Research report

Examining the predictive utility of an extended theory of planned behaviour model in the context of specific individual safe food-handling

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ABSTRACT

Background: In order to minimise the occurrence of food-borne illness, it is recommended that individuals perform safe food-handling behaviours, such as cooking food properly, cleaning hands and surfaces before preparing food, keeping food at the correct temperature, and avoiding unsafe foods. Previous research examining the determinants of safe food-handling behaviour has produced mixed results; however, this may be due to the fact that this research examined these behaviours as a totality, rather than considering the determinants of each behaviour separately. As such, the objective for the present study was to examine the predictors of the four aforementioned safe food-handling behaviours by applying an extended theory of planned behaviour to the prediction of each distinct behaviour. *Method:* Participants were 170 students who completed theory of planned behaviour measures, with the addition of moral norm and habit strength at time 1, and behaviour measures one week later. *Results:* While the influence of injunctive and descriptive norm and perceived behavioural control differed between behaviours, it appeared that moral norm was an important predictor of intention to engage in each of the four behaviours. Similarly, habit strength was an important predictor of each of the behaviours and moderated the relationship between intention and behaviour for the behaviour of avoiding unsafe food. *Conclusion:* The implication of these findings is that examining safe food-handling behaviours separately, rather than as a totality, may result in meaningful distinctions between the predictors of these behaviours.

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Introduction

Foodborne disease is a global problem (Kuchenmüller et al., 2009) that not only affects individual health and wellbeing, but also impacts upon society by way of extensive costs related to both sick leave and medical expenses (Hall et al., 2005; Mullan, 2009). Data from Australia and North America show that approximately one quarter of the population will experience illness due to foodborne pathogens each year (McKercher, 2012; Scallan et al., 2011). It has, however, been suggested that this approximation underestimates the true rate of foodborne disease, as many individuals do not seek medical treatment, resulting in an underreporting of cases (Hall, Yohannes, Raupach, Becker, & Kirk, 2008; Majowicz et al., 2005). Additionally, recent data suggest that the incidence of foodborne disease is increasing (McKercher, 2012).

A substantial proportion of foodborne disease occurs in the home (Griffith, Mullan, & Price, 1995), with estimates ranging

from 50% to 87% (Clayton, Griffith, & Price, 2003). Fortunately, many of these illnesses are preventable by safe food-handling behaviours exercised during all stages of food preparation and storage (Scharff, 2010). For example, early research suggested that correct temperature control, avoiding preparation of food too far in advance of cooking, and avoiding cross-contamination from other foods and utensils, can all reduce the risk of foodborne disease (Bryan, 1988 as cited in Mullan, 2009; Roberts, 1982). More recently, Azevedo, Albano, Silva, and Teixeira (2014) proposed that correct hand hygiene and taking precautions when cooking, storing, and preparing food, could also reduce this risk. Specifically in Australia, the National guidelines recommend that the following four behaviours should be performed in order to minimise the occurrence of foodborne disease: 'cook food properly', 'clean hands and surfaces before preparing food', 'keep food at the correct temperature', and 'avoid unsafe foods' (Food Safety and Regulatory Activities, 2011). Previous research attempting to predict and explain engagement in safe food-handling behaviour has produced inconsistent results (for a review, see: Redmond & Griffith, 2003). This may be due to the fact that the majority of research to date has considered safe food-handling behaviours as a totality (Mullan, Wong, Davis, Todd, & Kothe, 2015),

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rather than considering the determinants of each of the different behaviours separately. Given the variety of behaviours corresponding to safe food-handling (Azevedo et al., 2014; Food Safety and Regulatory Activities, 2011), it is likely that individual safe food-handling behaviours are determined by different factors.

Various theoretical frameworks have been applied to the explanation and prediction of safe food-handling behaviours, including the Health Action Process Approach (Chow & Mullan, 2010), and the Health Belief Model (Bearth, Cousin, & Siegrist, 2014; Rimal, 2000). The model that appears to account for the most variance in behaviour is, however, the Theory of Planned Behaviour (TPB; Mari, Tiozzo, Capozza, & Ravarotto, 2012; Mullan & Wong, 2009; Mullan, Wong, & Kothe, 2013; Seaman & Eves, 2010; Shapiro, Porticella, Jiang, & Gravani, 2011), which has been applied to both overall safe food-handling behaviour, as well as specific behaviours including hand hygiene (Clayton & Griffith, 2008) and cooking food properly (Mari et al., 2012).

The TPB posits that the most proximal predictor of behaviour is one's intention to perform that behaviour (Ajzen, 1991). Intention is in turn influenced by perceptions of the likely outcome of behaviour and an evaluation of these outcomes as positive or negative (attitudes), perceptions of pressure from significant others to perform the behaviour (subjective norm), and perceptions of confidence or self-efficacy in overcoming any barriers to the performance of the behaviour (perceived behavioural control; PBC). The TPB has been shown to be a valid model in the prediction of intentions and behaviour across a wide range of health-related behaviours (Armitage & Conner, 2001; McEachan, Conner, Taylor, & Lawton, 2011). Regarding safe food-handling behaviours, the TPB constructs of attitude, subjective norm, and PBC have been shown to account for two thirds of the variance in intention to perform safe food-handling behaviours, although only subjective norms and PBC, not attitudes, were significant predictors (Mullan & Wong, 2009).

Applications of the TPB to the prediction of safe food-handling behaviours do, however, result in a finding that is common within the TPB literature; that is, that a proportion of individuals fail to translate their positive intentions into behaviour, leaving what is commonly referred to as the 'intention–behaviour gap' (Sheeran, 2002). For example, Mullan and Wong (2009) found that intention only predicted 21 per cent of the variance in safe food-handling behaviour, leaving a significant proportion of the variance unexplained. Consequently, the TPB, which is primarily a motivational rather than a volitional model, has been criticised as being incomplete (Sniehotta, Presseau, & Araújo-Soares, 2014), and numerous researchers have therefore included additional variables in attempts to improve the prediction of behaviour and explain why some individuals fail to translate their (usually) positive intentions into action (e.g., Reuter et al., 2010; Sainsbury, Mullan, & Sharpe, 2013; Sniehotta, Scholz, & Schwarzer, 2005).

Moral norm is one variable that has been added to the standard TPB, both as a pre-intentional predictor (Conner & Armitage, 1998; Manstead, 2000) and a direct predictor of behaviour (Godin, Gagnon, Lambert, & Conner, 2005), as well as specifically to bridge the gap between intentions and behaviour (Godin, Conner, & Sheeran, 2005). Moral norm refers to the perceived moral correctness or incorrectness of a particular behaviour (Ajzen, 1991), and is used to aid in the prediction of behaviours that have consequences beyond the individual – for example, driving under the influence of alcohol (Moan & Rise, 2011) and condom use (Godin et al., 2005). Conner and Armitage (1998) reported an average increase in the prediction of intention of four per cent when moral norms were included in addition to the standard TPB pre-intention variables (based on 11 studies).

Regarding the influence of moral norms on behaviour, Godin et al. (2005) conducted a moderation analysis using data from five previously conducted studies and demonstrated that 'morally-aligned intentions' – intentions formed on the basis of the perceived moral correctness of a behaviour – were better predictors of behaviour

than intentions that were formed based on the likely outcomes of a behaviour ('attitudinally-aligned intentions'). Interestingly, despite evidence of an overall moderation effect, this was only significant for the behaviours of smoking, driving over the speed limit, and nurses' use of universal precautions, all of which would be considered to have a moral component as such actions have the potential to impact other people. In contrast, in the two included studies that measured physical activity – a behaviour that only minimally involves or impacts other people – there was no evidence for a distinction between morally- and attitudinally-aligned intentions on behaviour (Godin et al., 2005). Given that cooking and food preparation are activities often performed for other people, the inclusion of a variable that accounts for whether individuals consider the moral consequences of their actions may be of particular value here (see Clayton & Griffith, 2008, for a relevant study investigating moral norm in hand hygiene behaviours for caterers).

Another variable that has been proposed in order to narrow and explain the intention–behaviour gap is habit strength (Gardner, de Bruijn, & Lally, 2011) – that is, the degree to which the performance of a particular behaviour has become habitual or automatised (Verplanken & Orbell, 2003). Habit strength represents another variable that may be of particular importance in determining safe food-handling behaviour because for many individuals food preparation is likely a repeatedly and routinely performed activity. Ouellette and Wood (1998) contend that behaviours that are performed consistently in stable conditions eventually become habitual and are executed without the need for conscious intention. Given that the context involved in safe food-handling behaviour is typically consistent (i.e., the kitchen), it is likely that the enactment of certain safe food-handling behaviours have become habitual for many people. Indeed, Brennan, McCarthy, and Ritson (2007) found that in relation to engaging in safe food-handling behaviours, habit and past experience were important predictors of future behaviour. Therefore, it may be useful to also account for the role of habit in addition to the TPB variables in the prediction of safe food-handling behaviour.

Study aims and hypotheses

The aim of this study was to employ an extended TPB model in an attempt to improve the prediction of the performance of specific safe food-handling behaviours. In particular, the variables of moral norm and habit strength were added to the model and applied to the prediction of four distinct safe food-handling behaviours in order to determine: (1) whether these elements would add to the prediction of intention and behaviour over and above the standard TPB; (2) whether the TPB and additional variables differentially predicted specific safe food-handling behaviours; and (3) whether the addition of habit in particular moderated the intention–behaviour gap. It was hypothesised that the TPB variables of attitude, subjective norm, and PBC would significantly predict the intention to perform each of the four safe food-handling behaviours, and that moral norm would add to the prediction when added after the standard TPB variables. Regarding behaviour, it was predicted that intention and PBC would significantly predict each of the four safe food-handling behaviours, and that habit strength would add to the prediction when added after the TPB variables. Finally, it was hypothesised that habit would interact with intention to predict behaviour, such that intention would not guide the behaviour of individuals with strong safe food-handling behaviour habits.

Method

Design

A prospective design was employed, in which the variables hypothesised to predict intention and behaviour were measured at