

Social determinants of food choice

Richard Shepherd

Department of Psychology, University of Surrey, Guildford, Surrey GU2 5XH, UK

Food choice is influenced by a large number of factors, including social and cultural factors. One method for trying to understand the impact of these factors is through the study of attitudes. Research is described which utilizes social psychological attitude models of attitude–behaviour relationships, in particular the Theory of Planned Behaviour. This approach has shown good prediction of behaviour, but there are a number of possible extensions to this basic model which might improve its utility. One such extension is the inclusion of measures of moral concern, which have been found to be important both for the choice of genetically-modified foods and also for foods to be eaten by others. It has been found to be difficult to effect dietary change, and there are a number of insights from social psychology which might address this difficulty. One is the phenomenon of optimistic bias, where individuals believe themselves to be at less risk from various hazards than the average person. This effect has been demonstrated for nutritional risks, and this might lead individuals to take less note of health education messages. Another concern is that individuals do not always have clear-cut attitudes, but rather can be ambivalent about food and about healthy eating. It is important, therefore, to have measures for this ambivalence, and an understanding of how it might impact on behaviour.

Food choice: Social psychological attitudes: Optimistic bias

Food choice, like any complex human behaviour, will be influenced by many interrelating factors. It is not determined entirely by physiological or nutritional need, but is also influenced by social and cultural factors. The culture in which individuals are brought up has a very strong influence on the types of choices made, and social interactions will have a profound effect on our views of foods and our eating behaviour.

A number of models seeking to delineate the effects of likely influences have been put forward in the literature (for example, see Pilgrim, 1957; Khan, 1981; Randall & Sanjur, 1981; Shepherd, 1985; for review, see Shepherd, 1989). However, few of these models present any indication of likely mechanisms of action, nor do they quantify the relative impact of different factors. Also they do not allow any quantitative tests which are predictive of food choice. Many such models are only catalogues of the likely influences, although as such they are useful in pointing to the variables to consider in studies in this area.

An example of one such model is shown in Fig. 1. The factors influencing food choice are categorized as those related to the food, to the individual making the choice and to the external economic and social environment within

which the choice is made. Some of the chemical and physical properties of the food will be perceived by the individual in terms of sensory attributes, e.g. flavour, texture or appearance. However, perceiving these sensory attributes in a particular food does not necessarily mean that an individual will or will not choose to consume that food. Rather it is the individual's liking for that attribute in that particular food which will be the determining factor. Other chemical components in the foods, such as the amount of protein or carbohydrate, will have effects on the individual, e.g. reducing hunger, and the learning of the association between the sensory attributes of a food and its post-ingestional consequences appears to be a major mechanism by which preferences develop. Psychological differences between individuals, such as personality, may also influence food choice (Shepherd & Farleigh, 1986).

As outlined earlier, there are also many factors in the context within which the choice is made that are likely to be very important. These factors include marketing and economic variables as well as social, cultural, religious or demographic factors (Murcott, 1989; Shepherd, 1989). The impact of these factors has been receiving increasing attention (for example, see Murcott, 1998).

Abbreviation: TPB, Theory of Planned Behaviour.

Corresponding author: Dr Richard Shepherd, fax +44 (0)1483 259553, email R.Shepherd@surrey.ac.uk

The immediate social context within which a meal is eaten can influence food choice and consumption. Work by de Castro & de Castro (1989) has shown that the amount of food consumed increases with an increasing number of individuals present at a meal. This situation is true even when those eating alone are excluded from the analysis.

The Theory of Planned Behaviour

One approach to studying food choice derives from social psychological research into attitude-behaviour relationships. In this approach it is assumed that many of the influences on food choice are likely to be mediated by the beliefs and attitudes held by an individual. Beliefs about the nutritional quality and health effects of a food may be more important than the actual nutritional quality and health consequences in determining an individual's choice. Likewise various marketing, economic, social, cultural, religious or demographic factors may act through the attitudes and beliefs held by the individual. Thus, the study of the relationship between choice and the beliefs and attitudes held by an individual offers one possible route towards a better understanding of the influence of different factors on food choice.

The idea behind measuring attitudes is that they are thought to be causally related to behaviour. This link is true both in the common use of the term attitude and in the research literature in social psychology (Eagly & Chaiken, 1993), but the empirical evidence for this link has not always been clear. In the nutrition literature, for example, many studies have attempted to measure the degree of association between attitudes and consumption of foods. Axelson *et al.* (1985) performed a meta-analysis of such studies and found evidence for small (although statistically significant; $P < 0.001$) correlations between attitudes and behaviour (r 0.18). Thus, a superficial survey of this area might lead to the conclusion that attitudes are not related to behaviour to an important degree. The same type of finding in social psychology led to a crisis in attitude research in the late 1960s (Wicker, 1969), which resulted in the generation of a number of structured attitude models (for example, see Ajzen & Fishbein, 1980). One example of such a structured

attitude model is the Theory of Reasoned Action (Ajzen & Fishbein, 1980) and its extension in the form of the Theory of Planned Behaviour (TPB; Ajzen, 1988). These models have been widely applied in the area of social psychology, and more recently have been applied to food choice issues.

The Theory of Reasoned Action seeks to explain behaviour which is under the control of the individual. The TPB, however, in addition seeks to be applicable to non-volitional behaviours, goals and outcomes which are not entirely under the control of the individual. With volitional behaviours it is argued that intention to perform a behaviour is the best predictor of behaviour. Intention, in turn, is predicted by two components: the individual's own attitude (e.g. whether the individual sees the behaviour as good, beneficial, pleasant, etc.) and perceived social pressure to behave in this way (termed the subjective norm). These relationships are shown schematically in Fig. 2. The TPB also includes a component of perceived control, in addition to attitude and subjective norm in the prediction of behavioural intentions, and as a possible influence on the intention-behaviour link (see Fig. 2).

In turn, attitude is predicted by the sum of products of beliefs about outcomes of the behaviour and the individual's evaluations of these outcomes as good or bad. The subjective norm is predicted by the sum of products of normative beliefs, which are perceived pressure from specific individuals or groups (e.g. doctors, family) and the individual's motivation to comply with the wishes of these individuals or groups. In a similar fashion perceived control is determined by specific control beliefs.

The Theory of Reasoned Action has been widely applied to many issues in social psychology (Ajzen & Fishbein, 1980; Tesser & Shaffer, 1990), and more recently also successfully applied to a range of food choice issues (Axelson *et al.* 1983; Shepherd & Stockley, 1985, 1987; Shepherd & Farleigh, 1986; Tuorila, 1987; Shepherd, 1988, 1989; Tuorila & Pangborn, 1988). Sheppard *et al.* (1988) carried out a meta-analysis of eighty-seven studies using this model in the area of general consumer choice (not specifically related to foods). They found an estimated correlation of 0.53 between intention and behaviour, and a multiple correlation of 0.66 between attitude plus subjective norm against intention (Sheppard *et al.* 1988). Thus, this model has validity both in the study of general consumer choice and the study specifically of food choice.

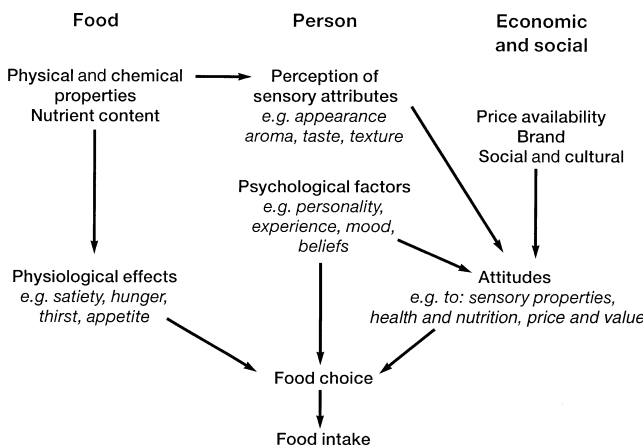


Fig. 1. Some factors affecting food choice and intake. (From Shepherd, 1985.)

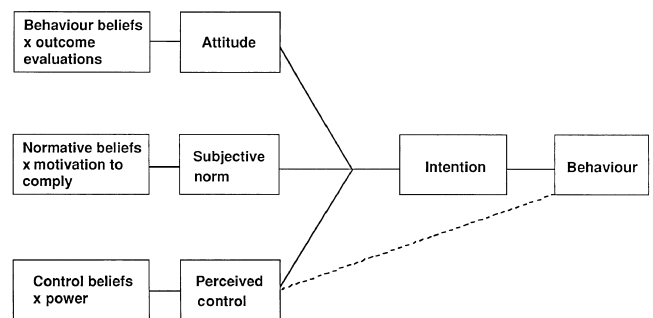


Fig. 2. Schematic representation of the components of the Theory of Planned Behaviour of Ajzen (1988). (----), Possible influence.

The incorporation of perceived control has received some support in social psychological applications (for example, see Ajzen, 1988), and in studies of weight loss (Schifter & Ajzen, 1985) and dietary health behaviours (Ajzen & Timko, 1986), although not in all applications (Fishbein & Stasson, 1990). In a study of biscuit and bread consumption (Sparks *et al.* 1992), intentions to consume wholemeal bread were not influenced by perceived control but intentions to consume biscuits were. Thus, inclusion of a measure of perceived control may be important in predicting choices of some, although not all, foods. It is important to remember that a failure to find a significant effect for perceived control does not invalidate the TPB, because it would be argued that in those cases the behaviour is volitional.

Moral and ethical concerns

Although the Theory of Reasoned Action and TPB have proved successful in many applications in the food choice area, there are a number of shortcomings in their conceptualization and implementation. This situation has led to a number of suggested modifications and extensions. One such extension is the inclusion of moral concerns within this type of approach.

In its basic form the TPB is purely utility or instrumentally based, with behaviour leading to outcomes which are seen as beneficial or not. However, there are some behaviours where moral considerations might also play a significant part, irrespective of beliefs about outcomes. In the food area such moral considerations might be expected to be important, for example in the choice of whether or not to consume genetically-modified foods. This factor was examined by Sparks *et al.* (1995) who demonstrated that within the TPB, moral or ethical considerations add significantly to the prediction of intention from attitude, social norm and perceived control, but only to a limited extent. The point in the model where moral concerns really play a part is in the prediction of attitude from beliefs and evaluations. Moral concerns were found to be highly significant in predicting attitude over and above the effect of more instrumentally-based beliefs and evaluations (β -0.41 , $P < 0.001$ and β 0.60 , $P < 0.001$ for the two behaviours included).

One other area where moral concerns might play a role is when foods are chosen for other individuals. Raats *et al.* (1995) examined the choice of milks varying in fat content, and included questions of the form 'I feel obliged to use skimmed milk for my family's health'. This measure of moral obligation led to only a marginally-significant increase in the prediction of consumption of whole milk ($P = 0.08$), but was not significant for semi-skimmed and skimmed milk. However, as in the study by Sparks *et al.* (1995), the moral obligation responses led to significant increases ($P < 0.001$) in the prediction of attitude after taking account of the beliefs and evaluations (Table 1). This effect has also been shown for mothers' attitudes towards additives in foods for their children (Shepherd & Raats, 1995).

The choices modelled using the TPB are seen as rational choices made based on the utility of expected outcomes. In order for this theory to be more generally applicable it needs

Table 1. Multiple correlation coefficients (R) and standardized regression coefficients (β) from regressions predicting attitude to consuming milk of different fat levels (modified from Raats *et al.* 1995)

	R	Regression coefficient (β)
Whole milk (n 224)		
Belief evaluations	0.83	0.71***
Obligation for family's health	0.85	0.24***
Semi-skimmed milk (n 229)		
Belief evaluations	0.78	0.68***
Obligation for family's health	0.82	0.25***
Skimmed milk (n 225)		
Belief evaluations	0.84	0.74***
Obligation for family's health	0.85	0.19***

*** $P < 0.001$.

to take account of other influences which are not always captured using the types of questions employed in applications of the TPB. The inclusion of these more abstract concerns of moral and ethical issues offers one way in which this theory can be made more generally applicable.

Dietary change and optimistic bias

Despite a great deal of knowledge gained on the impacts of diet on health and on specific diseases (Department of Health, 1994), relatively little is known about how to influence dietary choices in an effective way. Given recommendations, for example, to reduce fat in the diet or increase the consumption of fruit and vegetables, it is then necessary to understand what determines an individual's choices of foods and what obstacles there might be to such changes. Although official recommendations have been in place in the UK since the report by the Committee on Medical Aspects of Food Policy (Department of Health and Social Security, 1984) for a reduction in the energy in the diet derived from fat, there has been relatively little change (Department of Health, 1994).

In addition to research aimed at understanding the factors influencing food choice, research in social psychology has also addressed a number of issues relevant to dietary change. There are a number of possible reasons for the lack of effectiveness of attempts at dietary change. Two specific issues will be discussed here, optimistic bias and ambivalence.

Optimistic bias refers to a phenomenon where individuals underestimate the risk to themselves relative to others from a variety of hazards (for example, see Weinstein, 1987, 1989). It is also sometimes referred to as unrealistic optimism or over-optimism.

The phenomenon of optimistic bias can be illustrated by asking a question such as 'Compared with other men or women my age, my chances of having a heart attack in the future are,' with responses on a scale running from 'much below average' to 'much above average', and a mid-point of 'average for men or women my age'. Weinstein (1989) has demonstrated that there is a consistent group trend to mark personal risk as below average. However, if the sample of individuals is representative of the appropriate population

(i.e. they are not a special group such as nutritionists comparing themselves with the general population) then the mean response over the sample should be near the centre of the response scale. Optimistic bias has been reported for a wide variety of hazards, including food-related examples.

The reasons for optimistic bias are not entirely clear, although a number of suggestions have been made. It has been argued that optimistic bias is related to the need of an individual to feel that he or she has control over a situation (McKenna, 1993). Such a feeling of control will reduce perceived risk, and this effect has been called an 'illusion of control'. Clearly, some hazards are easier than others for the individual to control, and thus it might be predicted that those hazards where personal control is higher will also be more likely to exhibit optimistic bias.

The relationships between perceived risk and perceived control were explored by Frewer *et al.* (1994). In this study, 186 quota-sampled individuals rated risk from a number of different types of hazards. The potential hazards included a high-fat diet, along with other risks such as microbiological and technological ones (e.g. genetically-modified foods). In each case they rated the risk to themselves, and separately rated the risk to 'other people'. A third risk target of 'society' was added, since for some hazards the risk may be more generalized than being a risk to specific individuals, and control may not reside with individuals but rather with institutions or structures within society.

Optimistic bias was found for all the hazards, such that individuals saw themselves at less risk than other individuals, with the differences being significant ($P < 0.001$) for all the hazards. However, the effects were larger for some of the hazards, being particularly marked for the lifestyle hazards of a high-fat diet and alcohol abuse, as well as for food poisoning from home-prepared foods. In the cases of some other forms of hazards, such as genetic modification, the effects were less pronounced, although still statistically significant ($P < 0.001$).

Control is confirmed as an important issue when the results for perceived control are examined. Individuals saw themselves as having more control than other individuals over lifestyle hazards (high-fat diet, alcohol abuse), along with food poisoning from home-produced foods. Also ratings of control were very high for these hazards (means of 89, 84 and 88 on a 100 mm line rating scale for a high-fat diet, alcohol abuse and food poisoning respectively).

In a second study (Sparks *et al.* 1995), a sample of 612 individuals rated the chances of their putting on weight, having heart disease and being unwell because of a high-fat diet. They rated these outcomes relative to other individuals of the same age and sex on a seven-point scale from 'much below average' (1) through 'average' (4) to 'much above average' (7). In each case they rated their susceptibility as less than average. The same individuals also rated their consumption relative to average consumption of cheese, meat, fat, margarine or butter and biscuits, buns, cakes and pastries. In each case, except cheese, the participants rated their consumption of these foods as less than average.

Thus, individuals have a very positive view of risk to themselves from various hazards, and also have a very positive view of their own intake of particular nutrients and

of specific foods. There is still, of course, a question as to whether this view has any impact on their behaviour.

This question was examined by Paisley & Sparks (1998) using the TPB. In this study 152 participants filled in a questionnaire concerning reducing fat intake. The standard components of the TPB were included, but the attitude component was split into a cognitive part and an affective part, and the perceived control component was split into a part referring explicitly to control and a separate component concerning difficulty of making the changes. In addition to these components, participants were also asked 'Do you feel that you need to reduce your fat intake' with responses on a five-point scale labelled 'no, need to increase', 'not at all', 'slightly', 'a great deal' and 'a very great deal'. A regression was calculated, initially including the components of the TPB and then adding in the ratings of perceived need. This regression showed a significant increase ($P < 0.01$) in variance accounted for with the addition of perceived need; this effect still remained when a measure of past behaviour was also included. Thus, perceived need is a significant predictor of intentions to reduce fat intake, even when other important determining factors are taken into account. If individuals do not feel they need to change, because they feel that their diet is already healthy and they are at less risk than the average person, then they are less likely to implement change.

Optimistic bias is clearly of importance if we are interested in how individuals think about risks, and how their views on risks influence their behaviour. A number of explanations have been put forward for such a bias. Individuals may choose inappropriate groups with whom to compare their personal risks; if asked about the risk of drugs they may compare the risks to themselves with those to drug addicts rather than comparing themselves with the 'average person'. There may also be a need to deny risks in order to avoid anxiety, or individuals may not consider the likely actions taken by other individuals to avoid risks, thereby attaching too much weight to their own risk-avoiding behaviours (Weinstein, 1984). The reasons for optimistic bias are only just beginning to be understood. There are many questions still to be answered, in particular the effect of this bias on behaviour and its full implications for dietary interventions require further elucidation.

Ambivalence

A second possible reason for the lack of success in attempts at dietary change is that individuals are actually ambivalent about healthy eating. The concept of ambivalence has been addressed in social psychology at various times, but the predominant view of attitudes is that exemplified in the TPB (pp. 808–209), i.e. individuals hold positive or negative views concerning an attitude object. This view of attitudes does not allow for individuals holding positive and negative feelings simultaneously. However, food is an area where individuals might be expected to be ambivalent. In popular coverage of food issues, foods are often characterized as tasting nice and yet being unhealthy, and therefore it might be expected that individuals will have mixed feelings about consuming particular foods or about diet in general.

When individuals hold ambivalent attitudes or have mixed feelings it might be expected that there would be a less clear relationship between attitudes and behaviour. It is also possible that attempts to change behaviour through changing beliefs and attitudes might be more difficult where both attitudes are less well structured and there is a less-clearly-defined attitude-behaviour link.

We have tested whether ambivalence might be a factor which moderates the effect of attitudes on intention and behaviour in several studies (for example, see Sparks *et al.* 1992). In one study (Sparks *et al.* 1999) we examined attitudes towards the consumption of chocolate and meat. The standard components of the TPB were assessed, with attitude being assessed using ratings on scales from 'favourable' to 'unfavourable' and from 'positive' to 'negative'. These scores were combined in order to calculate a general attitude score. Ambivalence was assessed by asking separate questions about positive and negative aspects of the behaviour. In one question participants were asked to consider only the positive things about eating chocolate (or meat) and to ignore any negative things, and then to rate those positive things from 'not at all positive' to 'extremely positive'. A similarly-worded question then assessed negative aspects on a scale from 'not at all negative' to 'extremely negative'. These ratings were then combined using the formula from Thompson *et al.* (1995). The chocolate questionnaire was completed by 166 members of the public and the meat questionnaire by 159.

In order to test whether the attitude-intention relationship was attenuated for those individuals with higher ambivalence, we computed a multiple regression which predicted intention from attitudes, ambivalence and the attitude \times ambivalence product (Cohen & Cohen, 1983). In order to do this multiple regression, scores were centred. We would predict a strong effect of attitude alone, based on previous results from the TPB. We would also predict a significant negative effect for the interaction between attitude and ambivalence (shown as a negative β coefficient in the multiple regression). This predicted effect was indeed found both for chocolate and for meat, as shown in Table 2. There was no effect for ambivalence alone, showing that (after the effect of attitude has been considered) higher levels of ambivalence do not themselves relate to higher or lower intention. Rather the effect is for higher levels of ambivalence to attenuate the attitude-intention relationship.

Table 2. Correlations (r) and standardized regression coefficients (β) from multiple regressions of intention to consume chocolate and meat on attitude, ambivalence and the product of attitude and ambivalence

Predictor	β	r
Chocolate (n 153; R^2 0.36)		
Attitude	0.55***	0.58***
Ambivalence	0.03	-0.02
Attitude \times ambivalence	-0.15*	-0.27*
Meat (n 156; R^2 0.54)		
Attitude	0.66***	0.72***
Ambivalence	-0.05	-0.02
Attitude \times ambivalence	-0.14*	-0.44***

* $P < 0.05$, *** $P < 0.001$.

Thus, those individuals who are more ambivalent and have more mixed feelings about consumption of these foods tend to have less clear relationships between attitudes and intention. For those individuals who hold ambivalent attitudes the different positive and negative views may be more or less salient in different contexts. Thus, when confronted with foods more immediate sensory responses may predominate, whereas in the absence of food the individual may focus more on health-related beliefs. The methods to assess ambivalence require further research, as do its implications for dietary behaviour and in particular dietary change.

Conclusions

Food choice is potentially influenced by a large range of potential factors. Many models put forward in this area involve merely listing the likely influences rather than offering a framework for empirical research and practical application. Although there is general agreement on the types of influences likely to be important, the integration of these factors into a coherent and quantitative model of food choice remains an area in need of development.

The attempt to model food choice via an understanding of beliefs and attitudes of individuals requires a structured framework within which to measure and relate the variables of interest. One model from social psychology for achieving this framework is the TPB. This model generally reveals good prediction of behaviour, and can be used to determine the relative importance of different factors in influencing food choice. Various extensions of this model, including for example moral obligation, offer a means for developing a clearer understanding of the factors influencing the choice of particular types of foods in particular contexts. They thus pave the way for exploring the more emotional and feeling elements potentially important in food choice, rather than simply addressing the rational cognitive issues prevalent in the literature.

Dietary change has proved to be difficult to implement effectively, and some reasons for this difficulty have been discussed previously (pp. 809-810). Ambivalence towards healthy eating and dietary change offers one potential avenue for further research. The phenomenon of optimistic bias also offers some insight into possible reasons for the lack of success. If individuals see themselves as at less than average risk from a particular hazard, it is unlikely that they will be influenced by messages putting over the need for the general population to make changes. The feeling of need to change has been shown to be important in dietary change, and addressing this motivational issue is likely to be an important step for the future.

Acknowledgements

Various parts of the work reported here were funded by the Biotechnology and Biological Sciences Research Council, the Economic and Social Research Council and the Ministry of Agriculture, Fisheries and Food.

References

- Ajzen I (1988) *Attitudes, Personality, and Behaviour*. Milton Keynes: Open University Press.
- Ajzen I & Fishbein M (1980) *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Ajzen I & Timko C (1986) Correspondence between health attitudes and behavior. *Basic and Applied Social Psychology* **7**, 259–276.
- Axelson ML, Brinberg D & Durand JH (1983) Eating at a fast-food restaurant – a social-psychological analysis. *Journal of Nutrition Education* **15**, 94–98.
- Axelson ML, Federline TL & Brinberg D (1985) A meta-analysis of food- and nutrition-related research. *Journal of Nutrition Education* **17**, 51–54.
- Cohen J & Cohen P (1983) *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*. Hillsdale, NJ: Lawrence Erlbaum.
- Department of Health and Social Security (1984) *Diet and Cardiovascular Disease. Report on Health and Social Subjects* no. 28. London: H.M. Stationery Office.
- Department of Health (1994) *Nutritional Aspects of Cardiovascular Disease. Report on Health and Social Subjects* no. 46. London: H.M. Stationery Office.
- de Castro JM & de Castro ES (1989) Spontaneous meal patterns of humans: influence of the presence of other people. *American Journal of Clinical Nutrition* **50**, 237–247.
- Eagly AH & Chaiken S (1993) *The Psychology of Attitudes*. San Diego, CA: Harcourt, Brace and Jovanovich.
- Fishbein M & Stasson M (1990) The role of desires, self-predictions, and perceived control in the prediction of training session attendance. *Journal of Applied Social Psychology* **20**, 173–198.
- Frewer LJ, Shepherd R & Sparks P (1994) The interrelationship between perceived knowledge, control and risk associated with a range of food related hazards targeted at the self, other people and society. *Journal of Food Safety* **14**, 19–40.
- Khan MA (1981) Evaluation of food selection patterns and preferences. *CRC Critical Reviews in Food Science and Nutrition* **15**, 129–153.
- McKenna FP (1993) It won't happen to me: unrealistic optimism or illusion of control? *British Journal of Psychology* **84**, 39–50.
- Murcott A (1989) Sociological and social anthropological approaches to food and eating. *World Review of Nutrition and Dietetics* **55**, 1–40.
- Murcott A (editor) (1998) *The Nation's Diet: The Social Science of Food Choice*. Harlow, Essex: Addison Wesley.
- Paisley CM & Sparks P (1998) Expectations of reducing fat intake: the role of perceived need within the Theory of Planned Behaviour. *Psychology and Health* **13**, 341–353.
- Pilgrim FJ (1957) The components of food acceptance and their measurement. *American Journal of Clinical Nutrition* **5**, 171–175.
- Raats MM, Shepherd R & Sparks P (1995) Including moral dimensions of choice within the structure of the Theory of Planned Behavior. *Journal of Applied Social Psychology* **25**, 484–494.
- Randall E & Sanjur D (1981) Food preferences – their conceptualization and relationship to consumption. *Ecology of Food and Nutrition* **11**, 151–161.
- Schifter DE & Ajzen I (1985) Intention, perceived control, and weight loss: an application of the Theory of Planned Behavior. *Journal of Personality and Social Psychology* **49**, 843–851.
- Shepherd R (1985) Dietary salt intake. *Nutrition and Food Science* **96**, Sept/Oct, 10–11.
- Shepherd R (1988) Belief structure in relation to low-fat milk consumption. *Journal of Human Nutrition and Dietetics* **1**, 421–428.
- Shepherd R (editor) (1989) Factors influencing food preferences and choice. In *Handbook of the Psychophysiology of Human Eating*, pp. 3–24. Chichester, West Sussex: Wiley.
- Shepherd R & Farleigh CA (1986) Preferences, attitudes and personality as determinants of salt intake. *Human Nutrition: Applied Nutrition* **40A**, 195–208.
- Shepherd R & Raats MM (1995) Attitudes and beliefs in food habits. In *Food Choice, Acceptance and Consumption*, pp. 346–364 [HL Meiselman and HJH MacFie, editors]. London: Blackie Academic and Professional.
- Shepherd R & Stockley L (1985) Fat consumption and attitudes towards food with a high fat content. *Human Nutrition: Applied Nutrition* **39A**, 431–442.
- Shepherd R & Stockley L (1987) Nutrition knowledge, attitudes, and fat consumption. *Journal of the American Dietetic Association* **87**, 615–619.
- Sheppard BH, Hartwick J & Warshaw PR (1988) The theory of reasoned action: a meta-analysis of past research with recommendations for modifications and future research. *Journal of Consumer Research* **15**, 325–343.
- Sparks P, Hedderley D & Shepherd R (1992) An investigation into the relationship between perceived control, attitude variability and the consumption of two common foods. *European Journal of Social Psychology* **22**, 55–71.
- Sparks P, James R, Conner M, Shepherd R & Povey R (1999) Ambivalence about health-related behaviours: an exploration in the domain of food choice. *British Journal of Health Psychology* (In the Press).
- Sparks P, Shepherd R & Frewer LJ (1995) Assessing and structuring attitudes toward the use of gene technology in food production: the role of perceived ethical obligation. *Basic and Applied Social Psychology* **16**, 267–285.
- Sparks P, Shepherd R, Wieringa N & Zimmermanns N (1995) Perceived behavioural control, unrealistic optimism and dietary change: an exploratory study. *Appetite* **24**, 243–255.
- Tesser A & Shaffer DR (1990) Attitudes and attitude change. *Annual Review of Psychology* **41**, 479–523.
- Thompson M, Zanna M & Griffin D (1995) Let's not be indifferent about (attitudinal) ambivalence. In *Attitude Strength: Antecedents and Consequences*, pp. 361–386 [RE Petty and JA Krosnick, editors]. Hillsdale, NJ: Lawrence Erlbaum.
- Tuorila H (1987) Selection of milks with varying fat contents and related overall liking, attitudes, norms and intentions. *Appetite* **8**, 1–14.
- Tuorila H & Pangborn RM (1988) Prediction of reported consumption of selected fat-containing foods. *Appetite* **11**, 81–95.
- Weinstein ND (1984) Why it won't happen to me: perceptions of risk factors and susceptibility. *Health Psychology* **3**, 431–457.
- Weinstein ND (1987) Unrealistic optimism about susceptibility to health problems: conclusions from a community-wide sample. *Journal of Behavioral Medicine* **10**, 481–500.
- Weinstein ND (1989) Optimistic biases about personal risks. *Science* **246**, 1232–1233.
- Wicker AW (1969) Attitude versus actions: the relationship of verbal and overt behavioral responses to attitude objects. *Journal of Social Issues* **25**, 41–78.