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No time to waste: Applying social psychological methods  
and theories to household food waste reduction

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Thesis submitted for the degree Doctor of Philosophy

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## DECLARATION

**The thesis conforms to an ‘article format’ in which the middle chapters consist of discrete articles written in a style that is appropriate for publication in peer-reviewed journals in the field. The first and final chapters present synthetic overviews and discussions of the field and the research undertaken.**

Chapter 2 is published in the journal of *Resources, Conservation and Recycling*:

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The author contributions are as follows: Ella Graham-Rowe was responsible for all of the data collection, data analysis and writing of the manuscript. Donna Jessop and Paul Sparks were responsible for providing feedback on study design and corrections to the manuscript. Ella Graham-Rowe, Donna Jessop and Paul Sparks were collectively responsible for the initial conception of the research.

Chapter 3 is under review with *Resources, Conservation and Recycling*.

The author contributions are as follows: Ella Graham-Rowe was responsible for all of the data collection, data analysis and writing of the manuscript. Donna Jessop and Paul Sparks were responsible for providing feedback on study design and corrections to the manuscript. Ella Graham-Rowe, Donna Jessop and Paul Sparks were collectively responsible for the initial conception of the research.

Chapter 4 is written in a style suitable for submission to *The Journal of Environmental Psychology*

The author contributions are as follows: Ella Graham-Rowe was responsible for all of the data collection, data analysis and writing of the manuscript. Donna Jessop and Paul Sparks were responsible for providing feedback on study design and corrections to the manuscript. Ella Graham-Rowe and Donna Jessop were both responsible for the initial conception of the research.

Chapter 5 is written in a style suitable for submission to *The Journal of Environmental Psychology*

The author contributions are as follows: Ella Graham-Rowe was responsible for all of the data collection, data analysis and writing of the manuscript. Donna Jessop and Paul Sparks were responsible for providing feedback on study design and corrections to the manuscript. Ella Graham-Rowe and Donna Jessop were both responsible for the initial conception of the research.



I hereby declare that this thesis has not been and will not be submitted in whole or in part to another University for the award of any other degree.

Signature:.....

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## SUMMARY

The amount of food thrown away by UK households is substantial and, to a large extent, avoidable. Despite the obvious imperative for research to identify key factors that motivate, enable or prevent household food waste reduction, little research to date has directly addressed this objective. The research presented in this thesis had two clear aims: (1) to investigate antecedents of household food waste reduction and barriers to change, and (2) to explore whether self-affirmation techniques can increase motivation to reduce household food waste.

Four empirical studies were conducted. The first study qualitatively explored thoughts, feelings and experiences of 15 UK household food purchasers. Analysis revealed seven core categories representing both motivations and barriers to household food waste reduction. The second study ( $N = 279$ ) applied an extended theory of planned behaviour (TPB) model to predict household food waste reduction intention and behaviour. Results revealed that the extended TPB variables predicted 64.55% of intention to reduce household food waste and 5.03% of the variance in household food waste behaviour.

Studies 3 and 4 explored whether self-affirmation techniques would promote openness to information detailing the negative consequences of household food waste.

Study 3 ( $N = 224$ ) found that self-affirmed participants reported more positive cognitions towards household food waste reduction on a number of outcomes compared to their non-affirmed counterparts. However, there was no impact of the self-affirmation manipulation on behaviour at follow-up. Study 4 ( $N = 362$ ) failed to replicate the impact of self-affirmation on cognitions. However, self-affirmed participants reported that they threw

away less household food waste at follow-up. Further research in the context of self-affirmation on food waste reduction behaviour is required.

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## **CHAPTER 1. AN INTRODUCTORY OVERVIEW**

### **Overview**

The research presented in this thesis was designed to explore the issue of household food waste from a social psychological perspective. Specifically, the programme of research had two main aims. The first of these was to investigate antecedents of household food waste reduction and barriers to change. The second aim was to explore the potential for self-affirmation techniques to increase motivation to reduce household food waste. This first chapter is intended to provide a brief overview of the literature relevant to the thesis. Given the broad scope of this thesis and the proliferation of research in the theories covered, this introductory chapter is not intended to provide a detailed review of the literature but to illustrate a range of work in each area.

In light of the aims of this thesis, this chapter begins with a brief overview of the negative environmental and social consequences of global food waste and highlights the contribution from UK households. The literature reporting both qualitative and quantitative studies investigating the precursors of household food waste is then discussed. It is concluded that there is a dearth of empirical evidence identifying people's motivations, capabilities, opportunities and barriers to household food waste reduction. It is argued that such investigations should be theory-driven, as theory can provide a framework from which causal processes can be identified and can guide the development of effective, replicable and parsimonious interventions. The theory of planned behaviour is then outlined along with a discussion of additional variables that could enhance the predictive utility of the model. This is followed with a critical appraisal of a study that has applied the TPB to household food waste. Subsequently, self-affirmation theory is introduced and supporting

literature discussed. It is argued that self-affirmation techniques have the potential to make people more open to messages detailing the negative consequences of their behaviour. Finally, the empirical research presented in this thesis is outlined.

### **Global food waste**

Food waste is a major contemporary global issue. It has been estimated that each year one third, 1.3 billion tons (1.32 billion metric tonnes), of food produced for human consumption is lost or wasted globally (Gustavsson, Cederburg, Sonesson, van Otterdijk & Meybeck, 2011). Food waste occurs at all stages of the food supply chain; however, in low-income countries much of it is lost (e.g. decreased in mass or nutritional value) as a consequence of inefficient agriculture and fragmented supply chains (Bond, Meacham, Bhunnoo & Benton, 2013; Parfit, Barthel & MacNaughton, 2010). By contrast, in high-income countries, such as the UK, much of the food is wasted as a consequence of oversupply or consumer shopping/food management behaviour (Food and Agriculture Organization [FAO], 2013; Parfit et al., 2010). In high income countries it is the consumer that has been identified as the biggest offender, contributing more food waste than any other single sector, including: manufacturing, distribution, grocery retail and the hospitality sector (Griffin, Sobal & Lyson, 2009; Quested, Parry, Eastel & Swannell, 2011).

Food waste has many negative environmental, social and economic impacts. For example, it was estimated that in 2007 the food that was produced for human consumption, but which went uneaten, occupied almost 1.4 billion hectares of land or approximately 30 percent of the world's agricultural land area (FAO, 2013). This practice devours land and resources that could otherwise be used to feed the world's poor (Stuart, 2009). Similarly, food waste contributes directly to global hunger because, when high-income countries

purchase food that goes uneaten, it creates a false demand, which subsequently increases the price of food (FAO, 2013; Stuart, 2009). At present, 868 million people are chronically under-nourished worldwide and with the global population predicted to reach 9.3 billion by 2050, and a projected increased food demand of 50-70% (Bond et al., 2013), these issues will only get worse. Moreover, food that is produced but not eaten occupies precious land contributing to the need for agricultural expansion. This expansion results in deforestation and the destruction of wild areas with the consequence of loss of wildlife habitat; it has been estimated that 9.7 million hectares of land globally are deforested each year to grow more food (FAO, 2013).

Food waste has further implications for water wastage as it has been estimated that 250 cubic kilometres of water are used in global agricultural production of food that is lost or wasted each year, an amount almost three times the volume of Lake Geneva (FAO, 2013). Food production is water intensive; for example, it has been estimated that it takes 15 thousand litres of water to produce one kilogram of beef (Mekonnen & Hoekstra, 2010); 160 litres to produce a 150-gram soy burger (Ercin, Aldaya & Hoekstra, 2011); and 122 litres of water to produce 1kg of apples (Institution of Mechanical Engineers, 2013). Worryingly, the rise in demand for water to grow food has contributed to the increasing scarcity of fresh water in many parts of the world (Hoekstra, Mekonnen, Chapagain, Mathews & Richter, 2012).

The negative impact of food waste does not just occur at the production stage but also at the end stage too. The disposal of food waste into landfills contributes to the release of gases, most notably methane a more potent greenhouse gas than carbon dioxide, with 34 times the global warming potential over 100 years (IPCC, Fifth Assessment Report, 2013). However, even if food waste was diverted from landfills and composted instead, this would

do little to make up for the wasted energy and resources that went into its production, transportation and storage.

Climate change has been described as the greatest collective challenge facing humankind (Ki-Moon, 2009), threatening global health (Costello et al., 2009), sustainable economic growth (Stern, 2006), natural eco-systems (Intergovernmental Panel on Climate Change [IPCC], 2007) and food security (Trade and Environment Review, 2013). Food waste is compounding the problem. In 2007 the global carbon footprint of food waste was calculated to be the equivalent of 3.3 gigatons of carbon dioxide (CO<sub>2</sub>) emissions (FAO, 2013).

### **UK Consumers**

In the UK, we throw away approximately 15 million tonnes of food every year, of which 7 million tonnes come from our homes. This food waste represents 19% of the food purchased for the home; 4.2 million tonnes (60%) of which could have been eaten had it been managed better (Waste Resource Action Plan [WRAP], 2013a). It has been estimated that avoidable food and drink waste in the UK is responsible for 17 million CO<sub>2</sub> equivalent tonnes of greenhouse gas emissions (WRAP, 2011; 2013a).

Buying food, not eating it and then throwing it away currently costs the average UK family with children an estimated £680 a year (WRAP, 2009a). This is an alarming statistic, especially considering the increase in the number of people in the UK who have turned to food banks to feed themselves and their families. It is estimated that more than 500,000 people in the UK are reliant on food aid (Cooper & Dumbleton, 2013).

## **Identifying key precursors and barriers to food waste and food waste reduction in the home**

It has been argued that minimising food waste is the best way to reduce the environmental impact of food waste, rather than focusing on food waste management, because the majority of the environmental impact occurs during production and supply rather than during disposal (Quested et al., 2011). However, encouraging the public to modify their household food waste behaviour is a major challenge for policy makers and intervention designers, not least because to date there has been a dearth of research that has looked to identify the key factors that motivate, enable or prevent household food waste minimisation behaviour. Furthermore, Quested, Marsh, Stunell and Parry (2013) have argued that predicting food waste is not a simple task, as there are multiple interacting behaviours that can influence whether or not food will go to waste.

### ***Qualitative research***

Qualitative studies are invaluable in social psychological research where little is known about the subject, as they represent an opportunity to gather information not anticipated by the researcher (William, 2007). This type of research also allows for an in-depth exploration of the key cognitions, emotions and behaviours underlying an issue. However, to date only two peer-reviewed studies have carried out qualitative research in the context of identifying important precursors to household food waste. The first qualitative study (Wansink, Brasel & Amjad, 2000) investigated people's motivations for purchasing grocery items that they subsequently failed to eat. A random sample of 423 US household purchasers were asked to locate one item that they had purchased at least six months prior, but not yet used. Using an open-ended paper questionnaire participants were

asked to describe why they had purchased the specific item, why they had not managed to use it and what they intended to do with the item now that it had been brought to their attention. Two researchers independently coded the responses. Results revealed that the majority of the items people reported buying and not using had been bought with the anticipation of a 'specific occasion' or 'specific recipe' in mind. However, as the occasion to use the product had failed to arise, many of the participants pushed the items to the back of the cupboard and forgot about them. Although this study provides valuable insight into why people may fail to consume specific items, which they had purchased, it does not tackle the range of issues that may influence household food waste behaviour.

More recently, Evans (2011, 2012) reported a sociological study that explored the processes and dynamics of the passage of household food from purchase to disposal. Nineteen households participated, recruited from two streets in the UK. The author spent eight months with the participants carrying out in-depth interviews in their homes, accompanying them on shopping trips and tracking individual items from their cupboards and fridge over time. Analysis of interview transcripts revealed that a key reason that food goes to waste is a consequence of the tension between perishable foods and the demands of providing for the home/family. In-depth interviews revealed a number of potentially important themes relating to how and why household food gets thrown away. Thus, the papers were structured around issues such as: 1) feeding the family, 2) eating 'properly', 3) the mismatch between the materiality (the short shelf life and packaging) of 'proper' food and the social-temporal demands of everyday life and 4) anxieties surrounding food safety and storage. Evans concluded that it is important not to perceive food waste as a matter of individuals making negative choices to engage in behaviours that lead to food waste, but to recognise the social and material contexts of food practices and to look beyond the



household for solutions.

This last study presents an interesting and informative perspective and provides invaluable insight into the role factors such as packaging and storage might play in influencing food waste. However, it is vital to tackle food waste from multiple levels including the household level. Evans' study lacked psychological insight to inform household food waste interventions, as the author did not address any potential motivations underpinning food waste reduction behaviour. Knowing more about people's food waste minimisation motivations (whether goal based, habitual or emotionally motivated) as well as their perceived capabilities, perceived opportunities and barriers to food waste minimisation practices is essential if effective interventions are to be designed. Therefore, the first empirical paper presented in Chapter 2 of this thesis aimed to address this gap in the literature. A qualitative study of household food purchasers' thoughts, feelings and experiences was carried out to uncover their food waste minimisation motivations, capabilities, opportunities and barriers.

### ***Quantitative research***

In addition to the qualitative studies discussed above, quantitative research has identified specific food management behaviours that can result in household food waste. Potential behaviours identified have included: buying and/or cooking too much, not planning meals in advance, failing to compile a shopping list, failing to carry out a food inventory before shopping, impulse purchases and not using the food in time (Brook Lyndhurst, 2007; Doron, 2012; Exodus, 2007; Parfitt, Barthel & Manaughton, 2010; Stefan, van Herpen, Tudoran & Lähteenmäki, 2013). However, there is little quantitative

research that has investigated the psychological mechanisms underpinning these behaviours.

Potential barriers to household food waste reduction have been reported, including the relatively low public awareness of the negative impact of household food waste (Brook Lyndhurst, 2007; WRAP, 2013a) the lack of awareness of one's own food waste contributions (Brook Lyndhurst, 2007; Doron, 2013; Exodus, 2007; Hamilton, Denniss & Baker, 2005; WRAP, 2013a), a belief that food waste is inevitable (de Coverly, McDonagh, O'Malley & Patterson, 2008; Exodus 2007), poor food quality or aesthetics (Van Garde, & Woodburn, 1987), fear of food poisoning (Exodus, 2007), lack of time (WRAP, 2013a), lack of perceived expense of waste (WRAP, 2013a), composting/using food waste collection (WRAP, 2013a) and a lack of food management knowledge and skills (Brook Lyndhurst, 2007; Exodus, 2007; WRAP, 2013a). According to a recent survey carried out by WRAP (2013a) the top cited motivations to reduce household food waste include: saving money (78%), managing an efficient home (70%), feelings of guilt (57%), reduced impact on the environment (48%) and food shortages elsewhere (39%).

### ***Theories of behaviour and behaviour change***

Research of the kind listed above represents an important first step in identifying some of the barriers and motivations to reducing household food waste. However, it has been argued that such investigations should be theory-driven, as theory can provide a framework from which causal processes can be identified and hence theory-based research can guide the development of effective, replicable and parsimonious interventions (Michie & Abraham, 2004; Michie et al., 2008; Steg & Vlek, 2009).

Deciding on the most appropriate theory to apply can be a difficult task as there are many to choose from, plus a large number of theories have shared or overlapping constructs (Michie et al., 2005). In a recent review, 83 theories of behaviour and behaviour change were identified, all offering potential insight into human behaviour from a range of disciplines (Michie, West, Campbell, Brown & Gainforth, 2014). Specifically there are a number of theories that have the potential to inform household food waste reduction interventions. Two such contenders are the norm-activation model (Schwartz, 1975) and the value-belief-norm theory (Stern et al., 1999) both of which describe pro-environmental behaviour as being guided by moral obligations to perform or refrain from a particular action and both theories have been successful at explaining a range of environmental behaviours (e.g. Nordlund & Garvill, 2003; Stern et al., 1999; Steg, Dreijerink & Abrahamse, 2005). A third potential theory is the focus theory of normative conduct (Cialdini, Kallgren & Reno, 1991), which focuses on how social norms influence behaviour and explains how behaviour may vary depending on (a) which norms are involved and (b) which norm is most salient at the time. The focus theory of normative conduct has been successfully demonstrated in a number of experimental studies about littering behaviour (e.g. Cialdini, Kallgren & Reno, 1991; Cialdini, Reno & Kallgren, 1991; Kallgren, Reno & Cialdini, 2000). However, it has been argued that normative perspectives such as those outlined above are best suited to explaining low-cost environmental behaviours and not as successful at explaining situations with high behavioural costs or strong constraints on behaviour (Steg & Vlek, 2009). This limitation might be due to the fact that some environmental-related behaviours are likely to be underpinned by multiple factors and not just normative concerns.

One theory that does take into consideration multiple factors in behaviour is Dittmar's (1992) theory on the meaning of material possessions, which has been utilised to explain car-use. Dittmar proposed that material goods do not just fulfill instrumental functions but they also have symbolic and affective functions. Steg (2005) found that car use was more strongly linked to affective (e.g. enjoyment of driving) and symbol functions (e.g. status and prestige) rather than instrumental functions (e.g. getting from A to B). It is plausible that such a theory may likewise help to explain why household food purchasers are motivated to have a surplus of food in their homes, ultimately resulting in food going to waste. However, over-purchasing is unlikely to be the only behaviour that contributes to household food waste. It seems likely that household food waste reduction is related to reasoned processes and issues such as financial and time constraints. It is also very likely that people's perceptions of control will influence their household food waste reduction behaviour. The theory of planned behaviour (Ajzen, 1988,1991) is an influential theory, which assumes that peoples' motivations to perform a particular behaviour (behavioural intentions) are dependent on weighing up the costs and benefits of carrying out the behaviour in question. Furthermore, the theory considers the individual's perceived ability to enact a behaviour and perceived evaluation by others if they were to engage in the behaviour.

Another theory which acknowledges that behaviour results from multiple motivations is goal-framing theory (Lindenberg & Steg, 2007). This theory suggests that goals direct how individuals perceive, evaluate and behave in situations. The theory distinguishes three types of goal frames: a hedonic goal-frame (goals that make you feel better in the short-term), which are said to be the strongest goals; a gain goal-frame (goals that protect or improve personal resources); and a normative goal-frame (goals that act in

line with social expectations) which are said to be the weakest goals of the three and dependent on external support. When one of the goal-frames becomes active it is said to direct an individual's attention and behaviour whilst the other two goal-frames are pushed into the background. Lindenberg and Steg argue that when background goals are compatible with the goal-frame it strengthens it, and if in conflict with the goal-frame they weaken it. Whilst goal-framing theory offers an interesting integrative perspective on environmental behaviour, at present there is limited evidence of its effectiveness and little is known about how multiple motivations will affect environmental behaviour (Steg & Vlek, 2009).

On reflection it was felt that the Theory of Planned Behaviour (Ajzen, 1988, 1991), was deemed the best framework from which to begin to investigate causal processes relating to household food waste reduction. Firstly, it is one of the most frequently cited and influential behavioural theories for the prediction of human social behaviour, including environmental behaviour. Secondly, it has the widest evidence base of all the theories listed above. Thirdly, the TPB considers a wide range of motivational factors. Finally, the TPB is a framework that has the potential for expansion, either through the inclusion of additional variables, or through interaction or moderation effects.

### **Theory of Planned Behaviour (TPB)**

According to the TPB, the most immediate determinant of behaviour is an individual's intention to perform that behaviour. Intention, in turn, is predicted by three components: attitude, subjective norm and perceived behavioural control. Attitude reflects the degree to which the performance of the behaviour is valued positively or negatively and is determined by a set of salient beliefs concerning the consequences of carrying out the

behaviour weighted by an evaluation of the importance of each of these consequences.

Subjective norms capture the perceived social pressure to either engage or not engage with the behaviour, and is underpinned by a set of beliefs concerning normative expectations of others and weighted by the person's motivation to comply with others. Perceived behavioural control is said to reflect an individual's appraisal of his/her ability to carry out the behaviour, underpinned by a set of beliefs about the occurrence of factors that may help or hinder his/her performance of the behaviour weighted by the perceived power to facilitate or inhibit behavioural performance.

Generally speaking the stronger the intention to perform a behaviour the greater the chance it will be performed. However, whether or not intention predicts behaviour depends, in part, on factors outside of individual control and therefore actual behavioural control can moderate the intention-behaviour relationship. The theory also suggests that, if there are barriers to action, then perceived behavioural control can be an independent predictor of behaviour, unmediated by intention.

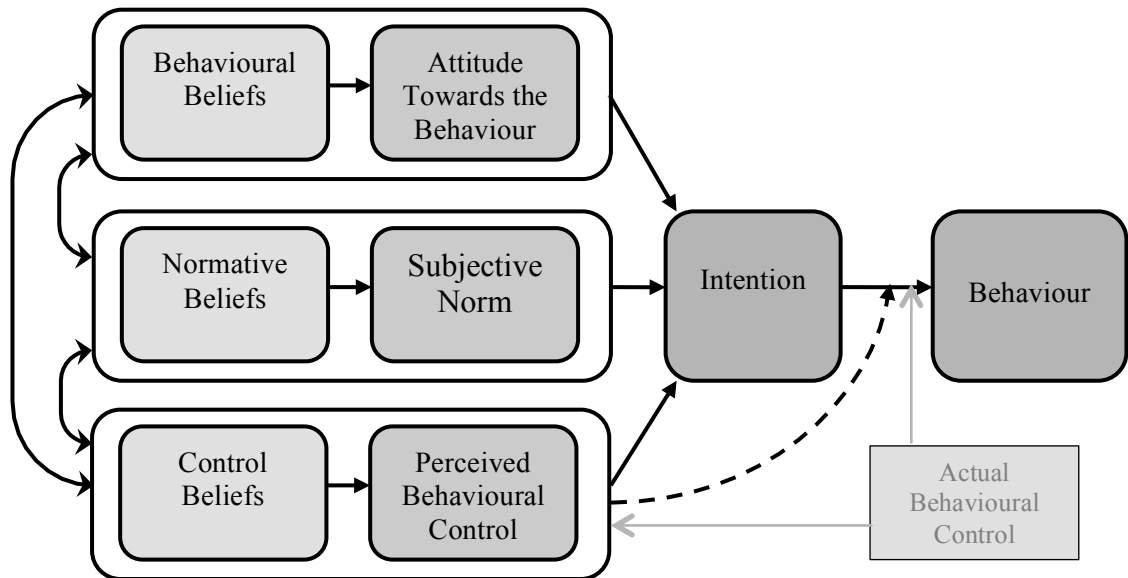


Figure 1: The Theory of Planned Behaviour (Source: Ajzen, 2006)

### ***Application of the theory of planned behaviour (TPB)***

The TPB has been applied to a wide variety of behaviours including, but not limited to: leisure choice (Ajzen & Driver, 1991), dishonest actions (Beck & Ajzen, 1991), condom use (Albarracín, Johnson, Fishbein, & Muellerleile, 2001), healthy eating (Conner, Norman & Bell, 2002), smoking cessation (Rise, Kovac, Kraft & Moan, 2008) and alcohol use and misuse (Marcoux & Shope, 1997). Indeed, meta-analyses support the ability of the TPB to predict intention and behaviour, with the variables of attitude, subjective norm and perceived behavioural control able to account for, on average, 39% of the variance in intention, while intention and perceived behavioural control are typically able to explain 27-28% of the variance in behaviour (Armitage & Conner, 2001; Sheeran, 2002).

### ***Applications of the TPB to environmental domains***

Within the environmental literature, the theory of planned behaviour has been applied to: travel mode choice (e.g. Bamberg, Ajzen & Schmidt, 2003; Gardner & Abraham, 2010), ecotourism (e.g. Chen & Tung, 2014; Han, Hsu, & Sheu, 2010), green activism (Fielding, McDonald & Louis, 2008), water conservation (Trumbo & O’Keefe, 2001), recycling (e.g. Boldero, 1995; Taylor & Todd, 1995) and sustainable food choices (for a review see; Han & Hansen, 2012). Findings have typically provided support for the assumptions underlying the TPB in that attitude, subjective norm and perceived behavioural control have been found to be significant predictors of intention. Furthermore, although it has been less frequently tested, there is some evidence that intention can contribute to the prediction of behaviour in environmental domains (e.g. Bamberg et al., 2003; Boldero, 1995; Gardner & Abraham, 2010). Moreover, in a meta-analysis (albeit not specifically restricted to the TPB papers) it was found that, on average, intention explained 27% of the variance in self-reported pro-environmental behaviours (Bamberg & Moser, 2007).

### ***The sufficiency of the TPB and additional predictors***

According to the TPB, attitude, subjective norm and perceived behavioural control should account for all or most of the meaningful variance in intention and any effect from other variables not accounted for in the model should be mediated by the theory’s core predictors (Fishbein & Ajzen, 2010). However, Ajzen (1991) stated that, in principle, the TPB is open to the inclusion of additional predictors, if they can account for a substantial proportion of the variance in intention or behaviour over and above the core TPB variables. Research on the TPB has made considerable progress since the theory was introduced and a



number of variables have been found to augment the predictive utility of the TPB including: anticipated regret (Van der Pligh & de Vries, 1998), belief salience (van der Pligh & de Vries, 1998), connectedness (Sparks, Hinds, Curnock & Pavey, 2014), descriptive norm (Rivis & Sheeran, 2003a), goal desires (Perugini & Conner, 2000), group norm (Terry & Hogg, 1996), impulsivity (Churchill, Jessop & Sparks, 2008), moral obligations (Beck & Ajzen, 1991), past behaviour (Abraham & Sheeran, 2003), personality traits (Courneya, Bobick & Schinke, 1999), prototype perception (Rivis & Sheeran, 2003b), reactance (Orbell & Hagger, 2006) and self-identity (Sparks & Shepherd, 1992).

Although it is acknowledged that there are a number of additional predictors that have the potential to augment the predictive utility of the TPB, these variables generally have not been applied within the environmental domain or to date have only a limited evidence-base. Therefore, for the sake of parsimony it was decided that it would be prudent to stick to the four additional constructs: (1) self-identity, (2) anticipated regret, (3) moral norms and (4) descriptive norms, as these variables have been widely investigated and have a strong evidence-base across several domains, including environmental-research.

### ***Self-Identity***

Self-identify has been considered as a potential variable to be incorporated into the TPB model. Self-identity is influenced not only by personal motivations, but offers insight into social influence (Styker & Burke, 2000; Tajfel & Turner, 1986). According to Rise, Sheeran and Hukkelberg (2010) self-identity refers to “salient and enduring aspects of one’s self-perception” (p. 1087) and it is typically operationalised in terms of the extent to which the individual sees themselves as the sort of person who would be willing to engage in the behaviour in question. A number of researchers have investigated the potential for

self-identity to contribute to the prediction of intention (e.g. Sparks & Shepherd, 1992). In a meta-analysis carried out to assess the role of self-identity in the TPB model it was found that self-identity explained, on average, an additional 9% of the variance in intention when past behaviour and the core TPB variables were controlled for (Rise et al., 2010).

Furthermore, research findings support the capacity of self-identity to significantly contribute to the prediction of intention in the context of environment-related behaviours (e.g. Fielding et al., 2008; Nigbur Lyons & Uzzell, 2010; Sparks & Shepherd, 1992; Terry, Hogg & White, 1999).

### ***Anticipated Regret***

It has been suggested that affect and emotions are not sufficiently accounted for in the TPB model (Van der Pligt & de Vries, 1998) and that anticipated regret can influence intention and behaviour over and above the core TPB variables (Abraham & Sheeran, 2003). Anticipated regret is a cognitive appraisal of how you imagine you will feel as a result of realising that an action or inaction has resulted in an unfavourable outcome (Conner & Sparks, 2005). In a meta-analysis of the TPB, Sandberg and Conner (2008) found that anticipated regret made a significant and unique contribution, explaining 7% of the variance in intention over and above the core TPB variables, whereas in another meta-analysis it was found that anticipated regret increased the variance in intention accounted for by 5% (Rivis, Sheeran, & Armitage, 2009). Anticipated regret has also been found to make an important contribution to the TPB model in the context of environment-related behaviours (e.g. Kaiser, 2006).

### ***Moral Norm***

Reviews of the TPB have highlighted the need for further investigation of normative influences on behaviour (e.g. Armitage & Conner, 2001; Godin & Kok, 1996). Empirical studies have shown that moral norm can increase the predictive utility of the TPB model (e.g. Beck & Ajzen, 1991; Manstead, 2000). Moral norm has been recommended for inclusion in the model when the behaviour has a moral or ethical dimension to it (Conner & Sparks, 2005), as moral norm relates to a person's perception of the moral correctness or incorrectness of a particular behaviour (Ajzen, 1991). In meta-analyses of extended TPB research, moral norm was found to explain, on average, an additional 4% (Conner & Armitage, 1998) and 3% (Rivis et al., 2009) of the variance in intention. Environment-related behaviours arguably have a strong moral element and, as such, it would seem prudent to include moral norm when investigating such behaviours. Indeed, in support of this contention, studies support the ability of moral norm to make a unique contribution to intention in the context of environment-related behaviours (e.g. Chan & Bishop, 2013; Largo-Wight, Bian & Lange, 2012).

### ***Descriptive norm***

The original TPB model considers only subjective norm as a social influence on behaviour. Subjective norm is determined by the individual's beliefs about whether other important people in their lives (e.g. friends, family) want them to carry-out a behaviour (Rivis & Sheeran, 2003a). However, the correlation between subjective norm and intention has often emerged as relatively weak compared to the correlation between attitude and intention and the perceived behavioural control and intention relationship (Hausenblas, Carron & Mack, 1997). Cialdini, Reno and Kallgren (1990) argued that there are in fact two

types of normative pressures that can be identified. First, there is the injunctive norm that relates to the individual's perception of pressure from other people to behave a certain way, and this pressure is captured in the subjective norm measure in the TPB. However, there is another social pressure, descriptive norm, which refers to an individual's perception of how significant others behave, and this type of norm has also been shown to influence people's behaviour (e.g. Goldstein, Cialdini & Griskevicius, 2008). A number of studies have included a measure of descriptive norm in the TPB model and found an independent influence on intention over and above the core variables (e.g. Conner & McMillan, 1999; Sheeran & Orbell, 1999). In a meta-analysis, descriptive norm increased the variance explained in intention by 5% over and above the core TPB constructs (Rivis & Sheeran, 2003a). Furthermore, descriptive norm has been shown to significantly add to the prediction of intention in the context of environment-related behaviours (e.g. Heath & Gifford, 2002; Largo-Wight et al., 2012; Nigbur et al., 2010).

### ***The TPB and household food waste***

The author is aware of only one published study that has applied the TPB to investigate household food waste. Stefan et al. (2013) examined the influence of the core TPB predictors on intention not to waste food among Romanian consumers. They found that only attitude predicted intention not to waste food; there was no evidence that subjective norm or perceived behavioural control influenced intention. However, there were several limitations to this study. The first limitation relates to behavioural incompatibility. The authors assessed cognitions in relation to several behaviours. For example, perceived behavioural control items related to the individual's ability to balance incoming food with household consumption, whereas intention items related to not wasting food. Measurement

compatibility represents an important prerequisite underpinning the predictive efficacy of the TPB (Ajzen, 1988; Fishbein & Ajzen, 2010). Thus, the cognitions and the behaviour should be compatible in terms of the target (e.g. food waste), the action (e.g. reduce), the context (e.g. at home) and the time (e.g. over the next seven days). Failure to meet this criterion may explain why the authors found no evidence that subjective norm and perceived behavioural control impacted upon intention, as they were not compatible with the intention measure. A second limitation to this study was that the authors did not consider whether additional empirically supported psychological constructs, such as self-identity, anticipated regret, moral norm and descriptive norm, could contribute to the prediction of food waste intention over and above the core TPB variables. Finally, the authors did not assess behaviour at follow-up and hence it was not possible to determine whether intention in turn impacted on behaviour, as specified by the model.

In light of the above, the aim of the second empirical paper, presented in Chapter 3 of this thesis, was to extend the findings of Stefan et al. (2013). The first aim was to explore whether all three core predictors of the TPB model would predict intention to reduce household food waste when Ajzen's (1988) principle of compatibility was met. The second aim was to explore whether additional constructs, namely, self-identity, anticipated regret, moral norm and descriptive norm, would contribute to the prediction of intention over and above the core TPB variables. Finally, the third aim was to see whether the TPB model could predict future household food waste reduction.

### **Self-affirmation theory**

As acknowledged earlier in this chapter the most effective way of decreasing the negative environmental consequences of household food waste, in high-income countries,

is to encourage people to reduce the amount they throw away. One widely applied method used in behaviour change interventions is to provide people with threatening information (Peters, Ruiter & Kok, 2013a). Messages that inform people of the consequences of their actions are widely believed to influence attitude change and hence increase motivation to change behaviour, a hypothesis supported by the theory of planned behaviour (Ajzen, 1991), social cognitive theory (Bandura, 1986) and the Information-Motivation-Behavioural Skills model (Fisher & Fisher, 1992). Similarly, providing information about behavioural risks is a behaviour change technique supported by the Information-Motivation-Behavioural Skills model (Fisher & Fisher, 1992).

However, in practice, messages designed to confront people with the negative consequences of their behaviour have frequently been shown to be ineffective in the absence of high self-efficacy (e.g. Peters, Ruiter & Kok, 2013b) which is a term used to describe “people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives” (Bandura, 1994, p. 81). Moreover, it has been suggested that such threatening information can lead to defensive responses, in both health and environmental domains (e.g. Freeman, Hennessy, & Marzullo, 2001; Kunda, 1990; Stoll-Kleemann, O’Riordan & Jaeger, 2001).

Self-affirmation theory (Steele, 1988) is a theoretical perspective put forward to explain why people may respond defensively when confronted with personally relevant threatening events or information. Self-affirmation theory contends that people have a flexible self-system that is driven by the need to maintain their self-integrity, and protect the belief that they are “adaptively and morally adequate” (Steele, 1988, p. 262). Therefore, messages that highlight that a person’s actions are not consistent with this positive view of the self can threaten his/her positive global self-image as they imply personal inadequacy.

One way in which people protect themselves from messages that call into question the positive image they have of themselves is to respond defensively.

In a review on defensive reactions to health-promoting information van 't Riet and Ruiter (2013) discussed four distinct and prevalent defensive strategies people use when faced with messages or situations that confront them with the reality that they are behaving in a way which contradicts their own valued standards. The four main defensive strategies examined were: (1) avoidance, which is when a person ignores the threat; (2) suppression of the negative emotions from conscious awareness; (3) denial of the existence or of the implications of the threat; and (4) cognitive reappraisal, which is when an individual accepts the threat and the consequences of the threat to be true, but additional beliefs are adopted which help to view the consequences in a less emotionally threatening way. Although defensive biases, such as those listed above, may be effective at protecting the individual from the threat to self-integrity this is often at the expense of long-term benefits, as defensive responses can act as a barrier to adaptive change, leaving the individual vulnerable (Cohen & Sherman, 2014).

### ***Self-affirmation techniques***

Critically, self-affirmation theory offers an alternative strategy to help maintain global self-integrity, without the need to respond defensively to the threat. Self-affirmation is a relatively simple technique where individuals are given the opportunity to reflect on a personal and cherished value, action or attribute that typically does not address the area of the relevant threat, but taps into a valued identity (Sherman, 2013). The most commonly used self-affirmation technique is a value affirmation (Cohen & Sherman, 2014). Typically, the experimental manipulation involves participants picking their most important value

from a list. They are then asked to write about the value and why it is important to them. Participants in the control condition carry out a relatively analogous exercise as they are asked to pick their least important value from the list and write about why that value might be important to someone else.

Sherman (2013) proposed that the changes that occur as a result of value-based self-affirmations are down to three psychological changes. The first is that a self-affirmation boosts the psychological resources a person has to cope with the threat, thus helps to counteract ego depletion, which is a term “coined to refer to the state of diminished resources following exertion of self-control...” (Baumeister, Vohs & Tice, 2007, p. 352). The second is that a self-affirmation widens the perspective with which people view information and events in their lives and their resources to cope, by allowing them to take a step back and gain perspective on what is truly important, and the third is that a self-affirmation can lead to an “uncoupling of the self and the threat”(Sherman, 2013 p. 839), thus reducing the impact the stress or threat has on the self.

### ***Self-affirmation as a coping strategy***

Bolstering self-integrity by self-affirming has been found to be an effective coping strategy (Cohen & Sherman, 2014). Self-affirmation can buffer people from everyday psychological stressors, which call into question people’s ability to adequately adapt (Sherman & Cohen, 2006). Self-affirmation has been successful at buffering against the stress of *academic threats* (Creswell, Dutcher, Klein, Harris, & Levine, 2013; Sherman, Bunyan, Creswell, & Jaremka, 2009; Sherman et al., 2013), *social and political conflict* (Binning, Sherman, Cohen & Heitland, 2010; Čehajić-Clancy, Effron, Halperin, Liberman



& Ross, 2011; Cohen et al., 2007; Stone, Whitehead, Schmader, Focella, 2011; Ward, Atkins, Lepper & Ross, 2011) and issues with *interpersonal relationships* (Jaremka, Bunyan, Collins & Sherman, 2011; Stinson, Logel, Shepherd, Zanna, 2011).

### ***Reducing defensive responses to health threats***

However, of more relevance to the aims of the thesis, is a growing body of literature that shows that self-affirmation can reduce defensive responses to threatening health risk information. It is assumed that people can be biased in their evaluation of threatening health risk information because being a ‘healthy person’ is an important part of how people see themselves and they are motivated to protect this positive view of the self (Sherman & Cohen, 2006). By extension, it is predicted that being self-affirmed should facilitate more open-minded processing of information that highlights the negative consequences of health-related behaviour. Reviews of the literature broadly support the hypothesis that self-affirmation will result in reduced defensive processing of threatening health information (Aronson, Cohen & Nail, 1999; Cohen & Sherman, 2014; Harris & Epton, 2009; Harris, 2011; McQueen & Klein, 2006; Sherman & Cohen, 2006). For example, self-affirmed participants have been shown to report more positive intentions towards reducing alcohol consumption (Harris & Napper, 2005; Scott, Brown, Phair, Westland & Schüz, 2013), increased perceived control, self-efficacy and intentions to reduce cigarette consumption (Armitage, Harris, Hepton & Napper, 2008; Harris, Mayle, Mabbott & Napper, 2007), greater levels of response-efficacy and self-efficacy in regard to increasing fruit and vegetable consumption (Epton & Harris, 2008), and more positive attitudes, intentions, self-efficacy and response-efficacy, along with reduced message derogation, in relation to sunscreen use (Jessop, Simmonds, & Sparks, 2009). Moreover, at least within the domain

of health research, findings suggest that self-affirmation is most effective for at-risk groups (Harris & Epton, 2010).

There is also some evidence that self-affirmation can precipitate behaviour change. Thus self-affirmation manipulations have been shown to result in positive behavioural effects within the experimental setting. For example, individuals have been shown to be more likely to purchase condoms (Sherman, Nelson & Steele, 2000), or request a free sample of sunscreen (Jessop et al., 2009). Furthermore, some studies suggest that a self-affirmation manipulation can also influence behaviour in the longer-term (e.g. Armitage, Harris & Arden, 2011; Cook, Trebaczyk, Harris & Wright, 2014; Epton & Harris, 2008; Logel & Cohen, 2011; Scott et al., 2013).

### ***Reducing defensiveness to environmental threats***

Although there is ample evidence to support the premise that self-affirmation can increase acceptance of threatening health information, there is a relative lack of research investigating whether self-affirmation can promote more openness to threatening environment-related information. Hypothetically, it is reasonable to assume that messages that highlight the negative consequences of one's behaviour for the environment may similarly arouse psychological threat, as studies show that the majority of people in the UK value the global environment (e.g. Defra, 2007). As such, information that details how their behaviour might threaten global health, food security and the environment would most likely call into question a view of themselves as a moral, competent, rational individuals and hence pose a threat to their self-integrity. Therefore, by extension, self-affirmation techniques might also be efficacious at reducing defensive responses to messages that highlight the detrimental impacts of human behaviours for the environment.

Recently, two published papers have reported studies that have investigated the potential for self-affirmation to increase openness to messages about anthropogenic climate change (i.e. messages that highlight that climate change results from, or is produced by, human beings). Sparks, Jessop, Chapman and Holmes (2010, Study 1) found that participants who completed a self-affirmation manipulation, prior to or after reading information about the threat posed by climate change and how human activity contributes to climate change, reported less denial and greater personal involvement with regard to mitigating the consequences of climate change.

Similarly, Van Prooijen and Sparks (2014) demonstrated that self-affirmed participants reported greater acceptance of climate change risks after reading messages about the threat of anthropogenic climate change. Additionally, self-affirmed participants who had initially indicated that they were relatively sceptical about anthropogenic climate change reported heightened individual efficacy with regard to reducing such climate change risks.

Notwithstanding these initial positive findings, only one published study has directly explored whether self-affirmation can render people more open to information detailing the negative consequences of a specific behaviour for the environment (Sparks et al., 2010; Study 2). Sparks et al. found that self-affirmed “low-recyclers” had a greater intention to increase the amount they recycled after reading messages about (a) the environmental costs of failing to recycle and (b) the benefits and relative ease of recycling, compared to “low-recyclers” who had not been self-affirmed. This preliminary study provides evidence that a self-affirmation manipulation has the potential to increase motivation to engage in a pro-environmental behaviour.

Despite showing great promise, Sparks et al.'s (2010; Study 2) study was subject to a number of limitations. First, the authors reported the effects of self-affirmation on only two cognitive antecedents of behaviour change: attitude and intention. However, as discussed earlier in this chapter, an extended TPB model (Ajzen, 1988; 1991) would identify a number of additional predictors of intention and behaviour, including: subjective norm, perceived behavioural control, self-identity, anticipated regret, moral norm and descriptive norm (Conner & Sparks, 2005; Ravis & Sheeran, 2003a). Second, Sparks et al. did not explore whether intention translated into behaviour; that is, they did not measure whether self-affirmed “low-recyclers” increased their recycling at follow-up compared to “low-recyclers” who had not been self-affirmed.

### ***Household food waste and defensive responses***

Although in its infancy, the research discussed above does appear to support the idea that self-affirmation may hold promise in terms of rendering people more open to messages (a) detailing the negative consequences of anthropogenic climate change and (b) outlining the negative consequences of specific behaviours for the environment, such as recycling. However, despite the fact that food waste has many negative environmental impacts, including contributing to climate change, the preliminary household food waste research, discussed earlier in this chapter, fails to show that a concern for climate change, or a concern for the environment is a rationale that strongly underpins household food waste reduction. Instead, the research indicates that people offer many personal justifications for their household food waste behaviour such as: time constraints; pressure to feed the family and eat healthily; a belief that food waste is inevitable; poor food quality and aesthetics; and a fear of food poisoning (e.g. de Coverly et al., 2008; Evan, 2011, 2012;

Exodus, 2007; Van Garde, & Woodburn, 1987; WRAP, 2013a). Hence, it is plausible that people may respond defensively to messages that call into question their household food waste behaviour even if they do not strongly associate this behaviour with the negative consequences of climate change.

Therefore, the remainder of the experimental work reported in this thesis is dedicated to exploring the potential for self-affirmation to increase openness to a message detailing the facts about household food waste, not only highlighting the negative consequences of household food waste for the environment but also detailing the negative consequences of household food waste for the individual.

Specifically, Chapter 4 presents a study which tested whether a value-based self-affirmation manipulation would result in more openness to such a message, as reflected in more positive cognitions regarding reducing ones food waste and a change in food waste behaviour at follow-up. The study presented in Chapter 5 reports a replication and an extension of this study; specifically it additionally investigates whether a brief value-based self-affirmation manipulation could be integrated into the household food waste message to positive effect.

### **Fruit and vegetable waste**

In the empirical studies reported in Chapters 3, 4 and 5 a decision was made to focus on household fruit and vegetable waste, rather than generic food waste, for several reasons. The first was because fresh fruit, vegetables and salad make up the greatest overall share of household food waste out of all the food groups (WRAP, 2013a). According to WRAP (2008), 359,000 tonnes of potatoes go to waste each year in the UK, 177,400 tonnes (49%) of which are thrown away whole and untouched. We also throw away 190,000

tonnes of apples, of which 178,800 tonnes (94%) are thrown away whole and untouched. The worst culprit is salad, with 45% of all that is purchased by weight ending up in the bin. Furthermore, with a heavy reliance on energy intensive heated greenhouses, refrigeration and transportation (Garnett, 2008), fruit and vegetable waste reduction represents an important and worthwhile target. Second, there is the added benefit of encouraging increased consumption of fruit and vegetables, since eating 400 grams or more of fruit and vegetables a day is associated with reduced risk of diseases (World Health Organization [WHO], 2003). Finally, it was hypothesised that reducing fruit and vegetable waste might be a relatively straightforward goal to achieve, as increased consumption does not necessarily require as much skill, knowledge or effort in preparation, compared to other food groups, such as meats.

### **Overview of the Current Programme of Research**

The programme of research presented in this thesis looked at household food waste from a social psychological perspective and had two key objectives. The first was to determine the antecedents of household food waste reduction and barriers to change among UK household food purchasers. Accordingly, the study reported in Chapter 2 was designed to qualitatively explore UK household food purchasers' thoughts, feelings and experiences relating to household food management and disposal as a means to identify the core motives and barriers to household food waste reduction. The study reported in Chapter 3 tested the utility of applying an extended theory of planned behaviour (TPB) model to predict household fruit and vegetable waste reduction intention and behaviour.

The second aim of the thesis was to explore whether self-affirmation might represent a useful technique to increase openness to a message that detailed the negative

consequences of household food waste and hence promote motivation to decrease food waste. Thus, the study presented in Chapter 4 explored whether a value-based self-affirmation manipulation would result in individuals reporting more positive cognitions towards reducing their household food waste and being more likely to reduce their household food waste at follow-up, compared to their non-affirmed counterparts. Chapter 5 furthered this line of enquiry by replicating the study reported in Chapter 4, using a non-student sample. It also extended the study by exploring whether a brief value-based self-affirmation manipulation, integrated into the food waste message, would similarly be effective at promoting openness.

The implications of the findings of the current programme of research for household food waste reduction and theoretical development are discussed in Chapter 6 together with limitations and suggestions for future research directions.

## **CHAPTER 2. MOTIVATIONS TO MINIMISE HOUSEHOLD FOOD WASTE AND BARRIERS TO CHANGE: A QUALITATIVE ANALYSIS.**

### **Abstract**

The amount of food thrown away by UK households is substantial and, to a large extent, avoidable. Furthermore, such food waste has serious environmental consequences. If household food waste reduction initiatives are to be successful they will need to be informed by people's motivations and barriers to minimising household food waste. This paper reports a qualitative study of the thoughts, feelings and experiences of 15 UK household food purchasers, based on semi-structured interviews. Two core categories of motives to minimise household food waste were identified: 1) pragmatic concerns and 2) doing the 'right' thing. A third core category illustrated the importance of food management skills in empowering people to keep household food waste to a minimum. Four core categories of barriers to minimising food waste were also identified: 1) A 'good' provider identity; 2) Minimising inconvenience; 3) Lack of priority; and 4) Exemption of responsibility. The wish to avoid experiencing negative emotions (such as guilt, frustration, annoyance, embarrassment or regret) underpinned both the motivations and the barriers to minimising food waste. Findings thus reveal potentially conflicting personal goals, which may hinder existing food waste reduction attempts.



## **Introduction**

It has been estimated that each year, one-third of the edible parts of food, destined for human consumption, is lost or wasted globally (Gustavsson, Cederberg, Sonesson, van Otterdijk, & Meybeck, 2011). Much of the waste that comes from high-income countries has been attributed to poor marketing practices and consumer behaviour, with consumers being singled out as being the biggest contributors over and above food manufacturing, distribution, grocery retail and the hospitality sectors (Griffin, Sobal & Lyson, 2009; Quested, Parry, Eastal & Swannell, 2011). In the UK alone it has been estimated that households generate 7 million tonnes of food waste a year, most of which is thought to be avoidable (Waste and Resource Action Programme [WRAP], 2011), despite research suggesting that consumers have a distaste of wasted utility (Bolton & Alba, 2012). Although the figure in the UK has dropped significantly from the previous estimate of 8.3 million tonnes in 2006/07, household food waste remains an alarming problem and there is still much room for improvement.

There are many serious negative consequences of household food waste. Firstly, it has a social impact as it contributes towards increases in global food prices, making food less accessible for the poorest as well as increasing the number of malnourished people both in developed and developing countries (Stuart, 2009). Secondly, it has an economic impact: buying food, not eating it and then throwing it away currently costs the average UK family an estimated £680 a year (WRAP, 2011). Thirdly, the production and supply of food which is subsequently wasted has a number of environmental costs: according to the Food and Agriculture Organization of the United Nations (FAO, 2013), food waste contributes to the demand for agricultural land, placing increased pressure on the world's already dwindling forests. Food waste further has implications for water wastage. For

example, it has been estimated that in the UK 6.2 billion cubic metres of water per year is wasted producing food that is then thrown away - the equivalent of 243 litres of water per person per day (Chapagain & James, 2011). Furthermore, the disposal of biodegradable waste into landfills contributes to the release of gases, most notably methane a more potent greenhouse gas than carbon dioxide, with 34 times the global warming potential over 100 years. (IPCC, Fifth Assessment Report, 2013). In summary, according to WRAP (2011; 2013a), greenhouse gas emissions of approximately 17 million CO<sub>2</sub> equivalent tonnes are associated with the manufacture, distribution, storage, use and disposal of edible food and drink that is wasted in the UK.

Despite the obvious imperative for research to identify key factors that motivate, enable or prevent household food waste minimisation behaviour, little research to date has directly addressed this objective. Studies that have concentrated explicitly on household food waste have primarily focussed on identifying what food is most likely to be thrown away (WRAP, 2009a, 2009b, 2012), who is most likely to throw food away (Brook Lyndhurst, 2007; Doron, 2012; Koivupuro et al., 2012; WRAP, 2009a), and how people feel about food waste. For example, Brook Lyndhurst (2007) identified the top three concerns people had about food waste to be: 1) that it's seen as a waste of money; 2) that it's seen as a waste of good food; and 3) that it makes them feel guilty. More recently Doron (2013) has also identified environmental concerns as a further category of concern about food waste; however WRAP have concluded that environmental concern is not a key concern at present (Quested, Marsh, Stunell & Parry, 2013).

Whilst such research questions are doubtless important, they don't address the question of why food gets wasted. Some research has attempted to identify the specific behaviours that result in household food waste. Potential behaviours identified have

included: buying and/or cooking too much, not planning meals in advance, failing to compile or comply with a shopping list, failing to carry out a food inventory before shopping, impulse purchases, and throwing away food that has passed its sell-by-date (Brook Lyndhurst, 2007; Doron, 2012; Exodus, 2007; Parfitt, Barthel & Manaughton, 2010; Stefan, van Herpen, Tudoran & Lähteenmäki, 2013). Research has also highlighted a relatively low public awareness of the negative impact of household food waste (Brook Lyndhurst, 2007; Quested et al., 2011; Quested et al., 2013) and a lack of awareness of one's own food waste contributions (Brook Lyndhurst, 2007; Doron, 2013; Exodus, 2007; Hamilton, Denniss & Baker, 2005). However, most of the research addressing these issues has used methodologies that entail people being given closed-ended questions followed by a series of possible responses. These methodologies have limitations as they impose responses on the participant and don't give them the opportunity to voice their own views about a particular phenomenon. Qualitative research methodologies can overcome these limitations as they allow for the researcher to explore and therefore better understand complex phenomena without imposing limitations (William, 2007).

To date only two published peer-reviewed studies have attempted to elicit participant beliefs about household food waste using qualitative methods. Wansink, Brasel and Amjad (2000) investigated people's motivations for purchasing grocery items that they subsequently failed to use. A random sample of 423 US household purchasers were asked to locate one item that they had purchased at least six months prior but had as yet not used. They were then asked in an open-ended questionnaire to explain why they had purchased the specific item, why they had not managed to use it and what they intended to do with the item now that it had been brought to their attention. Results revealed that the majority of the items people reported buying and not using had been bought with the anticipation of a

‘specific occasion’ or ‘specific recipe’ in mind. However, as the occasion to use the product had failed to arise, many of the participants reported that they had forgotten about the item and - now it had been brought to their attention - they intended to throw it away. Although this study provides valuable insight into why people may fail to use specific items of food, which they had purchased, it does not tap the range of factors that may influence household food waste behaviour.

More recently, Evans (2011, 2012) carried out a sociological exploration of food practices in 19 households in the UK. In-depth interviews revealed a number of potentially important themes relating to how and why household food gets thrown away. The papers were structured around issues such as: 1) feeding the family; 2) eating ‘properly’; 3) the mismatch between the materiality (its short shelf life and packaging) of ‘proper’ food and how this interacts with the social-temporal demands of everyday life; and 4) anxieties surrounding food safety and storage. Evans concluded that household food waste is not a consequence of individual’s thoughtlessness but rather a result of the social and material conditions in which food is provided and he suggested that interventions and policy should target these conditions rather than the individual, if household food waste is to be reduced.

Although the themes uncovered in these studies represent an important starting point there is still a lack of understanding of the nature of household food waste minimisation behaviour. Knowing more about people’s food waste minimisation motivations (whether goal based, habitual or emotionally motivated) as well as their perceived capabilities to minimise food waste and perceived opportunities or barriers to food waste minimisation practices is essential if effective interventions are to be designed. Accordingly, the aim of the current study was to directly address this gap in the literature.

## Method

### *Participants and Sampling procedures*

Participants ( $N = 15$ ) from thirteen households were recruited from the South of England, through a UK University online recruitment database. The database comprised of students and non-students who had expressed a willingness to participate in research in exchange for course credits or a small fee. An “illustrative sampling” method was employed (Turrentine & Kurani, 2007) to generate a sample representing a mix of characteristics. The sampling frame was defined by: 1) age (18-29 years/30-49 years/50+ years), and 2) household size (e.g. family/couple/single). Recruitment of participants was supplemented using opportunity sampling when it was not possible to recruit a mix of characteristics/demographics from the database alone. In order to take part in the current study, participants had to be aged eighteen or over and have sole or joint responsibility for household food purchasing. Accordingly, one or two participants per household could be eligible for inclusion. When two members of a household wished to be included in the study they were interviewed together. Fifteen interviews were conducted, as it was at this point that saturation was reached. Participant characteristics are summarised in Table 1.

Table 1. Household members demographics

Participant No. <sup>a</sup>	Gender	Household size <sup>b</sup>	Age	Location	Income <sup>c</sup>	Education level
P1	F	Couple	31	City	21,000-40,000	Graduate or above
P2	F	Family (1parent/2 children)	39	Suburban	21,000-40,000	Graduate or above
P3	F	Single/lives alone	24	Suburban	20,000 or less	Graduate or above
P4	F	Single/shared flat	21	City	20,000 or less	A levels or equivalent
P5	M	Couple/shared house	21	City	20,000 or less	A levels or equivalent
P6	F	Family (2 parent and 2 children)	43	Rural	71,000-100,000	A levels or equivalent
P7	F	Couple	26	Rural	41,000-70,000	Graduate or above
P8a/b	M/F	Family (2 parents and 3 children)	55/49	City	21,000-40,000	A levels or equivalent
P9a/b	F/M	Couple	72/74	Rural	21,000-40,000	A levels or equivalent
P10	M	Family (2 parent and 2 children)	41	City	41,000-70,000	Graduate or above
P11	F	Single and lives alone	75	Rural	20,000 or less	GCSE or equivalent
P12	M	Single and lives alone	34	City	41,000-70,000	Graduate or above
P13	F	Family (2 parent and 3 children)	38	City	41,000-70,000	GCSE or equivalent

<sup>a</sup> Four of the fifteen participants came from two rather than four separate households (see 8a/b and 9a/b)

<sup>b</sup> 'Couple' refers to married or unmarried partners.

<sup>c</sup> Income relates to pooled income for those living as a couple or in a family, but individual income for all others.

### ***Interview Procedure***

The participants were invited to take part in a study about various topics on food. The interviews were carried out between May and August 2011 at the researcher's office or home, or at the home of the participant. Before the interview commenced, participants were required to read a study information sheet, which contained information on the study procedure, confidentiality and the right to withdraw. If the participants were happy to continue they were asked to sign a consent form and were told that they would receive £10 at the end of the interview.

The interviews were semi-structured, with the interviewer asking participants questions regarding their thoughts and feelings about household food purchasing, choices, preparation, as well as their thoughts and feelings about throwing food away and reducing food waste (Appendix A).

The pre-prepared interview questions were used only as a guide or to elicit further discussion of salient topic areas, if and when appropriate. The interviews lasted 45 minutes on average, and were recorded (with permission) and transcribed verbatim. At the end of the interview participants were asked to fill in a short demographic questionnaire (Appendix B), before being paid £10 for their participation.

### ***Thematic analysis using Grounded Theory procedures***

Interview transcripts were coded using grounded theory analytical procedures to identify thematic categories underpinning consumers' beliefs, emotions and behaviours with regards to household food waste. Transcripts were read and reread. Initial 'open' coding was undertaken to assign initial conceptual labels to the text, and these labels were refined as new insights emerged. Secondary 'axial' coding involved making connections between concepts and organising these into higher-order categories/themes.

Further ‘selective’ coding generated an understanding of how the core thematic categories were interrelated (Strauss & Corbin, 1998). Throughout the analytic process the ‘constant comparison’ method was used (Glaser & Strauss, 1967). New instances in the data were compared to the data already assigned to codes and when similar conceptual labels were assigned these too were compared so as to assess consistency, develop understanding of the core meaning of each concept and to help refine the labels attached to these concepts.

The intention was not to construct a comprehensive theory but instead to carry out a thematic analysis of the content at each coding stage. Therefore the term grounded theory refers only to a defined set of coding procedures and this methodology has been successfully applied to several studies, for example, commuters’ reasons for car-use (Gardner & Abraham, 2007) and mainstream consumers’ responses to and evaluations of plug-in battery-electric cars (Graham-Rowe et al., 2012).

## **Results**

Coding procedures identified seven overarching categories that arose independently from the interview schedule. Two of these categories represented motivations to minimise food waste. These were: 1) pragmatic concerns and 2) doing the ‘right’ thing. A third category (food management) illustrated the importance of food management skills in empowering people to keep household food waste to a minimum. The remaining four categories represented barriers to minimising food waste in the home. The first two of these represented motivations to over-purchase: (4) being a ‘good’ provider; (5) minimising inconvenience, while the last two represented both a lack of perceived social pressure prompting behaviour change and a perceived lack of physical opportunity to engage in food waste minimisation practices: (6) lack of priority



and (7) exemption from responsibility. These seven categories are described below and illustrative quotes are provided.

### ***Pragmatic concerns***

One of the main motivations to minimise household food waste was the desire not to waste money. Unsurprisingly most of the household food purchasers in this study thought that food waste was a waste of money, (*“but to me it’s a waste of money. If there is food there I’ll eat it, you know” P5*) and financial concerns were often seen as more significant than other concerns.

*“... it’s not for any obvious reason like oh those poor starving children, I’d like to say that but it’s not actually...I just think it’s just such a waste of money really to be throwing stuff away because you’ve already paid for it and now you’re getting nothing back for it quite frankly...” (P11)*

The thought of the money they had wasted (as a consequence of discarding food that they had paid for) resulted in some of the household food purchasers experiencing negative feelings.

*“It does annoy me. It annoys me more now, recently, my habit. I’ve just thought it’s just a waste of money. Because you go out to earn don’t you? You work and then you get paid and you’ve only got a finite amount of resources. I now see that if I throw away twenty pounds worth of food a week, that’s... I had to work to earn that twenty pounds, sit behind a desk or drive a car or whatever I’m doing at work.” (P12)*

Indeed a few of the household food purchasers indicated that a decrease in disposable income or a lifestyle change had resulted in them having to adapt their food waste attitude and behaviours to become less frivolous with food.

*“I think it’s more of a recent thing, I think it’s also to do with money because I’m a student. It’s just seems that if you throw away food it’s like you’re wasting your own money whereas before [when I lived at home] like you’re not buying it and you don’t really care to be honest, you don’t really think about how much it cost.” (P3)*

The household food purchasers who had financial constraints felt that behaving ‘frugally’ (when it came to shopping for food and cooking) was fundamental to avoiding waste. This included avoiding over-purchasing food (*“I don’t buy as much so our freezer is never full”* P9a) even if it meant compromising on variety and choice. Using the food that they already had at home before purchasing more food appeared to be a key technique used by some of the household food purchasers to keep food waste, and therefore food cost, to a minimum.

*“ [left-over meals] usually gets put in the fridge for [my husband’s] lunch the next day. Actually anything for our main meals if there is anything leftover he will take it to work the next day for lunch... It’s cheaper because then he’s not eating out at work. If we don’t have any left-overs he will make pack lunches from what we’ve got left.” (P13)*

Another motivation to keep food waste to a minimum came from a concern of wasted utility, in so much as some of the household food purchasers felt that to throw food away, rather than eat it, meant that the food had not fulfilled its purpose.

*“It’s not necessarily that it’s a financial waste of money it’s just I think that it’s a waste of food and I think I’m quite a realistic meat eater in that I think that you know if you’re going to kill an animal to eat then utilise it thoroughly....” (P2)*

### ***Doing the ‘right’ thing***

A second, yet strongly linked, motivation for minimising household food waste related to the desire to do the ‘right’ thing. Many of the household food purchasers talked about food waste being ‘wrong’, for a variety of reasons.

For some of the household food purchasers, this stance was felt to be irrespective of their personal financial situations.

*“If money wasn’t an object ... I still wouldn’t waste food, that’s more of an ethical stance... I think people can be incredibly wasteful with food and there’s no need to be.” (P5)*

The motivation to behave appropriately did not originate from the same place for everyone. Some household food purchasers described how this viewpoint had come from a time in social history when waste was generally not tolerated, possible or affordable whilst others had adopted this viewpoint from friends and family.

*“Well I think I grew up with the ethos of you know my mother never used to waste anything, she couldn’t afford to. So I still have that...” (P8a)*

However, others indicated that their motivation was a more recent development resulting from their becoming increasingly aware of the negative environmental and social repercussions of food waste. Consequently they often felt bad when their behaviour resulted in food going to waste.

*“I think that my consciousness is definitely changing. I don’t know if it is an age thing, I have great anxiety about the way we live and on an individual level I am thinking much more consciously about everything I do in my household.” (P2)*

The motivation to do ‘the right thing’ and reduce feelings or worry about the future was also expressed as a motivating emotion to keep food waste to a minimum.

*“I worry about it [food waste] on a bigger scale, more globally. Because you know we are the generation that has bequeathed our children disaster. That our generation profligate and used up the world’s resources and now everything is running out... so I do take on board being very careful about not wasting food. (P8b)*

### ***Food management***

Food management was mentioned by many of the household food purchasers as a factor that can facilitate the minimisation of household food waste. The people who felt that they had food management skills and knowledge often described how they cooked meals in batches and stored them in the fridge or freezer ready for another day. This allowed them to cook the food whilst the ingredients were still fresh and to use their time wisely and cook when they were less busy therefore avoiding the possibility of food going to waste due to time constraints.

*“And I normally cook up big batches of stuff so I’ll cook up like chilli and then freeze it, and have that over, you know, the next few days with other things I have frozen previously.” (P5)*

It was apparent for some that their experience and knowledge of food management allowed them to plan in advance.

*“I plan ahead, so when I sit and do my on-line shopping I’ve got an idea of what I’ll be cooking or what I’ll be using, so I don’t tend to have a lot of waste.”(P13)*

Having the knowledge and awareness that food left over from previous meals

could be re-created into a different dish was viewed as a helpful way to make sure food didn't go to waste.

*"I usually do a roast chicken on a Saturday or Sunday, and then have that again on Monday with sort of roast vegetables again and use the carcass to make a stock to make a soup or something."* (P2)

Knowledge about food storage, food hygiene safety and an understanding of use-by/sell-by/best-before dates were also seen as an important tool to help avoid unnecessary food waste. Having confidence in food management was said to dissipate some of the fears of getting ill or giving oneself food poisoning.

*"See I am not fearful even if the steak has gone brown, it's fine. The thing is if you open up the thing and the thing stinks then you know that it's gone off. No smell it's fine. But that is, there is a lot of fear with food 'oh god you mustn't eat anything past its sell-by date.'"* (P8b)

Food management skills had been taught directly (*"I think that comes from working in kitchens as a teenager."* P4), were assimilated through the imitation of important people in their lives (*"I think it just came from seeing my parents do it. Seeing them cut the mould off the cheese and throw out the top slice of bread when it's gone blue..."* P4), or were self-taught (*"... it definitely wasn't like this when I first started staying at home, [I] probably wasted a lot more then."* P13).

Many of the household food purchasers who felt that they had the expertise were of the mind that food management knowledge and confidence was essential if food waste is to be kept to a minimum (*"... anything left in the house I'll make a dinner from it. I'll just look in cupboards and go and look what's in the fridge and use things up and make a meal."* P8b). They were also aware that not everyone had these tools (*"...if everyone had the ability to cook and just in the way that ingredients can be put together*

*to make something nice then there would be a huge amount less waste.” P8a).*

### ***The ‘good’ provider identity***

Although the desire not to waste good food or money was a significant motivation for some, so was the desire to be a ‘good’ parent, ‘good’ partner or ‘good’ host. The need to feel like a ‘good’ provider and minimise any feelings of guilt experienced if they failed to meet personal or cultural expectations was vocalised by some of the household food purchasers and this perceived need to provide was frequently fulfilled by over-purchasing.

Parents (most notably mothers) described the importance of purchasing a variety of foods perceived to be healthy and nourishing, even if it meant food going to waste.

*“... it’s very much to do with my feeling of being a good mother as well, having plenty of fruit and vegetables in and that feeling of having a full cupboard... even if they don’t eat it you know that was my intention and that’s what I am offering.” (P2)*

For some this wish to provide an over-abundance of healthy foods to children extended beyond over-purchasing food to the over-preparation of food with parents often cooking more food than the children would eat.

*“Yeah, I do tend to over-cook for [the children] just in case. I’d rather have enough for them to eat if they want more rather than them snacking on something less healthy. So I do tend to over portion their dinners [make too much].” (P13)*

Providing an abundance of food was not reserved exclusively for children but sometimes extended to feeding other family members such as partners.

*“... (my husband) is like a massive pig (laughs) and he doesn't like having not very much, he always likes having a massive amount on his plate and leaving it if he doesn't want it which he does quite a lot. So I feel pressure like to make sure he has enough food so he's not feeling hard done by.” (P1)*

For some the wish to be a 'good' provider was centred on household guests rather than family members. This desire to be a 'good' host also resulted in food waste as household food purchasers over-purchased for social occasions.

*“I had friends for lunch last week, I over-buy then, totally... I did throw some food away last week because I, I can never visualise how much they are going to eat. So that's the only time, from an entertainment point of view. Yes I, I go overboard then.” (P11)*

The desire to make guests feel 'looked after' extended beyond just purchasing behaviour for one household, with a perceived need to maximise the time spent with their guests resulting in another type of food waste.

*“I guess if we have people over for dinner rather than keeping any left-overs we would throw them away... Say you've got friends that you don't see that often, rather than spending half-an-hour in the kitchen tidying up you're obviously going to be spending it talking to your friends, so I guess we would be more likely to throw it away and put the dishwasher on.” (P7)*

For those people that entertained guest sometimes described over-purchasing food as a way to avoid experiencing potential embarrassment of not having enough to go round.

*“I am always afraid of running out [of food]...I suppose embarrassment you see that's the thing...just wanting to please, that's basically what it would be, I want everyone to be happy”. (P11)*

### ***Minimising inconvenience***

A further barrier to minimising household food waste concerned the desire to shop, cook and prepare food with convenience and time constraints in mind. Stocking up on food was viewed as a way of protecting yourself from the inconvenience of having to go shopping if something unplanned or unexpected happened, or simply as a means of freeing up time for other responsibilities or personal pursuits and reducing future stress.

*“...I know I can basically come in from work and there is plenty of food available for me and the children. And if anyone was ill because it’s only me there wouldn’t be any necessity to go out, erm. Yeah, you’re sort of covered for all eventualities.”(P2)*

However, stockpiling perishable products as a way of minimising trips to the shops often resulted in food going to waste.

*“... what I tend to do (as I am keen to have fruit in) is that I will go out and I will buy stuff and I’ve already got it in so I have too much and it will go off, or the two for one blueberry error, which I do waste a lot of blueberries and they’re expensive but I want them in all the time so I tend to restock.” (P2)*

Several of the household food purchasers mentioned that they did not want to poison themselves, as they viewed getting ill as another type of inconvenience that could result in them having to take time off work or leaving them unable to carry out other commitments. This meant that they felt less prepared to take any kind of risk with eating food on or past its use-by dates or products that don’t look fresh. A few of the household food purchasers reported that this concern meant they would rather throw food away rather than take a risk with their health.



*“I don’t know if it consciously goes through my mind but if I’ve got a lot of work to do and I think I can’t be ill then I might be slightly less likely to take my chances and more likely to throw it away. Because I think I can’t be throwing up for three days.” (P1)*

### ***Lack of priority***

A third apparent barrier to minimising household food waste was the low priority given to this behaviour by some of the household food purchasers. While a number of the household food purchasers felt that they had their household food management and waste under control and felt good about their behaviour and its consequences, others showed a real lack of engagement with issues surrounding food waste. The belief that tackling food waste was not a priority in their life appeared to come from various sources. One reason voiced by household food purchasers for their lack of concern appeared to stem from their belief that food waste didn’t have negative environmental consequences (*“...because food rots down, doesn’t it?” P2*).

Another reason was that food waste wasn’t a big problem and that there were bigger problems to worry about. A few of the household food purchasers felt that because they were already behaving sustainably in other ways they felt ok about throwing food away.

*“I haven’t given it an awful lot of thought to be honest. No I haven’t. I mean I do put my paper in one thing and the tins in the... I separate like that, but if it’s food throwing away I just throw it away. I have to be honest with you it doesn’t keep me awake at night.” (P11)*

Finally, a sense that wasting food is the status quo was evident in some household food purchasers’ narratives. Some household food purchasers felt that

creating household waste was an accepted social norm.

*“No, I think that everyone wastes, I think probably most people do waste like me. I think especially people that I know or I speak to do. I suppose it is because people do seem to have more disposable income or have had disposable income and it’s become habit to live like that.” (P6)*

### ***Exemption of responsibility***

A final subset of barriers to minimising household food waste was the perception that the responsibility for food waste lay with the food industry and supermarkets rather than the individual. Some of the household food purchasers felt that they wasted food because the quality of much food sold in supermarkets was poor. Food quality, especially taste, was seen as an important factor in determining whether or not the food got eaten, especially in respect to fruit and salad.

*“Yeah, and we bought these Clementines from the Co-Op the other day, a big bag of twelve, and they were absolutely inedible and we sort of turned it into a joke... Well I went in and prodded a few the next day, to see if they were the same. Really, really hard, it was like sucking a lemon. Erm, you know that was £2.50 and a load of fruit in the bin.” (P2)*

The food industry and supermarkets were also criticised for providing some items in pack sizes that were not suitable for people who lived alone or in couples. And even when products were sold in smaller quantities or pack sizes some household food purchasers still felt that their choice was limited.

*“Yeah, we tried buying small loaves of bread but they don’t have as much choice in like... you know we usually get best-of-both and stuff and they don’t... and they do really small slice sizes which is really annoying, they don’t*

*just do half loaves but the same size...” (P1)*

Household food purchasers also cited financial incentives, such as promotions as a further source of food waste. These in-store marketing techniques made some household food purchasers feel that they were put in a predicament caught between buying in bulk, which represented ‘value-for-money’ but increased the likelihood that food would go to waste, or buying in smaller quantities, which incurred greater financial cost per quantity but reduced the chances of food waste occurring.

*“You buy a pack of mince, it’s cheap and you cook all of it. You couldn’t eat all of it, otherwise I would be the size of a house.” (P12).*

Supermarkets were also criticised by some of the household food purchasers for trying to palm-off their own waste onto the customers through the use of ‘2 for the price of 1’ offers or pre-packed items, typically multipack fruit and vegetables.

*“And the other thing with supermarkets is very often fruit, tomatoes are all pre-packed and you often can’t see how fresh they are, so it could be wastage coming from the fact they want to get rid of their rubbish.” (P9b)*

## Discussion

Qualitative coding procedures identified seven overarching categories relating to significant motivations and barriers underlying people's thoughts and feelings about household food waste. The analysis highlighted the importance of two key motivations underlying the desire to minimise food waste (pragmatic concerns and doing the 'right' thing). A third category illustrated how food management knowledge and skills can underpin food waste minimisation efficacy. Finally four main barriers to reducing household food waste were evident (the 'good' provider, minimising inconvenience, lack of priority and exempt from responsibility).

### *Motivations to minimise household food waste*

For many of the household food purchasers the desire to avoid wasting food for financial reasons was viewed as a strong motivator to keep food waste to a minimum. The analysis also suggested that some people were uncomfortable with the idea of wasting food not just for financial reasons, but also because it represented wasted utility. This ties in with Brook Lyndhurst's (2007) finding that the top reasons given for being concerned about food waste were that it was waste of money and that it was a waste of good food. It also supports recent empirical research demonstrating that people's dislike of purchasing products that may go unused is driven by distaste for the items' unused utility, rather than purely an aversion to squandering money (Bolton & Alba, 2012).

It is possible that such pragmatic concerns are influenced by the recent recession in the UK resulting in a sobering effect on consumer spending and a growing distaste for excessive consumption (Flatters & Willmott, 2009). However, it is unlikely that changes in the UK economy represent the sole motivation to minimise food waste. For

example, in the present study, some people reported that their food waste behaviour was guided by a sense of what they felt was ‘right’ and for some people this motivation originated from the post-war era or from a standard of behaviour that had been passed down from their parents or grandparents. Having a higher level of concern for the negative consequences of food waste was clearly a motivator to want to keep household food waste to a minimum. It is interesting to note that several of the household food purchasers interviewed in this current study indicated that both pragmatic and ethical/moral food waste concerns were important to them.

However, it is noteworthy that individuals rarely mentioned environmental consequences as a motivator to minimise food waste in the present study. This supports WRAP’s conclusions but differs from Doron’s (2013) finding that environmental concern was the most frequently selected motivator compared to the motivation to save money. However, Doron presented participants with a choice out of only two motivations (environmental or financial) and asked them to pick which was most relevant to them. It is possible that, while participants might select environmental concerns under such conditions, such concerns might be less likely to be volunteered spontaneously as a motivation to minimise food waste. It is noteworthy that while some participants in the current study mentioned that they grew some of their own vegetables, composted at least some of their food waste or occasionally fed left overs to their family pet, they did not verbalise the link between these behaviours and a reduced environmental impact.

No matter what the motivational push or pull was to avoid food waste, it was apparent that the people in the current study who claimed to have cooking skills and food storage knowledge were more likely to report being in control of their food waste. Brook Lyndhurst (2007) found that participants who expressed a lack of competence in

basic cooking and food management skills reported higher levels of food waste.

Relatedly, Exodus (2007) found that people were more likely to report food waste behaviour if they had a strong fear of food poisoning. It was perhaps not surprising then that in the present study, those who felt confident about their food management skills and knowledge reported that they wasted very little food.

### ***Barriers to minimising food waste***

Echoing Evans' (2011, 2012) findings, we found that the wish to be a 'good' provider in terms of providing healthy and/or abundant food for family or guests was a strong barrier to minimising food waste for some household food purchasers. Being able to provide healthy and/or ample food for the people in one's life can be interpreted as being symbolic of one's ability to protect and nurture them. Dittmar (2004) argues that constructing a sense of identity is an important driver of consumer behaviour as people purchase material goods to express who they are and who they would like to be. Arguably this research could be extended to the purchase of food items. Thus, individuals may purchase an abundance of healthy foodstuff to express and affirm their identity as a 'good' provider. Relatedly, Stryker's identity theory argues that identity-relevant behaviours (actions that help to fulfil a particular role) may become habitual, as they are important to the individual self-concept (Stryker, 1987; Stryker & Burke, 2000). By extension, it is plausible that people who identify with being a 'good' provider may repeatedly over-purchase food because it is important for the expression of this identity. However, it is important to note that although habitual behaviours and self-identity can be highly correlated, the evidence suggests that they may be conceptually distinct (Gardner, De Bruijn, & Lally, 2012). Furthermore, such

behaviours need not relate to a individual's self-identity, since non-identity behaviours can also become habitual (e.g. Lally, van Jaarsveld, Potts & Wardle, 2010).

Another factor that appeared to stand out as a potential barrier to minimising food waste was the desire to minimise inconvenience. Thus, some people explained how they bought in bulk or in excess of their needs in order to avoid unnecessary and untimely trips to the shops. This barrier appeared to be an issue for participants irrespective of whether they lived in a rural or an urban area. Furthermore, some food purchasers described how they sometimes threw away food in order to avoid the inconvenience that would arise if they were to fall ill from food poisoning. Although this latter factor is likely to be interrelated with people's cooking and storage knowledge, it was nonetheless linked to a desire to minimise inconvenience.

The importance of minimising inconvenience as a potential barrier to minimising food waste mirrors the findings of Cox et al. (2010) who found that inconvenience was a widely cited reason for not adopting household waste minimisation behaviours. Furthermore, the importance of convenience in determining food shopping practices is reflected in the increased use of convenience foods and convenience food preparation that has emerged over recent decades (Beck, 2007; Gofton, 1995).

In the current study it was clear that not everyone was aware of the negative consequences of throwing food away, a finding that supports previous research (Brook Lyndhurst, 2007; Quested et al., 2011). While some people didn't see food waste as a real problem, others simply felt that food waste was inevitable and, therefore, there was not much point in trying to reduce it (see also de Covely, McDonagh, O'Malley & Patterson, 2008; Exodus, 2007). It was also apparent that some people did not feel that they were accountable for their household food waste and instead blamed others, such as the food industry and supermarkets. This displacement of responsibility is possibly a

defence mechanism to reduce a state of dissonance that has arisen from a discrepancy between their behaviour and their standard values (see Festinger, 1957). Also apparent was a perception that wasting food is the norm. However, because household food waste is virtually invisible to the outside world, it is unlikely that people really know how much food other people waste.

On the other hand, many household food purchasers reported either that they did not waste (much) food or that they did not feel that their own behaviour contributed much to the food waste problem. A general lack of awareness of the amount of food waste generated has been documented in prior research (Brook Lyndhurst, 2007; Exodus, 2007; Hamilton et al., 2005) and it has been suggested that this lack of awareness may be as a consequence of household food waste being thrown away a bit at a time, often mixed with other household waste, stored outside the home, and regularly hauled away and dumped out of sight (McKnight-Yeates, 2009).

### ***Managing negative emotions***

It was apparent from the analysis that people's motivations both to reduce food waste and to over-purchase foodstuffs were frequently underpinned by the desire to avoid experiencing negative emotions. Managing negative emotions has thus been identified as a unifying category in the present study.

Perhaps unsurprisingly, there was no evidence in the current study that any of the household food purchasers intended to waste food. Indeed, those who did admit to wasting food often indicated that they would feel much less guilt if they didn't create food waste. Furthermore, some household food purchasers expressed a sense of frustration or annoyance when they recalled wasting food in the past and one participant described how their food waste behaviour made them feel anxious.



The finding that food waste can evoke negative emotions corresponds with other research that has documented guilt as a negative emotion associated with wasteful behaviour (see: Brook Lyndhurst, 2007; Hamilton et al., 2005). It has been suggested that guilt could be utilised as a motivational tool in campaigns to promote pro-environmental behaviour (Bedford et al., 2011). However, caution should be exercised before embarking on such approaches. The use of guilt to promote behaviour change is unlikely to prove successful as an isolated intervention technique and could, in fact, result in compensation behaviours such as denial either of the severity of the issue itself or of one's personal responsibility (Bedford et al., 2011). Indeed, the findings of the current study provided evidence of such denial, illustrated through the categories 'lack of priority' and 'exemption of responsibility'. It is plausible that these barriers to household food waste minimisation represent attempts to manage and minimise uncomfortable feelings of guilt.

Furthermore, the findings of the current study demonstrate that refraining from minimising food waste might itself *protect* against negative emotions. Thus food purchasers described how the desire to be a 'good' provider and to minimise inconvenience (both of which have the potential to precipitate food waste) were sometimes underpinned by motivations to avoid negative emotions such as guilt and frustration respectively. The desire to avoid experiencing these negative emotions maybe more powerful in influencing food waste behaviour than the desire to avoid negative emotions associated with food waste per se. In other words, some people might find it easier to experience a certain amount of remorse as a result of throwing away food than they would to feel guilty for failing to provide their children with an abundance of healthy food choices. Certainly, such emotional drives are likely to be in conflict.

### ***Implications of the research and future directions***

The present study has highlighted specific factors that may motivate household food waste minimisation. Accordingly, the findings suggest it may be beneficial for food waste reduction initiatives to: 1) target the potential pragmatic concerns some people might have by highlighting the benefits of reducing household food waste (e.g. the financial rewards) and 2) emphasise the point that reducing your food waste is the ‘right’ thing to do. The current research findings also suggest that people may need to be trained in food management skills to empower them to keep household food waste to a minimum. Many motivational techniques, including those mentioned above, are already commonplace in household food waste reduction interventions with some noted success (see for example: Love Food Hate Waste, 2007). However, the present study has also highlighted potential barriers to household food waste minimisation. Successful campaigns at a population level are unlikely to reach their true potential unless they simultaneously address issues such as denial of responsibility and the potential conflict caused by seemingly unrelated everyday goals (such as the desire to be a ‘good’ provider), which have the potential to act as barriers to household food waste minimisation.

Participants in the current study were not told that the primary focus of the study was household food waste. Nonetheless, it is important to bear in mind the potential influence of demand characteristics: responses may also have been influenced by participants’ desires to present themselves in a positive light (Goffman, 1959). Furthermore, interviewees’ responses may have been influenced by the status, age, race or gender of the interviewer (Charmaz, 2006).

Although we did not use a large representative sample of UK household food purchasers in this study, there is no reason to believe that the underlying motivations and perceived barriers expressed by the current sample would differ from other UK household food purchasers. Furthermore it is not unusual for qualitative research to employ sample sizes similar to that used in the current study (see: Gardner & Abraham, 2007; Mann & Abraham, 2006). Nevertheless, future research may benefit from replicating the current research using a larger stratified sample of the UK population to assess whether the current findings are replicated. Future research may also benefit from using prospective quantitative methodologies to explore whether the motivations and/or barriers identified in this study are important predictors of people's food waste behaviour.

Finally, it would be interesting to explore whether any differences expressed in motivations and barriers in the present study could reliably be associated with socio-demographic characteristics, such as gender, household size, age, area of residence, income or education level. The small sample size in the present study precluded carrying out such analyses in an appropriate way; however, it could be argued that a 'good provider' identity was most notable for mothers. Future research would benefit from exploring such associations with larger stratified samples.

### **Conclusion**

In conclusion, this research represents one of only a few attempts in the qualitative literature to identify people's underlying motivations and barriers to food waste minimisation. Carrying out research of this kind represents an important step in the development of successful interventions. The current study has identified some potential motivators to target in household food waste minimisation initiatives, but it

has also revealed some important barriers that may well need addressing. It is possible that some barriers to household food waste minimisation, such as the belief that household food waste does not pose a serious environmental threat, may be relatively easy to overcome through the dissemination of food waste information. However, other barriers, such as the potentially conflicting desire to be a 'good' provider, may prove more challenging to address and may well require more innovative approaches.

### **CHAPTER 3. APPLYING THE THEORY OF PLANNED BEHAVIOUR TO HOUSEHOLD FOOD WASTE REDUCTION**

#### **Abstract**

Identifying the antecedents of household food waste reduction is an important step in the development of effective and efficient interventions. This prospective study tested the utility of applying an extended theory of planned behaviour (TPB) model to household food waste reduction. At baseline, participants ( $N = 279$ ) completed a questionnaire designed to measure the following cognitive constructs derived from the extended TPB model: intention, attitude, subjective norm, perceived behavioural control, self-identity, anticipated regret, moral norm and descriptive norm. At follow-up, participants ( $N = 204$ ) completed a questionnaire assessing their household food waste behaviour. The extended TPB model accounted for a substantial amount (64%) of the variance in intention, with attitude, subjective norm, perceived behavioural control, self-identity and anticipated regret emerging as significant linear predictors. Furthermore, intention significantly predicted the likelihood that participants had reduced their household fruit and vegetable waste at follow-up; however, the amount of variance in behaviour accounted for by the model was relatively small (5%). Results demonstrate the utility of applying an extended theory of planned behaviour model to predict motivation and - to a lesser extent - behaviour, in the context of household fruit and vegetable waste reduction.

## Introduction

One third of food produced for human consumption is lost or wasted each year, the equivalent of 1.32 billion tonnes globally (Gustavsson, Cederburg, Sonesson, van Otterdijk & Meybeck, 2011). In 2007, the global carbon footprint of food waste was calculated to be the equivalent of 3.3 gigatons of carbon dioxide (CO<sub>2</sub>) emissions (Food and Agriculture Organization [FAO], 2013). Food waste occurs at all stages of the food supply chain; however, in high-income countries (such as the UK), consumers have been identified as the biggest single contributor to food waste (Griffin, Sobal & Lyson, 2009).

Buying food, not eating it and then throwing it away currently costs the average UK family an estimated £680 a year and is responsible for 17 million CO<sub>2</sub> equivalent tonnes of greenhouse gas emissions (WRAP, 2011; 2013a). In 2012, UK households threw away 7 million tonnes of food, 60% of which could have been eaten. Although this represents a reduction of 1.3 million tonnes since the last estimate in 2007, the cause of the reduction is unclear. It may be the result of a temporary response to the global financial and food crises of 2008; however, it may also be - at least in part - a response to national campaigns, such as Love Food Hate Waste (2007), which raise awareness of the consequences of food waste as well as providing tips and ideas on how to reduce it. Either way, there is still a long way to go before the amount of food thrown away from UK homes reaches a level that has a minimal negative impact on the environment and it is crucial that effective interventions are designed in order to assist in future reductions of food waste.

It is widely acknowledged that minimising food waste in the home is the best way to reduce the impact of food waste on the environment (Quested, Marsh, Stunell & Parry, 2013). However, Quested et al. (2013) argue that predicting household food

waste is not a simple task as there are multiple, interacting behaviours that can influence the amount and likelihood of food going to waste. Despite this, it is unlikely that people will reduce their food waste unless they are motivated to do so. Furthermore, interventions designed to reduce household food waste are unlikely to be effective unless they target the key psychological mechanisms that underpin motivations and/or barriers to household food waste reduction.

Surprisingly, there has been little peer-reviewed research that focuses on identifying key motivations to reduce household food waste and that which does exist is primarily qualitative in nature. For example, in a qualitative study that investigated the thoughts, feelings and experiences of 15 UK household food purchases, Graham-Rowe, Jessop and Sparks (2014) found that the two key psychological motivations to minimise household food waste were: (1) 'waste concerns', reflecting people's pragmatic considerations not to waste money and a concern for the wasted utility of food, and (2) a desire to do the 'right' thing, which reflects people's beliefs that it is wrong to waste food. However, they also found that the main psychological barrier to household food waste minimisation was the motivation to over-purchase household food in order to fulfil other needs not related to waste reduction, such as the desire to be a 'good' provider or to minimise inconvenience. Other key barriers reflected both a lack of priority attributed to reducing household food waste and a perceived exemption from responsibility of household food waste. Furthermore, it was reported that both motivations and barriers were partially underpinned by the wish to avoid experiencing negative emotions such as guilt, frustration, annoyance, embarrassment or regret, thus potentially creating conflict between motivations to minimise food waste (e.g. a desire not to waste money) and motivations to act in ways that could potentially increase household food waste (e.g. a desire to minimise inconvenience).

Similarly, in a sociological exploration of food practices in UK households, Evans (2011; 2012) found barriers to household food waste minimisation that related to issues such as: the imperative to cook and eat ‘properly’ (e.g. preparing fresh, healthy foods from scratch); a mismatch between the short life-span of fresh food and the demands of everyday life (e.g. tastes, preferences and unforeseen circumstances); and anxieties surrounding food safety and storage.

Research of the kind reported above is an important first step in identifying some of the key factors that underpin household food waste reduction and barriers to change. However, it has been argued that investigations into the determinants of potentially modifiable behaviours should be theory-driven, as theory can provide a framework from which causal processes can be identified and can guide the development of effective, replicable and parsimonious interventions (Michie & Abraham, 2004; Steg & Vlek, 2009). One well-established model, which specifies the cognitive antecedents of behaviour, is the theory of planned behaviour (TPB; Ajzen, 1988, 1991). It was decided that the TPB was the best framework from which to begin to investigate causal processes relating to household food waste reduction, for several reasons. Firstly, it is one of the most frequently cited and influential behavioural theories for the prediction of human social behaviour, including environmental behaviour. Secondly, the TPB considers a wide range of motivational factors not considered in other theories. Finally, the TPB is a framework that has the potential for expansion, either through the inclusion of additional variables, or through interaction or moderation effects.

The TPB model (Ajzen, 1988, 1991) proposes that the most immediate precursor of behaviour is behavioural *intention*, which reflects the level of motivation to engage in the behaviour in question. The stronger an individual’s intention to perform the



behaviour, the greater the likelihood it will be performed. Intention is predicted by three further variables: *attitude*, *subjective norm* and *perceived behavioural control*. Attitude reflects the degree to which the performance of the behaviour is valued positively or negatively by the individual, subjective norm reflects the perceived social pressure to engage with the behaviour and perceived behavioural control reflects the individual's appraisal of his/her ability to carry out the behaviour.

In summary, if individuals feel favourable towards a particular behaviour, believe that important people in their lives would approve of them carrying out the behaviour and are confident about their ability to undertake the behaviour, then they are more likely to have more a positive intention to engage in the behaviour. This positive intention in turn is associated with a greater likelihood that the behaviour will be enacted. It is also worth noting that in some situations perceived behavioural control is believed to exert a direct effect on behaviour unmediated by intention (Ajzen, 1991).

The TPB model has been applied across a variety of environmental behaviours, including: travel mode choice (e.g. Bamberg, Ajzen & Schmidt, 2003; Gardner & Abraham, 2010), water conservation (Trumbo & O'Keefe, 2001), recycling (e.g. Boldero, 1995; Taylor & Todd, 1995), and sustainable food choices (for a review see Han & Hansen, 2012). Findings have typically supported the utility of the TPB constructs in predicting intention. Furthermore, although less frequently tested, there is some evidence that intention can contribute to the prediction of environment-related behaviour, as specified by the model (e.g. Bamberg et al., 2003; Boldero, 1995; Gardner & Abraham, 2010). Moreover, in a meta-analysis (albeit not specifically restricted to applications of the TPB) it was found that, on average, intention accounted for 27% of the variance of self-reported pro-environmental behaviours (Bamberg & Moser, 2007).

### ***Additional predictors***

However, the sufficiency of the TPB model has been widely debated (Eagly & Chaiken 1993; Conner & Armitage, 1998) and it has been suggested that the prediction of intention may be augmented by the inclusion of additional predictor variables. Although there are a number of additional predictors that have the potential to contribute to the predictive utility of the TPB with regards to household food waste reduction, these variables have either not been applied within the environmental-domain, or have a limited evidence-base. Therefore, for reasons of parsimony it was decided to only include the following four additional constructs: (1) self-identity; (2) anticipated regret; (3) moral norms; and (4) descriptive norms. These predictors were selected as they have been widely investigated and have strong evidence-base across several behavioural domains, including environmental-research.

### ***Self-Identity***

According to Rise, Sheeran & Hukkelberg (2010) self-identity refers to the “salient and enduring aspects of one’s self-perception” (p. 1087). This construct is typically operationalised in terms of the extent to which the individual sees him/herself as the sort of person who would be willing to engage in the behaviour in question. Within the environment-related literature, a general pro-environmental self-identity has been found to be an independent predictor of intention to carbon-offset (Whitmarsh & O’Neill, 2010). Likewise, specific environment-related identities have been found to be independent predictors of intention to purchase green products (Sparks & Shepherd, 1992), intention to engage in environmental activism (Fielding, McDonald & Louis, 2008) and intention to recycle (e.g. Nigbur Lyons & Uzzell, 2010; Terry, Hogg & White, 1999).

### ***Anticipated Regret***

Anticipated regret encapsulates people's beliefs about whether they will feel regret if they do not act in the way recommended (Van der Pligt & de Vries, 1998). It has been suggested that this construct might make an independent contribution to the prediction of intention when the behaviour assumes a more affective component (Rivis, Sheeran & Armitage, 2009). Anticipated regret has been found to make an important contribution to the TPB model in the context of environment-related behaviours. For example, anticipated regret was found to significantly and uniquely contribute to intention to act in a sustainable or ecological way across a variety of pro-environmental behaviours (Kaiser, 2006).

### ***Moral Norm***

Moral norm relates to a person's perception of the moral correctness or incorrectness of a particular behaviour (Ajzen, 1991). It has been suggested that it should be included in the TPB model when the behaviour has a moral or ethical dimension to it (Conner & Sparks, 2005). Recent research in the environment-related literature has found moral norm to be a useful addition to the TPB. For example, moral norm was shown to significantly predict intention to recycle (e.g. Chan & Bishop, 2013, Largo-Wight, Bian & Lange, 2012).

### ***Descriptive norm***

Descriptive norm refers to an individual's perception of whether significant others, such as friends, family and neighbours, attempt to carry out or avoid the behaviour in question (Cialdini, Kallgren, & Reno, 1991). It has been suggested that the TPB should be expanded to include descriptive norm as an additional source of social

influence (Rivis & Sheeran, 2003a). Descriptive norm has been found to contribute to the TPB model in the context of environment-related behaviour; thus, descriptive norm was shown to significantly contribute to the prediction of intention to recycle (e.g. Largo-Wight et al., 2012; Nigbur et al., 2010).

### ***Applying the theory of planned behaviour to household food waste***

To date, only one published study has applied the TPB model to household food waste. Stefan, van Herpen, Tudoran and Lähteenmäki (2013) found that only attitude predicted intention not to waste food; there was no evidence that subjective norm or perceived behavioural control influenced intention. However, there were limitations to this study. Firstly, the authors assessed cognitions in relation to several behaviours including throwing food out, cooking /preparing the amount of food needed and buying the right amount of food. Compatibility in the assessment of cognitions and behaviour represents an important prerequisite underpinning the predictive efficacy of the TPB (Ajzen, 1988). Thus, the cognitions and the behaviour should be compatible in terms of the target (e.g. food waste), the action (e.g. to reduce), the context (e.g. at home) and the time (e.g. over the next seven days). Failure to meet this criterion may explain why the authors found no evidence that subjective norm and perceived behavioural control impacted upon intention. Accordingly, the first aim of the current study was to explore whether all three core predictors of the TPB model would predict intention to reduce household food waste when Ajzen's principle of compatibility was met.

Secondly, the authors did not consider whether additional empirically-supported psychological constructs, such as self-identity, anticipated regret, moral norm and descriptive norm, significantly contributed to the prediction of intention to reduce household food waste over and above the core TPB constructs. Hence, the second aim

of the current study was to explore whether the additional constructs described above might contribute to the prediction of intention over and above attitude, subjective norm and perceived behavioural control.

Thirdly, the authors did not assess behaviour at follow-up and hence it was not possible to determine whether intention did lead to a reduction in food waste as specified by the TPB model. Therefore, the third aim of the current study was to see whether the TPB model could predict whether or not individuals reduced their household fruit and vegetable waste during the seven-day period subsequent to the measurement of intention.

### ***The present study***

In the current study the decision was made to focus on fruit and vegetable waste, rather than waste from all food groups, for several reasons. The first was because fruit and vegetables make up the greatest overall share of household food waste out of all the food groups (WRAP, 2008). With a heavy reliance on energy intensive heated greenhouses, refrigeration and transportation (Garnett, 2008), fruit and vegetable waste reduction thus represents an important and worthwhile target. Secondly, there is the added benefit of encouraging increased consumption of fruit and vegetables, as eating 400g or more of fruit and vegetables a day is associated with reduced risk of disease (World Health Organization, [WHO], 2003). Finally, it was hypothesised that reducing fruit and vegetable waste would be a relatively straightforward behaviour to enact, as increased consumption does not necessarily require as much skill, knowledge or effort in preparation compared to that of other food groups, such as meats.

*Hypothesis 1.* In accordance with the TPB, it was predicted that intention to reduce household fruit and vegetable waste would be predicted by attitude, subjective norm and perceived behavioural control.

*Hypothesis 2.* It was predicted that the inclusion of self-identity, anticipated regret, moral norm and descriptive norm would increase the amount of variance in intention that could be accounted for by the model.

*Hypothesis 3.* In accordance with the TPB, it was predicted that intention and perceived behavioural control would predict fruit and vegetable waste reduction at one-week follow-up.

## **Method**

### ***Design and Procedure***

The current study employed a prospective survey-based design. Participants were recruited opportunistically by a number of methods. The recruitment message containing the link to the baseline questionnaire was emailed to contacts of the first author, posted on online chat-rooms, bulletin boards and newsletters, and advertised on a student online recruitment website. To aid recruitment an incentivised snowballing technique was used which involved offering a cash prize to the person who recruited the greatest number of additional participants (see Gardner, 2009),

Participants were invited to take part in a study exploring their thoughts and feelings regarding how much fruit and vegetables get thrown away from their homes. To be eligible for the study participants had to be: (a) eighteen years or over and (b) a UK resident. All data were collected between May and July 2012. Participants who provided their e-mail address at baseline were sent the web-link to the follow-up questionnaire seven days later and were asked to complete this questionnaire as soon as

possible. To deter attrition, participants who completed both questionnaires were entered into a cash prize draw or given the option to gain course credits.

### ***Participants***

Three hundred and seventy participants completed the baseline questionnaire. Participants who indicated that they had not wasted any fruit and vegetables in the past 7 days ( $n = 91$ ) were omitted from further analysis, as it would not have been possible for these individuals to reduce their waste. The analyses reported below were thus conducted solely on data from the remaining 279 participants. Ages ranged from 18 to 79 years ( $M = 35.01$ ,  $SD = 12.71$ ). The majority of sample were white British (80.07%), female (79.78%), educated to undergraduate level or above (62.32%) and indicated that they lived in an urban or suburban area (80.15%). All participants were resident in the UK at the time of the study.

Two hundred and four participants completed follow-up measures representing an attrition rate of 26.88%. Preliminary analyses were conducted to determine whether there were any differences between participants who responded to only the baseline questionnaire and those who responded at both baseline and follow-up. A series of one-way ANOVAs revealed no significant differences between the two groups in terms of age, number of adults living in their household, number of children living in their household, level of responsibility for household food shopping, level of responsibility for household food cooking or level of fruit and vegetable waste at baseline (all  $ps > .09$ ). Likewise, a series of Chi-square analyses revealed no significant associations between responding at follow-up and gender, marital status, occupation, educational qualification, income or nationality (all  $ps > .09$ ). However, a Chi-square analysis did reveal a significant association between responding at follow-up and location,  $\chi^2 (1, N =$

277) = 10.04,  $p < .01$ , Cramer's  $V = .19$ ; participants who lived in a rural location were over represented at follow-up.

### ***Materials***

Baseline questionnaire (Appendix C). At baseline, participants completed a questionnaire including the following sections:

*Demographic information.* Participants were asked to indicate their age, gender, occupational status, marital status, level of education, number of adults and children living in their household, nationality, household income, household location and whether or not they were a UK resident.

*Responsibility for household food shopping.* Responsibility for household food shopping was assessed by the following item: "To what extent are you responsible for food shopping in your household?" (*not at all responsible* [1] to *responsible for all or almost all* [5]).

*Responsibility for household food cooking and preparation.* Responsibility for their household food cooking and preparation was assessed by the following item: "To what extent are you responsible for cooking and preparing food in your household?" (*not at all responsible* [1] to *responsible for all or almost all* [5]).

*Fruit and vegetable waste behaviour.* Participants' fruit and vegetable waste at baseline was assessed by the item: "Please estimate what percentage of your household's total fruit/vegetables got thrown away in the last seven days". Possible responses ranged from 0% - 100% with ten percent increments.

*Extended theory of planned behaviour predictors.* Participants were asked to complete a series of items assessing the cognitive constructs detailed in the extended TPB model. Unless otherwise indicated, responses were given on 7-point scales ranging



from *strongly disagree* (1) to *strongly agree* (7). All scales showed acceptable internal reliability and composite scores were calculated from the means of the constituent items.

*Intention.* Three items assessed participants' intention, e.g., "I intend to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days",  $\alpha = .91$ .

*Attitude.* Participants' attitude towards reducing their household food waste in the next seven days was assessed by asking them to respond to the statement: "For me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days would be..." on six pairs of semantic differentials (*extremely pointless* [1] to *extremely worthwhile* [7], *extremely unenjoyable* [1] to *extremely enjoyable* [7], *extremely foolish* [1] to *extremely wise* [7], *extremely bad* [1] to *extremely good* [7], *extremely unpleasant* [1] to *extremely pleasant* [7], *extremely harmful* [1] to *extremely beneficial* [7]),  $\alpha = .87$ .

*Subjective Norm.* Two items assessed subjective norm, e.g., "Most people who are important to me probably think that I should reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days",  $r(277) = .46, p < .001$ .

*Perceived behavioural control.* Four items assessed perceived behavioural control, e.g., "It would be possible for me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days",  $\alpha = .77$ .

*Moral Norm.* Four items assessed moral norm, e.g., "I feel a strong obligation to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days,"  $\alpha = .82$ .

*Descriptive Norm.* Two items assessed descriptive norm, e.g. “Most people I know try to reduce the amount of fruit and vegetables that they throw away”,  $r(277) = .47, p < .001$ .

*Anticipated Regret.* Two items assessed anticipated regret, e.g., “I would feel regret if I did not reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days”,  $r(277) = .68, p < .001$ .

*Self-Identity.* Three items assessed self-identity, e.g., “I am the type of person who would reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days”,  $\alpha = .81$ .

*Follow-up questionnaire* (Appendix D). At follow-up participants were again asked to respond to the same behaviour measure used to assess their fruit and vegetable waste over the previous seven-day period at baseline. On the basis of their responses, participants were categorised as either having reduced or not having reduced their fruit and vegetable waste at follow-up. Specifically, participants who indicated that the percentage of their household’s total fruit and vegetables that got thrown away at follow-up was lower than at baseline were categorised as reducers (1), whilst participants who indicated that the percentage of their household’s total fruit and vegetables that got thrown away at follow-up was the same or higher than at baseline were categorised as non-reducers (0).

## Results

Descriptive statistics are reported in Table 2. Pearson correlation coefficients ( $r$ ) between demographic variables and the extended theory of planned behaviour constructs are given in Table 3.

It can be seen that the overall fruit and vegetable waste of participants appeared to be lower at Time 2 than at Time 1. In order to test for a measurement effect of the questionnaire on behaviour at follow-up (e.g. Godin, Sheeran, Conner & Germain, 2008) a paired-samples t-test was conducted. There was a statistically significant decrease in fruit and vegetable waste from Time 1 ( $M = 16.91$ ,  $SD = 9.86$ ) and Time 2 ( $M = 14.36$ ,  $SD = 14.12.79$ ),  $t(203) = 3.32$ ,  $p < .001$ . This result suggests that there was a direct effect of asking participants to report their cognitions (such as their intentions) on their subsequent behaviour.

Table 2. Descriptive statistics for the key study variables

	Min.	Max.	<i>M</i>	<i>SD</i>	<i>N</i>
Age	18	79	35.01	12.71	272
Number of children	0.00	4.00	0.67	1.04	276
Number of additional adults	0.00	6.00	1.61	1.26	277
Responsibility for food shopping	1.00	5.00	3.82	1.30	278
Responsibility for cooking	1.00	5.00	3.74	1.27	278
Intention	1.00	7.00	5.13	1.29	279
Attitude	2.33	7.00	5.55	0.96	279
Subjective Norm	1.00	7.00	4.82	1.24	279
Perceived behavioural control	1.00	7.00	5.00	1.31	279
Self-identity	1.00	7.00	5.04	1.27	279
Anticipated regret	1.00	7.00	4.48	1.58	279
Moral norm	1.00	7.00	4.83	1.28	279
Descriptive norm	1.00	7.00	4.41	1.19	279
Baseline waste behaviour (%)	10	70	17.49	10.97	279
Follow-up waste behaviour (%)	0	90	14.36	12.79	204

Table 3. Pearson's correlation coefficients ( $r$ ) between background variables, the extended TPB constructs and behaviour

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Age	-													
2 No. of children	.13*	-												
3 No. of additional adults	-.25***	-.13*	-											
4 Responsible for food shopping	.39***	.08	.45***	-										
5 Responsible for cooking	.32***	-.00	.42***	.84***	-									
6 Intention	.18**	-.02	-.12*	.24***	.22***	-								
7 Attitude	.26***	-.04	.22***	.30***	.26***	.72***	-							
8 Subjective Norm	.08	-.00	-.02	.07	.07	.50***	.45***	-						
9 Perceived Behavioural Control	.01	-.02	.25***	.41***	.38***	.54**	.40***	.29***	-					
10 Self-Identity	.26***	-.04	-.12*	.26***	.26***	.72***	.69***	.41***	.33***	-				
11 Anticipated Regret	.23***	-.00	-.15*	.19**	.17**	.72***	.69***	.43***	.33***	.68***	-			
12 Moral Norm	.25***	-.03	-.16**	.24***	.22***	.73***	.77***	.49***	.33***	.82***	.82***	-		
13 Descriptive Norm	.13*	-.00	.01	.08	.05	.33***	.30***	.49***	.07	.41***	.32***	.41***	-	
14 T1 Waste behaviour	-.24***	-.04	-.07	-.08	-.03	.02	-.01	.07	.02	-.17**	-.02	-.06	-.6	-
15 T2 Waste behaviour	-.22**	-.01	-.09	-.02	.02	-.15*	-.11	-.01	-.06	-.20**	-.16*	-.19**	-.10	.58***

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

### ***Predicting intention to reduce household fruit and vegetable waste***

A hierarchical multiple regression analysis was conducted to determine whether the extended TPB model could significantly predict intention. A number of demographic and background variables were controlled for in this analysis, as preliminary analyses had revealed that they were associated with intention. Specifically, gender, age, marital status, number of additional adults living in household, responsibility for household food shopping and responsibility for household food cooking were entered at step 1 for this reason. The core TPB variables - attitude, subjective norm and perceived behavioural control - were entered at step 2 to see if these variables significantly contributed to the prediction of intention. Self-identity, anticipated regret and descriptive norm were entered at step 3 to explore whether the variables contributed significantly to the prediction of intention over and above the core TPB predictors<sup>1</sup>. The resultant hierarchical multiple regression is summarised in Table 4.

Step 1 predictors accounted for 9.21% of the variance in intention to reduce household fruit and vegetable food waste,  $F(6, 261) = 4.42, p < .001$ . Gender was the only significant predictor ( $\beta = .15, p = .02$ ), with female participants reporting more positive intentions to reduce household fruit and vegetable waste.

When attitude, subjective norm and perceived behavioural control were included at step 2, the model accounted for an additional 54.71% of the variance, a significant increase,  $\Delta F(3, 258) = 130.42, p < .001$ . Attitude ( $\beta = .52, p < .001$ ), subjective norm ( $\beta = .18, p < .001$ ) and perceived behavioural control ( $\beta = .31, p < .001$ ), all emerged as significant linear predictors, such that reporting a more positive attitude, a more positive

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<sup>1</sup> Following Tabachnick & Fidell (1989) a decision was made to omit moral norms from analysis due to multicollinearity as moral norms were found to be highly correlated with both anticipated regret,  $r(277) = .82, p < .001$ , and identity  $r(277) = .82, p < .001$ .

subjective norm and a greater level of perceived behavioural control were all associated with more positive intentions to reduce household fruit and vegetable waste.

The inclusion of self-identity, anticipated regret and descriptive norm at step 3 significantly increased the amount of variance in intention that could be accounted for,  $\Delta F(3, 255) = 31.86, p < .001$ ;  $\Delta R^2 = .10$ . Inspection of the beta weights revealed that both self-identity ( $\beta = .25, p < .001$ ) and anticipated regret ( $\beta = .29, p < .001$ ) emerged as significant linear predictors, such that higher levels of self-identity and anticipated regret were associated with more positive intention scores. By contrast, descriptive norm did not emerge as a significant linear predictor ( $\beta = .01, p = .80$ ). Together the variables in this final model accounted for 73.92% of the variance in intention to reduce household fruit and vegetable waste; attitude ( $\beta = .21, p < .001$ ), subjective norm ( $\beta = .11, p < .01$ ) and perceived behavioural control ( $\beta = .28, p < .001$ ) all remained significant positive linear predictors.

It should be noted that controlling for baseline fruit and vegetable waste at step 1 did not influence the patterns of findings reported above.

Table 4: Hierarchical multiple regression of intention to reduce household fruit and vegetable waste

Predictors	Step 1	Step 2	Step 3
	$\beta$	$\beta$	$\beta$
Gender <sup>a</sup>	.15*	.10*	.07*
Age	.10	.05	.00
Marital status <sup>b</sup>	.05	.05	.04
Number of additional adults	-.03	.04	.03
Responsibility for food shopping	.09	-.13	-.08
Responsibility for food cooking	.06	.03	-.00
Attitude		.52***	.21***
Subjective norm		.18***	.11**
Perceived behavioural control		.31***	.28***
Self-identity			.25***
Anticipated regret			.29***
Descriptive norm			.01
$R^2$	.09***	.64***	.74***
$F$	4.42***	50.79***	59.73***
$\Delta R^2$		.55***	.10***
$\Delta F$		130.86***	31.86***

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ ;

<sup>a</sup> Females = 1, Males = 0.

<sup>b</sup> Married/cohabiting with partner = 1, Other = 0.

### ***Predicting a reduction in household fruit and vegetable waste at follow-up***

In order to explore whether intention and perceived behavioural control would predict whether or not participants reduced their fruit and vegetable waste at follow-up, a hierarchical multiple logistic regression was conducted. Preliminary analyses revealed that marital status was the only demographic variable associated with whether individuals had reduced their fruit and vegetable waste at follow-up, therefore this variable was entered at step 1 to control for any impact on behaviour. In accordance



with the predictions of TPB intention and perceived behavioural control were entered at step 2.

The step 1 predictor, marital status, was able to correctly classify 57.71% of participants,  $\chi^2 (1) = 4.35, p = .04$ ; Nagelkerke  $R^2 = 0.03$ , reflecting the fact that participants who were married or co-habiting were more likely to report a reduction in their household fruit and vegetable waste at follow-up.

When intention and perceived behavioural control were included at step 2, the fit of the model was significantly improved  $\Delta\chi^2 (2) = 7.90, p = .02$ , resulting in an additional 6.47% of participants being correctly classified. The full model containing all predictors was statistically significant  $\chi^2 (3) = 12.25, p < .01$ , indicating that the model was able to distinguish between responders who did and did not reduced their fruit and vegetable waste. The model as a whole explained 7.89% (Nagelkerke R squared) of the variance in reduction behaviour and correctly classified 64.18% of cases. As shown in Table 5, only intention made a unique statistically significant contribution to the model.

It should be noted that controlling for baseline fruit and vegetable waste at step 1, did not influence the patterns of findings reported above.

Table 5: Logistic regression predicting the likelihood of reporting a reduction of household fruit and vegetable waste behaviour

Predictors	B	S.E.	Wald	d.f.	<i>p</i>	Odds Ratio	95% C.I. for Odds Ratio	
							Lower	Upper
Marital status <sup>a</sup>	.53	.30	3.22	1	.07	1.70	0.95	3.05
Intention	.30	.14	4.39	1	.04	1.35	1.02	1.79
PBC <sup>b</sup>	.05	.13	.14	1	.71	1.05	.82	1.35
Constant	-1.99	.71	7.85	1	.01	.14		

<sup>a</sup> Married/cohabiting with partner = 1, Other = 0.

<sup>b</sup> PBC = Perceived Behavioural Control

## Discussion

The findings of the current study support the first hypothesis that, in accordance with the TPB model (Ajzen, 1988,1991), intention to reduce household fruit and vegetable waste would be predicted by attitude, subjective norm and perceived behavioural control. That is, participants who felt favourable about reducing their household fruit and vegetable waste, felt that other people approved of them reducing their household fruit and vegetable waste and felt confident in their ability to reduce their household fruit and vegetable waste, were more likely to intend to reduce their household fruit and vegetable waste. The pattern of findings in the current study differed somewhat from those reported by Stefan et al. (2013), as these authors found attitude to be the only core TPB construct associated with intention. However, as alluded to in the introductory section, this may be - at least in part - due to the high degree of compatibility of the measures in the current study, which represents a fundamental requirement of the TPB model (Fishbein & Ajzen, 2010).

Furthermore, the findings of the current study provide support for the second hypothesis that the inclusion of the additional predictive variables would increase the amount of variance in intention that could be accounted for by the model. Specifically, self-identity and anticipated regret each made a significant contribution to the prediction of intention. Thus, people who expressed a strong identity, as the sort of person who would reduce their household fruit and vegetable waste were more likely to intend to engage in this behaviour. This finding contributes to a growing body of evidence demonstrating that self-identity can be an important predictor of intention in environment-related domains (e.g., Sparks & Shepherd, 1992). Likewise, people who believed that they would feel regret if they did not reduce their household fruit and vegetable waste were more likely to intend to perform this behaviour. This finding is congruent with existing research suggesting that anticipated regret can be an important predictor of intention in environment-related domains (e.g. Kaiser, 2006).

There was no evidence that descriptive norm was a significant predictor of intention in the current study (compare further Heath & Gifford, 2002; Nigbur et al., 2010). Furthermore, although descriptive norm was significantly correlated with intention the size of the correlation coefficient was smaller than for the other predictor variables. One explanation for this could be that people are unaware of the amount of food waste others generate, which might limit the impact of descriptive norm on intention.

Unfortunately, in the present study, the high correlations between moral norm and (a) self-identity (b) anticipated regret precluded the inclusion of moral norm in the final model. Accordingly, it was not possible to ascertain whether this construct would have contributed significantly to the prediction of intention. However, the findings do point to the potential for there to be a high degree of overlap between moral norm and

(a) self-identity and (b) anticipated regret. Such overlap might be particularly apparent when the behaviour under investigation has a strong moral dimension, as is often the case with environment-related behaviours.

From a theoretical perspective, the findings of the current study support the growing literature suggesting that the predictive utility of the TPB might be augmented with the inclusion of additional predictor variables (e.g. Conner & Armitage, 1998). Specifically, the findings of the current study suggest that the additional constructs of self-identity and anticipated regret should be taken into account when exploring motivations to engage in environment-related behaviours, such as the reduction of household food waste.

The findings of the present study partially support the third hypothesis that household fruit and vegetable waste reduction at follow-up would be predicted by the TPB constructs intention and perceived behavioural control. Specifically, it was found that intention, but not perceived behavioural control, emerged as a significant predictor with more positive intentions to reduce household fruit and vegetable waste being associated with a greater likelihood that household fruit and vegetable waste was reduced at follow-up. However, the amount of variance in behaviour accounted for by intention was less than that which has been previously documented in environment-related domains (see Bamberg & Moser, 2007). One explanation for this finding could be that the strength of the intention-behaviour relationship is likely to be moderated by whether or not the person actually had the opportunity and the resources to carry out the behaviour (actual control). In the context of household food waste, it is likely that people may not have complete control over the amount of fruit and vegetables that are thrown away, due to the behaviour of other members of the household. Whilst the current study did include measurements of perceived responsibility of household food

shopping and cooking it was accepted that these responsibilities do not necessarily equate with actual control over household food waste. Future research would benefit from trying to assess actual control, in order to test the validity of this supposition.

Moreover, the more general finding that people's motivations do not accord perfectly with their behaviour has been widely documented and is referred to as the intention-behaviour gap (e.g. Sheeran, 2002). A number of potential moderators of the intention-behaviour gap have been suggested, including goal desires (Prestwich, Perugini & Hurling, 2008), implementation intentions (Gollwitzer & Sheeran, 2006), and strength of habit (Verplanken, Aarts, van Knippenberg & Moonen, 1998). It may be that these variables are also important in the context of environment-related behaviours, such as fruit and vegetable waste reduction, and they also represent important avenues for future research.

It is interesting to note that in the current study the overall fruit and vegetable waste of participants was significantly lower at Time 2 than at Time 1. This suggests that there was a direct effect of asking participants to report their cognitions (such as their intentions) on their subsequent behaviour. Studies across a range of behavioural domains have shown that measuring people's intentions or expectations can affect their future behaviour (e.g. Sherman, 1980; Greenwald, Carnot, Beach & Young, 1987; Morwitz, Johnson, & Schmittlein, 1993; Sandberg & Conner, 2009) and as such this phenomenon has been referred to as the 'mere measurement effect' (e.g. Godin, Sheeran, Conner & Germain, 2008). However, a recent meta-analysis of the effects of measuring TPB constructs on health behaviour, within prospective studies, found that in fact the mean effect size across all studies was very small (Mankarious & Kothe, 2014). The authors suggest that the findings do not support a meaningful change in behaviour associated with the "mere measurement effect". Interestingly, subgroup analysis showed

a significant decrease in socially undesirable behaviour (e.g. binge drinking and risky driving) suggesting that studies which have found a decrease in reported undesirable behaviours might be a result of the *mere measurement effect*, but there was no significant change found for socially desirable behaviour. In the current study the behaviour under investigation was arguably socially desirable behaviour (food waste reduction), thus the observed reduction in household food waste was unlikely to be a result of the “mere measurement effect”. It is possible that the effect was instead a consequence of procedures that resulted in the recruitment of highly motivated participants.

There are a number of limitations to this study that should be acknowledged. Firstly, as mentioned above the participants were self-selected and therefore unlikely to be a true representation of UK household food purchasers/providers. Future research would benefit from replicating the current research using a larger stratified sample of the UK population. Secondly, the self-report measure used in this study required participants to estimate the percentage of their household fruit and vegetables that were thrown away retrospectively. It is possible that some people were not able to estimate accurately and/or were not motivated to do so. It would be prudent for future research to replicate the current research using a more objective measure of waste. However, at present there is no accepted or standard method for monitoring and evaluating household food waste reduction and each of the existing methods have their limitations (Sharp, Giorgi & Wilson, 2010). Finally, only the cognitive precursors for reducing household fruit and vegetable waste were examined and not the cognitive precursors for not reducing household fruit and vegetable waste. Recent research has demonstrated that the antecedents of pro-environmental action and inaction are different and not simple opposites, and hence should be simultaneously considered in the prediction of

pro-environmental intention and behaviours (Richetin et al., 2012). Therefore, it would be advantageous that future food waste reduction studies measure both cognitions to reduce and cognitions not to reduce, simultaneously, to improve the predictive power of the TPB model.

In summary, the current study is the first to apply an extended TPB model to household fruit and vegetable waste reduction. Findings support the utility of this model at predicting intentions to reduce household fruit and vegetable waste and highlight the importance of considering the additional predictors of self-identity and anticipated regret alongside the core TPB constructs. Findings also provide some evidence that the TPB model might represent a useful framework for predicting household fruit and vegetable waste reduction behaviour, although the amount of variance accounted for in behaviour was small. Future research would benefit from investigating potential moderators of the intention-behaviour gap in this behavioural domain.

**CHAPTER 4. APPLYING SELF-AFFIRMATION TO ENVIRONMENT-RELATED BEHAVIOUR: EVIDENCE THAT SELF-AFFIRMATION PROMOTES POSITIVE COGNITIONS TOWARDS HOUSEHOLD FOOD WASTE REDUCTION**

**Abstract**

Evidence that self-affirmation can promote openness to information about environmental issues is limited. The current study explored whether a self-affirmation manipulation would render individuals more open to information about household food waste reduction. Participants ( $N = 224$ ) received either a self-affirmation manipulation or control equivalent prior to reading a message detailing the negative consequences of household food waste. Participants next completed a series of measures assessing cognitive precursors to behaviour change. Household food waste behaviour was assessed at one-week follow-up. Compared to their non-affirmed counterparts, self-affirmed participants reported more positive cognitions towards household food waste reduction on a number of outcomes, including intention, attitude, perceived norm, self-identity, anticipated regret and moral norm. There was no impact of the self-affirmation manipulation on behaviour at follow-up. Findings suggest that self-affirmation might represent a technique that can be usefully employed to facilitate people's engagement with pro-environmental behaviours.



## **Introduction**

A major challenge facing society is how best to persuade people to change their attitude and behaviour either for their own benefit (e.g. the prevention of illness) or for a greater good (e.g. environmental protection). Public communication campaigns frequently focus on the serious negative consequences of people's actions, the rationale being that this will motivate people to change their behaviour. However, such approaches have frequently been shown to be ineffective (e.g. Keller, 1999; Ruiter, Abraham & Kok, 2001). Moreover it has been suggested that such information can lead to defensive responses in both health and environmental domains (e.g. Freeman, Hennessy, & Marzullo, 2001; Stoll-Kleemann, O'Riordan & Jaeger, 2001).

Self-affirmation theory (Steele, 1988) offers a theoretical account of why people may respond defensively when faced with messages that highlight the negative consequences of their behaviour. The theory posits that people are motivated to protect their self-integrity, the belief that they are "adaptively and morally adequate, that is, competent, good, coherent, unitary, stable, capable of free choice, capable of controlling important outcomes..." (p. 262). To accept a message detailing the shortcomings of one's behaviour is tantamount to admitting that one has failed to live up to these standards. Consequently, defensive responses to such messages may represent attempts to restore or protect a sense of self-integrity.

Critically, however, self-affirmation theory offers a potential means of reducing such defensive reactions to potentially threatening information by use of a relatively simple technique. Specifically, self-affirmation theory contends that if an individual is given the opportunity to self-affirm by reflecting on their cherished values, actions or attributes, this should act as a boost to their self-integrity and hence leave them more open to considering potentially threatening information without needing to engage in

defensive responses. Such “offsetting” is believed to be effective as people are more concerned with maintaining an overall sense of self-integrity than with tackling every specific threat to the self (Steele, 1988).

In light of the above considerations, self-affirmation may predispose individuals to consider potentially threatening information in a more open and less biased manner. In support of this position, a growing body of evidence has shown that participants who are self-affirmed prior to reading personally relevant health-risk information are more open to this information than are their non-affirmed counterparts. For example, self-affirmed participants have been shown to report more positive intention towards reducing alcohol consumption (Harris & Napper, 2005; Scott, Brown, Phair, Westland & Schüz, 2013), increased perceived control, self-efficacy and intention to reduce cigarette consumption (Armitage, Harris, Hepton & Napper, 2008; Harris, Mayle, Mabbott & Napper, 2007), greater levels of response-efficacy and self-efficacy in regard to increasing fruit and vegetable consumption (Epton & Harris, 2008), and more positive attitude, intention, self-efficacy and response-efficacy, along with reduced message derogation, in relation to sunscreen use (Jessop, Simmonds, & Sparks, 2009).

Although there is some evidence that self-affirmation manipulations can result in positive behavioural effects within the experimental setting (e.g. Sherman, Nelson & Steele, 2000; Jessop et al., 2009), evidence that such positive changes in cognitions can influence behaviour in the long-term is mixed, with only a few studies demonstrating effects of self-affirmation on behaviour at follow-up (Armitage, Harris & Arden, 2011; Cook, Trebaczyk, Harris & Wright, 2014; Epton & Harris, 2008; Scott et al., 2013, but see also Harris et al., 2007; Harris & Napper, 2005; Reed & Aspinwall, 1998).

The evidence outlined above suggests that self-affirmation can promote engagement with information that people might be predisposed to be resistant to in

health-related-domains. However, little research has explored whether self-affirmation might similarly render individuals more open to information that details the negative environmental consequences of their behaviour.

To date, only two published studies have explored whether self-affirmation would result in people being more open to generic information detailing (i) the threat posed by climate change and (ii) the contribution of human activity to climate change (Sparks, Jessop, Chapman & Holmes, 2010, Study 1; Van Prooijen & Sparks, 2014). Sparks et al. found that participants who completed a self-affirmation manipulation prior to or after reading such information reported less general denial of climate change and, more specifically, greater personal involvement with regard to mitigating the consequences of climate change. Similarly, Van Prooijen and Sparks demonstrated that self-affirmed participants reported greater acceptance of climate change risks and heightened individual efficacy with regard to reducing such risks. Together, these findings suggest that self-affirmation might promote acceptance of information detailing the consequences of the anthropogenic nature of climate change.

In much the same way that people can respond defensively to messages detailing the negative consequences of climate change - as a consequence of their scepticism - it seems plausible that people could likewise be defensive to information detailing the negative consequences of their own actions (such as food waste) for the environment. However, despite the fact that food waste has many negative environmental impacts, including its contribution to climate change, qualitative research has revealed that although household food purchasers can respond defensively when discussing their household food waste behaviour it is not predominantly as a consequence of denial of climate change. For example, Graham-Rowe et al. (2014) found that psychological barriers to household food waste reduction was more a response to perceived conflicting

goals, thus some people felt that household food waste reduction was difficult to achieve without it impacting on important personal goals, such as being a ‘good’ provider. Such justifications are likely to be, at least in part, a defence mechanism to reduce a state of dissonance that has arisen from a discrepancy between the persons’ behaviour and their standard values (see Festinger, 1957). Furthermore, other responses revealed evidence of further defensive responses impeding behaviour change, such as ignorance, pro-environmental tokenism, fatalism, downward social comparisons and displaced blame (see Gifford, 2011; van ‘t Riet & Ruiter, 2013).

Similarly, in a TPB study on household food waste (study 2, Chapter 3) a gap between intention to reduce household food waste and subsequent behaviour was found. This gap suggests that habitual patterns of behaviour may also be a cause of defensive responses because when habits have developed an individual is less motivated to attend to or to seek out new information, especially if the information is not consistent with the habit (Maio et al., 2007). Therefore it seems plausible that a self-affirmation manipulation may reduce the defensive responses of people when faced with messages that highlight the negative consequences of their household food waste behaviour.

To date, only one published study has directly explored whether self-affirmation would render people more open to information detailing the consequences of a specific behaviour for the environment (Sparks et al., 2010; Study 2). Sparks et al. exposed participants to information detailing (a) the environmental costs of failing to recycle and (b) the benefits and relative ease of recycling. They demonstrated that “low-recyclers” who were self-affirmed prior to reading this information expressed a stronger intention to increase the amount they recycled; however, there was no evidence that the self-affirmation manipulation influenced attitude towards recycling. This study represents an important first step in the application of self-affirmation to specific environment-related

behaviours. Furthermore, the findings suggest that self-affirmation techniques have the potential to promote acceptance of information detailing the negative consequences of one's behaviour for the environment, with the result that individuals may be motivated to change their behaviour accordingly.

Nonetheless, Sparks et al.'s (2010; Study 2) application of self-affirmation theory to recycling behaviour is subject to a number of limitations. First, the authors explored the effects of self-affirmation on two cognitive antecedents of behaviour change: attitude and intention. However, empirically supported models of behaviour change suggest that a number of cognitive variables may be important precursors to behaviour change. For example, the theory of planned behaviour (TPB; Ajzen, 1988, 1991) contends that behavioural intention is the most proximal determinant of behaviour, which in turn is predicted by attitude, subjective norm and perceived behavioural control. Recent evidence further suggests that a number of additional variables might also contribute significantly to the prediction of intention or behaviour, including: self-identity, anticipated regret and moral norm, (Conner & Sparks, 2005). Accordingly, the first aim of the current study was to extend the findings of Sparks et al. by exploring whether self-affirmation would promote more positive cognitions across a range of potentially important precursors of behaviour change, namely: intention, attitude, perceived norm, perceived behavioural control, self-identity, anticipated regret and moral norm. Secondly, Sparks et al.'s (2010; Study 2) message attended to the negative consequences of failing to recycle for the environment, but not the negative personal consequences. Therefore the second aim of the current study was to present participants with information on the negative consequences of household food waste for both the environment and for the individual.

Finally, Sparks et al. (2010; Study 2) did not explore whether the reported effects of self-affirmation on intention translated into behaviour change at follow-up. Therefore the third aim of the current study was to establish whether a self-affirmation manipulation could promote positive environment-related behaviour change in the week following the intervention.

The decision was made to focus on food waste in the present study, with a particular focus on household fruit and vegetable waste reduction. Food waste has a major detrimental impact on the environment, including contributing to climate change (Food & Agriculture Organization [FAO] 2013, Waste Resource Action Plan [WRAP], 2013a). Despite this, in 2012 households in the UK threw away 4.2 tonnes of potentially edible food, of which 1.2 million tonnes comprised fruit and vegetable waste.

In accordance with self-affirmation theory, it was hypothesised that individuals who received a self-affirmation manipulation would be more open to a message detailing the negative consequences of food waste. Specifically it was predicted that those who were self-affirmed would display a stronger intention, a more positive attitude, greater perceived norm, greater perceived behavioural control, greater self-identity, more anticipated regret and a stronger moral norm regarding reducing household fruit and vegetable waste compared to their non-affirmed counterparts. Furthermore it was predicted that self-affirmed participants would waste less fruit and vegetables at one-week follow-up.

## **Method**

### ***Design and Procedure***

The study employed a one-way experimental design (self-affirmation manipulation: control, self-affirmation). At baseline, participants completed a measure

of household fruit and vegetable waste. They were then exposed to either a self-affirmation manipulation or a matched-control task prior to reading a message detailing the negative consequences of household food waste. Participants subsequently completed measures of cognitive precursors of behaviour change based on an extended theory of planned behaviour framework; specifically they completed measures of intention, attitude, perceived norm, perceived behavioural control, self-identity, anticipated regret and moral norm in regards to reducing their household fruit and vegetable waste. Household fruit and vegetable waste was again assessed at one-week follow-up.

Participants were recruited opportunistically through several universities in the UK and were invited to take part in a study exploring their thoughts and feelings about household fruit and vegetable waste. The recruitment message contained a link to the baseline questionnaire. Upon clicking on this link participants were randomly allocated to either the self-affirmation condition or the control condition. Participants who provided their e-mail address at baseline were sent the web-link to the follow-up questionnaire seven days later and were asked to complete this questionnaire as soon as possible. To aid recruitment and deter attrition, participants who completed both questionnaires were entered into a cash prize draw or given the option to gain course credits.

### ***Participants***

Three hundred and ten participants completed the baseline questionnaire. Participants who indicated that they had wasted less than ten percent of their household fruit and vegetables in the previous week ( $n = 85$ ) were omitted from further analysis as it was hypothesised that the food waste information would not be personally relevant or

threatening to these individuals. One participant was omitted from further analysis as a suspicion probe revealed that they were aware of the purpose of the study. The analyses reported below were thus conducted solely on data from participants ( $N = 224$ ) who indicated that they had wasted ten percent or more of their household fruit and vegetables in the preceding week. Ages ranged from 18 to 64 years ( $M = 21.62$  years,  $SD = 5.86$ ). The majority of the sample were female (83.50%), students (90.99%), single (83.26%), had no one under the age of eighteen living in their household (90.91%) and had two or more additional adults living in their household (75.45%). All participants had to be eighteen years or older and resident in the UK at the time of the study.

One hundred and ninety three participants completed the follow-up questionnaire representing an attrition rate of 13.84%. The number of participants in each condition were as follows: control condition, baseline  $n = 123$ , follow-up  $n = 107$ ; self-affirmation condition, baseline  $n = 101$ , follow-up  $n = 86$ .

Preliminary analyses were conducted to determine whether there were any differences between participants who responded to only the baseline questionnaire and those that responded at both baseline and follow-up. A series of one-way ANOVAs revealed no significant differences between the two groups in terms of number of adults living in their household, number of children living in their household, level of responsibility for household food shopping, level of responsibility for household food cooking and preparation, or baseline fruit and vegetable waste behaviour (all  $ps > .06$ ). However, there was a significant difference between follow-up responders and non-responders in terms of age,  $F(1, 221) = 5.46$ ,  $p < .01$ . Those that completed both time points were significantly younger ( $M = 21.23$ ) than those who completed only the baseline questionnaire ( $M = 23.93$ ). A series of Chi-square analyses revealed no



significant associations between responding at follow-up and gender, marital status, occupational status or condition (all  $ps \geq .06$ ).

### ***Materials***

Baseline questionnaire (Appendix E).

At baseline participants completed a questionnaire including the following sections:

*Demographic information.* Participants were asked to indicate their age, gender, occupational status, marital status, number of adults and children living in their household and UK residency.

*Responsibility for household food shopping.* Responsibility for household food shopping was assessed using the following item: “To what extent are you responsible for food shopping in your household?”; *not at all responsible* (1) to *responsible for all or almost all* (5).

*Responsibility for household food cooking and preparation.* Responsibility for their household food cooking and preparation was assessed using the following item: “To what extent are you responsible for cooking and preparing food in your household?”; *not at all responsible* (1) to *responsible for all or almost all* (5).

*Fruit and vegetable waste behaviour.* The following definition of household food waste was provided to all participants before they were asked to estimate their baseline fruit and vegetable waste behaviour: “*We are interested in fruit and vegetables that were brought into the home with the intention of being eaten. We are not concerned with waste that is generally perceived to be inedible, such as banana skins, apple cores and tough outer leaves. By ‘thrown away’ we mean any fruit and vegetables disposed of into the household rubbish bin, fed to animals or composted*”. Participants’ fruit and

vegetable waste at baseline was assessed by the item: “Please estimate what percentage of your household’s total fruit/vegetables got thrown away in the last seven days”.

Possible responses ranged from 0% - 100% with five percent increments.

*Self-affirmation manipulation.* Following Harris and Napper (2005), participants in the self-affirmation condition were asked to read a list of values and select their *most important* value (the value they picked need not have been on the list). They were then asked to give three reasons why the value was important to them and to give an example of something they had done demonstrating the importance of the value to them. Participants in the control condition were asked to select their *least important* value, give three reasons why this value might be important to someone else and give an example of something someone else might do to demonstrate the importance of the value to them.

*Value importance.* All participants were then asked to respond to the following question. “How important to you is the value that you selected to write about?”;

*Extremely unimportant (1) to extremely important (7).*

*Food waste message.* Participants next read a message detailing the negative consequences of food waste and provided suggestions of how to reduce household fruit and vegetable waste. This message was presented over three pages of the on-line questionnaire. The first page introduced climate change and the threat it poses to the modern world and outlined the link between food waste and climate change. An excerpt from this page read: “*Food waste is a major contributor to emissions of carbon dioxide and other greenhouse gases. The production, distribution and storage of food which is subsequently thrown away wastes energy, fuel and water, and contributes towards deforestation.*” The second page addressed the consequences of food waste to the individual, highlighting the financial and emotional costs. An excerpt from this page

read: “*Did you know that purchasing food that never gets eaten costs the average household £480 a year, rising to £680 for a family with children?*” The third page explained that fruit and vegetables were the most commonly wasted food group in the home and highlighted the benefits of reducing fruit and vegetable waste. This final page also presented suggestions for how to use up the fruit and vegetable in the home that might otherwise be thrown away (e.g., “Add fruit to cereal or yogurt in the morning”). All the information provided was deemed to be factually correct and was adapted from official on-line resources (Love Food Hate Waste, 2013; Food and Agriculture Organization, 2013; IPCC, 2007).

*Food waste information check.* To ensure participants had read the food waste risk information, they were asked to briefly summarise the information they had just read. All participants completed this check acceptably.

*Cognitive Precursors of Behaviour Change.* Participants were then asked to complete a series of scales assessing constructs from an extended theory of planned behaviour model. Unless otherwise indicated, responses were given on 7-point scales ranging from *strongly disagree* (1) to *strongly agree* (7). All scales showed good internal reliability and composite measures were created by calculating mean scores from the constituent items.

*Intention.* Participants’ intention were assessed by three items, e.g., “I intend to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days”,  $\alpha = .92$ .

*Attitude.* Participants’ attitude were assessed by asking them to respond to the statement: “For me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days would be...” on six pairs of semantic differentials (*extremely pointless* [1] to *extremely worthwhile* [7], *extremely unenjoyable*

[1] to *extremely enjoyable* [7], *extremely foolish* [1] to *extremely wise* [7], *extremely bad* [1] to *extremely good* [7], *extremely unpleasant* [1] to *extremely pleasant* [7], *extremely harmful* [1] to *extremely beneficial* [7],  $\alpha = .83$ .

*Perceived Norm.* Following Ajzen (2006), perceived norms were assessed by items assessing both subjective norm, e.g., “Most people who are important to me probably think that I should reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days” and descriptive norm, e.g., “Most people I know try to reduce the amount of fruit and vegetables that they throw away”. The resultant four item scale had acceptable internal reliability,  $\alpha = .75$ .

*Perceived behavioural control.* Perceived behavioural control was assessed using four items, e.g., “It would be possible for me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days”,  $\alpha = .74$ .

*Anticipated Regret.* Anticipated regret was assessed by two items, e.g., “I would feel regret if I did not reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days”,  $r(222) = .83$ ,  $p < .001$ .

*Self-Identity.* Self-Identity was assessed with three items, e.g., “I am the type of person who would reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days”,  $\alpha = .84$ .

*Moral Norm.* Moral norm was assessed with four items, e.g., “I feel a strong obligation to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days”,  $\alpha = .79$ .

*Follow-up questionnaire* (Appendix F). At follow-up participants were reminded of the definition of household fruit and vegetable waste given at baseline. Participants were again asked to respond to the same behaviour measure used to assess

their fruit and vegetable waste over the previous seven-day period at baseline, “Please estimate what percentage of your household’s total fruit/vegetables got thrown away in the last seven days”. Possible responses ranged from 0% - 100% with five percent increments. Participants were then given a space to add any comments. Finally, as a suspicion probe, participants were asked, “what do you think is the purpose of the study?”

## Results

### *Preliminary Analyses*

At baseline, the percentage of fruit and vegetables that participants had thrown away in the past seven days ranged from 10% -100% ( $M = 22.43$ ,  $SD = 15.86$ ).

A series of one-way ANOVAs revealed no significant differences between participants in the self-affirmation and control conditions in terms of age, number of adults living in their household, number of children living in their household, level of responsibility for household food shopping, level of responsibility for household food cooking and preparation, or baseline fruit and vegetable waste behaviour (all  $ps \geq .16$ ). A series of Chi-square analyses revealed no associations between condition and gender, marital status, or occupational status (all  $ps \geq .52$ ).

As expected, participants in the self-affirmation condition rated the value that they had selected to write about as significantly more important to them than did participants in the control condition,  $F(1, 222) = 210.75$ ,  $p < .001$ ,  $\eta p^2 = .49$ ,  $Ms = 5.86$  and 2.56 respectively.

***The impact of the self-affirmation manipulation on cognitive precursors of behaviour change.***

A series of one-way ANOVAs was conducted to ascertain whether the self-affirmation manipulation influenced each of the following cognitive outcomes: intention, attitude, perceived norm, perceived behavioural control, self-identity, anticipated regret and moral norm. The relevant means and standard deviations are summarised in Table 6.

*Intention.* There was a significant main effect of the self-affirmation manipulation on intention,  $F(1, 222) = 4.91, p = .03, \eta p^2 = .02$ , reflecting the fact that participants in the self-affirmation manipulation condition reported stronger intention to reduce their household fruit and vegetable waste compared to participants in the control condition,  $M_s = 5.53$  and  $5.18$  respectively.

*Attitude.* There was a significant main effect of the self-affirmation manipulation on attitude,  $F(1, 222) = 7.85, p = .01, \eta p^2 = .03$ , with participants in the self-affirmation condition reporting a more positive attitude towards reducing their household fruit and vegetable waste than their counterparts in the control condition,  $M_s = 5.71$  and  $5.41$  respectively.

*Perceived norm.* There was a significant main effect of the self-affirmation manipulation on perceived norm,  $F(1, 222) = 4.49, p = .04, \eta p^2 = .02$ . Participants in the self-affirmation condition reported greater normative pressure to reduce their household fruit and vegetable waste compared to participants in the control condition,  $M_s = 4.66$  and  $4.36$  respectively.

*Perceived behavioural control.* There was no effect of the self-affirmation manipulation on perceived behavioural control,  $F(1, 222) = 0.95, p = .33, \eta p^2 = .00$ .

*Anticipated regret.* There was a significant main effect of the self-affirmation manipulation on anticipated regret,  $F(1, 222) = 4.89, p = .03, \eta p^2 = .02$ . Participants in the self-affirmation condition anticipated experiencing greater regret if they did not reduce their household fruit and vegetable waste compared to participants in the control condition,  $M_s = 4.47$  and  $4.02$  respectively.

*Self-Identity.* There was a significant main effect of the self-affirmation manipulation on self-identity,  $F(1, 222) = 8.88, p < .001, \eta p^2 = .04$ , with participants in the self-affirmation condition identifying themselves more strongly as the type of person who would reduce their household fruit and vegetable waste compared to their counterparts in the control condition,  $M_s = 5.27$  and  $4.80$  respectively.

*Moral norm.* There was a significant main effect of the self-affirmation manipulation on moral norm,  $F(1, 222) = 7.33, p = .01, \eta p^2 = .03$ , reflecting the fact that participants in the self-affirmation condition felt a stronger moral obligation to reduce their household fruit and vegetable waste compared to participants in the control condition,  $M_s = 4.75$  and  $4.32$  respectively.

A series of hierarchical multiple regression analyses were conducted in order to determine whether any of the effects of the self-affirmation manipulation on cognitive outcomes was moderated by baseline fruit and vegetable waste behaviour. The results revealed no significant interactions between baseline behaviour and the self-affirmation manipulation for any of the cognitive outcomes, all  $\beta_s < |.16|, p_s > .06$ . Therefore, there was no evidence that baseline fruit and vegetable waste behaviour moderated any impact of the self-affirmation manipulation on the cognitive precursors to behaviour change assessed in the current study.

Table 6: Summary of one-way ANOVAs comparing participants in the control condition and the self-affirmation condition.

	<b>Control</b> ( <i>n</i> =123) <i>M</i> ( <i>SD</i> )	<b>Self-Affirmation</b> ( <i>n</i> =101) <i>M</i> ( <i>SD</i> )	<i>F</i>	$\eta p^2$
Attitude	5.41 (0.87)	5.71 (0.71)	7.85*	.03
Intention	5.18 (1.31)	5.53 (1.01)	4.91*	.02
Perceived behavioural control	5.10 (1.17)	5.26 (1.19)	0.95	.00
Perceived norm	4.36 (1.07)	4.66 (1.08)	4.49*	.02
Self-identity	4.80 (1.29)	5.27 (1.02)	8.88**	.04
Anticipated regret	4.02 (1.60)	4.47 (1.39)	4.89*	.02
Moral norm	4.32 (1.27)	4.75 (1.03)	7.33*	.03

Note: \*  $p < .05$ ; \*\*  $p < .01$

***The impact of the self-affirmation manipulation on household fruit and vegetable waste behaviour at follow-up.***

A one-way analysis of covariance was conducted to ascertain whether there was any effect of the self-affirmation manipulation on household fruit and vegetable waste at follow-up, controlling for baseline household fruit and vegetable waste. This analysis revealed no significant main effect of the self-affirmation manipulation on fruit and vegetable waste at follow-up,  $F(1, 190) = 0.29$ ,  $p = .59$ ,  $\eta p^2 = .00$ . Thus, there was no evidence that self-affirmation was associated with reduced fruit and vegetable waste at follow-up. The marginal means and standard errors for the control group = 17.68 (1.24) and for the self-affirmation group = 16.67 (1.39).

Furthermore, a hierarchical multiple regression analysis revealed no evidence that baseline fruit and vegetable waste behaviour moderated any association between condition and fruit and vegetable waste at follow-up,  $\beta = -.08$ ,  $p = .37$ .



## **Discussion**

The findings of the current study broadly support the first prediction that participants who received a self-affirmation manipulation prior to reading information detailing the negative consequences of food waste would report more positive cognitions towards reducing their household fruit and vegetable waste. Thus self-affirmed participants reported stronger intention, a more positive attitude, a greater perceived norm, greater self-identity, more anticipated regret and a stronger moral norm regarding reducing their household fruit and vegetable waste compared to their non-affirmed counterparts. These findings thus extend those of Sparks et al. (2010; Study 2) by demonstrating that the effects of self-affirmation can hold across a variety of cognitive outcomes, all of which have been shown to be important predictors of behavioural intention and/or behaviour (Ajzen, 1988, 1991; Connor & Sparks, 2005). Contrary to other self-affirmation findings there was no evidence in the current study that the impact of the self-affirmation manipulation on outcomes was influenced by baseline behaviour (cf. Harris & Napper, 2005; Sparks et al., 2010).

The predicted pattern of effects was not apparent for perceived behavioural control. While it is not unusual for self-affirmation research to report effects for some outcome variables but not others (Harris & Epton, 2009), it is possible that the absence of an effect for perceived behavioural control may reflect a limit to the actual control experienced by participants in the current study. The majority of the sample was made up of students living in multi-occupancy housing, which presumably limited the actual control they had over their households' total fruit and vegetable waste.

Furthermore, the current study found no evidence that self-affirmation was associated with changes in behaviour at follow-up. Thus the second prediction, that self-affirmed participants would report less fruit and vegetable waste in the week following

the intervention, was not supported. However, this lack of impact of self-affirmation on behaviour at follow-up is not unusual in self-affirmation research (see e.g. Reed & Aspinwall, 1998, Harris & Napper, 2005; Harris et al., 2007), and it has been suggested that self-affirmation should be viewed as a motivational technique rather than as part of a goal-striving process (Harris & Epton, 2009).

It is noteworthy that the risk-information presented in the current study documented the negative consequences of household food waste from two perspectives. The first perspective emphasised the impact of food waste on the environment by highlighting the link between food waste and climate change. The second perspective stressed the consequences of food waste for the individual by highlighting the financial and possible emotional costs associated with throwing food away. By contrast Sparks et al. (2010; Study 2) emphasised only the environmental consequences of not recycling in the message they presented to participants.

It would seem important from a theoretical and an applied perspective to explore further the impact of the content of the information provided to individuals when applying self-affirmation to an environmental domain. Many environment-related behaviours can be framed in terms of the consequences for the environment or for the individual. Evidence suggests that which of these is targeted can have important consequences for outcomes (Evans et al., 2012). For example, it has been argued that messages that appeal to self-interest (e.g. financial gains) can reduce “spillover effects” (Thøgersen & Compton, 2009), which is “the effect by which adoption of one pro-environmental behaviour may increase people’s inclination to adopt other pro-environmental behaviours...” (WWF, 2009, p. 6). Furthermore, it has been argued that messages that appeal to self-interest may serve to reinforce self-enhancing values and undermine concern for social and environmental problems (Crompton, 2011; Kasser &

Crompton, 2011). It remains to be established whether the same boundaries to the effectiveness of behaviour-specific environment-related information remain when this information is paired with self-affirmation techniques.

The current study was subject to several limitations. First, it relied on a self-report measure of fruit and vegetable waste; it would be prudent for future research to replicate the findings using a more objective measure of waste (Sharp, Giorgi, & Wilson, 2010). The current study also employed a student sample. Future research would therefore benefit from exploring whether the pattern of findings reported here holds for a representative sample drawn from the general population.

Nevertheless, this study represents just the second application of self-affirmation to a specific environment-related behaviour and the first application of self-affirmation to household food waste reduction. The findings suggest that self-affirmation has the potential to increase openness to information detailing the negative consequences of environment-related behaviours and may promote motivation to change behaviour accordingly. Future research would benefit from investigating the influence of the content of the environment-related information in such contexts. In particular, it would be of interest to explore whether the apparent boundaries to the effectiveness for environment-related messages that focus on self-interest hold when they are coupled with self-affirmation.

**CHAPTER 5. APPLYING SELF-AFFIRMATION TO ENVIRONMENT-RELATED BEHAVIOUR: EVIDENCE THAT SELF-AFFIRMATION PROMOTES POSITIVE BEHAVIOUR TOWARDS HOUSEHOLD FOOD WASTE REDUCTION**

**Abstract**

A major challenge facing society is how best to persuade people to change their environment-related behaviour, as people can respond defensively to messages that highlight the negative consequences of their behaviour. This study explored whether a self-affirmation manipulation could increase openness to a message detailing the negative consequences of household food waste. Furthermore, it investigated whether a brief self-affirmation manipulation could be integrated alongside this message to positive effect. Participants ( $N = 362$ ) received either a standard self-affirmation manipulation, an integrated self-affirmation manipulation or a control equivalent, prior to reading a message detailing the negative consequences of household food waste. Participants next completed a series of measures assessing cognitive precursors to behaviour change. Household food waste behaviour was assessed at one-week follow-up. Results revealed no impact of either self-affirmation manipulation on the cognitive precursors to behaviour change. However, participants in the standard self-affirmation condition who were categorised as high or average wasters at baseline, indicated that they threw away a lower percentage of household fruit and vegetable waste at follow-up, compared to their non-affirmed counterparts. Findings suggest that a standard self-affirmation manipulation might represent a technique that can be usefully employed to facilitate household food waste reduction change.

## **Introduction**

Household food waste has a major detrimental impact on the environment, including contributing to climate change (WRAP, 2011; 2013a). Despite national campaigns aimed at reducing household food waste, UK households still throw away approximately 19% of the food and drink purchased for consumption (WRAP, 2013a). One possible reason for such continued high levels of waste is that people may respond defensively to information detailing the negative consequences of their behaviour (e.g. Freeman, Hennessy, & Marzullo, 2001; Stoll-Kleemann, O’Riordan & Jaeger, 2001).

Self-affirmation theory (Steele, 1988) contends that people are continually motivated to protect their self-integrity, the belief that they are “adaptively and morally adequate” (p. 262). Messages recommending that an individual should change their behaviour because it is damaging to the environment are likely to call into question this view of the self as adaptive and moral and hence may threaten the individual’s self-integrity. In order to protect his/her self-integrity, the individual may be motivated to process the message defensively and, as a result, the recommendation for behaviour change may be rejected.

Importantly from an applied perspective, however, self-affirmation theory contends that people who are given the opportunity to reflect upon a different but important aspect of their self-integrity, prior to exposure to such threatening information, should be better able to process the information without resorting to defensive responses.

In support of this position, two recent studies have indicated that self-affirmation may result in people being more open to information detailing the negative consequences of their behaviour for the environment. Sparks, Jessop, Chapman and Holmes (2010; study 2) demonstrated that ‘low recyclers’ who completed a value-based

self-affirmation manipulation prior to reading information about the environmental costs of failing to recycle, reported more positive intentions to recycle, compared to their non-affirmed counterparts.

Similarly, Graham-Rowe, Jessop and Sparks (under review, Chapter 4) found that participants who were self-affirmed prior to exposure to a message detailing the negative consequences of food waste reported more positive cognitions towards reducing their household fruit and vegetable waste behaviour on a number of outcomes, namely intention, attitude, perceived norm, self-identity, anticipated regret and moral norm, compared to their non-affirmed counterparts. Interestingly, there was no evidence that the self-affirmation manipulation impacted on behaviour at one-week follow-up.

While these studies highlight the capacity for self-affirmation to promote openness to information detailing the negative consequences of one's behaviour for the environment, they are subject to several limitations. Firstly, both studies used predominantly student samples and therefore it is questionable whether these findings can be generalised. Secondly, they failed to adequately assess behaviour at follow-up; thus Sparks et al. (2010; Study 2) did not measure behaviour at follow-up and Graham-Rowe et al. (under review, Chapter 4) utilised a single-item measure to assess fruit and vegetable waste, which may not have captured adequately the variability in people's behaviour. Furthermore, both studies used a relatively complex and time intensive self-affirmation manipulation that required participants to write about their most important value, thus requiring a motivated sample. It is hard to envisage how such tasks, as they currently stand, could be integrated into real-world campaigns. Given this, it would seem important for research to turn its attention to the development of brief self-affirmation manipulations that can be readily integrated into environmental campaigns.

In a health-related domain, Jessop, Simmonds and Sparks (2009) explored the utility of integrating a brief positive-trait self-affirmation manipulation into a leaflet presenting information detailing the risks of skin cancer and highlighting the benefits of using sunscreen. Participants were asked to read a list of positive traits and to circle the ones that applied to them. They were then informed that if they had circled any of the above traits this made them an ideal candidate to take part in a sun safety challenge - to wear sunscreen when sunbathing - for the rest of the year. Results revealed that the participants who had been allocated this integrated self-affirmation condition reported less-defensive processing of the information compared to their control counterparts. Furthermore, they were more likely to request a free sample of sunscreen. Despite its apparent success, one limitation to Jessop et al.'s integrated self-affirmation manipulation was that it required participants to actively engage with the task by circling positive traits. It is questionable how likely people are to participate in this manner in a real world context. Certainly it would seem to be important to explore whether brief, integrated self-affirmation manipulations, that require no active participation from recipients, can similarly be integrated into health – or environment – promotion materials, to positive effect.

In light of the above limitations the first aim of the current study was to replicate Graham-Rowe et al.'s (under review, Chapter 4) study, utilising a non-student sample and employing a more detailed measure of fruit and vegetable waste. The second aim was to explore whether a brief integrated self-affirmation manipulation would promote open processing of environment-related information. This integrated self-affirmation was designed so that it was (a) brief, requiring no written or verbal response, and (b) worded such that the self-affirmation task was ostensibly related to the environment-related message.

In accordance with self-affirmation theory, it was predicted that individuals who received a standard value-based self-affirmation manipulation would be more open to a message detailing the negative consequences of food waste. Specifically it was hypothesised that participants receiving this manipulation would display more positive cognitions towards household fruit and vegetable waste reduction, compared to their non-affirmed counterparts. Secondly, it was hypothesised that a standard value-based self-affirmation should be effective at promoting behaviour change, insofar as participants who received this self-affirmation manipulation should report a lower percentage of fruit and vegetable waste at follow-up compared to their control counterparts. Thirdly, it was hypothesised that a brief value-based self-affirmation manipulation, integrated into the food waste message, would similarly promote positive cognitions and a reduction in fruit and vegetable waste at follow-up.

## **Method**

### ***Design and Procedure***

The study employed a one-way experimental design (condition: control, standard self-affirmation, integrated self-affirmation). At baseline, participants completed a measure of household fruit and vegetable waste. They were then exposed to either a self-affirmation manipulation (standard or integrated) or a control task, prior to reading a message detailing the negative consequences of household fruit and vegetable waste. Participants subsequently completed measures of cognitive precursors to behaviour change based on an extended theory of planned behaviour framework; specifically they completed measures of intention, attitude, perceived norm, perceived behavioural control, self-identity, anticipated regret and moral norm in regards to



reducing their household fruit and vegetable waste. Household fruit and vegetable waste was again assessed at one-week follow-up.

Participants were recruited opportunistically by contacting several UK fruit and vegetable box companies asking them to advertise the study to their customers. Participants were also recruited through contacting local council waste management departments and asking them to advertise the study to their staff members. Participants were invited to take part in a study exploring their thoughts and feelings about household fruit and vegetable waste. The recruitment message contained a link to the baseline questionnaire. Upon clicking on this link participants were randomly allocated to one of the three conditions. Participants who provided their e-mail address at baseline were sent the web-link to the follow-up questionnaire seven days later and were asked to complete the questionnaire as soon as possible. To aid recruitment and deter attrition, participants who completed both questionnaires were entered into a cash prize draw.

### ***Participants***

Four hundred and fifty seven participants completed the baseline questionnaire. Participants who indicated that they hadn't wasted any of their household fruit and vegetables in the past seven days ( $n = 95$ ) were omitted from further analysis, as it was hypothesised that the food waste information would only be personally relevant and threatening to those who indicated that they wasted at least some of their fruit and vegetables. The analyses reported below were thus conducted solely on data from the remaining three hundred and sixty two participants. Ages ranged from 18 to 86 years ( $M = 43.30$  years,  $SD = 12.73$ ). The majority of the sample were female (82.32%), employed/self-employed (77.07%), married/living with partner (75.14%), had no one under the age of eighteen living in their household (62.98%) and had one or more

additional adults living in their household (88.67%). All participants had to be eighteen years or older and resident in the UK at the time of the study.

Two hundred and eighty three participants completed the follow-up questionnaire representing an attrition rate of 38.07%. The numbers of participants in each condition were as follows: standard self-affirmation condition, baseline  $n = 106$ , follow-up  $n = 84$ , control condition, baseline  $n = 114$ , follow-up  $n = 90$ ; short self-affirmation condition, baseline  $n = 142$ , follow-up  $n = 109$ . Given the disparity between the numbers of participants that were observed in each condition at baseline and what would be expected with random allocation, a Chi-square analysis was conducted to compare the number of participants who had been allocated a condition, but dropped out, versus the number of participants who had been allocated a condition and completed the Time 1 questionnaire. The results revealed that there was a differential dropout rate,  $\chi^2(2, N = 690) = 12.43, p < .01$ , Cramer's  $V = .13$ . In particular, there was a higher than expected dropout rate among participants allocated into the standard self-affirmation condition and a lower dropout rate than expected among participants allocated into the integrated self-affirmation condition.

Preliminary analyses were conducted to determine whether there were any differences between participants who responded to only the baseline questionnaire and those who responded at both baseline and follow-up. A series of one-way ANOVAs revealed no significant differences between the two groups in terms of number of adults living in their household, number of children living in their household, level of responsibility for household food shopping, level of responsibility for household food cooking and preparation, or baseline fruit and vegetable waste behaviour (all  $ps \geq .22$ ). However, there was a significant difference between the two groups in terms of age,  $F(1, 352) = 15.13, p < .001, \eta^2 = .04$ . Participants who completed both time points were

significantly older ( $M = 44.65$ ) than participants who completed only the baseline questionnaire ( $M = 38.38$ ). A series of Chi-square analyses revealed no significant association between responding at follow-up and gender, marital status or condition (all  $ps \geq .23$ ). However, a Chi-square analysis revealed a significant association between responding at follow-up and occupational status,  $\chi^2(1, N = 360) = 5.35, p = .02$ , Cramer's  $V = .12$ ; such that employed/self-employed participants were under-represented at follow-up.

### ***Materials***

Baseline questionnaire (Appendix G). At baseline participants completed a questionnaire including the following sections:

*Demographic information.* Participants were asked to indicate their age, gender, occupation status, marital status, number of adults and children living in their household and UK residency.

*Responsibility for household food shopping.* Responsibility for household food shopping was assessed using the following item: "To what extent are you responsible for food shopping in your household?"; not *at all responsible* (1) to *responsible for all or almost all* (5).

*Responsibility for household food cooking and preparation.* Responsibility for their household food cooking and preparation was assessed using the following item: "To what extent are you responsible for cooking and preparing food in your household?"; not *at all responsible* (1) to *responsible for all or almost all* (5).

*Fruit and vegetable waste behaviour definition.* The following definition of household food waste was provided to all participants before they were asked to estimate their baseline fruit and vegetable waste behaviour: "*We are interested in fruit*

*and vegetables that were brought into the home with the intention of being eaten. We are not concerned with waste that is generally perceived to be inedible, such as banana skins, apple cores and tough outer leaves. By 'thrown away' we mean any fruit and vegetables disposed of into the household rubbish bin, fed to animals or composted".*

*Fruit and vegetable waste behaviour.* Based on existing classifications of fruits (citrus, berries, tropical) and vegetables (root, stem/leaf, other vegetables) fruit and vegetable waste behaviour was assessed using seven items, each of which assessed waste from a particular category of either fruits or vegetables, e.g., "Please estimate what percentage of your household's root vegetables (e.g. carrots, potatoes, onions, turnips) was thrown away in the last seven days",  $\alpha = .71$ . A mean score was calculated for each participant, with higher scores indicating higher levels of fruit and vegetable waste at baseline.

*Self-affirmation manipulation.* Following Harris and Napper (2005), participants in the standard self-affirmation condition were asked to read a list of values (conscientiousness, spirituality/religiousness, compassion, intelligence, generosity, trustworthiness, creativity, hedonism, friendliness, kindness, spontaneity) and select their most important value (this value did not have to appear on the list). They were then asked to give three reasons why the value was important to them and to give an example of something they had done demonstrating the importance of the value to them (Appendix G, p. 237). Participants in the control condition were asked to select their least important value from the same list presented to participants in the standard self-affirmation condition, give three reasons why this value might be important to someone else and give an example of something someone else might do to demonstrate the importance of the value to them (Appendix G, p. 238).

For the integrated self-affirmation condition (designed for this study), it was hypothesised that for the manipulation to be believable the values had to be tangentially associated with the behaviour under investigation. Therefore, the values that could be selected by the participants had to be limited. This meant that the integrated self-affirmation condition was not equivalent to the standard self-affirmation condition. Participants were presented with the following list of eleven values (conscientiousness, morality, compassion, commitment, determination, resourcefulness, intelligence, open-mindedness, creativity, enthusiasm, competence) and asked to select their most important value from the list. Participants were then asked to think about why the value was important to them and how it had influenced the things they had done. On the next page they were presented with a message that read: “the good news is that if any of these values are important to you, you are likely to be successful in reducing your household food waste” (Appendix G, p. 239).

*Value importance.* Participants in the standard self-affirmation condition and the control condition were then asked to respond to the following question. “How important to you is the value that you selected to write about?”; *Extremely unimportant* (1) to *extremely important* (7). Value importance was not measured in the integrated self-affirmation condition, as having done so would have required participants to actively engage with the task, thus interfering with the objective of the manipulation.

*Food waste message.* Following Graham-Rowe et al. (under review, Chapter 4) participants next read a message detailing the negative consequences of food waste and providing suggestions for how to reduce household fruit and vegetable waste. This message was presented over three pages of the on-line questionnaire. The first page introduced climate change and the threat it poses to the modern world and outlined the link between food waste and climate change. An excerpt from this page read: “*Food*

*waste is a major contributor to emissions of carbon dioxide and other greenhouse gases. The production, distribution and storage of food which is subsequently thrown away wastes energy, fuel and water, and contributes towards deforestation.*” The second page addressed the consequences of food waste for the individual, highlighting the financial and emotional costs. An excerpt from this page read: *“Did you know that purchasing food that never gets eaten costs the average household £480 a year, rising to £680 for a family with children?”* The third page explained that fruit and vegetables were the most commonly wasted food group in the home and highlighted the benefits of reducing fruit and vegetable waste. This final page also presented suggestions for how to easily use up the fruit and vegetable in the home that might otherwise be thrown away (e.g., “Add fruit to cereal or yogurt in the morning”). All the information provided was adapted from official on-line resources (Love Food Hate Waste, 2013; Food and Agriculture Organization, 2013; IPCC, 2007).

*Food waste information check.* To ensure participants had read the food waste risk information, they were asked to briefly summarise the information they had just read. All participants completed this check acceptably.

*Cognitive Precursors of Behaviour Change.* Participants were then asked to complete a series of items assessing cognitive precursors to behaviour change derived from an extended theory of planned behaviour model (e.g. Conner & Sparks, 2005; Rivas & Sheeran, 2003a). Unless otherwise indicated, responses were given on 7-point scales ranging from *strongly disagree* (1) to *strongly agree* (7). Measures of internal reliability were acceptable for all constructs (all alphas  $\geq .72$ ; all  $r_s \geq .80$ ). Mean scores were calculated for each participant, with higher scores indicating higher levels of the construct under investigation.

*Intention.* Participants' intention was assessed by three items, e.g., "I intend to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days".

*Attitude.* Participants' attitude was assessed by asking them to respond to the statement: "For me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days would be..." on six pairs of semantic differentials (e.g. *extremely pointless* [1] to *extremely worthwhile* [7]).

*Perceived Norm.* Following Ajzen (2006), perceived norm was assessed by items assessing both subjective norm, e.g., "Most people who are important to me probably think that I should reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days" and descriptive norm, e.g. "Most people I know try to reduce the amount of fruit and vegetables that they throw away".

*Perceived behavioural control.* Perceived behavioural control was assessed using four items, e.g., "It would be possible for me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days".

*Anticipated Regret.* Anticipated regret was assessed by two items, e.g., "I would feel regret if I did not reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days".

*Self-Identity.* Self-Identity was assessed with three items, e.g., "I am the type of person who would reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days".

*Moral Norm.* Moral norm was assessed with four items, e.g., "I feel a strong obligation to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days".

Follow-up questionnaire (Appendix H). At follow-up participants were reminded of the definition of household fruit and vegetable waste given at baseline and were asked to respond to the same seven questions to assess their fruit and vegetable waste over the previous seven-day period,  $\alpha = .63$ . A mean score was calculated for each participant, with higher scores indicating higher levels of fruit and vegetable waste at follow-up. Participants were then given a space to add any comments. Finally, as a suspicion probe, participants were asked, “what do you think is the purpose of the study?”

## Results

### *Preliminary Analyses*

At baseline, the average percentage of fruit and vegetables that participants indicated that they had thrown away in the past seven days ranged from 0.71% - 33.57% ( $M = 3.91$ ,  $SD = 4.73$ ).

A series of one-way ANOVAs revealed no significant differences between participants in the standard self-affirmation, the integrated self-affirmation and control conditions in terms of age, number of adults living in their household, number of children living in their household, level of responsibility for household food shopping, level for responsibility of household food cooking and preparation, or baseline fruit and vegetable waste behaviour (all  $ps \geq .20$ ). A series of Chi-square analyses revealed no significant associations between condition and gender, marital status, or occupational status (all  $ps \geq .19$ ).

As expected, participants in the standard self-affirmation condition rated the value that they had selected to write about as significantly more important to them than did participants in the control condition,  $F(1, 218) = 76.14$ ,  $p < .001$ ,  $\eta p^2 = .26$ ,  $Ms =$



5.06 and 2.58 respectively. The results of a probe question revealed that none of the participants in this study indicated that they knew the true purpose of the study.

***The impact of the self-affirmation manipulations on cognitive precursors of behaviour change***

A series of one-way ANOVAs was conducted to ascertain whether condition influenced each of the following cognitive outcomes: intention, attitude, perceived norm, perceived behavioural control, self-identity, anticipated regret and moral norm. The resultant analyses are summarised in Table 7. The results revealed no significant main effects of condition on any of the outcome variables (all  $ps \geq .14$ ) with the exception of anticipated regret,  $F(2, 359) = 5.02, p < .01, \eta^2 = .03$ . In order to identify where the mean differences lay for anticipated regret, a Games-Howell *post hoc* test was conducted, as the Levine's test indicated that the assumption of homogeneity of variance had not been met. Results revealed that the only pair of conditions to differ significantly were the integrated self-affirmation condition and the standard self-affirmation condition ( $p < .01$ ); participants in the integrated self-affirmation condition reported greater levels of anticipated regret than participants in the standard self-affirmation condition,  $Ms = 5.35$  and  $4.76$  respectively.

Table 7: Summary of one-way ANOVAs comparing participants in the control condition, the standard self-affirmation condition and the integrated self-affirmation condition on cognitive precursors to behaviour change.

	<b>Control</b>	<b>Standard Self-Affirmation</b>	<b>Integrated Self-Affirmation</b>		
	( <i>n</i> =114)	( <i>n</i> =106)	( <i>n</i> =142)		
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>F</i>	$\eta p^2$
Attitude	5.89 (1.02)	5.81 (0.97)	6.01 (0.87)	1.38	.01
Intention	5.80 (1.17)	5.81 (1.24)	6.03 (1.01)	1.67	.00
Perceived Norm	4.67 (1.12)	4.58 (1.12)	4.64 (1.15)	.195	.00
Perceived Behavioural Control	5.53 (1.23)	5.60 (1.31)	5.67 (1.17)	0.41	.00
Self-Identity	5.74 (1.31)	5.83 (1.15)	5.86 (1.33)	0.29	.00
Anticipated Regret	4.93 (1.66)	4.76 (1.70)	5.35 (1.26)	5.02**	.03
Moral Norm	5.30 (1.48)	5.27 (1.27)	5.57 (1.23)	2.00	.01

Note: \*\*  $p < .01$

A series of hierarchical multiple regressions was conducted to see if baseline fruit and vegetable waste behaviour moderated any patterns of associations between condition and each of the cognitive outcomes measured. Condition was dummy coded for this analysis, as recommended by Aiken and West (1991) so that the first contrast ( $D_1$ ) compared the standard self-affirmation condition (1) with the control condition (0) and the second contrast ( $D_2$ ) compared the integrated self-affirmation (1) with the control condition (0). Baseline fruit and vegetable waste scores were mean centred prior to analysis. Condition and baseline fruit and vegetable waste scores were entered at step 1, and the two-way interaction terms between these variables were entered at step 2. Inspection of the  $F$  change statistic at step 2 revealed no evidence that baseline fruit and vegetable waste moderated the impact of condition on intention, attitude, perceived norm, perceived behavioural control, self-identity, anticipated regret or moral norm, all  $\Delta F_s \leq .71$ ,  $p_s \geq .49$ .

***The impact of the self-affirmation manipulations on household fruit and vegetable waste behaviour at follow-up.***

A one-way analysis of covariance was conducted to ascertain whether there was any effect of condition on household fruit and vegetable waste at follow-up, controlling for baseline household fruit and vegetable waste. This analysis revealed a marginally significant main effect,  $F(2, 279) = 2.48$ ,  $p = .09$ ,  $\eta^2 = .02$ . The relevant marginal means and standard errors are reported in Table 8.

Table 8: Summary of one-way ANCOVA comparing participants in the control condition, the standard self-affirmation condition and the integrated self-affirmation condition on behaviour at follow-up, controlling for baseline behaviour.

	Control ( <i>n</i> = 90)	Standard Self-Affirmation ( <i>n</i> = 84)	Integrated Self-Affirmation ( <i>n</i> = 109)		
	<i>Marginal Mean (SE)</i>	<i>Marginal Mean (SE)</i>	<i>Marginal Mean (SE)</i>	<i>F</i>	$\eta p^2$
Follow-up waste behaviour (%)	3.07 (0.32)	2.14 (0.33)	2.94 (0.29)	2.48 <sup>†</sup>	.02

Note: <sup>†</sup>  $p < .10$ . Note: Marginal means calculated at baseline fruit and vegetable waste = 3.84

In line with the hypotheses planned contrasts were conducted to test whether: (1) participants in the standard self-affirmation condition wasted a lower percentage of fruit and vegetables at follow-up compared to participants in the control condition and (2) participants in the integrated self-affirmation condition wasted a lower percentage of fruit and vegetables at follow-up compared to participants in the control condition. The first analysis revealed that participants in the standard self-affirmation condition wasted a significantly lower percentage fruit and vegetables at follow-up than did participants in the control condition,  $p = .04$ , 95% CI [0.4, 1.82], estimated marginal means = 2.18 and 3.07 respectively. The second planned contrast revealed that there was no significant difference in the percentage of fruit and vegetables wasted at follow-up between participants in the integrated self-affirmation condition and participants in the control condition,  $p = .76$ , 95% CI [-.71, .97], estimated marginal means = 2.94 and 3.07 respectively.

A hierarchical multiple regression analysis was conducted to determine if baseline fruit and vegetable waste moderated any associations between condition and fruit and vegetable waste at follow-up. Condition ( $D_1$  and  $D_2$ ) and mean-centred baseline fruit and vegetable waste scores were entered at step 1; the two-way interaction terms between these variables were entered at step 2. Critically, when the interaction terms was included, at Step 2, this significantly increased the variance in fruit and vegetable waste at follow-up accounted for by the model,  $\Delta F(2, 277) = 9.01$ ,  $p < .001$ ,  $\Delta R^2 = .04$ , demonstrating that any effect of condition on fruit and vegetable waste at follow-up was moderated by baseline fruit and vegetable waste. Inspection of the beta weights revealed that the interaction between  $D_1$  and baseline fruit and vegetable waste was significant ( $\beta = -.25$ ,  $p < .001$ ), demonstrating that baseline fruit and vegetable waste moderated the impact of the standard self-affirmation condition (as compared to

the control condition) on behaviour at follow-up. There was no significant interaction between D<sub>2</sub> and baseline fruit and vegetable waste ( $\beta = -.06, p = .32$ ), demonstrating that there was no evidence that baseline fruit and vegetable waste moderated any impact of the integrated self-affirmation condition (as compared to the control condition) on outcomes. The resultant hierarchical multiple regression is summarised in Table 9.

Table 9: A summary of hierarchical multiple regression analysis exploring whether baseline behaviour moderated the impact of condition on behaviour at follow-up. ( $n = 283$ )

Predictors	Step 1	Step 2
	$\beta$	$\beta$
D <sub>1</sub> condition	-.12*	-.12*
D <sub>2</sub> condition	-.02	-.02
Mean centred baseline behaviour	.59***	.76***
D <sub>1</sub> interaction		-.25***
D <sub>2</sub> interaction		-.06
$R^2$	.36***	.40***
$F$	51.69***	36.40***
$\Delta R^2$		.04***
$\Delta F$		9.01***

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .00$

In order to further explore the moderating role of baseline fruit and vegetable waste on the impact of the standard self-affirmation manipulation, simple slopes analysis was conducted (Aiken & West, 1991). Specifically, with the data set restricted to participants in the standard self-affirmation condition and control conditions only, follow-up fruit and vegetable waste was regressed onto condition (dummy coded: control = 0, standard self-affirmation = 1), for those with low (1 SD below the mean), mean and high (1 SD above the mean) baseline fruit and vegetable waste scores.

Analyses revealed there was a significant effect of condition on follow-up fruit and vegetable waste scores for participants with high baseline fruit and vegetable waste scores  $\beta = -.39$ ,  $t(173) = -4.59$ ,  $p < .001$ ,  $SE = .62$  and mean baseline fruit and vegetable scores  $\beta = -.13$ ,  $t(173) = -2.13$ ,  $p = .04$ ,  $SE = .44$ . Individuals in the self-affirmation condition reported lower follow-up fruit and vegetable waste compared to those in the control condition. There was no effect of condition on follow-up fruit and vegetable waste scores for individuals with low baseline fruit and vegetable scores,  $\beta = .13$ ,  $t(173) = 1.59$ ,  $p = .11$ ,  $SE = .62$ . Figure 2 plots the simple slopes for the interaction.

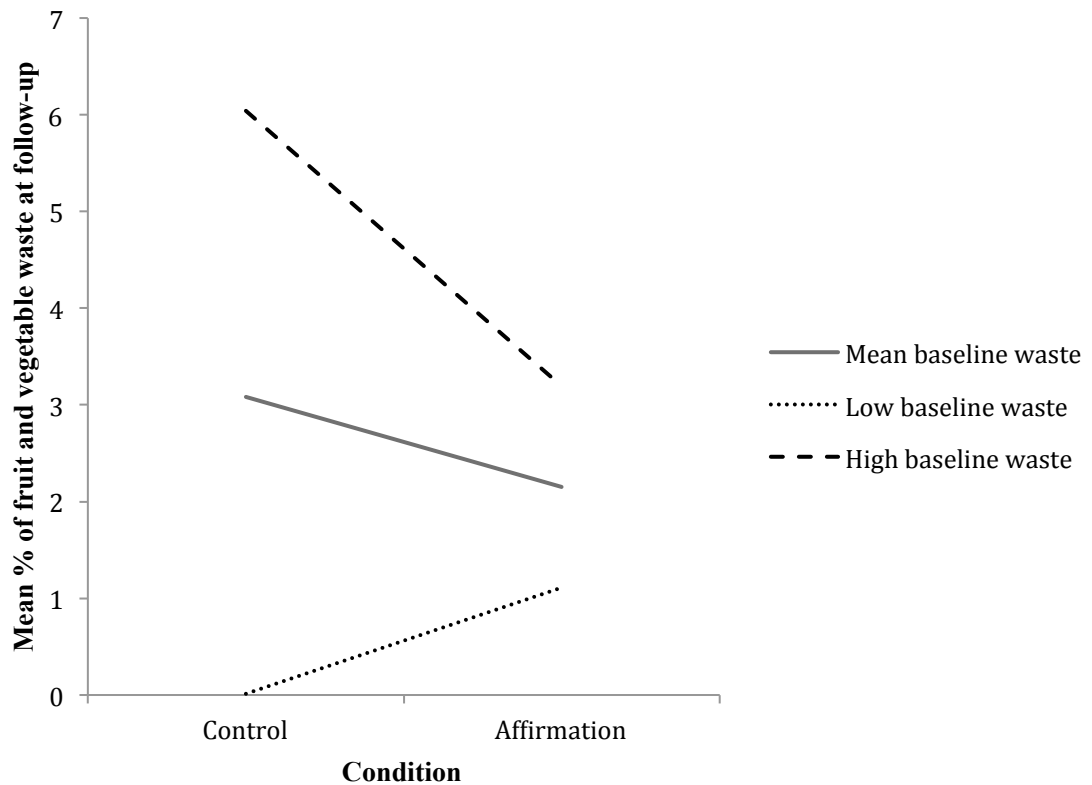


Figure 2: Fruit and vegetable waste behaviour at follow-up regressed onto condition for individuals with low, mean and high fruit and vegetable waste behaviour at baseline

## Discussion

The findings of the current study failed to support the first prediction that participants who received a standard value-based self-affirmation manipulation, prior to reading information about the negative consequences of food waste, would report more positive cognitions towards reducing their household fruit and vegetable waste compared to their control counterparts. Specifically, there was no evidence of any impact of the value-based self-affirmation manipulation on intention, attitude, perceived norm, perceived behavioural control, self-identity, moral norm and descriptive norm. While there was an effect of condition on anticipated regret, unexpectedly the significant difference lay between the standard self-affirmation condition and the integrated self-affirmation condition, with participants in the standard self-affirmation condition reporting *lower* levels of anticipated regret. Moreover, there was no evidence that baseline behaviour significantly moderated any impact of the standard self-affirmation manipulation on any cognitive outcomes.

The findings reported above are generally not in-line with those reported by Sparks et al. (2010; Study 2) and directly contradict those reported by Graham-Rowe et al. (under review, Chapter 4). Thus, Graham-Rowe et al. found that self-affirmed participants reported more positive cognitions towards household food waste reduction on the following outcomes; intention, attitude, perceived norm, self-identity, anticipated regret and moral norm.

One possible explanation for the difference between the findings of the current study and that of Graham-Rowe et al. (under review, Chapter 4) pertains to the different participant samples. Participants in the current study were self-selected and many already had a real interest in sustainability issues, since most were recruited through organic fruit and vegetable box delivery schemes or via local council waste



management departments. Therefore, the participants may not have been particularly defensive to the information; as such there may not have been much scope for the standard self-affirmation manipulation to reduce such defensive processing.

Interestingly, the findings of the current study provide support for the second prediction, that participants who received a standard value-based self-affirmation manipulation would waste a lower percentage of fruit and vegetables at follow-up. Thus participants in the standard self-affirmation condition wasted significantly less household fruit and vegetable at follow-up compared to those in the control condition. Moreover, baseline fruit and vegetable waste behaviour was found to moderate this association. Specifically, self-affirmed participants who were categorised as having high baseline waste or average baseline waste reported lower levels of waste at follow-up, compared to those in the control condition. There was no significant effect of the standard self-affirmation manipulation for participants characterised as having low baseline waste. This finding is in-line with research which suggests that the greatest effects of self-affirmation are generally found for people most at risk, where being at risk is typically operationalised as being most likely to engage in the detrimental behaviour under investigation (e.g. Harris & Napper, 2005; Harris, Mayle, Mabbott & Napper, 2007; Scott, Brown, Phair, Westland & Schüz, 2013). It is noteworthy, however, that previous studies have typically found baseline risk to moderate cognitive outcomes rather than behavioural outcomes.

The findings of the current study, regarding the impact of the value-based standard self-affirmation manipulation on behaviour, are not in-line with those reported in Graham-Rowe et al. (under review, Chapter 4) which found no evidence of any impact of the same value-based standard self-affirmation manipulation on fruit and vegetable waste at follow-up. One possible explanation for this discrepancy relates to

the amount of control participants in the respective samples may have had. Participants in the Graham-Rowe et al.'s study were primarily sharing their households with other students and this may have meant that they did not have the opportunity or influence to reduce the total amount of fruit and vegetables thrown away from their household. By contrast, the majority of the participants in the current study were older and were more often living with their partner. Therefore, arguably, these participants may have had greater control over limiting their household fruit and vegetable waste. It is interesting to note, however, that this explanation is not supported in differences in participant's perceptions of behavioural control between the studies. Indeed, participants perceived behavioural control scores were somewhat higher in the Graham-Rowe et al. study compared to the participants in the current study. However, perceived behavioural control does not necessarily accurately reflect actual control.

A second possible explanation for the difference in behavioural findings between the current study and that of Graham-Rowe et al. (under review, Chapter 4) concerns the different fruit and vegetable waste measures used. In the Graham-Rowe et al.'s study a single-item measure was utilised, which may not have been sensitive enough to pick up on small differences in food waste behaviour. By contrast, in the current study a more comprehensive seven-item measure was designed to assess fruit and vegetable waste. As a result this new measure may have been more capable at detecting small variances in fruit and vegetable waste behaviour.

The findings of the current study provided no support for the third hypothesis that a brief value-based self-affirmation manipulation integrated into the food waste message would promote: (1) positive cognitions towards reducing household fruit and vegetable waste and (2) a reduction in household fruit and vegetable waste at follow-up. This is disappointing; particularly as a brief integrated self-affirmation manipulation has

been shown to be effective at increasing openness to information in a different behavioural domain (e.g. Jessop et al., 2009). One key difference between the integrated self-affirmation manipulation utilised in the current study and that employed by Jessop et al. is that the latter required participants to actively engage in the task by circling values that applied to them. By contrast, in the current study, an integrated self-affirmation manipulation was used that did not require active participant involvement. It is possible that participants might need to be actively involved with a value-based self-affirmation in order to fully engage with the task and for the self-affirmation to be effective. Indeed, in the current study, it cannot be confirmed that participants engaged with the request to select a value.

Alternatively, it is possible that the integrated self-affirmation manipulation was not effective in the current study because it inadvertently increased defensiveness for some recipients. Indeed, it has been suggested that self-affirming in the same domain as the threat can potentially promote defensive responses (Sherman & Cohen, 2006). However, in the current study, the values included in the integrated self-affirmation manipulation needed to be (at least) tangentially associated with the behaviour under investigation in order for the task to be plausible. The above notwithstanding, it is noteworthy that Sparks et al. (2010; study 2) and Jessop et al. (2009) similarly used values that could be related to the behaviour in question, yet they still found positive effects on cognitive and behavioural outcomes. Given the apparent benefit of developing self-affirmation manipulations that can be readily integrated into health - or environment – related messages to positive effect, it would seem to be important to further investigate boundaries to the efficacy of integrated self-affirmation manipulations.

It is important to note that the two self-affirmation tasks in this study were not equal, in that participants in the integrated self-affirmation condition were not able to select their most important value if it was not presented in the list. This restriction might have influenced how important the value was to them. By extension this restriction might have had a knock-on effect to the extent to which participants were able to self-affirm, as people are better able to self-affirm if they can pick a value that is central to them (Steele, 1988). Therefore, it is possible that the participants in the integrated self-affirmation condition were not affirmed to the same extent as those in the standard self-affirmation condition.

Additionally, the lists of values in the two self-affirmation conditions were not identical. As previously discussed, the values had to be at least tenuously linked to the message. Therefore, there is a potential for such a manipulation to prime participants rather than self-affirm them. Such design limitations should be addressed in future research.

Furthermore, it is unclear as to why there was a differential dropout rate between the two self-affirmation conditions at baseline. It is possible that more participants dropped out of the standard self-affirmation condition, as it was more time intensive, compared to the integrated condition. The finding suggests that there might be a motivation-related, confounding variable in the analysis. It is therefore recommended that such potential confounding variables should be controlled for in future research.

The current study was subject to some methodological limitations. First, although the measure of fruit and vegetable waste may have been better able to capture variability in this behaviour than that used by Graham-Rowe et al. (under review; Chapter 4), it still nevertheless relied on participants' self-reports. It would be prudent for future research to replicate the study using a more objective measure of waste

(Sharp, Giorgi, & Wilson, 2010). A second limitation pertains to the self-selected nature of the sample. Specifically, the recruitment message asked people to take part in a study exploring their thoughts and feelings about household fruit and vegetable waste. Willing participants may have been interested in the subject of food waste reduction, which may have introduced bias into the study. Future research should ideally utilise stratified samples of the general population.

In summary, the current study is the first to test the utility of a self-affirmation manipulation at promoting pro-environmental behaviour using a non-student population. Furthermore, it represents the first application of an integrated self-affirmation manipulation in an environment-related domain. The findings suggest that a standard self-affirmation manipulation has the potential to reduce household fruit and vegetable waste behaviour. This effect was apparent for those with high or average levels of fruit and vegetable waste at baseline. Disappointingly, there was no evidence that the integrated self-affirmation manipulation was successful at promoting positive cognitions towards fruit and vegetable waste reduction or at influencing behaviour. Future research would benefit from investigating boundaries to the effectiveness of integrated self-affirmation manipulations in applied contexts.

## CHAPTER 6: GENERAL DISCUSSION

The current thesis had two overarching aims. The first aim was to explore potential antecedents of household food waste reduction and possible barriers to change. The second was to assess self-affirmation as a potential means of increasing openness to information that highlights the negative consequences of household food waste.

This final chapter will give a brief recapitulation of the background issues and summarise the findings of the empirical chapters within the context of these two overarching aims. The implications of this research for intervention design and theoretical development will also be considered within this framework. Lastly, limitations of the studies reported in this thesis and suggestions for future research will be outlined.

### **Antecedents of household food waste reduction and barriers to change**

#### ***Recapitulation of the background issues***

Approximately a third of the world's food is lost or wasted each year (Gustavsson, Cederburg, Sonesson, van Otterdijk & Meybeck, 2011) resulting in negative environmental and social outcomes (FAO, 2013; Hoekstra, Mekonnen, Chapagain, Mathews & Richter, 2012; IPCC, 2007; Stuart, 2009). In high-income countries, such as the UK, the consumer is thought to be a major contributor (FAO, 2013; Parfitt, Barthel & Manaughton, 2010), throwing away approximately 19% of the food purchased for the home (WRAP, 2013a) resulting in 17 million CO<sub>2</sub> equivalent tonnes of greenhouse gas emissions (WRAP, 2011; 2013a).

### ***Recapitulation of the research aims and findings***

Encouraging people to reduce their household food waste is a major challenge since (a) there are multiple interacting behaviours that can influence whether or not food will go to waste (Quested, Marsh, Stunell and Parry, 2013), and (b) there is limited knowledge of the key factors that motivate, enable or prevent household food waste minimisation behaviour. The first aim of this thesis was to identify precursors to household food waste reduction and barriers to change. Accordingly, study 1 (Chapter 2) utilised semi-structured interviews to explore motivations and barriers to household food waste reduction. Two key psychological motivations to minimise household food waste were identified: (1) *pragmatic concerns* reflecting people's wish not to waste money and a concern for the wasted utility of food, and (2) a desire to do *the 'right' thing*, which reflected people's belief that it is wrong to waste food. It was also found that those people who felt that they had *food management skills* believed that they were better-able to keep their food waste to a minimum. However, four barriers to household food waste reduction were also identified. The first two presented motivations to over-purchase: in order to be a *'good' provider* and to *minimise inconvenience*, while the last two reflected both a *lack of priority* attributed to reducing food waste and perceived *exemption from responsibility*. Furthermore, it was found that both motivations and barriers to minimise household food waste could be underpinned by the desire to avoid experiencing negative emotions (such as guilt, embarrassment or regret), thus potentially creating conflict between motivations to minimise household food waste (e.g. a desire to do the *'right' thing*) and motivations to act in ways that could potentially increase household food waste (e.g. being a *'good' provider*).

One of the limitations of qualitative research is that it is not always possible to identify causal pathways. Indeed, there is a growing recognition that effective behaviour

change interventions should draw on theories of behaviour and behaviour change, which provide a framework from which causal processes can be identified (Michie, et al., 2008; Michie, West, Cambell, Brown & Gainforth, 2014). Accordingly, study 2 (Chapter 3) explored the predicted utility of an extended TPB model at accounting for household fruit and vegetable waste intention and behaviour. Findings demonstrated that, in accordance with the TPB model (Ajzen, 1988, 1991), intention to reduce household food waste was predicted by household food waste attitude, subjective norm and perceived behavioural control. Findings further revealed that the inclusion of self-identity and anticipated regret significantly increased the amount of variance in intentions accounted for by the model. The final extended TPB model was able to account for 64% of the variance in intention. Furthermore, in line with the TPB model, reduction in household fruit and vegetable waste at follow-up was predicted by intention. However, the amount of variance in behaviour accounted for by the model was relatively small.

Together studies 1 and 2 (reported in Chapters 2 and 3) provide a relatively comprehensive investigation into the antecedents of UK household food waste and food waste reduction behaviour, identifying a number of potential psychological motivations and barriers to reducing household food waste as well as testing a framework from which causal processes can be identified. Both studies provide valuable insights for the development of future household food waste reduction initiatives and the findings of study 2 have important implications for theoretical development. These are discussed further below.



### ***Implications of the research findings for intervention design***

In terms of promoting motivation to reduce household food waste the findings of study 2 (Chapter 3) indicate that interventions might benefit from targeting one of the following determinants of intention: attitude, subjective norm, perceived behavioural control, self-identity and anticipated regret.

The findings from study 1 (Chapter 2) provide more detailed insight into particular beliefs that might be associated with food waste behaviours, and which could profitably be targeted in future interventions. For example, interventions could promote potential *waste concerns* people might have by highlighting the financial benefits of reducing household food waste and/or emphasising the point that reducing food waste is the ‘right’ thing to do. Similarly, findings from study 1 have highlighted the fact that there appears to be little social pressure to engage in food waste reduction. In fact, there was some evidence to suggest that throwing food away is the ‘status quo’. It may therefore be advantageous for interventions to raise awareness of positive normative messages. Furthermore, targeting perceived barriers such as the belief that food goes to waste as a result of factors outside of their control, such as a lack of appropriate pack sizes available, could be addressed by providing food management skills and knowledge.

It is plausible that interventions targeting the specific beliefs, capabilities and barriers identified as being associated with household food waste behaviours - as identified in study 1 (Chapter 2) - might themselves influence such core components of the TPB model as attitudes, subjective norms and perceived behavioural control. For example, it seems likely that an intervention that highlights positive beliefs (e.g. food waste reduction is the ‘right’ thing to do) or that food waste is a ‘big’ problem, might have a knock-on effect on participant’s attitudes. As asserted by Ajzen (1988, 1991),

attitudes are underpinned by beliefs to which the behaviour is viewed positively or negatively. Similarly, it is possible that providing messages which highlight that food waste reduction is *the 'right' thing to do* and reducing food waste is *what is expected of you* might strengthen perceived normative pressure. According to Ajzen (1988, 1991) subjective norms are underpinned by beliefs concerning normative expectations of others. Finally, it is possible that interventions that target food management skills might be expected to empower people to keep their household food waste to a minimum. According to Ajzen (1988, 1991), perceived behavioural control is underpinned by beliefs about factors that either help or hinder performance.

Another important implication of the research findings of study 2 (Chapter 3) for the development of intervention design is the apparent gap between intention and behaviour. Thus intention to reduce household fruit and vegetable waste was only minimally (albeit significantly) associated with household fruit and vegetable waste reduction at follow-up. Therefore, effective interventions that target motivations to reduce household fruit and vegetable waste may fail to have an impact on waste reduction per se. The findings of study 1 (Chapter 2) suggest that this could – at least in part – be a consequence of conflicting goals. Thus the goal of participants to be a ‘good’ provider may conflict with their goal to reduce household food waste. Campaigns targeting food waste are unlikely to reach their full potential unless they take into consideration such conflicting goals. It is therefore recommended that campaign designers consider ways to minimise or overcome such conflict.

### ***Implications of the research findings for theoretical development***

From a theoretical perspective, the findings of study 2 (Chapter 3) add support to the literature that recommends the evaluation of additional factors within an extended

TPB model framework, since they have the potential to make an independent contribution to the prediction of intention over and above the core TPB constructs (e.g. Conner & Armitage, 1998). Specifically, the findings concur with existing evidence that self-identity is an important independent predictor of environment-related intention (e.g., Sparks & Shepherd, 1992). Likewise, the findings are congruent with Kaiser (2006) in suggesting that anticipated regret could be an important independent predictor of environment-related intention.

Furthermore, the findings from study 2 (Chapter 3) highlight a discrepancy between intention and behaviour within the TPB model, thus adding support to the literature which argues that people's motivations do not accord perfectly with their behaviour (e.g. Sheeran, 2002). Such findings suggest that increasing motivation is not always enough to change behaviour and further work is needed to identify key moderators of the intention-behaviour gap in relation to household food waste reduction.

### **Self-affirmation and household food waste reduction**

#### ***Recapitulation of the background issues***

Public communication campaigns frequently focus on the negative consequences of people's actions, the rationale being that this should motivate people to change their behaviour. However, such campaigns often convey messages that could be perceived as threatening as they imply personal inadequacy, thus motivating recipients to process the message defensively, often at the expense of message acceptance and behaviour change (Freeman, Hennessy, & Marzullo, 2001; Stoll-Kleemann, O'Riordan & Jaeger, 2001). There is growing body of evidence to support the proposition that self-affirmation manipulations can facilitate open-minded evaluations of threatening events

and information (Cohen & Sherman, 2014; Sherman & Cohen, 2006). Furthermore, research has repeatedly demonstrated that self-affirmation manipulations can reduce defensive responses to health related messages (Aronson, Cohen & Nail, 1999; Cohen & Sherman, 2014; Harris, 2011; Harris & Epton, 2009; McQueen & Klein, 2006; Sherman & Cohen, 2006). However, the evidence that self-affirmation manipulations can promote openness to information, highlighting the negative consequences of one's behaviour for the environment is limited, despite the fact that initial studies show great promise (Sparks, Jessop, Chapman & Holmes, 2010; Van Prooijen & Sparks, 2014).

Although there are many environmental impacts of household food waste, including its contribution to climate change, the preliminary research failed to categorically show that a concern for climate change, or for the environment more generally, is a rationale that strongly underpins household food waste reduction. This suggests that messages that highlight the negative consequences of household food waste may not evoke strong defensive responses. However, there was evidence from study 1 (chapter 2) that for some people motivation to minimise household food waste is underpinned by an ethical and/or moral rationale, thus suggesting that messages that highlight the fact that they are not living up to such standards could indeed induce defensive responses. Furthermore, people may be defensive about their household food waste behaviour for a number of reasons. Previous research has found that people offer many excuses or justifications for wasting household food, including: personal time constraints; a pressure to feed the family and eat healthily; a belief that food waste is inevitable; poor food quality and aesthetics; and a fear of food poisoning (e.g. de Coverly et al., 2008; Evan, 2011, 2012; Exodus, 2007; Van Garde, & Woodburn, 1987; WRAP, 2013a). Such efforts to justify household food waste behaviour could be carried out in an attempt to maintain positive self-worth and lessen any feelings of threat.

Consequently, studies 3 and 4 (reported in Chapters 4 and 5) explored whether value-based self-affirmation manipulations can promote openness to information detailing the negative consequences of household food waste not just for the environment but also for the individual.

### ***Recapitulation of the research aims and findings***

Study 3 (Chapter 4) explored whether a standard value-based self-affirmation manipulation could increase openness to a message that detailed the negative consequences of household food waste. Findings revealed that self-affirmed participants reported more positive cognitions towards household food waste reduction on a number of outcomes, specifically: intention, attitude, perceived norm, self-identity, anticipated regret and moral norm. However, there was no impact of the self-affirmation manipulation on either perceived behavioural control or behaviour at follow-up.

Study 4 (Chapter 5) replicated study 3 using a non-student sample and utilising a more detailed fruit and vegetable waste measure. Furthermore, it explored whether a brief value-based self-affirmation manipulation, which was integrated into the food waste message, would be effective at promoting positive cognitions towards fruit and vegetable waste reduction and behaviour change at follow-up.

Findings revealed no significant positive impact of the standard value-based self-affirmation manipulation on any of the measured cognitive outcomes. However, there was a significant main effect of this self-affirmation manipulation on behaviour, with self-affirmed participants throwing away a significantly lower percentage of fruit and vegetables at one-week follow-up, compared to their non-affirmed counterparts. Moreover, hierarchical moderated multiple regression analysis revealed this effect to be

apparent for participants who wasted high or average levels of household fruit and vegetables at baseline.

Somewhat disappointingly there was no evidence that the integrated self-affirmation manipulation had any effect on cognitions or behaviour at follow-up. Studies 3 and 4 (reported in Chapters 4 and 5) thus provide mixed evidence with regards to the utility of applying self-affirmation manipulations to promote household fruit and vegetable waste reduction. However, these initial findings show promise for the application of a standard value-based self-affirmation manipulation in this domain.

### ***Implications of the research findings for intervention design***

The research findings summarised above have important implications for the design of effective interventions to promote household fruit and vegetable waste. The findings from study 3 (Chapter 4) indicate that a standard value-based self-affirmation manipulation can be effective at promoting openness to a message detailing the negative consequences of food waste, as reflected in more positive cognitions towards this behaviour. However, the fact that this finding was not replicated in study 4 (Chapter 5) suggests that future research is required to establish the boundaries to the effectiveness of self-affirmation manipulations in such contexts before they can be recommended for inclusion in campaigns targeting the general public.

Moreover, the findings from study 3 (Chapter 4) again highlight the issue that stimulating motivation to engage in behaviour may not be sufficient to promote the behaviour itself. Intriguingly, in study 4 (Chapter 5) there was evidence of an impact of the self-affirmation manipulation on behaviour, despite not having found any evidence that the intervention influenced well-established cognitive precursors to behaviour change. Again, more research is required to ascertain when self-affirmation

manipulations might result in behaviour change, in an environment-related context, before they are recommended for inclusion in interventions.

Lastly, the findings of study 4 (Chapter 5) indicated that an integrated self-affirmation manipulation was not successful at promoting positive cognitions towards household fruit and vegetable waste reduction and nor was it successful at promoting behaviour change. Future research is required to further investigate boundaries to the efficacies of integrated self-affirmation manipulations before they are recommended for inclusion in intervention campaigns.

### ***Implications of the research findings for self-affirmation theory***

The research findings of studies 3 and 4 (reported in Chapter 4 and 5) also have a number of implications for self-affirmation theory. Firstly, the findings from study 3 contribute to the body of literature suggesting that self-affirmation appears to be able to increase openness to information detailing the negative consequences of an individual's behaviour on the environment (Sparks et al., 2010; Van Prooijen & Sparks, 2014). However, study 4 failed to replicate these findings suggesting that this is not a ubiquitous effect and further research is recommended.

Furthermore, findings from study 4 (Chapter 5) suggest that a standard value-based self-affirmation manipulation was effective at promoting behaviour change; however, this did not appear to be through any impact on well-established cognitive precursors to behaviour change. Research in health-related domains has suggested that self-affirmation can have direct impacts on health-related outcomes, notably weight-loss, and it has been argued that this maybe through the boost it provides to self-control and working memory (e.g. Logel & Cohen, 2011). Similarly, it is possible that in study

4 the self-affirmation may have had an impact on behaviour, mediated not by deliberative cognitions, but through its effects on executive control.

Additionally, the significant impact of the standard value-based self-affirmation manipulation on behaviour in study 4 (Chapter 5) also contributes to the literature suggesting that self-affirmations might be most effective for individuals most at risk. Thus, the result shows that the people who were categorised as high or average wasters at baseline showed the greatest effects from the self-affirmation manipulation. Previous research has shown that the people who are most likely to behave in ways that are detrimental to their health are also the ones most likely to respond defensively to messages that highlight the negative consequences of their behaviour (e.g. Harris & Napper, 2005; Harris, Mayle, Mabbott & Napper, 2007; Scott, Brown, Phair, Westland & Schüz, 2013). The findings in study 4 thus suggest that this may also be the case for environment-related behaviours.

Finally, the findings from study 4 (Chapter 5) revealed no effect of the integrated value-based self-affirmation manipulation. One explanation could be that participants didn't have to engage in the task, which may have been a boundary to the effectiveness of an integrated value-based self-affirmation. However, other self-affirmation manipulations have recently emerged, such as looking at one's online Facebook profile (Toma & Hancock, 2013), which similarly do not require active engagements from participants. Such self-affirmation manipulations may offer some insights for the design of future integrated self-affirmation manipulations.



## **Limitations in the current programme of research**

### ***Methodological limitations***

There are a number of methodological limitations to the empirical studies reported in this thesis. The first of these pertains to sampling and recruitment. Study 3 (Chapter 4) utilised a student sample and, as such, it is questionable whether the findings extend to the general population. Indeed, these findings were not replicated in Study 4 (Chapter 5) using a sample drawn from the general public. Furthermore, despite attempts in studies 2 and 4 (reported in Chapters 3 and 5) to recruit participants from the general public it is questionable how representative the respondents were of the UK population, as the recruitment methods used may have introduced a sampling bias. Specifically, participants were invited to take part in a study exploring their thoughts and feelings about household fruit and vegetable waste. The e-mail recruitment messages were posted on online chat-rooms and bulletin boards (study 2), sent to local council departments (studies 2 and 4) and sent to retailers of organic fruit and vegetable boxes (study 4). Participants were additionally asked to pass the recruitment e-mail on to other people who they felt might be interested in participating. It is likely that such self-selection would result in people participating only if they were interested in food waste reduction. Furthermore, some of the participants targeted for recruitment (e.g. from organic fruit and vegetable box schemes) arguably would have an *a priori* interest in sustainability issues. Both of these factors are likely to have contributed in the samples not being a representative cross-section of the UK population. Therefore, it would be preferable that future studies recruit a more stratified sample of UK participants by applying a different recruitment strategy, such as using a paid participant panel, or by not revealing the aim of the study upfront.

A second methodological limitation to this thesis pertains to its reliance on self-report measures of household fruit and vegetable waste. Although self-reports are widely used in psychological research, they are subject to a number of limitations. In the context of the present research one key issue relates to people's accuracy in estimating and reporting their household fruit and vegetable waste retrospectively. Errors may have been introduced either as a result of social desirability biases, or because of variations in the ability of individuals to remember. Another issue pertains to the fact that participants were asked to report the amount of fruit and vegetables thrown away from the household as a collective rather than by themselves as individuals. Therefore, it is likely that there may have been inaccuracies and variations in the ability of people to know how much fruit and vegetables other members of the household were throwing away. A further issue arising from the measure of fruit and vegetables waste utilised in the current research relates to the attempt to assess this behaviour as a single outcome rather than looking at specific behaviours that can contribute to household fruit and vegetable waste. Consequently, the self-report measures used were unable to establish if any reduction in fruit and vegetable waste was as a result of buying less or consuming more. Furthermore, the measures were not able to differentiate between individuals who wasted 50% of their total fruit and vegetable by throwing away only two of four apples purchased in a week and those for whom 50% food waste may have reflected several kilos for fruit and vegetables. It would be prudent for future studies to utilise measures that can distinguish between these different waste behaviours.

Despite the potential limitations of the self-reported measure used in the current research, to date there is no accepted or standard method for monitoring and evaluating household food waste objectively. Although expensive and labour-intensive at present, it may be advantageous for future research to utilise food waste diaries and more

objective methods of measurement, such as weight-base monitoring, in addition to self-report measures.

A third methodological limitation to the research reported in this thesis is that the follow-up measure of household fruit and vegetable waste behaviour was taken one week after baseline measures were acquired. It is possible that there were natural week-by-week variations of waste levels, due to variations in weekly purchasing and consumption patterns. Such variations were found in a report that described a model of the impact of milk purchases and consumption on household food waste (WRAP, 2013b). The authors found that there were large fluctuations in weekly milk waste over the length of the study, which ran for more than a year. For example, some weeks there was no milk waste, but on the weeks that waste did occur, levels were often high. It is therefore recommended that future studies employ much longer follow-up time intervals so as to incorporate such natural variations.

### ***Evolution of measurement***

Further to the methodological limitations mentioned above there were also some issues relating to the evolution of measurement that need highlighting. Within this thesis the measurement of social norms and the food waste measure were operationalised differently in the earlier chapters compared to later chapters.

In the TPB study (Chapter 3) it was thought appropriate that the measurement of social norms should follow Ajzen's (1988, 1991) original model and therefore the questionnaire was designed to measure subjective norms alongside the other core variables of intention, attitudes and perceived behavioural control. Furthermore, the decision was made to include a separate measure of descriptive norms to test if this additional social norm predictor would augment the predictive utility of the core TPB constructs. However, in the self-affirmation studies (Chapters 4 and 5) the decision was

made to combine the two measures, descriptive norms and subjective norms, a combined social norm measure now widely accepted (e.g. Ajzen, 2006). This decision was made as both the subjective norm and descriptive norm measures used in the TPB study utilised just two-items each to identify the underlying constructs, and having only two items has been viewed as problematic (Eisinga, Grotenhuis, & Pelzer, 2012). Furthermore, the combined resultant four-item scale used in the self-affirmation studies had acceptable internal reliability.

Within the four empirical studies the presence or absence of a specified description of food waste varied. For example, in the qualitative study (chapter 2) no description of food waste was provided, as it was thought important that the participants were able to respond spontaneously in the interview, thus increasing the opportunity to gather information that might not have been anticipated by the researcher. For the TPB study (Chapter 3) it was also decided that it would be preferable not to provide participants with a set definition of food waste. The rationale for this decision was that it was not critical that all participants defined household food waste in precisely the same way, so long as each participant used the same criterion for estimating their household food waste at both baseline and at follow-up. It was considered that this would be more likely to happen if they used their own definition. However, it became apparent that some of the participants in the TPB study felt uncomfortable doing so and had commented at the end of the questionnaire that they felt that a definition should have been provided for clarification purposes. As a consequence of this feedback it was decided that for the following empirical studies (Chapters 4 and 5) it would be advantageous to provide a working definition of household food waste. The definition provided was identical for both self-affirmation studies.

Similarly, the measurement of household food waste differed between the empirical studies reported in this thesis. Initially, in the TPB study (Chapter 3) household food waste was measured utilising a one-item measure: “Please estimate what percentage of your household’s total fruit/vegetables got thrown away in the last seven days”. Possible responses ranged from 0% - 100% with ten percent increments. However, it became apparent from qualitative feedback at the end of the study that some of the participants would have preferred a greater range of possible responses to the question. Therefore, for the first self-affirmation study (Chapter 4) it was decided that the food waste measure would be expanded to include 5 percent increments. For the second self-affirmation (Chapter 5) it was decided to expand the household food waste measure further still by increasing the number of items measuring household food waste from one to seven, with each item representing a different category of fruit and vegetable. From this seven-item measure a mean waste score was calculated for each participant. This was done as a way to aid participant recollection of their household food waste in order to capture a more accurate measure and also to increase the range of potential responses.

In retrospect, it is apparent that the household food waste measures utilised in the current series of studies have both strengths and weaknesses. The one-item measure used in the TPB study and the first self-affirmation study was simple and did not require much effort from the participants. However, this strength is also its weakness, as it was unlikely to have prompted a deep level of reflection from the participants of their past household food waste behaviour. It was felt that the seven-item measure was preferable to the one-item measure, as it required the participants to think about certain items that they may have otherwise omitted. However, this measure was repetitive, time intensive and therefore could have caused participants to lose interest and drop out. It would be

prudent for future research to further improve and refine such a self-report measure of household food waste.

***How do we know the effects are due to self-affirmation?***

There is a tacit assumption in self-affirmation studies that any impacts of the self-affirmation manipulation on outcomes are a result of affirming self-integrity rather than another cause such as priming values. This is a limitation of the two self-affirmation studies reported in this thesis. However, similarly it could be argued that it is also a limitation across a range of self-affirmation research when a value picked by the participant is potentially related to the topic under investigation. Therefore it would be prudent to investigate the fundamental differences between self-affirmation effects and priming effects in future research.

At present it is not clear why self-affirmed participants are more ready to accept such risk information. It would be prudent and informative for future research to attempt to demonstrate how the self-affirmation manipulation affects the processing of information and other such outcomes, such as those reported in the current thesis.

Researchers have investigated a number of potential mediators of self-affirmation, the most common being state self-esteem and mood. It may have been advantageous in the current self-affirmation studies to include assessments of popular potential mediators of open-mindedness, such as self-esteem and affect, even though previous research has produced conflicting findings (Harris & Epton, 2009). However, the concern was that the very process of assessing mediators, such as those mentioned above might in and of itself prime higher levels of self-esteem or prime positive/negative mood, which could interfere with any impact of the self-affirmation manipulation. Therefore, in the current self-affirmation studies no such measurement instruments were used. Nevertheless, it would be valuable for future research to further

ascertain the underlying processes behind the apparent impacts of the self-affirmation manipulation.

***Limitations of theoretical insight due to reasons of parsimony***

It is important to acknowledge that there are additional predictor variables that may have been appropriate for inclusion into the TPB framework but not selected in this programme of research for reasons of parsimony. It would be prudent for future research to consider other predictors, such as belief salience (van der Pligh & de Vries, 1998), connectedness (Sparks, Hinds, Curnock & Pavey, 2014), goal desires (Perugini & Conner, 2000) and impulsivity (Churchill, Jessop & Sparks, 2008).

Furthermore, due to reasons of parsimony it was not possible to test other potential theories of behaviour change in this programme of research. Strong contenders, already discussed in the introductory chapter of this thesis, include: the norm-activation model (Schwartz, 1975); the value-belief-norm theory (Stern et al., 1999); the focus theory of normative conduct (Cialdini, Kallgren & Reno, 1991); the theory on the meaning of material possessions (Dittmar, 1992); and Goal-framing theory (Lindenberg & Steg, 2007). However, there are other less obvious theories that could offer valuable insight. For example: the prototype willingness model (Gerrard et al., 2008) suggest that a person's 'willingness' to engage in a behaviour not only plays an important part in the path to intention but it is also a function of their risk prototypes (their cognitive representations of a typical person who carries out the behaviour) and their perceptions of vulnerability to the risk of the behaviour (Michie et al., 2014). It is recommended that theories that consider pathways to behaviour, other than intention, should be investigated in future research.

### **Future household food waste reduction research**

The research presented in this thesis has highlighted five key avenues that warrant further exploration when examining household food waste reduction: (1) goal-conflict; (2) habit and habit disruption; (3) the intention-behaviour gap; (4) the content of food waste messages within the context of self-affirmation research; and (5) the development of integrated self-affirmation manipulations.

#### ***Goal conflict***

The issue of goal conflict, in the context of household food waste reduction, requires further consideration. Study one (Chapter 2) revealed that both motivations and barriers to household food waste reduction could be underpinned by the wish to avoid experiencing negative emotions (such as guilt, frustration, annoyance, embarrassment or regret). This finding reveals the potential for conflicting goals that could reduce the impact of household food waste reduction attempts and make any intervention attempt to change individual behaviour more complex. It has been argued that in such cases when there is such psychological conflict it is unlikely that public information campaigns will be enough and programmes that not only inform but also shift motivation and provide essential skills to maintain behaviour change are essential (Maio et al., 2007). Therefore it is recommended that research further explores the extent to which such psychological conflict plays a part in household food waste behaviour and investigate methods to overcome such conflict.

#### ***Habit and habit disruption***

Another area that should be developed further, in the context of household food waste, is habit and habit disruption. Although there is only limited evidence from study



1 (chapter 2) that people reported habitually wasting food, this is not surprising due to the automatic nature of habits. Nevertheless, some people did report repetitive shopping, food storage or cooking behaviours that are associated with household food waste. Furthermore, study 2 (chapter 3) revealed an intention-behaviour gap that could be explained by habitual patterns of behaviour. Habits have been defined as learned behavioural patterns that have become automatic responses to situational cues (Verplanken & Aarts, 1999). They are formed through repetition of behaviour in a specific context and this association makes alternative options less accessible in memory (Gardner, 2014). When habits have developed people are less likely to attend to or acquire new information, especially if the information is not in-line with the habitual behaviour (Maio et al., 2007). However, it is important to stress that although habitual behaviours are repetitive not all repetitive behaviours are habitual (Kurz, Gardener, Verplanken & Abraham, 2014); therefore, it is critical that future studies first ascertain whether behaviours associated with household food waste or food waste reduction are indeed habitual.

Future research could endeavour to identify and test self-regulatory strategies that facilitate behaviour change. Addressing the issues associated with translating motivation into action, Gollwitzer (1993, 1999) recommends that people should form a contingent plan, identifying a course of action appropriate to a defined situation. Such “implementation intentions” specify when, where and how performance of behaviour should be performed and thus link anticipated situational cues to specific goal-directed action. Research has demonstrated that forming implementation intentions facilitates positive behaviour change across a range of habitual behaviours (e.g. Adriaanse, Vinkers, De Ridder, Hox & De Wit, 2011; Belanger-Gravel, Godin, Amireault, 2013;

Gollwitzer & Sheeran, 2006), but as yet this strategy has not been utilised in regard to food waste reduction behaviour.

Changing or modifying the environment in which the habitual behaviour is dependent is another area that merits further investigation. For example, there is some evidence to suggest that modifying the household environment may break habitual actions that are associated with food consumption (Wansink, 2014). Specifically, Wansink and van Ittersum (2013) found that simply reducing plate size can reduce overportioning and therefore the resultant food waste. However, such interventions do not address issues with overpurchasing food items. There is some evidence to show that interventions that take advantage of times when habits are naturally disrupted, such as when people move house, can be more successful at changing habits such as transport choice (e.g. Verplanken, Walker & Jurasek, 2008). Insights such as those mentioned above might be particularly useful avenues for future household food waste research.

### ***The intention-behaviour gap***

Future research could profitably assess potential moderators of the intention-behaviour gap in relation to household food waste. One key issue emerging from the extended theory of planned behaviour study (study 2, Chapter 3) was that there was a weak (albeit significant) association between intention and behaviour. This finding might be a consequence of structural or situational barriers, nonetheless, there may be other psychological variables that are key determinants of whether people who are motivated to reduce their household fruit and vegetable waste, achieve this goal or not.

One possible explanation could be that habit strength moderates the intention-behaviour relationship (De Bruijn et al., 2007). When habits and intention conflict, habits are thought to override conscious deliberate intention (Gardner, Abraham, Lally

& de Bruijn, 2012). Research has shown that as habit strength increases the intention-behaviour association weakens (e.g. Gardner, De Bruijn, & Lally, 2011; Ouellette, & Wood, 1998). One potential route for future research, therefore, would be to test the moderating role of habit strength on food waste reduction behaviour. This could be further broken down by investigating the strength of habit of specific behaviours associated with household food waste reduction, such as using a shopping list and planning meals in advance.

Another potential moderator worth considering in future research is goal desires. It has been argued that although behavioural goals are typically highly correlated with intentions, they are distinct concepts and goal desires have been found to moderate the effect of intention on behaviour (e.g. Prestwich et al., 2008). Intentions represent people's willingness to try to enact behaviour (Ajzen, 1991), whereas goal desire reflect ones desires to achieve an overarching goal. Therefore linking an intention (e.g. to reduce household food waste) with a strongly desired goal (e.g. to be pro-environmental) can strengthen the link between intention and behaviour (Prestwich, Perugini & Hurling, 2008). Furthermore, Abraham and Sheeran (2003) have argued that goal theory can enhance the prediction and understanding of the theory of planned behaviour. Specifically, they suggest that goal conflict is an important source of discrepancy between intentions and behaviour. The qualitative study reported in Chapter 2 of this thesis revealed people may have many goals that can facilitate or impede food waste reduction, and that pursuing some goals (e.g. minimising inconvenience) may be at odds with achieving another (e.g. doing the 'right' thing). Therefore, it may be fruitful to investigate the effect of how such potentially conflicting personal goals might influence the intention-behaviour relationship in regards to household food waste reduction.

***The content of food waste messages within the context of self-affirmation research***

The investigation of environment-related behaviour, within the self-affirmation literature, is a relatively new field. Consequently little attention has been given to either the perspective or the content of the message. In studies 3 and 4 (reported in Chapters 4 and 5) of this thesis the message highlighted the negative impact of household food waste not only from the perspective of the environment (e.g. highlighting the link between food waste and climate change), but also from the perspective of the individual (e.g. highlighting the financial and emotional costs associated with food waste). Therefore, it is not possible to say whether both perspectives were necessary, nor is it possible to say which would be the most effective at promoting changes in cognitions and behaviour when paired with a self-affirmation manipulation.

However, within the wider context of environment-related research, there has been much debate as to the most effective way to frame environment-related messages. Furthermore, evidence shows that how these messages are framed can have important consequences for outcomes (Evans et al., 2012; Pelletier & Sharp, 2008). For example, while it has been suggested that framing messages in terms of the severity of climate change, or highlighting the negative consequences of high-carbon lifestyles, might increase defensive reactions (Van Prooijen & Sparks, 2014), others argue that messages that are exclusively focused on the positive outcomes of climate change solutions are unlikely to be convincing (Swim et al., 2009).

It has also been argued that messages that appeal to self-interest values (e.g. financial gains or pleasure) can reduce “spill-over effects” into other pro-environmental behaviours and may serve to reinforce self-enhancing values and undermine concern for social and environmental problems (Crompton, 2011; Kasser & Crompton, 2011; Steg, Bolderdijk, Keizer, & Perlaviciute, 2014; Thøgersen & Compton, 2009). There appears

to be growing consensus among environmental psychology researchers that the best way to encourage sustainable pro-environmental behaviour in the long-term is to target normative reasons for doing so; in other words campaigns should focus on how carrying out a pro-environmental behaviour will benefit other people, future generations and the environment. It has been argued that framing messages in terms of the benefits to the individual can strengthen self-enhancement values (e.g. hedonic and egoistic values) at the expense of self-transcendence values, namely altruistic and biospheric values, which may only have short-term benefits for the environment (Crompton, 2008, 2011; Steg et al., 2014),

However, to date there have been no investigations into message framing or content in the environment-related domain within the context of self-affirmation research. Therefore, it is recommended that one way the environment-related self-affirmation research could go next is to explore the effects of presenting different types of message framing and message content alongside a self-affirmation manipulation.

### ***The development of integrated self-affirmation manipulations***

A final avenue that warrants further exploration relates to integrated self-affirmation manipulations. The research in this thesis reported a novel approach to administering an integrated value-based self-affirmation manipulation, as it required no active participation from the recipient, but required the participants to only reflect upon their chosen value. However, there was no evidence that this integrated self-affirmation manipulation was successful at promoting positive cognitions towards fruit and vegetable waste reduction or at influencing behaviour. It is possible that participants need to be actively involved with the value-based self-affirmation in order to fully engage with the task and for the self-affirmation to take effect.

Interestingly, there is recent and promising research to support the efficacy of a new brief-style of self-affirming to enhance the effectiveness of health-risk information (Armitage, Harris & Arden, 2011; Armitage, Rowe, Arden & Harris, 2014). In these studies self-affirmation has been blended with implementation intentions so that after exposure to a threatening health message participants who were randomised into the self-affirming implementation intention condition were presented with the stem, “if I feel threatened or anxious, then I will...” this is then followed by four options to choose from, such as “...think about the things I value about myself”. This technique has shown to be as effective as a standard self-affirmation manipulation, to extend beyond the student population, and have long-term behavioural effects. However, as yet it has not been established whether such a self-affirmation technique can be integrated into an environment-related campaign. It is therefore recommended that further research explore the boundaries of an integrated self-affirmation manipulation in the context of environment-related behaviours such as household food waste reduction.

### **Conclusion**

The research presented in this thesis has contributed to food waste research in a number of ways. Firstly, it has identified some of the antecedents of food waste reduction that can be targeted in household food waste minimisation initiatives, but it has also revealed some important barriers that may need to be addressed. It is possible that some barriers to household food waste minimisation may be relatively easy to overcome through the dissemination of information. However, other barriers, such as the desire to be a ‘good’ provider or having conflicting goal desires may prove more challenging to address and may well require innovative approaches.

Secondly, findings suggest that an extended TPB model provides a useful framework for predicting intention and, to a lesser extent, behaviour in the context of household fruit and vegetable waste reduction. Furthermore, the results suggest that interventions designed to motivate food waste reduction might profitably target one or more of the following cognitive antecedents: attitude, subjective norm, perceived behavioural control, self-identity and anticipated regret. Future research would benefit from investigating moderators of the apparent intention-behaviour gap such as strength of habit, goal desires and the formulation of implementation intentions.

Finally, the current programme of research provides unique evidence that a standard value-based self-affirmation manipulation may be usefully applied to increase openness to messages that highlight the negative consequences of food waste. However, findings were mixed and more research is needed to clarify boundaries to the effectiveness of this self-affirmation manipulation in an environment-related contexts. It is recommended that further research utilising self-affirmation techniques in environment-related domains could benefit from: (1) investigating the impact of the content and perspective of the environment-related information presented, and (2) exploring further the potential for a brief self-affirmation manipulation to be successfully integrated into an environment-related messages.

## REFERENCES

- Abraham, C., & Sheeran, P. (2003). Acting on intentions: The role of anticipated regret. *British Journal of Social Psychology, 42*, 495-511.
- Abraham, C., Sheeran, P., & Johnston, M (1998). From health beliefs to self-regulation: Theoretical advances in the psychology of action control, *Psychology and Health, 13*(4), 569-591.
- Adriaanse, M.A., Vinkers, C.D., De Ridder, D. T., Hox, J. J., & De Wit, J.B. (2011). Do implementation intentions help to eat a healthy diet? A systematic review and meta-analysis of the empirical evidence. *Appetite, 56*(1), 183-193. Doi: 10.1016/j.appet.2010.10.012
- Aiken, L. S., & West, S.G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.
- Ajzen, I. (1988). *Attitudes, personality, and behavior*. Milton Keynes: Open University Press.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179–211.
- Ajzen, I. (1996). The directive influence of attitudes on behavior. In P.M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp.385-403). New York: Guilford.
- Ajzen, I. (2006). Constructing a theory of planned behavior questionnaire. Retrieved from: <http://people.umass.edu/aizen/pdf/tpb.measurement.pdf>



- Ajzen, I., & Driver, B. L. (1991). Prediction of leisure participation from behavioral, normative, and control beliefs: An application of the theory of planned behavior. *Leisure Sciences, 13*(3), 185-204. Doi: [10.1080/01490409109513137](https://doi.org/10.1080/01490409109513137)
- Ajzen, I., & Fishbein, M. (2005). The influence of attitudes on behavior. In D. Albarracín, B. T. Johnson, & M.T. Zanna (Eds.), *The handbook of attitudes* (pp.173-221). Mahwah, NJ: Lawrence Erlbaum Associates.
- Albarracín, D., Johnson, B.T., Fishbein, M., & Muellerleile, P.A. (2001). Theories of reasoned action and planned behavior as models of condom use: A meta-analysis. *Psychological Bulletin, 127*(1), 142-161.
- Armitage, C.J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology, 40*(4), 471-499.  
Doi: 10.1348/014466601164939
- Armitage, C.J., Harris, P.R., & Arden, M.A. (2011). Evidence that self-affirmation reduces alcohol consumption: Randomized exploratory trial with a new, brief means of self-affirming. *Health Psychology, 30*(5), 633-641.  
Doi: [10.1037/a0023738](https://doi.org/10.1037/a0023738)
- Armitage, C.J., Harris, P.R., Hepton, G., & Napper, L. (2008). Self-affirmation increases acceptance of health-risk information among UK adult smokers with low socioeconomic status. *Psychology of Addictive Behaviors, 22*(1), 88-95.  
Doi: [10.1037/0893-164X.22.1.88](https://doi.org/10.1037/0893-164X.22.1.88)

- Armitage, C.J., Rowe, R., Arden, M.A., & Harris, P.R. (2014). A brief psychological intervention that reduces adolescent alcohol consumption. *Journal of Consulting and Clinical Psychology*, 82(3), 546-550. Doi: [10.1037/a0035802](https://doi.org/10.1037/a0035802)
- Aronson, J., Cohen, G.L., Nail, P.R. (1999). Self-affirmation theory: an update and appraisal. In E. Harom-Hones, J. Mills (Eds), *Cognitive dissonance: Progress on a pivotal theory in social psychology*. (pp:127-147). Washington, DC: American Psychological Association. Doi: [10.1037/10318-006](https://doi.org/10.1037/10318-006)
- Bamberg, S., Ajzen, I. & Schmidt, P. (2003). Choice of travel mode in the theory of planned behavior: the roles of past behavior, habit, and reasoned action. *Basic and Applied Social Psychology*, 25(3), 175-187. Doi: [10.1207/S15324834BASP2503\\_01](https://doi.org/10.1207/S15324834BASP2503_01)
- Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, 27(1), 14-25. Doi: [10.1016/j.jenvp.2006.12.002](https://doi.org/10.1016/j.jenvp.2006.12.002)
- Bandura, A. (1994). Self-efficacy. In V.S. Ramachaudran (Ed.), *Encyclopedia of Human behavior*, 4, (pp. 71-81). New York, NY: Academic Press.
- Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. New Jersey, US: Prentice-Hall.
- Baumeister, R.F., Vohs, K. D., & Tice, D.M. (2007). The strength model of self-control. *Current Directions in Psychological Science*. 16, 351-355. Doi: [10.1111/j.1467-8721.2007.00534.x](https://doi.org/10.1111/j.1467-8721.2007.00534.x)

- Beck, L., & Ajzen, I. (1991). Predicting dishonest actions using the theory of planned behavior. *Journal of Research in Personality*, 25, 285-301.
- Beck, M.E. (2007). Dinner preparation in the modern United States, *British Food Journal*, 109(7), 531-547. Doi:[10.1108/00070700710761527](https://doi.org/10.1108/00070700710761527)
- Bedford, T., Collingwood, P., Darnton, A., Evans, D., Gatersleben, B., Abrahamse, W. & Jackson, T. (2011). *Guilt: An effective motivator for pro-environmental behaviour change?* RESOLVE Working Paper 07-11. Retrieved from: [http://resolve.sustainablelifestyles.ac.uk/sites/default/files/resolve\\_wp\\_07-11amended.pdf](http://resolve.sustainablelifestyles.ac.uk/sites/default/files/resolve_wp_07-11amended.pdf)
- Bélanger-Gravel A., Godin G, Amireault S. (2013). A meta-analytic review of the effect of implementation intentions on physical activity. *Health Psychology Review*, 7(1): 23-54. Doi:10.1080/17437199.2011.560095
- Binning, K, R., Sherman, D, K., Cohen, G, L., & Heitland, K. (2010). Seeing the other side: Reducing political partisanship via self-affirmation in the 2008 presidential election. *Analyses of Social Issues and Public Policy*, 10 (1), 276-292.  
Doi: 10.1111/j.1530-2415.2010.01210.x
- Boldero, J. (1995). The prediction of household recycling of newspapers: The role of attitudes, intentions and situational factors. *Journal of Applied Social Psychology*, 25(5), 440-462. Doi: 10.1111/j.1559-1816.1995.tb01598.x
- Bond, M., Meacham, T., Bhunnoo, R., & Benton, T.G. (2013). *Food waste within global food systems*. A global food security report. Retrieved from: <http://www.foodsecurity.ac.uk/assets/pdfs/food-waste-report.pdf>

Brook Lyndhurst (2007). *Food behaviour consumer research: Quantitative phase*.

Retrieved from: <http://www.wrap.org.uk/content/food-behaviour-consumer-research-quantitative-phase>

Čehajić-Clancy, S., Effron, D.A., Halperin, E., Liberman, V., & Ross, L.D. (2011).

Affirmation, acknowledgment of in-group responsibility, group-based guilt, and support for reparative measures. *Journal of Personality and Social Psychology*, 101, (2) 256–270. Doi: [10.1037/a0023936](https://doi.org/10.1037/a0023936)

Chan, L., Bishop, B. (2013). A moral basis for recycling: Extending the theory of planned behaviour. *Journal of Environmental Psychology*, 36, 96-102. Doi: 10.1016/j.jenvp.2013.07.010

Chapagain, A. & James, K. (2011). *The water and carbon footprint of household food and drink waste in the UK*. Retrieved from: <http://www.wrap.org.uk/content/water-and-carbon-footprint-household-food-and-drink-waste-uk-1>

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Sage Publications, Thousand Oaks, CA.

Chen, M., & Tung, P. (2014). Developing an extended theory of planned behavior model to predict consumers' intention to visit green hotels. *International Journal of Hospitality Management*, 36, 221-230. Doi: 10.1016/j.ijhm.2013.09.006. ISSN: 0278-4319.

Churchill, S., Jessop, D., & Sparks, P. (2008). Impulsive and/or planned behaviour: Can impulsivity contribute to the predictive utility of the theory of planned

behaviour? *British Journal of Social Psychology*, 47(4), 631-646. Doi: 10.1348/014466608X284434

Cialdini, R.B., Kallgren, C.A., & Reno, R.R. (1991). A focus theory of normative conduct: a theoretical refinement and re-evaluation of the role of norms in human behavior, *Advances in Experimental Social Psychology*, 24, 201-234. Doi: [10.1016/s0065-2601\(08\)60330-5](https://doi.org/10.1016/s0065-2601(08)60330-5)

Cialdini, R.B., Reno, R.R., & Kallgren, C.A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, 58(6), 1015-1026.

Cohen, G.L., & Sherman, D.K. (2014). The psychology of change: Self-affirmation and social psychological intervention. *Annual Review of Psychology*, 65, 333-371. Doi: 10.1146/annurev-psych-010213-115137

Cohen, G.L., & Sherman, D.K., Bastardi, A., Hsu, L., McGoey, M., & Ross, L. (2007). Bridging the partisan divide: Self-affirmation reduces ideological closed-mindedness and inflexibility in negotiation. *Journal of Personality and Social Psychology*, 93(3), 415-430. Doi: 10.1037/0022-3514.93.3.415

Conner, M., & Armitage, C.J. (1998). Extending the theory of planned behavior. A review and avenues for further research. *Journal of Applied Social Psychology*, 28, 1429-1464. Doi: 10.1111/j.1559-1816.1998.tb01685.x

Conner, M., & McMillan, B. (1999). Interaction effects in the theory of planned behavior: Studying cannabis use. *British Journal of Social Psychology*, 38(2), 195-222.

- Conner, M., & Norman, P. (2005). *Predicting health behaviour: Research and practice with social cognition models* (2<sup>nd</sup> Edition). Open University Press.
- Conner, M., Norman, P., & Bell, R. (2002). The theory of planned behavior and health eating. *Health Psychology*, 21(2), 194-201. Doi: [10.1037/0278-6133.21.2.194](https://doi.org/10.1037/0278-6133.21.2.194)
- Conner, M., & Sparks, P. (2005). Theory of planned behaviour and health behaviour. In M. Conner & P. Norman (Eds.), *Predicting health behaviour: Research and practice with social cognition models 2nd edition*. (pp. 170-222). Mainhead: Open University Press.
- Cook, R., Trebaczyk, H., Harris, P., & Wright, A.J. (2014). Self-affirmation promotes physical activity. *Journal of Sport and Exercise Psychology*, 36(2), 217-223. Doi: 10.1123/jsep.2013-0041
- Cooper, N., & Dumpleton, S. (2013). *Walking the breadline, the scandal of food poverty in 21<sup>st</sup> century Britain*. Retrieved from: <http://www.church-poverty.org.uk/walkingthebreadline/info/report/walkingthebreadlinefile>
- Costello, A., et al. (2009). Managing the health effects of climate change. *Lancet*, 373, 1693-1733. Retrieved from: <http://environmentportal.in/files/Managing%20the%20health%20effects%20of%20climate%20change.pdf>
- Courneya, K. S., Bobick, T. M., & Schinke, R.J. (1999). Does the theory of planned behavior mediate the relationship between personality and exercise behavior? *Basic and Applied Social Psychology*, 21(4), 317-324. Doi:10.1207/S15324834BASP2104\_5

Cox, J., Giorgi, S., Sharp, V., Strange, K., Wilson, D.C. & Blakey, N. (2010).

Household waste prevention – A review of evidence. *Waste Management Research*, 28(3), 193-219. Doi: 10.1177/0734242X10361506

Creswell, J.D., Dutcher, J. M., Klein, W. M., Harris, P.R., Levine, J. M. (2013). Self-affirmation improves problem-solving under stress. *PLoS one*, 8(5). Doi: 10.1371/journal.pone.0062593

Crompton, T. (2008). *Weathercocks and signposts. The environment movement at a crossroads*. Godalming, UK, WWF-UK. Retrieved from: [http://assets.wwf.org.uk/downloads/weathercocks\\_report2.pdf](http://assets.wwf.org.uk/downloads/weathercocks_report2.pdf)

Crompton, T. (2011). Finding cultural values that can transform the climate change debate. *Solutions Journal*, 2(4), 56-63. Retrieved from: <http://www.thesolutionsjournal.com/node/969>

Davies, P., Walker, A. E., & Grimshaw, J.M. (2010). A systematic review of the use of theory in the design of guideline dissemination and implementation strategies and interpretation of the results of rigorous evaluations. *Implementation Science*, 5, 14. Doi:10.1186/1748-5908-5-14

De Bruijn, G-J., Kremers, S. P. J., De Vet, E., De Nooijer, J., Van Mechelen, W., & Brug, J. (2007). Does habit strength moderate the intention–behaviour relationship in the Theory of Planned Behaviour? The case of fruit consumption. *Psychology and Health*, 22(8), 899–916. Doi:10.1080/14768320601176113

de Coverly, E., McDonagh, P., O'Malley, L. & Patterson, M. (2008). Hidden Mountain: The Social Avoidance of Waste. *Journal of Macromarketing* 28: 289-303. Doi: 10.1177/0276146708320442

Defra (2007). *Report, Questionnaire and Data Tables Following Survey of Public Attitudes attitudes and Behaviours toward the Environment: 2007*. Retrieved from:  
<http://webarchive.nationalarchives.gov.uk/20130123162956/http://www.defra.gov.uk/statistics/files/pas2007report.pdf>

Defra (2008). A framework for pro-environmental behaviour. Report. Retrieved from:  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69277/pb13574-behaviours-report-080110.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69277/pb13574-behaviours-report-080110.pdf)

Dittmar, H. (1992). *The Social Psychology of Material Possessions: To Have is To Be*. Havester Wheatsheaf, Hemel Hempstead, UK, St. Martin's Press, New York.

Dittmar, H. (2004). Are you what you have? Consumer society and our sense of identity. *The Psychologist*, 17(4), 206-210. Retrieved from:  
[http://www.thepsychologist.org.uk/archive/archive\\_home.cfm?volumeID=17&editionID=105&ArticleID=684](http://www.thepsychologist.org.uk/archive/archive_home.cfm?volumeID=17&editionID=105&ArticleID=684)

Doron, N., (2012). A clear plate means a clear conscience. In N. Doron, (ed.), *Revaluing Food*. Fabian Society, London. Retrieved from:  
<http://www.fabians.org.uk/publications/revaluing-food/>

Doron, N., (2013). *Waste not want not: How fairness concerns can shift attitudes to food waste*. Fabian Society, London. Retrieved from:



[http://www.fabians.org.uk/wp-content/uploads/2012/05/Fabian\\_Waste\\_Pamphlet\\_5.12\\_web.pdf](http://www.fabians.org.uk/wp-content/uploads/2012/05/Fabian_Waste_Pamphlet_5.12_web.pdf)

Eagly, A. H., & Chaiken, S. (1993). *The Psychology of Attitudes*. Fort Worth, TX: Harcourt Brace Jovanovich.

Eisinga, R., Grotenhuis, M. T., & Pelzer, B. (2012). The reliability of a two-item scale: Pearson, Cronbach, or Spearman e Brown? *International Journal of Public Health*, <http://dx.doi.org/10.1007/s00038-012-0416-3>. Advance online publication.

Epton, T., & Harris, P.R. (2008). Self-affirmation promotes health behavior change. *Health Psychology*, 27 (6), 746-752. Doi: [10.1037/0278-6133.27.6.746](https://doi.org/10.1037/0278-6133.27.6.746)

Ercin, A.E., Aldaya, M.M., & Hoekstra, A.Y. (2011). The water footprint of soy milk and soy burgers and equivalent animal products. Value of water, Research report No: 49. Retrieved from: <http://www.waterfootprint.org/Reports/Report49-WaterFootprintSoy.pdf>

Evans, D. (2011). Blaming the consumer – once again: the social and material contexts of everyday food waste practices in some English households. *Critical Public Health*, 21(4), 429-540. Doi: 10.1080/09581596.2011.608797

Evans, D. (2012). Beyond the throwaway society: Ordinary domestic practice and a sociological approach to household food waste. *Sociology*, 46, 41-56. Doi: 10.1177/0038038511416150

Evans, L., Maio, G.R., Corner, A., Hodgetts, C.J., Ahmed, S., & Hahn, U. (2012). Self-interest and pro-environmental behaviour. *Nature Climate Change*.

Doi:10.1038/nclimate1662

Exodus (2007). *We don't waste food: A householder survey*. Retrieved from:

<http://www.wrap.org.uk/content/we-dont-waste-food-householder-survey>

FAO. (2013). *Food wastage footprint, impacts on natural resources: Summary report*.

Retrieved from: <http://www.fao.org/docrep/018/i3347e/i3347e.pdf>

Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.

Fielding, K.S., McDonald, R., & Louis, W.R. (2008). Theory of planned behaviour, identity and intentions to engage in environmental activism. *Journal of Environmental Psychology*, 28, 318-326. Doi: 10.1016/j.jenvp.2008.03.003

Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. Psychology Press: New York.

Fisher, J. D., & Fisher, W. A. (1992). Changing AIDS risk behavior. *Psychological Bulletin*, 111(3), 455–474.

Flatters, P., & Willmott, M. (2009). Understanding the post-recession consumer. *Harvard Business Review*, July-August, 106–112.

Freeman, M.A., Hennessy, E.V., & Marzullo, D.M. (2001). Defensive evaluation of antismoking messages among college-age smokers: The role of possible selves. *Health Psychology*, 20(6), 424-446. Doi: [10.1037/0278-6133.20.6.424](https://doi.org/10.1037/0278-6133.20.6.424)

Gardner, B. (2009). Incentivised snowballing. *The Psychologist*, 22 (9), 768-769.

[http://www.thepsychologist.org.uk/archive/archive\\_home.cfm?volumeID=22&editionID=179&ArticleID=1558](http://www.thepsychologist.org.uk/archive/archive_home.cfm?volumeID=22&editionID=179&ArticleID=1558)

Gardner, B. (2014). A review and analysis of the use of ‘habit’ in understanding, predicting and influencing health-related behaviour. *Health Psychology Review*, (In press). Doi:10.1080/17437199.2013.876238

Gardner, B., & Abraham, C. (2007). What drives car use? A grounded theory analysis of commuters’ reasons for driving. *Transportation Research Part F*, 10(3), 187-200. Retrieved from: <http://dx.doi.org/10.1016/j.trf.2006.09.004>

Gardner, B., & Abraham, C. (2010). Going green? Modelling the impact of environmental concerns and perceptions of transportation alternatives on decisions to drive. *Journal of Applied Psychology*, 40(4), 813-849.  
Doi: 10.1111/j.1559-1816.2010.00600.x

Gardner, B., Abraham, C, Lally, P., & de Bruijn, G-J. (2012). Towards parsimony in habit measurement: Testing the convergent and predictive validity of an automaticity subscale of the Self-Report Habit Index. *International Journal of Behavioral Nutrition and Physical Activity*, 9, 102. Doi:10.1186/1479-5868-9-102

Gardner, B., de Bruijn, G.-J., & Lally, P. (2011). A systematic review and meta-analysis of applications of the Self-Report Habit Index to nutrition and physical activity behaviours. *Annals of Behavioral Medicine*, 42, 174–187. Doi: 10.1007/s12160-011-9282-0

- Gardner, B., de Bruijn, G.-J., & Lally, P. (2012). Habit, identity, and repetitive action. A prospective study of binge-drinking in UK students. *British Journal of Health Psychology*, 17, 565-581. DOI:10.1111/j.2044-8287.2011.02056.x
- Garnett, T. (2008). *Cooking up a storm. Food, greenhouse gas emissions, and our changing climate*. Food Climate Research Network. Retrieved from: [http://www.fcrn.org.uk/sites/default/files/CuaS\\_web.pdf](http://www.fcrn.org.uk/sites/default/files/CuaS_web.pdf)
- Gerrard, M., Gibbons, F.X., Houlihan, A.E., Stock, M.L., & Pomery, E.A. (2008). A dual-process approach to health risk decision making: *The prototype willingness model*. *Developmental Review*, 28, 29-61. [Doi:10.1016/j.dr.2007.10.001](https://doi.org/10.1016/j.dr.2007.10.001)
- Gifford, R. (2011). The dragons of Inaction: Psychological barriers that limit climate change mitigation and adaptation. *American Psychologist*, 66(4), 290-302. Doi: 10.1037/a0023566
- Glaser, B.G., & Strauss, A. L. (1967). *The discovery of grounded theory: strategies for qualitative research*. Chicago: Aldine.
- Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion*, 11(2), 87-98.
- Godin, G., Sheeran, P., Conner, M. & Germain, M, (2008), Asking questions changes behavior: Mere measurement effects on frequency of blood donation. *Health Psychology*, 27(2), 179-184. Doi: 10.1037/0278-6133.27.2.179.
- Goffman, E. (1959). *The presentation of self in everyday life*. Penguin Books Ltd. UK.

- Gofton, L. (1995). Dollar rich and time poor? Some problems in interpreting changing food habits. *British Food Journal*, 97(10), 11-16. Doi: [10.1108/00070709510104295](https://doi.org/10.1108/00070709510104295)
- Goldstein, Cialdini & Griskevicius. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels, *Journal of Consumer Research*, 35(3), 472-482. Doi: 10.1086/586910
- Gollwitzer, P.M. (1993). Goal achievement: The role of intentions. *European Review of Social Psychology*, 4(1), 141-185.
- Gollwitzer, P.M. (1999). Implementation intentions: Strong effects of simple plans. *The American Psychologist*, 54(7), 493-503.
- Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in Experimental Social Psychology*, 38, 69-119.
- Graham-Rowe, E., Gardner, B., Abraham, C., Skippon, S., Dittmar, H., Hutchins, R., Stannard, J. (2012). Mainstream consumers driving plug-in battery-electric and plug-in hybrid electric cars: A qualitative analysis of responses and evaluations. *Transportation Research Part A*, 46(1), 140-153. Retrieved from: <http://dx.doi.org/10.1016/j.tra.2011.09.008>
- Graham-Rowe, E., Jessop, D.C., & Sparks, P. (2014). Identifying motivations and barriers to minimising household food waste. *Resources, Conservation & Recycling*, 84, 15-23. <http://dx.doi.org/10.1016/j.resconrec.2013.12.005>

- Graham-Rowe, E., Jessop, D.C., Sparks, P. (Under Review). Assessing a self-affirmation intervention to promote household food waste reduction.
- Greenwald, A. G., Carnot, C. G., Beach, R., & Young, B. (1987). Increasing voting behavior by asking people if they expect to vote. *Journal of Applied Psychology*, 72, 315-318. Doi:[10.1037/ 0021-9010.72.2.315](https://doi.org/10.1037/0021-9010.72.2.315)
- Griffin, M., Sobal, J., & Lyson, T. A. (2009). An analysis of a community waste stream. *Agriculture & Human Values*, 26(1), 67-81. Retrieved from: <http://hdl.handle.net/10.1007/s10460-008-9178-1>
- Gustavsson, J., Cederberg, C., Sonesson, U., van Otterdijk, R., & Meybeck, A. (2011). *Global food losses and food waste: Extent, cause and prevention*. Food and Agricultural Organization of the United Nation (FAO). Retrieved from: <http://www.fao.org/docrep/014/mb060e/mb060e00.pdf>
- Hamilton C., Denniss R., Baker D. (2005). *Wasteful consumption in Australia*. Discussion Paper Number 77, March 2005. Manuka, Australia: The Australia Institute. ISSN 1322-5421. Retrieved from: [http://www.tai.org.au/documents/dp\\_fulltext/DP77.pdf](http://www.tai.org.au/documents/dp_fulltext/DP77.pdf)
- Han, Y., & Hansen, H. (2012). Determinants of sustainable food consumption: A meta-analysis using a traditional and a structural equation modelling approach. *International Journal of Psychological Studies*, 4(1), 22-45. Doi:[10.5539/ijps.v4n1p22](https://doi.org/10.5539/ijps.v4n1p22)
- Han, H., Hsu, L., & Sheu, C. (2010). Application of the theory of planned behavior to green hotel choice: Testing the effect of environmental friendly activities.

*Tourism Management*, 31(3), 325-334. Doi:10.1016/j.tourman.2009.03.013

Harris, P.R. (2011). Self-affirmation and the self-regulation of health behavior change.

*Self and Identity*, 10(3), 304-314. Doi:10.1080/15298868.2010.517963

Harris, P.R., Brearley, I., Sheeran, P., Barker, M., Klein, W. M., Creswell, J.D., Levine,

J.M., Bond, R. (2014). Combining self-affirmation with implementation

intentions to promote fruit and vegetable consumption. *Health Psychology*,

33(7), 729-736. Retrieved from: <http://dx.doi.org/10.1037/hea0000065>

Harris, P.R., & Epton, T. (2009). The impact of self-affirmation on health cognition,

health behaviour and other health-related responses: A narrative review. *Social*

*and Personality Psychology Compass*, 3(6), 962-978. Doi: [10.1111/j.1751-](https://doi.org/10.1111/j.1751-9004.2009.00233.x)

[9004.2009.00233.x](https://doi.org/10.1111/j.1751-9004.2009.00233.x)

Harris, P.R., & Epton, T. (2010). The impact of self-affirmation on health-related

cognition and health behaviour: Issues and prospects. *Social and Personality*

*Psychology Compass*, 4(7), 439-454. Doi: 10.1111/j.1751-9004.2010.00270.x

Harris, P. R., Mayle, K., Mabbott, L., & Napper, L. (2007). Self-affirmation reduces

smokers' defensiveness to graphic on-pack cigarette warning labels. *Health*

*Psychology*, 26(4), 437-446. Doi: [10.1037/0278-6133.26.4.437](https://doi.org/10.1037/0278-6133.26.4.437)

Harris, P.R., & Napper, L. (2005). Self-affirmation and the biased processing of

threatening health-risk information. *Personality and Social Psychology Bulletin*,

31(9), 1250-1263. Doi: [10.1177/0146167205274694](https://doi.org/10.1177/0146167205274694)

- Hausenblas, H.A., Carron, A.V., & Mack, D.E. (1997). Applications of the theories of reasoned action and planned behavior to exercise behavior: A meta-analysis. *Journal of Sport and Exercise Psychology*, 19, 36-51.
- Heath, Y., & Gifford, R. (2002). Extending the theory of planned behavior. Predicting the use of public transportation. *Journal of Applied Social Psychology*, 32(10), 2154-2189. Doi: 10.1111/j.1559-1816.2002.tb02068.x
- Hoekstra, A.Y., Mekonnen, M.M., Chapagain, A.K., Mathews, R.E., & Richter, B.D., (2012). Global monthly water scarcity: Blue water footprints versus blue water availability. *PLoS ONE*, 7(2), e32688. Doi:10.1371/journal.pone.0032688
- Institution of Mechanical Engineers. (2013). *Global food, waste not want not*. Retrieved from:[http://www.imeche.org/docs/defaultsource/reports/Global\\_Food\\_Report.pdf?sfvrsn=0](http://www.imeche.org/docs/defaultsource/reports/Global_Food_Report.pdf?sfvrsn=0)
- IPCC, (2007). Forth assessment report: Climate change (2007). Working Group II Report. *Impacts, Adaptation and Vulnerability*. M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, (Eds).[Cambridge University Press](http://www.cambridge.org/9780521864661), Cambridge, UK. Retrieved from:  
[http://www.ipcc.ch/publications\\_and\\_data/publications\\_ipcc\\_fourth\\_assessment\\_report\\_wg2\\_report\\_impacts\\_adaptation\\_and\\_vulnerability.htm](http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg2_report_impacts_adaptation_and_vulnerability.htm)
- IPCC, (2013). Fifth assessment report: Climate Change 2013. *The Physical Science Basis*. Working Group 1 contribution to the Fifth Assessment report of the Intergovernmental Panel of Climate Change: Summary for policymakers. Retrieved from:  
[http://www.climate2013.org/images/uploads/WGI\\_AR5\\_SPM\\_brochure.pdf](http://www.climate2013.org/images/uploads/WGI_AR5_SPM_brochure.pdf)



- Jaremka, L.M., Bunyan, D.P., Collins, N.L., & Sherman, D.K. (2011). Reducing defensive distancing: Self-affirmation and risk regulation in response to relationship threats. *Journal of Experimental Social Psychology*, 47(1), 264–268. Doi:10.1016/j.jesp.2010.08.015
- Jessop, D.C., Simmonds, L.V., & Sparks, P. (2009). Motivational and behavioural consequences of self-affirmation interventions: A study of sunscreen use among women. *Psychology and Health*, 24(5), 529-544. Doi: [10.1080/08870440801930320](https://doi.org/10.1080/08870440801930320)
- Kaiser, F.G. (2006). A moral extension of the theory of planned behavior: Norms and anticipated feelings of regret in conservationism. *Personality and Individual Differences*, 41(1), 71-81. Retrieved from: <http://dx.doi.org/10.1016/j.paid.2005.11.028>
- Kallgren, C. A., Reno, R. R., & Cialdini, R. B. (2000). A focus theory of normative conduct: When norms do and do not affect behaviour. *Personality and Social Psychology Bulletin*, 26, 1002–1012.
- Kasser, T., & Crompton, T (2011). *Limitations of environmental campaigning based on values for money, image, and status*. Retrieved from: [http://www.climateaccess.org/sites/default/files/Kasser%20and%20Crompton\\_Limitations%20of%20Environmental%20Campaigning.pdf](http://www.climateaccess.org/sites/default/files/Kasser%20and%20Crompton_Limitations%20of%20Environmental%20Campaigning.pdf)
- Keller, P.A. (1999). Converting the unconverted: The effect of inclination and opportunity to discount health-related fear appeals. *Journal of Applied Psychology*, 8(3), 403-415. Doi: [10.1037/0021-9010.84.3.403](https://doi.org/10.1037/0021-9010.84.3.403)

- Ki-Moon, B. (2009). *Remarks at 39<sup>th</sup> Plenary Assembly of the world federation of United Nations Associations*. Retrieved from:  
[http://www.un.org/apps/news/infocus/sgspeeches/statments\\_full.asp?statID=555#.UvTj\\_fYwL-Y](http://www.un.org/apps/news/infocus/sgspeeches/statments_full.asp?statID=555#.UvTj_fYwL-Y)
- Koivupuro, H-K., Hartikainen, H., Silvennoinen, K., Katajajuuri, J-M., Heikintalo, N., Reinikainen, A., Jalkanen, L. (2012). Influence of socio-demographical, behavioural and attitudinal factors on the amount of avoidable food waste generated in Finnish household. *International Journal of Consumer Studies*, 36 (2), 183-191. Doi: 10.1111/j.1470-6431.2011.01080.x
- Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin*, 108(3), 480-498. Doi: [10.1037/0033-2909.108.3.480](https://doi.org/10.1037/0033-2909.108.3.480)
- Lally, P., van Jaarsveld, C.H.M., Potts, H.W.W., & Wardle, J. (2010). How are habits formed: Modelling habit formation in the real world. *European Journal of Social Psychology*, 40, 998-1009. Doi: 10.1002/ejsp.674
- Largo-Wight, E., Bian, H., & Lange, L. (2012). An empirical test of an expanded version of the theory of planned behavior in predicting recycling behavior on campus. *American Journal of Health Education*, 43(2), 66-73. Doi: 10.1080/19325037.2012.10599221
- Lindenberg, S. & Steg, L. (2007). Normative, gain and hedonic goal frames guiding environmental behaviour. *Journal of Social Issues*, 63(1), 117-137. Doi: 10.1111/j.1540-4560.2007.00499.x

- Logel, C., & Cohen, G.L. (2011). The role of the self in physical health: Testing the effect of a values-affirmation intervention on weight loss. *Psychological Science*, 23, 53-55. Doi: 10.1177/0956797611421936
- Love Food Hate Waste. (2007). Retrieved from: <http://england.lovefoodhatewaste.com/>
- Love Food Hate Waste. (2013). *About food waste*. Retrieved from: <http://england.lovefoodhatewaste.com/content/about-food-waste-1>
- Maio, G.R., Verplanken, B., Manstead, A.S.R., Stroebe, W., Abraham, C., Sheeran, P. & Conner, M. (2007). Social psychological factors in lifestyle change and their relevance to policy. *Social Issues and Policy Review*, 1(1), 99-137. Doi: 10.1111/j.1751-2409.2007.00005.x
- Mankarious, E. & Kothe, E. (2014). A meta-analysis of the effects of measuring theory of planned behaviour constructs within prospective studies. *Health Psychology Review*, Doi: 10.1080/17437199.2014.927722
- Mann, E., & Abraham, C. (2006). The role of affect in UK commuters' travel mode choices: An interpretative phenomenological analysis. *British Journal of Psychology*, 97(2), 155-176. Doi:10.1348/000712605X61723
- Manstead, A.S.R. (2000). The role of moral norm in the attitude-behavior relation. In D.J. Terry & M.A. Hogg (Eds.), *Attitudes, behavior, and social context: The role of norms and group membership*. Applied Social Research Series (pp. 11-30). Mahwah, NJ: Lawrence Erlbaum Associates.

Marcoux, B. C., & Shope, J. T. (1997). Application of the theory of planned behavior to adolescent use and misuse of alcohol. *Health Education Research*, 12(3), 323-331.

McKnight-Yeates, L. (2009). *Out of sight, out of mind: What influences our perception of waste and activates our intentions to live more sustainably?* Unpublished MSc Dissertation, Royal Roads University, Victoria, British Columbia, Canada. Retrieved from:  
<http://dspace.royalroads.ca/docs/bitstream/handle/10170/379/mcknight-yeates,%20lisa.pdf?sequence=1>

McQueen, A., & Klein, W.M.P. (2006). Experimental manipulations of self-affirmation: A systematic review. *Self and Identity*, 5(4), 289-354.  
Doi:10.1080/15298860600805325

Mekonnen, M. M., & Hoekstra, A.Y. (2010). *The green, blue and grey water footprint of farm animals and animal products*. Volume 1, Main report. Value of water, research report series No:48. Retrieved from:  
<http://www.waterfootprint.org/Reports/Report-48-WaterFootprint-AnimalProducts-Vol1.pdf>

Michie, S., & Abraham, C. (2004). Interventions to change health behaviours: Evidence-based or evidence-inspired? *Psychology and Health*, 19(1), 29-49.  
Doi:10.1080/0887044031000141199

Michie, S., Hardeman, W., Fanshawe, T., Prevost, A.T., Taylor, L., & Kinmonth, A. L. (2008). Investigating theoretical explanations for behaviour change. The case

study of ProActive. *Psychology and Health*, 23(1), 25-39. Doi:  
10.1080/08870440701670588

Michie, S., Johnston, M., Abraham, C., Lawton, R., Parker, D., Walker, A., &  
Psychological Theory Group. (2005) Making psychological theory useful for  
implementing evidence based practice: A consensus approach. *Quality & Safety  
in Health Care*, 14(1), 26-33. Doi: 10.1136/qshc.2004.011155

Michie, S., West, R., Cambell, R., Brown, J. & Gainforth, H. (2014). *ABC of behavior  
change theories*. Silverback Publishing.

Morwitz, V. G., Johnson, E., & Schmittlein, D. (1993). Does measuring intent change  
behavior? *Journal of Consumer Research*, 20(1), 46–61. Doi:[10.1086/209332](https://doi.org/10.1086/209332)

Nigbur, D., Lyons, E., & Uzzell, D. (2010). Attitudes, norms, identity and  
environmental behaviour: Using an expanded theory of planned behaviour to  
predict participation in a kerbside recycling programme. *British Journal of  
Social Psychology*, 49(2), 259-284. Doi: 10.1348/014466609X449395

Norlund, A.M. & Garveill, J. (2003). Effects of values, problem awareness, and  
personal norm on willingness to reduce personal car use. *Journal of  
Environmental Psychology*, 23, 339-347.

Orbell, S., & Hagger, M. (2006). “When no means no”: Can reactance augment the  
theory of planned behavior? *Health Psychology*, 25(5), 586-594. Doi:  
[10.1037/0278-6133.25.5.586](https://doi.org/10.1037/0278-6133.25.5.586)

Ouellette, J.A., & Wood, W. (1998). Habit and intention in everyday life: The multiple  
processes by which past behavior predicts future behavior. *Psychological*

*Bulletin*, 124(1), 54–74. Doi: [10.1037/0033-2909.124.1.54](https://doi.org/10.1037/0033-2909.124.1.54)

Parfitt, J., Barthel M., & MacNaughton, S. (2010). Food waste within food supply chains: Quantification and potential for change to 2050. *Philosophical Transactions of the Royal Society B*, 365(1554), 3065-3081. Doi: [10.1098/rstb.2010.0126](https://doi.org/10.1098/rstb.2010.0126)

Pelletier, L.G., & Sharp, E. (2008). Persuasive communication and proenvironmental behaviours: How message tailoring and message framing can improve the integration of behaviours through self-determined motivation. *Canadian Psychology*, 49(3), 210-217. Doi: 10.1037/a0012755

Perugini, M., & Conner, M., (2000). Predicting and understanding behavioural volitions: The interplay between goals and behaviors. *European Journal of Social Psychology*, 30(5), 705-731

Peters, G-J,Y., Ruiter, R.A.C., & Kok, G, (2013a). Threatening communication: A qualitative study of fear appeal effectiveness beliefs among intervention developers, policymakers, politicians, scientists, and advertising professionals. *International Journal of Psychology*, 49(2), 71-79. Doi:10.1080/17437199.2012.703527

Peters, G-J,Y., Ruiter, R.A.C., & Kok, G, (2013b). Threatening communication: A critical re-analysis and a revised meta-analytic test of fear appeal theory. *Health Psychology Review*, 7, 8-31. Doi:10.1080/17437199.2012.703527

Prestwich, A., Perugini, M., & Hurling, R. (2008). Goal desires moderate intention-behaviour relations. *British Journal of Social Psychology*, 47, 49-71.

Doi: 10.1348/014466607X218221

Quested, T.E., Marsh, E., Stunell, D., & Parry, A.D. (2013). Spaghetti soup: The complex world of food waste behaviours. *Resources, Conservation and Recycling*, 79, 43-51, Retrieved from:

<http://dx.doi.org/10.1016/j.resconrec.2013.04.011>

Quested, T. E., Parry, A. D., Easteal, S., & Swannell, R. (2011). Food and drink waste from households in the UK. *Nutrition Bulletin*, 36, 460-467.

Doi: 10.1111/j.1467-3010.2011.01924.x

Reed, M.B., & Aspinwall, L.G. (1998). Self-affirmation reduces biased processing of health-risk information. *Motivation and Emotion*, 22(2), 99-132.

Doi:10.1023/A:1021463221281

Richetin, J., Perugini, M., Conner, M., Adjali, I., Hurling, R., Sengupta, A., Greetham, D. (2012). To reduce and not to reduce resource consumption? That is two questions. *Journal of Environmental Psychology*, 32(2), 112-122. Doi:

10.1016/j.jenvp.2012.01.003

Rise, J., Kovac, V., Kraft, P., & Moan, I.S. (2008). Predicting the intention to quit smoking and quitting behaviour: Extending the theory of planned behaviour. *British Journal of Health Psychology*, 13(2), 291-310.

Rise, J., Sheeran, P., & Hukkelberg, S. (2010). The role of self-identity in the theory of planned behavior: A meta-analysis. *Journal of Applied Social Psychology*,

40(5), 1085-1105. Doi: 10.1111/j.1559-1816.2010.00611.x

Rivis, A., & Sheeran, P. (2003a). Descriptive norms as an additional predictor in the theory of planned behaviour: A meta-analysis. *Current Psychology: Developmental, Learning, Personality, Social*, 22(3), 218-233.

Rivis, A., & Sheeran, P. (2003b). Social influences and the theory of planned behaviour: Evidence for a direct relationship between prototypes and young people's exercise behaviour. *Psychology and Health*, 18(5), 567-583.  
Doi:10.1080/0887044032000069883

Rivis, A., Sheeran, P., & Armitage, C. J. (2009). Expanding the affective and normative components of the theory of planned behavior: A meta-analysis of anticipated affect and moral norms. *Journal of Applied Social Psychology*, 39(12), 2985-3019. Doi: 10.1111/j.1559-1816.2009.00558.x

Ruiter, R.A.C., Abraham, C., & Kok, G. (2001). Scary warnings and rational precautions: A review of the psychology of fear appeals. *Psychology and Health*, 16(6), 613-630. Doi:10.1080/08870440108405863

Sandberg, T., & Conner, M. (2008). Anticipated regret as an additional predictor in the theory of planned behaviour: A meta-analysis. *British Journal of Social Psychology*, 47(4), 589-606. Doi: 10.1348/014466607X258704

Sandberg, T., & Conner, M. (2009). A mere measurement effect for anticipated regret: Impacts on cervical screening attendance. *British Journal of Social Psychology*, 48, 221-236. Doi:10.1348/014466608X347001



Schwartz, S. (1975). The Justice of need and the activation of humanitarian norms.

*Journal of Social Issues*, 31(3), 111-136.

Scott, J.L., Brown, A.C., Phair, J.K., Westland, J.N., & Schüz, B. (2013). Self-affirmation, intentions and alcohol consumption in students: A randomized exploratory trial. *Alcohol and Alcoholism*, 48(4), 458-4463. Doi: 10.1093/alcalc/agt027

Sharp, V., Giorgi, S., & Wilson, D.C. (2010). Methods to monitor and evaluate household waste prevention. *Waste Management and Research*, 28(3), 269-280. Doi:10.1177/0734242X10361508

Sheeran, P. (2002). Intention behavior relations: A conceptual and empirical review. In W. Stroebe, & M. Hewstone (Eds.), *European Review of Social Psychology*, 12 (pp. 1-36). Chichester, UK, Wiley. Doi: 10.1002/0470013478.ch1

Sheeran, P., & Orbell, S. (1999). Augmenting the theory of planned behavior: Roles for anticipated regret and descriptive norms. *Journal of Applied Social Psychology*, 29(10), 2107-2142. Doi: 10.1111/j.1559-1816.1999.tb02298.x

Sherman, D. K. (2013). Self-affirmation: Understanding the effects. *Social and Personality Psychology Compass*, 7(11), 834-845. Doi: 10.1111/spc3.12072

Sherman, D. K., Bunyan, D. P., Creswell, J. D., & Jaremka, L. M. (2009). Psychological vulnerability and stress: The effects of self-affirmation on sympathetic nervous system responses to naturalistic stressors. *Health Psychology*, 28(5), 554-562. Doi: 10.1037/a0014663.

- Sherman, D.K., & Cohen, G.L. (2006). The psychology of self-defence: Self-affirmation theory. In MP Zanner (Ed.), *Advances in Experimental Social Psychology*, 38, (pp: 183-242). San Diego, CA: Academic.
- Sherman, D. K., Hartson, K. A., Binning, K.R., Purdie-Vaughns, V., Garcia, J., Taborsky-Barba, S., Tomassetti, S., Nussbaum, A. D., & Cohen, G.L. (2013). Deflecting the trajectory and changing the narrative: How self-affirmation affects academic performance and motivation under identity threat. *Journal of Personality and Social Psychology*, 104(4), 591-618. Doi: [10.1037/a0031495](https://doi.org/10.1037/a0031495)
- Sherman, D.K., Nelson, L.D., & Steele, C.M. (2000). Do messages about health risks threaten the self? Increasing the acceptance of threatening health messages via self-affirmation. *Personality and Social Psychological Bulletin*, 26(9), 1046-1058. Doi: 10.1177/01461672002611003
- Sherman, S. J. (1980). On the self-erasing nature of errors of prediction. *Journal of Personality and Social Psychology*, 39(2), 211–221. Doi:[10.1037/0022-3514.39.2.211](https://doi.org/10.1037/0022-3514.39.2.211)
- Sparks, P., Hinds, J., Curnock, S., & Pavey, L. (2014). Connectedness and its consequences: A study of relationships with the natural environment. *Journal of Applied Social Psychology*, 44(3), 166-174. Doi: 10.1111/jasp.12206
- Sparks, P., Jessop, D.C., Chapman, J., & Holmes, K. (2010). Pro-environmental actions, climate change, and defensiveness: Do self-affirmations make a difference to people's motives and beliefs about making a difference? *British Journal of Social Psychology*, 49(3), 553-568. Doi: 10.1348/014466609X471976

- Sparks, P., & Shepherd, R. (1992). Self-Identity and the theory of planned behavior: Assessing the role of identification with 'green consumerism'. *Social Psychology Quarterly*, 55(4), 388-399. Retrieved from: <http://www.jstor.org/stable/2786955>
- Steele, C.M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.). *Advances in Experimental Social Psychology* (Vol. 21, pp. 261-302). New York: Academic Press.
- Stefan, V., van Herpen, E., Tudoran, A. A., & Lähteenmäki, L. (2013). Avoiding food waste by Romanian consumers: The importance of planning and shopping routines. *Food Quality and Preference*, 28(1), 375-381. Doi: 10.1016/j.foodqual.2012.11.001
- Steg, L. (2005). Car use: lust and must. Instrumental, symbolic and affective motives for car use. *Transportation Research Part A: Policy and Practice*, 39, 147-162.
- Steg, L. Bolderdijk, J. W., Keizer, K., & Perlaviciute, G. (2014). An integrated framework for encouraging pro-environmental behaviour: The role of values, situational factors and goals. *Journal of Environmental Psychology*, 38, 104-115. Doi: 10.1016/j.jenvp.2014.01.002
- Steg, L. Dreijerink, L. & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: A test of VBN theory. *Journal of Environmental Psychology*, 25, 415-425. [Doi:10.1016/j.jenvp.2005.08.003](https://doi.org/10.1016/j.jenvp.2005.08.003)
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, 29, 309-317. Doi:10.1016/j.jenvp.2008.10.004

Stern, N. (2006). *Stern review on the economics of climate change*. UK Treasury.

Retrieved from: [http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/independent\\_reviews/stern\\_review\\_economics\\_climate\\_change/stern\\_review\\_report.cfm](http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm)

Stern, P.C., Dietz, T., Abel, T., Guagnano, G.A. & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Research in Human Ecology*, 6(2), 81-97.

Stinson, D.A., Logel, C., Shepherd, S., & Zanna, M.P. (2011). Rewriting the self-fulfilling Prophecy of social rejection: Self-affirmation improves relational security and social behavior up to 2 months later. *Psychological Science*, 22(9), 1145–1149. Doi: 10.1177/0956797611417725

Stoll-Kleemann, S., O' Riordan, T., & Jaeger, C.C. (2001). The psychology of denial concerning climate mitigation measures: Evidence from Swiss focus groups. *Global Environmental Change*, 11(2), 107-117. Doi: 10.1016/S0959-3780(00)00061-3

Stone, J., Whitehead, J., Schmader, T., & Focella, E. (2011). Thanks for asking: Self-affirming questions reduce backlash when stigmatized targets confront prejudice. *Journal of Experimental Social Psychology* 47(3), 589–598. Doi:10.1016/j.jesp.2010.12.016

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedure for developing grounded theory*, (2<sup>nd</sup> Ed), Sage, London.

- Stryker, S. (1987). Identity theory: Developments and extensions. In K. Yardley & T. Honess (Eds.) *Self and identity: Psychosocial perspectives*, (pp:89–103). New York: Wiley.
- Stuart, T. (2009). *Waste: Uncovering the global food scandal*. Penguin Books: London.
- Stryker, S. & Burke, P. J. (2000). The past, present and future of an identity theory. *Social Psychology Quarterly*, 63(4), 284–297. Doi: [10.2307/2695840](https://doi.org/10.2307/2695840)
- Swim, J.K., (Chair), Clayton, S., Doherty, T., Gifford, R., Howard, G., Reser, J., Stern, P., & Weber, E. (2009). *Psychology and global climate change: Addressing a multi-faceted phenomenon and set of challenges*. A Report by the American Psychological Association's task force on the interface between psychology and global climate change. Retrieved from:  
<http://www.apa.org/science/about/publications/climate-change-booklet.pdf>
- Tabachnick, B.G., & Fidell, L.S. (1989). *Using multivariate statistics* (second edition). HarperCollins Publishers, Inc. New York.
- Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behavior. In S. Worchel and W. G. Austin (Eds.), *Psychology of intergroup relations* (pp. 7-24). Chicago: Nelson Hall.
- Taylor, S., & Todd, P. (1995). An integrated model of waste management behavior. A test of household recycling and composting intentions. *Environmental and Behavior*, 27(5), 603-630. Doi: 10.1177/0013916595275001

- Terry, D. J., & Hogg, M. A. (1996). Group norms and the attitude-behavior relationship: A role of group identification. *Personality and Social Psychology Bulletin*, 22(8), 776-793. Doi: 10.1177/0146167296228002
- Terry, D. J., Hogg, M. A., & White, K. M. (1999). The theory of planned behaviour: Self-identity, social identity, and group norms. *British Journal of Social Psychology*, 38(3), 225–244. Doi: 10.1348/014466699164149
- Thøgersen, J., & Crompton, T. (2009). Simple and painless? The limitations of spillover in environmental campaigning. *Journal of Consumer Policy*, 32(2), 141-163. Doi:10.1007/s10603-009-9101-1
- Toma, C.L., & Hancock, J.T. (2013). Self-affirmation underlies Facebook use. *Personality and Social Psychology Bulletin*, 39(3), 321-331. Doi: 10.1177/0146167212474694
- Trade and Environment Review (2013). *Wake up before it's too late: Make agriculture truly sustainable now for food security in a changing climate*. Retrieved from: [http://unctad.org/en/PublicationsLibrary/ditcted2012d3\\_en.pdf](http://unctad.org/en/PublicationsLibrary/ditcted2012d3_en.pdf)
- Trumbo, C. W., & O'Keefe, G. J. (2001). Intention to conserve water: Environmental values, planned behavior, and information effects. A comparison of three communities sharing a watershed. *Society & Natural Resources*, 14(10), 889-899. Doi:10.1080/089419201753242797
- Turrentine, T.S. & Kurani, K.S. (2007). Car buyers and fuel economy? *Energy Policy*, 35(2), 1213-1223. Doi: 10.1016/j.enpol.2006.03.005

- Van der Pligt, J., & de Vries, N. K. (1998). Expectancy-value models of health behaviour: The role of salience and anticipated regret. *Psychology and Health, 13*(2), 289-305. Doi:10.1080/08870449808406752
- Van Garde, S. J. & Woodburn, M. J. (1987). Food discard practices of householders. *Journal of the American Dietetic Association, 87*(3), 322–329.
- Van Prooijen, A-M., & Sparks, P. (2014). Attenuating initial beliefs: Increasing the acceptance of anthropogenic climate change information by reflecting on values. *Risk Analysis, 34*(5), 929-936. Doi: 10.1111/risa.12152
- van't Riet, J. & Ruiter, R.A.C. (2013). Defensive reactions to health-promoting information: an overview and implications for future research. *Health Psychology Review, 7*(1), 104-136. Doi:10.1080/17437199.2011.606782
- Verplanken, B., Aarts, H. (1999). Habit, attitude, and planned behaviour: Is habit an empty construct or an interesting case of goal-directed automaticity? *European Review of Social Psychology, 10*, 101-134.
- Verplanken, B., Aarts, H., van Knippenberg, A., Moonen, A. (1998). Habit versus planned behaviour: A field experiment. *British Journal of Social Psychology, 37*(1), 111-128. Doi: 10.1111/j.2044-8309.1998.tb01160.x
- Wansink, B. (2014). *Slim by design - Mindless eating solutions for everyday life*. William Morrow: New York
- Wansink, B., Brasel, S.A. & Amjad, S. (2000). The mystery of the cabinet castaway: Why we buy products we never use. *Journal of Family and Consumer Sciences, 92*, 104 -107. Retrieved from:

[http://www.foodpsychology.cornell.edu/pdf/permission/1990-2000/Cabinet\\_Castaway-JFCS\\_2000.pdf](http://www.foodpsychology.cornell.edu/pdf/permission/1990-2000/Cabinet_Castaway-JFCS_2000.pdf)

Wansink, B & van Ittersum, K. (2013). Portion size me: plate-size induced consumption norms and win-win solutions for reducing food intake and waste. *Journal of Experimental Psychology. Applied*, 19, 320-332. Doi: 10.1037/a0035053

Ward, A., Atkins, D.C., Lepper, M.R., & Ross, L. (2011). Affirming the self to promote agreement with another: Lowering a psychological barrier to conflict resolution. *Personality and Social Psychology Bulletin*, 37(9) 1216–1228. Doi: 10.1177/0146167211409439

Whitmarsh, L., & O'Neill, S. (2010). Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours. *Journal of Environmental Psychology*, 30(3), 305-314. Doi: 10.1016/j.jenvp.2010.01.003

WHO (2003). *Promoting fruit and vegetable consumption around the world*. Retrieved from: <http://www.who.int/dietphysicalactivity/fruit/en/>

William, C. (2007). Research methods. *Journal of Business & Economic Research*, 5 (3), 65-72. Retrieved from: <http://journals.cluteonline.com/index.php/JBER/article/viewFile/2532/2578>

WRAP (2008). *The food we waste. Food waste report 2*. Retrieved from: <http://www.ifr.ac.uk/waste/Reports/WRAP%20The%20Food%20We%20Waste.pdf>



WRAP (2009a). *Household food and drink waste in the UK*. Final Report. Retrieved from:

<http://www.wrapcymru.org.uk/sites/files/wrap/Household%20food%20and%20drink%20waste%20in%20the%20UK%20-%20report.pdf>

WRAP (2009b). *Down the drain*. Final Report. Retrieved from:

<http://www.wrap.org.uk/sites/files/wrap/Down%20the%20drain%20-%20report.pdf>

WRAP (2011). *New estimates for household food and drink waste in the UK*. Retrieved

from: <http://www.wrap.org.uk/content/new-estimates-household-food-and-drink-waste-uk>

WRAP (2012). *Helping consumers reduce food waste – A retail survey*. Retrieved from

<http://www.wrap.org.uk/sites/files/wrap/240412%20Retailer%20review%202011.pdf>

WRAP (2013a). *Household food and drink waste in the United Kingdom 2012: Final*

*report*. Retrieved from: <http://www.wrap.org.uk/sites/files/wrap/hhfdw-2012-main.pdf>

WRAP (2013b). *The milk model: Simulating food waste in the home*. Final report.

Retrieved from:

<http://www.wrap.org.uk/sites/files/wrap/Milk%20Model%20report.pdf>

WWF-UK. (2009). *Simple and painless? The limitations of spillover in environmental campaigning*. Godalming, UK: WWF-UK. Available from:

[http://assets.wwf.org.uk/downloads/simple\\_painless\\_report.pdf](http://assets.wwf.org.uk/downloads/simple_painless_report.pdf).

**APPENDICES**

## APPENDIX A

### Chapter 2: Interview schedule

***The interviews were semi-structured, with the interviewer asking participants questions about the following topics:***

Thoughts and feelings regarding purchasing food

*Tell me how you shop for food for your household?*

*Can you describe a typical food shopping trip?*

*How do you feel about shopping for food?*

*How do you decide what food you are going to buy?*

Thoughts and feelings regarding food choices and food preparation in the home

*Once at home, how is it decided what food is going to be eaten and when?*

*When, if at all, does food get thrown away in your household?*

*Can you describe why you think this happens?*

Thoughts and feelings regarding throwing food away

*Tell me about your thoughts and feeling regarding throwing food away.*

*Tell me how your thoughts and feelings may have changed over the years.*

*Why do you think other people you know throw food away?*

*Tell me how you think other people you know feel about throwing food away?*

Thoughts and feelings regarding reducing food waste

*What do you think are the best or most effective ways to avoid or reduce the amount of food that gets thrown away in the home?*

*Which, if any, of these behaviours do you carry out yourself?*

*Tell me how you feel about taking steps to avoid or reduce the amount of food that gets thrown away in your household.*

The pre-prepared interview questions were used only as a guide or to elicit further discussion of salient topic areas, if and when appropriate.

## APPENDIX B

## Chapter 2: Demographic questionnaire

1. What was your age on your last birthday?   years
2. Are you male/female
- Male ☐ 1 Female ☐ 2
3. What is your highest educational level?
- None ☐ 1 GCSE or vocational equivalent ☐ 2  
A Levels or vocational equivalent ☐ 3 Graduate or above ☐ 4
4. What is your marital status?
- Single (never married) ☐ 1 Living with a partner ☐ 2  
Married ☐ 3 Separated ☐ 4  
Divorced ☐ 5 Widowed ☐ 6
5. Which one of the following best describes your ethnic background?
- |                                    |                             |                                   |                             |
|------------------------------------|-----------------------------|-----------------------------------|-----------------------------|
| Any white background               | <input type="checkbox"/> 1  | Asian and white background        | <input type="checkbox"/> 2  |
| Black African and white background | <input type="checkbox"/> 3  | Any other mixed ethnic background | <input type="checkbox"/> 4  |
| Bangladeshi                        | <input type="checkbox"/> 5  | Indian                            | <input type="checkbox"/> 6  |
| Pakistani                          | <input type="checkbox"/> 7  | Any other Asian background        | <input type="checkbox"/> 8  |
| African                            | <input type="checkbox"/> 9  | Caribbean                         | <input type="checkbox"/> 10 |
| Any other black background         | <input type="checkbox"/> 11 | Any Chinese background            | <input type="checkbox"/> 12 |
| Arab                               | <input type="checkbox"/> 13 | Any other ethnic background       | <input type="checkbox"/> 14 |
| Gypsy/ Irish or Scottish Traveller | <input type="checkbox"/> 15 | <i>Prefer not to say</i>          | <input type="checkbox"/> 16 |
6. Which of the following best describes the area that you live in?
- Rural ☐ 1 Suburb ☐ 2  
City ☐ 3
7. How many adults (18 or over) live in your household?
- Just you ☐ 1 Two ☐ 2

Three ☐ 3Four or more ☐ 4

8. How many children (under 18) live in your household?

None ☐ 1One ☐ 2Two ☐ 3Three or more ☐ 4*If yes, what are their ages?*

Child 1..... Years old

Child 2..... Years old

Child 3..... Years old

Child 4..... Years old

Child 5..... Years old

Child 6 .....Years old

9. Who is responsible for the food shopping in your household:

Only you ☐ 1Mostly you ☐ 2Your share it equally with  
another/other member/s of your  
household ☐ 3You always do it together with  
another/other member/s of your  
household ☐ 4

10. How often do you/others shop for the food for your household:

More than once a week ☐ 1Once a week ☐ 2Less than once a week ☐ 3

11. What type of shop/s do you mostly buy your household food from:

Supermarket – in person ☐ 1Supermarket – On line ☐ 2Local independent shops ☐ 3Farmers market ☐ 4

12. What is your total household income (i.e. your income plus that of a spouse and/or anyone who lives with you?)

£20,000 or less ☐ 1£21,000-40,000 ☐ 2£41,000-70,000 ☐ 3£71,000-100,000 ☐ 4£101,000-150,000 ☐ 5Above £150,000 ☐ 6**THANK YOU!**

## APPENDIX C

### Chapter 3: Questionnaire - Baseline measures

#### Welcome

**Thank you for your interest in this study. This study is about people's thoughts and feelings regarding how much fruit and vegetables get thrown away from their homes.**

Participation in this study entails completing a questionnaire now, which will take about 15 minutes to complete. Then in one week's time I will send you the web link to a second questionnaire. This second questionnaire will take no more than a couple of minutes to complete.

Participants who complete both questionnaires will be entered into a prize draw with the chance of **winning £75!** Also the person who recruits the most participants will **receive £75.**

Participation is voluntary, and you can withdraw from the study at any stage until it is no longer practical for you to do so.

Names and e-mail addresses will be removed from all questionnaires as soon as the final phase of the study has been completed, and your answers will be stored anonymously from that point.

You are welcome to take part in this study if you are **over 18 years old** and a **current UK resident.**

Please read the instructions carefully and answer the questions in the order that they appear on the page.

You will not be able to return to a page once you have clicked the continue button.

**By clicking on the continue button below, you are indicating that:**

- You consent to the processing of your personal information for the purposes of this research study.
- You understand that such information will be treated as strictly confidential and handled in accordance with the Data Protection Act 1998.

**About you...**

**Please read the questions carefully and answer them in the order they appear on the page.**

**1. Please enter today's date (dd/mm/yyyy) (Optional)**

**2. Please enter your full name** (This is vital information so we can contact you with the second part of the study, and so you can be contacted if you are the winner of the prize draw) *(Optional)*

**3. Please enter your e-mail address** (This is so you can be contacted if you are the winner of the prize draw) *(Optional)*

**4. How did you hear about this study?** (If it was a person please give their name) *(Optional)*

**5. Are you male or female?** *(Optional)*

Male / Female

**6. What is your age?** *(Optional)*

**7. What is your current marital status?** *(Optional)*

Single (never married)

Married

Separated

Divorced

Living with a partner

Widowed

Other *(please specify)*:

**8. What is your current occupational status?** *(Optional)*

Student

Employed

Self-employed

Unemployed

Stay at home parent/housewife/househusband

Other *(please specify)*:

**9. What is the highest qualification you have?** *(Optional)*

Key or basic skills

CSE, GCSE, O-levels

NVQ, A-level, International Baccalaureate

HND, BTEC, or other higher education qualification below degree level

Undergraduate degree

Postgraduate degree

Professional qualification

**10. What is your approximate total household income before tax?** *(Optional)*

£0 - 9,999

£10,000 - 19,999  
 £20,000 - 29,999  
 £30,000 - 39,999  
 £40,000 - 49,999  
 £50,000 - 59,999  
 £60,000 +

**11. How many adults (other than you) live in your household?** *(Optional)*

**12. How many children live in your household?** *(Optional)*

**13. Which of the following best describes your ethnic background?** *(Optional)*

If you selected Other, please specify:

**14. Are you a UK resident** *(Optional)*

Yes / No

**15. Which county in the UK do you live in?** *(Optional)*

**16. Which of the following best describes the area that you live in?** *(Optional)*

Rural /Suburb /City

**17. Are you fluent in English?** *(Optional)*

Yes / No

**18. Are you responsible for food shopping in your household?** *(Optional)*

Not responsible at all  
 Responsible for less than half  
 Responsible for about half  
 Responsible for more than half  
 Responsible for all or almost all

**19. Are you responsible for cooking and preparing the food in your household?** *(Optional)*

Not responsible at all  
 Responsible for less than half  
 Responsible for about half  
 Responsible for more than half  
 Responsible for all or almost all

**How much fruit and vegetables did you throw away?**

**This next section includes some questions about the amount of fruit and vegetables that got thrown away from your household in the last seven days.**

**20. Please estimate what percentage of your household's total fruit and vegetables got thrown away in the last seven days?**



0%  
10%  
20%  
30%  
40%  
50%  
60%  
70%  
80%  
90%  
100%

**21.** Please estimate what percentage of your household's **fruit** got thrown away in the last seven days?

0%  
10%  
20%  
30%  
40%  
50%  
60%  
70%  
80%  
90%  
100%

**22.** Please estimate what percentage of your household's **vegetables** got thrown away in the last seven days?

0%  
10%  
20%  
30%  
40%  
50%  
60%  
70%  
80%  
90%  
100%

**How much fruit and vegetables do you typically throw away?**

**This next section includes some questions about what percentage of your household's total fruit and vegetables gets thrown away in a typical seven day period?**

**23.** Please estimate what percentage of your household's total **fruit and vegetables** gets thrown away in a typical seven day period?

0%

10%  
20%  
30%  
40%  
50%  
60%  
70%  
80%  
90%  
100%

**24.** Please estimate what percentage of your household's **fruit** gets thrown away in a typical seven day period?

0%  
10%  
20%  
30%  
40%  
50%  
60%  
70%  
80%  
90%  
100%

**25.** Please estimate what percentage of your household's **vegetables** gets thrown away in a typical seven day period?

0%  
10%  
20%  
30%  
40%  
50%  
60%  
70%  
80%  
90%  
100%

**Below is a list of statements asking about your thoughts and feelings. Please click the button to the left of the response that best represents your answer.**

**26. For me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days would be...**

Extremely pointless  
Moderately pointless  
Slightly pointless  
Neither pointless nor worthwhile  
Slightly worthwhile

Moderately worthwhile  
Extremely worthwhile

**27. If I wanted to I could reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**28. I would feel regret if I did not reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**29. I plan to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**30. Most people I know try to reduce the amount of fruit and vegetables that they throw away**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**31. For me to reduce the amount of fruit and vegetables that get thrown away from my household over the next seven days would be...**

Extremely unenjoyable  
Moderately unenjoyable  
Slightly unenjoyable  
Neither unenjoyable nor enjoyable

Slightly enjoyable  
 Moderately enjoyable  
 Extremely enjoyable

**32. I think of myself as the sort of person who would reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**33. Not reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days would go against my principles**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**34. Most people who are important to me try to reduce the amount of fruit and vegetables that they throw away**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**35. For me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days would be...**

Extremely foolish  
 Moderately foolish  
 Slightly foolish  
 Neither foolish nor wise  
 Slightly wise  
 Moderately wise  
 Extremely wise

**36. The people in my life whose opinions I value probably would approve of me reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days**

Strongly disagree  
 Moderately disagree

Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**37. It is mostly up to me whether I reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**38. I am the type of person who would reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**39. Reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days would feel like I was doing the morally right thing**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**40. For me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days would be...**

Extremely bad  
 Moderately bad  
 Slightly bad  
 Neither bad nor good  
 Slightly good  
 Moderately good  
 Extremely good

**41. I intend to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days**

Strongly disagree

Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**42. Most people who are important to me probably think that I should reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**43. Reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days is an important part of who I am**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**44. If I didn't reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days it would play on my conscience**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**45. It would be possible for me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**46. I will try to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**47. If I didn't reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days I would feel regret**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**48. For me to reduce the amount of fruit and vegetables that get thrown away from my household over the next seven days would be...**

Extremely unpleasant  
 Moderately unpleasant  
 Slightly unpleasant  
 Neither unpleasant nor pleasant  
 Slightly pleasant  
 Moderately pleasant  
 Extremely pleasant

**49. I feel a strong obligation to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**50. I believe I have complete control over reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**51. For me to reduce the amount of fruit and vegetables that gets thrown away from my**

**household over the next seven days would be...**

Extremely harmful  
Moderately harmful  
Slightly harmful  
Neither harmful nor beneficial  
Slightly beneficial  
Moderately beneficial  
Extremely beneficial

Once you have clicked the continue button at the bottom of this page your questionnaire will be automatically submitted. From then on it will no longer be possible to withdraw unless you email me directly.

**Only click the continue button if you are happy to submit your questionnaire**

**Final Page**

**Thank you very much for taking the time to complete this questionnaire.**

I will contact you next week by email and send you the web link to the second questionnaire. The second questionnaire is very short and should only take a few minutes to complete. When you have completed the second questionnaire you will be entered into the £75 draw.

Please feel free to email me if you have any questions about this research. Researcher: Ella Graham-Rowe (E.J.Graham-Rowe@sussex.ac.uk)



**APPENDIX D****Chapter 3: Questionnaire - Follow-up measures**

Welcome

**Thank you for agreeing to complete part 2 of the household fruit and vegetable waste study.**

This questionnaire is the second and final part of this study. There are six questions and it should take no more than a couple of minutes to complete.

Once you have completed this questionnaire you will be entered into a prize draw with the chance of **winning £75!**

Participation is voluntary, and you can withdraw from the study at any stage until it is no longer practical for you to do so.

Please read the instructions carefully and answer the questions in the order that they appear on the page.

You will not be able to return to a page once you have clicked the continue button.

**By clicking on the continue button below, you are indicating that:**

- You consent to the processing of your personal information for the purposes of this research study.
- You understand that such information will be treated as strictly confidential and handled in accordance with the Data Protection Act 1998.

About you...

1. Please enter today's date (dd/mm/yyyy)
2. Please enter your e-mail address (This is so you can be contacted if you are the winner of the prize draw). Please provide the same email address as in the previous questionnaire.
3. Please enter your full name

**How much fruit and vegetables did you throw away?**

**This next section includes some questions about the amount of fruit and vegetables that got thrown away from your household in the last seven days.**

4. Please estimate what percentage of your household's total **fruit and vegetables** got thrown away in the last seven days?

0%  
10%  
20%  
30%  
40%  
50%  
60%  
70%  
80%  
90%  
100%

5. Please estimate what percentage of your household's **fruit** got thrown away in the last seven days?

0%  
10%  
20%  
30%  
40%  
50%  
60%  
70%  
80%  
90%  
100%

6. Please estimate what percentage of your household's **vegetables** got thrown away in the last seven days?

0%  
10%  
20%

30%  
40%  
50%  
60%  
70%  
80%  
90%  
100%

Final Page

**Thank you very much for taking the time to complete the second and final questionnaire for this study.**

Your name will now be entered into the £75 draw.

The aim of my study is to explain people's thoughts and feelings regarding the amount of fruit and vegetables that get thrown away from their households and to see whether these influence their behaviour. If you would like to withdraw your questionnaires now that you know the purpose of the study and/or you would like further information regarding this study, please contact me.

Ella Graham-Rowe, School of Psychology, University of Sussex, BN1 9QH. Email: E.J.Graham-Rowe@sussex.ac.uk

If you would like further information about ways to reduce the amount of fruit and vegetables that you throw away, you might find the following website useful:

<http://www.lovefoodhatewaste.com/>

**APPENDIX E****Chapter 4: Questionnaire - Baseline measures for both conditions**

**Thank you for agreeing to take part in this study.**

**This study is about people's thoughts and feelings on reducing the amount of household fruit and vegetables that are thrown away.**

**Participation in this study entails completing a questionnaire now, which will take about 15 minutes to complete. Then, in one week's time I will send you the web link to a second questionnaire. This second questionnaire will take no more than a couple of minutes to complete.**

**To take part in this study you must be over 18 years old and a current UK resident.**

**Participants who complete both questionnaires will be entered into a prize draw with the chance of winning £100!**

**PLEASE NOTE**

Participation is voluntary and you can withdraw from the study at any stage until it is no longer practical for you to do so.

Names and e-mail addresses will be removed from all questionnaires as soon as the final phase of the study has been completed. Your answers will be stored anonymously from that point.

**Please read the instructions carefully and answer the questions in the order that they appear on the page.**

**You will not be able to return to a page once you have clicked on the "continue" button.**

**This research is hosted by the University of Sussex and has been approved by the University's research ethics committee.**

**By clicking on the continue button below, you are indicating that:**

- You consent to the processing of your personal information for the purposes of this research study.
- You understand that such information will be treated as strictly confidential and handled in accordance with the Data Protection Act 1998.

*About you...*

**Please complete the following questions.**

**1. Please enter today's date** (dd/mm/yyyy)

**2. Please enter your e-mail address** (This is vital information so we can contact you with the second part of the study, and so you can be contacted if you are the winner of the prize draw)

**3. Please enter your full name**

**4. How did you hear about this study?**

**5. Are you male or female?**

Male / Female

**6. What is your age?**

**7. What is your current marital status?**

Single (never married)

Married

Separated

Divorced

Living with a partner

Widowed

Other (*please specify*):

**8. What is your current occupational status?**

Student

Employed

Self-employed

Unemployed

Stay at home parent/housewife/househusband

Other (*please specify*):

**9. If you answered 'student' in the previous question, what subject are you studying?**

**10. How many adults (other than you) live in your household?**

**11. How many children live in your household?**

**12. Are you a UK resident**

Yes / No

**13. To what extent are you responsible for food shopping in your household?**

Not responsible at all  
 Responsible for less than half  
 Responsible for about half  
 Responsible for more than half  
 Responsible for all or almost all

**14. To what extent are you responsible for cooking and preparing the food in your household?**

Not responsible at all  
 Responsible for less than half  
 Responsible for about half  
 Responsible for more than half  
 Responsible for all or almost all

*How much fruit and vegetables gets thrown away in your household?*

**Now we would like to ask you some questions about the amount of fruit and vegetables that get thrown away from your household.**

Please note that for the purposes of this study we are interested in fruit and vegetables that were brought into the home with the intention of being eaten. We are not concerned with waste that is generally perceived to be inedible, such as banana skins, apple cores and tough outer leaves. By 'thrown away' we mean any fruit and vegetables disposed of into the household rubbish bin, fed to animals or composted.

**15. Please estimate what percentage of your household's total fruit and vegetables was thrown away in the last seven days?**

0%  
 5%  
 10%  
 15%  
 20%  
 25%  
 30%  
 35%  
 40%  
 45%  
 50%  
 55%  
 60%  
 65%  
 70%  
 75%  
 80%  
 85%

90%  
95%  
100%

**16.** Please estimate what percentage of your household's total **fruit and vegetables** gets thrown away **in a typical seven day period?**

0%  
5%  
10%  
15%  
20%  
25%  
30%  
35%  
40%  
45%  
50%  
55%  
60%  
65%  
70%  
75%  
80%  
85%  
90%  
95%  
100%

### Self-affirmation manipulation only

---

#### *Your values*

In the present study we are interested in investigating people's values. By values we mean the moral principles and standards by which people try to live their lives. For example, honesty might be a core value for some people. That is, they may try to be honest in all they do - whether in dealing with other people or when studying or working. Following are some personal values that other people have described as important to them.

Conscientiousness  
 Spirituality/religiousness  
 Compassion  
 Intelligence  
 Generosity  
 Trustworthiness  
 Creativity  
 Hedonism (the pursuit of pleasure)  
 Friendliness  
 Kindness  
 Spontaneity

**17.** Please select the value that is **MOST** important to YOU, and write it in the space provided below.

Please note, this value does NOT have to appear on the list above.  
 The **MOST** important value to me is...

**18.** Why is this value important to YOU? Please write **THREE** reasons why this value is important to YOU.

**19.** Please give an example of **something you've done** to show how important this value is to you.

**20. How important to you is the value that you selected to write about?**

Extremely unimportant  
 Moderately unimportant  
 Slightly unimportant  
 Neither unimportant nor important  
 Slightly important  
 Moderately important  
 Extremely important



### Control manipulation only

---

#### *Your values*

In the present study we are interested in investigating people's values. By values we mean the moral principles and standards by which people try to live their lives. For example, honesty might be a core value for some people. That is, they may try to be honest in all they do - whether in dealing with other people or when studying or working. Following are some personal values that other people have described as important to them.

Conscientiousness  
 Spirituality/religiousness  
 Compassion  
 Intelligence  
 Generosity  
 Trustworthiness  
 Creativity  
 Hedonism (the pursuit of pleasure)  
 Friendliness  
 Kindness  
 Spontaneity

**17.** Please select the value that is **LEAST** important to you, and write it in the space provided below.

Please note, this value does NOT have to appear on the list above.  
 The **LEAST** important value to me is...

**18.** Why might this value be important to SOMEONE ELSE? Please write **THREE** reasons why this value might be important to SOMEONE ELSE.

**19.** Please give an example of **something someone else might do** to show how important this value is to them.

**20. How important to you is the value that you selected to write about?**

Extremely unimportant  
 Moderately unimportant  
 Slightly unimportant  
 Neither unimportant nor important  
 Slightly important  
 Moderately important  
 Extremely important

**Please now read the information on the following pages carefully.**

### **Food waste and the environment**

Climate change is one of the most serious environmental threats facing the world. Its impacts are likely to be felt globally as temperatures increase, sea levels rise and patterns of drought and flooding change. Predicted consequences of climate change include increased deaths, disease and injury due to heatwaves, floods, storms, fires, droughts and malnutrition.

The 2007 Fourth Assessment Report of the Intergovernmental Panel on Climate Change concluded it is very likely (more than 90% probability) that most of the observed global warming since the mid-20th century is due to the observed increase in human-caused greenhouse gas concentrations.

Food waste is a major contributor to emissions of carbon dioxide and other greenhouse gases. The production, distribution and storage of food that is subsequently thrown away wastes energy, fuel and water, and contributes towards deforestation. Each of these in turn adds to climate change. If we stopped throwing food away in the UK it would save the equivalent of at least 17 million tonnes of carbon dioxide, the same as taking one in every five cars off our roads.

### **Food waste and you**

Food waste doesn't just pose a threat to the environment; it also has immediate negative implications for you. Did you know that purchasing food that never gets eaten costs the average household £480 a year, rising to £680 for a family with children? This is equivalent of throwing £50 in the bin each month.

Throwing food away can also cause you to experience uncomfortable and negative feelings. A recent survey revealed that food waste is the number one cause of 'green guilt'. It is perhaps not surprising that people feel guilty about throwing food away, as it is bad for the environment and your pocket. Furthermore, when so many people are starving in the world it may seem particularly immoral to waste food.

Most people underestimate the amount of food that they throw away because they are simply unaware of the waste that they generate. In a recent study, people who indicated that they did not waste any food were actually found to be throwing away on average 90kg a year.

**We all contribute to the negative environmental, economic and social consequences of food waste and therefore we all need to contribute to the solution.**

**A win-win situation.**

We waste more fruit and vegetables (including salad) than any other type of food. Indeed we throw away a quarter of the fruit and vegetables that we buy. Eating fruit and vegetables, rather than throwing them away, will not just benefit the environment, your pocket and your conscience, it will also benefit your health.

According to the World Health Organization following a diet high in fruit and vegetables could help prevent major diseases such as cardiovascular disease and some forms of cancer.

Making sure the fruit and vegetables you buy don't go to waste is fairly easy, since much of it can be eaten without a great deal of planning or skill. Below are some suggestions of how you can increase your fruit and vegetable intake.

1. Add fruit to cereal or yogurt in the morning
2. Make fruit and vegetable smoothies or juices
3. Add vegetables such as mushrooms, peppers and onions to an omelette
4. Add salad to your homemade sandwiches
5. Snack on seasonal fruit in between meals
6. Add fruit (like grapes, mandarins or strawberries) to salads
7. Make a salad to go with every meal
8. Pre-cut vegetable sticks and take them to work to snack on
9. Make a fruit salad for dessert

**21. Please briefly summarise what the last 3 pages of information were about.**

*Your thoughts and feelings...*

**Below is a list of statements asking about your thoughts and feelings. Please click the button to the left of the response that best represents your answer.**

**22. For me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days would be...**

Extremely pointless  
Moderately pointless  
Slightly pointless  
Neither pointless nor worthwhile  
Slightly worthwhile  
Moderately worthwhile  
Extremely worthwhile

**23. I am the type of person who would reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**24. Reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days is an important part of who I am.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**25. I think of myself as the sort of person who would reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**26. For me to reduce the amount of fruit and vegetables that get thrown away from my household over the next seven days would be...**

Extremely unenjoyable  
 Moderately unenjoyable  
 Slightly unenjoyable  
 Neither unenjoyable nor enjoyable  
 Slightly enjoyable  
 Moderately enjoyable  
 Extremely enjoyable

**27. I plan to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**28. For me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days would be...**

Extremely foolish  
 Moderately foolish  
 Slightly foolish  
 Neither foolish nor wise  
 Slightly wise  
 Moderately wise  
 Extremely wise

**29. I believe I have complete control over reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**30. Not reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days would go against my principles.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**31. Most people I know try to reduce the amount of fruit and vegetables that they throw away from their households.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**32. Most people who are important to me try to reduce the amount of fruit and vegetables that they throw away from their households.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**33. If I didn't reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days it would play on my conscience.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**34. It would be possible for me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**35. If I didn't reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days I would feel regret.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**36. For me to reduce the amount of fruit and vegetables that gets thrown away from my**

**household over the next seven days would be...**

Extremely unpleasant  
 Moderately unpleasant  
 Slightly unpleasant  
 Neither unpleasant nor pleasant  
 Slightly pleasant  
 Moderately pleasant  
 Extremely pleasant

**37. I intend to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**38. For me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days would be...**

Extremely harmful  
 Moderately harmful  
 Slightly harmful  
 Neither harmful nor beneficial  
 Slightly beneficial  
 Moderately beneficial  
 Extremely beneficial

**39. Most people who are important to me would probably approve of me reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**40. Most people who are important to me probably think that I should reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**41. I would feel regret if I did not reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**42. Reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days would feel like I was doing the morally right thing.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**43. It is mostly up to me whether I reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**44. I will try to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**45. I feel a strong obligation to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree



Strongly agree

**46. If I wanted to I could reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**47. For me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days would be...**

Extremely bad  
Moderately bad  
Slightly bad  
Neither bad nor good  
Slightly good  
Moderately good  
Extremely good

**48. I would not want my family or friends to think of me as someone who is concerned about environmental issues.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**49. I think of myself as someone who is very concerned with environmental issues.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**50. I would be embarrassed to be seen as having an environmentally-friendly lifestyle.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**51. I think of myself as an environmentally-friendly consumer.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**52. I thought the information that I was asked to read about the negative consequences of food waste was overblown.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**53. I thought the information that I was asked to read about the negative consequences of food waste was exaggerated.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**54. I thought the information that I was asked to read about the negative consequences of food waste tried to manipulate my feelings.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**55. I thought the information that I was asked to read about the negative consequences of food waste tried to strain the truth.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**56. If there is anything that you would like to comment on in regard to your household fruit and vegetable waste or anything else to do with this questionnaire then please write in the space below.**

---

Thank you very much for taking the time to complete this questionnaire.

**In a week's time you will receive an e-mail with a web link to the second questionnaire. The second questionnaire is very short and should only take a few minutes to complete.**

Please try and complete the second questionnaire as soon as possible once you receive the email.

When you have completed the second questionnaire you will be entered into the £100 draw.

**If you have any questions about the study please contact me (Ella Graham-Rowe) via email ([E.J.Graham-Rowe@sussex.ac.uk](mailto:E.J.Graham-Rowe@sussex.ac.uk))**

**APPENDIX F****Chapter 4: Questionnaire – Follow-up measures for both conditions****Thank you for agreeing to complete part 2 of this study about  
household fruit and vegetable waste**

This questionnaire is the second and final part of this study. It should take no more than a couple of minutes to complete.

Once you have completed this questionnaire you will be entered into a prize draw with the chance of **winning £100!**

**PLEASE NOTE**

Participation is voluntary and you can withdraw from the study at any stage until it is no longer practical for you to do so.

Names and e-mail addresses will be removed from all questionnaires as soon as the final phase of the study has been completed. Your answers will be stored anonymously from that point.

**Please read the instructions carefully and answer the questions in the order that they appear on the page.**

**You will not be able to return to a page once you have clicked on the "continue" button.**

**This research is hosted by the University of Sussex and has been approved by the University's research ethics committee.**

**By clicking on the continue button below, you are indicating that:**

- You consent to the processing of your personal information for the purposes of this research study.
- You understand that such information will be treated as strictly confidential and handled in accordance with the Data Protection Act 1998.

*About you...*

1. Please enter today's date (dd/mm/yyyy)
2. Please enter your e-mail address (This is so you can be contacted if you are the winner of the prize draw and to match up your data with your first questionnaire). **Please provide the same email address as in the previous questionnaire.**
3. Please enter your full name

*How much of your household fruit and vegetables got thrown away?*

**Now we would like to ask you some questions about the amount of fruit and vegetables that got thrown away from your household in the last 7 days.**

Please note that for the purposes of this study we are interested in fruit and vegetables that were brought into the home with the intention of being eaten. We are not concerned with waste that is generally perceived to be inedible, such as banana skins, apple cores and tough outer leaves. By 'thrown away' we mean any fruit and vegetables disposed of into the household rubbish bin, fed to animals or composted.

4. Please estimate what percentage of your household's **total fruit and vegetables** was thrown away **in the last seven days?**

0%  
5%  
10%  
15%  
20%  
25%  
30%  
35%  
40%  
45%  
50%  
55%  
60%  
65%  
70%  
75%  
80%  
85%  
90%  
95%  
100%

**5. In the past 7 days, less fruit and vegetables have been thrown away from my household than in a typical week.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**6. I have reduced the amount of fruit and vegetables that got thrown away from my household over the last 7 days.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**7. If there is anything that you would like to comment on in regard to your household fruit and vegetable waste or anything else to do with this questionnaire then please write in the space below.**

**8. What do you think is the purpose of this study?**

**Thank you for taking part in our study about household fruit and vegetable waste.**

Your name will now be entered into the £100 draw.

This study was designed to explore whether writing about a personally important value would influence responses to information about food waste. Therefore some of you were asked to write about an important value before reading this information and some of you were asked to write about an unimportant value. You all then answered the same questions about household fruit and vegetable waste.

If you would like to withdraw your questionnaires now that you know the purpose of the study and/or you would like further information regarding this study, please contact me (Ella Graham-Rowe) via email (E.J.Graham-Rowe@sussex.ac.uk)

If you would like further information about ways to reduce the amount of fruit and vegetables that you throw away, you might find the following website useful:

<http://www.lovefoodhatewaste.com/>

**APPENDIX G****Chapter 5: Questionnaire – Baseline measures for all three conditions**

**Thank you for agreeing to take part in this study.**

**This study is about people's thoughts and feelings on reducing the amount of household fruit and vegetables that are thrown away.**

**Participation in this study entails completing a questionnaire now, which will take about 15 minutes to complete. Then, in one week's time I will send you the web link to a second questionnaire. This second questionnaire will take no more than a couple of minutes to complete.**

**To take part in this study you must be over 18 years old and a current UK resident.**

**Participants who complete both questionnaires will be entered into a prize draw with the chance of winning £100!**

**PLEASE NOTE**

Participation is voluntary and you can withdraw from the study at any stage until it is no longer practical for you to do so.

Names and e-mail addresses will be removed from all questionnaires as soon as the final phase of the study has been completed. Your answers will be stored anonymously from that point.

**Please read the instructions carefully and answer the questions in the order that they appear on the page.**

**You will not be able to return to a page once you have clicked on the "continue" button.**

**This research is hosted by the University of Sussex and has been approved by the University's research ethics committee.**

**By clicking on the continue button below, you are indicating that:**

- You consent to the processing of your personal information for the purposes of this research study.
- You understand that such information will be treated as strictly confidential and handled in accordance with the Data Protection Act 1998.

**About you...**

**Please complete the following questions.**

**1. Please enter your e-mail address** (This is vital information so we can contact you with the second part of the study, and so you can be contacted if you are the winner of the prize draw)

**2. Please enter your full name**

**3. How did you hear about this study?**

**4. Are you male or female?**

Male/ Female

**5. What is your age?**

**6. What is your current marital status?**

Single (never married)

Married

Separated

Divorced

Living with a partner

Widowed

Other (*please specify*):

**7. What is your current occupational status?**

Student

Employed

Self-employed

Unemployed

Stay at home parent/housewife/househusband

Retired

Other (*please specify*):

**8. If you answered 'student' in the previous question, what subject are you studying?**

**9. How many adults (other than you) live in your household?**

**10. How many children live in your household?**

**11. Are you a UK resident**

Yes / No

**12. To what extent are you responsible for food shopping in your household?**



Not responsible at all  
 Responsible for less than half  
 Responsible for about half  
 Responsible for more than half  
 Responsible for all or almost all

**13. To what extent are you responsible for cooking and preparing the food in your household?**

Not responsible at all  
 Responsible for less than half  
 Responsible for about half  
 Responsible for more than half  
 Responsible for all or almost all

**How much fruit and vegetables gets thrown away in your household?**

**Now we would like to ask you some questions about the amount of fruit and vegetables that get thrown away from your household.**

Please note that for the purposes of this study we are interested in fruit and vegetables that were brought into the home with the intention of being eaten. We are not concerned with waste that is generally perceived to be inedible, such as banana skins, apple cores and tough outer leaves. By 'thrown away' we mean any fruit and vegetables disposed of into the household rubbish bin, fed to animals or composted.

**14. Please estimate what percentage of your household's total fruit and vegetables gets thrown away in a typical seven day period?**

0%,  
 5%  
 10%  
 15%  
 20%  
 25%  
 30%  
 35%  
 40%  
 45%  
 50%  
 55%  
 60%  
 65%  
 70%  
 75%  
 80%  
 85%  
 90%  
 95%  
 100%

**15.** Please estimate what percentage of your household's total **fruit and vegetables** was thrown away **in the last seven days?**

0%  
5%  
10%  
15%  
20%  
25%  
30%  
35%  
40%  
45%  
50%  
55%  
60%  
65%  
70%  
75%  
80%  
85%  
90%  
95%  
100%

**16.** Please estimate what percentage of your household's **root vegetables** (e.g. carrots, potatoes, onions, turnips) was thrown away **in the last seven days.**

N/A  
0%  
5%  
10%  
15%  
20%  
25%  
30%  
35%  
40%  
45%  
50%  
55%  
60%  
65%  
70%  
75%  
80%  
85%  
90%  
95%  
100%

**17.** Please estimate what percentage of your household's **stem and leaf vegetables** (e.g. broccoli, asparagus, lettuces, leeks) was thrown away **in the last seven days**.

N/A

0%

5%

10%

15%

20%

25%

30%

35%

40%

45%

50%

55%

60%

65%

70%

75%

80%

85%

90%

95%

100%

**18.** Please estimate what percentage of your household's **other vegetables** (e.g. peppers, cucumbers, tomatoes, aubergines) was thrown away **in the last seven days**.

N/A

0%

5%

10%

15%

20%

25%

30%

35%

40%

45%

50%

55%

60%

65%

70%

75%

80%

85%

90%

95%

100%

**19.** Please estimate what percentage of your household's **citrus fruits** (e.g. oranges, lemons, limes, grapefruits) was thrown away **in the last seven days**.

N/A

0%

5%

10%

15%

20%

25%

30%

35%

40%

45%

50%

55%

60%

65%

70%

75%

80%

85%

90%

95%

100%

**20.** Please estimate what percentage of your household's **berry fruits** (e.g. blueberries, raspberries, strawberries, blackberries) was thrown away **in the last seven days**.

N/A

0%

5%

10%

15%

20%

25%

30%

35%

40%

45%

50%

55%

60%

65%

70%

75%

80%

85%

90%

95%

100%

**21.** Please estimate what percentage of your household's **tropical fruits** (e.g. bananas, mangoes, pineapples, kiwi) was thrown away **in the last seven days**.

N/A

0%

5%

10%

15%

20%

25%

30%

35%

40%

45%

50%

55%

60%

65%

70%

75%

80%

85%

90%

95%

100%

**22.** Please estimate what percentage of your household's **other fruits** (e.g. apples, peaches, plums, pears) was thrown away **in the last seven days**.

N/A

0%

5%

10%

15%

20%

25%

30%

35%

40%

45%

50%

55%

60%

65%

70%

75%

80%

85%

90%

95%

100%

**23.** Do you have a **regular fruit/vegetable box delivered** to your household?

Yes / No

**24.** If you have a fruit/vegetable box delivered please indicate (in the space below) **which company** supplies it.

**25.** What **type** of fruit/vegetable box do you get delivered?

N/A

Fruit only

Vegetables only

Salad only

Mixed fruit and vegetables

**26.** What **size** of fruit/vegetable box do you get delivered?

N/A

Mini

Small

Medium

Large

### Standard self-affirmation manipulation only

---

#### *Your values*

In the present study we are interested in investigating people's values. By values we mean the moral principles and standards by which people try to live their lives. For example, honesty might be a core value for some people. That is, they may try to be honest in all they do - whether in dealing with other people or when studying or working. Following are some personal values that other people have described as important to them.

Conscientiousness  
 Spirituality/religiousness  
 Compassion  
 Intelligence  
 Generosity  
 Trustworthiness  
 Creativity  
 Hedonism (the pursuit of pleasure)  
 Friendliness  
 Kindness  
 Spontaneity

**27.** Please select the value that is **MOST** important to YOU, and write it in the space provided below.

Please note, this value does NOT have to appear on the list above.  
 The **MOST** important value to me is...

**28.** Why is this value important to YOU? Please write **THREE** reasons why this value is important to YOU.

**29.** Please give an example of **something you've done** to show how important this value is to you.

**30. How important to you is the value that you selected to write about?**

Extremely unimportant  
 Moderately unimportant  
 Slightly unimportant  
 Neither unimportant nor important  
 Slightly important  
 Moderately important  
 Extremely important

### Control manipulation only

---

#### *Your values*

In the present study we are interested in investigating people's values. By values we mean the moral principles and standards by which people try to live their lives. For example, honesty might be a core value for some people. That is, they may try to be honest in all they do - whether in dealing with other people or when studying or working. Following are some personal values that other people have described as important to them.

Conscientiousness  
 Spirituality/religiousness  
 Compassion  
 Intelligence  
 Generosity  
 Trustworthiness  
 Creativity  
 Hedonism (the pursuit of pleasure)  
 Friendliness  
 Kindness  
 Spontaneity

**27.** Please select the value that is **LEAST** important to you, and write it in the space provided below.

Please note, this value does NOT have to appear on the list above.  
 The **LEAST** important value to me is...

**28.** Why might this value be important to SOMEONE ELSE? Please write **THREE** reasons why this value might be important to SOMEONE ELSE.

**29.** Please give an example of **something someone else might do** to show how important this value is to them.

**30. How important to you is the value that you selected to write about?**

Extremely unimportant  
 Moderately unimportant  
 Slightly unimportant  
 Neither unimportant nor important  
 Slightly important  
 Moderately important  
 Extremely important



**Integrated self-affirmation manipulation only****Your values**

**Please take a few moments to read the following list of values.**

Conscientiousness  
Morality  
Compassion  
Commitment  
Determination  
Resourcefulness  
Intelligence  
Open-mindedness  
Creativity  
Enthusiasm  
Competence

**Please consider which of these values is MOST important to YOU. Think about why this value is important to you and how it has influenced things you have done.**

**Next page....**

**The good news is that if any of these values are important to you, you are likely to be successful in reducing your household food waste.**

**Please now read the information on the following pages carefully.**

### **Food waste and the environment**

Climate change is one of the most serious environmental threats facing the world. Its impacts are likely to be felt globally as temperatures increase, sea levels rise and patterns of drought and flooding change. Predicted consequences of climate change include increased deaths, disease and injury due to heatwaves, floods, storms, fires, droughts and malnutrition.

The 2007 Fourth Assessment Report of the Intergovernmental Panel on Climate Change concluded it is very likely (more than 90% probability) that most of the observed global warming since the mid-20th century is due to the observed increase in human-caused greenhouse gas concentrations.

Food waste is a major contributor to emissions of carbon dioxide and other greenhouse gases. The production, distribution and storage of food that is subsequently thrown away wastes energy, fuel and water, and contributes towards deforestation. Each of these in turn adds to climate change. If we stopped throwing food away in the UK it would save the equivalent of at least 17 million tonnes of carbon dioxide, the same as taking one in every five cars off our roads.

### **Food waste and you**

Food waste doesn't just pose a threat to the environment; it also has immediate negative implications for you. Did you know that purchasing food that never gets eaten costs the average household £480 a year, rising to £680 for a family with children? This is equivalent of throwing £50 in the bin each month.

Throwing food away can also cause you to experience uncomfortable and negative feelings. A recent survey revealed that food waste is the number one cause of 'green guilt'. It is perhaps not surprising that people feel guilty about throwing food away, as it is bad for the environment and your pocket. Furthermore, when so many people are starving in the world it may seem particularly immoral to waste food.

Most people underestimate the amount of food that they throw away because they are simply unaware of the waste that they generate. In a recent study, people who indicated that they did not waste any food were actually found to be throwing away on average 90kg a year.

**We all contribute to the negative environmental, economic and social consequences of food waste and therefore we all need to contribute to the solution.**

**A win-win situation.**

We waste more fruit and vegetables (including salad) than any other type of food. Indeed we throw away a quarter of the fruit and vegetables that we buy. Eating fruit and vegetables, rather than throwing them away, will not just benefit the environment, your pocket and your conscience, it will also benefit your health.

According to the World Health Organization following a diet high in fruit and vegetables could help prevent major diseases such as cardiovascular disease and some forms of cancer.

Making sure the fruit and vegetables you buy don't go to waste is fairly easy, since much of it can be eaten without a great deal of planning or skill. Below are some suggestions of how you can increase your fruit and vegetable intake.

1. Add fruit to cereal or yogurt in the morning
2. Make fruit and vegetable smoothies or juices
3. Add vegetables such as mushrooms, peppers and onions to an omelette
4. Add salad to your homemade sandwiches
5. Snack on seasonal fruit in between meals
6. Add fruit (like grapes, mandarins or strawberries) to salads
7. Make a salad to go with every meal
8. Pre-cut vegetable sticks and take them to work to snack on
9. Make a fruit salad for dessert

**31. Please briefly summarise what the last 3 pages of information were about.**

**Your thoughts and feelings...**

**Below is a list of statements asking about your thoughts and feelings. Please click the button to the left of the response that best represents your answer.**

**32. For me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days would be...**

Extremely pointless  
Moderately pointless  
Slightly pointless  
Neither pointless nor worthwhile  
Slightly worthwhile  
Moderately worthwhile  
Extremely worthwhile

**33. I am the type of person who would reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**34. Reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days is an important part of who I am.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**35. I think of myself as the sort of person who would reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**36. For me to reduce the amount of fruit and vegetables that get thrown away from my household over the next seven days would be...**

Extremely unenjoyable

Moderately unenjoyable  
 Slightly unenjoyable  
 Neither unenjoyable nor enjoyable  
 Slightly enjoyable  
 Moderately enjoyable  
 Extremely enjoyable

**37. I plan to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**38. For me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days would be...**

Extremely foolish  
 Moderately foolish  
 Slightly foolish  
 Neither foolish nor wise  
 Slightly wise  
 Moderately wise  
 Extremely wise

**39. I believe I have complete control over reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**40. Not reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days would go against my principles.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**41. Most people I know try to reduce the amount of fruit and vegetables that they throw away from their households.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**42. Most people who are important to me try to reduce the amount of fruit and vegetables that they throw away from their households.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**43. If I didn't reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days it would play on my conscience.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**44. It would be possible for me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**45. If I didn't reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days I would feel regret.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**46. For me to reduce the amount of fruit and vegetables that gets thrown away from my**

**household over the next seven days would be...**

Extremely unpleasant  
 Moderately unpleasant  
 Slightly unpleasant  
 Neither unpleasant nor pleasant  
 Slightly pleasant  
 Moderately pleasant  
 Extremely pleasant

**47. I intend to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**48. For me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days would be...**

Extremely harmful  
 Moderately harmful  
 Slightly harmful  
 Neither harmful nor beneficial  
 Slightly beneficial  
 Moderately beneficial  
 Extremely beneficial

**49. Most people who are important to me would probably approve of me reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**50. Most people who are important to me probably think that I should reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
 Moderately disagree  
 Slightly disagree  
 Neither disagree nor agree  
 Slightly agree  
 Moderately agree  
 Strongly agree

**51. I would feel regret if I did not reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**52. Reducing the amount of fruit and vegetables that gets thrown away from my household over the next seven days would feel like I was doing the morally right thing.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**53. It is mostly up to me whether I reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**54. I will try to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**55. I feel a strong obligation to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree



**56. If I wanted to I could reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**57. For me to reduce the amount of fruit and vegetables that gets thrown away from my household over the next seven days would be...**

Extremely bad  
Moderately bad  
Slightly bad  
Neither bad nor good  
Slightly good  
Moderately good  
Extremely good

**58. I would not want my family or friends to think of me as someone who is concerned about environmental issues.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**59. I think of myself as someone who is very concerned with environmental issues.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**60. I would be embarrassed to be seen as having an environmentally-friendly lifestyle.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**61. I think of myself as an environmentally-friendly consumer.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**62. I thought the information that I was asked to read about the negative consequences of food waste was overblown.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**63. I thought the information that I was asked to read about the negative consequences of food waste was exaggerated.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**64. I thought the information that I was asked to read about the negative consequences of food waste tried to manipulate my feelings.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**65. I thought the information that I was asked to read about the negative consequences of food waste tried to strain the truth.**

Strongly disagree  
Moderately disagree  
Slightly disagree  
Neither disagree nor agree  
Slightly agree  
Moderately agree  
Strongly agree

**66. If there is anything that you would like to comment on in regard to your household fruit and vegetable waste or anything else to do with this questionnaire then please write in the space below.**

Thank you very much for taking the time to complete this questionnaire.

**In a week's time you will receive an e-mail with a web link to the second questionnaire. The second questionnaire is very short and should only take a few minutes to complete.**

Please try and complete the second questionnaire as soon as possible once you receive the email.

When you have completed the second questionnaire you will be entered into the £100 draw.

**If you have any questions about the study please contact me (Ella Graham-Rowe) via email (E.J.Graham-Rowe@sussex.ac.uk)**

**APPENDIX H****Chapter 5: Questionnaire – Follow-up measures for all three conditions**

**Thank you for agreeing to complete part 2 of this study about  
household fruit and vegetable waste**

This questionnaire is the second and final part of this study. It should take no more than a couple of minutes to complete.

Once you have completed this questionnaire you will be entered into a prize draw with the chance of **winning £100!**

**PLEASE NOTE**

Participation is voluntary and you can withdraw from the study at any stage until it is no longer practical for you to do so.

Names and e-mail addresses will be removed from all questionnaires as soon as the final phase of the study has been completed. Your answers will be stored anonymously from that point.

**Please read the instructions carefully and answer the questions in the order that they appear on the page.**

**You will not be able to return to a page once you have clicked on the "continue" button.**

**This research is hosted by the University of Sussex and has been approved by the University's research ethics committee.**

**By clicking on the continue button below, you are indicating that:**

- You consent to the processing of your personal information for the purposes of this research study.
- You understand that such information will be treated as strictly confidential and handled in accordance with the Data Protection Act 1998.

**About you...**

**1. Please enter your e-mail address** (This is so you can be contacted if you are the winner of the prize draw and to match up your data with your first questionnaire). **Please provide the same email address as in the previous questionnaire.**

**2. Please enter your full name**

**How much of your household fruit and vegetables got thrown away?**

**Now we would like to ask you some questions about the amount of fruit and vegetables that got thrown away from your household in the last 7 days.**

Please note that for the purposes of this study we are interested in fruit and vegetables that were brought into the home with the intention of being eaten. We are not concerned with waste that is generally perceived to be inedible, such as banana skins, apple cores and tough outer leaves. By 'thrown away' we mean any fruit and vegetables disposed of into the household rubbish bin, fed to animals or composted.

**3. Please estimate what percentage of your household's total fruit and vegetables was thrown away in the last seven days?**

N/A

0%

5%

10%

15%

20%

25%

30%

35%

40%

45%

50%

55%

60%

65%

70%

75%

80%

85%

90%

95%

100%

**4. Please estimate what percentage of your household's root vegetables (e.g. carrots, potatoes, onions, turnips) was thrown away in the last seven days.**

N/A

0%

5%  
10%  
15%  
20%  
25%  
30%  
35%  
40%  
45%  
50%  
55%  
60%  
65%  
70%  
75%  
80%  
85%  
90%  
95%  
100%

5. Please estimate what percentage of your household's **stem and leaf vegetables** (e.g. broccoli, asparagus, lettuces, leeks) was thrown away **in the last seven days**.

N/A  
0%  
5%  
10%  
15%  
20%  
25%  
30%  
35%  
40%  
45%  
50%  
55%  
60%  
65%  
70%  
75%  
80%  
85%  
90%  
95%  
100%

6. Please estimate what percentage of your household's **other vegetables** (e.g. peppers, cucumbers, tomatoes, aubergines) was thrown away **in the last seven days**.

N/A  
0%

5%  
10%  
15%  
20%  
25%  
30%  
35%  
40%  
45%  
50%  
55%  
60%  
65%  
70%  
75%  
80%  
85%  
90%  
95%  
100%

7. Please estimate what percentage of your household's **citrus fruits** (e.g. oranges, lemons, limes, grapefruits) was thrown away **in the last seven days**.

N/A  
0%  
5%  
10%  
15%  
20%  
25%  
30%  
35%  
40%  
45%  
50%  
55%  
60%  
65%  
70%  
75%  
80%  
85%  
90%  
95%  
100%

8. Please estimate what percentage of your household's **berry fruits** (e.g. blueberries, raspberries, strawberries, blackberries) was thrown away **in the last seven days**.

N/A  
0%

5%  
10%  
15%  
20%  
25%  
30%  
35%  
40%  
45%  
50%  
55%  
60%  
65%  
70%  
75%  
80%  
85%  
90%  
95%  
100%

**9.** Please estimate what percentage of your household's **tropical fruits** (e.g. bananas, mangoes, pineapples, kiwi) was thrown away **in the last seven days**.

N/A  
0%  
5%  
10%  
15%  
20%  
25%  
30%  
35%  
40%  
45%  
50%  
55%  
60%  
65%  
70%  
75%  
80%  
85%  
90%  
95%  
100%

**10.** Please estimate what percentage of your household's **other fruits** (e.g. apples, peaches, plums, pears) was thrown away **in the last seven days**.

N/A  
0%  
5%



10%  
15%  
20%  
25%  
30%  
35%  
40%  
45%  
50%  
55%  
60%  
65%  
70%  
75%  
80%  
85%  
90%  
95%  
100%

**11. If there is anything that you would like to comment on in regard to your household fruit and vegetable waste or anything else to do with this questionnaire then please write in the space below.**

**12. What do you think is the purpose of this study?**

**Thank you for taking part in our study about household fruit and vegetable waste.**

Your name will now be entered into the £100 draw.

This study was designed to explore whether thinking and/or writing about a personally important value would influence responses to information detailing the negative consequences of food waste. Therefore some of you were asked to think about an important value before reading this information, some of you were asked to write about an important value and some of you were asked to write about an unimportant value. You all then answered the same questions about household fruit and vegetable waste.

If you would like to withdraw your questionnaires now that you know the purpose of the study and/or you would like further information regarding this study, please contact me (Ella Graham-Rowe) via email (E.J.Graham-Rowe@sussex.ac.uk)

If you would like further information about ways to reduce the amount of fruit and vegetables that you throw away, you might find the following website useful:

<http://www.lovefoodhatewaste.com/>