DIFFERENCES AND SIMILIARITIES IN THE FOOD WASTING BEHAVIOR OF CONSUMERS DEPENDING ON AGE

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Abstract
Food security and food waste are two of the most debated topics nowadays, as they have important effects on the economy, the society and the environment. Every year big quantities of food waste are produced at all levels of the supply chain, from farmers, food producers, retail, hospitality industry and final consumers. As several studies point out that a big amount of the food leftovers are produced by the final consumer, researchers in the field have tried to determine the demographical, behavioural and psychological factors that affect food waste. The objective of this paper is to determine the similarities and the differences in the behavior and perception of consumers related to food waste depending on age. The results of the discriminant analysis have shown that people younger and older than 40 years have similar habits regarding the process of buying, preparing and storage of food. Both generations feel bad for wasting food, but none of them recycles food leftovers. The differences for the behavior of the two generations refer to the fact that the young generations prefer to eat outside their own home, while people older than 40 years prefer to cook and eat at home.

Keywords
Food waste, food recycling, consumers, consumer behavior, generation.

JEL Classification
M10, M31

Introduction

The developments in the social and technological fields have led to a modernization of society in which food has become a common good. As a result, great amount of food leftovers are produced every year (Thyberg and Tonjes, 2016). New consumer trends characterized by overcrowded schedules, an increased emancipation and convenience orientation of consumers have determined individuals to take less care of the efficiency of bought and prepared food. The big quantities of food waste have negative effects on several fields such as economy, society and environment (Heikkila et al. 2016). From an economic perspective, the big quantities of unused food produce big financial losses for all actors in the supply chain (Cicatiello et al. 2016), determined by the use of unnecessary production capacities, resources and overconsumption (Chaboud and Daviron, 2017). The waste produced by food leftovers has a negative impact on the environment by producing greenhouse effects or water waste (Schmidt and Matthies, 2018; Food and Agriculture Organization of the United Nations, 2013; Chaboud and Daviron, 2017). Not less important

are the social inequities, by which a part of the population has too much to eat, while another part is starving. For all these reasons, researchers focus on the factors that determine food waste with the purpose of reducing this phenomenon with several negative implications for our society. As the phenomenon of food waste has increased, the problem of food security in the world has become more actual and important than ever.

Literature review

Several researches have shown that the biggest quantity of waste is produced by the final consumers (Garcia-Herrero et al., 2018; Nikolaus et al. 2018; Stenmarck et al., 2016) and that it is affected by several demographic, psychological and behavioral factors. Taking into account the importance of the consequences of food waste, it is important to determine any kind of factors that can create food leftovers, in order to reduce this phenomenon.

Both attitudinal and behavioral studies regarding food waste have proven the fact that socio-demographic characteristics have a significant impact on the amount of food thrown away. Females have been shown to be more wasteful than males (Porpino, 2016); households with higher incomes buy more food that they end up not consuming before it expires in comparison to lower income households (Jörissen, et al. 2015; Secondi et al., 2015); large families, especially if they have children waste more food per capita than people who live alone (Richter & Bokelmann, 2018; Nikolaus et al. 2018; Porpino, 2016) etc. However, in the context of the current ageing population, it is particularly important to explore the influence that age has on the attitudes and behavior that lead to food waste. Old age is associated with thrift in many cultures and studies have shown that older people tend to waste less food than younger one. For example, Quested et al. (2013) found that when food is prepared by older people, less is wasted, while Visschers et al. (2016) found a significantly higher level of desire not to waste food among older people. In addition, Koivupuro et al. (2012) concluded that people with ages above 64 waste less food in comparison to all other age groups, making them the category that is the most efficient when it comes to food management. These findings were confirmed by a large study on 27 European countries which concluded that individuals with ages between 45 and 54 wasted around on third of their food, while people over 65 wasted only one sixth of the food bought (Secondi et al., 2015). In contrast, Stancu et al. (2016) found age and other socio-demographic characteristics to be less significant in predicting food waste in comparison to psychological traits (e.g., perceived behavioral control) and food related routines (i.e., shopping plans and leftover reuse). In addition, Qi and Roe (2016) found no differences in terms of attitudes and awareness related to food waste based on age and concluded that age segmentation is less likely to provide scholars with significant insights related to food waste than other behavioral and attitudinal segmentations. In spite of these contradictory findings, most of the available studies reinforce the idea that age remains a significant factor in the understanding of food consumption patterns and there are multiple explanations for the way in which age influences the amount of food wasted through an impact not only on attitudes about food, but also in the practices related to cooking and eating.

Scholars argue that the negative experience that people have gone through dramatic political or economic events such as WWII when there was a food shortage or periods of high inflation when food was inaccessible explains why older people tend to waste less food (Visscher et al., 2016). These experiences might have had an impact on older people's attitude about food and made them more concerned about not wasting food. This is supported by studies which show that older people are more likely to be aware about the problem of food waste and to have sought information on how to prevent this (Neff et al., 2015). Studies find that the concern regarding food waste among older consumers is not generated by concerns regarding environmental pollution or social inequities, but rather by concerns related to the financial and moral aspects of waste in general which can be linked

to the way in which older generations were brought up to value efficiency and thrift (Hebrock and Boks, 2017).
Besides attitudinal differences resulting from the way in which different generations were educated during childhood and the experienced that they were exposed to while growing up, studies also point towards the existence of various behavioral differences that result from the changes in lifestyle that happen as individuals grow older. For example, especially when they live alone, older people have more predictable schedules and desires about food which makes it easier for them to accurately predict how much food to buy and to cook (Winter et al., 2016). Elderly people also tend to spend significantly less on food items, partially because they have lower disposable incomes in comparison to most other age categories (due to the decrease in revenues resulting from retirement) and also spend more on food consumption at home and significantly less for food consumed in public places (Chen et al., 2017). In fact, Gaiani et al. (2018) found that elderly people tend to belong to the category of frugal consumers who consume food at home, very infrequently eat fruits and vegetables and declare that they waste almost no food.
Apparently, a big part of the wasted food quantity is determined by inefficient consumption patterns related to food. Especially in developed countries where food expenses represent only a small part of the income of the consumers, so that, there is no incentive for reducing the phenomenon of food waste (Aschemann-Witzel et al., 2017; Nikolaus et al., 2018; Richter and Bokelmann, 2018). Behavior patterns that favor food waste can be observed from the moment of buying the food, during the preparation until serving and consumption (Schmidt and Matthies, 2018). In the buying phase, consumers have the tendency of buying exaggerated quantities of food or they buy products with a short shelf-lifetime that are not consumed until they spoil (McCarthy and Liu, 2017). During preparation time, several consumers don't have the ability to estimate the necessary quantities of food, which leads again to exaggerated quantities of cooked food, that are not consumed (Gaiani et al., 2018). Another typology of modern consumers refers to a conscious-fussy consumer who does not eat the food he/she does not like or who forgets the existing food in the fridge (Gaiani et al., 2018; McCarthy and Liu, 2017).

Research methodology

The objective of the research is to determine the demographic characteristics that affect the consumer's behavior related to food wasting. The 33 items related to food waste have been included in a multiple topic survey, which has been carried out in the period December 2018-January 2019 in the urban population, on a sample of 252 respondents. The validity of the sample related to food waste is given by the Cronbach Alpha value of 0.729.
In this article we focus on the differences of behavior and perception depending on age. The sample has been divided into two groups based on their age: group 1 (defined as G1) consisted of people younger than 40 years and group 2 (defined as G2) included people older 40 years. The sample includes 252 valid responses, out of which 161 respondents with ages younger than 40 years (G1) and 91 respondents with ages older than 40 years (G2). With the help of the discriminant analysis, we have tested with help of the SPSS 20 the significant differences between the two groups. The results are presented in the following.

Results and discussion

The results of the research show that there are behaviors and perception that there are behaviors that show difference for the two age groups and also similar ones. From the 33 analyzed items 15 show significant differences, having $p<0.10$ and 18 items are similar for both groups.
The behavior which shows the highest differences is the habit of eating and cooking at home ($F=48.816$, $p=0.000$). People older than 40 years prefer to eat and cook at home ($M_{G2}=5.08$),

while young people prefer to eat out (M_{G1}=3.41). This is also confirmed by the item, which describes the preference of consumers to eat outside their homes, even if they have food at home (F=22.559, p=0.000), where the mean of perception is higher for the young people (M_{G1}=3.56) in comparison to people older than 40 years (M_{G2}=2.42). Another behavior that differs in a significant way is the planning of the shopping experience. People older than 40 years have a constant schedule for going shopping (F=25.591, p=0.000, M_{G2}=4.10) for instance once a week, in comparison to younger people (M_{G1}=2.83). This is also confirmed for the planning of the shopping experience (F=4.832, p=0.029<0.05), where older people prefer to do a shopping list (M_{G2}=5.18) in comparison to people younger than 40 years (M_{G1}=4.63). Food leftovers are also used differently for feeding animals (F=16.270, p=0.000) or donation to people need ((F=13.450, p=0.000). People older than 40 years feed animals (M_{G2}=4.28) or donate food leftovers (M_{G2}=3.16) more frequently in comparison to younger people (M_{G1}=3.04 for feeding animals; M_{G1}=2.31 for donating food leftovers). It can be observed that feeding animals happens more frequently in comparison to food donations for people in need.

The young generation considers that they throw away more food than the average population (F=5.260, p=0.023) although both groups have an under-average value for this item (M_{G1}=3.10, M_{G1}=2.56). Trying new products (F=9.762, p=0.002) and buying more products when hungry (F=15.833, p=0.000) are behaviors that characterize the young generations (M_{G1}=4.73 for trying new products and M_{G1}=5.29 for buying more, when hungry). Packaging are apparently designed for the middle-aged population, older than 40 years as they don't consider that packages contain too much food (F=3.468, p=0.06, M_{G2}=3.81) in opposition to younger people who consider that packages contain too much food (M_{G1}=4.25). People older than 40 years consider more, that a rich food offer at meals is associated with a social status (F=3.190, p=0.067, M_{G1}=4.78, M_{G1}=4.31)

The re-use of food is also a typical activity for people older than 40 years, who check the "best before" date and consume the products that expire (F=3.812, p=0.052, M_{G2}=4.86, M_{G1}=4.37) or using products cooked in the previous days (F=3.808, p=0.052, M_{G2}=4.88, M_{G1}=4.45). On the other hand the young generation keeps the food as long as possible in the hope that they eat it (F=3.393, p=0.067, M_{G1}=4.78, M_{G2}=4.31) and they rather throw food away, if they don't eat it (F=3.145, p=0.075), although both groups have an under average value for this item (M_{G2}=3.20, M_{G1}=2.76).

Similar behavior and perceptions for the two age groups can be observed for the bad feelings related to food waste. Both the young people and the older people feel bad for throwing away food (F=0.922, p=0.338>0.10, M_{G1}=5.05, M_{G2}=5.27), they have a bad conscious related to the hungry children in the world (F=2.109, p=0.148>0.10, M_{G1}=4.23, M_{G2}=4.64) and they think of the money they have spent for food (F=0.809, p=0.369>0.10, M_{G1}=4.31, M_{G2}=4.54). In spite of these, none of the groups recycle food (F=0.972, p=0.325>0.10, M_{G1}=2.13, M_{G2}=2.37).

Both generations have similar behavior related to the shopping experience, in which both consumers groups buy more products than they have on the shopping list (F=0.735, p=0.392>0.10, M_{G1}=4.94, M_{G2}=4.74) and with the purpose of having a food reserve at home (F=1.374, p=0.242>0.10, M_{G1}=3.78, M_{G2}=3.52). Both consumer groups buy products for general purposes (F=1.7666, p=0.185>0.10, M_{G1}=4.82, M_{G2}=4.52) and they have the ability to prepare receipts with the existing food (F=0.244, p=0.621>0.10, M_{G1}=4.41, M_{G2}=4.53). Both generations state that they don't eat the products after expiration date, even if they look good (F=2.137, p=0.145>0.10, M_{G1}=2.55, M_{G2}=2.92) and as expected, they throw it away when is shows signs of alteration (F=0.185, p=0.668>0.10, M_{G1}=5.65, M_{G2}=5.75). Both groups state that they prefer not to buy products with visual imperfections (F=1.146, p=0.285>0.10, M_{G1}=2.78, M_{G2}=3.03).

Table no. 1 Discriminant analysis results regarding significant differences based on grouping variable age

Item	Mean G1	Mean G2	SD G1	SD G2	F (1,250)	p
I cook and eat at home every day	3.41	5.08	1.72	1.95	48.816	.000
I have a fixed schedule for shopping (i.g. once a week)	2.83	4.10	1.78	2.09	25.591	.000
I prefer to eat out, even if I have cooked food	3.56	2.42	1.87	1.71	22.559	.000
I feed domestic animals with food leftovers.	3.04	4.28	2.29	2.42	16.270	.000
When I am hungry, I buy more products	5.29	4.27	1.82	2.12	15.833	.000
I donate food leftovers to people in need	2.31	3.16	1.67	1.92	13.450	.000
I like to try new products	4.73	3.98	1.73	1.91	9.762	.002
I throw away more food than average population	3.10	2.56	1.83	1.62	5.260	.023
I plan the shopping experience and I do a shopping list	4.63	5.18	1.90	1.89	4.832	.029
I check ”best before” date & consume those that expire	4.37	4.86	1.88	1.94	3.812	.052
I use cooked food from previous days	4.45	4.88	1.67	1.77	3.808	.052
Packages contain more food than I need	4.25	3.81	1.79	1.85	3.468	.064
I keep food as long as I hope to eat it	4.78	4.31	1.84	2.09	3.393	.067
A rich food offer is a social status symbol	2.76	3.20	1.82	1.84	3.190	.075
I throw away food, if I don’t eat it	3.05	2.61	1.88	1.94	3.145	.077
I eat food after expiration date, if they look good	2.55	2.92	1.83	2.09	2.137	.145
I think of hungry children, when wasting food	4.23	4.64	2.18	2.02	2.109	.148
I buy products for general purposes (not for a receipt)	4.82	4.52	1.71	1.75	1.766	.185
I buy more products than need, for having a reserve	3.78	3.52	1.65	1.72	1.374	.242
I buy food products with visual imperfections	2.78	3.03	1.65	1.99	1.146	.285
I spend a lot of time when going shopping	3.99	3.74	1.81	1.91	1.047	.307
I recycle food waste	2.13	2.37	1.82	1.89	.972	.325
I feel bad for throwing away food	5.05	5.27	1.76	1.86	.922	.338
I think of spend money, when wasting food	4.31	4.54	1.86	1.96	.809	.369
I buy more products than mentioned on shopping list	4.94	4.74	1.74	1.80	.735	.392
A big quantity of wasted food well lead to food crisis	3.92	4.10	1.93	2.01	.458	.499
I keep food in optimal conditions for longer freshness	5.08	4.95	1.60	1.82	.352	.554
I have the ability to prepare receipts with existing food	4.41	4.53	1.70	1.85	.244	.621
I throw away food as it shows signs of alteration	5.65	5.75	1.76	2.02	.185	.668
I buy more products at special occasions (Christmas)	4.79	4.88	1.84	1.75	.159	.690
I prepare too much food and it is not consumed	4.23	4.31	1.73	1.90	.114	.736
I buy products with longer “best before” period	4.50	4.53	1.86	1.89	.012	.913
I freeze products in order to avoid their deterioration	3.90	3.87	2.00	2.14	.007	.935

Observation: G1 are people younger than 40 years; G2 are people older than 40 years
Source: Own research results

Even more similarities are observed at the behavior for buying more at special occasions and holidays (F=0.159, p=0.690>0.10, M_{G1}=4.79, M_{G2}=4.88), in the process of preparing more food than it can be consumed (F=0.114, p=0.736>0.10, M_{G1}=4.23, M_{G2}=4.31). Both groups try to keep the food products in optimal conditions for longer freshness (F=0.352, p=0.554>0.10, M_{G1}=5.08, M_{G2}=4.95), they freeze food in order to avoid deterioration (F=0.007, p=0.935>0.10, M_{G1}=3.90, M_{G2}=3.87) and they buy products with longer “best before” period (F=0.012, p=0.913>0.10, M_{G1}=4.50, M_{G2}=4.53).

Conclusions

Several consumer researches have shown that certain basic behaviors are learned from the parents. Eating or cleaning habits are most frequently learned from the parents and therefore there are similarities related to these types of behaviors. The results of our research show that there are also similarities related to food wasting behavior of consumers. The two age groups analyzed in this paper, have similar behaviors related to the buying habits as they have the tendency to buy more products as planned and with the purpose of having certain food reserves at home. Their preference related to the visual aspect of food is also similar, as both generations don't buy food with imperfections or they throw it away when it shows signs of deterioration. Similarities can be also observed when we analyze the preparation and storing of food as both generations affirm that they do their best in order to avoid food leftovers.

Both generations have a bad conscious when wasting food, but in spite of this bad feeling, none of the two groups recycle food leftovers. People older than 40 years have rather the tendency to give food leftovers to domestic animals or o donate them to people in need. In spite of this results, both groups have an under average value for these items showing that this type of behavior related to food recycling is not very frequent.

The results of the research have revealed also differences related to the food habits of people younger and older than 40 years. The main differences are related to the locations where people prefer to eat, whereby people older than40 years prefer to cook and eat at home, while young people prefer to eat outside their house, at restaurants or canteens. Another difference for the two groups can be observed for the planning of eating and buying food. Younger people are more eager to try new products and they have a more impulsive buying behavior by choosing at the moment of buying the products they want. In opposition to this, people older than 40 years like to plan in advance their shopping experience and the products they buy.

The analysis of the difference and similarities of behavior of two groups of consumers of different ages, is important for the determination of changes in the habits of the consumers. On one hand it is important to analyze the existing behavior of consumers related to the acquisition, preparation, storage and consumption of food in order to determine the cause for food waste. Besides by knowing the behavior that produces food waste, interventions can be made in order to reduce the quantity of wasted food. On the other hand, all these changes have an impact on the business environment as there is a switch from eating at home to eating out or ordering food. This change of behavior can be seen as a chance for restaurants, canteens or catering companies. This impacts also the strategy for food waste, in the sense that the waste is produced at the business level and not at the final consumer level.

Food waste and asymmetric distribution of food around the world remain important research topics. The more we know about the food and eating behavior of consumers, the easier it will be to increase the efficient use of food and to reduce the quantity of wasted food.

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