

Designing survey questions on food-related issues

Question design toolkit based on a theory
of behavioural change



Jo d'Ardenne, Sally McManus, Julia Hall

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Executive summary

Background to the project

NatCen was commissioned by the Food Standards Agency (FSA) to undertake a review of food-related data available specifically from longitudinal survey sources. Project oversight subsequently moved to the Department of Health, as a result of changes in departmental responsibilities. The project has produced three main outputs:

1. An initial scoping of what food-related longitudinal data sources currently exist, called *Longitudinal data on food-related issues: A scoping review*. (Hall *et al.*, 2011a).
2. An analysis of trends in and predictors of changes in food choices and food behaviours using the data identified: *Food choices and behaviours: trends and the impact of life events* (Hall *et al.*, 2011b).
3. And this question design toolkit, to help with the design and selection of future survey questions on food-related issues.

Previous work commissioned by the Food Standards Agency (PSI, 2009) recommended that questionnaire development should be based on social scientific theory, and that surveys should seek to capture not just food-related behaviours but also the psychosocial factors that have an impact on them. This question design toolkit builds on this work.

The aims of this report are to:

1. Provide more detail of one psychosocial model of behavioural change, the Theory of Planned Behaviour (TPB), and explain the model's potential relevance to survey work in this field.
2. Identify the extent to which existing longitudinal questions on food map onto TPB constructs and what question areas could be developed to address current gaps in coverage.
3. Review whether any TPB constructs have been measured in the Food and You Study, and whether these could be of interest in any future longitudinal work carried out.

4. Give advice on and examples of how to write questions based on TPB constructs. This advice could be applied to the development of questions on any health behaviour topic.
5. Provide general question design advice to facilitate in the development or selection of questions once policy topic priorities have been decided.

Mapping existing survey questions to TPB constructs

Six key British surveys with longitudinal data on food-related issues have been identified. These are:

1. Avon Longitudinal Survey of Parent and Children (ALSPAC)
2. British Household Panel Survey (BHPS) - Youth Cohort (YC)
3. English Longitudinal Survey of Aging (ELSA)
4. Family and Children Surveys (FACS)
5. National Health and Development Survey (NHDS)
6. Whitehall II.

The TPB is a social cognition model that aims to map out influences on behavioural change. The review demonstrated that questions related to TPB constructs have been included in longitudinal surveys, with a particularly good source being ALSPAC. However, all the TPB items identified in ALSPAC were only included in one wave of the study, whereas the questions on dietary behaviours were asked in every wave.

The other surveys reviewed also focused on behaviours (using food frequency items to various degrees of detail) with little information collected on why people exhibit dietary behaviours. There is a lack of information collected on the underlying belief structures that lead to these behaviours.

Mapping 'Food and You' survey questions to TPB constructs

The Food and You Survey, which is currently cross-sectional, was found to contain a number of questions that tap into wider TPB constructs.

- Lots of questions captured **attitudes to food-related behaviours**, although most of these focused on general 'healthy eating' rather than more specific behaviours.
- Two items related to how **social pressures influenced food related behaviour**.
- Five items addressed issues of **perceived behavioural control**.
- However, the Food and You Survey was found to contain no items on **intentions to change dietary practice or food hygiene**. Questions on intentions may be particularly relevant for longitudinal research. They would enable data analysis to examine what proportion of people who

intend to change their behaviour go on to do so, and what factors predict successful change.

Designing new behaviour measures involves:

- Defining a behaviour
- Deciding on a unit of behaviour
- Defining a reference period
- Deciding on a method of data collection.

There are issues that need to be addressed at each of these steps, including considering what respondents are likely to be able to **understand**, what information they will be **able to retrieve**, and whether or not they will be **willing** to do so.

Attitude measures take a variety of forms, including:

- Verbal rating scales
- Numeric rating scales
- Agree/disagree scales
- 'Tick all that apply' questions
- Ranking tasks.

Various factors such as the type of behaviour, the level of detail required and method of administration will inform the decision about what approach is most appropriate in a particular situation.

Scoping work is a key part of the question development process. This consists of both reviewing existing literature and carrying out consultative work with members of the target population. A primary output of the scoping work will be identification of what TPB constructs are of greatest salience for the topic being studied.

There is a range of key resources including general textbooks, online resources and cognitive testing resources that provide guidance on broader questionnaire design principles.

1 Introduction

1.1 Background and aims

NatCen was commissioned by the Food Standards Agency (FSA) to undertake a review of food-related data available specifically from longitudinal survey sources. Project oversight subsequently moved to the Department of Health, as a result of changes in departmental responsibilities. The project has produced three main outputs:

1. An initial scoping of what longitudinal data sources currently exist, called *Longitudinal data on food related issues: A scoping review*. (Hall *et al.*, 2011a).
2. An analysis of trends in and predictors of changes in food choices and food behaviours using the data identified, called *Food choices and behaviours: trends and the impact of life events*, (Hall *et al.*, 2011b).
3. And this question design toolkit, to help with the design of future questions on food-related issues.

Previous work commissioned by the Food Standards Agency (PSI, 2009) recommended that future questionnaire development should be based on social scientific theory, and that surveys should seek to capture not just food-related behaviours but also the psychosocial factors that have an impact on them. One aim of this project was to ascertain the extent to which existing longitudinal surveys capture information on the range of food-related issues. It was initially intended that where gaps in coverage existed, new questions could be written to meet these needs.

However, the initial scoping work carried out by NatCen (Hall *et al.*, 2011a) showed that there is a more general paucity of survey questions in this area within longitudinal surveys. Due to the scale of coverage gap, and uncertainty about what information will be of highest priority for data-users in the future, the purpose of this third project output was revised. Therefore, rather than design a new questions the purpose of this report is to provide a toolkit on how to write questions that capture psychosocial drivers of behaviour using an existing model of behaviour change; the Theory of Planned Behaviour. It is hoped this guidance will be useful when designing new questions (or in selecting existing questions) once future measurement priorities have been ascertained. Specifically, the aims of this report are to:

- a. Provide more detail of one psychosocial model of behavioural change, the Theory of Planned Behaviour (TPB), and explain the model's potential relevance to future longitudinal survey work.
- b. Identify the extent to which existing longitudinal questions on food map onto TPB constructs and what types of question areas could be developed to plug existing gaps in coverage.
- c. Review whether any TPB constructs have been measured in the Food and You Study which could be of interest in any future longitudinal work carried out.
- d. Give advice on and examples of how to write questions based on TPB constructs. This advice could be applied to the development of questions on any health behaviour topic.
- e. Provide general questionnaire design advice to facilitate in the development of future questions once policy topic priorities have been decided.

The questionnaire design advice provided is applicable for the development of both cross-sectional and longitudinal survey questions.

1.2 The Theory of Planned Behaviour (TPB)

Longitudinal data are needed to examine changes at the individual level over time and to identify what factors predict change. This includes analysis of demographic variables and other established factors linked to behavioural change. This review considers the extent to which current survey questions collect information that can be applied to one theory of behaviour of change, the Theory of Planned Behaviour (TPB). Advice is provided on how to develop new questions informed by this model.

1.2.1 Why use the Theory of Planned Behaviour?

A number of theories have been developed that try to predict the drivers of behaviour and behavioural change. These models include the Theory of Planned Behaviour (Ajzen, 1985); The Health Belief Model (Rosenstock, 1966), Protection Motivation Theory (Rogers, 1975) and the Trans-theoretical Theory of Change (Prochaska and DiClemente, 1984). The reasons we have chosen the TPB for the basis of this review, as opposed to other theories of behavioural change, are:

1. The theory has already been successfully applied to a wide range of health related behaviours, including a number of dietary behaviours (Povey *et al.*, 2000; Conner and Sparks, 2005), such as consumption of low fat foods, fruit

and vegetable intake, eating breakfast, taking supplements, and restricting sugar intake.

2. Various meta-analyses have shown that TPB has predictive power across a wide range of other behaviours (Armitage and Conner, 2001; Conner and Sparks, 2005). The model has been applied to diverse areas related to health, including physical activity, alcohol consumption, smoking, drug use, condom-use and attendance at health screening.
3. TPB measures mostly appear in a psychological research context or are applied in a specific clinical setting. They have been applied in general social surveys; for example, the Family Resources Survey (FRS) included questions based on TPB constructs to measure behavioural drivers of lone-parents returning to work. However, the approach has been under-utilised in this context and there is substantial scope for expanding on the application of TPB constructs to the production of measures for general population surveys.

1.2.2 What is the Theory of Planned Behaviour?

The TPB is a social cognition model that aims to map out the influences on behavioural change. The model was originally developed by Fishbein and Ajzen (1975) as the Theory of Reasoned action. Ajzen (1985) subsequently expanded the model to become the Theory of Planned Behaviour. Since this point the model has been adapted by a number of authors depending on their field of interest (see Conner and Sparks, 2005, for a review). Figure 1.1 illustrates the interplay between the psychosocial constructs in the TPB model.

Figure 1:1 The Theory of Planned Behaviour model

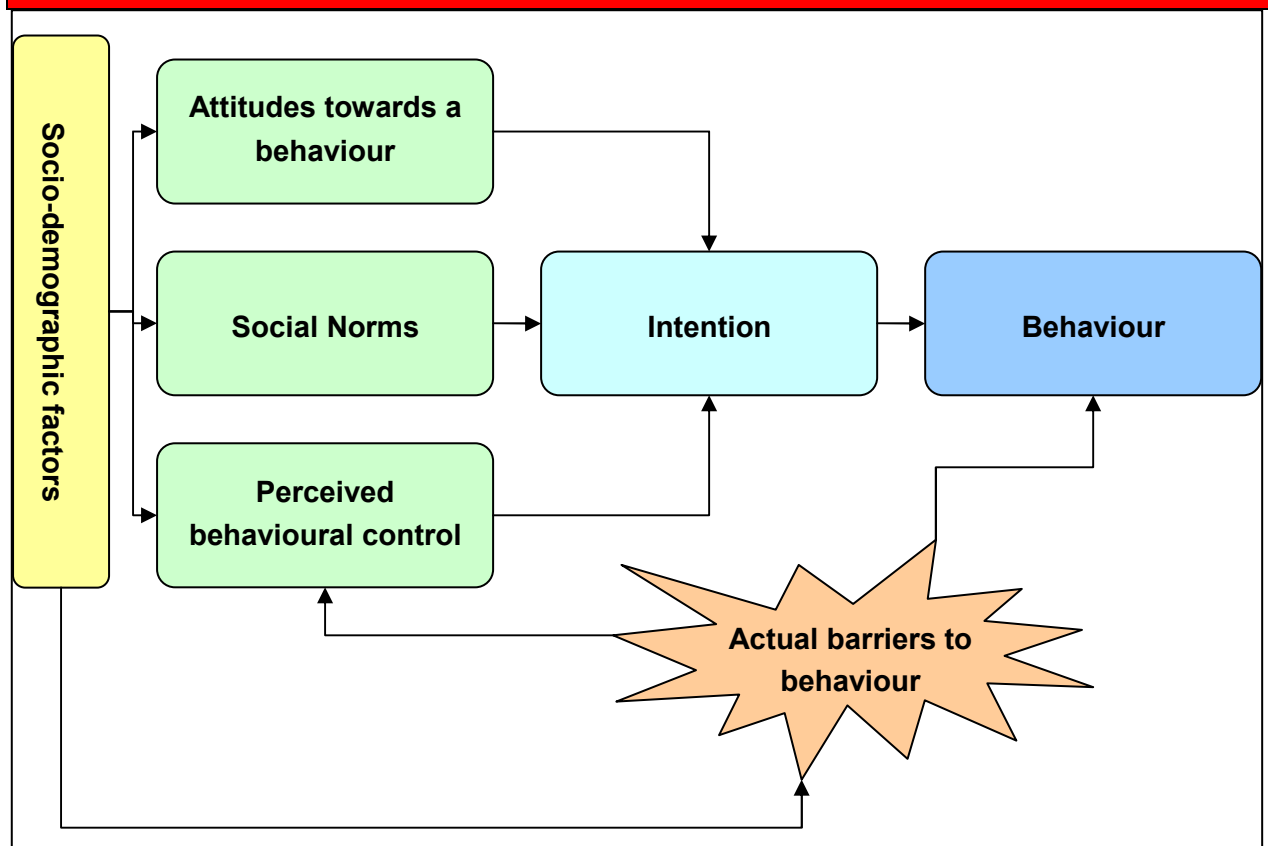


Figure adapted from Conner and Sparks (2005).

The overall model states that behaviours are influenced by attitudes, social norms and perceived control, via the formation of intentions. Socio-demographic factors will influence the formation of attitudes, social norms and beliefs about control. In addition, actual barriers moderate behaviour regardless of intention. Examples of the types of things that fall under each TPB construct are summarised in Figure 1.2.

Figure 1:2 The Theory of Planned Behaviour constructs

Socio-demographic factors include age, sex, ethnicity, nationality, education and socio-economic status.

Attitudes towards behaviour include both beliefs about a behaviour and evaluations about the outcome of a behaviour. Beliefs about a behaviour can be based on affect (e.g. eating fast food feels pleasant or unpleasant) and on *cognition* (e.g. eating fatty food is healthy or unhealthy). Outcome evaluations are about how important an outcome is to a respondent (e.g. 'it is very important to me that I eat food I enjoy' or 'it is very important that I eat healthily').

Social norms refer to the extent to which a person feels social pressure to perform a given behaviour. Social norms are made up of beliefs about others (e.g. 'my partner would like me to eat less saturated fat') and motivation to comply (e.g. 'I think it is important to please my partner by eating less saturated fat'). Social norms can refer to pressure from significant others, such as friends, family members, and employers, or can refer to social pressure more broadly, such as pressure from the 'the media' or 'society.'

Perceived behavioural control refers to the extent to which people believe that they have control over the target behaviour, regardless of whether or not this belief is true. Perceived behavioural control has two elements; beliefs about *external factors* (e.g. 'my local shop does not stock low-fat options') and beliefs about *internal factors* (e.g. 'I don't have the will-power required to follow a low-fat diet'). Internal factors are sometimes referred to as self-efficacy, and these have been established as different from other types of belief about control (Armitage and Conner, 1999).

Actual barriers to behaviour refers to objective barriers that influence whether or not a person can perform a certain behaviour, rather than the respondents' beliefs about barriers. The distinction is important as although respondents may report a barrier to a behaviour this barrier may or may not exist in reality. For example, respondents may believe their local shop does not stock low-fat options when in fact it does. In practice, measures of actual barriers to behaviour are not included in TPB questionnaires as they would require independent verification .

Intentions refer to whether or not a respondent hopes to perform a specific behaviour in a given timeframe.

Behaviour refers to whether or not a respondent actually performs the specific behaviour in the given timeframe.

1.2.3 Strengths and weaknesses of the Theory of Planned Behaviour

It should be noted that the TPB (along with other social cognition models on behavioural change) cannot fully explain all variances in behaviour. One issue arising is the ‘behavioural-intention’ gap, where people intend to perform a particular behaviour but then fail to do so. Related to this, the TPB model does not take into account non-reflective reasons for doing things; for example the role of past behaviour and habit is predictive of behaviour above and beyond the variance explained by TPB variables (Norman and Conner 2006; Ouelette and Wood, 1998). This is particularly an issue when it comes to looking at the drivers of food-related behaviours given that these tend to be routine and therefore non-reflective.

However, a key advantage of using TPB behaviour in *longitudinal* research is that past behaviour (from previous waves) is known and therefore the role of past behaviour can be assessed and incorporated into analysis. Data can therefore be used to examine the relative strength of psychosocial factors (such as attitudes, social pressures and control) compared with past behaviour or habit (defined here as consistent behaviour in previous data waves).

Various other types of measure have been added to the original model in an attempt to increase its predictive power, such as moral or cultural norms and self identity (Conner and Sparks, 2005). Therefore, it is not suggested that future food-related measures be restricted to TPB constructs, rather that the model can be used as a starting point for mapping out potential psychosocial influences that may be of interest when assessing behavioural change. The types of measure used will be dependant on the behaviour of interest and decisions about what to include should ultimately be based on this scoping work (see Section 3.3.1).

1.3 Outline of report

The rest of this report builds on the PSI scoping review (PSI, 2009) and the NatCen scoping review of longitudinal food measures (Hall *at al.*, 2011) by:

- 1) Assessing the extent to which existing longitudinal questions map onto TPB constructs (Section 2.1).
- 2) Assessing the extent to which TPB constructs are assessed in the Food and You Survey. The purpose of this exercise is to identify questions that map onto TPB constructs, and so may potentially be of particular relevance to retain in any future longitudinal work (Section 2.2).

- 3) Providing a question design toolkit giving advice on how to write (or identify) questions that meet existing gaps in questionnaire coverage. This advice could be applied in relation to any topic once decisions related to measurement priorities have been made. This advice will include:
 - i. Designing behaviour measures (Section 3.1)
 - ii. Designing attitude measures (Section 3.2)
 - iii. Developing measures specifically based on TPB constructs (Section 3.3).

- 4) Providing further general advice on questionnaire design (Section 3.4), including a list of further resources (Section 3.5).

2 Mapping existing survey questions to TPB constructs

This chapter reviews the extent to which TPB constructs are currently captured in both existing longitudinal surveys and in the currently cross-sectional Food and You Survey. This review focuses on the types of questions asked. For other methodological and substantive issues relating to longitudinal data on food-related issues please see the two companion reports by Hall *et al.* (2011a and 2011b).

2.1 Review of longitudinal surveys

There are six key British surveys with longitudinal data on food-related issues that are appropriate for secondary analysis (with measures repeated on at least three points and a wave of data collection undertaken since 1999):

1. Avon Longitudinal Survey of Parent and Children (ALSPAC)
2. British Household Panel Survey (BHPS) - Youth Cohort (YC)
3. English Longitudinal Survey of Aging (ELSA)
4. Family and Children Surveys (FACS)
5. National Health and Development Survey (NHDS)
6. Whitehall II.

The aim of this section is to illustrate the extent to which the questions asked longitudinally currently address TPB constructs and where gaps in coverage occur. Figure 2.1 lists the TPB constructs that have been measured in these surveys, as well as whether they have been assessed at at least three waves.

Table 2:1 TPB constructs measured in longitudinal surveys reviewed

TPB construct		Measured at 1+ waves	Topics covered	Measured at 3+ waves
Attitudes about a behaviour	Beliefs about a behaviour	ALSPAC	Beliefs about cost of fruit and vegetables	✗
	Evaluation of outcome	ALSPAC	Importance of cost, taste, ease of preparation in food choice. Whether respondents think about specific health issues when buying food.	✗
Social norms	Beliefs about social norms/ pressure from others	ALSPAC	Pressure from partner/ friends/ family/ media to lose or gain weight.	✗
	Motivation to comply	ALSPAC	The extent to which children/ other people influence food choice/ advertising influences food choice	✗
Perceived Control	Beliefs about external barriers /enablers	FACS	Beliefs about whether family can afford fresh meat/ fruit/ vegetables	✓
		ELSA	Whether had to cut down on food or skip meals due to cost	
	Beliefs about internal barriers/ enablers	ALSPAC	Whether stress, or other feelings influence the amount people eat.	✗
Intentions		No surveys identified	None identified	✗
Behaviour		ALSPAC	Fruit and vegetable consumption	✓
			Details on other types of food consumed (how often eats meat, dairy, carbohydrates, fast foods, confectionary, caffeinated drinks etc)	
			Use of vitamin and mineral supplements	
		BHPS YC	Consumption of sweets/ crisps/Fizzy drinks	
			Frequency of 'family meals'	
	Fruit and vegetable consumption			

	Whitehall II	Fruit and vegetable consumption	
		Details on other types of food consumption (meat, dairy, carbohydrates, etc)	
	NHDS	Dietary consumption (as part of 5 day food diary)	
	ELSA	Fruit and vegetable consumption	

The review of longitudinal surveys demonstrated that questions related to TPB constructs have been included in longitudinal surveys, with a particularly good source being ALSPAC. One ALSPAC questionnaire contained a battery of items on the relative importance of various beliefs and social pressures when choosing food.¹ Likewise ALSPAC has included questions on whether respondents consider various health conditions (for example, heart disease, cancer, tooth decay) when deciding what foods to consume. Another ALSPAC questionnaire looked at whether school children (aged 13) had felt any pressure to change their weight and looked at what emotional factors, such as stress, influenced their eating behaviours.

Unfortunately, all the TPB items identified in ALSPAC were only included in one wave of the study, whereas the questions on actual dietary behaviours were asked in every wave. The other surveys reviewed also focused on behaviours (using food frequency items to various degrees of detail) with little information collected on why people exhibit dietary behaviours. A clear gap therefore is any information on the underlying belief structures that lead to these behaviours.

Repeated questions that attempt to measure changes in attitudes, social pressures and intentions were not included in the longitudinal surveys reviewed. One TPB construct covered to a small extent in an existing longitudinal survey was perceived behavioural control: FACS has repeated a battery of questions on whether respondents feel they are forced to avoid certain foods because they cannot afford them². Likewise, ELSA has also contained an item related to cost of food although the questions were asked at two time points only. Other factors related to perceived behavioural control (both external and internal) were not repeatedly measured in the longitudinal surveys reviewed.

¹ The Lifestyle and Health of Mother battery included 10 items. Respondents were asked 'When you are choosing food for meals for your family, how much do the following influence your choice...: Cost? Convenience of preparation? What is good (healthy) to eat? The special offers available when shopping? What your children prefer to eat? What you prefer to eat? What other people prefer to eat? Dietary requirements of a member of the family? Adverts/programmes on the television/ radio? Articles about food in magazines/ newspapers?' The scale used for all items was A lot/ quite a bit/ a little/ not at all.

² Respondents were asked whether they: 'Have a cooked main meal everyday; Have meat or fish every other day; Have a roast, meat joint or something similar once a week; Have fresh fruit on most days; Have fresh vegetables on most days; Have cakes and biscuits on most days; Are able to afford good quality/brand name food on most days. The answer options used were: 'We have this/ We do not want/need this at the moment/ We would like to have this but cannot afford it at the moment'.

Therefore, this review demonstrates that currently longitudinal surveys do not appear to be repeatedly collecting information on the psychosocial constructs that influence dietary behaviours. This indicates that current longitudinal surveys cannot show us how changes in psychosocial factors may influence behaviour over time, or the extent to which behavioural change is associated with changes in psychosocial structures.

2.2 Review of 'Food and You' questions

The second part of this chapter examines the extent to which TPB constructs are measured within the currently cross-sectional Food and You Survey. The purpose of this exercise is to identify which topics covered already map onto TPB constructs, and therefore would be potentially of interest in any future longitudinal work, should it be carried out. Likewise, suggestions of areas that could be added in the future are included. Where possible suggestions refer to existing questions identified in the PSI scoping review (PSI, 2009).

The Food and You Survey was found to contain questions that tap into wider TPB constructs, in addition to measures of behaviour. Findings related to this are summarised in Table 2.2.

Table 2:2 TPB constructs measured in the Food and You Survey			
TPB construct		Questions found?	Specific topics covered in the Food and You Survey
Attitudes about a behaviour	Beliefs about a behavioural outcomes	✓	<p>General attitudes about cooking and eating e.g. whether respondents enjoy cooking or whether respondents don't have time or consider 'food is fuel'.</p> <p>Beliefs about whether healthy food tastes pleasant or unpleasant.</p> <p>Beliefs about the impact of diet on health.</p> <p>Beliefs about how important specific dietary behaviours are (e.g. eating more vegetables, eating less salt) is to leading a 'healthy lifestyle'.</p> <p>Beliefs on how healthy 'eating out' is.</p>

			Beliefs about when food poisoning is likely to occur.
	Evaluation of outcome	✓	Beliefs about the importance of food safety when eating out.
Social norms	Beliefs about social norms/ pressure from others	✗	None identified.
	Motivation to comply	✓	Two items on motivation to comply to dietary 'experts'.
Perceived behavioural control	Beliefs about external barriers /enablers	✓	Two items on whether the cost of food influences what respondents buy. One open question on barriers to eating healthily.
	Beliefs about internal barriers/enablers	?	One item on whether respondents feel 'confused' about what is healthy and what is not. One open question on barriers to eating healthily
Intentions		✗	None identified
Behaviour		✓	How often cooks food for self and others
			Fruit and vegetable consumption
			Consumption of meat, dairy products, potatoes, cakes and biscuits, ready meals etc
			Eating outside of the home
			Steps taken to reduce expenditure on food
			Food safety behaviours

2.2.1 Attitudes towards a behaviour

The Food and You Survey includes a relatively large number of items capturing people's attitudes towards food-related behaviours. However, the majority of these attitudinal items capture beliefs about general 'healthy eating' behaviours, rather than attitudes towards more specific behaviours. Some questions were included in relation to specific behaviours (for example, how important respondents consider specific

behaviours to be in relation to living a healthy lifestyle³ and beliefs about food poisoning). Whether or not attitudes towards other specific behaviours need to be added will be dependant on policy topic priorities going forward.

It was noted that measures that looked at *outcome evaluations* were not included in relation to dietary behaviours; these should potentially be considered if a longitudinal version of this survey goes ahead. Outcome evaluation questions could look at how important respondents consider a healthy diet to be, compared to other factors that influence food choice such as eating food that tastes good, eating food that is inexpensive, eating food that is quick and easy to prepare, eating 'organic' or 'fair trade' food. These types of questions have already been included in other cross-sectional surveys (PSI, 2009), such as BSA 2008, the Low Income Diet and Nutrition Survey, the Public Attitudes to Food Issues Survey and the Sustainable Development in Food Policy Survey. Section 3.3.2 gives advice on how to write these types of questions.

In contrast, the Food and You Survey does contain some evaluation items in relation to selecting a restaurant, for example respondents are asked to rate what factors are important to them when choosing a place to eat out (price, recommendations, hygiene). However, it does not contain corresponding items on behavioural beliefs (whether respondents think eating out is expensive or inexpensive, or whether it puts them at greater risk of food poisoning).

It should also be noted that the Food and You Survey not only measures respondents' beliefs about food-related behaviours but also asks a small number of items to test respondent's knowledge. For example, the survey asks knowledge questions about food safety, such as what temperature a fridge should be kept at and what food labels mean. Likewise, the survey tests respondents on whether they know the recommended daily allowance of calories, fat, saturated fat and salt, and what effects eating too much fat and salt could have on health.

Although there is a natural overlap between beliefs and knowledge, the two types of measure should be treated as distinct. For example, a respondent may know what their recommended daily allowance of fat is, yet still not believe that eating more than this is unhealthy or that this could lead to negative outcomes. However, knowledge measures could be a useful supplement to belief measures in a longitudinal survey, as they could be used to assess whether an individual's knowledge changes over time and the extent to which this is predictive of both changes in beliefs and behaviours.

³ Fifteen specific behaviours were included in total. These included eating fruit and vegetables, eating less salt, limiting food high in saturated fat, drinking plenty of water.

2.2.2 Social norms

The Food and You Survey contained little in relation to how social pressures influenced food-related behaviours, other than the inclusion of two items around trust in advice from dietary experts.⁴ Should there be opportunity to continue the Food and You Survey longitudinally, further questions on social pressures could be added. These questions could, for example, try to capture the influence of family members and friends on dietary choice or food safety practices. Likewise, questions on wider social pressures, for example from advertising or the media, could also be included. A number of items in these areas have already been included in other cross-sectional surveys (PSI, 2009), such as the Health Education Population Survey (2005), BSA 2008 and the Low Income Diet and Nutrition Survey (2005). Section 3.3.4 includes guidance on how to write these types of questions.

2.2.3 Perceived behavioural control

The Food and You Survey collected information related to perceived behavioural control. The survey contained one open question on barriers to eating healthily⁵ and two items on whether cost influenced what foods people buy.⁶ These items referred to food in general rather than whether cost was a barrier to buying 'healthy foods' or specific types of food. There is scope to expand questions asked on external barriers further. Other surveys have included items not just on cost but also on accessibility, such as whether healthy foods are available in the shops and restaurants respondents usually go to (BSA 2008; Health Education Population Survey, 2005).

Furthermore, the Food and You Survey contains an item on whether the respondent was the person responsible for food/grocery shopping in the household⁷. However, no information was collected as to how this impacted on the control respondents had over food purchased. An item capturing this would be useful.

⁴ These items consisted of a 5-point agree/disagree scale and the statements: 'The experts contradict each other over what foods are good and bad for you' and 'I am fed up of experts telling me what I should eat.'

⁵ The question wording for this item was 'Some people find it difficult to eat more healthily. Can you tell me, please, what do you think would be the difficulties, if any, for you in trying to eat more healthily?'

⁶ These items consisted of a 5-point agree/disagree scale with the statements 'The price of food means I often don't buy the food I would like' and 'The price of food doesn't matter to me as long as I know the quality is good.'

⁷ The wording for this question was 'Thinking about food grocery shopping, which of these best describes the level of responsibility you have for the shopping in your household?'

- Responsible of all or most of the food/grocery shopping
- Responsible for about half of the food/grocery shopping
- Responsible for less than half of the food/grocery shopping
- Not responsible for any of the grocery shopping.

Finally, the Food and You Survey touched on internal barriers with one item on whether respondents felt confused about healthy eating choices.⁸ Other cross-sectional surveys have included items on other internal barriers (PSI, 2009) to healthy eating including knowledge about confidence about food preparation and cooking and will-power (Health Education Population Survey, 2005; Low Income Diet and Nutrition Survey).

No items were identified that examined perceived behavioural control in relation to food safety.

2.2.4 Intentions

The Food and You Survey did not contain any items on intention to change dietary practice or food safety behaviours in the future.

As discussed in Section 1.1.3, intentions do not always lead to corresponding behaviours. Questions on intentions may be particularly relevant for longitudinal research, so that the extent to which an intention at point one leads to a behavioural change at point two can be assessed. For example, data analysis could examine what proportion of respondents who intend to make a dietary change actually go on to change their diet. It could also examine what factors are associated with people not making the change they intended to, and the relative importance of other factors such as past behaviour or habit.

Suggestions on how to measure intentions are included in Section 3.3.5.

⁸ This item consisted of a 5-point agree/disagree scale with the statement 'I get confused over what's supposed to be healthy and what isn't.'

3 Question design toolkit

The aim of this chapter is to give best practice advice on how to design new questionnaire measures that incorporate TPB constructs. Examples have been given in relation to various topic areas, including fruit and vegetable consumption and buying fast food and takeaway⁹s. However, the guidance is designed to be transferable and the principles can also be applied to other topic areas.

This chapter provides advice on:

1. Designing behavioural measures
2. Designing attitudinal measure
3. Conducting scoping work
4. Designing measures based on the following TPB constructs:
 - a. Attitudes about a behaviour
 - b. Social norms
 - c. Perceived behaviour control
 - d. Intentions

In addition, advice on general best practice principles of question design are provided in Section 3.4, including guidance on formulating questions on sensitive topics and knowledge questions. Further resources on questionnaire design are included in Section 3.5.

A number of resources are available on how to design TPB measures. For instance Conner and Sparks (2005) and Francis *et al.* (2004) provide a step by step guide for health practitioners wishing to develop measures in clinical settings. Measures used in a clinical context tend to go into more detail than is appropriate for a general population survey, where a wide range of subjects need to be included. The specificity of the questions, and the level of detail collected on each topic, have to be weighed up against practical constraints such as overall questionnaire length and respondent burden.

⁹ Unless otherwise specified, the example questions given have been produced to be part of this review, rather than being taken from an existing survey or source of questions. The example questions are used to illustrate the concepts discussed or to show the different choices available when framing questions; they are not included as recommendations for questions to use.

3.1 Designing behaviour measures

There are four key steps involved in designing a behavioural measure. These are to:

1. Define a behaviour
2. Decide on a unit of behaviour
3. Define a reference period
4. Decide on a method of data collection.

3.1.1 Defining a behaviour

Prior to designing a behavioural measure researchers need to have a clear definition of what the behaviour entails and parameters need to be set on what is considered to be in scope and out of scope. For example, if the research interest is measuring fruit and vegetable consumption, decisions need to be made as to whether dried fruit and juices should be included.

Sometimes, as in the case of fruit and vegetable consumption, parameters can be established by looking at pre-existing literature or guidelines. However, this may not be the case for other topic areas of interest. For example what counts as a 'food hygiene' behaviour? What counts as a 'convenience' food item? What counts as a 'fast food' item? Having a clear definition of the target behaviour up front will clarify subsequent decisions on how a behaviour is measured.

3.1.2 Deciding on the units of behaviour

The next stage in developing behavioural measures is to decide on the units of measurement. When doing this the first thing is to consider the respondents' perspective. Therefore you will need to consider:

- Whether respondents are likely to **understand** what information is being asked for. Are respondents likely to understand key terms in the way the researcher intends? For example a 'portion' of fruit may mean something specific in the research context that respondents do not think of when answering.
- Whether respondents are able to **retrieve** the information being asked. Respondents may understand a question (e.g. How many grams of fat did you consume yesterday) but still not be able to access this information as it was never encoded or stored in their mind.
- Whether respondents will **be willing** to provide the required information. Respondents may be unwilling to expend a lot of cognitive effort answering difficult questions and, therefore could provide inaccurate answers or make an

answer up¹⁰ (Krosnick, 1991). Therefore questions that require respondents to do calculations or keep complex definitions in mind when answering should be avoided.

Units of measurement need to be realistic in terms of respondent capacity and willingness to respond. Compromises may have to be made between what the overall scope of interest is and what detail that can reasonably be collected. For example, trying to collect specifics about the quantity of salt consumed will be problematic as respondents do not have this information. Therefore survey questions on salt consumption (such as those included in Whitehall II or ALSPAC) use top level indicators such as whether or not respondents add salt when cooking, whether respondents add salt to food at the table, whether respondents buy low salt equivalents and so fourth. Multiple units of measurement may be required to assess an overall behavioural construct (for example, the range of definitions of how much fruit constitutes a 'portion' used in HSE)..

Units of behaviour vary in terms of their specificity, as illustrated by the examples in Table 3.1.

Table 3:1 Different framings of a question on consumption in the last week

Specific behaviours	General behaviours
Did you eat/ drink any of the following yesterday... (Yes/No to each)	Did you eat any fruit yesterday?
...Fresh fruit?	Yes
...Tinned fruit?	No
...Dried fruit?	
...Fruit juice?	

Specific measures are better understood than general ones. By using specific measures it is easier to ensure respondents keep within the scope of the behavioural definition, that is that they don't include things that are out of scope or forget things that are in scope. The downside to breaking general measures down into a series of more specific measures is the impact on survey length. Therefore, decisions on the units of measurement need to involve a trade-off between:

¹⁰ This phenomenon is known as survey *satisficing*.

- Level of precision that is required or desirable.
- Impact on questionnaire length and time.

In addition, questions on the same behaviour can take a number of forms. Table 3.2 summarises some of the ways in which a question on behaviour in the last week can be framed.

Table 3:2 Different framings of a question on consumption in the last week			
Frequency of behaviour	Banded frequency of behaviour	Number of days on which behaviour occurred	Banded number of days on which behaviour occurred
In the last week how many times did you do X?	In the last week how often do you do X? -Not in the last week -1-3 times -4-6 times -7-9 time -10 times or more	On how many days in the last week did you do X?	On how many days in the last week did you do X? -Not in the last week -1-3 days -4-6 days -Every day

The most appropriate question to ask will depend on the subject matter and the level of detail required. Open questions should be asked if a high level of detail is necessary for analysis and if a respondent can be expected to recall all the occasions when the behaviour occurred in the reference period (see Section 3.1.3). Banded response options could be considered if less detail is required about the level of consumption. When using banded frequency questions, specific quantifiers rather than vague quantifiers should be used (see Table 3.3).

Table 3.3 Examples of specific and vague quantifiers	
Specific quantifiers	Vague quantifiers
How often do you eat X? Every day 4-6 times per week 1-3 times per week Less often	How often do you eat X? Often Sometimes Rarely Never
✓	✗

Vague qualifiers have been shown to be problematic as respondents have different opinions as to what constitutes ‘often’, ‘sometimes’ and so forth (Schaffer, 1991). Respondents’ judgments as to whether or not they do something ‘often’ will be influenced by their perception of how common the behaviour is among others (Wright, Gaskell & O’Muircheartaigh, 1994).

3.1.3 Defining a reference period

As discussed in the PSI scoping paper (PSI 2009), a key concern in the design of dietary measures is selecting an appropriate reference period. It is difficult for respondents to recall accurate details of food consumption over a period of longer than a few days. This is because most eating occurrences are not salient, that is, they are habitual and non-distinct rather than striking, emotional events (Sudman & Bradburn, 1982; Tourangeau, Rips & Rasinski, 2000).

If a detailed breakdown of consumption is required (for example, the precise quantity of fruit and vegetable consumed) a shorter reference period should be used (such as a day). Longer reference periods are suitable if measuring a behaviour that is less common: ‘In the last week how many times did you eat at a cafe, bar or restaurant?’. Longer reference periods are more acceptable when asking for banded frequencies, as respondents are may not be expected to recall specific instances but rather to approximate. A further issue to consider is whether the reference period should refer to a ‘specific’ time period or a ‘typical’ time period (see Table 3.4).

Table 3.4 Examples of specific and vague reference periods	
Specific reference	Typical reference
<i>In the <u>last week</u> how often did you eat X?</i>	<i>In a <u>typical week</u>, how often do you eat X?</i>
Every day	Every day
4-6 times per week	4-6 times per week
1-3 times per week	1-3 times per week
Less often	Less often

It is generally accepted that asking for a ‘typical’ behaviour is more difficult than asking about behaviour fixed to a specific time period. This is because, for respondents to say what is typical: they have to recall their behaviour across a number of occasions (rather than just one) and then try work out an average. Therefore, questions that use a specific reference are felt to be more accurate.

However, for longitudinal research some form of measure of ‘typical’ behaviour may be useful. One likely aim of longitudinal research is to assess whether behavioural patterns have changed between survey waves. It is arguable that by only collecting information on one specific reference per wave it is more difficult to be confident that changes in reports between waves are always indicative of stable behaviour change.

It should be noted that specific reference periods and typical reference periods are not mutually exclusive. For example, the Whitehall II study has included both detailed food frequency items on fruit and vegetable consumption yesterday combined with a single item that assesses general consumption.¹¹ Therefore general measures on typical consumption could be useful to validate whether a stable behavioural change has actually occurred. Alternatively, respondents could be asked to provide both specific and typical information for each behaviour of interest, for example after asking what consumption was in the last week, a follow up question could be asked to ascertain whether or not this consumption was ‘typical’. If consumption was not typical an additional question on typical consumption could be asked. The downside of this approach is that it increases the number of behavioural questions asked within a questionnaire up to threefold, with associated impact on respondent burden and cost.

3.1.4 Deciding on a method of data collection

A key consideration when designing a measure is the method of data collection. This includes whether to use a retrospective questionnaire or a diary based method for collection of information about food consumption, a choice that has been explored in detail elsewhere. As noted in the PSI scoping paper (PSI, 2009) diary-based collection methods (such as that now used on NDNS) provides greater detail and accuracy than retrospective questionnaires. However, diaries are not typically used in longitudinal surveys due to:

- The level of burden a diary places on respondents (and the impact this has on response rates and, potentially, the impact on retention between waves).
- Cost and time considerations

Another consideration is whether questions should be interviewer administered or asked in a self-completion format (either paper or on a laptop). The advantage of self-completion is that respondents may be encouraged to admit beliefs and behaviours that are not socially desirable (see Section 3.4.3.) Self-completions add

¹¹ The typical item is: “How often do you eat fresh fruit or vegetables?”: ‘*Seldom or never*’, ‘*Less than once a month*’, ‘*1-3 times a month*’, ‘*1-2 times a week*’, ‘*3-4 times a week*’, ‘*5-6 times a week*’, ‘*Daily*’, ‘*2 or more times daily*’.

somewhat to respondent burden and require respondents to have an appropriate level of literacy.

For a detailed discussion of the benefits and weaknesses of different data collection methods, see a text such as Wright and Marsden (2010).

3.2 Designing attitude measures

There are several types of question that can be used to measure attitudes. This section discusses different types of attitude measure and the relative strengths and weaknesses of each. The following section (Section 3.3) will examine how these principles can be applied to the design of measures of TPB constructs.

3.2.1 Rating scales

The most common type of measure for assessing an attitude is a rating scale in which a respondent has to pick one answer on a scale ranging between diametrically opposed word pairings. Rating scales in surveys tend to be either verbal or numeric (see Table 3.5).

Table 3.5 Examples of verbal and numeric scales

Example of a verbal scale

In general, how healthy is your diet?

1. Very unhealthy
2. Fairly unhealthy
3. Neither unhealthy or healthy
4. Fairly healthy
5. Very healthy

Example of a numeric scale

In general, how healthy is your diet?

Unhealthy 1 2 3 4 5 Healthy

Through reviewing a number of experiments, Krosnick & Fabrigar (1997) concluded that verbal labeling of scale points increases the reliability and validity of obtained data, possibly as verbal labels may be easier for respondents to understand. However, with longer scales it may become difficult to select an appropriate verbal label for every point on the scale. Likewise, verbal scales are more difficult to administer over the telephone, as respondents have no visual cue to remind them of each answer category. Therefore numeric scales are appropriate alternatives

depending on the questionnaire mode and the number of points required (see Section 3.2.2).

Numeric rating scales vary as to whether they include negative numbers or not, as shown in Table 3.6.

Table 3.6 Examples of positive and negative numeric scales

Example of a positive numeric scale

In general, how healthy is your diet?

Unhealthy											Healthy
	0	1	2	3	4	5	6	7	8	9	10
	✓										

Example of a negative numeric scale

In general, how healthy is your diet?

Unhealthy											Healthy
	-5	-4	-3	-2	-1	0	1	2	3	4	5
	✗										

Response distributions change depending on the version of numbering used (Fuchs, 2005; Schwarz *et al.*, 1991), with respondents being less likely to pick low end responses when the negative numeric scale is used. This implies that negative numeric scales should be avoided in order to minimise the risk of data being positively skewed.

3.2.2 Number of points

The number of points a rating scale should have varies depending on measurement aims. If the interest is in attitude direction, a smaller number of points may be more appropriate (three to five). If the interest is more in the strength of an attitude or if there are differences in attitudes between groups, more points may be more appropriate (seven to eleven). Guidelines on writing TPB constructs (e.g. Francis *et al.*, 2004) suggest having at least seven points in a scale. However, existing guidelines are typically written for clinical settings and therefore may require a higher degree of sensitivity than is necessary for social survey measures.

Scales should have an odd-number of points. This is because midpoints allow respondents to express neutral or ambivalent opinions. Studies have shown that

midpoints increase scale reliability and reduce random measurement error (O’Muircheartaigh *et al.*, 1999; Dillman, 2007). Poor reliability in scales without midpoints is likely to be due to respondents ‘making up’ answers that do not reflect actual views. This can mean that response distributions are not replicated when questions are repeated.

This has particular ramifications for longitudinal surveys, where researchers are specifically interested in attitude change within an individual over time. Steps should be taken to ensure that changes in answers between waves are only indicative of actual attitude change, rather than an artifact of an incomplete scale.

3.2.3 Agree/disagree scales

Agree/disagree scales are one of the most commonly used rating measures in social surveys. Respondents are presented with a series of statements in which they have to provide an agree/disagree response on a five point verbal scale (Table 3.7).

Table 3.7 Example of an agree/disagree statement and scale (taken from HSE 2007)

Healthy foods are enjoyable

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

The popularity of the agree/disagree scale is due to the fact it can be applied to almost any question construct and it can be repeated multiple times in questionnaire blocks that are quick and easy to administer. However, despite the fact agree/disagree scales are commonly used there is a body of evidence that shows this type of scale is problematic.

A number of authors (Fowler and Cosenza, 2008; Saris *et al.*, 2010) argue that agree/disagree scales place unnecessary cognitive demands on respondents and, in so doing, introduce the risk of measurement error. The authors claim that answer scales should be specific to each question or item.

Table 3.8 Example of an agree/disagree scale and its equivalent item-specific scale

Agree/disagree scale	Item-specific scale
Healthy foods are usually pleasant.	Would you say healthy foods are...
Strongly agree	Always pleasant
Agree	Usually pleasant
Neither agree or disagree	Sometimes pleasant, sometimes unpleasant
Disagree	Usually unpleasant
Strongly disagree	Always unpleasant

The agree/disagree scale is more cognitively demanding than the item-specific scale for the following reasons:

- 1) Respondents have to recognise that the agree/disagree scale represents a *continuum* from very pleasant through to unpleasant (in the item-specific scale this is self-evident). Respondents may not always make this connection. For example respondents may disagree to the statement ‘Healthy foods are *usually* pleasant’ if they think health foods are *always* pleasant.
- 2) Respondents have to form a perception of what each agree/disagree response category corresponds to along this continuum (in the item-specific scale this is already spelt out)
- 3) Respondents have to match their actual perceptions onto the response categories provided (this could be difficult in both questions but at least in the item-specific scale the response categories are more likely to match the everyday language used by respondents).

Saris and colleagues go on to demonstrate that questions using agree/disagree scales consistently have lower scores of statistical validity than equivalent questions using item-specific scales across a range of substantive topic domains. Therefore agree/disagree scales should be used with caution, and where possible item-specific formats are preferable.

Agree/disagree scales are also prone to acquiescence bias, where respondents are more likely to agree with a statement than disagree with an opposite statement (Krosnick & Presser, 2009). Strategies for avoiding this acquiescence bias have included reversing the polarity of statements so some are positive and some are negative. This forces respondents to think about each statement rather than repeatedly saying ‘agree’ to each item. However, Saris *et al.* (2010) have demonstrated that negatively phrased agree/disagree statements such as ‘I *rarely* do

X' have lower levels of reliability than equivalent positively phrased items i.e. 'I *usually* do X'. This is potentially because switching between positive and negative items causes confusion in some respondents and can lead to their providing an answer that is the opposite of their actual view (d'Ardenne and Nicholls, 2010). Therefore, if agree/disagree questions are used they should not contain negative statements.

As mentioned in Section 3.2.2, these issues are particularly important for longitudinal surveys to get right. Longitudinal analysis examines change within individuals, and so it is key that differences between waves are not an artifact of a respondent error linked to complex question syntax.

3.2.4 Other types of attitude question

Although the majority of attitude measures are rating scales, other question types could also be of use. For example 'tick all that apply' questions were identified in a number of the surveys reviewed in this project in relation to attitudes towards food behaviours (Table 3.9).

Table 3.9 Example of an attitudinal 'tick all that apply' question

Which of the following are important to you, when you are deciding what food to buy?

Tick all that apply

1. Price
2. Quality
3. Whether your family eat it
4. Whether something is 'low fat'
5. Whether something is 'low salt'
6. Whether something is organic
7. None of these.

Similarly, the same question can be adapted to become a *ranking* task (Table 3.10).

Table 3.10 Example of an attitudinal ranking task

Which of the following is *most* important to you, when you are deciding what food to buy?

Tick one only

1. Price
2. Quality
3. Whether your family eat it
4. Whether something is 'low fat'
5. Whether something is 'low salt'
6. Whether something is organic
7. None of these

(What is *next* most important thing?)

The number of response options that can be used in this type of question is dependent on the subject area being asked about. The answers should provide full coverage of all the likely response options if a respondent is going to be able to answer appropriately. However, the longer the list of response options, the more a respondent has to read and the greater the respondent burden becomes. Lists of response options should be kept succinct by avoiding the use of overlapping or similar categories.

3.3 Designing measures using TPB constructs

The previous section provided a general overview of design decisions to be made when writing attitudinal questions. This section discusses options for developing attitudinal measures based specifically on TPB constructs.

3.3.1 Scoping work: process and coverage

As has been discussed, there are a number of psychosocial factors that could influence whether or not people engage in a food-related behaviour. However, the specifics of what these are will vary according to the behaviour being measured. Therefore prior to designing any questions scoping work should be used to establish what types of psychosocial influences are likely to be involved in relation to the behaviour of interest. Reviewing existing literature and liaising with substantive experts is a useful starting point, and likewise can be used to contextualise results as part of later analyses.

Scoping work should also ideally include some form of consultation with the members of the target population such as focus group work (Francis *et al.*, 2004). Consultation is useful to ensuring the measures are complete, that is that they tap into all the types of influences respondents identify. Likewise, consultation helps ensure that questions are framed in a way that is meaningful to respondents rather than in a way that is obscure or academic.

A series of open questions should be asked of scoping groups to encourage respondents to give full details of all the factors that might influence them in relation to the behaviour under investigation. Table 3.11 contains the sorts of initial questions that could be used for exploratory work. The example used is fruit and vegetable consumption, although similar scoping questions could be asked in relation to most topic areas.

Table 3:11 Example questions for use in a scoping focus group		
TPB construct	Example construct	Example questions
Attitudes towards behaviour	Positive beliefs	What do you think are the advantages of eating fruit and vegetables?
	Negative beliefs	What do you think are the disadvantages of eating fruit and vegetables?
Subjective norms	Social influences	Do other people influence how much you eat fruit and vegetables? Who? How do they have an influence?
Perceived behavioural control	General control	How easy or difficult is it for you to eat fruit and vegetables? Why?
	Barriers	What are the barriers to you eating more fruit and vegetables?
	Enablers	What would encourage you to eat more fruit and vegetables?

Focus groups should be semi-structured to allow for the fact that unanticipated influences on behaviour may be raised in addition to those predicted by the TPB model (see Section 1.1.3). These unanticipated influences should be explored and incorporated if appropriate.

After focus groups have been conducted the different influences respondents discuss should be clustered into themes. These themes can form the basis for question coverage; the aim being to measure each influence identified.

After designing the initial list of influences further discussions with survey commissioners and data users may be required. There will be restrictions on how many psychosocial measures can be incorporated due to impact on survey length and cost. Decisions may have to be made about what measurement areas are likely to be priorities. Decisions should be shaped by factors such as:

- whether data on a topic is already collected elsewhere
- how strong an influence a factor is expected to have on the food behaviour;
- whether there are particular measurement concerns with the measure
- whether the factor is seen as amenable to policy intervention (and therefore likely to have a greater impact on policy and social change)

If data are available from a pilot or elsewhere, factor analysis may also be able to help reduce the number of items included, for example by identifying where two measures are so closely correlated that there is redundancy in including both.

3.3.2 Measuring attitudes towards a behaviour

As discussed in Section 1.1 according to TPB, attitudes towards a behaviour consist of both:

- 1) Beliefs about a given behaviour ('eating fried food is pleasant or unpleasant'), and
- 2) Evaluations of outcomes ('how important it is to eat food that tastes pleasant').

Therefore, attitude measures should ideally capture both beliefs and the relative importance respondents give to these beliefs (outcome evaluations). Table 3.12 shows examples of how measures could be devised to capture both of these dimensions. In this illustration the attitude constructs being measured relate to food:

- Cost
- Taste
- Healthiness
- Speed of preparation.

The list of constructs of interest to cover would be identified through prior scoping work.

Table 3:12 Measuring beliefs about a behaviour

Measures of beliefs about a behaviour									
Fruit and vegetables are...									
Expensive	1	2	3	4	5	6	7	Inexpensive	
In general, most fruit and vegetables taste...									
Pleasant	1	2	3	4	5	6	7	Unpleasant	
Eating fruit and vegetables is...									
Healthy	1	2	3	4	5	6	7	Unhealthy	
Preparing meals using fruit and vegetables is...									
Quick	1	2	3	4	5	6	7	Time consuming	
Measures of outcome evaluations:									
How important are each of the following to you ...									
Buying food that is <i>affordable</i>									
Not important	1	2	3	4	5	6	7	Very important	
Buying food that is <i>tastes good</i>									
Not important	1	2	3	4	5	6	7	Very important	
Buying food that is <i>healthy</i>									
Not important	1	2	3	4	5	6	7	Very important	
Buying food that is <i>quick to prepare</i>									
Not important	1	2	3	4	5	6	7	Very important	

The example above uses 7-point numerical scales, however shorter verbal scales would work equally well (see Section 3.2 for a discussion on number of points and types of rating scale). Likewise, ranking tasks could be used to test the relative importance of outcome evaluations. Examples of verbal answer scales and a ranking format are given in Table 3.13.

Table 3:13 Alternative formats: verbal answer scales and ranking tasks

3-point verbal answer scales

How important are each of the following to you ...buying food that is *affordable*

- Very important
- Fairly important
- Not important at all

5-point verbal answer scales

How important are each of the following to you ...buying food that is *affordable*

- Very important
- Fairly important
- Neither important or unimportant
- Fairly unimportant
- Very unimportant

Ranking task

*Which of these factors is the **most** important consideration to you when buying food?*

- 1) Buying food that is affordable
- 2) Buying food that tastes good
- 3) Buying food that is healthy
- 4) Buying food that is quick to prepare

What is the second most important consideration?

What is the third most important consideration?

These alternative approaches can also be used in relation other TPB constructs.

3.3.3 Measuring subjective social norms

The following section looks at how to design measures related to social norms. As discussed in Section 1.1 social norms in TPB consist of both:

- 1) The social pressure from others to perform a given behaviour.
- 2) Motivation to comply to these social pressures.

Therefore, measures should aim to capture both the social pressures that exist and the relative strength of these pressures.

Social norms can be measured by asking respondents to describe the beliefs and behaviours of others (e.g. ‘Does your partner like X?’ or ‘How often does your partner eat X?’). This is known as a descriptive norm. Alternatively, social norms can be measured by asking whether others try to influence the respondent ‘Does you partner think you should cut down on the amount of X you eat?’ This is known as an injunctive norm. Descriptive and injunctive norms have both been found to be predictive of intentions to diet (Connor *et al.*, 1996).

Table 3.14 shows examples of measures of descriptive norms, injunctive norms and motivation to comply. The specific construct being measured is pressure from children in relation to buying fast food or takeaways. The principles could also be adapted to measure social pressure from other people in relation to other sorts of behaviours. As discussed the constructs used should be based on scoping work (see Section 3.3.1).

Table 3:14 Measuring social norms (1)

Measures of descriptive norms

My children think that fast food and takeaway tastes...

Pleasant 1 2 3 4 5 6 7 **Unpleasant**

Measures of injunctive norms

My children think I should buy...

Less fast food 1 2 3 4 5 6 7 **More fast food**

Measures of motivation to comply

How much pressure do you have from you children to buy fast food or takeaways?

No pressure 1 2 3 4 5 6 7 **A lot of pressure**

How important are each of the following to you ...

Giving my children food they *like*

Not important 1 2 3 4 5 6 7 **Very important**

Giving my children food that is *healthy*

Not important 1 2 3 4 5 6 7 **Very important**

The important/not important scale can also be used in measuring attitudes towards behavioural outcomes. Different TPB constructs can be measured in a single block of questions when the same answer scales are used.

Table 3.15 gives examples of how information on the types of social pressure people face could be framed.

Table 3:15 measuring sources of social pressure

Types of social pressure: check all that apply

Which of the following influence the amount of fast food or takeaway you eat?

- Your children
- Your partner or spouse
- Other family members
- Friends
- Advertisements
- Special offers or promotions
- None of these

Types of social pressure: rating scales

How much do the following influence the amount of fast food or takeaway you eat?

- Your children (A lot/a little/not at all)
- Your partner or spouse (A lot/a little/not at all)
- Other family members (A lot/a little/not at all)

3.3.4 Measuring perceived behaviour control

The following section looks at how to design measures related to perceived behavioural control. As discussed in Section 1.1, perceived behavioural control consists of both:

- 1) Beliefs about external barriers that impact on a behaviour, and
- 2) Beliefs about internal barriers that impact on a behaviour.

Examples of how to frame questions on barriers are given in Table 3.16. Here, the constructs used are accessibility, affordability, confidence in relation to preparation and will-power to stick to a diet. However, the constructs selected should be based on scoping work.

Table 3:16 Measuring external and internal barriers

Measuring external influences of control									
How easy or difficult is for you to ...									
... find fresh fruit and vegetables in your local shop?									
Difficult	1	2	3	4	5	6	7		Easy
... afford to eat fresh fruit and vegetables every day?									
Difficult	1	2	3	4	5	6	7		Easy
Measuring internal influences of control									
How confident are you that...									
...you know how to prepare meals containing fresh fruit and vegetables?									
Not confident at all	1	2	3	4	5	6	7		Very Confident
...you could keep to a diet containing more fresh fruit and vegetables?									
Not confident at all	1	2	3	4	5	6	7		Very Confident

For the purposes of questionnaire design ‘actual barriers’ cannot generally be captured: only perceived barriers. Measurement of actual barriers would require independent or objective verification from another source.

A measure of overall assessment of control is also a common feature of existing TPB questionnaires. An example of this type of measure is included in Table 3.17. This time a verbal 5-point scale has been used.

Table 3:17 Overall self-assessment of control

All things considered, how easy or difficult would it be for you to eat fresh fruit and vegetables a day?
- Very easy
- Fairly easy
- Neither easy nor difficult
- Fairly difficult
- Very difficult

This type of measure should come directly after all the other perceived behavioural control measures. This encourages respondents to have all the different types of perceived behavioural control ‘in mind’ when they answer the question.

3.3.5 Measuring intentions

Intention questions have particular applications in longitudinal surveys as they allow for examination of the ‘behavioural-intention’ gap, that is the extent to which people intend to perform a behaviour but do not do so (see Section 1.1.3). However, without intention measures longitudinal surveys can still examine the relative importance of psychosocial processes (attitudes, social norms and control) compared to other factors (such as life-events and habit) in behavioural change. Therefore intention questions may overall be less of a priority in longitudinal research where there are tight restrictions on instrument length (Table 3.18).

Table 3:18 Examples of how to measure intentions

Do you intend to do any of the following in the next 12 months...

Eat more fresh fruit and vegetables

No intention to 1 2 3 4 5 6 7 **Definitely intend to**

Eat less fast food or takeaways

No intention to 1 2 3 4 5 6 7 **Definitely intend to**

3.4 General questionnaire design best practice

This section outlines basic good practice principles for effective questionnaire design.

- **Section 3.4.1** highlights general principles for designing questions
- **Sections 3.4.2 and 3.4.3** provide checklists of do’s and don’ts in relation to question and answer category wording
- **Section 3.4.4** provides advice on writing questions to test respondent knowledge
- **Section 3.4.5** focuses on writing questions on sensitive topics
- **Section 3.4.6** considers questionnaire length vs. item specificity
- **Section 3.4.7** provides advice on questionnaire testing.
- **Section 3.4.8** provides a brief overview of some research questions that could be addressed during analysis and how findings should be reported.

The guidance provided is relevant to both cross-sectional and longitudinal question design.

3.4.1 General principles

Designing good survey questions relies on three basic principles. These are that:

1. Respondents should **understand** the questions as intended
2. Respondents should be **able** to answer the questions
3. Respondents should be **willing** to answer the questions

In the light of these principles, the following issues should be considered when writing survey questions:

- Is it clear what information the question is asking for or is there any ambiguity?
- Will respondents have the necessary information to be able to answer the question? Or does the question ask for information that respondents will not be able to remember?
- Will respondents be motivated to answer all the questions accurately and honestly?

3.4.2 Question wording

Table 3:19 Checklist of best practice in designing survey question wording

- ✓ Keep questions short and to the point.
- ✗ Avoid double-barrelled questions
- ✓ Where possible, break long, complicated questions down into a series of shorter, simpler ones.
- ✓ Keep question wording neutral.
- ✗ Avoid jargon, acronyms and technical terms unless you are certain they will be understood by respondents. Remember terminology may be used inconsistently between different organisations or regions. Using definitions can ensure key terms are consistently understood.
- ✗ Avoid vague words or words that could have multiple interpretations. Many commonly used survey words could have multiple interpretations, such as 'you', 'household', and 'regularly'. Using definitions can ensure key terms are consistently understood.
- ✓ Definitions and clarifications should come before the answer space to ensure they are read. Avoid lengthy, ungrammatical questions or questions with complicated syntax (such as double-negatives).

3.4.3 Answer categories

If asking respondents to select an answer from a list of possible answer categories the following advice needs to be kept in mind.

Table 3:20 Checklist of best practice in designing survey question answer

categories

- ✓ Provide clear instructions on how respondents should use the answer categories for each question, for example 'select one answer only' or 'select Yes/No for each.'
- ✓ Ensure answer categories are presented in a logical order.
- ✗ Avoid overlapping answer categories
- ✗ Do not ask respondents to provide detailed information when only top level or banded information is required for analysis. The level of detail asked for should be appropriate to the aims of the survey.
- ✓ Ensure answer categories are complete. Remember to include 'None of these', 'Not applicable', 'Don't know' or 'Other' response categories where appropriate.

3.4.4 Measuring knowledge

As noted in Section 2.1 knowledge measures may be a useful supplement to behavioural beliefs and outcome evaluations. Knowledge questions should typically be open, rather than a closed list of answer categories, to prevent respondents correctly guessing the answer by picking a response option at random. Open responses can either be coded by the interviewer (in the case of an interviewer administered mode) or by a coder post data collection.

The downside of open questions of this nature is that they may be prone to high levels of 'don't know' answers, including 'don't know' answers from people who have the knowledge but are not confident when tested (Krosnick and Presser; 2010). Therefore, steps should be taken to alleviate this behaviour, for example the question wording should encourage respondents to guess if they are uncertain. Likewise, an overt 'don't know' option should not be offered.

3.4.5 Asking sensitive questions

One issue highlighted by the PSI scoping review (PSI 2009) was that questions on food-related behaviours may be influenced by sensitivity. This section aims to consider why certain types of question may be sensitive and what steps could be taken to reduce the impact of this on responses given.

It has been well documented that respondents may be unwilling to give accurate answers to questions they consider to be sensitive. Questions can be considered sensitive for three reasons (Tourageau, Rips and Rasinski, 2000):

1. The question is considered intrusive and is not subject matter typically brought up in polite conversation (for example, sexual practices or income):
2. Admitting to the behaviour could have a negative outcome if the information was disclosed (for example, if the behaviour is illegal or illicit).

3. Certain responses are more socially desirable (the respondent feels they will 'look good' if they give one response rather than another).

The majority of questions on food topics are not likely to be considered intrusive as talking about food does not generally break 'conversation norms.' Likewise, fear of disclosure is not a concern for the majority of food topics as no negative consequences would ensue if a respondent's answers were made public. It is possible that fear of disclosure could be a concern for certain groups in specific situations (for example a survey about food hygiene behaviours conducted with restaurant workers). If fear of disclosure is a potential issue, additional steps need to be taken to reassure respondents about anonymity and confidentiality.

The inclusion of reassurances has been shown to have a positive, although small, impact on the reporting of illicit activities and on general response rates (Singer, Von Thurn & Miller; 1995). However, qualitative research has also demonstrated that confidentiality statements are not always phrased in a way that is accessible to respondents, and that poorly understood statements are off-putting rather than reassuring (Gerber, 2003). Therefore, care needs to be taken that any reassurances given are phrased in a way that is accessible, meaningful and respondent-friendly.

A number of reports acknowledge that respondents could give socially desirable answers in relation to food-related questions (e.g. Craig, Shelton et al., 2008). However, there is no clear evidence about how much this occurs in practice and what impact this would have on survey results. The types of question potentially prone to social desirability bias are those where respondents know what the desirable behaviour is, for example people know they should wash their hands prior to handling food or that guidelines state they should eat five portions of fruit and vegetables a day.

There are a number of suggestions as to how to counter problems of social desirability when designing survey questions. The one clear method of doing this, that has empirical backing, is moving from a interviewer administered mode to a self-completion mode. Experimental studies have repeatedly shown that respondents are more likely to report 'undesirable behaviours' such as drug use, smoking and failing to vote in a self-completion mode compared to talking to an interviewer (see Tourangeau and Yan; 2007 for a review). However, these experiments have not typically looked at the impact of mode on the reporting of dietary behaviours, other than looking at reports of alcohol consumption.

A number of question wording techniques for overcoming social desirability have also been suggested; although the majority of these lack evidence to support their efficacy. Techniques to consider include:

- Introducing the questions with a statement that suggests negative behaviours are common: “These days many people find it difficult to eat a balanced diet...”
- Load question wording to assume negative behaviours *have* occurred: “How often do you...”.
- Load question wording to assume positive behaviours may not have occurred: “Do you do this...”

A further technique used in questionnaire design has been to encourage honesty in the introduction, for example by saying “...please be as honest and accurate as you can...” and providing information on why the questions are being asked in any introductory materials.

3.4.6 Question specificity vs. questionnaire length

This section discusses the benefits and limitations of asking multiple specific questions versus single general questions. Ways of maintaining question specificity while restricting overall questionnaire length are also considered, alongside the trade-offs associated with these approaches.

It has already been discussed that multiple specific questions can be advantageous compared with asking a single general question. The advantages of asking specific questions include:

- Reduced question ambiguity
- Improved accuracy
- Improved recall when reporting behaviours, for example respondents may recall more about what fruit they ate yesterday if asked a series of questions about different types of fruit, rather than a single question (see Section 3.1.2).
- More detailed information on both food-related behaviours and the factors that influence these behaviours is collected. Additional detail could be of use to policy makers. For example, a single general question on social pressure may indicate the extent to which social pressure exists, whereas multiple specific questions address social pressures from different sources, and which types of pressure are perceived to be most influential.

However, with increased specificity comes increased questionnaire length, which generally means:

- Increased survey cost.
- Increased satisficing behaviours. Asking similar TPB measures across a range of specific behaviours may have a negative impact on respondent motivation, as the format of questions could be repetitive. This could lead to respondents losing interest and giving non-optimal answers.

- Increased respondent burden. This could potentially lead to an increase in survey break-off and impact on respondent attrition between waves.

Therefore, the number and specificity of questions should be developed as part of an iterative review of measurement priorities by data-users and policy makers.

Compromises on item specificity and instrument length could be made by either:

- Prioritising TPB measures about specific behaviours depending on policy interest and not collecting TPB measures in other areas.
- Reducing the specificity of TPB measures, for example by designing measures around a broad concept of 'healthy eating' rather than specific dietary behaviours.

A number of other trade-offs could reduce the overall length of the instrument whilst maintaining a high level of question specificity. These include:

1. Splitting the sample; so half are asked TPB measures in relation to one set of behaviours and half are asked TPB measures in relation to another set of behaviours
2. Asking different question modules in different waves
3. Splitting data collection across multiple longitudinal surveys.

The advantages and disadvantages of these approaches are discussed below.

Splitting the sample involves developing procedures by which different respondents are randomly allocated to different groups. The groups are given different versions of the questionnaire (the same version at each wave). This might work as follows:

Table 3.21 Example of split sample

Randomised group	Question areas
Group A	TPB measures on fruit and vegetable consumption and food hygiene behaviours
Group B	TPB measures on salt consumption and fat consumption

This would increase the overall number of questions that could be asked within the survey but would reduce the overall base size for each question. For example if respondents are allocated to two groups, and 3,000 took part, only 1,500 responses would be collected for certain question areas. This may be sufficient for some kinds of analyses, but the key driver here would be whether analysis of subgroups would be required, and whether a reduced sample size would be sufficient to support this.

Asking alternative modules every other wave is another approach, which could work as follows:

Table 3.22 Example of alternating module content

Survey wave	Topic Areas
Odd years	TPB measures on fruit and vegetable consumption and food hygiene behaviours
Even years	TPB measures on salt consumption and fat consumption.

The trade-off here would be that, although the sample size would not be reduced per annum, data would only be collected on a specific area every two years rather than every year. This would mean it would take up to six years to collect three points of time-series data, rather than three years. There is an added issue of increased attrition associated with the longer timeframe.

Splitting the questionnaire up would involve different behaviours being asked about on different longitudinal surveys. However, in practice this approach would be unlikely to succeed given it would rely on long-term co-ordination across multiple parties. What could be a factor would be to give a lower priority to food behaviours already covered on other surveys.

These approaches would all impact on the ability to examine patterns in psychosocial factors across different behaviours.

3.4.7 Question testing

Questions need to be piloted on a small group of people. Thorough and careful piloting is particularly important for longitudinal surveys as changes to question wording between waves must be avoided. Question continuity is critical to ensure any change detected between waves is an actual change rather than an artefact brought about by a change in question wording.

Question testing can take various forms depending on resources available and the nature of the questions being tested. Cognitive testing involves asking respondents to verbalise their thought processes when answering the questions. This can uncover potential problems that would be concealed by a standard piloting process. It is particularly useful where there are concerns about whether respondents will understand a question, be able to recall or obtain the necessary information to answer it, or be willing to give an 'honest' response. Ideally, pilot respondents should not have been involved in any scoping work undertaken (Section 3.3).

3.4.8 Analysis and Reporting

How TPB measures should be recoded and analysed will depend on the specific questions used and the research questions being addressed. Multivariate regression analysis could be used to examine a number of issues, including:

- What TPB constructs, if any, are associated with 'positive' behaviours and what TPB are associated with 'negative' behaviours, and whether these associations are independent of socio-demographic variables;
- The relative power of different factors (such as socio-demographic variables and TPB constructs) at predicting behaviour;
- Whether TPB constructs are stable or whether they change over time, and what factors are linked with changes in these constructs; and
- The relative power of TPB variables at predicting behavioural change over time compared with other factors (socio-demographic variables or past behaviour).

The reporting and interpretation of the results should be accompanied by relevant insights from the initial scoping work. Likewise, the interpretation should be accompanied by a discussion of the wider sociological barriers that are not measured within the survey.

3.5 Further resources on questionnaire design

Further resources that provide more detailed guidance on broader questionnaire design issues for social surveys are listed below.

3.5.1 General textbooks

Buckingham, A and Saunders, P (2004) *The Survey Methods Workbook*, Polity.

Dillman, D. (2007) *Mail and Internet Surveys: The Tailored Design Method 2nd Edition*, New York: Wiley

Fowler, F.J (1995) *Improving Survey Questions: Design and Evaluation*, Applied Social Research Methods Series, Volume 38, Thousand Oaks, CA:Sage

Marsden,P.V., Wright, J.D. Ed (2010), *Handbook of Survey Research*. 2nd Edition Emerald Publishing Group.

Oppenheim, A.N. (1996) *Questionnaire Design, Interviewing and Attitude Measurement. New Edition*. London: Printer Publishers Ltd.

3.5.2 Cognitive testing resources

Tourangeau, R., Rips, L.J. & Rasinski K. (2000) *The Psychology of Survey Response*, Cambridge University Press

Willis, G. B. (2005). *Cognitive Interviewing*. Sage.

3.5.3 Online resources

Willis, G.B & Lessler, J.T. (1999) *The Questionnaire Appraisal System*

A useful checklist for the desk-evaluation of survey questions available at:

<http://appliedresearch.cancer.gov/areas/cognitive/gas99.pdf>

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Market Research Society (2006) *Questionnaire Design Guidelines*, available online at <http://www.mrs.org.uk/standards/quant.htm>

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Fowler, F.J. and Cosenza, C. (2008). Writing effective questions, in *International Handbook of Survey Methodology*, Chapter 8, Eds. De Leuw E.D., Joop, H.J., Dillman, D.A. , Taylor and Francis: New York.

Fuchs, M. (2005) "Children & Adolescents as Respondents. Experiments on Question Order, Response Order, Scale Effects and the Effect of Numeric Values Associated with Response Options." *Journal of Official Statistics*, 21, 4: 701-725.

Gerber, E. (2003) Respondents understanding of confidentiality language. Paper presented at the *Annual Conference of the American Association for Public Opinion Research*. Nashville, Tennessee. May 14-18, 2003.

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