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Food leftovers in workplace cafeterias: An exploratory analysis of stated behavior and actual behavior

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ABSTRACT

Reducing food waste is a major challenge to achieve a more sustainable food system. This research analyzes the food leftovers of 479 diners attending a workplace cafeteria. The methodology we develop allowed behavioral determinants to be matched with observed behavior (i.e. the amount of edible food left by each consumer) and stated behavior (i.e. the reported consumption for each meal). Results show that food leftovers depend on personal characteristics as well as situational factors. The strong discrepancy between stated and actual behavior stresses the need to rely on observational measures to avoid misleading interpretations in self-reported surveys about food waste. to avoid misleading interpretations in self-reported surveys about food waste.

1. Introduction

According to the FAO, about one third of the food produced for human consumption is lost or wasted globally, amounting to about 1.3 billion tons per year (Gustavsson et al., 2011). Reducing food waste is a growing public policy issue across the European Union (Reisinger et al., 2011) and worldwide (Gustavsson et al., 2011; Parfitt et al., 2010). This awareness is in line with a broader need to limit the footprint of human activity on the environment and to use resources more efficiently. At the European level, 12% of food waste occurs in the food service sector, including catering services and private restaurants (Stenmarck et al., 2016), and a significant amount of food waste within this sector comes from consumers' leftovers (Betz et al., 2015; Engström et Carlsson-Kanyama, 2004; Eriksson et al., 2017; Painter et al., 2016; Silvennoinen et al., 2015).

Despite the need for change in consumer behavior, drivers of food waste when eating out remain rather poorly documented. To date, studies in the food service industry mainly aimed at quantifying and characterizing food waste with aggregate measures at the collective level (Betz et al., 2015; Engström and Carlsson-Kanyama, 2004; Silvennoinen et al., 2015). The literature which specifically addresses drivers of food waste has extensively investigated household behaviors (e.g., Graham-Rowe et al., 2014; Stancu et al., 2016; Stefan et al., 2013; Visschers et al., 2016) while only few studies focus on individual behavior within the food service industry (Lorenz et al., 2017a; Lynhurst, 2013; Mirosa et al., 2016). These last studies outline the interconnected influence of personal factors such as socio-demographic variables and psychological drivers along with contextual factors such as social norms or food characteristics.

In most aforementioned studies, self-reported measures of food waste behavior are used. This method constitutes a major limitation since self-reports underestimate the amount of wasted food (van Herpen et al., 2016) while efforts to avoid or reduce it are often over-reported (Neff et al., 2015). It is well established that stated behavior is sensitive to social desirability bias, especially when the behavior considered, as food wasting, involves ethical considerations (Carrington et al., 2010; Krumpal, 2013). At the same time, this actual / reported behavioral gap can be traced back to the inherent nature of food waste that leads to difficulties in being aware of one's own behavior (van Herpen et al., 2016). Nevertheless, since objective behavioral measures, such as weighing methods, are expensive and resource intensive, self-assessment is often adopted by researchers.

To our knowledge, no research has investigated the discrepancy between self-reported behavior and weighing measures of individual's plate leftovers in catering services. Compared to in-home context, this particular setting offers the opportunity to reach a large sample and combine objective behavioral observations (i.e., weighing methods) with a survey that collects individual statements.

The purpose of this article is to conduct an exploratory analysis of the factors involved in (1) the individual quantity of plate leftovers and (2) the gap between the level of self-reported consumption and the amount of plate leftovers. This research focuses on three types of factors which effects on food waste are unclear or inconclusive: socio-demographic characteristics (age and gender), meal satisfaction and the

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social context of the meal. Identifying socio-demographic patterns can help to understand « who » is wasting, while investigating the relationship between meal satisfaction, social context and food waste is necessary to analyze « why » different amounts of wasted food is recorded across people.

The following section presents a literature review concerning food waste behavior and stated/actual behavior together with the main hypotheses. The data collection and the statistical methodology are then explained. Finally, calling on the results outlined in the next section, the implications, limitations and future research are discussed.

2. Background and main hypotheses

In this section, we first present the antecedents and assumptions about the drivers of food waste behavior before exposing our reasoning and hypothesis about the gap between self-reported behavior and actual behavior.

2.1. Drivers of food waste behavior

Scholars highlight that food leftovers in out-of-home settings are related to various interrelated factors such as individual characteristics, social context and situational factors (Betz et al., 2015; Lorenz et al., 2017b; Lynhurst, 2013). With regard to individual characteristics, the relationship between gender and food waste is unclear. Some studies about food waste within the domestic context found that women stated a stronger intention to reduce waste (Graham-Rowe et al., 2015) and were associated with less self-reported amount of food waste (Visschers et al., 2016) while a lower age is related to more food waste (Quested et al., 2013; Visschers et al., 2016). When eating out-of-home, some scholars show that women are likely to waste more often than men (Betz et al., 2015; Lorenz et al., 2017a). For example, (Lynhurst, 2013) conducted a study on the constraints and motivations of consumers to limit waste in commercial and collective catering. Results show that one-third of individuals report having left food at the end of their meal, and that women and younger people report this behavior more frequently. Similar results have been found relating to the gender effect on self-reported food waste (Betz et al., 2015) and visually estimated food waste (Lorenz et al., 2017a) while the effect of age highlighted in self-report data (Lynhurst, 2013) has not yet been proved statistically on observational data. Thus, in line with these results our assumptions are that:

The quantity of food leftovers is higher for women (H1) and younger people (H2).

It has been argued that for households, the social pressure on food waste is limited, since waste management is done in the private sphere, far from the eyes of others (Quested et al., 2013). However, eating out is a social activity where food consumption is exposed to the eyes of others (Poulain, 2002). In the field of social psychology of food, research has highlighted two kinds of social influence: the social modeling of eating (Cruwys et al., 2015), and the social facilitation effect (Herman, 2015).

Social modelling is the tendency to adapt one's food consumption to that of one's companions independently of internal cues such as hunger or satiety (Cruwys et al., 2015). More generally, normative theories suggest that conformity process has its roots in two types of social norms: injunctive norms, that is the perception of what others expect of you, and descriptive norms that represent the perception of what most others do (Cialdini et al., 1990). Both types of norms play as external cues about what and how much is appropriate to eat, but descriptive norms seem to have a stronger effect on food behavior than injunctive norms (Cruwys et al., 2015). With regard to food leftovers, Lynhurst (2013) notes that people leaving food are likely to explain their behavior with normative arguments such as "it's normal to leave a bit", "I do not want to appear greedy" or "how much I eat depends on who I'm with". Moreover, individuals who think that others usually waste food are more likely to report being wasteful (Lynhurst, 2013). Similarly, Lorenz et al. (2017b) find an indirect influence of perceived social norms on food leftovers. According to the literature, it is assumed that:

The quantity of food leftovers is negatively influenced by the perception that the other diners eat all their food (H3).

Another kind of social influence on food behavior is linked to the social facilitation of eating. Social facilitation refers to the fact that people are likely to increase their food intake when they eat with other people (Clendenen et al., 1994; de Castro, 1994; Herman, 2015). Some authors argue that commensality and conviviality create a social context that justifies eating more. The distraction provided by socializing is likely to interfere with the perception of satiety signals that would ordinary limit food intake (Herman, 2015). This social facilitation effect exists whatever the closeness of the members of the group. People eat more when eating with other persons than alone, regardless of whether they are family, friends or strangers (Herman, 2015). However, the increase of food intake is higher when people eat with family or friends than when they eat with strangers (Clendenen et al., 1994). Indeed, it has been shown that eating with others has also inhibiting effects since people wish to avoid appearing being an excessive eater in front of others (de Castro, 1994)(de Castro, 1994). Watching the amount eaten by others is likely to make people aware of an upper limit for one's own intake, beyond which one risks being negatively evaluated by the group (Herman, 2015). This impression management is stronger for meals taken with strangers. Moreover, this impression management reduces when the number of people eating together increases because the perceived social norm on the right amount to eat gets more unclear (Herman, 2015). In brief, the literature review shows that people eat more when eating with others than alone and the increase of food intake depends on the size and on the composition of the group.

The context of catering services is specific since people eating together are co-workers, and their relationship is in between friends and strangers. However, from the literature review, we can assume that people eat more when eating with others in this context, even if the size of this effect is difficult to estimate. As highlighted by Herman (2015), very few papers study where does the additional food intake come from: does it come from more ordering, or from less waste? One study on social facilitation in a restaurant shows that additional intake (when eating within groups) comes from more ordering and has consequently no effect on food waste. In the specific context of a catering service, the ordered amount of food is less prone to variation, specifically in case of fixed pricing. We might then expect that the increase of food intake when eating within groups comes from food waste, at least partly. Thus, we postulate that:

The quantity of food leftovers depends on the number of people with whom one eats (H4).

The influence of situational factors on eating behavior in various out-of-home settings has been extensively documented (Wansink, 2004). In particular, there is a positive effect of the perceived sensory quality of food such as taste, smell and visual appearance on food consumption (Ferreira et al., 2013). Consequently, satisfaction with taste, smell and visual appearance, has been identified as a main stated reason of food waste (Betz et al., 2015; Lorenz et al., 2017a; Lynhurst, 2013). Since taste and smell of the food depend on its temperature, satisfaction with food temperature could also have an effect on food leftovers. In addition to palatability, bigger portions lead to overconsumption and larger plate leftovers (Wansink et van Ittersum, 2013). Since many restaurants do not provide different portions sizes, people tend to report that they do not have any control over the quantity served to justify their own waste (Betz et al., 2015; Lynhurst, 2013). Thus, the mismatch between appetite and portion size is one of the drivers of food waste that has to be included in the analysis. Consequently, we assume that: