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CONSTRUCTING QUESTIONNAIRES BASED ON THE THEORY OF PLANNED BEHAVIOUR

A MANUAL for HEALTH SERVICES RESEARCHERS

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FOREWORD

This manual is a response to a request from health services researchers wishing to predict and understand behaviour, in particular, researchers throughout the European Union involved in the ***ReBEQI*** project (Research-Based Education and Quality Improvement). It is based on a psychological model of behaviour change, the Theory of Planned Behaviour (TPB; Ajzen, 1988), which evolved from the Theory of Reasoned Action (Fishbein, 1967) and is designed to assist psychologists and non-psychologists involved in health services research to produce an effective questionnaire to measure the TPB constructs. Advice from the TPB literature (e.g. Ajzen, 1988; Conner & Sparks, 1995; Godin & Kok, 1996) has been integrated, resulting in a guide to writing questionnaires that is based on current practice among TPB researchers. Questionnaires based on the TPB can be used to investigate the attitudes and beliefs underlying health-related behaviour. In implementation (or knowledge transfer) research with health care professionals, these questionnaires have been used to investigate the uptake of evidence-based practice.

The Theory of Planned Behaviour is the explicit theoretical basis for 222 studies published in the Medline database, and 610 studies published in the PsycINFO database, from 1985 to January 2004. Apparently, hundreds of researchers have used this theory and have gone about the fascinating but time consuming task of reading the source materials and considering current debates about measurement strategies, before constructing a questionnaire to investigate their topic of interest. This manual is a tool that may help researchers to fast-track through this process. For those who have the time to investigate the background issues, we have included a full discussion of our operational decisions in Appendix C.

This manual has been subjected to a wide range of reviewing and trialling procedures. We are grateful to many colleagues who reviewed earlier drafts, to workshop participants who used the manual as an ‘instant’ guide to writing questions and to our bilingual colleagues who provided translations, back-translations and comments on the Dutch and Italian versions of the brief questionnaire.

Jill Francis, Martin Eccles, Marie Johnston, Anne Walker, Jeremy Grimshaw, Robbie Foy, Eileen Kaner, Liz Smith, Debbie Bonetti

May, 2004

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1 BRIEF SUMMARY OF THE THEORY OF PLANNED BEHAVIOUR

To predict whether a person **intends** to do something, we need to know:

- Whether the person is in favour of doing it ('**attitude**')
- How much the person feels social pressure to do it ('**subjective norm**')
- Whether the person feels in control of the action in question ('**perceived behavioural control**')

By changing these three 'predictors', we can increase the chance that the person will intend to do a desired action and thus increase the chance of the person actually doing it. In a clinical consultation, the clinician's treatment decisions and actions are examples of intentional behaviour.

In implementation research, clinical guidelines make evidence-based recommendations about the actions of clinicians in order to maximise quality of care. Many interventions are likely to work through clinicians' attitudes, subjective norms and perceived behavioural control – enhancing these is likely to increase compliance with guidelines.

Box 1.1

A patient with atrial fibrillation presents to their GP for an annual review. The patient is not currently being treated with warfarin. Will the GP prescribe warfarin? The answer to this depends on whether the GP intends to do so. In other words, it is not an automatic, habitual or thoughtless action. The intention, in turn, depends on:-

- Whether, overall, the GP has a positive or negative **attitude** to prescribing warfarin for patients with atrial fibrillation
- To what extent the GP perceives that they experience **social pressure** to prescribe or not, including whether the GP thinks that
  - the patient wants warfarin
  - professional colleagues would approve of prescribing;
  - the health care system encourages prescribing
  - and how important these various people's opinions are to the GP
- Whether the GP finds it **difficult** to prescribe i.e. how difficult it is to enact the behaviour in the given context.

The Theory of Planned Behaviour can be useful in designing strategies to help people to adopt healthy behaviours and to help clinicians increase their uptake of guidelines. This manual is a guide about how to construct and score a questionnaire which measures the variables in this model. The relevant literature contains some controversies and debates about how best to do this, but this document does not explore these; we have made decisions about solutions (justified in Appendix C). The focus here is on assisting researchers to construct a theory-based research tool in a systematic and replicable manner.

Construction of these questionnaires involves the use of both qualitative and quantitative methods. The manual is organised in nine sections, of which this is the first. The second section presents a statement of the theory. The third lists the steps in the construction of a questionnaire based on the TPB. The fourth concerns the measurement of intentions. Sections five to seven are about how to measure the three predictor variables: attitudes; subjective norms; and perceived behavioural control. The eighth section is a guide to the steps involved in managing the project, including how to construct the questionnaire as a whole. The final section, nine, gives details of recommended approaches to analysis. Examples of materials for the preliminary elicitation study, and construction and scoring of the questionnaire, are included in Appendix A.

2 HOW THE THEORY WORKS

The Theory of Planned Behaviour (TPB; Ajzen, 1988, 1991) proposes a model about how human action is guided. It predicts the occurrence of a specific behaviour provided that the behaviour is intentional. The model is depicted in Figure 1 and represents the three variables[1] which the theory suggests will predict the intention to perform a behaviour. Intentions are the precursors of behaviour.

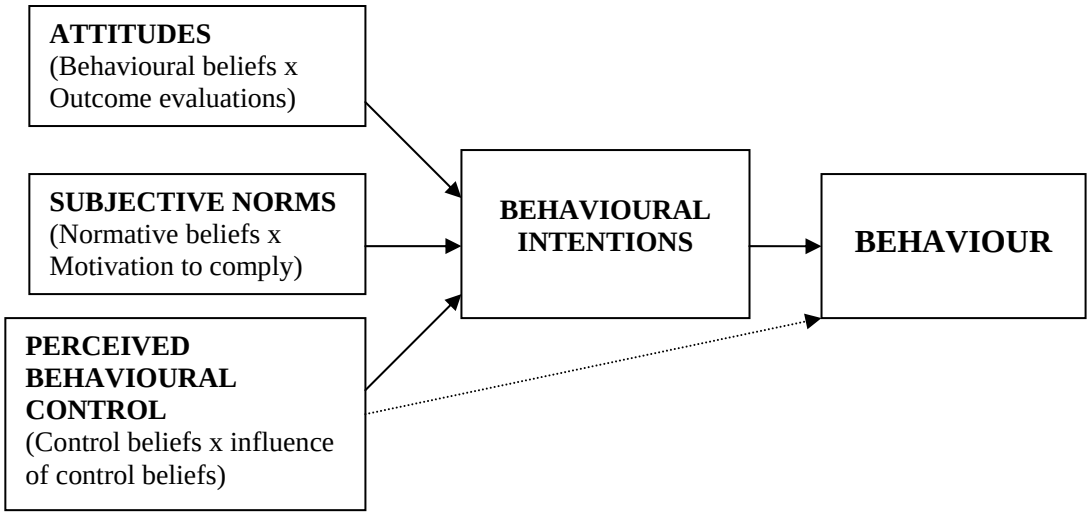


Figure 1. The Theory of Planned Behaviour (Ajzen, 1991)

The variable names in this model reflect psychological constructs and so they have a special meaning within the theory. Here are some brief explanations of these special meanings:

2.1 Behaviour

In implementation research, interventions are designed to change the behaviour of clinicians. The target behaviour should be defined carefully in terms of its Target, Action, Context and Time (TACT). For example, consider the behaviour, 'referring patients with back pain for a lumbo-sacral spine x-ray'. Here the target is the patient, the action is the referral, the context is the clinical condition (back pain) and the time is (implicitly) during the consultation.

This manual is about the application of the TPB to specific behaviours. It is possible to use the model to investigate more general behaviours (e.g. 'x-ray referral behaviour'), but it is important to observe the 'principle of compatibility' (Fishbein, 1967). That is, all the measures in the questionnaire – including the measure of intention – should refer to the same level of generality. For example, a questionnaire that includes a measure of attitudes towards prescribing antibiotics in general and a measure of intentions to prescribe antibiotics for uncomplicated sore throat violates the principle of compatibility. Any low correlations could be due to this as much as any other problems with the theory or its operationalisation.

2.2 Intention

Although there is not a perfect relationship between behavioural intention and actual behaviour, intention can be used as a proximal measure of behaviour. This observation was one of the most important contributions of the TPB model in comparison with previous models of the attitude-behaviour relationship. Thus, the variables in this model can be used to determine the effectiveness of implementation interventions even if there is not a readily available measure of actual behaviour.

[1] Note that the three variables also influence one another. Although Figure 1 is presented in a simplified form, a more detailed diagram would include double-ended arrows joining these three variables.

2.3 Attitudes *(towards the behaviour)*

Attitude toward the behaviour is a person's overall evaluation of the behaviour. It is assumed to have two components which work together: beliefs about consequences of the behaviour (behavioural beliefs; e.g. 'referring the patient for an x-ray will decrease future consultations') and the corresponding positive or negative judgements about each these features of the behaviour (outcome evaluations; e.g. 'decreasing future consultations is … desirable/undesirable').

2.4 Subjective norms *(about the behaviour)*

Subjective norms are a person's own estimate of the social pressure to perform or not perform the target behaviour. Subjective norms are assumed to have two components which work in interaction: beliefs about how other people, who may be in some way important to the person, would like them to behave (normative beliefs), e.g. 'I feel pressure from patients to refer them for an x-ray') and the positive or negative judgements about each belief (outcome evaluations), e.g. 'in regard to my decision to x-ray, doing what patients think I should do is important/ unimportant').

2.5 Perceived behavioural control *(of the behaviour)*

Perceived behavioural control is the extent to which a person feels able to enact the behaviour. It has two aspects: how much a person has control over the behaviour (e.g. low control over measuring blood pressure if the BP machine often malfunctions); and how confident a person feels about being able to perform or not perform the behaviour (e.g. not sufficiently skilled in measuring blood pressure). It is determined by control beliefs about the power of both situational and internal factors to inhibit or facilitate the performing of the behaviour (e.g. 'Whether I measure a patient's blood pressure is entirely up to me'; 'I could measure my patient's blood pressure if I wanted to').

2.6 Direct measures and indirect (belief-based) measures

With the exception of behaviour, the variables in the TPB model are psychological (internal) constructs. Each predictor variable may be measured directly e.g. by asking respondents about their overall attitude, or indirectly e.g. by asking respondents about specific behavioural beliefs and outcome evaluations. Direct and indirect measurement approaches make different assumptions about the underlying cognitive structures (see Appendix C) and neither approach is perfect. When different methods are tapping the same construct, scores are expected to be positively correlated, so it is recommended that both be included in TPB questionnaires (but see Section 8.4 about brief forms of the questionnaire). This manual explains how to construct questions for both types of measure.

2.7 Reliability

It is important to establish the **reliability** (Everitt, 1996) of each measure. For direct measures, one form of reliability may be established using an index of internal consistency (to determine whether the items in the scale are measuring the same construct). However, because people can quite logically hold both positive and negative beliefs about the same behaviour, it is not appropriate to assess the reliability of indirect measures using an internal consistency criterion. For example, someone may believe that referring patients with back pain will reassure the patients and also that an x-ray will expose these patients to unnecessary radiation. Equally, a GP may be highly motivated to comply with the expectations of professional colleagues but not at all motivated to comply with the expectations of patients. Hence, it does not make sense to eliminate some of these beliefs from overall measures on the grounds of low or negative correlations among them. It is necessary to use test-retest reliability (or 'temporal stability') for this purpose.

3 STEPS IN THE CONSTRUCTION OF A TPB QUESTIONNAIRE

The construction of a questionnaire to measure the variables in the TPB model proceeds in nine phases, some of which involve short but important tasks, with others involving a long process of empirical investigation. These steps are:

(a) Define the population of interest (examples: General medical practitioners in the Tayside region of Scotland; General dental practitioners in Newcastle, Durham and Northumberland, in the north-east of England). Decide how best to select a representative sample from this population.

(b) Carefully define the behaviour under study (explained using the TACT principle in Section 2.1 above). Use this definition to construct a general introductory statement for the start of the questionnaire, for example, "*Each question in this section refers to MEASURING THE BLOOD PRESSURE (BP) of your patients with Type 2 diabetes*". (See Appendix A.)

(c) Decide how best to measure intentions (explained in Section 4).

(d) Determine the most frequently perceived advantages and disadvantages of performing the behaviour (explained in Section 5).

(e) Determine the most important people or groups of people who would approve or disapprove of the behaviour (explained in Section 6).

(f) Determine the perceived barriers or facilitating factors which could make it easier or more difficult to adopt the behaviour (explained in Section 7).

(g) For a standard TPB-based study, include items to measure ALL of these constructs in the first draft of the questionnaire (see example in Appendix A).

(h) Pilot test the draft and reword items if necessary.

(i) Assess the test-retest reliability of the indirect measures by administering the questionnaire twice to the same group of people, with an interval of at least two weeks.

4 MEASURING BEHAVIOURAL INTENTIONS

Key:	🕐 🕐 🕐	very time consuming (allow weeks)
	🕐 🕐	quite time consuming (allow days)
	🕐	not very time consuming (allow hours)

This section describes three methods of measuring intentions. We have called Method 1 Intention Performance, because in some situations, it would be possible to observe actual performance using the same measurement scale, and this direct comparability could be useful for some studies. In the TPB literature, where most research has been about individual's own health-related behaviour (e.g. smoking, exercise), Generalised Intention (Method 2) is most commonly used. When investigating the behaviour of health care professionals, Intention Simulation (Method 3) could be a more valid proxy measure for actual behaviour, because it more closely approximates 'real' situations that require complex clinical decisions. However, it is time consuming and should be prepared with great care, or it may be misleading. A thorough conceptual analysis and review of Intention Simulation, carrying the appropriate warnings, is presented by Jones, Gerrity and Earp (1990).

In general, the methods used to measure intentions should be guided by researchers' judgements about which types of questions seem to make sense for the behaviour and sample under investigation.

4.1 Method 1: Intention performance

🕐

4.1.1 Procedure

Use a single item in the format shown in Box 4.1

Box 4.1

Given 10 patients presenting with back pain for the first time, how many patients would you expect to refer for an x-ray?

0 1 2 3 4 5 6 7 8 9 10

4.1.2 Scoring

For this single item measure, the number circled is the behavioural intention score.

4.2 Method 2: Generalised intention

🕐

4.2.1 Procedure

Adequate internal consistency can be demonstrated using three items. We suggest using the format shown in Box 4.2[2].

Box 4.2

1. I expect to refer patients with lower back pain for an x-ray

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

2. I want to refer patients with lower back pain for an x-ray

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

3. I intend to refer patients with lower back pain for an x-ray

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

[2] There is a research literature that discusses the conceptual differences between these three questions, although empirically, there is very considerable response consistency between these items. See Armitage and Conner (2001) for a discussion of this issue.

4.2.2 Scoring

Calculate the mean of the three intention scores.

4.3 Method 3: Intention simulation

4.3.1 Stages of Development

A. Write scenarios
B. For each scenario, ask for a treatment decision

4.3.2 Procedure

A. Write 10 scenarios, of around 80 to 100 words each, describing patients presenting with the clinical condition, based an exploratory study and/or your own or colleagues' clinical experience. It is important to cover a wide range of patient types and consultation situations. If sample size permits, you may want to systematically vary the features of the scenarios e.g. age of patient; prior consultation history; patient's current anxiety level; patient's preference regarding target behaviour.

B. For each scenario, ask respondents for a treatment decision which permits a 'Yes/No' answer (see Box 4.3.) You may also want to ask how difficult the decision was.

Box 4.3

The first patient is a 29 year old woman, who comes into your surgery, limping and holding her back. She describes her back pain as sharp and unceasing. She has had it for the last 3 weeks, and for the last week she has been unable to go to work because she can't drive. She is very worried that whatever is causing her problem is getting worse. She has had no previous episodes. Her last six attendances have been for repeat prescriptions for oral contraceptives.

Your decision: Refer for x-ray? YES ☐ NO ☐

On the scale 1 to 7, how difficult was it for you to make a decision for this scenario?

Not at all Difficult	1	2	3	4	5	6	7 Extremely Difficult

4.3.3 Scoring

Count the number of 'Yes' answers. This number is the score for behavioural simulation. The higher the number, the stronger is the intention to perform the behaviour. For decision difficulty, you may wish to calculate the mean of responses for each participant (which may modify the relationship between intentions and actual behaviour) or the mean for all participants across each scenario (which may reflect differences between scenarios). The decision whether and how to use difficulty scores depends on your research question.[3]

[3] Decision difficulty is not part of the TPB model. We acknowledge that there is a large literature on decision difficulty and anyone who wants to include this as a central part of their research would be wise to consult this body of work.

5 MEASURING ATTITUDES

Key: very time consuming (allow weeks)
quite time consuming (allow days)
not very time consuming (allow hours)

5.1 Direct measurement of attitude

5.1.1 Procedure

- Direct measurement involves the use of bipolar adjectives (i.e. pairs of opposites) which are evaluative (e.g. *good – bad*).
- Ideally, use about four items following a single 'stem' which defines the behaviour under investigation (see Box 5.1)[4].
- Include instrumental items (whether the behaviour achieves something e.g. *useful–worthless*) and experiential items (how it feels to perform the behaviour e.g. *pleasant – unpleasant*)[5].
- Include the *good – bad* scale if it is appropriate to the topic, as it captures overall evaluation.
- Arrange the items so that the ends of the scales are a mix of positive and negative endpoints.[6] (See Box 5.1)

Box 5.1[7] *Example: A patient presents with lower back pain. The target behaviour is referring the patient for x-ray.*

Referring a patient with acute lower back pain for x-ray is

stem

negative endpoints

harmful	1	2	3	4	5	6	7 beneficial
good	1	2	3	4	5	6	7 bad
pleasant (for me)	1	2	3	4	5	6	7 unpleasant (for me)
worthless	1	2	3	4	5	6	7 useful

5.1.2 Scoring

- Recode the items that have negatively worded endpoints on the right, so that higher numbers then always reflect a positive attitude to the target behaviour (e.g. for *'pleasant – unpleasant'*, an answer of 6 becomes score of 2; a score of 4 remains a 4).
- It is important that the attitude items have high internal consistency, i.e. that scores on these items correlate highly with each other (see Section 9.3). You may decide to omit items from the scale to improve internal consistency.

[4] Box 5.1 contains sample items that may not be applicable for every study. Indeed, indiscriminate use may result in low internal consistency of the scale and hence low correlations with intentions. (Valois & Godin, 1991). Researchers are advised to use careful pilot testing to establish whether items are appropriate.

[5] What needs to be assessed here is the perspective of the actor – not the target of the behaviour. For example, in Box 5.1, whether the behaviour is pleasant or unpleasant for the patient is more likely to emerge as a control belief (see Section 7.2.2) but is not an item that directly measures attitude.

[6] This mixing of positive and negative endpoints is a common practice that is designed to minimise the risk of 'response set', or a tendency to answer questionnaire items in the same way regardless of their content. However, some scholars (e.g. McColl et al, 2001) argue that this could be counter productive. This is a matter of judgement, in that different types of samples may respond differently to mixed or unmixed endpoints. It would be an important question to consider when a draft of the questionnaire is subjected to pilot testing (see Section 8.3.3).

[7] A 7-option response format most often recommended in the TPB literature, although 5-option formats are sometimes used.

- Calculate the mean of the item scores to give an overall attitude score.

5.2 Indirect measurement of attitude: measuring behavioural beliefs and outcome evaluations

5.2.1 Stages of Development

A. Conduct an elicitation study to elicit commonly held beliefs: Identify the content of behavioural beliefs that are shared by the target population.
B. Construct questionnaire items to assess the strength of behavioural beliefs.
C. Construct questionnaire items to assess outcome evaluations.

5.2.2 Procedure

A. Conduct an elicitation study

- Take a sample (about 25 people[8]) from the population from which you will select respondents for the questionnaire study.

- Use open-ended questions. These are normally presented in one-to-one interviews, but could also be in focus group or questionnaire form. Give participants a few minutes to list their thoughts in response to structured questions (Box 5.2).

- Content analyse the responses into themes (behavioural beliefs) and label the themes extracted. To increase the validity of the analysis, at least two researchers should do this independently. List the themes in order, from most frequently mentioned to least frequently mentioned.

Box 5.2 Example: Your patient has Type 2 diabetes. The target behaviour is taking the patient's blood pressure. Please take a few minutes to list your thoughts about the following questions:

What do you believe are the ***advantages*** of measuring the patient's blood pressure?
What do you believe are the ***disadvantages*** of measuring the patient's blood pressure?
Is there anything else you associate with measuring the patient's blood pressure?

B. Construct questionnaire items to assess the strength of behavioural beliefs

- Select the behavioural beliefs most often listed and convert these into a set of statements. These statements should reflect the beliefs which might affect the behaviour of the target population (see Box 5.3 for question and response formats). Inclusion of **75%** of all beliefs stated should give adequate coverage of the belief 'population'.

- Pilot test these items by asking about five people from the relevant population to answer the questions and tell you whether they have any difficulty answering them. Check comprehension and clarity. If necessary, modify the wording of the questions.

[8] This is the sample size recommended by Godin and Kok (1996). The sample size could legitimately be adjusted according to the principles of qualitative research methods, such as purposive sampling that adequately represents subsets of the population and sampling until data saturation is achieved. For these and other issues to do with qualitative research methods, a methods text such as Seale (1998) is recommended.

Box 5.3.1 ***Question format, behavioural beliefs***		***Box 5.3.2*** ***Response format, behavioural beliefs[9]***								
a	If I measure blood pressure (BP), I will feel that I am doing something positive for the patient.	Unlikely	1	2	3	4	5	6	7	Likely
b	It causes a lot of worry and concern for the patient if they are found to have high BP.	Unlikely	1	2	3	4	5	6	7	Likely
c	If I measure BP, I will detect any problems at an early stage.	Unlikely	1	2	3	4	5	6	7	Likely
d	If I measure BP, I've got to see some patients more often.	Unlikely	1	2	3	4	5	6	7	Likely

C. Construct questionnaire items to assess outcome evaluations

Convert each of the belief statements[10] into the form of an incomplete sentence. By completing the sentence (using the set response format), the participant expresses a positive or negative evaluation of the belief statement. (See Box 5.4 for question and response formats.)

Box 5.4.1 ***Question format, outcome evaluations***		***Box 5.4.2*** ***Response format, outcome evaluations[11]***								
e	Doing something positive for the patient is:	Extremely undesirable	-3	-2	-1	0	+1	+2	+3	Extremely desirable
f	Causing a lot of worry and concern for the patient is:	Extremely undesirable	-3	-2	-1	0	+1	+2	+3	Extremely desirable
g	Detecting problems for these patients at an early stage is:	Extremely undesirable	-3	-2	-1	0	+1	+2	+3	Extremely desirable
h	Having to see some patients more often is:	Extremely undesirable	-3	-2	-1	0	+1	+2	+3	Extremely desirable

- Pilot test these items by asking about five respondents to answer the questions and tell you whether they have any difficulty answering them. If necessary, modify the wording.

5.2.3 Scoring

For each behavioural belief, the belief score on the unlikely-likely scale is multiplied by the relevant evaluation score on the extremely bad/extremely good scale (see Box 5.5)[12]. The resulting products across are summed all the beliefs to create an overall attitude score:

[9] Some researchers prefer the endpoints 'Strongly disagree; strongly agree'. These may make more sense for some items and we recommend that researchers use their own judgement. We have used 'unlikely' and 'likely' in the example because an important feature of these items is that the respondent is making a judgement about the **probability** that a given item is true.
[10] Some outcome evaluation questions seem odd to participants. For example, asking whether 'doing something positive for the patient' is 'undesirable' seems downright silly, and this may affect response rates or response validity. For this and other items in which a pilot study indicates there will be zero variance, it is worth considering omitting the item from the questionnaire and weighting the behavioural belief score by a constant selected intelligently by the researcher.
[11] Some researchers prefer the endpoints 'extremely unimportant; extremely important'. We suggest 'extremely undesirable; extremely desirable' as they are directional, thereby enabling the respondent to say what are positive and negative items. For example, the researcher may think that 'causing worry and concern' is a negatively worded item, but a clinician may feel that a small amount of worry is good for the patient as it may increase the chances of compliance with treatment regimens.
[12] Note that this form of scoring for attitudes and for the other predictor variables is somewhat controversial. Our reasons for recommending this approach are given in a discussion paper (Appendix C). Briefly, we think that interpretation of scores is easier when the midpoint of the scale is zero, so it is clear whether the final score represents an influence for or against enacting the behaviour. Also, response scales are unipolar (1 to 7) or bipolar (-3 to +3), depending on whether the concept to be measured is unidirectional (e.g. probability) or bidirectional (e.g. evaluation).

Formula 5.1 $$A = (a \times e) + (b \times f) + (c \times g) + (d \times h)$$

Where A = total attitude score
a, b, c and d are scores for each of four behavioural beliefs
e, f, g and h are scores for outcome evaluations relating to each behavioural belief

Using this method,

- a ***positive*** (+) score means that, overall, the participant is ***in favour of*** taking blood pressure readings of patients with Type 2 diabetes.
- a ***negative*** (-) score means that, overall, the participant is ***against*** taking blood pressure readings of patients with Type 2 diabetes.

Box 5.5 Example, scoring procedure

a	If I measure blood pressure (BP), I will feel that I am doing something positive for the patient.	Unlikely	1	2	3	4	***5***	6	7	Likely
B	It causes a lot of worry and concern for the patient if they are found to have high BP	Unlikely	1	***2***	3	4	5	6	7	Likely
C	If I measure BP, I will detect any problems at an early stage.	Unlikely	1	2	3	4	5	***6***	7	Likely
D	If I measure BP, I've got to see some patients more often.	Unlikely	1	***2***	3	4	5	6	7	Likely
e	Doing something positive for the patient is:	Extremely undesirable	-3	-2	-1	0	+1	+2	***+3***	Extremely desirable
F	Causing a lot of worry and concern for the patient is:	Extremely undesirable	-3	***-2***	-1	0	+1	+2	+3	Extremely desirable
G	Detecting problems for these patients at an early stage is:	Extremely undesirable	-3	-2	-1	0	+1	+2	***+3***	Extremely desirable
H	Having to see some patients more often is:	Extremely undesirable	-3	-2	***-1***	0	+1	+2	+3	Extremely desirable

Imagine that a participant has responded by circling the numbers indicated in ***bolded italics*** above.

The total attitude score is calculated as

A = (5 x +3) + (2 x -2) + (6 x +3) + (2 x -1)
= (+15) +(-4) + (+18) +(-2)
= +27

Because there are 4 items, the possible range of total scores is (7 x ±3) x 4 = -84 to +84[13]

THEREFORE, THE ATTITUDE SCORE OF THE PARTICIPANT REFLECTS A WEAK TO MODERATE **POSITIVE** ATTITUDE (i.e. **IN FAVOUR** OF MEASURING BLOOD PRESSURE)

[13] The range will of course differ if different numbers of items are used, so interpretation of weak, moderate and strong attitudes will be determined by the possible range. The important aspect of this measurement scheme is that zero represents a neutral attitude, positive scores represent attitudes in favour of the behaviour as described, and negative scores represent attitudes against the behaviour as described. Differences in range between predictor variables are acceptable for correlational analysis, but if you want to compare the absolute values of predictor variables within or across studies, it would be necessary to calculate the mean of the multiplied scores (in this case, +27/4 = +6.75, possible range -21 to +21).

6 MEASURING SUBJECTIVE NORMS

Key: very time consuming (allow weeks)
quite time consuming (allow days)
not very time consuming (allow hours)

6.1 Direct measurement of subjective norm

6.1.1 Procedure

- Direct measurement involves the use of questions referring to the opinions of important people in general (See Box 6.1).
- Use the first three items in the format presented in Box 6.1, and additional items if they seem appropriate and if questionnaire length is not a problem.
- Where the response format completes an otherwise incomplete sentence (e.g. I should not / I should …), arrange the items so that the ends of the scales are a mix of positive and negative endpoints (See Box 6.1). However, where an item is a complete sentence, and the responses range from 'Strongly disagree' to 'Strongly agree', endpoints should not be mixed.

Box 6.1 *Example: A patient presents with lower back pain. The target behaviour is referring the patient for x-ray.*

1. Most people who are important to me think that

negative endpoint

I should 1 2 3 4 5 6 7 I should not refer patients who have lower back pain for x-ray.

2. It is expected of me that I refer patients who have lower back pain for x-ray.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

3. I feel under social pressure to refer patients who have lower back pain for x-ray.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

4. People who are important to me want me to refer patients who have lower back pain for x-ray.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

6.1.2 Scoring

- Recode the items that have negatively worded endpoints on the right, so that high scores then consistently reflect greater social pressure to do the target behaviour

- It is important that the subjective norm items have high internal consistency, i.e. that the scores on these items correlate highly with each other. (You may decide to omit items from the scale to improve internal consistency.)

- Calculate the mean of the item scores to give an overall subjective norm score

6.2 Indirect measurement of subjective norm: measuring normative beliefs and motivation to comply

6.2.1 Stages of Development

A. Conduct an elicitation study to elicit commonly held beliefs: Identify groups, organisations and categories of individuals ('reference groups') who are likely to apply social pressure with respect to the behaviour.

B. Construct questionnaire items to assess strength of normative beliefs with respect to each reference group.

C. Construct questionnaire items to assess motivation to comply: Add items in standard format for assessing motivation to comply with pressure from each reference group.

6.2.2 Procedure

A Conduct an elicitation study to elicit commonly held beliefs

- Sample about 25 people from the same population from which you will select respondents for the questionnaire study. (This would be the same 25 people as those referred to in Section 5.2.2.)

- Use open-ended questions. These are normally presented in one-to-one interviews, but could also be in focus group or questionnaire form. Give participants a few minutes to list their thoughts in response to structured questions (Box 6.2).

- Content analyse the responses into themes (normative beliefs) and label the sources of social pressure extracted. At least two researchers should do this independently. List these sources in order, from most frequently mentioned to least frequently mentioned.

Box 6.2 *Example: Your patient has Type 2 diabetes. The target behaviour is measuring the patient's blood pressure (BP). Please take a few minutes to list your thoughts about the following questions:*

Are there any individuals or groups who would ***approve*** of your measuring the patient's BP?
Are there any individuals or groups who would ***disapprove*** of your measuring the patient's BP?
Is there anything else you associate with measuring the patient's blood pressure?

B. Construct questionnaire items to assess strength of normative beliefs

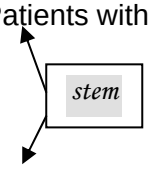
- Select the reference groups (or individuals) most often listed and convert these into the 'stems' of normative belief items (see Box 6.3). Inclusion of **75%** of the groups or individuals listed should give adequate coverage of the sources of social pressure.

- Items may reflect what important people *think* a person should do (*injunctive* norms) or what important people *actually* do *(descriptive* norms). Box 6.3 illustrates the difference between these types of items.

Box 6.3 Imagine that the elicitation study has identified three sources of social pressure: patients with Type 2 diabetes; diabetologists; and other GPs.

Injunctive items (what important people *think* a person should do)

1. Patients with Type 2 diabetes think I



should not -3 -2 -1 0 +1 +2 +3 should measure their blood pressure.

2. Diabetologists would

disapprove -3 -2 -1 0 +1 +2 +3 approve of my measuring patients' blood pressure.

Descriptive items (what important people *actually* do)

3. Other GPs

do not -3 -2 -1 0 +1 +2 +3 do measure the blood pressure of their patients with diabetes.

C. Construct questionnaire items to assess motivation to comply

- Convert each of the sources of social pressure into the form of a statement about the importance of the various sources of social pressure. (See Box 6.4.) By answering the questions, the participant indicates the strength of motivation to comply with each reference group or individual.

Box 6.4

1. Patients' approval of my practice is important to me

Not at all 1 2 3 4 5 6 7 Very much

2. What diabetologists think I should do matters to me

Not at all 1 2 3 4 5 6 7 Very much

3. Doing what other GPs do is important to me

Not at all 1 2 3 4 5 6 7 Very much

- Pilot test these items by asking about five respondents to answer the questions and tell you whether they have any difficulty answering them. If necessary, modify the wording of the questions.

6.2.3 Scoring

For each normative belief, the belief score on the should/should not or do/do not scale is multiplied by the score relating to the not at all/very much scale (See Box 6.5)[14]. The resulting are summed products across all the beliefs to create an overall subjective norm score:

Formula 6.1 $$N = (a \times d) + (b \times e) + (c \times f)$$

Where N = total subjective norm score
a, b and c are scores for each of the three normative beliefs
d, e and f are scores for motivation to comply relating to each source of social pressure

Using this method,

- a ***positive*** (+) score means that, overall, the participant experiences social pressure ***to*** measure the BP of patients for with diabetes.
- a ***negative*** (-) score means that, overall, the participant experiences social pressure ***not to*** measure the BP of patients for with diabetes.

Box 6.5 Example, scoring procedure

a	Patients with Type 2 diabetes think I … measure their blood pressure.	Should not	-3	-2	-1	0	***+1***	+2	+3	Should
b	Diabetologists would ……. of my measuring the BP of these patients.	Disapprove	-3	-2	-1	0	+1	+2	***+3***	Approve
c	Other GPs ….. measure the BP of these patients.	Do not	-3	-2	-1	0	+1	***+2***	+3	Do
d	Patients' approval of my practice is important to me.	Not at all	1	2	3	***4***	5	6	7	Very much
e	What diabetologists think I should do matters to me.	Not at all	***1***	2	3	4	5	6	7	Very much
f	Doing what other GPs do is important to me.	Not at all	1	***2***	3	4	5	6	7	Very much

Imagine that a participant has responded by circling the numbers indicated in **bold** above.

The total normative belief score is calculated as

$$N = (+1 \times 4) + (+3 \times 1) + (+2 \times 2)$$
$$= (+4) + (+3) + (+4)$$
$$= +11$$

The possible range of total scores is -63 to +63. THEREFORE,
THE NORMATIVE BELIEF SCORE OF THE PARTICIPANT REFLECTS FAIRLY WEAK **POSITIVE** SOCIAL PRESSURE (i.e. **TO MEASURE** PATIENTS' BLOOD PRESSURE).

[14] Note that this form of scoring is somewhat controversial. Our reasons for recommending this approach are given in a discussion paper (Appendix C).

7 MEASURING PERCEIVED BEHAVIOURAL CONTROL

Key: very time consuming (allow weeks)
quite time consuming (allow days)
not very time consuming (allow hours)

7.1 Direct measurement of perceived behavioural control (PBC)

7.1.1 Procedure

- Items should reflect people's confidence that they are capable of performing the target behaviour. This can be achieved assessing the person's self-efficacy and their beliefs about the controllability of the behaviour.

- Self-efficacy is assessed by asking people to report
  a) how difficult it is to perform the behaviour.
  b) how confident they are that they could do it. (See Box 7.1)

- Controllability is assessed by asking people to report
  a) whether performing the behaviour is up to them. (See Box 7.1)
  b) whether factors beyond their control determine their behaviour.

- Remember that where the response format completes an otherwise incomplete sentence (e.g. difficult / easy), arrange the items so that the ends of the scales are a mix of positive and negative endpoints. (See Box 7.1.) However, where an item is a complete sentence, endpoints should not be mixed.

Box 7.1

Self-efficacy

negative endpoint

1. I am confident that I could refer my patients for x-ray if I wanted to
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

2. For me to refer my patients for x-ray is
easy 1 2 3 4 5 6 7 difficult

Controllability

4. The decision to refer for x-ray is beyond my control.
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

5. Whether I refer for x-ray or not is entirely up to me.
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

7.1.2 Scoring

- Recode the items that have negative endpoints on the right, so that high scores then consistently reflect a greater level of control over the target behaviour.

- It is important that the subjective norm items have high internal consistency, i.e. that scores on these items correlate highly with each other. (You may decide to omit items from the scale to improve internal consistency.)

- Calculate the mean of the item scores to give an overall perceived behavioural control score

7.2 Indirect measures of PBC: Measuring control beliefs and their perceived power to influence behaviour

7.2.1 Stages of Development

A. Conduct an elicitation study to elicit commonly held beliefs: Identify the content of control beliefs which are shared by the target population about the behaviour.
B. Construct questionnaire items to assess the strength of these control beliefs
C. Construct questionnaire items to assess the power of these control factors to influence the behaviour

7.2.2 Procedure

A. Conduct an elicitation study to elicit commonly held beliefs

- Sample about 25 people from the same population from which you will select respondents for the questionnaire study. (Again, this would be the same 25 people as those referred to in Sections 5.2.2 and 6.2.2.)

- Use open-ended questions. These are normally presented in one-to-one interviews, but could also be in focus group or questionnaire form. Give participants a few minutes to list their thoughts in response to structured questions (Box 7.2).

- Content analyse the information into themes (control beliefs) and order and label the themes extracted. At least two researchers should do this independently. List the themes in order from most frequently mentioned to least frequently mentioned.

Box 7.2 *Example: Your patient has Type 2 diabetes. The target behaviour is taking a patient's blood pressure. Please take a few minutes to list your thoughts about the following questions:*

What factors or circumstances enable you to measure the blood pressure of a patient with diabetes?

What factors or circumstances make it difficult or impossible for you to measure the blood pressure of a patient with diabetes?

Are there any other issues that come to mind when you think about measuring the blood pressure of a patient with diabetes?

B Construct questionnaire items to assess the strength of control beliefs

- Select the beliefs most often listed and convert these into a set of statements. These statements should reflect the beliefs which might make it difficult to perform (or not perform) the target behaviour. (See Box 7.3 for question and response formats). Inclusion of **75%** of all beliefs listed should give adequate coverage of the belief 'population'.

Box 7.3 *Imagine that the elicitation study has identified a control factor to do with patients being inappropriately dressed for BP measurement; another to do with feeling rushed when measuring BP in the consultation; another about uncomfortable cuffs on BP machines.*

1. Patients with diabetes come to the consultation inappropriately dressed to have their BP measured.
Unlikely 1 2 3 4 5 6 7 Likely

2. When I am measuring BP in the consultation I feel rushed.
Unlikely 1 2 3 4 5 6 7 Likely

3. The cuffs on the BP machines are uncomfortable for patients.
Unlikely 1 2 3 4 5 6 7 Likely

C Construct questionnaire items to assess the power of these factors to influence the behaviour

Convert each of the control belief statements into the form of an incomplete statement about whether this makes it more or less likely that the person will do the target behaviour, or whether it makes the behaviour easier or more difficult to do. (See Box 7.4.)

Box 7.4

1. When patients with diabetes come to the consultation inappropriately dressed to have their BP measured, I am
less likely -3 -2 -1 0 +1 +2 +3 more likely
to measure their BP.

2. Feeling rushed in the consultation makes it
much more difficult -3 -2 -1 0 +1 +2 +3 much easier
to measure patients' BP.

3. When the cuffs on the BP machine are uncomfortable for patients, I am
less likely -3 -2 -1 0 +1 +2 +3 more likely
to measure patients' BP.

- Pilot test these items by asking about five respondents to answer the questions and tell you whether they have any difficulty answering them. If necessary, modify the wording.

7.2.3 Scoring

For each control belief, the belief score on the unlikely/likely scale is multiplied by the score relating to the relevant item on the less likely/more likely scale or the much more difficult/much easier scale (See Box 7.5). The resulting products are summed across all beliefs to create an overall perceived behavioural control score:

Formula 7.1 $$PBC = (a \times d) + (b \times e) + (c \times f)$$

Where PBC = total perceived behavioural control score.
a, b and c are scores for each of three control beliefs.
d, e and f are scores for control belief power relating to each control belief.

Using this method,

- a ***positive*** (+) score means that, overall, the participant ***feels in control of*** measuring patients' blood pressure.
- a ***negative*** (-) score means that, overall, the participant ***does not feel in control of*** measuring patients' blood pressure.

Box 7.5 Example, scoring procedure

a	Patients with diabetes come to the consultation inappropriately dressed to have their BP measured.	Unlikely	1	2	3	4	***5***	6	7	Likely
b	When I am measuring BP in the consultation I feel rushed.	Unlikely	1	2	***3***	4	5	6	7	Likely
c	The cuffs on the BP machines are uncomfortable for patients.	Unlikely	1	***2***	3	4	5	6	7	Likely
d	When patients with diabetes come to the consultation inappropriately dressed to have their BP measured, I am …….. to measure BP.	Less likely	***-3***	-2	-1	0	+1	+2	+3	More likely
e	Feeling rushed in the consultation makes it …… to measure patient's BP.	More difficult	-3	***-2***	-1	0	+1	+2	+3	Easier
f	When the cuffs on the BP machines are uncomfortable for patients, I am …….. to measure BP.	Less likely	***-3***	-2	-1	0	+1	+2	+3	More likely

Imagine that the participant has responded by circling the numbers indicated in ***bolded italics*** above.
The total perceived behavioural control score is calculated as

PBC = (5 x -3) + (3 x -2) + (2 x -3)
= (-15) + (- 6) + (- 6)
= - 27

The possible range of total scores is -63 to +63. THEREFORE,
THE PBC SCORE OF THE PARTICIPANT REFLECTS A **MODERATE** LEVEL OF **NEGATIVE** CONTROL, i.e. MEASURING PATIENTS' BLOOD PRESSURE IS FAIRLY DIFFICULT.

8 STEPS IN MANAGING A TPB SURVEY

8.1 Defining the population, clinical condition and behaviour of interest

Practical considerations and the more general research agenda will influence these decisions. For example, in the context of implementation research, the project will be easier to complete and more informative if

- There is clear clinical evidence about the relevant issue(s)
- compliance with the evidence is low or moderate
- the clinical condition is not rare
- among the population of interest there is variation in performing the behaviour to be investigated
- the behaviour involves a 'yes/no' treatment decision
- contact details are easily available for the population of interest

After these definitions are agreed on by the project team, write a formal definition of the behaviour under investigation. Recall the TACT principle, whereby the behaviour is defined with reference to its Target, Action, Context and Time. You are then ready to select people from the population of interest for the elicitation study.

8.2 Elicitation Study

8.2.1 Collecting the data

ONE elicitation study can be used to develop the indirect (belief-based) measures for all the predictor constructs in the TPB model (attitude; subjective norm; and perceived behavioural control). This involves:

- selecting the sample for the elicitation study (ideally, 25 participants)
- arranging a focus group or individual interview, or mailed questionnaire
- asking for free-format responses to the set questions (see list of questions in Appendix A)

8.2.2 Analysing the data

Two researchers independently analyse the content of the responses by labelling the themes and listing them in order of frequency for each of the following:

- behavioural beliefs
- sources of social pressure (reference individuals or groups)
- control belief strength

8.2.3 Wording the questions

A questionnaire item is developed to assess each theme that has emerged from the analysis. At this point, there should be a draft for questions to assess each of the following:

- behavioural beliefs
- sources of social pressure (reference individuals or groups)
- control belief strength

Using similar wording, a second set of items is developed to assess each of the following:

- outcome evaluation for each of the behavioural beliefs
- motivation to comply with each reference group or individual
- control belief power

8.3 Formatting and piloting the questionnaire

8.3.1 Number and content of questions

The first draft of the questionnaire includes:

- A set of demographic questions which will provide information about the sample. Examples of demographic questions are included in the questionnaire template (Appendix A).

- Questions which provide direct measures of all three predictor variables.

- The questions developed from the elicitation study, which are belief-based measures of the same three predictor variables. It is important to measure all the constructs that are represented in the model. All three predictors (attitude, subjective norm and perceived behavioural control) should be included.

- A set of questions to assess behavioural intention.

- Each construct should be measured using a minimum of three items. In addition to the demographic questions, this will result in a minimum of 12 items for intentions and direct measures of the predictor variables and a further 18 items for belief-based measures. If you decide to include the behavioural simulation method of measuring intentions, a further 10 items (one for each scenario) would be used. Thus, the questionnaire should consist of a minimum of 40 carefully worded items, plus 8 demographic items.

- Your elicitation study may reveal many more than three behavioural beliefs, normative beliefs and control beliefs. You may feel that, in order to cover the breadth of the constructs of attitude, subjective norm and perceived behavioural control, it is necessary to include a larger number of items relating to indirect measures of the predictor variables. Including such extra items will almost certainly improve the validity of the study but should be weighed against the issues of questionnaire length and its consequences in terms of participant fatigue and response rates.

8.3.2 Ordering of questions in the document

Ajzen recommends that items be mixed up through out the document. That is, questions used to assess attitudes should be interspersed with questions measure subjective norms and perceived behavioural control.

8.3.3 Piloting the questionnaire and creating the second draft

Ask about five respondents to complete the questionnaire and comment on the items. (These may be people who took part in the original elicitation study.) It would be useful if they could comment on the following:

- Are any items ambiguous or difficult to answer?
- Does the questionnaire feel too repetitive?
- Does it feel too long?
- Does it feel too superficial?
- Are there any annoying features of the wording or formatting?
- Are there inconsistent responses that might indicate that changes in response endpoints are problematic for respondents who complete the questionnaire quickly?

Cognitive interviewing techniques (Schwarz & Sudman, 1996) may be useful for pre-testing the questionnaire items.

If responses from this small sample lead to minor changes in wording or formatting, a second draft of the questionnaire can be written in consultation with the project team. If major changes are suggested, a second elicitation study with a different sample would be required.

8.4 Brief forms of the questionnaire

Researchers may wish to construct a brief form of a TPB questionnaire. A subset of items may be selected from the larger recommended questionnaire, but it is important that researchers are clear about the purpose of the research, and understand which research questions can and cannot be answered by a reduced data set. For example, the following list of broad research goals includes some ideas about variables that would have to be measured to address each goal.

- Predicting intentions

If the goal of the research is simply to do an analysis to predict variance in behavioural intentions, it would be sufficient to measure intentions (3 generalised intention items) and the three predictor variables using direct measures (3 items x 3 variables), resulting in a 12-item questionnaire.

- Understanding influences

If the goal of the research is to identify the specific beliefs that contribute most to the three predictor variables, both direct and indirect measures are needed. It is possible that a project may focus on understanding one of the predictors, and this would permit a detailed exploration of the components of that predictor (e.g. attitudes). However, there is the risk that other predictors may turn out to have a stronger relationship with intentions.

- Designing interventions

If the goal of the research is to assess the influence of each predictor with a view to designing an intervention to modify the most powerful predictor, a brief questionnaire such as that described in Point 1 above would give some relevant information. Data about the specific beliefs that are most strongly related to each predictor would be lacking, but could be assessed using a qualitative study of a subset of participants.

- Evaluating interventions

It is possible to assess one or some of the variables in the model using only the direct measures for extremely brief versions of questionnaires in a before-after design, to determine the effect of an intervention on any of the variables[15]. However, there is a risk associated with repeated use of the TPB questionnaire, as it is possible that learning effects will contaminate responses. For this reason, it is advisable to construct and pilot test parallel versions of a questionnaire (i.e. different items tapping the same constructs), or else to use the same questionnaire within an RCT design.

8.5 Translating questionnaires into other languages

Translation involves not only linguistic issues but also theoretical issues and questions of generalisability. The following broad principles are offered for researchers' consideration:

- The most important principle is that translation should be done by people who are native speakers of the language to which the questionnaire is being translated (the 'target language'). This person should also be experienced in questionnaire design in the target language, and ideally, also familiar with the TPB and ways in which TPB questionnaires are normally worded in the target language. Note the words of the philosopher of science, Karl Popper:

  > *'Everybody who has done some translating, and who has thought about it, knows that there is no such thing as a grammatically correct and also almost literal translation of any interesting text. Every good translation is an interpretation of the original text; and I would even go so far as to say that every good translation of a nontrivial text must be a theoretical reconstruction.'*
  >
  > (Popper, 1974/1992, p. 23)

- The translated questionnaire is then subjected to a process of validation by using 'back-translation' methods (translating back into the original language to establish equivalence with the original version) and a pilot study (as described in 8.3.3 above).

- Because it may not be valid to assume that commonly held beliefs about the target behaviour are the same in the target language environment as in the original population of interest, it may be appropriate to construct an entirely new questionnaire based on a new elicitation study using a sample drawn from the new population. However, if the goal of the research involves a direct comparison between countries with respect to specific beliefs and their influence on intentions, it may be appropriate to translate directly from an English-language questionnaire. In that case, it would be important to establish validity independently by conducting a qualitative study in the target population. This study would investigate the commonly held beliefs relating to the predictor variables and would assist in interpretation of findings from the comparative quantitative study.

- Sample questionnaires (brief form) about measuring blood pressure of patients with diabetes are included in Appendix B in Dutch and Italian. These questionnaires have been subjected to the back-translation and validation piloting processes described in the second dot point above.

[15] Some researchers have been concerned that using a questionnaire in the control arm of a trial constitutes an intervention, as asking the questions might influence behaviour. Our response to this concern is, 'If only changing behaviour could be as easy as that!' This issue is discussed in greater detail in Appendix C.

8.6 Main study: Practical issues

8.6.1 What sample size is needed?

Required sample size is determined by statistical power analysis. This requires the specification of the study design and the expected effect size (Everitt, 1996). It is reasonable to assume at least a moderate effect size (i.e. multiple R of around 0.3; Cohen, 1988) for TPB studies using a multiple regression approach. Generally, a sample size of 80 would be acceptable. Note that response rates are often around 50%, so you need to send out 160 questionnaires to achieve this sample size unless you have reasons for thinking that the response rate will be better than 50%.

Note that it is important to establish the representativeness of the sample, either by reporting a very high response rate or by comparing the known characteristics of responders and non-responders.

8.6.2 Other aspects of survey methodology that need to be kept in mind

- Approval is probably required from the relevant research ethics committee before the commencement of the project. In the UK, compliance with research governance structures is also required.
- When the questionnaire is mailed to research participants, it should be accompanied by an appropriate cover letter.
- Reminder letters should be sent out to non-responders two weeks after the questionnaires are mailed. A further reminder letter after a further two weeks will probably result in a further small increase in the response rate.
- It would be appropriate to close the data set after two months from the time of mailing the questionnaire.
- Readers may already be very familiar with these procedures, or may wish to consult the following references for further details:

McColl E, et al. (2001). Design and use of questionnaires: A review of best practice applicable to surveys of health service staff and patients. Health Technology Assessment Methodology, v. 5, no. 31; Alton: Core Research on behalf of the NCCHTA.

Moser CA, Kalton G. (1993). Social methods in social investigation (2nd ed). Aldershot, Hants, England: Dartmouth Publishing Co.

9 DATA ENTRY AND ANALYSIS

Many readers may already be very familiar with the following processes, or may wish to consult the following reference (or one similar) for further details:

Tabachnick BG, Fidell LS. (2001). Using Multivariate Statistics (4th Ed). Boston: Allyn and Bacon.

9.1 Setting up the data file

It is best to enter all the data into one SPSS file. Listing all the variables (questionnaire items) in the same order in which they appear in the questionnaire makes data entry quick and undemanding. It is worth spending the time to make clear and meaningful entries in the 'variable label' column. This will ensure that all output files include the meanings and/or content of the items analysed, which saves a lot of time at the interpretation stage.

Do not attempt to sort variables or compute composite variables at this stage. The SPSS syntax files will do this for you.

9.2 Data screening

Inspect the distributions of each variable, checking for data entry errors by noting whether all responses are in the range represented by the response format. Highly skewed distributions may require the use of nonparametric tests instead of a multiple regression approach to the analysis.

9.3 Main Analysis

- Analysis using the direct measures of the predictor variables

Use the 'recode' command to recode any negatively worded responses. After this, conduct an item analysis on the items relating to the direct measures, to establish internal consistency. If all internal consistency co-efficients are acceptable (> 0.6 as a rough guide), it is appropriate to include all the items in the composite variables.

Use 'compute' commands to create the composite variables for the direct measures. Remember to define these new variables clearly so that the variable labels will be included in the output files.

Using a multiple regression procedure, enter intention as the dependent variable, and the direct measures of attitude, subjective norm and perceived behavioural control as the predictor variables.

- Analyses using the indirect measures

Weight (multiply) each behavioural belief by the score for the relevant outcome evaluation to create a new variable that represents the weighted score for each behavioural belief. Similarly, weight each normative belief by the score for motivation to comply and each control belief by the score representing the influence of the control belief. Then sum the weighted beliefs to create a composite score for attitude, subjective norm and perceived behavioural control. It is a good idea to calculate a series of simple bivariate correlations between direct and indirect measures of the same construct, to confirm the validity of the indirect measures. (Low correlations would likely be a result of indirect measures that were poorly constructed or did not adequately cover the breadth of the measured construct.)

Using a multiple regression procedure, enter directly-measured attitude scores as the dependent variable, and the sum of the weighted behavioural beliefs as the predictor variables. Use a similar approach to predict directly measured subjective norms and perceived behavioural control.

You may be interested in determining the specific beliefs that have the greatest influence on intentions. To do this, dichotomise the intention variable either using a median split (i.e. low intenders versus high intenders) or by classifying cases on a zero/greater than zero basis (i.e. non-intenders versus intenders). Use a series of t-tests or discriminant analyses to identify the beliefs that discriminate between the two groups.

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11 GLOSSARY[16]

Attitude		A psychological tendency that is expressed by evaluating a particular behaviour with some degree of favour or disfavour
Behaviour		An action that is carried out at a specified time and is described in terms of the action itself, its target and the context
Behavioural beliefs		The perceived consequences of an action
Cognitive interviewing		A technique of pre-testing questionnaire items, in which respondents are encouraged to share their thoughts with the researcher about items either concurrently (as they answer the items) or retrospectively
Content analysis		Qualitative analysis of verbal data to discover the underlying topics or themes. References to these themes are often then counted to determine the most frequently mentioned themes
Control beliefs		Beliefs about the likelihood that one possesses the resources and opportunities thought necessary to execute the behaviour
Elicitation study		A qualitative investigation of a subset of a population under investigation, to discover the salient behavioural, normative and control beliefs about the behaviour
Endpoints		Verbal labels that are written at each end of a row of numbers to indicate the meanings of the most extreme numbers
Intention		A person's motivation in the senses of his or her conscious plan to exert effort to carry out a behaviour
Internal consistency		See 'reliability'
Motivation to comply		The extent to which a person feels inclined to match his or her behaviour to various sources of social pressure
Multiple regression		A quantitative analytic procedure that either simultaneously or cumulatively assesses correlations between a number of independent variables and one dependent variable
Norms	-descriptive	Perceptions about what important people actually do
	-injunctive	Perceptions about what important people think a person should do
	-subjective	Perceived social pressure to perform a behaviour
Normative beliefs		Perceptions of significant others' preferences about whether one should perform a behaviour

[16] Many of these definitions are derived from the seminal text by Eagly and Chaiken (1993). For expanded explanations of these definitions, this book is recommended. Also, readers are advised to refer to Everitt (1996) for other views.

Outcome evaluation		Evaluation of the perceived consequences of an action
Perceived behavioural control		Perceptions about how easy or difficult it is to perform the behaviour
Reliability		A property of a measuring instrument, indicating the extent to which it yields consistent results over repeated observations
	-internal consistency	A statistic for assessing the equivalence of different items in a scale. It is appropriate for measuring the reliability of a scale composed of multiple items, if it is valid to assume that the items are parallel measures of the same attitude content domain
	-test-retest	A statistic for assessing the stability of a scale over time (although this is subject to contamination by changes in 'true scores' over time)
Self-efficacy		The conviction that one can successfully execute a given behaviour
TACT principle		The description of behaviour in terms of its *target*, the *action* itself, the *context* in which it is performed, and *when* it is performed
Validity		A property of measuring instruments or of responses, indicating the extent to which they measure what they are supposed to measure

12 APPENDIX A: QUESTIONNAIRE DEVELOPMENT MATERIALS

12.1 Example, Elicitation Study Materials

The following may be used as a structured interview schedule for individual or focus group interviews, or it may be converted to a written questionnaire with a free responses format. Words in [square brackets] should be replaced in your own study, to reflect the population and the behaviour you decide to investigate.

We are conducting a study of [GPs] in [North Tyneside]. We are interested in the reasons why [GPs] do or do not [measure the blood pressure] of [their patients with Type 2 diabetes]. We would appreciate your responses to some questions about this. There are no right or wrong answers. Please tell us what you really think.

****

Please take a few minutes to list your thoughts about the following questions.

When [patients with Type 2 diabetes] consult their [GP],

- What do you believe are the ***advantages*** of [measuring the patient's blood pressure during a consultation]?
- What do you believe are the ***disadvantages*** of [measuring the patient's blood pressure during a consultation]?
- Is there anything else you associate with your own views about [measuring the patient's blood pressure during a consultation]?

- Are there any individual or groups who would ***approve*** of your [measuring the patient's BP during a consultation]?
- Are there any individual or groups who would ***disapprove*** of your [measuring the patient's BP during a consultation]?
- Is there anything else you associate with other people's views about [measuring the patient's blood pressure during a consultation]?

- What factors or circumstances would enable you to [measure the blood pressure of a patient with diabetes during a consultation]?
- What factors or circumstances would make it difficult or impossible for you to [measure the blood pressure of a patient with diabetes during a consultation]?
- Are there any other issues that come to mind when you think about [measuring the blood pressure of a patient with diabetes during a consultation]?

12.2 Example, Questionnaire

Note that this questionnaire has TWO sections. Section 1 asks about demographic information; Section 2 measures the predictor variables and intentions.

SECTION 1

About your BACKGROUND

A	How long have you been qualified?	**Years**
	How many sessions (1/2 days) do you work per week?	☐☐
B	How many GPs work at your practice?	☐☐
C	How many practice nurses work at your practice?	☐☐
D	Are you **Male** ☐ Or **Female** ☐	
E	Are you a **GP** ☐ Or a **Practice Nurse** ☐	

If you are a GP please go to Question G. If you are a Practice Nurse please answer question F

F	If you are a nurse do you provide care for people with Type 2 diabetes?	**Yes**	**No**
G	What is your approximate practice list size?	☐☐☐☐☐	

SECTION 2

Each question in this section refers to MEASURING THE BLOOD PRESSURE (BP) of your patients with Type 2 diabetes

1	If I measure their BP, I will feel that I am doing something positive for the patient	Unlikely	1	2	3	4	5	6	7	Likely
2	It causes a lot of worry and concern for a diabetes patient if they are found to have high BP	Unlikely	1	2	3	4	5	6	7	Likely
3	If I measure BP, I will detect any problems at an early stage.	Unlikely	1	2	3	4	5	6	7	Likely
4	If I measure BP, I've got to see patients more often	Unlikely	1	2	3	4	5	6	7	Likely
5	The blood pressure machine I use is not very accurate	Unlikely	1	2	3	4	5	6	7	Likely
6	When I am measuring BP in the consultation I feel rushed	Unlikely	1	2	3	4	5	6	7	Likely
7	The cuffs on BP machines are uncomfortable for patients	Unlikely	1	2	3	4	5	6	7	Likely

8	Patients come to the consultation inappropriately dressed to have their BP measured	Unlikely	1	2	3	4	5	6	7	Likely
9	Seeing patients more often is	Extremely undesirable	-3	-2	-1	0	+1	+2	+3	Extremely desirable
10	Worry and concern experienced by patients if they are found to have high BP is	Extremely undesirable	-3	-2	-1	0	+1	+2	+3	Extremely desirable
11	Doing something positive for the patient is	Extremely undesirable	-3	-2	-1	0	+1	+2	+3	Extremely desirable
12	For these patients, detecting problems at an early stage is	Extremely undesirable	-3	-2	-1	0	+1	+2	+3	Extremely desirable
13	Diabetologists think I	should not	-3	-2	-1	0	+1	+2	+3	should measure the BP of patients with diabetes.
14	Patients with Type 2 diabetes would	disapprove	-3	-2	-1	0	+1	+2	+3	approve of my measuring their BP.
15	Other GPs	do not	-3	-2	-1	0	+1	+2	+3	do measure the BP of their patients with diabetes.
16	The government would	disapprove	-3	-2	-1	0	+1	+2	+3	approve of my measuring the BP of patients with diabetes.
20	Overall I think that measuring these patients' BP is:	Harmful	1	2	3	4	5	6	7	Beneficial
21		Pleasant	1	2	3	4	5	6	7	Unpleasant
22		The wrong thing to do	1	2	3	4	5	6	7	The right thing to do
23		Good practice	1	2	3	4	5	6	7	Bad practice
24	Doing what other GPs do is important to me	Not at all	1	2	3	4	5	6	7	Extremely
25	Doing what diabetologists think I should do is important to me	Not at all	1	2	3	4	5	6	7	Extremely
26	The government's approval of my clinical practice is important to me	Not at all	1	2	3	4	5	6	7	Extremely
27	The approval of my patients with Type 2 diabetes is important to me	Not at all	1	2	3	4	5	6	7	Extremely
28	I am	Less likely	-3	-2	-1	0	+1	+2	+3	More likely to measure patients' BP if the machine that I use is accurate.

29	I am	Less likely	-3	-2	-1	0	+1	+2	+3	More likely
	to measure patients' BP if the cuffs on the machines are uncomfortable.									
30	I am	Less likely	-3	-2	-1	0	+1	+2	+3	More likely
	to measure patients' BP if I feel rushed in the consultation.									
31	I am	Less likely	-3	-2	-1	0	+1	+2	+3	More likely
	to measure patients' BP if they come to the consultation inappropriately dressed to have their BP measured.									
32	People who are important to me think that I should NOT measure the BP of patients with Type 2 diabetes	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
33	I expect to measure the BP of my patients with diabetes in each consultation	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
34	I feel under social pressure to measure the BP of these patients	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
35	I am confident that I can measure the BP of these patients in the consultation if I want to.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
36	Whether I measure the BP of these patients in the consultation is entirely up to me	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
37	For me to measure the BP of these patients in the consultation is	easy	1	2	3	4	5	6	7	difficult
38	I want to measure the BP of my patients with diabetes in each consultation	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
39	It is expected of me that I measure the BP of these patients	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
40	I intend to measure the BP of my patients with diabetes in each consultation	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

41	Out of the next 10 patients you see with a diagnosis of Type 2 diabetes, for how many would expect to measure BP?	0	1	2	3	4	5	6	7	8	9	10

THANK YOU FOR YOUR PARTICIPATION

12.3 Example, scoring key for questionnaire

After constructing your questionnaire, it is important to construct a scoring key such as the one below. This guides various stages of data analysis.

Question Numbers	**Response format**	**Items requiring reverse scoring**	**Items requiring internal consistency analysis**	**Items requiring multiplication**	**Construct measured**
1 to 4	1 to 7			1 x 11; 2 x 10;	Behavioural Beliefs
9 to 12	-3 to +3			3 x 12; 4 x 9	Outcome Evaluations
13 to 16	-3 to +3			13 x 25; 14 x 27; 15 x 24; 16 x 26	Normative Beliefs
24 to 27	1 to 7				Motivation to Comply
5 to 8	1 to 7			5 x 28; 6 x 30;	Control Belief Strength
28 to 31	-3 to +3			7 x 29; 8 x 31	Control Belief Power
20 to 23	1 to 7	21 and 23	20 to 23 (after recoding)		Attitudes, direct measure
32, 34, 39	1 to 7	32	32 (after recoding), 34 and 39		Subjective Norms, direct measure
35 to 37	1 to 7	37	35, 36 and 37 (after recoding)		Perceived Behavioural Control, direct measure
33, 38, 40	1 to 7	33	33, 38, 40		Generalised intention
41	0 to 10				Intention statement

13 APPENDIX B: EXAMPLES OF BRIEF QUESTIONNAIRES IN LANGUAGES OTHER THAN ENGLISH

13.1 Dutch language[17]

Behaviour: Measuring the blood pressure of patients with diabetes

Elke vraag in deze sectie heeft betrekking op de behandeling van uw patiënten met Type 2 diabetes. Wilt u voor elke vraag alstublieft telkens één nummer omcirkelen dat het meeste met uw mening overeenkomt. De nummer slopen van 1 (geheel mee oneens) tot 7 (geheel mee eens).

		Geheel mee oneens						***Geheel mee eens***
1.	Mensen die belangrijk voor mij zijn vinden dat ik de bloeddruk van mijn diabetespatiënten moet meten	1	2	3	4	5	6	7
2.	Mijn professionele organisatie vindt dat ik de bloeddruk van mijn diabetespatiënten moet meten	1	2	3	4	5	6	7
3.	Het meten van de bloeddruk van mijn diabetespatiënten is moeilijk	1	2	3	4	5	6	7
4.	Ik ben van plan om de bloeddruk te meten van al mijn diabetespatiënten tijdens hun volgende consult	1	2	3	4	5	6	7
5.	Ik verwacht dat ik de bloeddruk van al mijn diabetespatiënten ga meten tijdens hun volgende consult	1	2	3	4	5	6	7

6.	In het algemeen is volgens mij het meten van de bloeddruk van mijn diabetespatiënten:	***Schadelijk***	1	2	3	4	5	6	7	***gezondheids bevorderend***
7.		***Prettig***	1	2	3	4	5	6	7	***Niet prettig***
8.		***Verkeerd om te doen***	1	2	3	4	5	6	7	***Juist om te doen***
9.		***Goed handelen***	1	2	3	4	5	6	7	***Slecht handelen***

		Geheel mee oneens						***Geheel mee eens***
10.	Ik wil de bloeddruk meten van al mijn diabetespatiënten tijdens hun volgende consult	1	2	3	4	5	6	7
11.	Andere huisartsen meten de bloeddruk van hun diabetespatiënten niet	1	2	3	4	5	6	7
12.	Ik bepaal geheel zelf of ik de bloeddruk van mijn diabetespatiënten meet	1	2	3	4	5	6	7
13.	In het algemeen voel ik mij niet in staatom de bloeddruk van mijn diabetespatiënten temeten	1	2	3	4	5	6	7

[17] We are extremely grateful to Wendy Hardeman, Marije Bosch and Dr Trudy van der Weijden, who provided translations, back-translations and comments on this questionnaire

13.2 **Italian language**[18]

Behaviour: Measuring the blood pressure of patients with diabetes

Ciascuna domanda di questa sezione si riferisce al trattamento dei Suoi pazienti con un diabete di tipo 2. Per ciascua affermazione, la preghiamo di cerchiare il numero indicante il suo livello di accordo, da 1 (completamente in disaccordo) a 7 (completamente d'accordo) con i vari passi intermedi.

		Completamente in disaccordo						***Completamente d'accordo***
1.	Le persone che sono per me importanti professionalmente pensano che dovrei misurare la pressione del sangue dei miei pazienti con	1	2	3	4	5	6	7
2.	La mia societa' scientifica/professionale pensa che dovrei misurare la pressione del sangue dei miei pazienti con diabete	1	2	3	4	5	6	7
3.	Misurare la pressione del sangue dei miei pazienti con diabete e' difficile	1	2	3	4	5	6	7
4.	Intendo misurare la pressione del sangue di tutti i miei pazienti con diabete alla loro prossima visita	1	2	3	4	5	6	7
5.	Mi aspetto di misurare la pressione del sangue di tutti i miei pazienti con diabete alla loro prossima visita	1	2	3	4	5	6	7

6.	Tutto considerato, penso che misurare la pressione del sangue dei miei pazienti con diabete sia:	***Dannoso***	1	2	3	4	5	6	7 ***Benefico***
7.		***Gradevole***	1	2	3	4	5	6	7 ***Sgradevole***
8.		***La cosa sbagliata da fare***	1	2	3	4	5	6	7 ***La cosa giusta da fare***
9.		***Una buona prassi***	1	2	3	4	5	6	7 ***Una cattiva prassi***

		Completamente in disaccordo						***Completamente d'accordo***
10.	Voglio misurare la pressione del sangue di tutti i miei pazienti con diabete alla loro prossima visita	1	2	3	4	5	6	7
11.	Altri medici di famiglia non misurano la pressione del sangue dei loro pazienti con diabete	1	2	3	4	5	6	7
12.	Misurare la pressione del sangue dei miei pazienti con diabete dipende interamente da me	1	2	3	4	5	6	7
13.	Tutto considerato, non credo di poter misurare la pressione del sangue dei miei pazienti con diabete	1	2	3	4	5	6	7

[18] We are extremely grateful to Dr Marco Perugini and Dr Luciana Ballini, who provided translations, back-translations and comments on this questionnaire