

# Specifying the content of behaviour change interventions

## A taxonomy of behaviour change techniques

Work In  
Progress

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*on behalf of the BCT Taxonomy Team*

Aston University workshop, 31 January 2012



# Methods for strengthening evaluation and implementation: specifying components of behaviour change interventions (2010-2013)



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<http://www.ucl.ac.uk/health-psychology/BCTtaxonomy/>





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# Outline

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- Introduction
- Progress to date
- Task
- Discussion and questions

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# Introduction



# Two landmark trials in the prevention of Type 2 diabetes

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## The New England Journal of Medicine

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VOLUME 344

MAY 3, 2001

NUMBER 18



### PREVENTION OF TYPE 2 DIABETES MELLITUS BY CHANGES IN LIFESTYLE AMONG SUBJECTS WITH IMPAIRED GLUCOSE TOLERANCE

JAAKKO TUOMILEHTO, M.D., PH.D., JAANA LINDSTRÖM, M.S., JOHAN G. ERIKSSON, M.D., PH.D., TIMO T. VALLE, M.D.,  
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AND MATTI UUSITUPA, M.D., PH.D., FOR THE FINNISH DIABETES PREVENTION STUDY GROUP

The subjects in the intervention group were given detailed advice about how to achieve the goals of the intervention, which were a reduction in weight of 5 percent or more, in total intake of fat to less than 30 percent of energy consumed, and in intake of saturated fat to less than 10 percent of energy consumed; an increase in fiber intake to at least 15 g per 1000 kcal; and moderate exercise for at least 30 minutes per day. Frequent ingestion of whole-grain products, vegetables, fruits, low-fat milk and meat products, soft margarines, and vegetable oils rich in monounsaturated fatty acids was recommended. The dietary advice was tailored to each subject on the basis of three-day food records completed four times per year.

## The New England Journal of Medicine

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VOLUME 346

FEBRUARY 7, 2002

NUMBER 6



### REDUCTION IN THE INCIDENCE OF TYPE 2 DIABETES WITH LIFESTYLE INTERVENTION OR METFORMIN

DIABETES PREVENTION PROGRAM RESEARCH GROUP\*

The goals for the participants assigned to the intensive lifestyle intervention were to achieve and maintain a weight reduction of at least 7 percent of initial body weight through a healthy low-caloric, low-fat diet and to engage in physical activity of moderate intensity, such as brisk walking, for at least 150 minutes per week. A 16-lesson curriculum covering diet, exercise, and behavior modification was designed to help the participants achieve these goals.

# Rationale

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- Lack of shared language about the content of behaviour change interventions
- Hampers evidence synthesis and reporting
- Behaviour change techniques are key intervention components
- Reliable and valid BCT taxonomy might help advance the science of behaviour change

# Behaviour change techniques (BCTs)

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- Observable, replicable and irreducible components of an intervention designed to alter or redirect causal processes that regulate behaviour
- A BCT is proposed to be an ‘active ingredient’ – e.g., goal setting, action planning

# Example of a reliable taxonomy physical activity and healthy eating behaviours

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1. General information
2. Information on consequences
3. Information about approach
4. Prompt intention formation
5. Specific goal setting
6. Graded tasks
7. Barrier identification
8. Behavioral contract
9. Review goals
10. Provide instruction
11. Model/ demonstrate
12. Prompt practice
13. Prompt monitoring
14. Provide feedback

Involves detailed planning of what the person will do including, at least, a very specific definition of the behaviour e.g., frequency (such as how many times a day/week), intensity (e.g., speed) or duration (e.g., for how long for). In addition, at least one of the following contexts i.e., where, when, how or with whom must be specified.

20. Social support/ change

21. Role model

22. Prompt self talk

23. Relapse prevention

The person is asked to keep a record of specified behaviour/s. This could e.g. take the form of a diary or completing a questionnaire about their behaviour.

Inter-rater agreement of 85-100% (Abraham and Michie, 2008)

# BCT taxonomy study: Aims

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- Develop a reliable and generalisable taxonomy of BCTs as a method for specifying, evaluating and implementing behaviour change interventions
- Achieve multidisciplinary and international acceptance and use to allow for continuous development



STUDY PROTOCOL

Open Access

## Strengthening evaluation and implementation by specifying components of behaviour change interventions: a study protocol

Susan Michie<sup>1\*</sup>, Charles Abraham<sup>2</sup>, Martin P Eccles<sup>3</sup>, Jill J Francis<sup>4</sup>, Wendy Hardeman<sup>5</sup>, Marie Johnston<sup>1</sup>

### Abstract

**Background:** The importance of behaviour change in improving health is illustrated by the increasing investment by funding bodies in the development and evaluation of complex interventions to change population, patient, and practitioner behaviours. The development of effective interventions is hampered by the absence of a nomenclature to specify and report their content. This limits the possibility of replicating effective interventions, synthesising evidence, and understanding the causal mechanisms underlying behaviour change. In contrast, biomedical interventions are precisely specified (e.g., the pharmacological 'ingredients' of prescribed drugs, their dose and frequency of administration). For most complex interventions, the precise 'ingredients' are unknown; descriptions (e.g., 'behavioural counseling') can mean different things to different researchers or implementers. The lack of a method for specifying complex interventions undermines the precision of evidence syntheses of effectiveness, posing a problem for secondary, as well as primary, research.

We aim to develop a reliable method of specifying intervention components ('techniques') aimed at changing behaviour.

**Methods/Design:** The research will be conducted in three phases. The first phase will develop the nomenclature. We will refine a preliminary list of techniques and definitions. Using a formal consensus method, experts will then define the key attributes of each technique and how it relates to, and differs from, others. They will evaluate the techniques and their definitions until they achieve an agreed-upon list of clearly defined, nonredundant techniques. The second phase will test the nomenclature. Trained experts (primary researchers and systematic reviewers), equipped with a coding manual and guidance, will use the nomenclature to code published descriptions of complex interventions. Reliability between experts, over time, and across types of users will be assessed. We will assess whether using the nomenclature to write intervention descriptions enhances the clarity and replicability of interventions. The third phase will develop a web-based users' resource of clearly specified and nonredundant techniques, which will aid the scientific understanding of, and development of, effective complex interventions. Dissemination throughout the project will be through stakeholder meetings, targeted multidisciplinary workshops, conference presentation, journal publication, and publication in an interactive web-based platform (a Wiki).

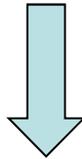
**Discussion:** The development of a reliable method of specifying intervention components aimed at changing behaviour will strengthen the scientific basis for developing, evaluating, and reporting complex interventions. It will improve the precision of evidence syntheses of effectiveness, thus enhancing secondary, as well as primary, research.

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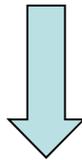
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# Research phases

Phase 1: Development of the taxonomy



Phase 2: Evaluation of the taxonomy



Phase 3: Dissemination of the prototype taxonomy

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**Progress to date:**

**Development of  
the taxonomy  
(Phase 1)**



# Phase 1: Development of taxonomy

Aim:

- Generate an extensive list of clearly labeled, defined, nonredundant BCTs as the basis of the taxonomy

# Labels and definitions

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No.	Label	Definition
47.	Goal setting (behaviour)	Set or agree a goal defined in terms of the behaviour to be achieved <i>Note: if goal type unspecified, code 45, Goal setting (outcome). If the goal defines a specific context for the behaviour, also code 49, Action planning (including implementation intentions)</i>
48.	Review of behaviour goal(s)	Review behaviour goal(s) and modify goal(s) or behaviour change strategy in light of achievement <i>Note: if outcome goal specified or goal type unspecified, code 46, Review of outcome goal(s)</i>
49.	Action planning (including implementation intentions)	Prompt detailed planning of performance of the behaviour goal (including at least one of context, frequency, intensity and duration). Context may be environmental (physical or social) or internal (physical, emotional or cognitive) <i>Note: evidence of action planning does not necessarily imply goal setting, only code latter if sufficient evidence</i>
50.	Problem solving/coping planning (including relapse prevention)	Analyse the behavioural problem and generate or select action plans that include overcoming barriers and increasing facilitators <i>Note: barrier identification without action plans is not sufficient</i>
51.	Discrepancy between current behaviour and goal	Draw attention to discrepancies between a person's current behaviour (in terms of the direction, duration, frequency or intensity of that behaviour) and previously set outcome goals, behavioural goals or action plans (goes beyond self-monitoring of behaviour). <i>Note: if discomfort is created code 84, Cognitive dissonance. If goals are modified, also code 46, Review of outcome goal(s) and/or 48, Review behaviour goal(s)</i>

# Phase 1: Procedure

*Work In Progress*

- Step 1 • Development of initial taxonomy
- Step 2 • Rating of labels and definitions (Delphi round 1) and revision
- Step 3 • Further rating (Delphi round 2)
- Step 4 • IAB feedback; pilot coding; team feedback
- Step 5 • Grouping BCTs

# Step 1 – Developing the initial taxonomy

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- Labels and definitions identified from all published taxonomies (n=6)
- 5 team members rated preferred labels and definitions
- Resulted in an initial taxonomy with 94 BCTs

APPLIED PSYCHOLOGY: AN INTERNATIONAL REVIEW, 2008, 57 (4), 660–680  
doi: 10.1111/j.1464-0597.2008.02041.x

## From Theory to Intervention: Mapping Theoretically Derived Behavioural Determinants to Behaviour Change Techniques

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Health Psychology  
2008, Vol. 27, No. 3, 379–387

## A Taxonomy of Behavior Change Techniques Used in Interventions

Charles Abraham  
University of Sussex

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**Objective:** Without standardized definitions of the techniques included in behavior change interventions, it is difficult to faithfully replicate effective interventions and challenging to identify techniques contributing to effectiveness across interventions. This research aimed to develop and test a theory-linked taxonomy of generally applicable behavior change techniques (BCTs). **Design:** Twenty-six BCTs were defined. Two psychologists used a 5-page coding manual to independently judge the presence or absence of each technique in published intervention descriptions and in intervention manuals. **Results:** Three systematic reviews yielded 195 published descriptions. Across 78 reliability tests (i.e., 26 techniques applied to 3 reviews), the average kappa per technique was 0.79, with 93% of judgments being agreements. Interventions were found to vary widely in the range and type of techniques used, even when targeting the same behavior among similar participants. The average agreement for intervention manuals was 85%, and a comparison of BCTs identified in 13 manuals and 13 published articles describing the same interventions generated a technique correspondence rate of 74%, with most mismatches (73%) arising from identification of a technique in the manual but not in the article. **Conclusions:** These findings demonstrate the feasibility of developing standardized definitions of BCTs included in behavioral interventions and highlight problematic variability in the reporting of intervention content.

Addictive Behaviors 36 (2011) 315–319



Contents lists available at ScienceDirect

Addictive Behaviors



Development of a taxonomy of behaviour change techniques used in individual behavioural support for smoking cessation

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# Step 2 – Delphi round 1

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## Participants

- Age 37-62 years; mean (SD)= 51 (8)
- N=14: UK (8), Australia (2), Netherlands (2), Canada (1) and New Zealand (1)
- Health, clinical and educational domains
- Self-reported expertise in delivering and/or designing behaviour change interventions

# Delphi round 1: questions

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- Does definition contain active ingredient?
- Is BCT conceptually unique, overlapping, redundant?
- If redundant, why?
- If overlapping, with which BCT?
- Unnecessary or omitted characteristics

Taxonomy revised based on ratings

## Step 3 - Delphi round 2 questions

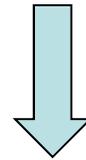
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- Is BCT clear, precise, distinct?
- Confidence in using BCT to describe intervention
- Confidence in whether two researchers or practitioners would agree in identifying BCT

# Delphi findings (steps 2 and 3)

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94 BCTs

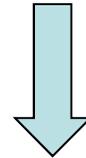


16 BCTs omitted

4 BCTs split into two

2 BCTs added

35 definitions and 7 labels amended



Post-Delphi: 84 BCTs

# Step 4 – Further refinement

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Feedback from 16/30 IAB members

Pilot coding:

- 6 experts extracted BCTs from 45 published intervention reports (3 journals)
- Pair of experts coded each intervention independently
- Inter-rater agreement, source of disagreement identified

Feedback from lay and expert team members

# Pilot coding

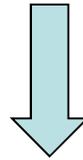
Three sources of disagreement:

- Differing interpretations of labels and definition
- Overlooked BCTs
- Misapplication of general coding principles

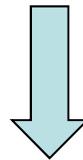
# Further refinement

Work In  
Progress

Post Delphi: 84 BCTs



7 BCTs added  
4 BCTs removed



87 BCTs

# Step 5 - Grouping BCTs

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- Develop conceptual groupings of BCTs
- 18 participants: age 27-67 years (mean=44),  
16 UK, 2 Australia
- 85 BCTs sorted into groups of choice (max 24) based  
on active ingredients
- Groups labelled according to content
- Cluster analysis to identify optimal grouping

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# Results: 16 groups

Scheduled consequences (10)

Reward & Threat (7)

Repetition & Substitution (7)

Antecedents (4)

Associations (8)

Covert Learning (3)

Natural Consequences (6)

Feedback & Monitoring (5)

Goals & Planning (9)

Social Support (3)

Comparison of Behaviour (3)

Self-belief (4)

Comparison of Outcomes (3)

Identity (5)

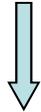
Shaping Knowledge (4)

Regulation (4)

# Taxonomy format

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Group



Definition



Label



Performance

	Label	Definition
	<b>Performance</b>	
59.	Behavioural rehearsal/practice	Prompt rehearsal or practice of the performance of the behaviour one or more times
60.	Habit formation	Prompt rehearsal and repetition of the behaviour in the same context repeatedly
61.	Instruction on how to perform a behaviour	Instruct, advise or agree on <u>how</u> to perform the behaviour to be changed <i>Note: when instruction is to attend classes such as exercise or cookery, code 61, Instruction on how to perform the behaviour, 59, Behavioural rehearsal/practice and 65, Modelling/demonstration of the behaviour</i>
62.	Conserving mental resources	Advise on ways of minimising demands on mental resources (e.g. getting enough sleep (cognitive), avoiding stressful situations (emotional))
63.	Self talk	Prompt positive self talk (aloud or silently) before and during the behaviour
64.	Behavioural experiments	Identify and test hypotheses about the behaviour, its causes and consequences, by collecting and interpreting data
65.	Modelling/demonstration of the behaviour	Provide an example for the person to aspire to or imitate

# What next?

- Training workshops
- Evaluation of the BCT taxonomy - reliability (Phase 2, step 1)
  - pilot coding with latest taxonomy
  - remote coding exercise: distance training followed by identification of BCTs from intervention reports (48 coders)

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## Phases 2 and 3

Phase 2: Evaluate the taxonomy

1. Training coders to code published intervention reports: assess reliability
2. Using taxonomy to design interventions: assess added value re. clarity and replicability

Phase 3: Disseminate the prototype taxonomy

Create a web-based resource and basis for further development, guided by an international consortium

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# **Task: Identify BCTs from an intervention description**



# Instructions

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- Materials: instructions, intervention description, BCT list
- Divide in pairs
- Each person reads the intervention description and uses the list of BCTs to identify BCTs in the description (see instructions)
- Underline relevant text and write BCT number in the margin
- Compare your scores with the other person
- Note any discrepancies and reasons, and your experiences of doing the task
- 20 mins for coding, 10 mins comparing scores

## The PRO-FIT intervention

The intervention consists of a personalized health counseling intervention. This is a combination of tailored web-based advice (PRO-FIT\*advice) and face-to-face counselling complemented with telephone booster sessions (PRO-FIT\*coach).

The goal of the intervention is to: 1) improve awareness of the cardiovascular disease risk through an increase of specific knowledge, cues to action and change in risk perception, 2) improve motivation with respect to healthy behaviour through an increase of specific knowledge and a change in attitude, self-efficacy and social influences, 3) adopt and maintain a healthier lifestyle, with regard to physical activity, saturated fat intake, fruit and vegetables intake, smoking and compliance to statin therapy, and 4) lower the level of LDL-C and other biological CVD risk indicators and thereby a reduction of the CVD risk.

### ***Risk communication***

Participants of the intervention group will receive a web link that directs them to the project website, where they can go through a number of web pages providing them with information about their CVD risk profile. After going through these web pages, they can log on to the tailored lifestyle advice (PRO-FIT\*advice) with their personal username and password that are given in the email.

### ***Computer tailoring***

PRO-FIT\*advice contains six advice modules on physical activity, fruit intake, vegetables intake, saturated fat intake, smoking and compliance to statin therapy. Participants can choose what modules to go through and in what order, but they will be advised and encouraged to complete all relevant modules (e.g. the module 'smoking' only if the participant is a smoker). For each module, participants first complete an online questionnaire that enables assessment of current behaviour and the relevant psychosocial correlates suggested by the I-Change model. After completion, the PRO-FIT\*advice software will analyse the answers and create personalized feedback and behaviour change advice, provided on the computer screen. More specifically, feedback on current behaviour in accordance with national

### List of behaviour change techniques

No	Label	Definition
1	Information about health consequences	Provide information about health consequences of performing the behaviour.
2	Persuasive communication	Present verbal or visual communication from a credible source in favour of or against the behaviour.
3	Modelling/demonstration of the behaviour	Provide an example for the person to aspire to or imitate.
4	Social support/encouragement (general)	Advise on, facilitate or provide social support (or non-contingent praise or reward for the behaviour. It includes encouragement and counselling.
5	Problem solving/coping planning	Analyse the behavioural problem and generate or select strategies that include overcoming barriers and increasing facilitators.
6	Goal setting (behaviour)	Set or agree a goal defined in terms of the behaviour to be achieved.
7	Action planning (including implementation intentions)	Prompt detailed planning of performance of the behaviour (must include at least one of context, frequency, intensity and duration). Context may be environmental (physical or social) or internal (physical, emotional or cognitive). <i>Note: evidence of action planning does not necessarily imply goal setting, only code latter if sufficient evidence</i>
8	Discrepancy between current behaviour and goal	Draw attention to discrepancies between a person's current behaviour (in terms of the direction, duration, frequency or intensity of that behaviour) and previously set outcome goals, behavioural goals or action plans (goes beyond self-monitoring of behaviour).
9	Self-monitoring of behaviour	Establish self-recording of specified behaviour/s as part of a behaviour change strategy.

Work in progress

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# Coded intervention description

### The PRO-FIT intervention

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**Comment [wh1]:** Information about health consequences (1)

### Computer tailoring

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**Comment [wh2]:** Instruction on how to perform a behaviour (12)

**Comment [wh3]:** Feedback on behaviour (10)

**Comment [wh4]:** Action planning (7)

**Comment [wh5]:** Goal setting (6)

**Motivational interviewing**

Two weeks after sending their personal PRO-FIT\* advice username and password, participants will be visited at home by their lifestyle coach. The participant and the coach will further establish the level of the participant's knowledge about FH and cardiovascular risk factors, and risk perception in a personal counselling session assisted by the information from the risk communication web pages. Furthermore, the coach will have access to the participant's personal PRO-FIT\* advice account and the advice will be discussed, ambivalence and barriers related to the recommended behaviour changes will be explored based on MI.

During the 12 months of follow-up one to five counsellor-initiated booster telephone sessions will be performed. The goal of these calls is twofold: to encourage the participant's current behavioural changes and to provide further brief motivational interviewing to encourage the planned behavioural changes. The number of telephone sessions will be based on the participant's action plans and their need for additional counselling. The calls will be scheduled with the participant and will be documented in the form of a personal calendar that is sent to the participant with a small booklet in which all topics to be addressed during the counselling session will be listed.

**Comment [wh5]:** Social support/encouragement (4)

# Your feedback

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- Number of discrepancies
- Reasons for discrepancies
- Experiences of doing the task

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# Discussion and questions

We welcome your feedback and involvement!

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Web: [www.ucl.ac.uk/health-psychology/BCTtaxonomy](http://www.ucl.ac.uk/health-psychology/BCTtaxonomy)

Email: [BCTTaxonomy@ucl.ac.uk](mailto:BCTTaxonomy@ucl.ac.uk)

