Chapter 4
Implementing Behaviour Change Strategies

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Learning Outcomes

This chapter contributes to achieving the following learning outcomes:

BC3.1 Identify standardised sources of behaviour change techniques (BCTs).
BC3.2 Identify core BCTs for the self-management of chronic disease.
BC3.3A Provide examples of determinants in selected target behaviours.
BC3.3 Explain how behaviour determinants (opportunities and barriers) influence the selection of BCTs.
BC3.4 Apply core and supplementary BCTs in different target behaviours.
BC4.3 Discuss health behaviour determinants in light of clinical hallmarks, progression and complications of chronic diseases.
BC8.2 Demonstrate how to assess behaviour determinants through structured questionnaires, interview and other approaches.
BC11.1 Demonstrate critical understanding of BCTs appropriate for brief or long-term behaviour interventions.

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4.1 Opportunities and Barriers to Implementing Change in Target Behaviours

4.1.1 Behaviour Determinants

Behaviour is influenced by determinants, as explained in Chap. 2. A key consideration is changeability, i.e. the extent to which determinants can be changed and the impact of those changes in influencing the target behaviour (Hankonen & Hardeman, 2020). Changeable factors that have a strong relationship to the behaviour are potential targets for interventions (Michie et al., 2011), impacting on intervention success (Williams et al., 2019).

Unmodifiable determinants are those that are unchangeable by a behavioural intervention, such as age. They may, however, influence the choice of an appropriate intervention. For instance, unemployment may have a negative influence on physical activity; although this barrier is not amenable to change by a behavioural intervention, it may be useful to tailor it (e.g. recommending strategies that do not involve spending money).

Chapter 3 presented key behaviours for self-management of high-priority chronic diseases, which may be influenced by a plethora of determinants. Examples are provided below for each target behaviour using the COM-B model, presented in Chap. 2. These examples do not intend to be exhaustive; they were collated based on case studies developed in the Train4Health project and the literature. An important consideration is that each person presents a unique combination of behaviour determinants based on morbidities, functional status, activities of daily living, preferences, resources and context. For example, forgetfulness may be a barrier to medication-taking in one person, while for others, not taking the medication may be related to concerns with side effects.

Similar barriers and facilitators may be observed across different target behaviours. For instance, facilitators for healthy diet may include social support or perceived self-efficacy, also identified as facilitators for physical activity.

4.1.1.1 Diet Including Alcohol Intake

Diet and alcohol intake are influenced by the interplay of behavioural, emotional and social factors, in addition to neuroendocrine and genetic influences. Certain religions limit the alcohol use, which can be seen as a facilitator within social opportunity (Kelly et al., 2018), according to the COM-B model. Influence of drinking alcohol habits of spouse/partner/family members/peers (Kelly et al., 2018) is also linked to social opportunity (Kelly et al., 2018). Examples of diet barriers and facilitators are shown in Table 4.1.

4.1.1.2 Physical Activity

Determinants for physical activity behaviour are presented in Table 4.2; examples include work schedule, social support, economic circumstances and energy.

4.1.1.3 Smoking Cessation

Barriers in smoking cessation include systems, organisations and the relationship between systems and individuals, for example, lack of access to smoking cessation programmes. Individual factors also influence quitting smoking such as physical addiction to nicotine. A range of most reported barriers to smoking cessation can be found in literature, such as enjoyment, craving, stress management and withdrawal symptoms. Common smoking cessation determinants are organised in Table 4.3.

Table 4.1 Examples of diet determinants

COM-B (West & Michie, 2020)		Determinant	
		Barriers	Facilitators
Capability *An attribute of a person that together with opportunity makes a behaviour possible or facilitates it*	**Physical capability** *Capability that involves a person's physique and musculoskeletal functioning* (e.g. *balance and dexterity)*	Tiredness to cook	Good cooking skills
		Physical disability to cook	
	Psychological capability *Capability that involves a person's mental functioning* (e.g. *understanding and memory)*	Lack of knowledge (e.g. a person with diabetes that does not know why and how to improve his/her diet)	Planning either to purchase food at work or prepare in advance food to bring to work
		Perception of time constraints	Being able to do a grocery list
		Lack of monitoring of food consumption	Being able to understand quantities
Motivation *An aggregate of mental processes that energise and direct behaviour*	**Reflective motivation** *Motivation that involves conscious thought processes* (e.g. *plans and evaluations)*	Lack of motivation	Perceived confidence in ability to cook
		Discouragement due to lack of results (Cheng et al., 2019)	
		Pleasure with eating foods containing added sugars and fats	
	Automatic motivation *Motivation that involves habitual, instinctive, drive-related and affective processes* (e.g. *desires and habits)*	Depression which may lead to self-neglect	Habit of eating vegetables, unsweetened cereals and fruits
		Anxiety or stress (e.g. leading to eat comfort food and snacks)	

(continued)

Table 4.1 (continued)

COM-B (West & Michie, 2020)		Determinant	
		Barriers	Facilitators
Opportunity *An attribute of an environmental system that together with capability makes a behaviour possible or facilitates it*	**Physical opportunity** *Opportunity that involves inanimate parts of the environmental system and time (*e.g. *financial and material resources)*	Time constraints	Ability to grow and produce food (Seguin et al., 2014)
		Accessibility and availability of unhealthy options (e.g. easy access to goodies)	Accessibility to farmers' markets and farm shares (Seguin et al., 2014)
		Price of healthy foods (Cradock et al., 2021; Pinho et al., 2018)	Having only healthy choices to eat at home
		Lack of healthy options (Pinho et al., 2018)	Availability of health eating in the local restaurant or café (Cradock et al., 2021)
	Social opportunity *Opportunity that involves other people and organisations (*e.g. *culture and social norms)*	Social context (e.g. inviting people to one's home and serving food and drink, enjoying drinking alcohol with friends)	Positive influences of family and friends on healthy eating behaviour (Cheng et al., 2019; Cradock et al., 2021)
		Taste preferences of family and friends (e.g. people around eating confectionery)	Religion

Table 4.2 Examples of physical activity determinants

COM-B (West & Michie, 2020)		Determinant	
		Barriers	**Facilitator**
Capability *An attribute of a person that together with opportunity makes a behaviour possible or facilitates it*	**Physical capability** *Capability that involves a person's physique and musculoskeletal functioning (*e.g. *balance and dexterity)*	Fatigue (Cortis et al., 2017)	Physical health status (e.g. a person who has lost weight may feel more energetic to engage in physical activity)
		Health status change (e.g. worsening dyspnoea in a person with COPD)	
	Psychological capability *Capability that involves a person's mental functioning (*e.g. *understanding and memory)*	Lack of knowledge about the importance of physical activity	Knowledge about the health consequences of an inactive lifestyle
			Physical activity planning (e.g. having a routine to do physical activity)

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Table 4.2 (continued)

COM-B (West & Michie, 2020)		Determinant	
		Barriers	**Facilitator**
Motivation *An aggregate of mental processes that energise and direct behaviour*	**Reflective motivation** *Motivation that involves conscious thought processes* (e.g. *plans and evaluations)*	Lack of prioritisation assigned to physical activity	Motivation to adopt and maintain healthy physical activity behaviour
		Preferences for sedentary activities at home (e.g. reading or watching television)	High levels of self-efficacy (e.g. perceived confidence in the ability to run 3 km)
		Lack of care with body image	Enjoyment (Cortis et al., 2017)
		Fear of injury (Cortis et al., 2017)	
Opportunity *An attribute of an environmental system that together with capability makes a behaviour possible or facilitates it*	**Physical opportunity** *Opportunity that involves inanimate parts of the environmental system and time* (e.g. *financial and material resources)*	Heavy work schedule	Good weather (e.g. when physical activities are performed outdoors)
		Lack of time (e.g. busywork routines or family obligations) (Cradock et al., 2021)	
		Economic circumstances (e.g. being unable to pay for the gym or group classes) (Cradock et al., 2021)	
		Neighbourhood (e.g. lack of parks or sidewalks or open spaces; long distance from parks)	
	Social opportunity *Opportunity that involves other people and organisations* (e.g. *culture and social norms)*	Lack of social support (e.g. no encouragement from family and friends to perform physical activity) (Cortis et al., 2017)	Social support (e.g. a friend that helps the person to keep focused and motivated)

Table 4.3 Examples of smoking cessation determinants

COM-B (West & Michie, 2020)		Determinant	
		Barriers	**Facilitator**
Capability *An attribute of a person that together with opportunity makes a behaviour possible or facilitates it*	**Physical capability** *Capability that involves a person's physique and musculoskeletal functioning (*e.g. *balance and dexterity)*	Nicotine addiction (Chean et al., 2019)	
		Withdrawal symptoms on quitting (Chean et al., 2019)	
	Psychological capability *Capability that involves a person's mental functioning (*e.g. *understanding and memory)*	Lack of knowledge about smoking cessation consultations	Planning skills for seeking smoking cessation help
Motivation *An aggregate of mental processes that energise and direct behaviour*	**Reflective motivation** *Motivation that involves conscious thought processes (*e.g. *plans and evaluations)*	Negative impression about the effectiveness of assisted smoking cessation (Chean et al., 2019)	High level of self-efficacy
		Pleasure from smoking	Willingness to quit smoking
	Automatic motivation *Motivation that involves habitual, instinctive, drive-related and affective processes (*e.g. *desires and habits)*	Stress/anxiety (Ferra et al., 2019)	
		Impaired capacity for self-control (Chean et al., 2019)	
		Impulse (i.e. the decision to resume smoking is rather impulsive)	
Opportunity *An attribute of an environmental system that together with capability makes a behaviour possible or facilitates it*	**Physical opportunity** *Opportunity that involves inanimate parts of the environmental system and time (*e.g. *financial and material resources)*	Unaffordable smoking cessation medication (Ferra et al., 2019)	Affordable smoking cessation medication (Ferra et al., 2019)
		Easy access to cigarettes (Ferra et al., 2019)	Restricted access to tobacco (Ferra et al., 2019)
		Limited access to smoking cessation programmes (Ferra et al., 2019)	Easy access to smoking cessation programmes (Ferra et al., 2019)
			Smoke-free homes and places
	Social opportunity *Opportunity that involves other people and organisations (*e.g. *culture and social norms)*	Example from others (e.g. friends who smoke in social activities or workplaces) (Chean et al., 2019)	Social support from family and friend to quit smoking
		Cigarette offers from friends and relatives (Chean et al., 2019)	

4.1.1.4 Medication Adherence

Medication adherence is affected by multiple determinants such as psychosocial, economic and health system factors (Kardas et al., 2013; Kvarnström et al., 2021; Mishra et al., 2021). For instance, a strong network providing social support increases medication adherence, while forgetfulness may contribute to non-adherence (Kardas et al., 2013; Kvarnström et al., 2021). Table 4.4 provides examples of barriers and facilitators of medication adherence.

Table 4.4 Examples of medication adherence determinants

COM-B (West & Michie, 2020)		Determinant	
		Barriers	**Facilitator**
Capability *An attribute of a person that together with opportunity makes a behaviour possible or facilitates it*	**Physical capability** *Capability that involves a person's physique and musculoskeletal functioning* (e.g. *balance and dexterity)*	Lack of dexterity to take the medication	Planning medication taken
		Unplanned travel or routine changes (Kvarnström et al., 2021)	Knowledge about prescribed medication
	Psychological capability *Capability that involves a person's mental functioning* (e.g. *understanding and memory)*	Forgetfulness	Integrating meditation into daily life (Kvarnström et al., 2021)
		Incapability of planning medication-taking	
Motivation *An aggregate of mental processes that energise and direct behaviour*	**Reflective motivation** *Motivation that involves conscious thought processes* (e.g. *plans and evaluations)*	Beliefs about lack of necessity (e.g. these medicines don't protect me from becoming worse; my health, at present, does not depend on these medicines, adapted from Horne et al., 1999) (Félix & Henriques, 2021)	Perception of disease severity (Kardas et al., 2013; Kvarnström et al., 2021)
		Concerns about medication (e.g. these medicines give me unpleasant side effects; these medicines disrupt my life) (Félix & Henriques, 2021; Horne et al., 1999)	Fear of recurrence of event, (e.g. physical pain and the fear of recurrence (Mishra et al., 2021)
	Automatic motivation *Motivation that involves habitual, instinctive, drive-related and affective processes* (e.g. *desires and habits)*	Depression (Félix & Henriques, 2021; Jackson et al., 2014; Kardas et al., 2013)	Habit

(continued)

Table 4.4 (continued)

COM-B (West & Michie, 2020)		Determinant	
		Barriers	**Facilitator**
Opportunity *An attribute of an environmental system that together with capability makes a behaviour possible or facilitates it*	**Physical opportunity** *Opportunity that involves inanimate parts of the environmental system and time* (e.g. *financial and material resources)*	Lack of medication availability (Kvarnström et al., 2021)	Good access to a healthcare facility (Kardas et al., 2013)
		Cost of medication	
		Lack of health insurance (Mishra et al., 2021)	
		Lack of clarity in prescription (Mishra et al., 2021)	
	Social opportunity *Opportunity that involves other people and organisations* (e.g. *culture and social norms)*	Cultural preference for alternative medicine (Kvarnström et al., 2021)	Support from healthcare professionals
		Lack of social support (Kardas et al., 2013)	Emotional or practical support by family members or careers (Kardas et al., 2013; Kvarnström et al., 2021; Mishra et al., 2021)

Clinical hallmarks, progression and complications of chronic diseases should be considered, as they may influence self-management behaviours. For example, the progression of COPD and the existence of dyspnoea on exertion may negatively influence physical activity. Furthermore, it may also be directly related to diet behaviour (e.g. if the person does not have the capability to go to the supermarket frequently due to fatigue, eating healthy food may be compromised).

Another example is a person who had a leg amputation due to type 2 diabetes complications and does not have a prosthesis; this may represent a barrier to specific exercises or physical activity. In the case of retinopathy caused by type 2 diabetes, recognising medicines may become difficult, which may influence how people take them.

In summary, clinical characteristics, progression and complications of chronic diseases, as well as other determinants exemplified previously should be assessed when planning a behaviour change intervention.

4.1.2 Assessing Behaviour Determinants Using Appropriate Measures

The previous section illustrates different determinants that influence target behaviours in the self-management of chronic disease. As already explained, the examples presented do not intend to be exhaustive. While these can be helpful to bear in mind

when assessing behaviour determinants, it is equally important not to forget that each person is unique and can present specific barriers and facilitators.

Identifying the key determinants that influence a target behaviour often requires a range of methods and sources. This section summarises approaches to assess determinants in order to guide the intervention plan.

The interview is the most frequent approach in practice to assess behaviour determinants. As explained in Chap. 5 "Communication and Person-Centred Behaviour Change", the interview ideally starts with open questions, to expand the dialogue and unravel the person's perspective on barriers and facilitators, and can then move to closed-ended questions, to fine-tune the understanding and clarify details. Possible questions are presented below (Boxes 4.1 and 4.2).

Box 4.1 Example of Open Questions

- Why have you been having difficulty increasing your fruit consumption?
- What helps you to take your medication/to increase your physical activity?
- What do you think is needed to eat fewer carbs and more veggies?
- What thoughts have you had about increasing walking?
- What is your biggest barrier to stop smoking?

Box 4.2 Example of Closed-Ended Questions

- Do you feel confident about managing your medication?
- Does the cost of healthy foods influence your behaviour?
- Do stress levels make you crave for a cigarette?
- Does pain in your knees bother you when walking?

The interview can be supplemented with tools to assess determinants; some tools are behaviour-specific (Table 4.5), while others are disease-specific and ascertain determinants in more than one target behaviour. The Diabetes Self-Efficacy scale is one example of a Likert-type scale with eight items that assess self-efficacy in different target behaviours, such as diet, physical activity and medication-taking (Ritter et al., 2016).

Keyworth et al., (2020) developed a novel six-item questionnaire for self-evaluating people's perceptions of capabilities, opportunities and motivations based on the COM-B model. This questionnaire is sufficiently generic for any behaviour or population. Respondents rate the level of agreement with the statement (e.g. I have the physical opportunity to *change my behaviour to improve my health*) on a scale from 0 to 10. Alternative text is presented in italics and can be replaced by a target behaviour such as physical activity or diet. Then, specific barriers or facilitators of behaviour can be explored for each COM-B component.

Table 4.5 Examples of behaviour-specific tools to assess determinants

Target behaviour	Determinant	Tool
Medication adherence	Beliefs about medicines	*Beliefs About Medicines Questionnaire – Specific (BMQ-Specific)* (Horne et al., 1999) The BMQ-specific is comprised of two five-item subscales to assess the person's beliefs about the necessity of prescribed medication and their concerns about potential adverse consequences of taking it: the necessity and the concerns scale. Each item is scored on a five-point Likert scale that varies from strongly disagree (1) to strongly agree (5). Total scores for the necessity and concerns scales are obtained by summing the scores of individual items (min. 5 and max. 25). The higher the score is, the greater the person's belief in the construct
	Multiple determinants	*Identification of Medication Adherence Barriers Questionnaire (IMAB-Q 30 or IMAB-Q 10)* (Brown et al., 2017) The IMAB-Q 30 and IMAB-Q 10 address potential barriers to medication adherence. IMAB-Q 10 is a 10-item questionnaire, while the IMAB-Q 30 comprises 30 items. Each item corresponds to a barrier that may be experienced on medication-taking by a person. Both questionnaires have a five-point Likert scale ranging from strongly agree to strongly disagree
	Self-efficacy	*The Self-Efficacy for Appropriate Medication Use Scale (SEAMS)* (Risser et al., 2007) The SEAMS is a 13-item scale to assess medication self-efficacy in chronic disease management. This three-point response scale – (1) not confident, (2) somewhat confident and (3) very confident – measures the level of confidence of taking medication as prescribed in different scenarios. An example of an item is "how confident are you that you can take your medicines correctly when you have a busy day planned?". Higher levels of self-efficacy for medication-taking are reflected by higher scores in SEAMS

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Table 4.5 (continued)

Target behaviour	Determinant	Tool
Physical activity	Competence Autonomy Relatedness	*Basic Psychological Needs in Exercise Scale (BPNES)* (Vlachopoulos et al., 2010) The BPNES is a 12-item scale that measures the satisfaction of psychological needs for exercise; it comprises three constructs: Autonomy (items 3, 6, 9, 12), competence (items 1, 4, 7, 10) and relatedness (items 2, 5, 8, 11). Respondents indicate their degree of agreement with each statement on a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The maximum score for each construct is 20
	Motivation	*Exercise Motivations Inventory (EMI-2)* (Markland & Ingledew, 1997) A 51-item scale to measure motivation to exercise, including enjoyment, health pressures, social recognition and stress management. The EMI-2 scale encompasses 14 subscales, and each item is assessed using a 6-point Likert scale (0 = not at all true for me to 5 = very true for me). Example of an item: *Personally, I exercise (or might exercise) to have a healthy body*. Higher scores indicate higher exercise motivation
	Self-efficacy	*Self-Efficacy for Physical Activity (SEPA)* (Marcus et al., 1992) The SEPA scale assesses confidence for engaging in physical activity. By listing potential barriers, respondents have to indicate their confidence in a five-point Likert scale (1 = not confident to 5 = extremely confident). SEPA scale has five items
Diet	Different determinants (including motivation)	*Regulation of Eating Behaviour Scale (REBS)* (Pelletier et al., 2004) The REBS scale is a 24-item scale focusing on factors such as external regulation, identified regulation, introjected regulation, integrated regulation, amotivation and intrinsic motivation. By using a seven-point Likert scale (1 = does not correspond at all and 7 = corresponds exactly), respondents indicate the extent of motives for regulating their eating behaviour
Smoking cessation	Nicotine dependence	*The Fagerström Test for Nicotine Dependence* (Heatherton et al., 1991) The Fagerström test comprises six items to assess the quantity of cigarette consumption, the compulsion to smoke and dependence. It encompasses two types of responses: Yes/no (scored from 0 to 1) and multiple choice (scored from 0 to 3). The Fagerström score is obtained by summing the scores of individual items (min. 0 and max. 10). The higher the score is, the more intense is the person's physical dependence on nicotine

4.2 Tailoring Behaviour Change Techniques in the Development of an Intervention Plan

4.2.1 Behaviour Change Techniques to Support Chronic Disease Self-Management

To replicate and implement behaviour change interventions in practice, we need an agreed language to report their content. A reliable method has been developed to specify content in terms of behaviour change techniques (BCTs), the active components of a behaviour change intervention. A BCT is "an observable, replicable, and irreducible components of an intervention designed to alter or redirect causal processes that regulate behaviour" (Michie et al., 2013).

Based on a series of consensus exercises, an extensive hierarchically clustered taxonomy of 93 distinct BCTs has been developed (Michie et al., 2013) – BCT Taxonomy version 1 (BCTTv1). This taxonomy consists of a total of 16 clusters, covering a total of 93 BCTs, together with definitions and illustrative examples. BCTTv1 offers a reliable method for specifying, interpreting and implementing the active ingredients of interventions to change behaviours, which that can be helpful to professionals (Michie et al., 2013).

To facilitate access and support professional practice, a mobile application has been developed with a fully searchable version of BCTTv1 (https://www.ucl.ac.uk/behaviour-change/resources/online-tools-behaviour-change). BCTs can be searched by label or grouping or alphabetically.

BCTs, as active ingredients of the interventions, can take different functions such as education (i.e. increase knowledge or understanding), training (i.e. impart skills) or persuasion (i.e. use communication to induce or negative feelings to stimulate action). The most frequently used BCTs for education are information about health consequences (5.1), information about social and environmental consequences (5.3), feedback on behaviour (2.2), feedback on outcome(s) of behaviour (2.7) and self-monitoring of behaviour (2.3). Informing a person who smokes that the majority of people disapprove of smoking in public places is an example of using a BCT (information about social and environmental consequences 5.3) for education purposes. Explaining the likelihood of increasing the glycated haemoglobin levels (A1C) when adopting an unhealthy lifestyle is another example of a BCT used for education purposes (information about health consequences 5.1). Table 4.6 presents a set of BCTs with accompanying definition and examples (Michie et al., 2013).

For the self-management of chronic diseases, 21 core BCTs were identified from the BCTTv1 based on a literature search in conjunction with behavioural psychologists' feedback (Guerreiro et al., 2021). The 21 BCTs are common to the 5 target behaviours in the 7 high-priority chronic diseases considered in Chap. 3 (type 2 diabetes, COPD, obesity, heart failure, asthma, hypertension and ischaemic heart disease) and are available at Guerreiro et al. (2021). Additional BCTs were organised in supplementary sets per target behaviour (Guerreiro et al., 2021).

BCTs are designed to enable behaviour change and can do this by augmenting factors that facilitate behaviour change or by mitigating factors that inhibit

Table 4.6 Set of BCTs, accompanying definition and example of application

BCT	Definition	Example
1.1 Goal setting (behaviour)	Set or agree on a goal defined in terms of the behaviour to be achieved	Set the goal of eating five pieces of fruit per day as specified in public health guidelines
2.3 Self-monitoring of behaviour	Establish a method for the person to monitor and record their behaviour(s) as part of a behaviour change strategy	Give the person a pedometer and a form for recording the daily total number of steps
5.1 Information about health consequences	Provide information (e.g. written, verbal, visual) about health consequences of performing the behaviour	Explain that not finishing a course of antibiotics can increase susceptibility to future infection

From Michie et al. (2013) and Michie et al. (2014, p. 259, 262, 266)

behaviour change. An illustration of this point is the case of a person with type 2 diabetes who does not believe in her or his ability to increase physical activity. The BCT Graded tasks (8.7) – set easy-to-perform tasks, making them increasingly difficult, but achievable, until behaviour is performed (Michie et al., 2014) – might change the behaviour by increasing the belief about the person's capabilities. When promoting healthy eating, one might hypothesise that the BCT Restructuring the physical environment (12.1) – change or advise to change the physical environment in order to facilitate performance of the wanted behaviour or create barriers to the unwanted behaviour – might change this behaviour by eliminating the access to a vending machine with unhealthy snacks in the workplace.

Additional classifications of techniques to change behaviour and influence motivation have been developed. A notable example is the compendium of self-enactable techniques (Knittle et al., 2020), developed from existing taxonomies (e.g. BCTTv1, Kok et al., 2016). The compendium contains a list of 123 techniques that can be enacted by the individual, and each technique is presented with a label, a definition, instructive examples on health behaviours, its source, information on whether it requires external inputs (e.g. obtaining information) and prerequisite techniques (e.g. the technique "feedback on behaviour" can only be used if "self-monitoring of behaviour" is in place). This can be a valuable resource for intervention developers and recipients in the context of chronic disease management, e.g. in self-delivered and technology-assisted interventions.

There are benefits of using BCTs provided by a taxonomy in interventions to support behaviour change:

- To establish a structured link with behaviour determinants, which facilitates intervention tailoring and increases effectiveness.
- To specify intervention content, facilitating the identification of effective interventions in practice.
- To enhance the comprehensiveness of interventions in practice, as it is less likely that barriers and facilitators are disregarded when the intervention is tailored to behaviour determinants.
- To ensure consistency across interventions.

4.2.2 Tailoring Behaviour Change Techniques

Section 4.1, provides examples of behaviour determinants. As pointed out, tailoring the intervention to behaviour barriers increases the likelihood of success (Williams et al., 2019). For example, a pillbox or reminders will do little for a person deciding not to take a medication due to concerns about side effects; such barrier requires techniques increasing knowledge or understanding, such as information about health consequences (5.1), or inducing a feeling to stimulate action, such as pros and cons (9.2). These BCTs consist of, respectively, highlighting the positive and negative consequences of taking the medication and advising the person to compare reasons for wanting and not wanting to perform the behaviour (Michie et al., 2014).

As depicted in Fig. 4.1, tailoring BCTs can be seen as a two-step sequential process. Firstly, choosing BCTs that can potentially be used in the intervention, based on their alignment with behaviour barriers – Step 1 in Fig. 4.1. Secondly, selecting BCTs from this "list" and deciding on operationalisation according to the person's unique combination of e.g. morbidities, functional status, activities of daily living, preferences and resources – Step 2 in Fig. 4.1.

An important consideration is that it may be unnecessary and potentially inappropriate to deliver all BCTs listed in Step 1. As explained, the patient as a unique person should be considered when selecting a BCT addressing a behaviour barrier. For example, social support may not be suitable for a person living alone and having a restricted social network. Operationalising a selected BCT also requires attention to the patient as a unique person; for instance, advising a person to set reminders in a mobile phone to take the medication – prompts/cues (7.1) – may not be appropriate for older persons unfamiliar with these devices. In such a case, helpful alternatives may include using a post-it.

Another important consideration is about the use of the BCTs alone or in combination change. For example, for a person who forgets to take the medication, the BCT Prompts and cues (7.1) – introduce or define environmental or social stimulus with the purpose of prompting or cueing the behaviour – may be sufficient to overcome this barrier. A combination of BCTs may be needed for a person who has concerns about medication, such asusing information about health consequences (5.1) and pros and cons (9.2) in bundle. The two-step sequential process depicted in Fig. 4.1 aids the decision of suggesting BCTs alone or in combination.

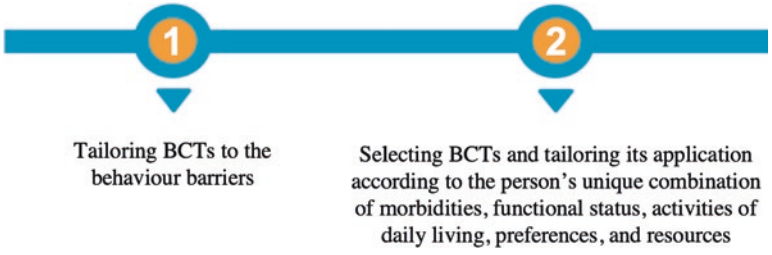

Fig. 4.1 Identifying and selecting BCTs when developing an intervention plan: steps 1 & 2

The alignment of BCTs with behaviour barriers is further exemplified in Table 4.7, using the case of physical activity of a fictitious person; the application of BCTs is also exemplified.

Table 4.7 Example: barriers to physical activity, aligned with BCTs and their application

COM-B component	Barrier	BCT	Definition (Michie et al., 2014)	Application
Physical capability	Fatigue	4.1 instruction on how to perform a behaviour	Advise or agree on how to perform the behaviour (includes "skills training")	Advise on physical activity or exercises that are less demanding
		1.4 action planning	Prompt detailed planning of performance of the behaviour (must incluvde at least one of context, frequency, duration and intensity). Context may be environmental (physical or social) or internal (physical, emotional or cognitive) (includes "implementation intentions")	Prompt the scheduling of physical activity for times in the day or week when the person feels less fatigue
Psychological capability	Lack of knowledge of the importance of physical activity	5.1 information about health consequences	Provide information (e.g. written, verbal, visual) about health consequences of performing the behaviour	Highlight the benefits for one's health of doing regular physical activity
Social opportunity	Lack of encouragement and support from family and friends	3.1 social support (unspecified)	Advise on, arrange or provide social support (e.g. from friends, relatives, colleagues, "buddies" or staff) or non-contingent praise or reward for performance of the behaviour. It includes encouragement and counselling, but only when it is directed at the behaviour	Advise the person to explain his/her interest in physical activity to friends and family and ask them to support his/her efforts
		3.2 social support (practical)	Advise on, arrange or provide practical help (e.g. from friends, relatives, colleagues, "buddies" or staff) for performance of the behaviour	Advise the person to invite friends and family to exercise with (e.g. walking in the park)

4.2.3 Selecting Behaviour Change Techniques According to the Length of the Intervention

The length of the intervention also influences the selection of BCTs. Box 4.3 presents the definition of brief and long-term interventions.

Box 4.3 Definition of Brief and Long-Term Intervention
Brief intervention

Intervention delivered in a short interaction between the provider and the individual, often carried out when the opportunity arises, typically taking no more than a few minutes. Although short in duration, a brief intervention can be delivered in several sessions (adapted from National Institute for Health and Care Excellence, 2014)

Long-term intervention

Intervention delivered in a longer interaction (e.g. around 30 minutes) between the provider and the individual, which has a structured plan and consists of multiple sessions over time (adapted from National Institute for Health and Care Excellence, 2014)

To facilitate comprehension, we have further conceptualised BCTs tailoring as a three-step sequential process, adding tailoring of BCTs to the length of the intervention as Step 3 (Fig. 4.2). That said, in practice Steps 2 and 3 can take place simultaneously.

In brief interventions it may not be feasible to use BCTs that require more than one encounter to operationalise. A good illustration is the case of Feedback on outcomes of behaviour (2.7). Let us consider a person living with obesity, who agrees to engage frequently in physical activity and is advised to monitor weigh (self-monitoring of outcome(s) of behaviour 2.4). It may be beneficial to provide feedback on how much weight the person has lost as an outcome of performing physical activity (Feedback on outcome(s) of behaviour 2.7). However, the selection of the

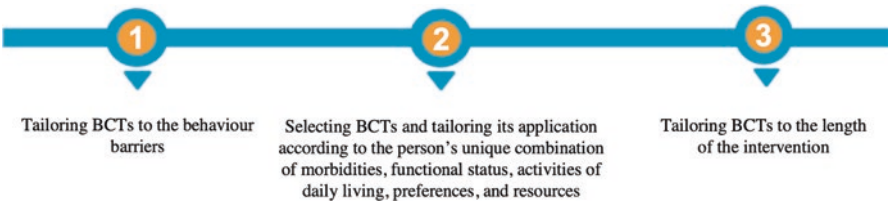

Fig. 4.2 Identifying and selecting BCTs when developing an intervention plan: steps 1, 2 & 3

latter BCT is not realistic in a brief intervention limited to one encounter or with unknown frequency of encounters. This can also be seen in the case of the BCT Review behaviour goal(s) (1.5), which may not be appropriate in a brief intervention limited to one encounter. However, if the brief intervention is delivered in several sessions, it is possible to use it provided that behaviour goals were previously set (Goal setting behaviour 1.1) and that is appropriate to revise them.

The number of BCTs used in an interaction may differ in a brief and long intervention. Due to the longer duration and structured nature, the latter may encompass a higher number of BCTs, if justified considering the behaviour determinants and person's unique preferences.

In brief and long interventions, professionals should also consider the modes of delivery of BCTs. Modes of delivery (MoD) are defined as the method(s) by which the content (i.e. BCTs) is brought to the person (Marques et al., 2020); they can influence the effectiveness of the interventions. For example, meta-research found effectiveness to be higher in smoking cessation interventions when the BCTs were delivered in person as opposed to written form (Black et al., 2020).

The modes of delivery are organised in four-level hierarchical structures comprising 65 entities. There are 15 upper-level classes, such as Informational MoD and Environmental change MoD. Each upper-level class includes sub-classes, as represented in Table 4.8 for Informational MoD.

Many factors influence the decision on the modes of delivery, not only the length of the interventions, but also the preferences and needs of the person. The modes of delivery should be considered when developing an intervention plan.

Key Points

- A plethora of determinants can influence positively or negatively the key self-management behaviours in high-priority chronic diseases.
- The COM-B model can guide the identification of behaviour determinants.
- Specific tools and approaches can be useful for assessing behaviour determinants such as Beliefs About Medicines Questionnaire (BMQ), Regulation of Eating Behaviour Scale (REBS) and interview.
- Behaviour change techniques (BCTs) are the active components of behaviour change interventions.
- When developing an intervention plan, tailoring BCTs should consider the behaviour determinants identified for the person, her/his unique combination of morbidities, functional status, activities of daily living, preferences, resources and context, and the length of the intervention.
- When behaviour change techniques are implemented in practice, consideration should also be given to the mode of delivery.

Table 4.8 Example of modes of delivery including in the Informational MoD

Upper-level class	Sub-level 1	Sub-level 2	Definition	Examples of usage
Informational MoD			Mode of delivery that involves intentional transmission of a representation of the world to an intervention recipient with the aim of changing that person's representation of the world	This includes delivery of rewards, prompts and cues that result in learning and information about the environment and environmental contingencies
	Human interactional mode of delivery		Informational mode of delivery that involves a person as intervention source who interacts with an intervention recipient in real time	
		Face-to-face mode of delivery	Human interactional mode of delivery that involves an intervention source and recipient being together in the same location and communicating directly	
		At-a-distance mode of delivery	Human interactional mode of delivery that involves an intervention source and recipient being in different locations and communicating through a communication channel	
	Printed material mode of delivery		Informational mode of delivery that involves use of printed material	Can include paper, acetate, text, diagrams and photographic images
		Letter mode of delivery	Printed material mode of delivery that involves a letter or postcard that can be sent through the post or handed directly to the recipient	
		Printed publication mode of delivery	Printed material mode of delivery that involves use of a printed publication	Includes leaflets, brochures, newspapers, newsletter, booklets, magazines, manuals or worksheets
	Electronic mode of delivery		Informational mode of delivery that involves electronic technology in the presentation of information to an intervention recipient	
		Mobile digital device mode of delivery	Electronic mode of delivery that involves presentation of information by a handheld mobile digital device that can store, retrieve and process data	

From Marques et al. (2020, p. 9, 10).

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