Short Communication

Hygienic food handling behaviours. An application of the Theory of Planned Behaviour

Barbara A. Mullan *, Cara L. Wong

School of Psychology, The University of Sydney, Sydney, NSW 2006, Australia

ARTICLE INFO

ABSTRACT

It is estimated that 5.4 million Australians get sick annually from eating contaminated food and that up to 20% of this illness results from food handling behaviour. A study was undertaken to investigate the efficacy of the Theory of Planned Behaviour (TPB) including past behaviour in predicting safe food handling intention and behaviour. One hundred and nine participants completed questionnaires regarding their attitudes, perceived behavioural control (PBC), subjective norm, intentions and past behaviour. Behaviour was measured 4 weeks later. The TPB predicted a high proportion of variance in both intentions and behaviour, and past behaviour/habit was found to be the strongest predictor of behaviour. The results of the present study suggest interventions aimed at increasing safe food handling intentions should focus on the impact of normative influences and perceptions of control over their food handling environment; whereas interventions to change actual behaviour should attempt to increase hygienic food handling as a habitual behaviour.

© 2009 Elsevier Ltd. All rights reserved.

Introduction

Attempts to predict health behaviour are not always successful. The use of the Theory of Planned Behaviour (TPB) can improve prediction of intention and to a lesser extent actual behaviour (Conner & Norman, 2005). The aim of the present study was to consider the TPB including past behaviour, in the area of food hygiene behaviours.

The number of reported foodborne illnesses in Australia has increased over the past 10 years (National Health and Medical Research Council, 2003). Approximately a quarter of the population experience foodborne illness annually (Mead et al., 1999; The Food Safety Information Council, 2008). In the United States this is an estimated 76 million cases and in Australia an estimated 5.4 million cases per year. Further, data on foodborne illnesses are believed to consistently underestimate their true incidence (Crerar, Dalton, Longbottom, & Kraa, 1996). As a result of the increasing incidence, in Australia and worldwide, foodborne diseases pose a significant public health problem (Desmarchelier, 1996).

Of particular import is that between 10 and 20% of foodborne illness in Australia is estimated to be as a result of consumer behaviour (Food Authority NSW, 2008), which is similar to that reported in the UK of 16% (Ryan, Wall, Gilbert, Griffin, & Rowe, 1996). Correct handling of food during all stages of its preparation and storage is essential in reducing the incidence of foodborne illness (National Health and Medical Research Council, 2003). Nevertheless, research has found that infrequent and poor hand-washing technique is common in Australian food handlers (Jay, Comar, & Govenlock, 1999). Between one- and two-thirds of surveyed participants did not wash knives and cutting boards after use with raw meat and before reuse of implements (Jay, Comar, & Govenlock, 1999a; Jevsnik, Hlebec, & Raspor, 2008). This is supported by the results of a systematic review of food safety studies, which has identified that consumers often implement unsafe food handling behaviours during domestic food preparation (Redmond & Griffith, 2003).

A large proportion of the research into foodborne illness investigates knowledge of food safety behaviours. For example, a study by Byrd-Bredbenner et al. (2007) found that although 97% of the sample rated their own food safety knowledge as at least fair, 60% did not wash their hands with soap and water, after touching raw poultry. Similarly Redmond and Griffith (2003) compared studies into consumer food safety information and found that whereas cross contamination knowledge was good, participants in other studies generally did not engage in these food safety behaviours. Despite calls for the application of models in behavioural science to be used in predicting safe food handling behaviours (Griffith, Mullan, & Price, 1995) very few studies have used social cognition models.

---

* Corresponding author.
E-mail address: barbara@psych.usyd.edu.au (B.A. Mullan).

Social cognition models (SCM; theories looking at people's thought processes and social influences) have been extensively used in attempts to understand health behaviours (Conner & Norman, 2005). One such model is the Health Belief Model (HBM), which was developed to predict preventative health behaviour of individuals and has been extensively utilised for this purpose (Janz & Becker, 1984). Briefly, it suggests that readiness to take a health action is determined by the perceived likelihood of susceptibility to the particular illness and by the perception of the severity of the consequences of getting the disease. Barriers to action must be taken into account and a cue to action is considered necessary before health action will be taken. A number of studies have been undertaken applying the HBM to food hygiene behaviours. Research using the HBM (Hanson & Benedict, 2002; Roseman & Kurzynske, 2006; Schafer, Schafer, Bultena, & Hoiberg, 1993) has found that the components are generally successful in predicting food safety behaviours.

However, conflicting evidence as to the efficacy of the Health Belief Model in describing food handling behaviour is to be found in a study by McArthur, Holbert, & Forsythe (2006) who found the Health Belief Model was a poor predictor of compliance to food safety recommendations in undergraduate students. As this is the target population for the present study, this was one reason to consider an alternative health model. Other difficulties with the model include conceptualisation of the relationship between the components of the model (Abraham & Sheeran, 2005), inconsistent measurement of constructs and failure to establish validity and reliability of measures. The model also does not include any measure of normative influences, which measure the influence that other people have on a person's behaviour (Conner & Sparks, 2005). Research has found that normative influences may play an important role in behaviours, which are performed publicly or, which impact on other peoples' health (Quine, Rutter, & Arnold, 1998). This may be important in food handling behaviours. Normative influences are an important component of another theory—Theory of Planned Behaviour (TPB; Ajzen, 1991).

This theory posits that intention is the main precursor to behaviour. The TPB claims that attitude (the degree a person has a favourable or unfavourable evaluation towards the behaviour), subjective norm (normative influences; the perceived social pressure to perform or not perform the behaviour), and PBC, (the individual's *perceptions* of the ease or difficulty of performing the behaviour of interest) predict intention. PBC influences intentions and directly affects behaviour. Armitage and Conner (2001) conducted a systematic review of studies using the TPB and found that the TPB variables explained 39% of variance in intention and 27% of behaviour. In one study of food related behaviour, Wong and Mullan (in press) found that the TPB was very successful at predicting breakfast consumption explaining 53% of variance in intention and 64% of variance in behaviour. Within other areas of food and nutrition the model has been successfully implemented to explain a wide variety of intentions and behaviours including healthy eating (Conner & Sparks, 2005; Povey, Conner, Sparks, James, & Shepherd, 2000), consuming foods enriched with omega 3 (Patch, Tapsell, & Williams, 2005) and eating behaviours in young adolescents (Fila & Smith, 2006).

While the TPB has not been used to directly predict food handling behaviours it has been shown to significantly predict 79% of intention and 87% of self-reported hand hygiene practice in hospitals (Jenner, Watson, Miller, Jones, & Scott, 2002) and 34% of the variance in hand hygiene malpractice in catering establishments (Clayton & Griffith, 2008). Despite the success of the model, there is still a proportion of unaccounted variance therefore, additional predictors have been investigated that may increase the power of the TPB.

Considerable research has been conducted incorporating the construct of past behaviour into the TPB (e.g. Rhodes & Courneya, 2003; Wong & Mullan, in press). While Ajzen (2002) himself has argued that frequency of past behaviour does not predict future behaviour, other research has suggested that at least in certain circumstances, past behaviour or habit may be an important predictor of future behaviour (Danner, Aarts, & de Vries, 2008; Ouellette & Wood, 1998). Brennan, McCarthy, and Ritson (2007) found that in relation to food handling behaviours past experience was an important predictor of future behaviour suggesting that is likely that food handling practices will become a habit when performed consistently thus past behaviour is also investigated in the present study. Therefore, the purpose of the present study was to investigate the predictive utility of the TRA and TPB in food handling behaviours and to further consider the addition of past behaviour.

Methods

The participants were 109 first year psychology students (85 female, 24 males), with a mean age of 19.5 years (range 17–35, SD = 2.43). Over half of the participants were of Australian-Caucasian ethnicity (53.2%, $n = 58$), 26.6% ($n = 29$) were Asian, 12% ($n = 13$) were European, and 8.4% ($n = 9$) were classified as other. Ethical approval was obtained from the University's Human Ethics Committee.

One hundred and nine participants completed two online questionnaires spaced 4 weeks apart. At time one, participants completed questions related to demographic information, TPB variables including attitudes, beliefs, perceived behavioural control, subjective norms, intention and past behaviour. At time two participants reported on food hygiene behaviours over the past 4 weeks.

Attitudes were assessed as the mean of 6 semantic differential scales (e.g. preparing food hygienically every meal would be: bad–good, unnecessary–necessary, unpleasant–pleasant, unenjoyable–enjoyable, beneficial–harmful, foolish–wise). Participants rated on a scale of 1–7 with a higher score indicating a more positive attitude. An alpha coefficient of .83 ($M = 6.47$, SD = 0.68) was reported.

Subjective norm was assessed by a single item "people who are important to me think I should prepare food hygienically every meal over the next 4 weeks" (unlikely–likely), scored 1–7 with a higher score indicating more normative pressure ($M = 6.10$, SD = 1.17).

PBC was assessed as the mean of four, seven-point (1–7) items including two items for controllability and two for self-efficacy. This is because the internal reliability of PBC items has frequently been found to be low (e.g. Ajzen, 2002; Sparks, 1994), therefore more than one measure of controllability is now recommended. For this variable an alpha coefficient of .93 ($M = 5.72$, SD = 1.27) was reported.

Behavioural Intention was assessed as the mean of four items, each measured on seven-point scales (I intend/plan/aim/will make an effort to prepare food hygienically every meal over the next 4 weeks). For Behavioural Intention the alpha coefficient was .98 ($M = 5.95$, SD = 1.26).

Past behaviour was measured by asking participants how many times per week during the previous 4 weeks, they had prepared food hygienically.

Behaviour was measured at time 2 by asking participants how many days (out of 28) over the 4 week prospective time period they had prepared food hygienically.

Data were analysed using SPSS version 15. Two hierarchical regression analyses were run, the first with attitude, subjective norm, PBC and past behaviour as predictors of intention. Secondly, intention, PBC and past behaviour were entered as predictors with four-week behaviour as the dependent variable.