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The significance of avoiding household food waste – A means-end-chain approach

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ABSTRACT

Many humans suffer from hunger, while edible food is discarded. This study aims at showing the importance of avoiding food waste in households and its causes by applying the means-end-chain analysis. Additional the means-end-chain approach should be examined in how far the method is suitable to get insights towards this topic. Consumer backgrounds in terms of feelings and attitudes regarding food waste should be shown, with the particular question why food waste personally is important. The data collection occurred utilizing the hard laddering method within a quantitative online survey. The results indicate that avoiding food waste is important for the greater part of consumers, as many claim to have a bad conscience, seeing it as morally wrong and reprehensible to waste food. A sample breakdown of gender, age and income points differences among these groups in regards to psychological consequences and value systems. Financial and environmental aspects have a lesser impact on attitudes and feelings regarding food waste in households.

1. Introduction

1.1. Background and objectives

In recent years, food waste and especially the determination of the quantity of food waste have become interesting subjects of study (Levis et al., 2010; Katajajuuri et al., 2014). The prevention of food waste is relevant to combating global problems of hunger and improving food security (Beretta et al., 2013; Garrone et al., 2014). Currently more food is harvested than necessary to sufficiently feed the world's population (Weltagrarbericht, 2009); by 2020, a quantitative increase of food waste of 42% from 2006 is predicted for the EU-27 (Mirabella et al., 2014). Food production is expected to further expand until 2050, by 110% (Nellemann et al., 2009; Garnett, 2013), albeit contributing to shrinking natural resources (Eriksson et al., 2014). One quarter of fresh water used in agricultural production, for example, is used for food not used for human consumption (Hall et al., 2009). Food production and thus its waste are connected with environmental damages, like the release of nitrogen and other greenhouse gases (Kummu et al., 2012; FAO, 2013; Grizetti et al., 2013; Eberle and Fels, 2014; Noleppa, 2014).

The highest quantity of food waste occurs in households (Monier et al., 2010; Parfitt et al., 2010; Gustavsson et al., 2011; Kranert et al., 2012). Consumers cause 42% of food waste in the EU-27 (Monier et al., 2010) and a total of two thirds of food waste in Germany, half of which is considered avoidable (Kranert et al., 2012). Consumers demonstrate a lack of awareness regarding the quantity of their own food needs as well as the environmental damages resulting from food waste and production (Quested et al., 2011), making it relevant to understand to what extent past experiences and acquired knowledge may influence food purchasing decisions or food waste behavior (Farr-Wharton et al., 2014). But needs to be stated that it is not possible to distribute all food surplus to people in need, but in light of the growing population and increasing urbanization, it is important to address food waste and connected issues thereof. It is still unclear how consumers classify this issue and if it is important for them to avoid food losses in their households and for what reasons. This study examines the importance of food waste in German households as well as background and attitudes behind, to provide insights to consumer perception and treatment of food. Further for this investigation the means-end-chain approach is tested, wether it is suitable to get insights to consumer perceptions towards food waste.

1.2. Food waste in households

Twenty percent of purchased food is discarded in the EU, and almost 30% of this are packaged foods, fruits, and vegetables

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(Rosenbauer, 2011). Totally 42% of food waste arise in households in the EU-27, amounting 38 million tons or 76 kg per capita (Monier et al., 2010). In Germany consumers are responsible for two thirds of the country's food waste (Kranert et al., 2012), reaching 80 kg per capita with a worth of 310 EUR (EHI Retail Institute, 2011). Nearly two third of these wasted foods in German households are avoidable or partly avoidable. This corresponds to 3.28 million tons of food waste, which are avoidable or partly avoidable (Kranert et al., 2012).

The quantity of food waste is affected by socio-demographical factors, like household size or consumers' age (Koivupuro et al., 2012; McCarthy and Liu, 2017). Thus, the amount of food waste increases with increasing household size (Ventour, 2008; Baker et al., 2009; Jörissen et al., 2015), although per capita food waste is as high in single households (Ventour, 2008; Quested et al., 2011; Koivupuro et al., 2012; Jörissen et al., 2015). Further, older people tend to waste less food (Ventour, 2008; Parfitt et al., 2010; Quested et al., 2011). Finally, there is a correlation between income and quantity of food waste (Baker et al., 2009; Parfitt et al., 2010). Consumer, who are rather price-focused, have lower amounts of food waste in their household, whereby there are fewer price-focused consumers in higher income classes (Aschemann-Witzel et al., 2017). At least, in households with higher income and small kids, where the family is eating often out, food is wasted more often (McCarthy and Liu, 2017).

Reasons of food waste in households are manifold. Most commonly food is wasted due to spoilage, leftovers on plates, food officially outdated for consumption, shorter shelf life of fresh foods and forgotten food in the fringed (Koivupuro et al., 2012; McCarthy and Liu, 2017). Individuals may purchase too much, use unsuitable or insufficient storage practices, find the food unsavory, cook too much to eat, and discard leftovers (Ventour, 2008; Koivupuro et al., 2012; Cox and Downing, 2007).

Some factors leading to food waste in households require government intervention, while others are better remediated by the food industry (Parfitt et al., 2010). The greatest motivator for consumers to waste lower amounts of food is the opportunity to save money (Baker et al., 2009; Graham-Rowe et al., 2014). This aspect by far has more importance than ecological benefits resulting by reducing food waste (Baker et al., 2009). Food waste may be reduced by changing consumer reactions towards waste, increasing awareness of poverty and hunger, and highlighting the moral implications of waste, for example by using guilt (Baker et al., 2009; Quested et al., 2011; Graham-Rowe et al., 2014; McCarthy and Liu, 2017). No responsibilities and absent priorities with handling food and food waste, as well as a low interest in food waste are barriers to minimizing food waste. But many consumers consider themselves to have their food and waste planning under control and are satisfied with their own behavior in this respect (Graham-Rowe et al., 2014). Habits and emotions are important factors for reducing food waste (Russell et al., 2017). Embedded consumer behavior and attitudinal interactions linked with household dynamics can lead an increased amount of food waste (Mallinson et al., 2016). Perceived behavioral control and routines like shopping are key factors for food waste, while planning routines only have an indirect impact. And at the end, injunctive norms and attitudes related to food waste are of higher importance, as moral norms and perceived behavioral control have no significant influence (Stancu et al., 2016).

Some consumers are indifferent to a certain extent and, for example, do not perceive the issue as a problem (Cox and Downing, 2007; Graham-Rowe et al., 2014), although the prevention of food waste is strongly linked to consumer behavior (Quested et al., 2013). Self-assessment regarding the amount of food waste is controversial in determining actual amounts of unused food supplies (Rosenbauer, 2011). Food routines are highly influenced by purchasing routines, and more so than by intentions of wasting less food (Stefan et al., 2013). Mostly, consumers are taken aback when confronted about wasting food and feel guilty. They are aware of how to regulate their food purchases, but do not apply such knowledge (Baker et al., 2009). Food waste therefore, can be understood as due to different behavioral patterns in food planning, purchasing, storage, preparation and consumption practices (Quested et al., 2011).

1.3. Terminology of food waste

Currently, there is no standardized method of obtaining data on the quantity of food waste and losses; each existing study generally employs a unique definition and different classifications when addressing the topic. Due to this fact, individual studies cannot be cross-referenced and compared with each other (Lebersorger and Schneider, 2011). According to various investigations, the term food waste may be divided into three subcategories: avoidable, partly avoidable, and unavoidable food waste (Ventour, 2008; Morgan, 2009; Kranert et al., 2012).

The terms of food waste and food loss are partly disparate defined in the literature. Morgan (2009) defines food losses as food which is wasted, but remaining in the food system. In contrast, Noleppa and von Witzke (2012), Gustavsson et al. (2011), and Parfitt et al. (2010) describe food losses as food that is discarded post-harvest, whereby food waste arise entirely at consumer level. Some investigations do not distinguish between food waste and food loss, for example Kranert et al. (2012).

Despite the different uses and demarcation of the terms "food waste" and "food losses" in existence, this study does not differentiate between the terms. As in this investigation the amount of food waste or losses is not quantified, but rather data about the individual's treatment of this issue is gathered, a precise demarcation of the terms is negligible. In the following, inspired by Östergren et al. (2014), food waste and loss comprises all food and drink rests occurring along the food supply chain, meaning avoidable, partly avoidable, and unavoidable food leftovers. This explanation was also provided to the respondents at the beginning of the questionnaire.

2. Materials and methods

2.1. Means-end-chain approach

The means-end-chain approach examines cognitive structures (Aurifeille and Florence, 1995; Grunert and Grunert, 1995) for a better understanding of consumers' criteria of product selection (Grunert and Grunert, 1995; Kitsawad and Guinard, 2014). The means-end-chain theory relies on the conjunction that consumer knowledge is organized hierarchically within different levels of abstraction. Consumers assign attributes to products related to their personal use and valuing of such products (Gutman, 1982; Claeys et al., 1995; Gengler et al., 1995; Olson, 1995; Reynolds et al., 1995; Ter Hofstede et al., 1998; Barrena and Sánchez, 2009). The means-end-chain approach reveals connections between applied attributes, consequences, and values (Grunert and Grunert, 1995; Arsil et al., 2014; Bieberstein and Roosen, 2015); structures seen as basic drivers of consumer behavior in regard to product choices (Grunert and Grunert, 1995; Russell et al., 2004a).

The origin of the means-end-chain theory was justified by Kelly (1955) (The Psychology of Personal Constructs), who stated that individuals have their own view of the world and can control their behavior by establishing rules or theories (Gengler et al., 1995; Gruber et al., 2008). The means-end-chain permits the examina-

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