

Investigating the factors influencing food waste behavior in the Egyptian society

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Abstract

Purpose – It is globally recognized that food waste has significant economic, social and environmental impacts. This study endeavors to identify the individuals' underlying factors that affect food waste behavior in a social context in Egypt.

Design/methodology/approach – Due to the scarcity of research illustrating food waste in a social context, a qualitative research paradigm is employed. In-depth semi-structured interviews are conducted with 18 Egyptian households to report their experiences, thoughts and feelings while eating in a social context.

Findings – Based on thematic analysis using grounded theory procedures, eight main elements affecting creation and reduction of food waste in social contexts are identified. Additionally, the authors investigate the role of emotions in social dining contexts. A key finding is that food waste in social events is inevitable and is the acceptable norm in the Egyptian culture. Thus, the first step to reduce food waste is paying more attention to change culture. Persuading people with the negative consequences of food waste issue on behalf of their cultural values will be more challenging and may require more innovative approaches.

Originality/value – Although food waste issue is one of the contemporary issues in the world, very little is known about how social food consumption leads to food waste behavior. This study employs social influence theory and the collectivistic culture orientation to investigate the unanswered question of why food gets wasted in social meal context.

Keywords Food waste behavior, Pro-environmental behavior, Social meal context, Egypt, Grounded theory, Culture

Paper type Research paper

1. Introduction and theoretical background

According to [FAO \(2011\)](#) report, the world wastes about one-third of the food produced for human consumption annually, approximately 1.3 billion tons. The issue of food waste in the food supply chain is increasingly recognized as a problem with multiple negative economic, social and environmental implications ([Alexander et al., 2017](#)). From an economic perspective, in the near East and North Africa region, more than 60 billion US\$ value of food are lost and



wasted annually, about 120 US\$ per capita. In addition, food waste is an environmental issue because the resources used in the production, transportation and preparation of food are wasted (Williams and Wikström, 2011). Furthermore, food waste disposal might require further environmental problem, as in the case of emissions of methane caused by decomposition of food in landfills (Dorward, 2012; Ghani *et al.*, 2013). Food waste is also considered a social issue, as these wasted resources could have been spent on serving the needs of other individuals, given that a significant proportion of the human population is suffering from hunger or malnutrition (Salhofer *et al.*, 2008). Therefore, food waste is related to unsustainability issue. It expresses an unsustainable use of food because social inequality causes carelessness for the current generation's food needs thus jeopardizing the ecological foundation needed to meet the food needs of future generations (Aschemann-Witzel *et al.*, 2016). The food waste hierarchy argues that the most attractive option is prevention, by minimizing food surplus and avoidable food waste. The second best option is to distribute food surplus to food poverty-affected populations, followed by the less preferred option to turn food waste into animal feed (Papargyropoulou *et al.*, 2014).

Developed and developing countries are dissipating roughly the same amount of food, 670 and 630 million tons respectively. It is usually thought that food waste in developing countries takes place mostly at the earlier stages of the food supply chain, while food waste at the consumer level is believed to be little, particularly when compared to its counterpart in developed countries (Aschemann-Witzel *et al.*, 2015). However, Wang *et al.* (2017) illustrate that this pattern may alter because the new life trends in developing countries tend to urbanize, develop their economy and adjust their dietary structure. In addition, there is nowadays a gigantic development in the administrative and technological harvesting methods, storage and refrigeration facilities, manufacturing and trade infrastructure, which are viewed as the main causes of food waste in developing countries (Aamir *et al.*, 2018). Two recent studies illustrate that food waste at the consumer level in developing countries becomes common and is not far from that of western countries (Wang *et al.*, 2017; Elmenofi *et al.*, 2015).

Following that, recent studies have examined consumers' food waste behavior in developing and emerging countries in order to provide efficient and effective interventions for food waste reduction. For instance, Zainal and Hassan (2019) investigate the factors influencing household food waste behavior in Malaysia. They have found that the psychosocial factors, households' leftover and shopping routines are useful to reduce food waste behavior. Moreover, Bhatti *et al.* (2023) examine food waste behaviors of young consumers in Pakistan. They have concluded that environmental concern, time pressure, attitudes and injunctive norms lead to higher intentions to reduce food waste. Additionally, Aschemann-Witzel *et al.* (2019, 2020) explore the reasons why household food waste behavior occur in Uruguay. From another perspective, Aschemann-Witzel *et al.* (2018) discuss food waste behavior issue in relation to the context of suboptimal food products. Similarly, Adel *et al.* (2022, 2023) explore consumers' behavioral intentions toward suboptimal food products in Egypt and China from the social psychology and economic value perspectives. Moreover, Montoli *et al.* (2023) propose food donation as a vital strategy to decrease food waste in Uruguay.

Egypt ranks the sixteenth place as one of the highest contributing countries to food waste with 73 Kg/capita/year (BCFN report, 2016). Capone *et al.* (2016) estimate the economic value of food waste by households per month. They conclude that about 79% of Egyptian households' waste less than US\$5 per month and around 15% of households' waste US\$6–20 per month. Elmenofi *et al.* (2015) develop a general overview of household food waste in Egypt concluding that food waste is common in Egypt, as about 86% of participants approved that they throw away food. Approximately 10% of 38 million tons cereals are wasted annually. According to the FAO (2013), the annual waste of both locally produced and imported wheat is estimated at 6.6 billion Egyptian Pounds (over USD 1 billion). A large part of food subsidy is

not directed to its intended use, for instances subsidized bread is used for animal feeding or selling the subsidized food in the black market (Abdelradi, 2018).

It is argued that social context has a significant impact on food choices and amounts eaten (Herman *et al.*, 2003). People may make different choices and evaluations when eating with companions compared with eating alone (Higgs and Thomas, 2016). The social context can be defined as “the people who may be present when choices are made, but also our understanding of the choices and preferences of socially connected others, social norms, and aspects of the situation that infer such norms” (Higgs *et al.*, 2019, p. 19). Absolom and Roberts (2011, p. 341) define social eating as “any meal, snack or beverage consumed whilst in the company of friends or family, and where there is an opportunity for meaningful social contact”. Herman (2017) mention that non-social eating is “eating alone or as part of an undifferentiated large group of 50–70 people”. Generally speaking, the concept of social eating is to eat in the presence of another person (Dornan *et al.*, 2021). It includes more than one form such as eating with usual family members, invitations, dish parties, wedding and birthday banquets, aqika (the Islamic tradition of sacrificing an animal on the celebration of a child’s birth) or collaborative (sharing) consumption (Parker *et al.*, 2019). It involves two individuals or more to include a couple, usual family members who are living with each other, other family members, friends, colleagues, neighbors . . . etc. It may be held in various places; in home or outside such as restaurants, cafes, hotels, resorts, clubs and wedding halls (Dornan *et al.*, 2021).

According to social influence theory, the literature illustrating the influences of social context on eating behaviors have been categorized into three broad areas: social facilitation, modeling and impression management (Higgs *et al.*, 2019). Social facilitation of eating means that the mere presence of other people enhances their food intake (de Castro and de Castro, 1989). One explanation is that social meals last longer time than do solo meals because of social interaction, therefore extending the opportunity for eating (de Castro, 1990). It has also been proposed that social interaction may distract individuals from observing how much they are eating, or their attentiveness of internal signals that might inhibit eating (e.g. satiation) (Herman, 2015). In addition, social meals are larger than meals eaten alone because eating alone is not enjoyable as eating with companions (Higgs *et al.*, 2019). Recently, it is argued that individuals tend to deliver more food when they know they will eat socially (Herman, 2015). Thus, social facilitation of eating may be considered habitual, or a part of the rituals of social meals (Schüz *et al.*, 2015). The second perspective of Modeling refers to the “the tendency to adapt one’s food consumption to that of one’s companions independently of internal cues such as hunger or satiety” (Sebbane and Costa, 2018). Indeed, people incline to eat more when someone who is eating a large amount is present and eat less in the presence of someone who is eating a small amount (Robinson and Higgs, 2013). Finally, impression management is concerned with stereotypes and “adapting one’s behavior to create a particular impression of oneself to others” (Leary, 2019). Individuals are usually interested in presenting themselves in a positive light to others, particularly to unfamiliar others who do not know them well (Baumeister and Leary, 1995). In the context of eating behavior, individuals make judgments about other people based on how much and what they eat (Vartanian *et al.*, 2015).

Previous literature on food waste in a social context has focused on investigating the factors and behaviors that resulted in household food waste including over-purchasing, failing to comply with a shopping list, not planning meals in advance, over-preparation, avoidance of leftovers, caring for a pet, inappropriate food conservation, plate leftovers, minimizing inconvenience, low priority given to this behavior and exemption from responsibility (Graham-Rowe *et al.*, 2014; Porpino *et al.*, 2015; Silvennoinen *et al.*, 2014). Research has also highlighted the motivations to reduce food waste such as saving money, waste concerns, doing the right thing (Graham-Rowe *et al.*, 2014; Neff *et al.*, 2015).

A recent study conducted by [Parker et al. \(2019\)](#) identified food-based collaborative consumption as a cause of over-purchasing, over-consuming and food waste. Previous research in social context sheds light on how social context affects individuals' eating behavior, however very little is known about the relationship between social eating and food waste.

Although it is clear that food-based social consumption is widespread and growing, research on food waste in social context does not address the question of why food gets wasted in social meal context, how consumers make their decisions in such contexts as well as the consequences of those decisions. The current study seeks to address this gap by examining the factors affecting food waste behavior in social meal context and the reasons behind its generation in such context in Egypt. Investigating food waste at the social level in Egypt is vital because consumers in Eastern cultures devote more attention to their social image and put emphasis on their relationships with others when making choices and in turn, they are more easily affected by other people ([Wang et al., 2017](#)). Indeed, the Egyptian culture measures high on the "collectivism" scale in comparison with most Western cultures ([Hofstede, 2001](#)). In addition, it is found that about 34% of food is wasted at the consumption level in North Africa, West and Central Asia ([Lipinski et al., 2013](#)). [Elmenofi et al. \(2015\)](#) further indicates that at least 60% of food in usual family meals, and more than 75% of food in a banquet, goes to waste into the rubbish bin, in particular during the fasting holy month of Ramadan since the households host 23% more banquets and dinner parties.

2. Method

2.1 Data collection

In-depth semi-structured interviews were conducted due to their recognized ability to gather rich data from the participants ([Silverman, 2013](#)). A "purposive judgment sampling approach" method was employed to select participants with expert knowledge on food waste occurrence in social meal contexts. This sampling method selects participants based on certain characteristics ([Morse and Richards, 2002](#)). In order to participate in the current research, participants had to (1) have at least a meal daily with their usual family members (2) have a social meal (e.g. invitations, wedding and birthday banquets, dish parties . . . etc.), with other individuals during the last three months and (3) have sole or joint responsibility for food purchasing, preparation, or payment. Consequently, one or two participants per household could be qualified for inclusion. When two members of the same household were included, they were interviewed together. Respondents have been selected to diversify several criteria, such as age, household size, gender, income and education level. Participants ($n = 18$) from fifteen households were recruited from seven different governorates in Egypt using a mix of convenience techniques and snowball techniques, i.e. where possible, participants were asked to provide contact details of other households who apply for mentioned previously conditions. Theoretical saturation is followed to reach a point where no new categories are achieved from further data ([Glaser and Strauss, 2017](#)). [Filimonau et al. \(2019\)](#) mention that saturation is usually perceived within 10–30 interviews which this sample fits into. Participants' characteristics are summarized in [Table 1](#). Interviews were administered between January and April 2020 at the researchers' home, at the home of the participant, or online. The interviews lasted, on average, between 40 and 90 min and were audio-recorded with permission and transcribed verbatim. A set of initial interview questions was prepared to cover the following topics: thoughts and feelings about eating habits, and thoughts and feelings regarding leftovers and throwing food away when eating in a group. These pre-prepared interview questions were employed only as a guide to provoke further discussion of salient topic areas regarding food waste in social meal context.

Participant no.	Gender	Household size	Age	Household income	Education level	Marriage years
P1	M	2 parents/2 kids	29	5000-less than 10,000	MSc	6
P2	M	2 parents/1 kid	32	10,000-less than 15,000	MSc	3
P3	M	2 parents/2 kids	30	5000-less than 10,000	MSc	8
P4a/b	M/F	couple	33/29	5000-less than 10,000	MSc/BSc	7
P5	M	2 parents/3 kids	37	5000-less than 10,000	PhD	9
P6	F	2 parents/2 adults	62	Less than 5000	average qualification	31
P7	F	2 parents/2 adults	58	15,000- less than 20,000	PhD	28
P8a/b	M/F	couple	28/26	5000- less than 10,000	BSc/BSc	2
P9	M	2 parents/2 kids	35	5000- less than 10,000	PhD	10
P10	F	2 parents/1 adult	46	15,000- less than 20,000	PhD	22
P11a/b	M/F	couple	61/73	Less than 5000	Above average qualification/BSc	38
P12	F	2 parents/2 kids	40	15,000- less than 20,000	PhD	19
P13	F	2 parents/2 adults	42	20,000 and above	BSc	20
P14	F	2 grandparents/6 parents (3 families)/4 grandchildren (3 adults and 1 kid)	65	20,000 and above	PhD	42
P15	F	2 parents/1 adult	48	5000- less than 10,000	BSc	17

Table 1.
Interview participants’
demographics

Source(s): Table by authors

2.2 Analysis

Thematic analysis using grounded theory procedures following [Braun and Clarke \(2006\)](#) was employed to identify thematic categories behind consumers’ beliefs, emotions and behaviors regarding food waste in a social context. Transcripts were read and reread to dip the researcher in the data. Next, initial open codes were developed to assign initial labels to the text, and these labels were developed as new insights emerged. Secondary “axial” coding was undertaken to make connections between concepts and organize them into higher-order categories/themes. In this phase, eighteen thematic categories were identified. Further “selective” coding was generated to assess the relationships between the core thematic categories, and in this phase some of them were merged under the higher-level terms ([Graham-Rowe et al., 2014](#); [Strauss and Corbin, 1998](#)). If no higher-level category was recognized, the original thematic category kept independent. During the analytic process the “constant comparison” method was used that means any new illustrations in the data should be compared to the data already assigned to codes to assess consistency and refine the labels continuously ([Glaser, 1965](#)). Through these phases the data were accumulated in a new way to identify the elements that affected food waste in social meal context.

2.3 Results

According to our analysis, eight overarching themes emerged independently as shown below.

2.3.1 Social meal status. All respondents indicate that waste while eating with usual family members is less than the case of invitations and social occasions. According to the interviewees, social meals in occasions are related positively to food waste. In particular, waste is more when such occasions are provided in an open buffet style. According to it, the diners serve themselves where they have the freedom to select the quantity of desired. Therefore, it is supposed that food waste in such style should be less because each individual can control the selected amounts himself/herself. However, most respondents argue that food waste in this style is more because each individual usually select more than his/her needs.

I think that open buffet is considered one of the disasters in our culture. Unfortunately, we cannot stop ourselves. I feel it goes back to psychological factors that this food is free; however its cost has been incurred in advance during booking. In turn, more waste is fulfilled. (P13)

Indeed, some respondents pay attention to food waste in Ramadan month where Muslims fast till sunset. They argue that Ramadan has its particular nature regarding eating behavior in which gatherings occurs remarkably. There are only two main meals during this month, “iftar” and “suhur”. Iftar is the meal consumed in the evening by Muslims to break their daily Ramadan fast at sunset while suhur is the meal consumed early in the morning before fasting, before dawn. It is argued that food waste increases greatly during Ramadan, in particular if it comes in the summer season.

In Ramadan, people are fasting; there are juices, more dishes and desserts. Each one breaks his fasting by drinking juices and soup, so you cannot eat too much so food is left over . . . in summer, people are interested in drinking water and juices more than eating food. In winter, cold makes people hungrier than summer resulting in eating more. (P11b)

2.3.2 Cultural values and norms. Society’s culture with its values and norms has an effect on people’s behavior. All respondents mention that variety and over-preparation are considered the status quo in social meals in invitations. Many interviewees argue that they have grown up on that behavior. Therefore, they assure that leftovers from invitations are the acceptable social norm.

Leftovers in invitations are very natural according to our culture because you should prepare food in large amounts. My family taught me that and most families do that. (P3)

It is found that generosity is one of the intrinsic motivations of over-preparation in a social meal script, in particular in invitations resulting in more leftovers. Moreover, achieving guest satisfaction and delight requires the occurrence of waste.

When a guest comes, I want to provide him the best; I want him to enjoy, so when he leaves, he will be satisfied and delighted. (P5)

Image is considered one of the cultural factors that has an effect on achieving waste in social meals. Embarrassment and fear from people words and criticisms push hosts to over-preparation and sometimes less consumption from guests causing food waste.

We have a problem in our society, how does someone come to me without providing good foods?! He will talk about me in a bad manner. How will be my image?! May be I am not convinced with that but it affects indirectly on my decisions. (P4a)

It is found that high appreciation of some types of food such as beef, chicken, and fish in the Egyptian culture facilitates the minimization of waste. The respondents argue that there is a concentration in consuming them in the first place in social meals. It is perceived that the various types of meat are “the food master” and have a great value in the minds.

Most foods which are thrown away are cooked vegetables, rice or pasta. However, different types of meat are not thrown, particularly with their high price. (P11a)

2.3.3 Ambient co-eaters' characteristics. The nature of surrounding people has a great effect on the amount of food eaten and accordingly on waste. Having a meal with others who love eating a lot or obese people encourages an individual to eat more causing less waste.

When I am eating with my friends, we order big amounts and a lot of dishes and share with each other, however often no waste because they are "monsters" (laugh) ... (P8a)

In case of eating outside in a group, the effect is not only limited to co-eaters, but it also includes the actions of other surrounding customers.

The other people may make me not eating because of their cleanness. If I feel they are not clean, I will leave food even if they are not on the same table. (P4b)

Co-eaters structure and group size also have an impact on social waste. Having children in a group increases the amount of waste because of the inability to control them. They sometimes eat and sometimes do not, as well as their amounts are variable however you should account them every time. In addition, one participant indicates that more waste is related to young people and teenagers because they are not aware with this issue. Furthermore, the number of co-eaters and gender composition are other determinants of social waste. The larger the group size, the greater the probability of achieving waste, in particular if the majority of group are females. Some respondents think that males eat quantities more than females.

If my daughter is with me, she always does not finish her meal or she orders more than her ability because she needs variety so she cannot finish and there is always leftover ... waste may be achieved with the big numbers because we order in big amounts, however if the number of men is more, I think there will be no leftover (laugh), if the number of women is more, leftover will be great. (P13)

2.3.4 Relationship quality between co-eaters. The strength of the relationship among co-eaters is found to affect food waste in a social meal. The stronger the relationship among co-eaters, the more it will reduce food waste. Having a good relationship with a familiar group makes the individuals feel comfortable to eat more.

... it was Ramadan gathering, it was very crowded over 100 persons. My seat was with people I do not know, I was not delighted and uncomfortable so I ate a little. I could not eat the amounts supposed to eat ... (P2)

Having a meal with unfamiliar group is related to embarrassment that affect negatively on the amounts eaten, resulting in food waste. Additionally, little consumption in such cases leads to more waste (*"many leftovers are achieved because those new guests usually eat conservatively."* P6).

When eating with a group I do not know well, I feel embarrassed and quite shy, having to eat in front of me only. On the contrary, while eating with familiar people, sure I eat more and have the daring to taste anything in front of you or others (P4b)

In addition, the nature of guest in invitations has an effect on the amounts and types of prepared dishes. Unlike friends and families, inviting new people requires over-preparation (*"Unlike other people, when I invite one of my brothers or sisters, I do not require preparing more dishes."* P10) because you do not realize their preferences (*"... I have invited friends before three or four times, so I know what they like. On contrary, if it is the first time to invite someone, I do not identify which dishes they prefer, so I will do more than one choice."* P1).

Furthermore, some guests have a certain appreciation and therefore, you need to give them more value by preparing a variety of types of food. This gratitude goes back to the

importance of those individuals (*"The first time the mother-in-law is invited; she should be given more interest and value."* P4b) or the scarcity of visits (*"... the quantity will not be over as long as these guests are invited continuously, however I have to prepare more and more to those who come in long periods."* P5).

2.3.5 Estimation inability. Estimation inability is mentioned by many of the interviewees as a factor that can facilitate the maximization of food waste in a social context. It is argued that estimating the right amounts of food for different individuals is very difficult. The more people there are, the more difficult the estimation will be. It is easier to estimate the quantity of usual family members than others.

Usually if I eat with my usual family, then my wife will cook based on our numbers. She knows exactly and is accustomed to the amounts of everyone and often no leftovers are left in this case. However, if you prepare for other people not your usual family members, you do not know at all their exact quantities that are enough for them. You do not know who is coming will eat a large amount or small amount! So it is normal to cook in excess quantities. (P3)

In addition, invitations, dish parties as well as social occasions like weddings and birthdays are considered major sources of inability to estimate the exact number of invited people and their exact quantities of food, leading to more food waste. Even if you know the exact number of invited people, you cannot estimate their exact amounts because of inability to predict their eating behaviors.

In birthdays or weddings, food should be so very much, there is a variety of food because you do not know exactly the amount of people who are attending, so we over-prepare food to be enough and overflows. I cannot think about who eats more and who does not, I do not have an idea about their exact preferences and which food will be finished and which does not. (P6)

Furthermore, while eating outside in groups in a restaurant, for example, the person (s) who is (are) responsible for selecting the dishes plays a significant role in estimating the required amounts of food. Social waste is almost trivial when everyone in a group chooses his/her dish because he/she can estimate exactly how much he/she needs.

Actually, when there is a gathering outside, two people in my family order for us but they order big quantities more than our needs, my husband is one of them. One day, I decided to order instead of them but they were not convinced with my amounts and they said to me "how these amounts are enough to this group size?!" and thus, they ordered other dishes and tried this and that, and in the end, more waste. (P12)

2.3.6 Previous experience. Experience is another factor, yet strongly linked to estimation ability, contributing to minimize household food waste. It is shown that evolution and learning over marriage years can help ladies estimating the right amounts for their family members. By the time, they can determine accurately the meal target to be enough for one day or two days. Additionally, they can adjust the cooked amounts to be the exact suitable amounts based on the previous experiences of cooking over the last days.

A person who has been married for a period not like one who has not been married or married for two or three years. She will have the knowledge of the dishes that everyone in the family loves. With the experience of the past years, you have the awareness which dishes are eaten and which are not. (P1)

In addition, previous experience with the restaurants and hotels allows the awareness of the types, sizes and tastes of dishes, limiting the occurrence of food waste.

The experience with the restaurant has a considerable impact; you know the types and sizes of dishes so leftover is little or maybe zero, no waste! ... the first time I go a hotel with open buffet with my wife and children, we wasted a lot of foods. However, the percentage of waste reduced 70% in the second

day, then 90% in the third day, and finally 95% in the last day. When we went the second time, we have already known the culture of open buffet, and therefore waste became less than 2%. (P9)

2.3.7 Service quality. Food quality is one of the most important dimensions of service quality which has an influence on social waste. There is a focus on the attributes of taste, presentation, cleanliness and freshness while discussing food waste issue (“The last time I ordered Pizza because of its amazing appearance while serving to other tables, however its taste was not good so I could not finish it.” P8b). The more the food tastes and looks beautiful (“eyes eat before mouth.” P3), the more the diners eat more food, minimizing waste. Besides, few respondents indicate to the importance of place reputation while eating outside, and how this reputation encourages them to order more, maximizing waste.

Reputation has an effect, when I go to a definite restaurant, and I know it is famous and fantastic, actually I order too much. (P4a)

Some interviewees illustrate the impact of other factors related to service quality when eating outside like menu design, portion size and waiting time. Variety of menu and its good presentation attracts the diners to order more and experience more dishes. In addition, (“*the variation of portion sizes for a dish among the restaurants may confuse the customers causing some waste.*” P13). Longer waiting time before ordering pushes the diners to order too much amounts because of the psychological state of hunger. However, longer waiting time after ordering affects negatively customer delight and appetite (“... *because [I] already ordered what I need in advance.*” P5).

We were in a fish restaurant and the menu has a variety of dishes, we left over too much food that was enough for another day, but it depends on how many dishes in the menu you prefer. The pictures and its presentation tempt me try. (P4a)

The restaurant was very crowding, it was a weekend and we were in a waiting list. It was very difficult because we were very hungry and have our lunch late about 9 pm after waiting, so we ordered many dishes because my children feel they want order everything in the menu. (P12)

2.3.8 Food waste beliefs. It is found that food waste issue can be viewed from three different perspectives; religious, economical and social responsibility. Religious beliefs are seen as more significant than other perspectives to motivate individuals to minimize food waste. Majority of respondents feel guilty that their religion orders them not to be wasteful (“*Verily spendthrifts are brothers of the Evil ones.*” P3) and they will be asked about all the blessings. It is argued that food waste is “haram” - a generic word, originates from Arabic language meaning: not permitted, or not acceptable - because it reflects disrespect, neglect and slander on food in particular and blessings in general.

... I feel guilty when I throw away food. Actually when food left over, I bear sins on my shoulders, and in case it is thrown, I feel very annoyed. Then I tell myself that it should be reused again, it should not be thrown away, and this is haram. (P8b)

Another motivation to minimize food waste is the economic value of waste. It is seen as a waste of money (“*throwing away food can be translated into money that has not been fulfilled its purpose.*” P7) and as a type of extravagance that may hurt the financial situation not only at the individual level (“... *today you have, tomorrow maybe you do not.*” P3) but also at the country level as a whole (“... *I am convinced that waste from me and waste from you and so on will lead to a great waste and loss at the country level.*” P4a). In addition, it is argued that the economic value of waste at invitations is more than usual resulting in reusing leftovers in other days to reduce loss (“... *to throw away such leftovers in invitations is financially difficult ... so we have a plan that these leftovers will be distributed to be eaten in the next days.*” P4a).

Social responsibility is another motivation that encourages the individuals to keep food waste to a minimum. They are many poor starving families who cannot provide a good living and food for their children (“... *there are some people who eat junk*.” P15). Most respondents justify their leftovers from invitations as not waste because of distributing them to poor people or feeding for animals and birds.

Sometimes, I put these leftovers in boxes and give my grandsons to distribute them to poor individuals in the street to be used to giving people. Also, I have a farm that has duck and chicken, so I keep any excess of food -which cannot be distributed- in my deep freezer in order to feed them. As well as, I use the bones for feeding the farm's dogs. (P14)

3. Discussion

3.1 Factors affecting the creation and reduction of food waste in social context

Generally, our analysis concluded that higher rates of food waste occur in social meals than individual meals. Similarly, [Aschemann-Witzel et al. \(2015\)](#) concluded that the socially-determined practices in eating crucially influence consumer's wastage of food. It is supposed that eating more in social contexts lead to less waste, however this is not the case according to the responses of most interviewees. This goes back to the norm of social meal script where over-preparation or over-ordering should occur, thus it is related to the social meal planning phase ([Herman, 2015](#)). This is similar to the results of [Cavazza et al. \(2011\)](#) that “a greater food intake in the presence of other people may be a conscious, planned choice rather than an unconscious response to food availability” (p. 280).

It is found that invitations and social events achieve more food waste. Echoing [Aschemann-Witzel et al. \(2015\)](#), it was concluded that consumer perceptions and habits in such occasions are formed by their upbringing, social and cultural background. Thus, the wish to be “a good provider host” and achieving guests' satisfaction and delight, especially with the dearth of such occasions, motivate hosts to prepare a variety of dishes. This ties in line with the result of [Cavazza et al. \(2011\)](#) that “when we invite someone over to dinner we normally prepare more food than we think our guests normally eat. We believe (or prefer to believe) that our guests will enjoy eating more.” [p. 277]. Furthermore, [Evans \(2011\)](#) and [Graham-Rowe et al. \(2014\)](#) findings indicated that the “good” provider identity was a strong barrier to minimize food.

Furthermore, cultural values and norms such as self-image, face perception and fear from people blames and generosity stimulate over-preparation and waste in such events. This reflects the collectivism culture of Egyptians where they devote more attention to their social image ([Hofstede, 2001](#)). Relatedly, [He et al. \(2016\)](#) found that face perception has a significant positive influence on the consumers' non-green consumption behavior. [Jiang et al. \(2009\)](#) also illustrated that reference groups had a significant effect on consumption behavior among Chinese consumers. Additionally, open buffet style catering in social events encourage individuals to select more than their needs because of its variety and thus controlling the amount of buffet waste is a substantial challenge ([Heikkilä et al., 2016](#); [Silvennoinen et al., 2014](#)). Our data also demonstrated that food waste increases during Ramadan as concluded by [Elmenofi et al. \(2015\)](#) since the households host 23% more banquets and dinner parties.

Our analysis indicates that high appreciation of food keeps food waste to a minimum. Relatedly, [Heikkilä et al. \(2016\)](#) found that low appreciation of food motivates taking too much food on the plate and not being able to finish it, increasing the amount of plate waste. In the same way, [Nikolaus et al. \(2018\)](#) found that foods believed less valuable were easily wasted with little guilt. Furthermore, our results are consistent with an exploratory study on household food waste in Egypt conducted by [Elmenofi et al. \(2015\)](#), since the authors found that not all food types are thrown away and the most wasted food products are the low appreciation foods (i.e. vegetables, fruits, cereals and bakery products).

The present study concluded that the ambient co-eaters have a crucial effect on food waste. [Berry *et al.* \(1985\)](#) suggested the modeling explanation that seeing co-eaters eat a lot will encourage one eats a lot too. In the field of social psychology of food, previous research has highlighted the “social modeling of eating” as a kind of the social influence ([Cruwys *et al.*, 2015](#)). In addition, our analysis sheds some light on the effect of gender composition and group size. Relatedly, Waste and Resources Action Programme (WRAP) in U.K found that household composition and household members’ age are vital factors influencing food waste. It was concluded that a lower age is related to more food waste (see [Quested *et al.*, 2013](#); [Vischers *et al.*, 2016](#)) as well as women are likely to waste more than men, a finding that supports previous research ([Betz *et al.*, 2015](#); [Lorenz *et al.*, 2017](#)). Furthermore, our result regarding group size is in line with the social correlation of [de Castro *et al.*’s \(1991\)](#) data who indicated that the correlation between the number of people eating and the amount eaten (per capita) is positive.

In addition, the relationship quality among co-eaters plays a vital role in maintaining food waste to a minimum. This is in a similar vein with the findings of [Herman \(2015\)](#) that the increase of food intake is higher when individuals eat with family or friends than eating with strangers. [Sebbane and Costa \(2018\)](#) explained the behavior of leaving food with normative arguments such as “how much I eat depends on who I’m with”. Indeed, it has been shown that individuals wish to avoid appearing being excessive eaters in front of others to make a positive impression ([Vartanian *et al.*, 2007](#)). This impression management is stronger when eating with strangers and reduces when the number of co-eaters increases since the perceived social norm on the right amounts that should be eaten becomes more unclear ([Herman, 2015](#)).

Moreover, our analysis showed that the inability to estimate the food intake of individuals and/or the accurate number of invited people in social context is found to maximize food waste. It is very difficult to estimate the number of diners in social events ([Silvennoinen *et al.*, 2014](#)). Relatedly, [Filimonau *et al.* \(2019\)](#) assure the importance of accurate demand forecasting in restaurants to reduce food waste. Forecasting allows restaurants to anticipate the number of customers who come and in turn they are ready with the approximate food amounts. It is also argued that when one of the co-eaters selects the dishes on behalf of the others, more waste will be achieved because of the inability to judge how much food co-eaters are likely to eat. This finding is in line with the results of [Brunstrom \(2011\)](#) that individuals in serving themselves have the ability to judge how much food they are probably to eat and provide themselves with the approximate amount. Similarly, [Koh and Pliner \(2009\)](#) argued that “participants ate nearly all the food they served themselves” (p. 599).

Majority of the respondents declare that experience generated from evolution and learning over marriage years could help in estimating the right amounts for their family members. Previous experience plays a vital role in minimizing food waste in social contexts and contributing to solve the above-mentioned issue of estimation inability. It is argued that experience is one of the Factors that affects food behaviors ([Farr-Wharton *et al.*, 2014](#); [Ganglbauer *et al.*, 2013](#)). It increases the professional skills and competences of individuals enabling them mastering their duties and acting properly in different situations ([Heikkilä *et al.*, 2016](#)). [Heikkilä *et al.* \(2016\)](#) argued that experience in restaurants has an impact on the creation of both kitchen and buffet waste because it is expected for an inexperienced chef to make mistakes in cooking and recipes, which may cause throwing food away.

The importance of food quality as a dimension of service quality contributing to facilitate the minimization of waste reflects the findings of [Ferreira *et al.* \(2013\)](#) who found a positive influence of the sensory quality of food such as taste, visual appearance and smell on food consumption. As well as, [Heikkilä *et al.* \(2016\)](#) concluded that using bought (frozen) bread was found to increase plate waste because of its poor quality compared with fresh bread. In addition, our analysis refers to the effect of some situation factors concerned with service quality when eating outside. Previous research focused on the effect of portions on plate

waste (see for example, [Sebbane and Costa, 2018](#); [Betz et al., 2015](#); [Ferreira et al., 2013](#)). Echoing [Wansink and Van Ittersum \(2013\)](#) finding, we found that bigger portions lead to overconsumption and larger plate leftovers. [Sebbane and Costa \(2018\)](#) concluded that the amount of food waste was higher among people who were less satisfied by the food taste or by the portion size.

For many of the participants, the desire to avoid wasting food for religious beliefs was viewed as a strong motivator to facilitate the minimization of waste. Our analysis also suggested the negative consequences of economic and social of food waste as other motivations to make respondents feel uncomfortable with wasting food and keep waste to a minimum. Likewise, [La Barbera et al. \(2016\)](#) argued that “Saving money” and “Reducing world hunger” were the most frequently expected positive outcomes of reducing food waste. Relatedly, [Graham-Rowe et al. \(2014\)](#) discussed the desire of several households to avoid food waste was for financial and economic reasons. Regarding social responsibility, [Filimonau and de Coteau \(2019\)](#) claim that donating food to the people in need can aid in re-distributing surplus food. However, it is remarkable that participants did not mention the environmental consequences as a motivator to minimize food waste, supporting the findings of [Graham-Rowe et al. \(2014\)](#) and WRAP’s conclusions.

3.2 Managing emotions in a social dining context

It was apparent from the analysis that a paradox of feelings is formed in a social dining context. Positive emotions generated by the atmosphere of gathering contribute to food waste facilitation. On the other hand, negative emotions resulting from leftovers and throwing away food contribute to food waste inhibition. While discussing the difference between having a meal with a group and eating individually, it has been showed that psychological state has an effect on eating behavior. Feelings of happiness, delight and distracting while eating in a group motivate individuals for higher food intake than eating individually. Furthermore, some respondents expressed that the atmosphere of sociability, warmth and friendliness in social meal contexts justify eating more. This ties in line with the social facilitation of eating proposed by [de Castro and de Castro \(1989\)](#) that refers to the fact that individuals are likely to proliferate their food intake when they eat with other people. [Sebbane and Costa \(2018\)](#) argued that “commensality” and “conviviality” in social contexts justify eating more. [Herman \(2015\)](#) illustrated that the distraction provided by socialization is likely to delay the perception of satiety signals.

On the other hand, our findings indicated that food waste in social contexts can evoke negative emotions such as sadness, annoyance and anxiety and one participant expressed how their food waste made her feel conscience torment. This result corresponds with other research which has discussed negative emotions related to wasteful behavior (see [Graham-Rowe et al., 2014](#); [Sirieix et al., 2017](#); [Watson and Meah, 2012](#)). Previous research indicated that guilt plays a vital role in reducing food waste ([Quested et al. \(2013\)](#)) and increasing pro-social behavior ([Hibbert et al., 2007](#)).

However, it has been found that some respondents minimize such negative emotions by the desire to be “a good provider” or by justifying that leftovers are distributed to other poor people or animals. This relates to the emotional conflict concluded by [Graham-Rowe et al. \(2014\)](#) who argued that it is easier for some people to feel guilt as a result of throwing away food than failing to provide their children with a plenty of healthy food choices.

4. Theoretical and practical implications

The current study makes several contributions to the existing literature of consumer psychology and sustainability. First, this study adds to social influence theory and the

collectivistic culture orientation by investigating the unanswered question of why food gets wasted in a social context. Second, we investigate social meal concept in a broad perspective including all meals that are not eaten lonely in order to gain a holistic view of food waste in such contexts. Doing so reveals the variances among different social meal forms that lead to overconsumption and waste. Third, we investigate a sizable and important context in food decisions as eating is regularly a social practice and eating a social meal with others is a widespread phenomenon (Block *et al.*, 2011; Parker *et al.*, 2019). Moving beyond the usual focus on the individual consumer level, this study revolves around a social phenomenon and, an individual in a collective manner as the unit of analysis. Fourth, identifying people's food waste minimization motivations and barriers (whether goal-based, habitual or emotionally motivated) in social meal contexts is the first step to design effective interventions (Graham-Rowe *et al.*, 2014). Fifth, this research contributes to the limited literature on the food waste issue in one of the developing countries in a North African metropolitan area; particularly most studies in food waste behavior have been conducted in developed countries. This helps us in identifying the cultural factors that affect food waste issue.

From a practical view, based on participants' responses, several suggested interventions to reduce food waste in a social context can be provided as follows:

Awareness of waste consequences: Several respondents suggested making the issue of food waste and its consequences more visible and noticeable. Specifically, respondents proposed using trending culture of social media and celebrities to make people feel that food waste is a wrong behavior. Films and series in TV can contribute in changing the attitudes by presenting the scenes of food in social events to reflect the number of people. Moreover, specific awareness programs for teenagers in schools and universities about food waste should be designed. In addition, the restaurants should position prompts regarding food waste on tables.

Paying for leftovers: Another suggestion was paying fines on leftovers when eating outside. In particular, punishments should be bigger in an open buffet style because people have the freedom to determine their exact amounts themselves and if they are still hungry, they can take again immediately. These financial fines can be calculated ascending by weighting the leftovers where increasing the leftovers weight leads to higher fines.

Learning from experiences: Some suggestions were mentioned based on learning from previous experiences in social meals such as adjusting the food amounts in the next day by estimating the leftovers in the previous day. In addition, some mentioned learning from previous invitations to make a balance between the amounts and types of dishes and the number of invited people. Other suggestions included enabling tasting before ordering or asking the waiter about the plate sizes if it is the first time to visit a certain restaurant.

Leftover reuse: One of the most common suggestions was reusing leftovers again. Participants suggested storing leftovers in the fridge and reusing them in another meal. In case they are not enough for making a new meal, they should not be thrown away; however other food should be prepared to complement them. Additionally, some participants mentioned using leftovers as ingredients for making a new related dish as a type of change and avoiding boredom.

Food waste recovery: Distributing leftovers to poor people was a suggestion to recover food waste from banquets. Leftovers from hotels, restaurants and weddings should be packaged and ordered in clean boxes and then distributed to charities up to date. One participant mentioned putting leftovers in a fridge specified for poor in the street was a good initiative and should be generalized. Another suggestion was separating leftovers from the garbage by packaging each type of food in a separate sack then gathering all these sacks in one big clean sack and after that putting it beside the waste bin.

Variety in portion size: Another suggestion to reduce food waste was making changes in the portion size and meal size in restaurants to be suitable for different structure families. It is

suggested for restaurants to provide smaller portions or to provide more than one size (quarter portion, half portion and full portion). The restaurant should clarify the right amounts for the customers by mentioning the number of pieces in a meal and how many individuals can have this meal. However, the restaurants sometimes depend on deceive marketing by imaging the Sandwich, for example, in the menu as a large portion, however it is really smaller in reality.

5. Limitations and future research

Qualitative research is not generalizable, meaning the study's results should be viewed as exploratory and not confirmatory. Another limitation is that the study was limited to a single country, indicating its findings could not be regarded fully representative of the broader region of Middle East area. One significant limitation in this research is that the majority of participants were highly educated and resided in urban places. Although we did not use a large representative sample in this study, it is usual for qualitative research to use sample sizes similar to that employed in the current research (Filimonau and Gherbin, 2017; Graham-Rowe *et al.*, 2014). Nevertheless, future research may benefit from using a larger stratified sample of the Egyptian population to evaluate whether the current findings are replicated. Larger samples could enable investigating the effect of socio-demographic characteristics, such as income level, gender, age, area of residence. Future research may also benefit from employing quantitative methodologies to examine whether the factors identified in this study are important predictors in food waste behavior in social contexts.

6. Conclusion

The current study aimed at examining the factors affecting food waste behavior in social meal context and the reasons behind its generation in such context in Egypt. Eighteen semi-structured interviews were conducted with Egyptian households. Based on thematic analysis using grounded theory procedures, eight main elements affecting creation and reduction of food waste in social contexts are identified. These factors involve social meal status, cultural values and norms, ambient co-eaters' characteristics, relationship quality between co-eaters, estimation inability, previous experience, service quality and food waste beliefs. Several interventions have been proposed to reduce food waste behavior. These interventions include awareness of waste consequences, paying for leftovers, leftover reuse, learning from previous experiences, food waste recovery and variety in portion sizes.

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