10

Using Social Cognition Models to Develop Health Behaviour Interventions

The Theory of Planned Behaviour as an Example

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Chapter Outline

This chapter describes how to use social cognition models to develop health behaviour interventions, using the theory of planned behaviour (TPB) as an example. Following a description of the theory, the steps involved in developing an intervention to change salient beliefs are summarised. Then, a number of complexities are discussed, for example the consequences of using different scoring schemes for the belief components. Next, a detailed example of a TPB-based intervention is presented. The chapter concludes with recommendations for research and practice.

Key Concepts

- Actual behavioural control
- Attitude toward the behaviour
- Elaboration likelihood model
- Elicitation study
- Intervention effect size
- Modal salient beliefs
- Perceived behavioural control
- Subjective norm
- Theory of planned behaviour
- Unipolar and bipolar scaling
Introduction

The term ‘social cognition models’ is used to refer to theories that specify the proximal cognitive determinants of behaviour. These theories include, among others, social cognitive theory (Bandura, 1986, 1997), the theory of reasoned action (Ajzen & Fishbein, 1980), the theory of planned behaviour (TPB; Ajzen, 1991), the health belief model (Strecher & Rosenstock, 2002), protection motivation theory (Rogers, 1983), the ‘continuum’ version of the health action process approach (HAPA-C; Schwarzer, 2008; Sutton, 2008) and the information-motivation-behavioral skills model (Fisher & Fisher, 1992). Social cognition models are widely used in health psychology to predict and explain health behaviours such as condom use, physical activity, smoking cessation and medication adherence. Increasingly, they are being used to change health behaviours; in other words, as the basis for health behavioural interventions.

This chapter focuses on the use of theory to develop interventions to change behaviour. Theories are useful in intervention development because they specify determinants of behaviour that are potentially amenable to change. Thus, theories inform us which variables should be targeted in interventions – which variables we should try to change in order to produce the desired change in behaviour. These are also the variables that we should measure (along with the target behaviour) when evaluating the impact of an intervention. In particular, it is important to assess whether an intervention that is designed to target behavioural determinants such as self-efficacy or attitude actually produces changes in these variables. If it does not, this provides one plausible reason for a lack of an intervention effect on behaviour.

Conner and Norman (2005) provide a detailed exposition of the major theories of health behaviour. This chapter focuses on one theory, the TPB, and explains how to use it to develop interventions to modify health-related behaviours. The TPB has several advantages over alternative theories. First, by contrast to theories that are health specific (e.g. the health belief model) or behaviour or domain specific (e.g. the AIDS risk reduction model; Catania et al., 1990), the TPB is a general theory. Stroebe argues that general models should be preferred for the sake of parsimony: 'it is not very economical to continue to entertain specific theories of health behaviour unless the predictive success of these models is greater than that of general models of behaviour' (2000, p. 27). Second, in the TPB, the constructs are clearly defined and the causal relationships between the constructs clearly specified. Third, there exist clear recommendations for how the constructs should be operationalised (Ajzen, 2006a). Fourth, the theory has been widely used to study health behaviours (Ogden, 2003). And finally, meta-analyses show that it accounts for a useful amount of variance in intentions and behaviour (but see Sutton, 2004, for a discussion of effective variance explained by social cognition models).

Although the chapter focuses on using the TPB to develop interventions, many of the comments are also applicable to other social cognition models.

The Theory of Planned Behaviour

The theory of planned behaviour (TPB; Ajzen, 1991, 2006b), an extension of the theory of reasoned action (Ajzen & Fishbein, 1980), is widely used to study the cognitive determinants of health behaviours (Conner & Sparks, 2005; Sutton, 2004).

According to the theory, behaviour is determined by the strength of the person’s intention to perform that behaviour and the amount of actual control that the person has over performing the behaviour. According to Ajzen (2006b), intention is ‘an indication of a person’s readiness to perform a given behaviour, and … is considered to be the immediate antecedent of behavior’, and actual behavioural control ‘… refers to the extent to which a person has the skills, resources, and other prerequisites needed to perform a given behavior.’ Perceived behavioural control, similar to Bandura’s (1986) construct of self-efficacy, refers to the person’s perceptions of their ability to perform the behaviour and is assumed to reflect actual behavioural control more or less accurately. To the extent that perceived behavioural control is an accurate reflection of actual behavioural control, it can, together with intention, be used to predict behaviour (Figure 10.1).

The strength of a person’s intention is determined by three factors: their attitude toward the behaviour, and other prerequisites needed to perform a given behavior.’ Perceived behavioural control, similar to Bandura’s (1986) construct of self-efficacy, refers to the person’s perceptions of their ability to perform the behaviour and is assumed to reflect actual behavioural control more or less accurately. To the extent that perceived behavioural control is an accurate reflection of actual behavioural control, it can, together with intention, be used to predict behaviour (Figure 10.1).

The strength of a person’s intention is determined by three factors: their attitude toward the behaviour, their overall evaluation of performing the
behaviour; their subjective norm, that is, the extent to which they think that important others would want them to perform it; and their perceived behavioural control. Attitude toward the behaviour is determined by the total set of salient (readily accessible) behavioural beliefs about the personal outcomes of performing the behaviour. Specifically, attitude is determined by the belief strength for each salient outcome (the perceived likelihood that the outcome will occur if the behaviour is performed) multiplied by the evaluation of that outcome (its perceived desirability or undesirability), summed across outcomes. Similarly, subjective norm is determined by the total set of salient normative beliefs, that is, beliefs about the views of important others (‘referents’). Specifically, subjective norm is determined by the belief strength for each salient referent (the perceived likelihood that the referent thinks the person should perform the behaviour) multiplied by his or her motivation to comply with that referent, summed across referents. Finally, perceived behavioural control is determined by the total set of salient control beliefs, that is, beliefs about the presence of factors that may facilitate or impede performance of the behaviour. Specifically, perceived behavioural control is determined by the belief strength for each salient control factor (the perceived likelihood that a given control factor will be present) multiplied by the perceived power of the control factor (the extent to which the control factor will make it easier or more difficult to perform the behaviour), summed across control factors.

The direct path from perceived behavioural control to behaviour in Figure 10.1 is causally ambiguous (Sutton, 2004). It is not clear from descriptions of the theory whether perceived behavioural control is assumed to have a direct causal effect on behaviour or whether the arrow represents an association between perceived behavioural control and behaviour that is induced by actual control as the common cause. This has implications for intervention. If the second interpretation is correct, then changing perceived behavioural control would not lead to behaviour change directly (though it may lead to behaviour change indirectly via a change in intention). Under either
interpretation, changing actual control (e.g. by increasing the individual’s skills or opportunities to perform the behaviour) would influence behaviour both directly and indirectly (via perceived behavioural control and intention). Note that Figure 10.1 shows actual control influencing perceived control directly but it may be more accurate to show this effect as mediated by control beliefs.

The TPB has been used in numerous observational studies to predict and explain intentions and behaviour. Meta-analyses of these studies show that, on average, the TPB explains between 35 and 50 percent of the variance in intentions and between 26 and 35 percent of the variance in behaviour (Sutton, 2004). However, to date the theory has not been widely used to develop behaviour change interventions (Hardeman et al., 2002).

Applications of the TPB to developing behavioural interventions have focused on changing attitude, subjective norm and perceived behavioural control by changing the salient beliefs that are assumed to determine these constructs. There are three strategies for achieving this aim: change existing salient beliefs; make existing non-salient beliefs salient; or create new salient beliefs. The following section, which is based on Fishbein and Middlestadt (1989) and Sutton (2002b), summarises the steps involved in developing an intervention to change existing salient beliefs.

Of course, there is much more involved in developing and evaluating a behavioural intervention than can be covered here. The scope of this chapter is limited to those aspects of intervention development that are directly related to theory. For a broader picture, the reader is referred to the UK Medical Research Council (MRC) framework (Campbell et al., 2000) and the updated guidelines (Craig et al., 2008). In particular, the theory that is selected as the basis for the behavioural intervention can be embedded in a larger causal model that specifies the hypothesised causal relationships between the components of the proposed intervention (including the proposed behaviour change techniques), the determinants of the target behaviour, the behaviour itself and consequent clinical and health outcomes (Hardeman et al., 2005). Drawing a causal model is a useful early step in the process of planning and designing an intervention. Such a model also helps in designing the evaluation of the intervention. In particular, it informs decisions about what should be measured; for example, measures of the theoretical determinants of the target behaviour should be included as intermediate outcomes. It also guides the analysis of the data; for example, if measures of the theoretical determinants are included, mediation analysis can be used to test hypotheses about causal pathways.

### Steps in the Development of a TPB-based Intervention

1. **Decide on the target behaviour and the target population**

   These are crucial decisions regardless of the theory that is being used to inform the intervention. However, in the TPB, the definition of the target behaviour assumes special importance because it also determines the definition of the constructs to be targeted in the intervention and the wording of the items used to assess these constructs, in accordance with the principle of correspondence or compatibility (Ajzen, 2005). Behaviours can be defined in terms of four components: action, target, time and context. The action component is a necessary part of the definition of any behaviour. The target component is usually necessary, though not always. Time and context are optional; they enable the definition of behaviour to be as specific as required. For example, consider the definition ‘stop smoking cigarettes in the New Year when I am at work’. Here, ‘stop smoking’ is the action, ‘cigarettes’ is the target, ‘in the New Year’ is the time component and ‘at work’ is the context. Having defined the target behaviour in terms of these four components, the measures of the theory’s constructs should incorporate this wording and the intervention should target beliefs about this particular behaviour.

2. **Identify the modal salient beliefs**

   The second step is to conduct an elicitation study to identify those salient beliefs with respect to the target behaviour that are most common in a sample of people drawn from the target population. Those beliefs that
are elicited first in response to open-ended questions such as those in Table 10.1 are assumed to be salient for the individual. Those elicited most frequently in the sample are designated the modal salient beliefs.

3. Decide which TPB components to target in the intervention

This decision can be informed by conducting a quantitative study in a second sample from the target population in which all the TPB variables, including the modal salient beliefs, are measured using a structured questionnaire. This second study is usually referred to as the main study. In the analysis, intention is regressed on attitude, subjective norm and perceived behavioural control; and behaviour is regressed on intention and perceived behavioural control. The findings are used to decide whether the intervention should target one, two or all three components. For example, suppose attitude is a relatively strong predictor of intention which is in turn a relatively strong predictor of behaviour, but subjective norm and perceived behavioural control have little independent predictive power. This pattern of findings could be used to justify focusing the intervention on the attitudinal component alone.

4. Decide which specific beliefs to target

The same dataset can be used to identify the beliefs that best discriminate between intenders and non-intenders (or between those who subsequently engage in the behaviour and those who do not). This is usually done by dividing the sample into two groups on the basis of intention or behaviour responses and examining differences in scores between groups on each of the belief measures in turn, for example by conducting a series of t-tests.

5. Develop and evaluate the intervention

The final step is to develop an intervention designed to change these key beliefs, and to evaluate the intervention using the TPB measures in another sample drawn from the target population. Table 10.2 lists the possible ways of changing existing behavioural, normative and control beliefs, using 'walking for more than 20 minutes a day' as the example target behaviour and assuming unipolar scoring (e.g. 1 to 7) for all six belief components.

Of course, variations on this procedure are possible. Relevant prior studies may already exist, which may obviate the need for collecting new data for steps 2 to 4.

Table 10.1  Open-ended questions used in the elicitation study by Elliott, Armitage and Baughan (2005)

<table>
<thead>
<tr>
<th>Question</th>
<th>Type of Belief</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What do you believe are the advantages of keeping within the speed limit while driving in built-up areas?</td>
<td>Salient behavioural beliefs</td>
</tr>
<tr>
<td>2. What do you believe are the disadvantages of keeping within the speed limit while driving in built-up areas?</td>
<td>Salient behavioural beliefs</td>
</tr>
<tr>
<td>3. Is there anything else you think is good or bad about keeping within the speed limit while driving in built-up areas?</td>
<td>Salient control beliefs</td>
</tr>
<tr>
<td>4. Which individuals or groups of people would approve of you keeping within the speed limit while driving in built-up areas?</td>
<td>Salient normative beliefs</td>
</tr>
<tr>
<td>5. Which individuals or groups of people would disapprove of you keeping within the speed limit while driving in built-up areas?</td>
<td>Salient normative beliefs</td>
</tr>
<tr>
<td>6. Are there any other individuals or groups who would approve or disapprove of you keeping within the speed limit while driving in built-up areas?</td>
<td>Salient control beliefs</td>
</tr>
<tr>
<td>7. What factors or circumstances would make you more likely to keep within the speed limit while driving in built-up areas?</td>
<td>Salient control beliefs</td>
</tr>
<tr>
<td>8. What factors or circumstances would make you less likely to keep within the speed limit while driving in built-up areas?</td>
<td>Salient control beliefs</td>
</tr>
<tr>
<td>9. Are there any other factors you can think of that make keeping within the speed limit while driving in built-up areas easy or difficult?</td>
<td>Salient control beliefs</td>
</tr>
</tbody>
</table>

Note: Questions 1 to 3 were designed to elicit salient behavioural beliefs, questions 4 to 6 salient normative beliefs and questions 7 to 9 salient control beliefs.

In addition to changing existing salient beliefs, the intervention may aim to create new salient beliefs by presenting novel information. For example, an intervention to encourage smokers to quit may present evidence that smoking is a risk factor for osteoporosis.

As described, the procedure seems quite straightforward. However, there are several complexities of which researchers and practitioners need to be aware.

### Complexities

#### Deciding which beliefs to include in the modal salient set

An important decision to be made is which of the beliefs from the elicitation study to include in the modal salient set for the questionnaire in the main study (step 3). This decision needs to be made for each of the three categories of beliefs (behavioural, normative, control). Ajzen and Fishbein (1980) suggest several possible decision rules: take the 10 or 12 most frequently mentioned beliefs; include all beliefs mentioned by at least 10 per cent or 20 per cent of the sample; select as many beliefs as necessary to account for a particular percentage (e.g. 75 per cent) of all beliefs elicited. Numerous variations on these rules could be devised. Application of these different rules may result in different sets of modal salient beliefs. Consider participants completing the TPB questionnaire in the main study. The ideal situation would be that each participant’s personally salient beliefs are all included in the questionnaire (call this criterion 1) and no participant is presented with any belief items that are not personally salient to them (criterion 2). The second criterion is relevant because of the risk that, as a consequence of measuring them, non-salient beliefs may become salient, that is, that the questionnaire will be reactive (French & Sutton, in press). Increasing the number of beliefs in the questionnaire (i.e. the size of the modal set) will favour the first criterion at the expense of the second. The decision will therefore be a compromise. See Sutton et al. (2003) for a method of using the data from an elicitation study to optimise this trade-off.

<table>
<thead>
<tr>
<th>Table 10.2</th>
<th>Ways of changing existing beliefs in the theory of planned behaviour, using ‘walking for more than 20 minutes a day’ as the example target behaviour</th>
</tr>
</thead>
</table>
| Behavioural beliefs | (a) Increase belief strength  
(e.g. increase the perceived likelihood that walking for more than 20 minutes a day will improve fitness)  
(b) Increase outcome evaluation  
(e.g. increase the perceived desirability of the outcome ‘will improve my physical fitness’) |
| Normative beliefs | (c) Increase belief strength  
(e.g. increase the recipient’s perceived likelihood that his/her parents – or other significant referents – would approve if he/she walked for more than 20 minutes a day)  
(d) Increase motivation to comply  
(e.g. persuade the recipient that he/she wants to do what his/her parents want them to do) |
| Control beliefs | (e) Increase belief strength  
(e.g. increase the recipient’s perceived likelihood that they will have more time in the future)  
(f) Increase perceived power  
(e.g. persuade the recipient that having more time in the future will make it easier to walk for more than 20 minutes a day) |

Note: These strategies assume the use, and validity, of a particular scoring scheme: unipolar scales for all six belief components, for example 1–7, where 1 means extremely unlikely (belief strength), extremely undesirable (outcome evaluation), extremely low (motivation to comply) and much more difficult (control belief power), and 7 means extremely likely (belief strength), extremely desirable (outcome evaluation), extremely high (motivation to comply) and much easier (control belief power).
Selecting the key beliefs

A commonly used procedure in step 4 is to divide the sample into ‘intenders’ and ‘non-intenders’ and to compare these two groups on each of the belief measures in turn using t-tests. For behavioural beliefs, such analyses may examine belief strength, outcome evaluation and/or the product term (belief strength multiplied by outcome evaluation). Those beliefs that best discriminate between the two groups (i.e. show the largest, or most statistically significant, difference in means) are selected for the intervention.

Apart from the loss of information incurred by artificially dichotomising the sample, the main limitation of this procedure is that, for a given belief score, the means for intenders and non-intenders will be partly based on participants for whom that belief is not salient. This proportion will generally be unknown but it may comprise the majority of participants (e.g. up to approximately 80 per cent if the decision rule is ‘include all beliefs mentioned by at least 20 per cent of the sample’). A difference between intenders and non-intenders may be observed in the full sample even if there is no difference between intenders and non-intenders for whom the belief is salient. Conversely, if there is a difference in means between intenders and non-intenders for whom the belief is salient, this may not be reflected in an analysis that includes all intenders and non-intenders. Given the problems with this procedure, a pragmatic strategy is to drop step 4 and to target in the intervention a subset of the modal salient beliefs identified in step 2.

The notion that some salient beliefs are more important than others in influencing intention is actually inconsistent with a key assumption of the TPB (Sutton, 2002b). For example, for salient behavioural beliefs, the theory assumes that each belief strength × outcome evaluation product term has the same weight (equal to 1) in determining attitude (and therefore intention). In other words, all the product terms are equally important in determining attitude.

The problems outlined in this and the preceding section arise when the TPB is used to develop a generic intervention where information about individual recipients of the intervention is not available, for example a national campaign to increase condom use among young people. The theory can also be used to develop individually tailored interventions. In tailored interventions, open-ended questions can be used to elicit a participant’s salient beliefs, and he or she is then asked to rate them with respect to belief strength, outcome evaluation and so on (e.g. Agnew, 1998; Rutter & Bunce, 1989). The intervention can then be individually targeted. Each individual receives a different version of the intervention, the exact content depending on their own idiosyncratic set of beliefs and belief scores.

The consequences of using different scoring schemes for the belief components

Table 10.2 assumes unipolar scoring (e.g. that responses to the belief questions are scored from 1 to 7) for all six belief components. This is just one of several scoring schemes that have been proposed. Different scoring schemes imply different strategies for changing beliefs. Suppose, for example, that a bipolar scoring scheme is used for behavioural belief strength and outcome evaluation (e.g., –3 to +3 with a midpoint of zero). If an individual believes that it is fairly unlikely (say, –2 on the belief strength scale) that a negative outcome such as ‘getting swollen ankles’ (say, –2 on the outcome evaluation scale) will occur if they walk for more than 20 minutes a day, then assuming that this ‘double negative’ belief is salient, it will contribute positively to his/her attitude toward engaging in this behaviour. Furthermore, the less likely the outcome is perceived to be and the more negatively it is evaluated, the greater the positive contribution to the person’s attitude. This suggests an intervention strategy of persuading the individual that this outcome is even less likely and even worse than they thought it was, which is the direct opposite of the strategy implied by unipolar scoring.

The question of how belief components should be scored to most accurately reflect the underlying mechanism of how they combine is still unresolved (Ajzen & Fishbein, 2008; French & Hankins, 2003; O’Sullivan et al., 2008). Researchers and practitioners should carefully consider the implications of different scoring schemes for the strategies they select to change beliefs.
Changing beliefs

A limitation of the TPB and similar theories is that it does not specify how to change beliefs, only that belief change requires exposure to ‘information’, broadly conceived to include not just written information from leaflets and web pages, for example, and verbal information, such as advice from a health professional, but also direct experience with the target behaviour and observation of others performing the behaviour. The currently dominant dual-process theories of persuasion offer only general recommendations about changing beliefs. According to the elaboration likelihood model (ELM; Petty & Wegener, 1999), the kind of change in beliefs or attitudes that is usually regarded as desirable in the health behaviour field (i.e., enduring, resistant to counterpersuasion and predictive of behaviour) is most likely to be produced if a communication presents ‘strong’ arguments and if the recipients are able and motivated to think about and elaborate on these arguments. However, little research has been done on what makes a strong argument; empirical studies using the ELM have relied on pretesting to identify high-quality arguments. Furthermore, relatively few studies have used the theory in the context of health behaviour change; the typical ELM study investigates attitudes to issues or policies such as a proposed increase in tuition fees rather than beliefs or attitudes with respect to changing personal health behaviour.

Intervention developers therefore need to take an empirical approach to developing strategies to change beliefs. Pretesting of intervention materials and messages should be an important part of step 5 of the intervention development process.

Estimating the potential size of an intervention effect

In planning an intervention, it is useful to have an estimate of the potential size of the intervention effect. This can be used to calculate the sample size required for the evaluation study (Cohen, 1992). Such an estimate is also helpful in the pretesting stage to assess whether the intervention is producing sufficiently large increases in attitude, subjective norm and perceived behavioural control.

It is possible to calculate an estimate of the potential size of an intervention effect from observational data on the TPB (such as would be obtained from step 3 of the intervention development procedure). For example, in a study of medication adherence in a sample of 61 patients with psychiatric problems, TPB variables were assessed at baseline using 7-point scales, and self-reported behaviour was assessed at follow up, in terms of the percentage of time the participant had adhered to medication over the previous nine weeks (Conner et al., 1998). In the analysis, intention was regressed on attitude, subjective norm and perceived behavioural control and behaviour was regressed on intention and perceived behavioural control.

Figure 10.2 shows the standardised and unstandardised partial regression coefficients. Results from observational studies of the TPB are often presented in this format or in a table displaying the same information.

Suppose the aim is to estimate the effect on behaviour of increasing attitude. The unstandardised coefficients can be used to derive this estimate in terms of the raw scores. Simply multiply the coefficient for the attitude–intention path by the coefficient for the intention–behaviour path. In this example, the estimate is 2.030 (= .504 × 4.027). This means that an intervention that increases attitude by one unit on the 7-point scale would be expected to produce an increase in medication adherence of about 2 percentage points. If an intervention increased attitude by one unit and subjective norm by 0.5 units, the estimate of the intervention effect would be 2.703 (= 2.030 + (0.5 × .334 × 4.027)). If the behaviour measure is a dichotomy (e.g. attended for a health check, yes/no, coded 1/0), the estimate can be interpreted as the increase in the probability of performing the behaviour or the increase in the proportion of participants who perform the behaviour.

The standardised coefficients can be used in the same way to yield an estimated intervention effect expressed in standard deviation units. For example, an intervention that increased attitude by 0.8 standard deviation units (a ‘large’ effect according to Cohen, 1992) would be estimated to increase behaviour by 0.8 × .423 × .400 = .135 standard deviation units – a ‘small’ effect.

This method of estimating potential intervention effect size is simpler and more direct than the simulation method used by Fifé-Shaw et al. (2007).
Such estimates are subject to a high degree of uncertainty. They will be imprecise, and the degree of imprecision will be greater in smaller samples. They may also be biased: drawing causal inferences from non-experimental data requires several strong assumptions (Sutton, 2002a). Nevertheless, in the absence of experimental data, it is necessary to rely on observational studies.

An Example of a TPB-based Intervention Study

Elliott and Armitage (2009) tested a generic TPB-based intervention to promote car drivers’ compliance with speed limits. The target behaviour was compliance with 30 mph speed limits, which was selected because most accidents in Britain occur on 30 mph roads. Participants were sampled from a database of drivers residing in the south east of England.

Participants were randomly assigned to a control group (N = 159) who were sent a baseline questionnaire or to an experimental group (N = 141) who were also sent an eight-page intervention booklet to be read after completing the questionnaire. Both groups were followed up by postal questionnaire at one month. The booklet included information about the risks of speeding in 30 mph areas and persuasive messages targeting behavioural, normative and control beliefs associated with complying with 30 mph speed limits. The beliefs to be targeted were those that predicted drivers’ attitudes, subjective norms, perceived behavioural control and/or intentions to comply with speed limits in a previous study (Elliott et al., 2005).

The messages targeting behavioural beliefs focused on five positive outcomes (that complying with 30 mph speed limits would put pedestrians at less risk, reduce the chances of an accident, use less fuel, make it easier to detect hazards and make driving more relaxing) and one negative outcome (that complying with 30 mph speed limits would make it difficult to keep up with the traffic). Table 10.3 shows the message that was used to target the negative outcome. The normative message targeted three groups of referents (friends, spouses/partners, parents/children). Finally, messages targeting control beliefs consisted of strategies that drivers can use to help them to avoid speeding when late or in a rush, when other drivers are exceeding the speed limit, when the speed limit is not clearly signed and when driving on long straight roads.

The TPB measures used in this study were closely in line with Ajzen’s recommendations (Ajzen, 2006a).
The measure of speeding behaviour was the mean of two items: ‘How often have you kept within 30 mph speed limits when driving over the last month? (never–nearly all the time); and ‘I have kept within 30 mph speed limits when driving over the last month’ (strongly disagree–strongly agree).

The intervention had limited effects on cognitions. It influenced one of the control power items: compared with those in the control group, participants in the intervention group were significantly more likely to say that if they were to drive on long straight roads this would make it more likely that they would keep within the speed limit. Intervention participants also had higher perceived behavioural control at follow up. Finally, there was significant effect on the behaviour measure: intervention participants reported greater compliance with speed limits compared with controls. The effect size was small (0.19). Mediation analysis supported a model in which the effect of the intervention on behaviour was mediated by change in perceived behavioural control which was in turn mediated by change in control power for ‘long straight roads’.

This study is a good example of a ‘pure’ TPB-based intervention. A number of observations can be made. The first concerns the target group. Ideally, the target population for such an intervention would be drivers who do not consistently comply with 30 mph speed limits. However, at baseline the study sample had on average strongly positive attitudes, subjective norms and perceived behavioural control with respect to the target behaviour and scored just over 5 on the 7-point self-report measure of compliance with the 30 mph speed limit. The authors comment that there was limited scope for changing many of the TPB variables. Second, the beliefs to be targeted in the intervention

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**Table 10.3 Examples of messages used by Elliott and Armitage (2009) to target behavioural, normative and control beliefs with respect to complying with 30 mph speed limits**

**Behavioural beliefs**

*Keeping to 30 mph speed limits will not make it difficult to keep up with the traffic*

Many drivers think that if they keep to the speed limit they will have difficulty keeping up with the traffic. However, this is a perception rather than a reality for the most part. Consider what driving in a 30 mph area is typically like. Even on larger 30 mph roads, there are roundabouts, traffic lights, pedestrian crossings, and other things that make it necessary for traffic to slow down or stop. If a vehicle in front starts to pull away from you, you will often find that by maintaining a speed of 30 mph you will catch up with that vehicle further up the road, because they have had to stop or slow down. They will have saved no significant amount of time and they will have gained little or no advantage.

**Normative beliefs**

*Do the people important to you really want you or themselves to be involved in an accident?*

Many drivers say that a reason why they sometimes drive faster than the speed limit is because they think other people would want them to do so. Drivers may think that people who are important to them, or people whose views they respect, would approve of them driving faster than the speed limit. However, is this really the case? It is a fact that increases in driving speed will increase the risk of a road traffic accident. It is also a fact that increases in driving speed will increase the severity of an accident, were it to occur. Ask yourself: Do the people who are important to me really want me, or themselves, to be involved in a road accident? Do my friends really want this to happen? Does my girl/boyfriend, or my wife/husband want this to happen? Do my parents or my children want this to happen?

**Control beliefs**

*Driving in a hurry?*

It’s actually very easy to keep within the speed limit. Keeping to 30 mph speed limits is something everyone should, and can, do. Many drivers say that they speed because they are late or in a hurry. However, as mentioned above, driving faster than the speed limit does not actually save you that much time when driving in 30 mph areas. You are more likely to make your appointment on time and find it easier to keep to 30 mph speed limits if you plan ahead and make sure you leave plenty of time to reach your destination.

were originally identified in a small \( N = 16 \) pilot elicitation study. All the beliefs were taken forward to a large quantitative study (Elliott et al., 2005). Those beliefs that were significantly predictive of the TPB variables were selected as targets for the intervention. As noted in an earlier section, this procedure is of doubtful validity. Third, regarding the content of the intervention, note that the normative message (Table 10.3) included information that increases in driving speed increase the risk and severity of accidents, which is relevant to behavioural beliefs. This illustrates a potential difficulty in TPB-based interventions, namely that it is not always easy to design messages that target a single component of the theory.

**Conclusions and Recommendations**

The theory of planned behaviour offers a systematic approach to intervention development. It is recommended that a modified stepwise procedure is employed based on the steps outlined earlier but omitting step 4 and conducting a relatively large elicitation study in step 2.

More basic research is needed on salient beliefs. The left-hand side of the theory has been neglected in research on the TPB to date. For example, there is little evidence on the stability of salient beliefs. In principle, different subsets of beliefs may be salient in different situations, which implies that a person’s attitude, subjective norm, perceived behavioural control and intention may vary depending on the context. Research is needed that systematically tests the effect of behaviour change techniques (Abraham & Michie, 2008), including information provision, on behavioural, normative and control beliefs. For example, does self-monitoring increase the salience of behavioural beliefs about the affective outcomes of performing the target behaviour? Does offering rewards for behaviour change work by creating a new salient belief (‘If I perform behaviour X, I will receive a reward’) or does it have additional, less obvious, effects? More research is needed on the most appropriate way of scaling belief components to reflect the underlying mechanism. Ajzen and Fishbein (2008) suggest that this may depend on the behaviour under investigation, the nature of the outcome and the labels used in the questionnaire items. The potential reactivity of TPB questionnaires should also be investigated. Such issues can be studied as part of the process of developing and evaluating TPB-based interventions.

**Discussion Points**

1. What advantages and disadvantages does the TPB have compared with alternative social cognition models?
2. How can the TPB be used to develop individually tailored interventions?
3. How effective have TPB-based interventions been in changing behaviour?
4. What are the implications of using different decision rules for selecting modal salient beliefs?
5. What are the implications for intervention strategies of using different schemes for scoring belief components?
6. How useful are models of persuasion in informing how to change beliefs?
7. How can TPB-based interventions increase actual control over the target behaviour?
8. How can the reactivity of TPB questionnaires be tested?

**Further Reading**


References


