Automaticity

N=427 FPs and Nurses

Findings:

- **Reflective** process: all 6 behaviours
- **Impulsive** process: 4 behaviours showed automaticity predicted additional variance in behaviour


*Annals of Behavioral Medicine*
Opportunity

- Health Psychologists have much to contribute
- Broad international interest in:

  “Sustainment of change”
  (role of non-reflective processes)

  “De-implementation”
  (breaking habit; behaviour substitution)

---

Clinical behaviour as ideal ‘natural lab’ for better understanding non-reflective processes
Clinical application example

Diabetes care and management
Retinopathy screening attendance
Interventions to improve the quality of diabetes care

1. Can BCTs be coded in diabetes implementation interventions?

2. Which BCTs and groups of BCTs are being used?

3. Which are associated with greater effectiveness?

Using a behaviour change techniques taxonomy to identify active ingredients within trials of implementation interventions for diabetes care

Justin Presseau, Noah M Ivers, James J Newham, Keegan Kittle, Kristin J Danko, and Jeremy M Grimshaw
Methods

• Secondary analysis of **142 trials** of interventions in *Lancet* review of diabetes QI interventions

• Independent double coding of 142 trials using the BCTTv1
  • Distinguished BCTs targeting behaviour change in **patients** from those targeting **healthcare professionals**

1Tricco et al (2012)
Results: BCTs targeting healthcare professionals

26 of 93 possible BCTs identified in intervention arms

Top 10 reported BCTs targeting professional behaviour change:

- Instruction on how to perform the behaviour
- Social support (practical)
- Adding objects to the environment
- Prompts and cues
- Restructuring the social environment
- Feedback on outcomes of behaviour
- Feedback on behaviour
- Information about health consequences
- Goal setting (outcome)
- Credible source
Results: BCTs targeting patients

38 of 93 possible BCTs identified in intervention arms

Top 10 reported BCTs targeting patient behaviour change:

1. Instruction on how to perform the behaviour
2. Information on health consequences
3. Restructuring the social environment
4. Prompts/cues
5. Goal setting (Behaviour)
6. Feedback on outcomes of behaviour
7. Goal setting (outcome)
8. Adding objects to the environment
9. Problem solving
10. Self-monitoring of outcomes of behaviour

Number of trials
### Results: Hierarchical meta-regression

**BCT categories targeting health professionals**

<table>
<thead>
<tr>
<th>BCT categories</th>
<th>Median point estimate in reduced HbA1c (95% CrI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antecedents</td>
<td>-0.42 (-0.62 to -0.22)</td>
</tr>
<tr>
<td>Shaping knowledge</td>
<td>-0.20 (-0.62 to 0.23)</td>
</tr>
<tr>
<td>Social support</td>
<td>-0.19 (-0.45 to 0.05)</td>
</tr>
<tr>
<td>Goals and planning</td>
<td>-0.13 (-0.57 to 0.30)</td>
</tr>
<tr>
<td>Feedback and monitoring</td>
<td>-0.06 (-0.72 to 0.55)</td>
</tr>
<tr>
<td>Natural consequences</td>
<td>-0.04 (-1.17 to 1.13)</td>
</tr>
<tr>
<td>Associations</td>
<td>0.08 (-0.62 to 0.50)</td>
</tr>
<tr>
<td>Other BCT categories</td>
<td>0.15 (-0.92 to 1.10)</td>
</tr>
</tbody>
</table>

*Crl = Credible Interval*
Results: Hierarchical meta-regression
BCT categories targeting **health professionals**

<table>
<thead>
<tr>
<th>BCT categories</th>
<th>Median point estimate in reduced HbA1c (95% CrI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antecedents</strong></td>
<td></td>
</tr>
<tr>
<td>Restructuring the physical environment</td>
<td>0.74 (-2.75 to 3.90)</td>
</tr>
<tr>
<td>Restructuring the social environment</td>
<td>-0.15 (-0.45 to 0.13)</td>
</tr>
<tr>
<td><strong>Adding objects to the environment</strong></td>
<td><strong>-0.51 (-0.75 to -0.27)</strong></td>
</tr>
<tr>
<td>Shaping knowledge</td>
<td>-0.18 (-0.60 to 0.26)</td>
</tr>
<tr>
<td>Social support</td>
<td>-0.21 (-0.47 to 0.03)</td>
</tr>
<tr>
<td>Goals and planning</td>
<td>-0.09 (-0.56 to 0.33)</td>
</tr>
<tr>
<td>Feedback and monitoring</td>
<td>0.03 (-0.65 to 0.62)</td>
</tr>
<tr>
<td>Natural consequences</td>
<td>-0.35 (-1.62 to 0.96)</td>
</tr>
<tr>
<td>Associations</td>
<td>0.07 (-0.41 to 0.52)</td>
</tr>
<tr>
<td>Other BCT categories</td>
<td>0.26 (-0.83 to 1.23)</td>
</tr>
</tbody>
</table>

**CrI** = Credible Interval
### Results: Hierarchical meta-regression

**BCT categories targeting patients**

<table>
<thead>
<tr>
<th>BCT categories</th>
<th>Median point estimate in reduced HbA1c (95% CrI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaping knowledge</td>
<td>-0.40 (-0.76 to -0.05)</td>
</tr>
<tr>
<td>Social support</td>
<td>-0.41 (-1.00 to 0.18)</td>
</tr>
<tr>
<td><strong>Feedback and monitoring</strong></td>
<td><strong>-0.38 (-0.74 to -0.04)</strong></td>
</tr>
<tr>
<td>Other BCT categories</td>
<td>-0.21 (-0.78 to 0.36)</td>
</tr>
<tr>
<td>Antecedents</td>
<td>-0.13 (-0.43 to 0.18)</td>
</tr>
<tr>
<td>Goals and planning</td>
<td>-0.07 (-0.47 to 0.38)</td>
</tr>
<tr>
<td>Comparison of outcomes</td>
<td>-0.08 (-0.68 to 0.69)</td>
</tr>
<tr>
<td>Associations</td>
<td>0.10 (-0.18 to 0.35)</td>
</tr>
<tr>
<td>Natural consequences</td>
<td>0.27 (-0.17 to 0.73)</td>
</tr>
</tbody>
</table>

Crl = Credible Interval
### Results: Hierarchical meta-regression
BCT categories targeting patients

<table>
<thead>
<tr>
<th>BCT categories</th>
<th>Median point estimate in reduced HbA1c (95% CrI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shaping knowledge</strong></td>
<td></td>
</tr>
<tr>
<td>Instruction on how to perform behaviour</td>
<td>-0.47 (-0.84 to -0.09)</td>
</tr>
<tr>
<td>Social support</td>
<td>-0.62 (-1.22 to 0.02)</td>
</tr>
<tr>
<td><strong>Feedback and monitoring</strong></td>
<td></td>
</tr>
<tr>
<td>Feedback on outcomes of behaviour</td>
<td>-0.38 (-0.76 to -0.01)</td>
</tr>
<tr>
<td>Self-monitoring of outcome(s) of behaviour</td>
<td>-0.10 (-0.83 to 0.80)</td>
</tr>
<tr>
<td>Self-monitoring of behaviour</td>
<td>-0.02 (-0.90 to 0.92)</td>
</tr>
<tr>
<td>Feedback on behaviour</td>
<td>0.08 (-1.67 to 1.83)</td>
</tr>
<tr>
<td>Monitoring of outcomes of b w/out feedback</td>
<td>1.08 (-1.22 to 3.45)</td>
</tr>
<tr>
<td>Other BCT categories</td>
<td></td>
</tr>
<tr>
<td>Antecedents</td>
<td>-0.23 (-0.91 to 0.40)</td>
</tr>
<tr>
<td>Goals and planning</td>
<td>-0.12 (-0.43 to 0.20)</td>
</tr>
<tr>
<td>Comparison of outcomes</td>
<td>-0.18 (-0.65 to 0.29)</td>
</tr>
<tr>
<td>Associations</td>
<td>-0.08 (-0.78 to 0.83)</td>
</tr>
<tr>
<td>Natural consequences</td>
<td>0.08 (-0.23 to 0.36)</td>
</tr>
</tbody>
</table>

Crl = Credible Interval
Summary across diabetes care

- Reliance on **only a subset of possible BCTs**: Opportunities for improved reporting and novel (theory based) intervention design

  ✓ Use BCTs to **describe** implementation interventions

  ✓ Investigate which **BCTs are associated with improved clinical outcomes**

  ✓ Can be **used in other systematic reviews of trials** of behaviour change interventions

Reviews of Implementation interventions
- Audit and Feedback
- Tapering opioid prescribing

Reviews of health behaviour change interventions
- Social media interventions
- Organ donation registration
Clinical application example

Diabetic Retinopathy screening attendance
Background: Diabetic Retinopathy

- Leading cause of blindness worldwide
  - Most common microvascular complication of people with diabetes: in Canada, most will develop a degree of retinopathy in their lifetime
  - In Canada, retinopathy disproportionately affects minorities
Background: Diabetic Retinopathy Screening

- Progression can be managed through regular eye screening. However, attendance is sub-optimal:
  - In a cohort study spanning 5 provinces, 30% had not had their eyes screened in the last 2 years, and 38% had never been screened.
Reviews of barriers/enablers and effective interventions

**Systematic Review or Meta-analysis**

**Barriers to and enablers of diabetic retinopathy screening attendance: a systematic review of published and grey literature**


**Objective 1:** Identify barriers and enablers to screening attendance across studies (using the TDF)

**Objective 2:** Identify strategies and behaviour change techniques associated with greater attendance (using the BCT taxonomy)
Review of barriers/enablers to screening attendance

- 69 studies identified

- Theoretical Domains Framework-identified key barriers/enablers:
  1. **Environmental Context and Resources (52 studies)**: accessibility, competing demands, cost
  2. **Social Influences (35 studies)**: Trust in doctor; family support; doctor-patient communication
  3. **Knowledge (35 studies)**: awareness of diabetes-retinopathy link, confusion between retinopathy screening & routine eye exam
  4. **Memory/Attention/Decision Processes (34 studies)**: symptoms, co-morbidities, forgetting
  5. **Beliefs about Consequences (26 studies)**: discomfort, inconvenience
  6. **Emotions (23 studies)**: fear of vision loss, of the procedure

- Only 3 studies conducted in Canada, only 1 of which was conducted in a minority group (Cree in Alberta)
Review of behaviour change techniques for increasing attendance

- Across 66 RCTs identified (3 in Canada): attendance increased by 12% (risk difference 0.12 [95%CI 0.10-0.14])
- Only 42% of 93 possible BCTs identified

Lawrenson et al 2018 (Cochrane Review)
## Review 2: BCTs for increasing attendance

<table>
<thead>
<tr>
<th>Patients</th>
<th>RD (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal setting (Outcome)</td>
<td>.26 (.16-.36)</td>
</tr>
<tr>
<td>Feedback on outcomes of behaviour/</td>
<td>.19 (.13-.25)</td>
</tr>
<tr>
<td>Credible source</td>
<td>.22 (.06-.38)</td>
</tr>
<tr>
<td>Prompts/cues</td>
<td>.11 (.07-.14)</td>
</tr>
<tr>
<td>Social support (unspecified)</td>
<td>.19 (.09-.28)</td>
</tr>
<tr>
<td>Problem solving</td>
<td>.17 (.08-.27)</td>
</tr>
<tr>
<td>Restructuring the social environment</td>
<td>.17 (.10-.24)</td>
</tr>
<tr>
<td>Instruction on how to perform behaviour</td>
<td>.13 (.11-.15)</td>
</tr>
<tr>
<td>Social support (practical)</td>
<td>.14 (.09-.20)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health professionals</th>
<th>RD (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restructuring the social environment</td>
<td>.19 (.12-.26)</td>
</tr>
<tr>
<td>Credible source</td>
<td>.16 (.08-.24)</td>
</tr>
<tr>
<td>Adding objects to the environment</td>
<td>.14 (.07-.20)</td>
</tr>
<tr>
<td>Social support (practical)</td>
<td>.13 (.03-.22)</td>
</tr>
<tr>
<td>Instruction on how to perform behaviour</td>
<td>.13 (.08-.17)</td>
</tr>
<tr>
<td>Prompts/cues</td>
<td>.12 (.06-.17)</td>
</tr>
<tr>
<td>Feedback on outcomes of behaviour</td>
<td>.11 (.07-.16)</td>
</tr>
</tbody>
</table>

Lawrenson et al 2018 (Cochrane Review)
What about in Canada? In minority groups most at risk?

- 1 in 5 people in Canada born outside Canada. Canada has the highest proportion of foreign-born population in G8: 21% of total population
  - Asia and Africa = largest source of immigration to Canada
- Vision-loss due to diabetic retinopathy disproportional affects visible minorities (25% of vision loss cases) compared to all ethnicities (4% of vision loss)
- Recent immigrants to Canada have lower attendance to retinopathy screening

1 StatsCan (2016); 2 ICES (2016)
Identifying barriers and enablers to attending retinopathy screening in immigrants from ethnocultural minority groups

Dogba et al (in press) JMI R Research Protocols

**Aim:** Identify barriers and enablers to attending DRS in ethnocultural minorities in Ontario and Quebec

- **3 studies:** identify barriers and enablers to diabetic retinopathy attendance in immigrants to Canada from:
  - Urdu- or Hindi-speakers immigrated from South Asia
  - Mandarin-speaking people immigrated from China
  - French speakers immigrated from African or Caribbean countries

- Interviews conducted in respondent’s mother tongue

- Topic guide and directed content analysis based on the TDF
Overall summary

- Successful implementation requires actors to change their behaviour(s)

- Implementation Intentions: promising, low-cost strategy for supporting motivated people to act on their good intention

- Audit and Feedback: promising strategy for using clinical process data to highlight opportunities for optimized healthcare
  - … but don’t jump straight to solutions: Using solutions before understanding the problem risks developing elegant solutions to non-problems

- AACTT, TDF and BCT taxonomy can be helpful behavioural tools for specifying behaviour, identify barriers and selecting fit-for-purpose solutions

- Drawing upon ImplSci can avoid pitfalls of ISLAGIATT and promote a shared understanding of what works to improve care
  - Future: draw on ImplSci to rigorously implement our evidenced interventions in health and clinical psychology so that we can follow-through on our breakthroughs¹

¹Presseau et al. (under review) Following through on our breakthroughs: the synergy between implementation science and health psychology.
Centre for Implementation Research and Psychology and Health Research Group: Regularly welcome research visits

- CPA conference 2020: Montreal
- CPA conference 2021: Ottawa!
- Chair CPA Health Psychology and Behavioural Medicine Section: if I can help, don’t hesitate to reach out
Acknowledgements

Implementation intentions review
Andrea Patey
Janet Squires
Sarah Asad
Sarah-Nicole Simard
Brittany Mutsaers
Brigitte Vachon
Christine Bond
Cynthia Fraser
Jill Francis
Jeremy Grimshaw

A&F
Gratianne Vaisson
Noah Ivers
Jeremy Grimshaw
Holly Witteman
Laura Desveaux
Caroline Bravo
Zach Bouck
Diego Llovet
Monica Taljaard

Diabetes BCT-QI review
Kristin Danko
Noah Ivers
Issa Dahabreh
Tom Trikalinos
James Newham
Jeremy Grimshaw

Habit review
Seb Potthoff
Othman Rasul
Falko Sniehotta
Marta Marques
Fiona Beyer
Richard Thomson
Leah Avery

Retinopathy Screening reviews
John Lawrenson
Ella Graham-Rowe
Fabi Lorencatto
Jennifer Burr
Catey Bunce
Noah Ivers
Luke Vale
Tunde Peto
Jill Francis
Patricia Aluko
Steve Rice
Jeremy Grimshaw

Retinopathy Screening in minority groups
Joyce Dogba
Catherine Bach
Michael Brent
Zack van Allen
Sarah Asad
Jeremy Grimshaw
Noah Ivers
France Légaré
Holly Witteman
Janet Squires
Xioaqin Wang
Olivera Sutakovic
Mary Zettl
Nicola McCleary
Thank you

Justin Presseau PhD
Assistant Professor, University of Ottawa
Scientist, Ottawa Hospital Research Institute
Lead, Psychology and Health Research Group

@JPresseau ohri.ca/pahrg
Criteria for selecting theory (what makes a good theory?)

Health Behaviours

Core
Clarifies types of behaviour explained
Defined constructs
Relationships within theory described
Causal explanation made clear
Mechanisms of action specified

Applications
Intended range of applications
Examples of successful applications

Context
Relationship to other theories
Historical heritage
Historical differences

Health Professional Behaviours

On the development, evaluation and evolution of behavioural theory
Falko F. Sniehotta, Justin Presseau & Vera Araujo-Soares
Newcastle University, England
Accepted author version posted online: 05 Mar 2015.

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

T-CaST: an implementation theory comparison and selection tool
Sarah A. Birken, Catherine L. Rohweder, Byron J. Powell, Christopher M. Shea, Jennifer Scott, Jennifer Leeman, Mary E. Grewel, M. Alexis Kline, Laura Damischroder, William A. Aldridge II, Emily R. Haines, Sharon Strauss and Justin Presseau

RESEARCH
Open Access

Usability
- TMF includes relevant constructs (e.g., self-efficacy; climate)
- Key stakeholders (e.g., researchers; clinicians; funders) are able to understand, apply, and operationalize TMF.
- TMF has a clear and useful figure depicting included constructs and relationships among them.
- TMF provides a step-by-step approach for applying it.
- TMF provides methods for promoting implementation in practice.
- TMF provides an explanation of how included constructs influence implementation and/or each other.

Testability
- TMF proposes testable hypotheses.
- TMF includes meaningful, face-valid explanations of proposed relationships.
- TMF contributes to an evidence base and/or TMF development because it has been used in empirical studies.

Applicability
- TMF focuses on a relevant implementation outcome (e.g., fidelity; acceptability).
- A particular method (e.g., interviews; surveys; focus groups; chart review) can be used with TMF.
- TMF addresses a relevant analytic level (e.g., individual; organizational; community).
- TMF has been used in a relevant population (e.g., children; adults with serious mental illness) and/or conditions (e.g., attention deficit hyperactivity disorder; cancer).
- TMF is generalizable to other disciplines (e.g., education; health services; social work), settings (e.g., schools; hospitals; community-based organizations), and/or populations (e.g., children; adults with serious mental illness).

Acceptability
- TMF is familiar to key stakeholders (e.g., researchers; scholars; clinicians; funders).
- TMF comes from a particular discipline (e.g., education; health services; social work).
Health Psychology has already contributed substantially to Implementation Science

- **Predictive studies** testing social cognition models\(^1,2,3,4\)
- **Qualitative** TDF studies\(^5,6,7\) and Behaviour Change Wheel\(^8\) to assess barriers and facilitators
- **Developing questionnaires** (eg. TPB manual for HSR)\(^9\); how to determine data saturation in theory-based qualitative research\(^10\); how to develop TDF interviews\(^11\) and TDF questionnaires\(^12\)
- Randomized Controlled Trials of **theory-based implementation interventions**\(^13,14,15,16,17,18\)
- **Theory-based process evaluations**: mediating mechanisms alongside trials\(^19,20\) & fidelity\(^21,22\)
- **Reviews of trials** of implementation interventions to change using BCT taxonomy\(^23,24\)
- Also useful for **advancing theory** to feed back into ‘mainstream’ health psychology
  - Dual processes models\(^25\), multiple behaviours and competing demands\(^26\)

\(^1\) Godin 2008; \(^2\) Walker 2003; \(^3\) Bonetti 2005; \(^4\) Presseau 2014; \(^5\) McSharry 2012; \(^6\) Patey 2012; \(^7\) Presseau 2017; \(^8\) Sinnott 2015; \(^9\) Francis 2004; \(^10\) Francis 2010; \(^11\) Atkins 2017; \(^12\) Huijg 2014; \(^13\) Clarkson 2008; \(^14\) Hrisos 2008; \(^15\) Casper 2008; \(^16\) Presseau 2014; \(^17\) Fuller 2012; \(^18\) Byrne 2005; \(^19\) Grimshaw 2014; \(^20\) Presseau 2016; \(^21\) Lorenzatto 2016; \(^22\) Toomey 2015; \(^23\) Presseau 2015; \(^24\) Lawrenson 2017; \(^25\) Potthoff (2017); \(^26\) Presseau (2009)