A guideline for behavior change

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It is not enough to provide people at risk of consuming arsenic or fluoride contaminated water with safe water facilities, because for certain reasons they might not use them or do not use them properly and regularly. Evidence suggests that the effectiveness of technologies is dependent on the degree of compliance, as De Preez et al. (2010) and Mäusezahl et al. (2009) demonstrated in the case of solar water disinfection. Providing populations at risk with safe water “hardware” must be accompanied by “software” programs that support behaviour change (Peal et al., 2010). These behaviour change programs aim at improving acceptance, adoption, and habitual use of safe water facilities. As behaviour is always the result of psychological processing of factors within the individual, behaviour change campaigns must take these factors into account. Practitioners must know which of these behavioural factors keep the target population attached to the old behaviour of consuming contaminated water.

For example, people will not use arsenic or fluoride removing household or community filters

- if they are not convinced about health effects of these filters
- if they dislike the taste of the water
- the price is regarded as too high,
- if they think that others disapprove of the consumption of such water
- if they think that filtering water is taking too much effort,
- if they are not committed enough to use filtered water.

Knowledge of which behaviour change techniques (BCT) change which inner factor is crucial for successful behaviour change campaigns.

In this guideline a general protocol for behaviour change is outlined containing the sequence of gaining knowledge about behavioural factors steering the behaviour to be changed, determining corresponding behaviour change techniques, and evaluating the behaviour change campaign. The procedure is divided into 9 steps which will be explained below.
How to use this guideline

Behaviour change is a crucial step to mitigate geogenic contamination and other water, sanitation, and hygiene related problems. However, it is also a challenging endeavor, which requires a multitude of skills and also takes time. This guideline provides an overview of the steps that need to be taken for successful behaviour change. It is not possible to convey all the knowledge and expertise required to successfully conduct all the steps in this guideline. Depending on the reader’s background, he or she will need to consult experienced persons for some steps. People and institutions interested in applying this approach are strongly recommended to participate in our training, where they will be thoroughly instructed and supplied with comprehensive information and skills, how to design, implement, and evaluate successful behaviour change campaigns.

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The 9 Steps towards sustainable Behaviour Change

1. Define the behaviour to be changed and the target population to be tackled
2. Gain a first impression about the favouring and hindering conditions of the behaviour
3. Catalogue all possible behaviour determinants
4. Develop questionnaire to measure behavioural factors
5. Conduct a representative baseline survey
6. Determine the factors, which steer the target behaviour
7. Define and design interventions to change recognised behavioural factors
8. Define suitable communication channels
9. Evaluate the effectiveness of the behaviour change techniques and their long-term effects
1 Define the behaviour to be changed and the target population to be tackled

So that human and financial resources are not wasted, it is important to define who exactly should change which behaviour.

![Woman collecting water from an arsenic-contaminated tubewell in Bangladesh](image)

Note that at this point, the technically and institutionally most suitable option(s) should have already been determined. In this step, it is now the aim to define which behaviours potential users need to adopt or change in order to install/use/maintain them.

**Target behaviour**

For defining the behaviour to be changed, a closer look at the stream of everyday behaviour is needed. Important questions that should be asked are:

- What is the safe water option that should be used? E.g. a community filter, a household filter, a neighbouring well?
- What performance is required to use that safe water option? E.g. fetching water at a public community filter, regularly filling a private household filter, contacting a neighbour for using his/her well?
- Which behaviour is crucial for the target population and not habitualised? E.g. is it important that women also cook with safe water, or is the goal to only drink the safe water, or do people only drink safe water but never use it for cooking even though they should?

Depending on the answers to these questions the target behaviour that has to be tackled differs from situation to situation. The exact definition of the behaviour to be changed is a crucial first step of the behavioural change process.

**Target population**
Defining the target population is crucial. Different action will be required depending on whether children or adults should be tackled, or men or women. The practitioner should know who in the household makes the relevant decisions, e.g. when the head of the household decides where the young daughter collects the drinking water, then his/her decision has to be changed but also the daughter’s behaviour (if it differs from the head of household’s decision). Sometimes modify person is not empowered to make decisions concerning modifications of their house, a tenant for example might not be allowed to dig an additional tubewell if the one he/she is using is contaminated. This decision may have to be made by the landlord and therefore his or her decision has to be changed. If people share a facility, then groups of people need to take the decision for change. In this case the whole user group has to be approached, this might mean involving a whole community in the process.

The main questions that should be answered are:

- Who are the decision makers? For example: head of household, community leader, religious leader, head of neighbourhood union, housewives?
- Who are the people who perform the target behaviour? For example: women, girls, men, a group of people?

The exact definition of the target population and the behaviour to be changed is a precondition for the next step in which the circumstances of the behaviour are clarified. To do this the following types of interviews have to be conducted.

<table>
<thead>
<tr>
<th>Tasks to complete step 1:</th>
</tr>
</thead>
<tbody>
<tr>
<td>➔ Interviews with experts and/or</td>
</tr>
<tr>
<td>➔ Interviews with local partners and/or</td>
</tr>
<tr>
<td>➔ Interviews with community and opinion leaders</td>
</tr>
<tr>
<td>➔ Focus-group discussion</td>
</tr>
</tbody>
</table>
EXAMPLE\textsuperscript{1}:

A rural village in Ethiopia has elevated fluoride concentrations in all of the accessible water sources. To prevent the uptake of excess fluoride, a fluoride-removal community filter was implemented. The filter is located in the centre of the village next to the main raw water source. The community can now purchase water from the new community filter. However, the treated water is more expensive than the unsafe raw water. The price was set by the local water committee to assure financial sustainability for the filter. After the implementation of the filter, the research team held interviews with their local partner NGO to complete step 1. The target behaviour was identified as fetching water at the community filter. The target behaviour is not different from the alternative behaviour, fetching water from an unsafe well because it is also public and requires the effort of fetching. Through the interviews the research team also found out, that the decision makers are the heads of the households (mainly men) and the ones who perform the behaviour (fetching water) are mainly women and younger girls.

\textbf{Figure 8.2:} Young woman fetching water at the community filter, Ethiopia.

\textsuperscript{1} The examples provided in the boxes are fictional but based on experiences in several projects.

2 First impression about the favouring and hindering conditions of the behaviour

In this step, qualitative formative research has to be conducted, meaning that one will conduct only few interviews and observations in order to have a basis for the next steps. Intensive, in-depth interviews should be carried out about barriers and facilitating conditions of the behaviour. Persons can also be asked directly about the reasons they have to perform or not to perform a behaviour, e.g. whether they find that it is too much effort to collect the water from a community filter. Also cultural habits regarding the social milieu of the target behaviour should be disclosed in in-depth interviews. For example, whether it is important or not to people to serve guests safe, uncontaminated water.

Observations of the daily life should be conducted for revealing when and where people perform or do not perform the behaviour, e.g. when a household filter is filled and which incidents hinder the filling.
Situation conditions of the behaviour should be surveyed, e.g. whether filtered water is available when working in the fields.

**Tasks to complete step 2:**
- In-depth interviews with people who are responsible for performing the behaviour
- Observation of randomly selected households during a whole day

**EXAMPLE:**
To complete step 2, the research team conducted five in-depth interviews with five different households and observed five women who are responsible for fetching water during an entire day. From the interviews, the research team learned that culturally it is very common to have guests for coffee ceremony. So this would be an important moment to use filtered water for making coffee instead of raw water. Because of this finding, the research team decided to consider the importance of having guests and serving them safe water as a possible favouring factor for the target behaviour.

![Coffee ceremony in a rural household, Ethiopia](image)

**Figure 8.3:** Coffee ceremony in a rural household, Ethiopia

### 3 Catalogue all possible behavioural determinants

By agreeing on the statement that behaviour is always the result of psychological processing of factors within the individual, one has to determine these inner behavioural factors in order to change the behaviour. This is basically done by comparing the behavioural factors of persons who perform the behaviour with those who do not perform the behaviour. Therefore the following steps have to be conducted:

- selection of behaviour influencing factors (Step 3)
- development of a questionnaire to collect data about these behavioural factors (Step 4)
- implementation of a representative household survey (Step 5)
- statistical determination of the most significant behavioural factors by using the data of the
To determine the behavioural factors influencing the target behaviour several theories of health psychology are proven to explain health behaviour, e.g. the Theory of Planned Behaviour (Ajzen et al., 2007) or the Health Action Process Approach (Schwarzer, 2008). Here we present the RANAS Model (Risk, Attitudes, Norms, Abilities, and Self-Regulation; see Figure 8.4) which represents an integration of several theories from social and health psychology (Mosler, 2012). The proposed model is divided into three distinctive components: The factor blocks grouping the behavioural factors, the target behaviours and interventions which represent the behaviour change techniques corresponding to the factor blocks. Whereas the behavioural factors and the target behaviours are described in the following, the behaviour change techniques (BCTs) will be depicted in detail in step 7.

Figure 8.4: The RANAS Model (Risk, Attitudes, Norms, Abilities, and Self-Regulation) of behaviour change.

**Factor blocks**

The behavioural factors are ordered in five different factor blocks. These blocks contain factors representing similar issues which can be summarised under the same generic term. The model postulates that for the formation of behaviour, five blocks of factors have to be favourable to the new behaviour: risk perceptions, attitudinal beliefs, normative beliefs, ability beliefs and self-regulation factors.

**Behavioural factors**

- Risk factors are perceived vulnerability and perceived severity of contracting an illness, and factual knowledge about the possibilities of being affected by a potential contamination. Information BCTs increase people’s risk beliefs (i.e. educational interventions).
Attitudinal factors contain instrumental beliefs and affective beliefs. Instrumental beliefs refer to advantages / disadvantages and costs / benefits of the behaviour whereas affective beliefs refer to feelings arising when thinking about the behaviour. Positive attitudes can be induced by persuasion BCTs (e.g. highlighting benefits of the behaviour).

Normative factors represent different social influences: descriptive norms (behaviours typically performed by others), injunctive norms (behaviours typically approved or disapproved by others), and personal norms (personal standards, what should be done). Norms can be changed by normative BCTs (e.g. opinion leaders, making performed behaviours more salient).

Ability factors represent the knowledge of a person to perform a behaviour, the confidence in one’s ability to organise and manage the behaviour (self-efficacy), and the confidence in one’s ability to deal with possible barriers (maintenance self-efficacy, recovery self-efficacy). Infrastructure and ability BCTs help people get confidence in their abilities (e.g. structural interventions to make water more accessible, adjusting the time of water collection to the daily schedule).

Self-regulation factors help to manage conflicting goals and distracting cues when intending to implement and maintain a behaviour. Important determinants are commitment to and remembering the behaviour. Planning BCTs help translate goals into actions (e.g. anticipate barriers, make plans how to overcome them).

Target behaviours and alternatives
Not only the target behaviour but also the alternative behaviour has to be considered. For example, not only drinking safe water (Behaviour A) but also drinking contaminated water (Behaviour B) has to be tackled. In addition, for both behaviours the use, intention and most important habit have to be considered. Behaviour with regard to water supply is mostly related to the use of a technology, e.g. a water filter. The intention to perform a behaviour is often regarded as a behaviour determining factor resulting from several beliefs. Habits are the most important outcome as the goal of each behaviour change campaign is to build a long-term habitual behaviour amongst the majority of the target population.

In several publications the factors of the RANAS Model have been proven to influence behaviour: for solar water disinfection (SODIS) see Heri and Mosler (2008) in Bolivia, and Kraemer and Mosler (2010) in Zimbabwe; for hygiene behaviour see Graf et al. (2008) in Kenya; for using arsenic free deep tube wells see Mosler et al (2010) in Bangladesh, for the consumption of fluoride-free water in rural Ethiopia see Huber et al (2011). Therefore, it can be concluded that analysing behavioural factors from the perspective of the RANAS Model is a successful means of predicting behaviour of populations in developing countries in the safe water supply sector.
Tasks to complete step 3:

- Carefully read the section and familiarise yourself with the behavioural determinants
- If necessary, add more behavioural determinants to the model

EXAMPLE:

After reading the section of step 3, the research team noticed that one possible factor is missing in the RANAS model to explain their target behaviour. As was found out during the in-depth interviews and the observations (step 2), having guests for coffee ceremony is something that has to be surveyed. That is why a new factor was added to the norm factor block of the behaviour change model: the importance of serving filtered water to guests (guest norm).

4 Develop questionnaire to measure behavioural factors

To measure the incidence of each of the behavioural factors in the population, a questionnaire has to be developed containing questions which are used as indicators for the corresponding factors.

The factors and some matching items are depicted in Table 8.1. The items in the table give an example, but have to be adapted and developed for each topic and for each local condition particularly. Note that this is a crucial step that requires much time and effort. It is vital to design questions and answer categories based on psychological theory and methodology. Furthermore, questions have to be developed so they can unequivocally be understood by the target population. It is necessary to closely work with local persons and conduct thorough pretesting to ensure this. If the investigator does not speak the local language, the items have to be carefully translated into the local language. Thereafter, re-translation into the items’ original language should unveil translation problems that need to be addressed. Finally, the items have to be introduced into a standardised questionnaire and be brought into a meaningful sequence.

Table 8.1: Measuring the behavioural factors with questions. Example of a questionnaire about drinking arsenic contaminated water versus arsenic-safe water.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Item example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vulnerability</td>
<td>How high or low do you feel are the chances that you get arsenicosis when drinking unsafe water? [-4 = very low ..... 4 = very high]</td>
</tr>
<tr>
<td>Severity</td>
<td>Imagine that you contracted ascinosis, how severe would be the impact on your life in general? [0 = not sever ..... 4 = very severely]</td>
</tr>
<tr>
<td>Factual Knowledge</td>
<td>How do you think that you get arsenicosis when drinking unsafe water? [Open-ended]</td>
</tr>
<tr>
<td>Instrumental beliefs</td>
<td>Do you think that using arsenic-safe water is time-consuming (expensive / healthy / effortful )? [0 = not at all expensive / healthy / effortful ..... 4 = very expensive / healthy / effortful]</td>
</tr>
<tr>
<td>Affective beliefs</td>
<td>How much do you like or dislike arsenic-safe disinfected water? [-4 = 1</td>
</tr>
<tr>
<td>Category</td>
<td>Question</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Personal norm</td>
<td>Do you feel a strong personal obligation to consume arsenic-safe water? [-4 = I strongly disagree ..... 4 = I strongly agree]</td>
</tr>
<tr>
<td>Descriptive norm</td>
<td>How many of your relatives drink arsenic-safe water? [0 = (Almost) nobody (0%) ..... 4 = (Almost) all (100%)]</td>
</tr>
<tr>
<td>Injunctive norm</td>
<td>Do you think that, overall, people who are important to you rather approve or disapprove that you drink arsenic-safe water? [-4 = nearly all disapprove .... 4 = nearly all approve]</td>
</tr>
<tr>
<td>Action knowledge</td>
<td>What can be done to avoid arsenicosis and its harmful effects? [Multiple choice answers, for each 0 = answer was wrong; 1 = answer was right]</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>Are you sure that you can consume as much arsenic-safe water as you need within the next month? [0 = very unsure ..... 4 = very sure]</td>
</tr>
<tr>
<td>Maintenance self-efficacy</td>
<td>How confident are you that you can consume as much arsenic-safe water as you want, even if your relatives continue to consume raw water?</td>
</tr>
<tr>
<td>Recovery self-efficacy</td>
<td>Imagine you have stopped drinking arsenic-safe water for several days. How confident are you to start drinking arsenic-safe water again? [0 = not confident at all ..... 4 = very confident]</td>
</tr>
<tr>
<td>Action Control (Planning)</td>
<td>Do you have a detailed plan when during the day to start to collect arsenic-safe water? [0 = No detailed plan at all ..... 4 = Very detailed plan]</td>
</tr>
<tr>
<td>Coping Planning</td>
<td>Have you made a detailed plan regarding what to do when you are hindered to collect your arsenic-safe water? [0 = No detailed plan at all ..... 4 = Very detailed plan]</td>
</tr>
<tr>
<td>Remembering/Forgetting</td>
<td>How often does it happen that you forget to collect your arsenic-safe water? [0 = almost never ..... 3 = almost always]</td>
</tr>
<tr>
<td>Commitment</td>
<td>How committed do you feel to drink arsenic-safe water? [0 = not at all..... 4 = very much]</td>
</tr>
<tr>
<td>Intention</td>
<td>How strongly do you intend to always drink arsenic-safe water? [0 = not at all ......4 = very strongly]</td>
</tr>
<tr>
<td>Behaviour</td>
<td>Percent of arsenic-safe drinking water of total daily water consumption. [ % ]</td>
</tr>
<tr>
<td>Habit</td>
<td>Do you go to collect your arsenic-safe water automatically? [0 = No, not at all automatically ..... 4 = very automatically]</td>
</tr>
</tbody>
</table>

**Tools for completing step 4:**
- Tool_1: Example baseline questionnaire on fluoride contaminated water in Ethiopia
- Tool_2: Example baseline questionnaire on arsenic contaminated water in Bangladesh
Tasks to complete step 4:

- Look at the example baseline questionnaires (tools for step 4) and adapt the questions to your target behaviour and target population
- If necessary add more questions regarding other behavioural determinants you added to the model

EXAMPLE:

For our example situation we can look at Tool 1, the example questionnaire for fluoride in Ethiopia. We added new questions, which cover our new factor guest norm. We asked people how important it is for them, that they can serve filtered water to their guests and what their guests would think about them if they would serve raw water instead.

5 Conduct a representative baseline survey

Conducting structured surveys with persons who are not familiar with these type of questions can be a challenge. It is therefore vital to conduct a thorough interviewer training, where interviewers learn and rehearse to explain questions in simple ways and to include examples to facilitate respondents’ understanding and answering. Furthermore, interviewers should acquire knowledge regarding the particular contamination, safe water options and basic health-behaviour theory.

Also, prior to the survey, an extensive pretest should be conducted. This means that the questionnaire will be applied to a small group of 20-30 people of the target population. The aim of the pretest is to identify questions that cannot be understood clearly or that do not show any variance (i.e. that were answered the same by all respondents). The identified items need to be reworded or omitted.

Figure 8.5: Training for interviewers, Bangladesh.

For the survey, a random selection of households is usually necessary as the target population is usually too large to conduct interviews with all people. Random selection is needed, because if we leave the selection to the interviewers, then we would gain a biased picture of the target population. Ideally,
this sample is drawn by randomly selecting respondents from a listing of the total population. This can be done for example by throwing a coin. If such a list is not available, as is often the case in developing countries, this can be done with the random route method. Thereby, the interviewers are sent to randomly selected intersections, which cover the complete area and were equally distributed throughout the investigation area. From there they select the households according to a fixed plan (e.g. every third house).

It is important to interview a quantitatively big sample because we want to tackle the majority of the population or identify large subgroups. Therefore we need to know the frequency distribution of the behaviours and corresponding behavioural factors in the population. To determine the number of households to be interviewed, one can apply the following rule of thumb: if the number of all households in a village or region is less or around 200, then 20% of the households should be interviewed, otherwise 10% of the households are sufficiently representative.

Figure 8.6: Interview with a woman responsible for fetching water, Ethiopia.

Tasks to complete step 5:

- Translate and retranslate your questionnaire
- Recruit a team of local interviewers
- Train the interviewer team in how to approach households, interviewing techniques, and the questionnaire
- Pretest your questionnaire in the field (with approx. 20-30 households)
- Get information on population figures in your project villages
- Select households for interviews randomly
- Conduct the baseline survey

EXAMPLE:

In our example case, the questionnaire had to be translated into two local languages, which are
spoken in the examined rural village (our target population). The questionnaires were designed in English and then translated into Amharic and Oromic and again retranslated in English. Through the retranslation, errors of translation became visible and could be corrected. The next task was to recruit a team of interviewers. Eight local college students were chosen after a test and personal interview. These students were then trained during four days. The training included: information about the project, fluoride, fluorosis and its prevention; how to approach households; how to handle rejections and difficult situations; interviewing techniques; questionnaire. After the training the questionnaire was pretested in the field with 20 households. From the regional office and the community leader we received the information that approximately 320 households belong to our project village. The team decided to approach 100 households for interviewing. The random route procedure was introduced and interviewers approached every third household on their route.

6 Determine the factors steering the target behaviour

We now want to find out which of the behavioural factors is most decisive for the performance of the behaviour in order to concentrate our efforts on these factors. Basically we do this by comparing the non-performers with the performers regarding the behavioural factors. We can apply a basic estimation or a statistical calculation, which is more valid but requires some skills in statistics. The basic estimation can be calculated by hand or with a calculation program (e.g. EXCEL), while the statistical calculation needs a statistics program (e.g. SPSS).

Dividing the sample into non-performers and performers

For a basic estimation we first have to differentiate between non-performers and performers of the behaviour. If the behaviour is performed to 100% or to 0% then this distinction is easy, but if we find all degrees of behaviour from 0-100% then we have to decide which part of the sample represents low performance and which part represents high performance persons. For example, if there is only a health effect when 80% of the drinking water is contaminant-free, then people consuming less than 80% contaminant-free water would be considered as low performers and people consuming equal or more than 80% contaminant-free water as high consumers.

Calculate means

Then, we simply calculate the mean for each behavioural factor for both groups (non-performers and performers). The biggest difference in the means between the two groups indicates which behavioural factors are most important for the performance of the behaviour. Note that for this step, it is important that all variables are on the same scale (e.g. reaching from 0 to 4).

For the more reliable statistical calculation we suggest to compute regression analysis, but to perform these analyses in a sophisticated way one has to consult experts (for a short description see Mosler, 2012).

Tools for completing step 6:

⇒ Tool_3: Example Excel Sheet for calculating means
Tasks to complete step 6:

- Look at the example Excel Sheet to understand the procedure
- Take your data and perform above steps 1 to 3

EXAMPLE:

Our example case is displayed in Tool 3. For fluoride it is essential that the total water consumption (drinking and cooking) of a household is fluoride-free. Therefore we defined performers as people who consume 100% fluoride-free water and non-performers as people who consume less than 100% of fluoride-free water. We found 50 households to be performers and 50 households to be non-performers (remember this is a fictional example). For these two groups we calculated the means of all factors from the RANAS model (including our new factor “guest norm”). In Tool 3, only 5 factors are displayed. Calculating the means of both groups for each factor and then looking at the difference between the two means, we found that the two groups differ the most in descriptive norm (what others normally do) and commitment towards using the community filter. These two factors show the greatest potential for being tackled and therefore changed.
7 Define and design behaviour change techniques (BCT)

In this step, the behaviour change techniques corresponding to the factor blocks of the RANAS Model have to be allocated. This means that it should be defined which class of techniques will most likely change which factors in which factor block. The relationship between one factor block and one BCT is not necessarily a one-to-one correlation. In fact, many of the BCTs tackle more than one factor. However, they should change the factors they are assigned to target more than the other factors. In the following table, the behaviour change techniques corresponding to each factor block are presented. The presented BCTs are based on Albarracin et al. (2005), Abraham (2011), Michie et al. (2008) and Mosler (2012).

Table 8.2: Factor blocks, behavioural factors and corresponding behaviour change techniques (BCTs) in the RANAS Model.

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Information BCTs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factual knowledge</td>
<td>Presentation of facts / knowledge transfer</td>
</tr>
<tr>
<td>Vulnerability</td>
<td>Personal risk information</td>
</tr>
<tr>
<td>Severity</td>
<td>Showing scenarios</td>
</tr>
<tr>
<td></td>
<td>Fear arousal</td>
</tr>
<tr>
<td>Attitudinal Factors</td>
<td>Persuasion BCTs</td>
</tr>
<tr>
<td>Instrumental beliefs</td>
<td>Persuasive arguments</td>
</tr>
<tr>
<td></td>
<td>Persuasive peripheral cues</td>
</tr>
<tr>
<td></td>
<td>Talking to others</td>
</tr>
<tr>
<td>Affective beliefs</td>
<td>Affective persuasion</td>
</tr>
<tr>
<td>Normative Factors</td>
<td>Norm BCTs</td>
</tr>
<tr>
<td>Descriptive norm</td>
<td>Highlighting norms</td>
</tr>
<tr>
<td>Injunctive norm</td>
<td>Informing about others’ approval/disapproval</td>
</tr>
<tr>
<td>Personal norm</td>
<td>Public commitment</td>
</tr>
<tr>
<td></td>
<td>Anticipated regret</td>
</tr>
<tr>
<td>Ability Factors</td>
<td>Infrastructural, Skill &amp; Ability BCTs</td>
</tr>
<tr>
<td>Action knowledge (skills)</td>
<td>Provide instruction</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>Setting up infrastructure</td>
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<td></td>
<td>Guided practice</td>
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<td></td>
<td>Facilitating resources (financing)</td>
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<td></td>
<td>Social help</td>
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<td></td>
<td>Provide instruction</td>
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<td>Modelling</td>
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<td></td>
<td>Reattribution of past successes and failures</td>
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<td>Maintenance (Coping) Self-efficacy</td>
<td>Coping with barriers</td>
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<tr>
<td>Recovery Self-efficacy</td>
<td>Coping with relapse</td>
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<tr>
<td>Self-Regulation Factors</td>
<td>Planning &amp; Relapse Prevention BCTs</td>
</tr>
<tr>
<td>Action control</td>
<td>Daily routine planning</td>
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<td>Coping planning</td>
<td>Outcome feedback</td>
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<td>Remembering</td>
<td>Contingency management</td>
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<td>Commitment</td>
<td>Stimulus control</td>
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<tr>
<td></td>
<td>Forming implementation intentions</td>
</tr>
</tbody>
</table>
In the following paragraphs, each behaviour change technique is described in detail and examples from different projects are displayed.

**Information BCTs - Risk Factors**

The block of risk perceptions can be influenced by information techniques, meaning that with the given information the person is able to form an understanding of the menacing health threat.

*Presentation of facts / knowledge transfer:* factual knowledge can be increased by the presentation of information which comprises techniques used to communicate circumstances and possibilities of contracting a disease (e.g. verbal presentation, pictures, movies).

*Personal risk information:* giving individualised messages which might focus on cumulative risk effects and presenting qualitative and quantitative examples individually for each person. It can also be useful to request persons to appraise their own susceptibility; this may lead to a discussion on their false beliefs about their invulnerability.

*Showing scenarios:* scenario-based risk information means presenting situations in the everyday life of the person where she or he can contract the disease.

*Fear arousal:* threat inducing arguments might raise fear by stressing the severity of contracting a disease, but graphic illustration of pain or distress, bodily disabilities or decay or even death might yet be more effective in arousing fear.

![Women educational workshop, Ethiopia.](image)

**Persuasive BCTs - Attitudinal Factors**

Instrumental beliefs can be changed by persuasive interventions, with strong arguments or peripheral cues.

*Persuasive arguments:* are those which use causal explanations, explain functionality, present novel and important information, and are of high positive expectancy value.

*Persuasive peripheral cues:* are competence, sympathy, credibility, famousness, publicity of the source; length and number of arguments of the message.

*Talking to others:* when trying to convince others the person herself is subject to self-persuasion.
because of generating and reminding arguments in favour of the new behaviour.

**Affective persuasion:** BCTs for affective beliefs (feelings) contain presenting the performance of a healthy behaviour as pleasant or joyful or to attach aversion to an unhealthy behaviour.

**Norm BCTs - Normative Factors**

BCTs targeting norms are provided to change normative beliefs about other people’s behaviour and appreciation of the new behaviour.

**Highlighting norms:** pointing to a still infrequent but desired behaviour or reducing the ‘social pressure’ for an unfavourable behaviour by referring to a favourable injunctive norm. Giving the message that an undesired behaviour is regrettably frequent (descriptive norm) is counter-effective. However, messages that appeal to negative injunctive norms related to a behaviour are effective.

**Informing about others’ approval/disapproval:** pointing out that important others support the desired behaviour or disapprove the unhealthy behaviour motivation to comply.

**Public commitment:** people make their commitment to a favourable behaviour public, thus showing to others that there are people who perform the new behaviour.

**Anticipated regret:** people are brought to imagine the concerns and regret they would feel after performing undesired behaviours which are not consistent with their personal norms of living healthily.

![Figure 8.8: Public commitment at a women workshop, Bangladesh.](image)

**Infrastructural, skill and ability BCTs - Ability Factors**

Infrastructural, skill and ability BCTs help people to gain confidence in their ability to perform a behaviour, which means they get a better appraisal of what they think they can do.

**Setting up infrastructure:** to have the necessary infrastructure (e.g. vessels for water collection, filters for filtering water etc.) is a precondition for performing the behaviour. The infrastructure can be provided externally (e.g. community filters, neighbouring wells) or privately by the household itself, perhaps receiving some help (e.g. household filters).

**Guided practice:** includes skill demonstration, instruction about the desired behaviour, enactment with feedback about the correctness of the performance.

**Facilitating resources:** financial help may be given directly to the persons or the support is coupled to the condition that the person has to make some effort to get the resources.
Social help: neighbours, friends, acquaintances, or relatives support the person with material help, action knowledge or verbal social support.

Provide instruction: Action knowledge (skills) is enhanced by conveying know-how in order to improve a person’s knowledge about how to perform the respective behaviour.

Modeling: persons who perform the behaviour and are perceived as competent and successful serve as behavioural models.

Reattribution of past successes and failures: self-efficacy is fostered if failures are not attributed to the person itself but to adverse circumstances; successes in contrast should be attributed to oneself.

Coping with barriers: maintenance (coping) self-efficacy can be improved by identifying barriers and planning solutions to behaviour change.

Coping with relapse: recovery self-efficacy will be augmented by identifying risky situations where one might fall back into the old behaviour, to plan coping responses and to practice these responses until they become automatic.

Planning & Relapse Prevention BCTs - Self-regulation Factors
Planning interventions in general help to translate goals into actions by preventing distraction, avoiding falling back into bad habits or inhibiting failing to get started. Relapse prevention skills can be improved by teaching persons to foresee high-risk situations in which lapses may happen. With coping planning as BCT the person is dealing with conflicting goals by considering the presumption of possible barriers and overcoming intervening behaviours. The commitment to perform a behaviour can be enhanced by making a contract with the person where she or he obliges her- or himself to perform the behaviour (self-commitment).

Daily routine planning: fosters action control as the person is prompted to plan exactly when to perform the desired behaviour in the course of daily life, it is discussed with the person about when and where in the daily routine the new behaviour can be integrated.

Outcome feedback: a feedback is given on the effects (e.g. health effect) produced by the desired behaviour or the person herself controls for these effects (self-feedback).

Contingency management: the person builds an own incentive system to be rewarded each time when performing the desired behaviour.

Stimulus control: coping planning can be done by removing reminders or cues to engage in old behaviours and add cues or reminders to engage in the new behaviour.

Forming implementation intentions: persons are stimulated to formulate, when, where, and how to intend to achieve his or her goals.

Prompts: are cues (memory aids) which trigger the behaviour in the right situation and help to remember the new behaviour.
Examples for BCT designs:
- **Design_1**: Persuasive BCT in Ethiopia
- **Design_2**: Knowledge transfer BCT in Ethiopia
- **Design_3**: Risk information BCT in Bangladesh
- **Design_4**: Public commitment BCT in Ethiopia
- **Design_5**: Pledging BCT in Bangladesh
- **Design_6**: Coping planning BCT in Bangladesh
- **Design_7**: Daily routine planning BCT in Ethiopia
- **Design_8**: Implementation intention BCT in Bangladesh
- **Design_9**: Information BCT loudspeaker rickshaw in Bangladesh
- **Design_10**: Reminders BCT Bangladesh

**Tasks to complete step 7:**
- Take your calculation from step 6 and identify which of your behavioural factors has the strongest intervention potential (the biggest difference in means between groups)
- Link your behavioural factors with the strongest potential to the list (Table 8.1) above and see possible BCTs for influencing that factor
- After identifying possible BCTs, check the provided examples and decide if these would be applicable in your case, or design new BCTs using the explanations in this chapter

**EXAMPLE:**
As we found out during step 6, the most promising factors to be changed to change people’s behaviour are the descriptive norm and commitment. That means that we could apply two interventions. Looking at the list of possible BCTs, we find out that we have to highlight norms (norm BCTs) and increase commitment with planning and relapse prevention BCTs. For the sake of convenience we only choose to implement one BCT, the public commitment. In order to compare the effect of our BCT we also need a control group (households without intervention). In the next step we now have to find out what the best communication channels are for our BCT.

**8 Define suitable communication channels**

The behavioural interventions have to be brought to the target population. This means that an adequate form of delivering the interventions must be determined. The communication channels can be differentiated into mass media and interpersonal channels. With mass media channels persons are contacted irrespective of their characteristics whereas by using interpersonal channels the contact established may consider the specific motivations of the counterpart. Many investigations have shown
that interpersonal channels are more effective than mass media channels (Allbarracin et al., 2005; Mosler & Martens, 2008; Tamas et al., 2009) but with mass media more people can be reached. Which channel is chosen for a behaviour change campaign will depend on availability and resources, but also to what kind of channel people are accustomed. In the following paragraphs, the different channels are described shortly.

**Mass Media Channels**

Mass media can be divided into print media and audio-visual media. Whereas newspapers, brochures, leaflets and the internet belong to print media, radio, television, loudspeaker systems or cars are audio-visual media. In the following some of the most important use of the channels is described.

**Informative report:** information is disseminated about how one can contract a disease and about which behaviour can prevent this.

**Mass media role modelling:** uses role model stories of community members who are perceived as attractive and similar to members of the population; they are given advice from experts to increase the adoption of new behaviours.

**Entertainment-education:** portrayals of role models and reinforcements; in various formats as soap operas, popular music, films and comic books, popular characters model new behaviours.

**Behavioural journalism:** potential models are interviewed with questions designed to elicit information about reasons for adopting the new behaviour, skills used or acquired in adopting the behaviour, and the perceived reinforcing outcomes they received.

For an example for a mass media channel please see **Design 9**.

![Image](image-url)

**Figure 9.9:** Mass media campaign with loudspeaker rickshaw, Bangladesh.

**Interpersonal Channels**

Using interpersonal channels means that one or more persons serve as the communication media to bring messages to a single person or a group of people.

**Community meetings:** meetings are organised which are open to all community members where behaviour change is introduced with messages or demonstrations; the behaviour to be changed might be displayed in a show, a quiz or theater etc.
**Home visits with promoters:** these are persons who are hired and trained for the promotion of the new behaviour, which they advertise house by house.

**Opinion leaders:** are persons from within a social system (community) with high social status and a high openness to innovations; they are used as voluntary social workers who are trained to promote the new behaviour in their social network.

**Peer to peer communication:** people are induced to do word of mouth advertising by talking positively about the new behaviour.

**From teachers to children to parents:** teachers are instructed to educate their pupils in behaviour change and then the pupils should transfer the change to their parents.

**Small group training:** a group of people is convened where the new behaviour is introduced and practiced; pros and cons of the new behaviour are discussed.

**Mobilizing social networks:** linking members to new networks as for example mentor programs, buddy systems and self-help groups which are practicing the new behaviour.

For examples for interpersonal channels see **Design 1 to 8**.

![Interpersonal communication, a health promoter talking to head of household, Ethiopia.](image)

**Figure 8.10:** Interpersonal communication, a health promoter talking to head of household, Ethiopia.

Table 8.3 helps you to find out which BCTs are easier to communicate through the interpersonal channel and which BCTs can be also communicated through mass media channels.

**Table 8.3:** Communication channels linked to BCTs.

<table>
<thead>
<tr>
<th>Communication Channel</th>
<th>BCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass media and interpersonal channels</td>
<td><strong>Information BCTs:</strong></td>
</tr>
<tr>
<td></td>
<td>Presentation of facts / knowledge transfer</td>
</tr>
<tr>
<td></td>
<td>Fear arousal</td>
</tr>
<tr>
<td>Interpersonal channel</td>
<td><strong>Personal risk information</strong></td>
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<tr>
<td></td>
<td><strong>Showing scenarios</strong></td>
</tr>
</tbody>
</table>
### Behavioral Change

<table>
<thead>
<tr>
<th>Mass media and interpersonal channels</th>
<th><strong>Persuasion BCTs:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Persuasive arguments</td>
</tr>
<tr>
<td></td>
<td>Persuasive peripheral cues</td>
</tr>
<tr>
<td></td>
<td>Talking to others</td>
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<tr>
<td></td>
<td>Affective persuasion</td>
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<table>
<thead>
<tr>
<th>Mass media and interpersonal channels</th>
<th><strong>Norm BCTs:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Highlighting norms</td>
</tr>
<tr>
<td></td>
<td>Informing about others’ approval/disapproval</td>
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<td></td>
<td>Public commitment</td>
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<thead>
<tr>
<th>Interpersonal channel</th>
<th><strong>Anticipated regret</strong></th>
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</table>

<table>
<thead>
<tr>
<th>Mass media and interpersonal channels</th>
<th><strong>Infrastructural, Skill &amp; Ability BCTs:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Provide instruction</td>
</tr>
<tr>
<td></td>
<td>Guided practice</td>
</tr>
<tr>
<td></td>
<td>Facilitating resources (financing)</td>
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<tr>
<td></td>
<td>Social help</td>
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<td></td>
<td>Modeling</td>
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<table>
<thead>
<tr>
<th>Interpersonal channel</th>
<th><strong>Reattribution of past successes and failures</strong></th>
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<tbody>
<tr>
<td></td>
<td>Coping with barriers</td>
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<tr>
<td></td>
<td>Coping with relapse</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Interpersonal channel</th>
<th><strong>Planning &amp; Relapse Prevention BCTs:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Outcome feedback</td>
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<tr>
<td></td>
<td>Contingency management</td>
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<td></td>
<td>Stimulus control</td>
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<td></td>
<td>Prompts</td>
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<td></td>
<td>Daily routine planning</td>
</tr>
<tr>
<td></td>
<td>Forming implementation intentions</td>
</tr>
</tbody>
</table>

#### Tasks to complete step 8:
- Check the table above (Table 8.3), which of your planned BCTs should be communicated interpersonally and which can be communicated through mass media
- Check what financial and human resources are available to you for BCTs and talk to local partners if availability is given for certain communication channels
- Implement your BCTs

#### EXAMPLE:
After checking Table 8.3, we learn that our planned BCT, public commitment, can be communicated through both mass media and interpersonal channels. Therefore we need to check our resources and budget to see if we can employ health promoters to communicate our intervention interpersonally.
Due to the fact that we work in a rather small village, we can also reach our target population through interpersonal channels. We decide to employ health extension workers from the village to deliver our public commitment intervention (blue flags to highlight which and how many households are already consuming 100% fluoride-free water; see Tool 7). As already mentioned during step 7, we have to divide our sample into two groups, an intervention group and a control group. This we do randomly. We take 25 households out of the performers (100% users) and randomly select 25 households out of the non-performer group and assign them to our BCT group. All other households are assigned to the control group (and do not receive a BCT).

9 Evaluate effectiveness of the behaviour change techniques and long-term effects

With this evaluation we want to know how effective the BCTs changed the behaviour but we also want to know via which behavioural factors the BCTs worked and which effects the BCTs had on these factors. The evaluation is done by conducting an intermediate (post-intervention) survey and a final survey. The intermediate survey should be conducted 1-2 months after the implementation of the BCTs and can be repeated each time a BCT was applied. The final survey is conducted 6 - 12 months after the last survey. During this 6-12 months period there should be no activities at all in the project area (no interviews, no interventions).

All surveys (including baseline) are panel surveys, meaning that the same persons are interviewed in all surveys to be able to detect changes of the same persons. For reasons of comparison, several areas with different BCTs and one control area where no BCTs are implemented should be surveyed. All factors from the model (including the factors which were added) should be measured with exactly the same questions in all surveys in order to analyse how these factors change over time. Additional questions should be included to check whether the BCTs were delivered as intended. Did the targeted group receive the BCTs? Did people like or dislike the BCTs? What can they remember about the BCTs?

Figure 8.11: Interviewing a woman responsible for water treatment, Bangladesh.

The goal of BCTs is of course to have long lasting effects. Ideally, BCTs enhance habit development for the use of a technology. Some BCTs may be proven successful to induce short-term behaviour change, but fail to support habitualisation. Others, in turn, may only render small behaviour change effects, but
might be long lasting. To evaluate the long-term effects of BCTs, the final survey is inevitable. Besides the questions from the former surveys, this questionnaire should specifically focus on assessing whether and why people have stopped performing the target behaviour. This information is important for further relapse prevention so that new or more BCTs can be designed to assist people in keeping up their healthy behaviours in the future.

The data can be analysed in a simple way: by comparing the change in behaviour (e.g. change in frequencies, means) of groups who received a BCT with groups who did not, the effectiveness of the BCTs becomes evident. To improve behaviour change campaigns it is also useful to compare the change in behavioural factors associated with BCTs. The analysis will show whether the targeted behavioural factors were actually changed or not, thus providing evidence about how the campaign should be modified.

**Tools for completing step 9:**
- **Tool_4**: Intermediate questionnaire Ethiopia
- **Tool_5**: Intermediate questionnaire Bangladesh
- **Tool_6**: Final questionnaire Ethiopia
- **Tool_7**: Final questionnaire Bangladesh
- **Tool_8**: Example Excel Sheet for calculating intervention effects

**Tasks to complete step 9:**
- After the implementation of the BCTs, wait for 1-2 month
- Add questions about the BCTs to your baseline questionnaire for your intermediate questionnaire
- Conduct the intermediate survey to evaluate the intervention effects
- After the last survey, wait for 6-12 months and make sure that during this period there are no activities taking place in the project area
- Add questions about reasons for stopping the target behaviour to your intermediate questionnaire for your final questionnaire
- Conduct your final survey to evaluate the long-term effects of BCTs and design new BCTs for relapse prevention
- Calculate the short and long-term effects of BCTs with help of Tool 18

**EXAMPLE:**
First we check if our public commitment BCT had a positive effect on changing behaviour and changing the two factors we tackled, descriptive norm and commitment. For that we need Tool 18. On sheet 2 in the Excel file we can now see how people changed over time in these 3 factors. The group who received a public commitment increased in behaviour, descriptive norm and commitment after the
intervention. However, the control group did not only significantly increase in behaviour and commitment, but also increased slightly in descriptive norm. This result is not surprisingly, given the fact, that living in the same village, the public commitment (seeing that a lot of people in the village committed themselves in public to use the community filter) must have had an effect on their descriptive norm (what others normally do).

After waiting 10 months since the intermediate survey, we conducted our final survey to evaluate the long-term effects of our BCT. The collected data you can again find in Tool 18, on sheet 3. There we added an extra column for entering the data from the final survey. If we now calculate the differences between the means from the final and the intermediate survey we can see the long-term effects in both groups. In our example we find out, that the public commitment BCT group stabilised their behaviour over time, whereas the control group even decreased in behaviour after 10 months. Furthermore, the BCT was able to also stabilise people's descriptive norm and commitment. In the control group the behavioural determinants decreased slightly over time.

These results indicate, that after implementing a new technology, it is essential to apply BCTs. If the new behaviour is not promoted, the primary increase can relapse in a decrease over time. A public commitment BCT is able to increase behaviour, the descriptive norm and people's commitment. To prevent people to relapse to their old behaviour (consuming raw water) it is important to stabilise their commitment towards the behaviour. This is possible with a public commitment BCT.

9.1 References and further reading


