



Full length article

What are the factors that an opportunity sample of UK students insinuate as being associated with their wastage of food in the home setting?

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ABSTRACT

The aim of this research was to investigate the factors that influence student awareness and behaviour associated with food waste. The study is exploratory in nature and the qualitative research approach contextualises personal accounts of food waste awareness and behaviour. Semi-structured interviews were undertaken with students ($n = 50$) from 12 households, who were enrolled at a UK university. Qualitative data was collected and thematically analysed using Microsoft NVivo 11 and a thematic map developed to firstly postulate how students' awareness and behaviour associated with food waste is influenced and secondly to support further study in this area. In order to tackle the issue of students' food waste, measures to increase awareness of food waste and improving design of kitchen environments should be adopted. However the latter is often not possible in short-term rented accommodation. The research contributes to the existing area of research and provides additional evidence for the factors that influence students' food waste behaviour.

1. Introduction

Global food waste is estimated to be 1.6 billion tonnes annually of which 1.3 billion tonnes is edible with a value of \$750 billion (FAO, 2017). This scale of food waste impacts society, the environment and the wider economy, in a world that is already struggling to feed the population. Global food production will need to increase by 50–70% to feed the 9.3 billion people living on the planet by 2050, whilst natural resources are becoming ever more scarce (Bond et al., 2013). Consequently, food supply chains need to become more sustainable from farm to fork, including by reducing existing levels of personal food waste. Food safety scares too can also have a major impact on supply chain food waste: for example, a Salmonella warning caused 32% of American tomatoes to be unharvested in 2008 (Gunders, 2012).

Total United Kingdom (UK) household food waste levels increased from 7 million tonnes in 2012, to 7.3 million tonnes of food in 2015 at a monetary value of £13 billion per annum. Avoidable UK household food waste reduced by 21% between 2007 and 2012 (Smithers, 2017) then increased by 5.1% to 4.4 million tonnes in 2015 (Quested and Parry, 2016). Individuals may not realise the impact that food waste has on the economy, the environment, and society often thinking because food is natural, and it simply rots into the ground (Doron, 2013). Domestic food waste largely ends up in landfill sites (Quested and Parry, 2011), where space is becoming increasingly scarce, especially as communities do not want new landfill sites a given area, due to

environmental and aesthetic concerns (Barr, 2004). When food is placed into landfill the resources associated with the food are lost (Doron, 2013), including in the UK, 5400 million cubic metres of water annually (Quested and Parry, 2011). In addition, methane, a potent greenhouse gas, that is 23 times stronger in terms of the environmental impacts than CO₂, is produced when food starts to rot into the ground (Themelis and Vllou, 2007), whilst 19 million tonnes of CO₂ is produced when manufacturing, distributing, storing and disposing of avoidable food waste (Doron, 2013).

Literature suggests two main motivators to encourage individuals to reduce food waste namely environmental concerns (Doron, 2013) and the monetary value associated with food waste (Lyndhurst, 2007; Graham-Rowe et al., 2014). These factors are important when considering the policy campaigns that have been developed to influence personal behaviour. Since 2009, a series of campaigns have been launched in the UK, by the government and supermarkets, with the aim of trying to reduce food waste levels (Quested and Parry, 2016). In 2005, the UK government launched the Courtauld Commitment, which is a voluntary agreement between major suppliers, manufacturers and supermarkets to improve resource efficiency and reduce waste. Subsequently, four stages of the agreement have been launched with future targets for 2025 to reduce food and drink waste by 20% (WRAP, n.d). In 2007, the UK government 'Love Food Hate Waste' (LFHW) campaign aimed to reach two audiences: firstly, the 15 million adults who are already aware, but need help in reducing the amount they waste, and

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secondly the remaining population who were identified as not being aware of food waste issues (Quested et al., 2012). It is difficult to determine the contribution of such campaigns to reducing food waste, because other concurrent socio-economic issues, can also play a part in food waste reduction. However recent research has suggested that appropriately targeted campaigns are of value (Schmidt, 2016; Delley and Brunner, 2017). The UK recession (2008–2012) caused food prices to rise by 14% whilst consumer income stayed static (Quested and Parry, 2011). As households had less disposable income, consumers started to pay more attention to perishable products like meat, as they could not afford to waste food (Quested and Parry, 2011; Miller and Branscum, 2012). Arguably this economic factor may have contributed to food waste reduction between 2007 and 2012, as equally as the impact of the LFHW campaign.

Food loss occurs at all stages of food production (Fig. 1), but the further down the supply chain the food travels from the farm, the more costly it becomes to waste food as greater value has been added, both in monetary and environmental terms. This makes consumers and food retailers the most impactful food wasters in cost, society and environmental terms (Eriksson et al., 2016). Fig. 1 illustrates the potential factors that contribute to the loss of food at different stages along the food supply chain.

The literature demonstrates clearly that food waste is a global problem and a national problem too in the UK and that unless action is taken to engage individuals and encourage them to modify their behaviour then the social, environmental and economic impact will continue unchecked.

2. Food waste behaviour and its impact on the quantities of food wasted

Consumer food waste can be categorised into three different groups: avoidable, possible avoidable and unavoidable (Quested and Johnson, 2009). **Unavoidable food waste** includes inedible material that would not be consumed under normal conditions, for example, egg shells, fruit stones or animal and fish bones. **Possible avoidable food waste** is the food and drink material that some people eat, whilst others do not (Quested and Johnson, 2009:14). Alternatively **avoidable food waste** is classed as any food and drink product that was once edible, but now due to its current nature is no longer fit for consumption, such mouldy fruit (Quested et al., 2012; Eriksson et al., 2016). Table 1 outlines over the time period between 2007 and 2015 the quantity of the three aforementioned categories of household food waste in the UK.

The data shows a drop in avoidable food waste, but conversely a rise in unavoidable food waste over the time period. Factors influencing the quantity of food waste at the retail level that are within the scope of the business to address include: visual appearance of food at point of sale, over ordering, baking too much, handling fresh produce incorrectly and undertaking promotions on products that cause customers to over-buy when they are unlikely to consume the product (Stenmarck et al., 2011). Customers favour choice with fully stocked shelves, forcing supermarkets to over order and over stock, increasing the chances of food going out of date (Stuart, 2009; Stenmarck et al., 2011; Wyman, 2014) Furthermore, when supermarkets run promotions such as 'buy one get one free', consumers switch away from regularly purchases, to promotional offers, causing a variance in demand and increasing the chance of over purchase and subsequent spoilage (Quested et al., 2012; Wyman, 2014). Consumer buying patterns depend on additional factors too such as the weather, season, offers and moods (Stenmarck et al., 2011; Eriksson et al., 2016) and retailers need to consider this as part of their customer offer in order to minimise food waste at retail level.

The 'good provider' describes individuals, who purchase large amounts of fruit and vegetable and tend to overcook, as they feel they have failed if the family goes hungry, or snacks on unhealthy food (Graham-Rowe et al., 2014; Quested and Luzecka, 2014; Mallinson et al., 2016). 'Food recipients,' are those individuals who do not buy

food for themselves and live in the family home i.e. children and teenagers who, Graham-Rowe et al. (2014) argue, are more likely to waste food, due to the lack of understanding of the monetary value of food. Food waste in the family setting may also be in response to 'children being fussy'. Parents are more likely to follow use by dates,¹ as they are concerned with the microbial safety issues surrounding food products (Quested and Luzecka, 2014).

The older generation, i.e. in their seventies and over, can be typed as the 'waste intolerators'. They waste 25% less food compared to the rest of the population. They lived in households with no tolerance of food waste, using up all the scraps and leftovers during the food rationing in the Second World War (Quested et al., 2013) and greater levels of education on food management and cooking (Godfray et al., 2010). This mindset has remained, even though food is relatively cheaper than the past (Graham-Rowe et al., 2014). Conversely, people lacking cooking skills and food storage knowledge are more concerned with the safety risks involved with food, compared to those who do know how to cook and store food correctly (Lyndhurst, 2007). The younger generation, i.e. aged 18–24, are said to be less educated in terms of food, food storage and food waste, and scraps and leftovers are more often thrown away due to them being perceived as being of little monetary value. Young adults such as students, who have just moved out the family home, may not be able afford to waste food, so they should in theory have greater awareness of the monetary value of food waste (Graham-Rowe et al., 2014). Conversely, other literature suggests that the younger generation, aged 18–24, are the highest food wasters within society (Hamilton et al., 2005; Lyndhurst, 2007; Principato et al., 2015; Mallinson et al., 2016). The literature highlighted a duality in findings with regard to student behaviour and no previous literature has considered UK students specifically. This presented as the research gap that this empirical work is designed to address. This paper is structured as follows: firstly an introduction to the topic of study. The methodology of the empirical study is then outlined followed by the results, and analysis. Key themes are discussed and conclusions and recommendations provided for further research.

3. Food waste and behaviours associated specifically with students

There have been a few studies on the topic of food waste and the younger generation including Italian and Spanish students (Graham-Rowe et al., 2014; Quested and Luzecka, 2014; Principato et al., 2015; Mondéjar-Jiménez et al., 2016). Principato et al. (2015) in their Italian study with students (n = 230) found the greater knowledge students had of the issues surrounding food waste, the greater the chance of changing behaviour. However, in the study students struggled to identify the specific environmental, social and economic issues linked to food waste. Conversely, Graham-Rowe et al. (2014) determined that with students the monetary value of food waste was a motivator.

In a further study, 6% of students were confused between 'best before,' and 'use by' dates, and would throw the food away without a sensory evaluation (Principato et al., 2015). Mondéjar-Jiménez et al. (2016) conducted an investigation to identify whether students in Spain and Italy waste the same types of food. Table 2 shows the cultural difference in the different types of food households waste on a weekly basis. For instance, on average Spanish students wasted more white meat (14.75%) on a weekly basis than Italian students (7.36%). Spanish students similarly wasted more convenience food (12.82%) per week on average compared to Italian students in the study (2.94%). However, both countries, as with UK households, waste more fruit, bread and

¹ The 'best before' date is associated with the quality (i.e. taste, texture, and aroma) and appearance of the product, which will slowly deteriorate after the date on the packaging, but it still safe to eat (Defra, 2011). Whereas the 'use by' date, is linked to the microbiological safety of the food product so after the 'use by date' has expired, the food could potentially cause illness (Defra, 2011).

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