

How to Make Change Happen: Behavioural Science 101

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Land acknowledgement

- Concordia University and the CIUSSS-NIM depends on traditional Indigenous territories to provide us physical space, sustenance, safety, and community to work, live, and play.
- The Kanien'kehá:ka Nation is recognised as the custodians of the lands and waters on which Concordia University and the CIUSSS-NIM stands today. Tiohtiá:ke commonly known as Montreal is historically known as a gathering place for many First Nations.
- We acknowledge that our ability to live and work on these lands today is a direct benefit of policies of expulsion and assimilation of Indigenous peoples during the time of settlement and Confederation, and since.
- The harms of these policies are many and *are still being felt in Indigenous communities today*. We express gratitude towards the Indigenous peoples who have and will continue to steward these lands. We commit to amplifying the voices of Indigenous peoples and working against the everyday forces of white supremacy and colonialism present in the research sector.



Disclosures

- Industry Grants/Research Support: Investigator-initiated research and educational grants
 - Moderna (2021), Abbvie (2014-16)
- Consulting Fees: Behaviour change related CME, trial behaviours, and statistical analysis
 - Abcellera (2025-ongoing), Sygesa (2016-2019), Astra-Zenica (2017)
- Speaker Fees: Behaviour change of health behaviours
 - Respiplus (2021), Novartis (2015), Jansen (2014)
- Advisory Board: Development of medication adherence education and ehealth behaviour change programs
 - Lucilab (2021-ongoing), Respiplus (2021), Astra-Zenica (2021), Sanofi (2019), Bayer (2018)



Learning objectives

- By the end of the presentation, you will be able to:
 - Detail what a behavioural/behaviour change intervention is
 - Describe the process of generating and testing a behavioural/behaviour change intervention
 - Individual level
 - Population level



Is exercise a behavioural intervention?

- What is high blood pressure called?
 - Hypertension
- What are?
 - Beta-blockers, diuretics, ACE-inhibitors
 - Anti-hypertensive medications
- Physical activity/exercise
 - Intervention or target?

Intervention → Intervention target



?



What is behavioural science and behavioural medicine?

- Human behaviour
 - Anything a person does in response to internal or external events.
 - Actions may be overt (motor or verbal) and directly measurable or, covert (activities not viewable but involving voluntary muscles) and indirectly measurable.
 - **Population human behaviour:** An aggregate of individual human behaviours in members of a population
- Behavioural Science
 - The *intersectoral scientific study* of behaviour
 - What enables it, what prevents it, and how best to elicit and maintain it (including decision-making)
 - Key goal of *developing and testing interventions* to change behaviours in multiple contexts at multiple levels
 - e.g., individual, population, policy
- Behavioural Medicine
 - The use of behavioural science to target **health**



Examples of the kinds of behaviours can we target

Classic health behaviours

- Physical activity
- Diet
- Smoking

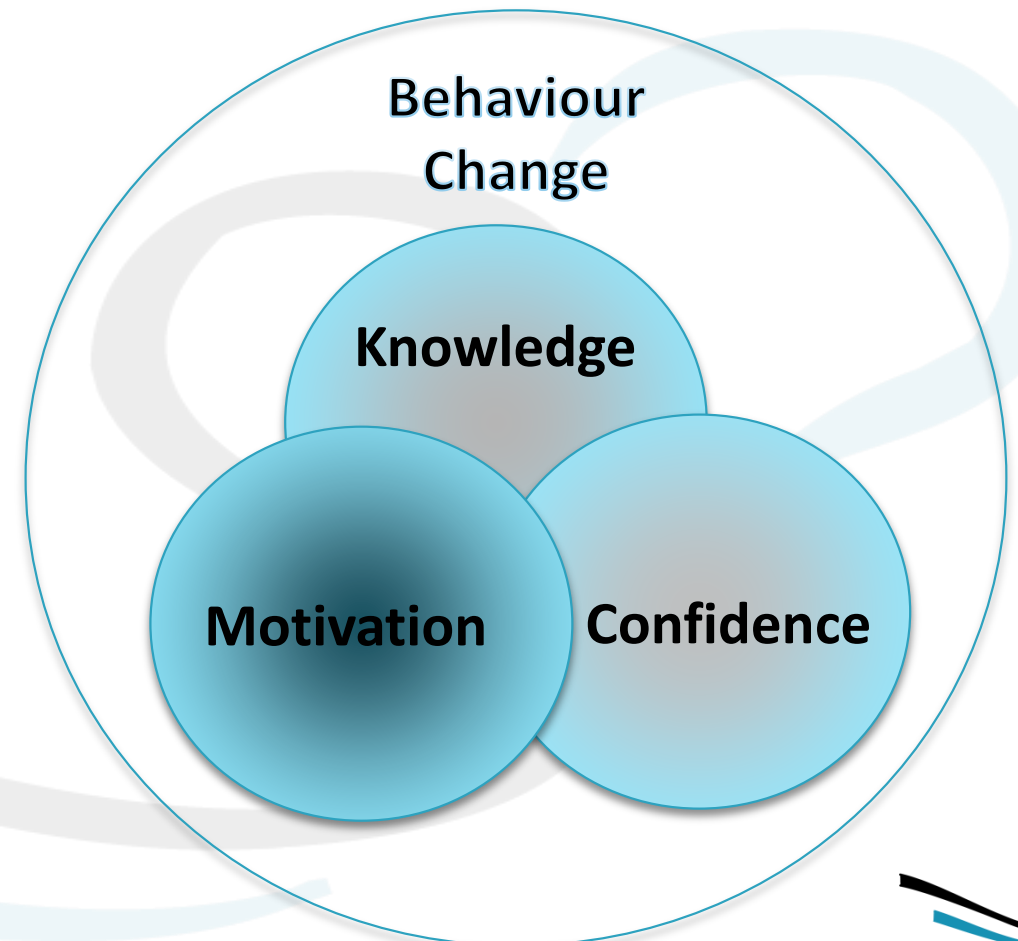
Trial behaviours

- Recruiting diverse populations
- Consistent intervention delivery
- Retention of participants



3 Criteria required to change a behaviour in an individual

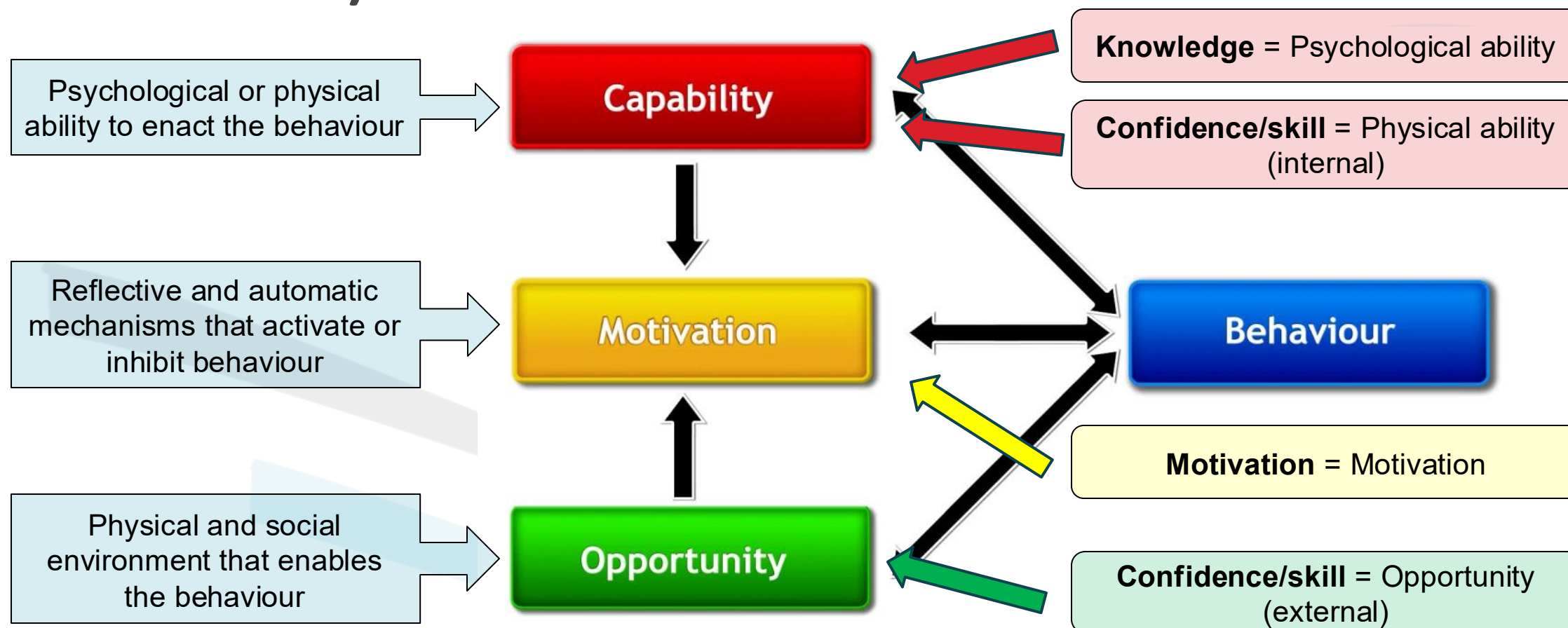
1. Knowledge/education
 - Agree on problem, about benefits, etc.
2. Motivation or desire
 - Believes they will benefit from change
3. Confidence or skill
 - Believes they can do what it takes to succeed



How to identify what factors are driving a behaviour: Translating KMC to COM-B



COM-B ('capability', 'opportunity', 'motivation' and 'behaviour') model



**So once we know
What do we do?**



Measurement – what to do with the information

- Use of the BCT Theory and Technique's tool
 - Connecting Mechanisms of Action (i.e., area of need) to BCT's
 - <https://theoryandtechniquetool.humanbehaviourchange.org>
- Kn = Knowledge (capability)
- Sk = Skill (capability)
- In = Intentions (motivation)

		Kn	Sk	SPRI	BaCa	Op	BaCo	Re	In
	Links Non-links Inconclusive No evidence								
+	2.5. Monitoring of outcome(s) of behaviour ...								
+	2.6. Biofeedback								
+	2.7. Feedback on outcome(s) of behaviour								
+	3.1. Social support (unspecified)								
+	3.2. Social support (practical)								
+	3.3. Social support (emotional)								
+	4.1. Instruction on how to perform behaviour								
+	4.2. Information about antecedents								
+	4.3. Re-attribution								
+	5.1. Information about health consequences								
+	5.2. Salience of consequences								
+	5.3. Information about social and environme...								
+	5.4. Monitoring of emotional consequences								
+	5.5. Anticipated regret								
+	5.6. Information about emotional consequen...								
+	6.1. Demonstration of the behaviour								
+	6.2. Social comparison								
+	6.3. Information about others' approval								
+	7.1. Prompts/cues								
+	7.5. Remove aversive stimulus								
+	7.7. Exposure								
+	7.8. Associative learning								
+	8.1. Behavioural practice/rehearsal								
+	8.2. Behaviour substitution								

What is a behaviour change intervention (BCI)?

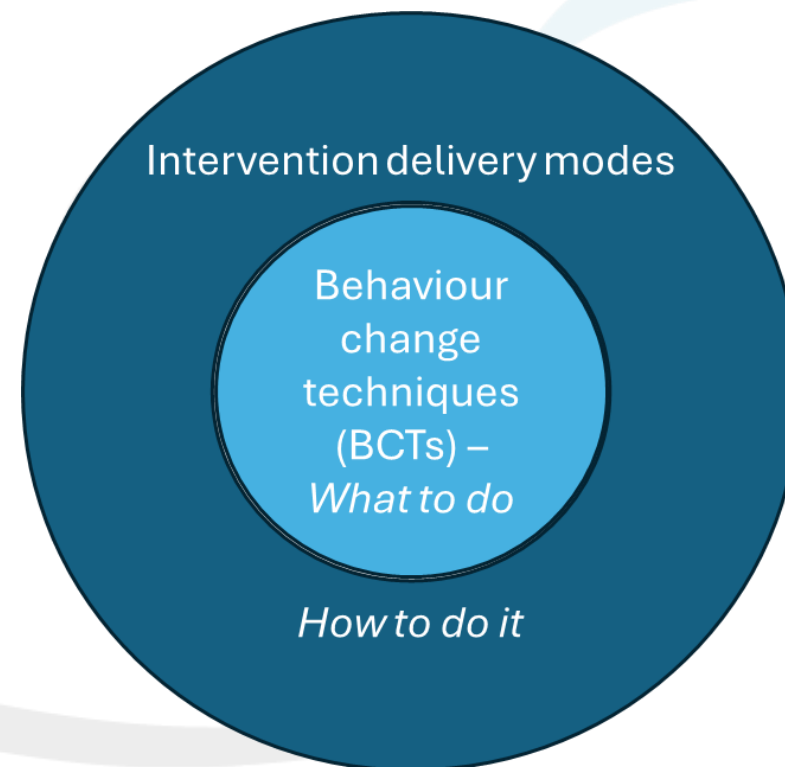
Behavioural/behaviour change
intervention

Complex series of interacting
techniques which are combined;

and

delivered in a certain way

to change a specific behaviour,
e.g., physical activity



Behaviour Change Techniques Ontology

BCT group	Definition	No. of BCTs in this group
Goal directed BCT	A behaviour change technique that sets or changes goals.	23
Monitoring BCT	A BCT that involves gathering or using information about performance.	12
Social support BCT	A BCT that involves taking steps to secure or deliver the support or aid of another person.	16
Guide how to perform behaviour BCT	A BCT that provides guidance regarding how to perform the behaviour.	6
Conduct a behavioural experiment BCT	A BCT that advises on how to identify and test hypotheses about the behaviour, its causes and consequences.	1

Level 1 label	Level 2 label	Level 3 label	Level 4 label	Definition
goal directed BCT BCIO:007001				A <behaviour change technique> that sets or changes goals.
	goal setting BCT BCIO:007002			A <goal directed BCT> that sets goals.
		set behaviour goal BCT BCIO:007003		A <goal setting BCT> that sets a goal for the behaviour to be achieved.
			set measurable behaviour goal BCT BCIO:007300	A <set behaviour goal BCT> that describes the behaviour to be achieved in terms of a measurable target.
		agree behaviour goal BCT BCIO:007004		A <goal setting BCT> that involves the intervention source agreeing with the person on a behavioural goal.
		set outcome goal BCT BCIO:007005		A <goal setting BCT> in which the goal is a positive outcome of performing the behaviour.
			set measurable outcome goal BCT BCIO:007300	A <set outcome goal BCT> that describes the behavioural outcome to be achieved in terms of a measurable target.
		agree outcome goal BCT BCIO:007006		A <goal setting BCT> that involves the intervention source agreeing with the person on a goal which is a positive outcome of performing the behaviour.

new perspective on	5
behaviour in the	21
renewal of what other	7
targeted pairing of a	15
person to perform a	9
to manage mental	4
ing relating to	6
structure or functioning	1
ies or other drugs.	3
	20
environment in which the	12

	impedes the behaviour.	
Prompt focus on self-identity BCT	A BCT that prompts the person to focus on their mental representation of themselves.	5
Behavioural consequence BCT	A behaviour change technique that alters the consequences or promised consequences for a behaviour.	77
Outcome consequence BCT	A behaviour change technique that alters the consequences or promised consequences for an outcome that results from performing or not performing a behaviour.	35

Marques et al. Wellcome Open Res. 2024
doi: 10.12688/wellcomeopenres.19363.1.

Level 1 label	Level 2 label	Level 3 label	Definition
monitoring BCT			A <behaviour change technique> that involves gathering or using information about performance.
	provide feedback BCT		A <monitoring BCT> in which feedback about the behaviour is provided.
		provide feedback on outcome of behaviour BCT	A <provide feedback BCT> that provides information about an outcome of the person's previous performance of the behaviour.
		provide feedback on behaviour BCT	A <provide feedback BCT> that provides information about the person's previous performance of the behaviour.
		provide biofeedback BCT	A <provide feedback BCT> that provides information about the functioning or state of the person's body, based on information collected by an external monitoring device.
	monitor emotional consequences BCT		A <monitoring BCT> that involves the person assessing their emotions after performing the behaviour.
	self-monitor outcome of behaviour BCT		A <monitoring BCT> in which the person uses a method to monitor and record an outcome of their behaviour.
	self-monitor behaviour BCT		A <monitoring BCT> in which the person uses a method to monitor and record their behaviour.
	record outcome of behaviour without feedback BCT		A <monitoring BCT> that records an outcome of performing the behaviour with the person's knowledge but without providing feedback about the outcome.
	record behaviour without feedback BCT		A <monitoring BCT> that records current performance of the behaviour with the person's knowledge but without providing feedback about their behaviour.
	observe outcome of behaviour without feedback BCT		A <monitoring BCT> that observes an outcome of performing the behaviour with the person's knowledge but without providing feedback about the outcome.
	observe behaviour without feedback BCT		A <monitoring BCT> that observes current performance of the behaviour with the person's knowledge but without providing feedback about their behaviour.



Example: Ensure participants in a complex clinical trial complete daily diary entries

- Behavioural diagnosis using the COM-B model
 - **Capability:** Do participants have the skills/knowledge to use the diary app?
 - **Opportunity:** Do participants have consistent access to a device and the time/environment to complete entries?
 - **Motivation:** Are participants motivated or do they perceive value?
- Identified Barriers
 - **Capability:** Not understanding the importance/impact
 - **Opportunity:** Lack of prompts or reminders - Forgetting to complete the diary
 - **Motivation:** Diary process seen as boring or difficult



BCT theory and technique's tool mapping

- **Capability:** Not understanding the importance/impact
 - **Intro video explaining diary role** - Information about the social and environmental consequences (BCT 5.3)
- **Opportunity:** Lack of prompts or reminders - Forgetting to complete the diary
 - **Tool to detail how and when the diaries will be filled** - Action planning (BCT 1.4)
 - **Pop-up daily reminders** - Prompts/cues (BCT 7.1)
- **Motivation:** Diary process seen as boring or difficult
 - **Progress dashboard** - Self monitoring of behaviour (BCT 2.3): internal
 - **Micro-incentives for weekly streaks** – Rewarding completion (BCT 14.5): external



Example: Tackling misinformation in young adults

- **Capability**
 - **Lack of knowledge** about credibility assessment strategies (lateral reading, source evaluation)
 - **Insufficient skills** to identify manipulation techniques (emotional appeals, false dichotomies, scapegoating)
- **Opportunity**
 - **Platform design** that prioritises engagement over accuracy
 - **Social endorsement cues** (likes, shares) that mislead credibility judgments
- **Motivation**
 - **Low perceived importance** of fact-checking for "minor" health claim
 - **Confirmation bias**: preferring information that aligns with existing beliefs



BCT theory and technique's tool mapping

- **Capability** – lack of knowledge and insufficient skill
 - **Step-by-step tutorials on lateral reading and source checking** - Instruction on how to perform the behaviour (BCT 4.1)
 - **Start with obvious examples, progress to subtle misinformation** - Graded tasks (BCT 8.7)
- **Opportunity** – platform design and social endorsement cues
 - **Browser extension tool for on-demand credibility checking** - Adding objects to the environment (BCT 12.5)
 - **Browser extension flags potentially unreliable sources and prompts verification** - Prompts/cues (BCT 7.1)
- **Motivation** – low perceived importance and confirmation bias
 - **Show impacts of health misinformation (vaccine hesitancy, harmful treatments)** - Information about health consequences (BCT 5.1)
 - **Explain anxiety, confusion, and mistrust caused by misinformation** - Information about emotional consequences (BCT 5.6)



Learning objectives

- By the end of the presentation, you will be able to:
 - Detail what a behavioural/behaviour change intervention is
 - BCTs + delivery mechanism
 - Describe the process of generating and testing a behavioural/behaviour change intervention
 - Individual level – Engaging in a complex clinical trial
 - Population level – Tackling misinformation

**“Things do not change:
We change”**

Henry David Thoreau



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