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Avoiding food waste by Italian consumers: related beliefs, attitudes, behaviour and the importance of planning and shopping routines

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Summary

Over the last decades, food waste has generated an immense amounts across the food life cycle, determining serious environmental, social and economic issues. Reducing the amount of food waste is a key element in developing a sustainable food system. The purpose of this study is to investigate the correlation between food waste and belief, attitudes and behaviours at the household level so exploring its possible drivers among Italian consumers: how people could reduce or avoid the amount of food waste is the main step for addressing the consumer behaviour and for planning shopping routines. In effect avoidable food waste represents the majority of food waste generated at the household level. The disposal of food is the final step in the food provisioning process (Munro, 1995) entailing a series of food-related behaviours from purchasing food to preparing and eating it (Jensen et al., 2012). The Theory of Planned Behavior (Ajzen, 1991) helps to understanding how the people actions can be modified linking beliefs and behaviour; this theory is our starting point to predict household decisions in order to avoid, to minimize or to recycle waste (Biswa et al., 2000; Knussen et al., 2004) as well as to improve food-related behaviours (Conner & Armitage, 2002). To this end, an on-line survey was carried out via social networks and e-mail. A focus group and a pilot test with 12 Italian consumers were conducted to support the questionnaire design. 256 were respondents. Results are in line with the studies on this research topics. The current study focuses on Italian consumers, but the basic concepts in our framework should be replicable and so applicable to any society. The policy implications are related to the crucial importance that new models to address behaviour consumer have to be identified in order to change eating habits and attitudes.

Keywords: Food Waste, Shopping routines, Consumer behaviour, Theory of Planned Behaviour.

JEL Classification codes: Q10, Q18, D12.

Avoiding food waste by Italian consumers: related beliefs, attitudes, behaviour and the importance of planning and shopping routines

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1. INTRODUCTION

Approximately one third of the food produced for consumption is lost or wasted globally (Fiore et al., 2014; FAO, 2011). A recent work demonstrated that food loss amounts to 1.3% of the sales of dairy products, 2.8% for bread & pastry and 4.2% for fruit & vegetables (Lebersorger and Schneider F., 2014). Indeed, over the last decades, food waste has generated an immense amounts across the food life cycle, determining serious environmental, social and economic issues. Reducing the amount of food waste is a key element in developing a sustainable food system. Worldwide, an estimated 1.3 billion tonnes of food is lost or wasted annually in production, manufacture and distribution, and in homes (FAO, 2013); this is approximately one third of food produced for human consumption. Consumers are the single biggest contributor to the total volume of food waste generated over the world (Griffin et al., 2009), surpassing the waste generated in harvesting, processing, and distributing food. Nevertheless reliable data are needed in order to quantify the contribution of each phase of supply chain (agriculture, production and processing, retail and consumers). These data constitute the basis for planning evaluation and identification of waste prevention measures (Lebersorger and Schneider, 2014). There are mainly three negative consequences of food waste: firstly the social impact because it contributes to increase the global food prices, consequently makes the food not accessible for the poorest and allows the increase of malnutrition (Graham-Rowe et al., 2014). Furthermore the social implications of food waste are related to food security, and the reduction of food waste has been identified as a key component of strategies to feed a future global population of 9 million people (Parizeau et al., 2014). Secondly the economic impact, throw away food is a waste of money. Thirdly the environmental impact, food production requires an increasing pressures such as water wastage, greenhouse gas production, dwindling forests, genetic erosion (Graham-Rowe et al., 2014); maintaining biodiversity, therefore, is an imperative for the Earth's environmental systems (Pearson et al., 2014). Although consumers principal role in contributing to this volume, there is a knowledge gap about the drivers of food waste in households (Stefan et al., 2012). Thus, understanding of factors that contribute to the amount of food waste generated by consumers is a priority and so a crucial driver for providing policies suggestions. International research activities on food waste are increasingly focusing on estimating the amount of food losses (e.g., Griffin et al., 2009) but, there is a surprising lack of studies investigating food waste disposal from the household food choice and consumer behaviour perspective. A significant component of this will involve understanding and assessing the dynamics of household food waste (particularly in Italy) and ultimately defying which are the principal factors determining these food losses.

This paper is structured as follows; firstly, an introduction on the Theory of Planned Behaviour is presented; then, the methodology steps are drawn. Result and policy implications are discussed. Finally, conclusions close the paper.

2. THE THEORY OF PLANNED BEHAVIOR: AN INTRODUCTION

In developed nations, food waste generated in homes is a large contributor to the total amount of food waste (Quested et al., 2013). In recent years, a decrease in food prices coupled with an apparent abundant availability of food have led to negligence towards food and an increase in wasteful behaviour (Stuart, 2009). In this context, the Theory of Planned Behaviour can give an important contribute; the aim of the TPB is to help to understanding how the behavior of the people can be modified (Ajzen, 1991). In this way, the TPB links beliefs and behavior. Besides to attitudes and subjective norms (deriving from the theory of reasoned action), the TPB adds the idea of perceived behavioral control, which originates from self-efficacy theory (Bandura, 1997; 1997); so motivation, performance, and feelings of frustration associated with repeated failures determine behavioral reactions.

The TPB has received considerable attention in the literature. Nowadays ethical values guide the behavior of the all kind of buyer (Contò et al. 2015; Burkhardt, 2012; Olsen and Banati, 2013); indeed several researches focus on the decisive role of ethics that is health, quality, trust, environmental welfare aspects in influencing consumer behavior (Krystallis et al., 2012; OECD, 2008; Young et al., 2010). Others (Guido et al., 2010) highlighted ethics personal beliefs on what is right or wrong can be considered the main motivator of purchasing intention.

The Theory of planned behaviour emphasizes that human behaviours are managed not only by personal attitudes, but by social pressures and a sense of control. Human behaviours can be predicted and changed best by considering dispositions focusing directly on the behavior of interest, such as self-efficacy beliefs and intentions (Ajzen, 2011; 2012). Lastly, attitudes and subjective norms can be considered important (Ajzen, 2001) in order to perform behaviors of different kinds; and perceptions of behavioral control, account for considerable variance in actual behavior (Ajzen, 1991). Some authors (Al-Swidi et al., 2014; Herath et al., 2013; Hoppe et al., 2013) investigated the direct effects of subjective norms on attitude, and buying intention in context of buying organic food; another recent research step (Liang, 2014) integrate food-related lifestyle (FRL) approaches in the TPB to investigate the profiles of consumers who purchase organic food online. In addition, other researchers identified the structural relationships among ecological concerns and the TPB's constructs in the genetically modified (GM) food context (Kim et al., 2014). Moreover, another innovative research demonstrated that assessing attitudes toward healthy food choices for the elderly were positively associated with consumption intention (Liu and Kwon, 2013).

Focusing on food policies, the psychological constructs in TPB were shown to influence farmers' decisions regarding the adopted strategy (Hansson et al., 2012) and regarding the designing process of the agricultural development programmes as well as the technology dissemination programmes (Herath, 2013). To instigate a change in intentions to eat sustainably, food policies could include training processes and workshops with varied educational components (McDonough et al., 2014).

The crucial aspect in the TPB is that the application of the theory can be applied to predict the likelihood that individuals will engage in different behaviours providing methodological and conceptual tools for the prediction of social behavior and for designing behaviour change interventions (Fishbein and Ajzen, 2011).

3. METHODOLOGY

The TPB (Ajzen, 1991) is our starting point functional to predict household decisions in order to minimize or recycle waste (Biswas et al. 2000; Knussen et al., 2004) as well as to improve food-related behaviours (Conner & Armitage, 2002). The TPB has proved to be flexible and also it has been used as a basis for developing conceptual models of consumer behaviour (Barr et al., 2001). As predicted by TPB, the work aims at investigating attitudes, subjective norms and perceived behavioural control.

We examine attitudes as two concepts: general attitudes towards waste measured as lack of concern about food waste, as people share an ideal not to waste food; moral aspects, an important addition to the TPB (Conner & Armitage, 1998), that, in accordance with recent studies, seems relevant for food waste as well, as most consumers feel bothered or guilty when engaging in wasteful behaviour (Bolton & Alba, 2012; Evans, 2012) or to enhance the prediction of intentions to purchase organic foods (Arvola et al., 2008) or to consume ready-to-eat meals (Olsen et al., 2010). The analysis of the subjective norms means what is considered approved or disapproved behaviour in a specific situation (Ajzen, 1991), in fact if wasting food is disapproved by important other, people should intend to waste less food. Finally, perceived behavioural control studied as the degree to which consumers think reducing food waste is under their control. We investigate also practices and shopping routines consumers have built around their household activities, to understand their influence in how much food consumers end up wasting. As confirmed in other studies, planning routines may, for some consumers, prevent them from underestimating inventory and purchasing items they already have at home, with a decrease of product spoilage (Chandon & Wansink, 2006). Also shopping routines, as making shopping lists or planning meals in advance, have a positive effect in limitation of food waste, reducing unplanned purchases (Bell et al., 2011). As background characteristics we include: socio-demographics, consumers' involvement with food, the frequency of their shopping trips and their awareness regarding the amount and type of food they waste and its consequences.

Data were collected in September-December 2014 by means of a web-based questionnaire using an online software. A focus group discussion with 6 respondents and a pilot test with 12 Italian consumers were conducted to support the questionnaire design. Items were developed by the authors based on previous studies. The questionnaire was developed in Italian, translated into English for its replicability, and distributed to Italian consumers through online platforms (Email, Facebook, LinkedIn). When it was possible, a personal phone-recall has been done. A link was sent to potential respondents who were asked to forward it to friends and acquaintances (Stefan et al., 2012). A total of 260 Italian consumers participated in the survey. During data screening, four cases were removed as they did not complete the survey resulting in a final sample of 256 respondents. Data analysis has been performed by using STATA.

The first step was a data statistical analysis. Results related to respondents' characteristics compared to the general population and to background variables are shown in the table 1 and table 2.

Table 1 Respondents' characteristics compared to the general population

	Sample	Population
Household size (mean)	2.99	3.05
Presence of children	16%	15.97%
Number of children (mean)	0.31	0.3
Age (mean)	36.576	36.582
Gender	49.22% of female 50.78% of male	49.25% of female 50.75 of male
Area of residence	Italy	

Table 2 Background variables

	Mean	Standard deviation
<i>Background factors of consumers' food waste</i>		
Awareness		
I know exactly how much food we throw away every day	5.00	1.65
I know exactly what kind of food we throw away	5.30	1.40
I am aware of how much money I pay weekly for food that gets thrown away	4.84	1.67
Food waste is a problem for the environment despite it is natural and biodegradable	5.33	1.64
The fact that I waste food does not affect the undernourished people in the world because anyway I could not give that food to them	3.25	1.99
Food involvement		
How would you rate your general involvement with food?	5.22	1.68
Frequency of shopping		
	Percentage	
How often do you usually do your main shopping trips?		
daily	11.70%	
2–3 Times per week	41.01%	
once a week or less often	44.53%	
How often do you usually do smaller “top up” shopping trips?		
daily	16.79%	
2–3 times per week	30.86%	
once a week or less often	46.87%	

In addition to statistical analysis, a correlation analysis was performed in order to highlight significant relationships between the 14 selected variables on the 20 total variables. They are as follows:

- 1 = Food waste
- 2 = Intention not to waste food- General
- 3 = Planning routines - List
- 4 = Planning routines –Check of inventories
- 5 = Planning routines –Plan of meals
- 6 = Shopping routines – Buying too much food
- 7 = Shopping routines – Items that you did not intent to buy
- 8 = Moral attitudes – Throwing away food bother me
- 9 = Moral attitudes – Throwing away food make me guilty
- 10 = Awareness – I know exactly how much food we throw away
- 11 = Awareness – I know exactly what kind of food we throw
- 12 = Awareness – How much money I pay weekly for food waste
- 13 = Awareness – Problem for the environment as it is natural and biodegradable
- 14 = Awareness – Waste food does not affect the undernourished people in the world

Pearson's correlation coefficient (r) was calculated to measure the strength of the association between the selected variables. The correlation coefficient formula is specified as follows:

$$r = \frac{\sum XY - \frac{\sum X \sum Y}{N}}{\sqrt{(\sum X^2 - \frac{(\sum X)^2}{N})(\sum Y^2 - \frac{(\sum Y)^2}{N})}} \quad (1)$$

4. RESULTS AND POLICY IMPLICATIONS

Results show, as you can see in Fig. 1, that the food items that are more wasted are vegetables and fruit followed by milk and dairy products and bread and bakery products. Instead the items that are less wasted are meat and fish. The 46.5 % of respondents are not wasting food. The 32.5% wastes less than a tenth of food that purchases in a week. The 17.8% wastes an amount between a tenth and a quarter of food that purchases in a week. The 1.3% wastes an amount comprised between a quarter and half of the food we purchases in a week. The 1.9% wastes more than an half of that purchased in a week. The Fig 2 illustrates the three main reasons to throwing away less food as possible are firstly the environmental reason: wasting less has an positive impact on the environment. Secondly food waste are synonyms of waste of money. Thirdly people who throw away food feel bored. The 55.1% of people interviewed are strongly motivated to not throw away any food over the next week (Fig. 3). The 50,8% of the people are trying hard not to throw away food (Fig. 3). As illustrated in Fig. 4 only the 21.5% of respondents makes every time a list of the food that intends to buy before to shopping trip. The 35.6% makes usually the list. The 23.8% of respondents checks every time its food inventories prior to shopping trips. The 23.8% checks usually food inventories. The 10.2% plans its meals in advance for several days ahead. The 14.4% plans usually meals. The 10.2% of respondents says that frequently they buy too much food more than they need when they go to shopping (Fig. 5).The 10.6 % of people interviewed frequently says that they buy food items that weren't in plan to buy (Fig. 5).The 43,6 % of the sample cares so much when it food thrown away food. The 41.4% of the sample feels guilty so much when thrown away food (Fig. 6). As show in Fig. 7, the 35.9% of respondents is really worried about the environmental impact of the food it throws away. The 34.7% is really worried about the impact of its food waste on the distribution of resources. The 29.7% is really worried about the amount of food that it throws away. The 28.5% is really worried about the cost of the food that it throws away.

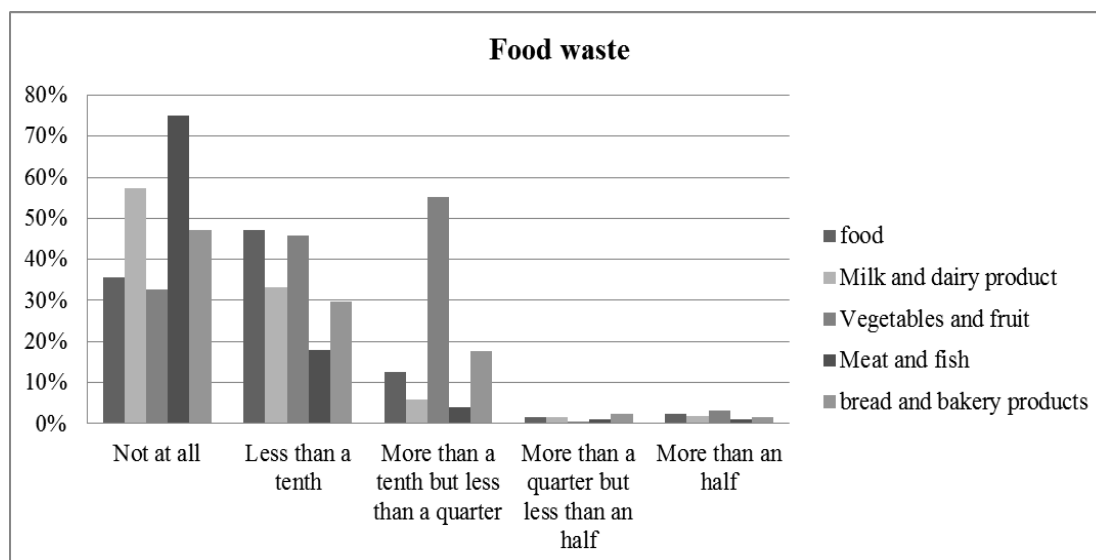


Fig. 1 Frequency distribution of food waste

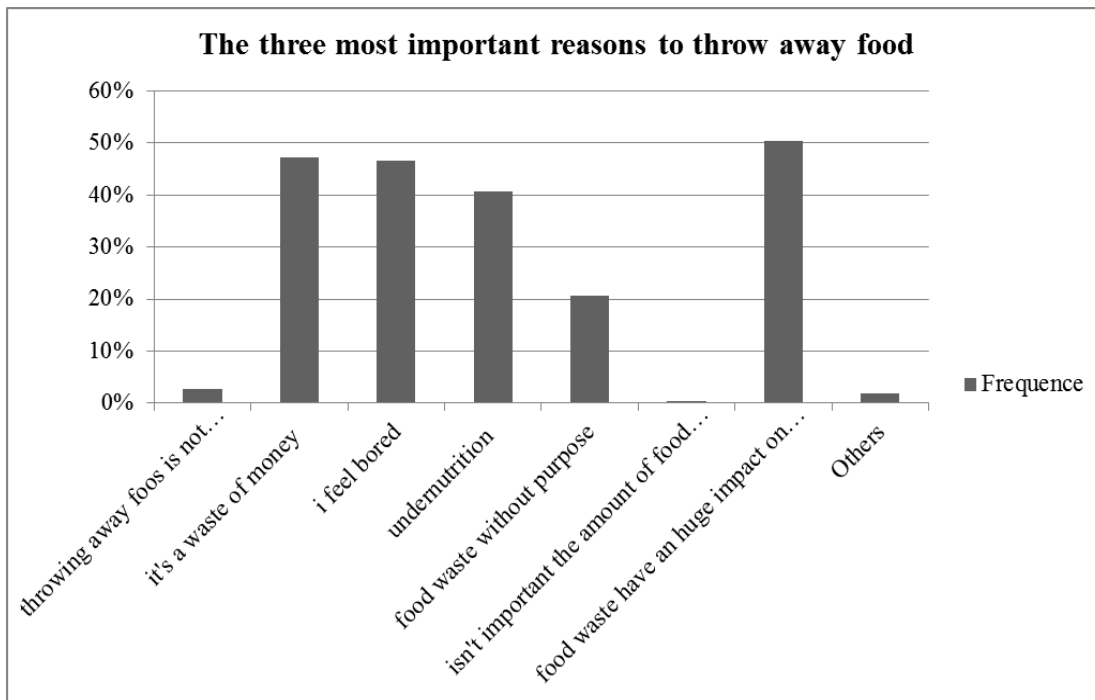


Fig. 2 Frequency distribution of the three most important reasons of food waste

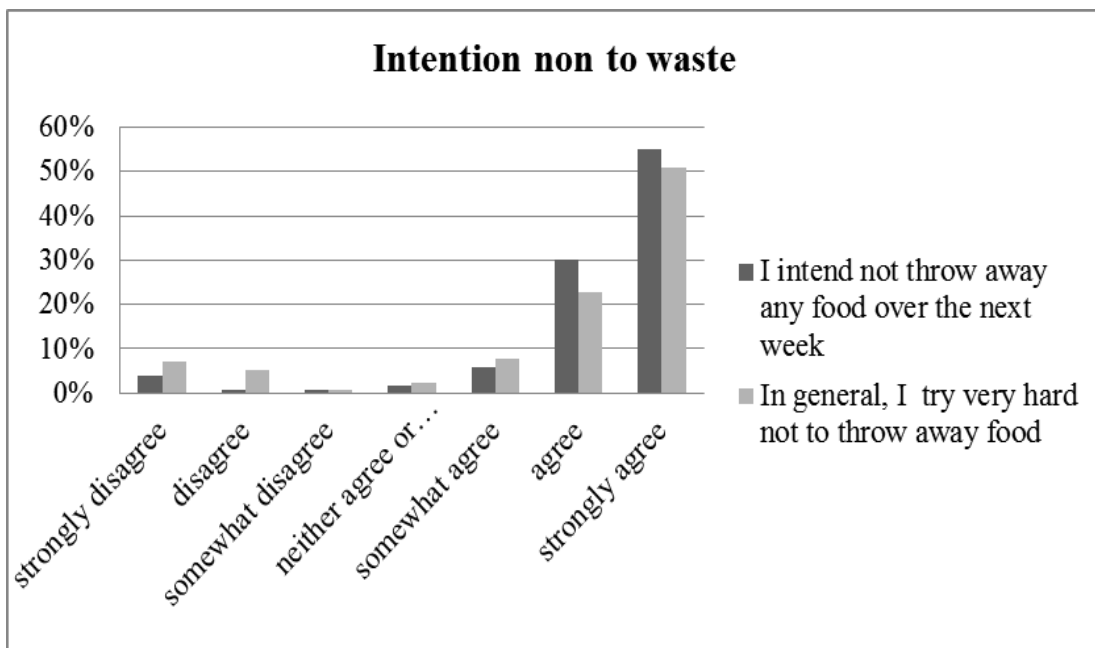


Fig.3 Frequency distribution of the intention not to throw away food

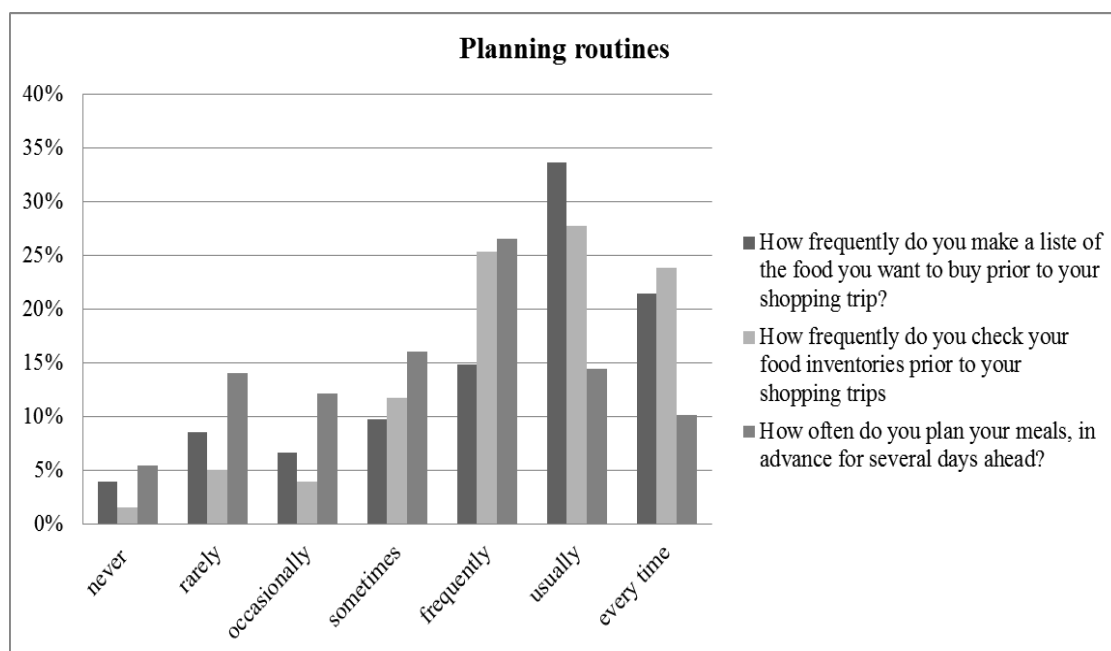


Fig. 4 Frequency distribution of planning routines

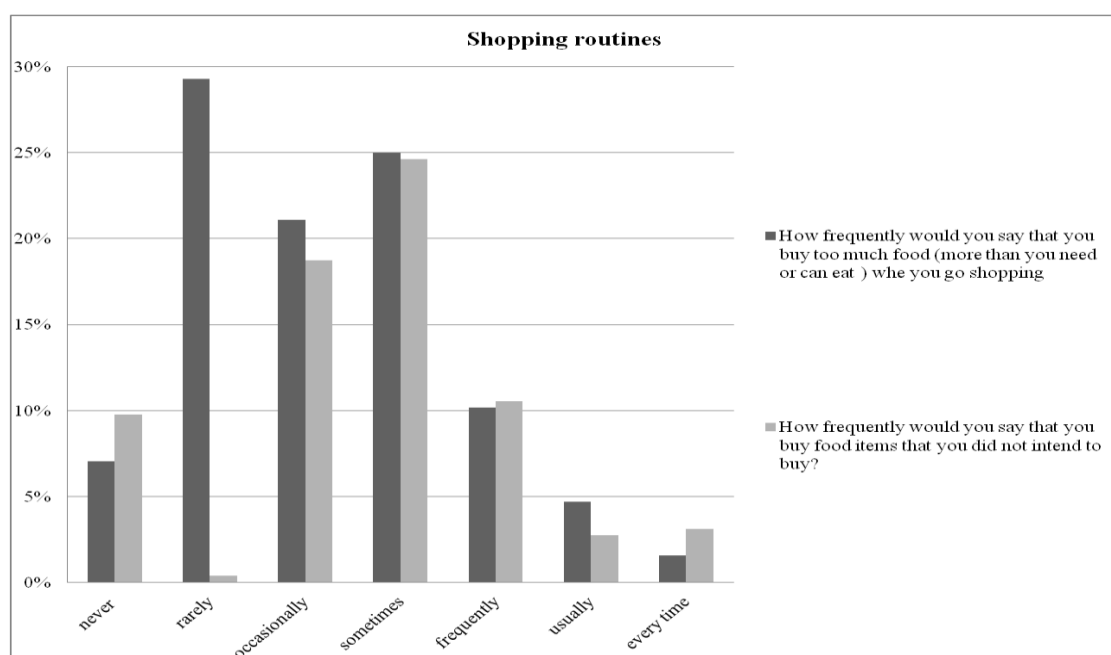


Fig. 5 Frequency distribution of Shopping Routines

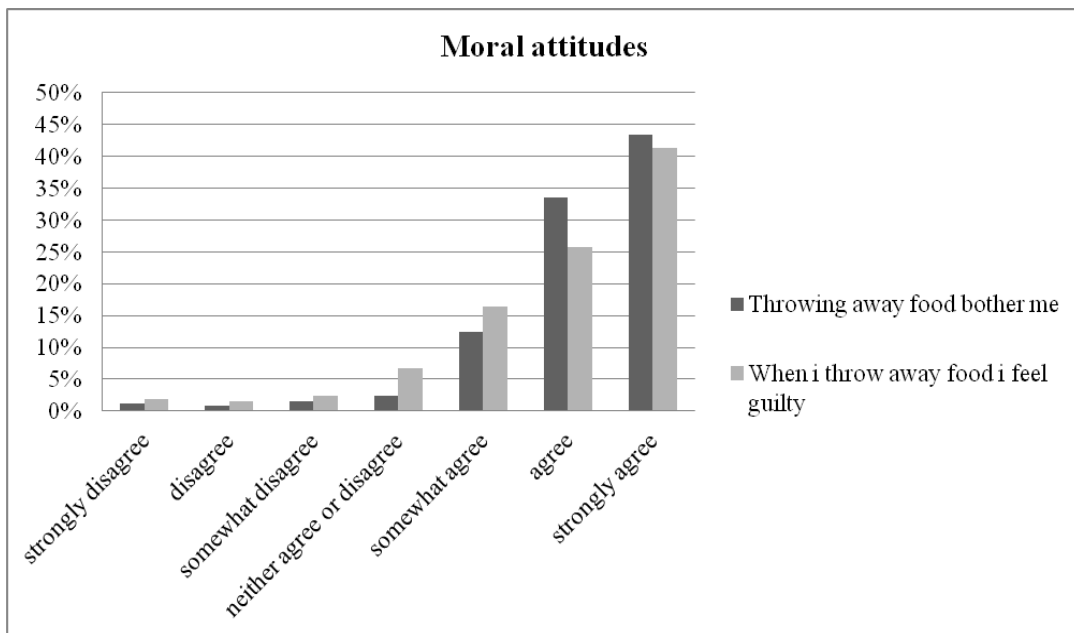


Fig. 6 Frequency distribution of Moral attitudes

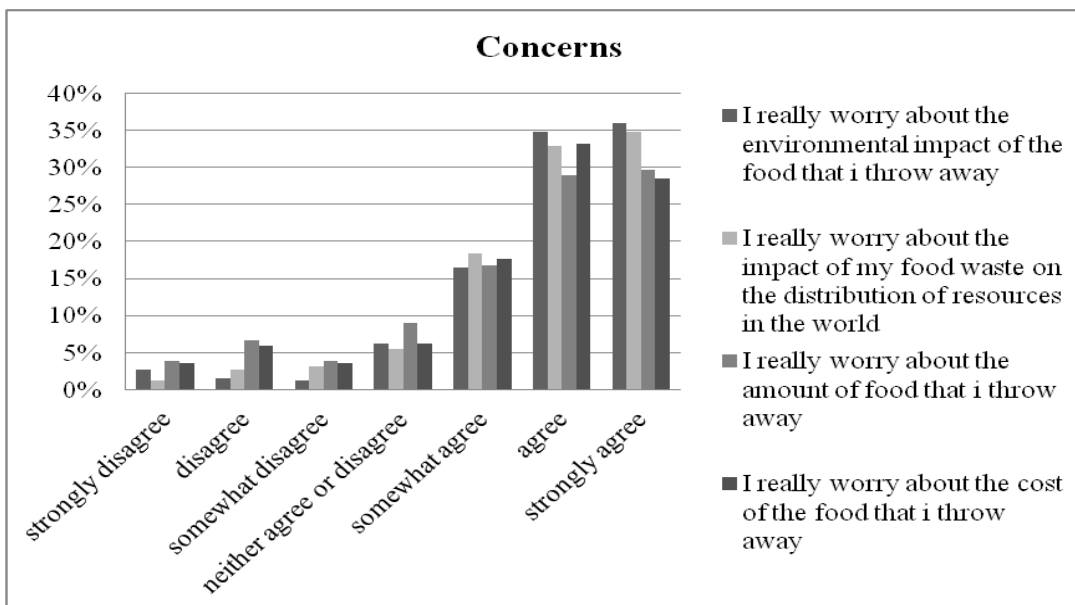


Fig. 7 Frequency distribution of Concerns

The second step related to the correlation analysis (Table 3) highlight that a positive correlation value was found between the variables Food waste (Var 1) and Shopping Routines on buying too much food (Var 6). Intention not to waste food (Var 2) is positively correlated with Moral Attitudes of consumers that feel guilty and worried throwing away food (Var 8 and Var 9). A positive correlation was found also between Planning Routines of consumers that plan meals (Var 5) and the Awareness that food waste is a problem for environmental despite it is natural and biodegradable and it doesn't affect the world hunger (Var 13 and Var 14). The variables shopping routines on buying too much food items that consumers didn't planned to buy (Var 6 ad Var 7) are positively correlated with the awareness about how much money consumers pay weekly for food waste (Var 12).

A negative correlation value was found between the Planning Routines of consumers that check the inventories prior to the shopping trip (Var 4) and the variables Shopping Routines on buying items that the consumers didn't planned to buy (Var 7). The Var 4 is also negatively correlated with the consumers' awareness about how much money they spend weekly for food waste (Var 12). Planning of meals (Var 5) is negatively correlated with the consumers' awareness of waste of money (Var 12). Finally The variables shopping routines on buying too much food items that consumers didn't planned to buy (Var 6 ad Var 7) are negatively correlated with the consumers' awareness that food waste didn't affect the world hunger.

Table 3 Matrix of correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-0.05	1	-	-	-	-	-	-	-	-	-	-	-	-
3	-0.09	0.00	1	-	-	-	-	-	-	-	-	-	-	-
4	-0.17**	0.07	0.60***	1	-	-	-	-	-	-	-	-	-	-
5	-0.03	0.06	0.41***	0.50***	1	-	-	-	-	-	-	-	-	-
6	0.23***	-0.00	-0.03	-0.12	-0.02	1	-	-	-	-	-	-	-	-
7	0.18**	0.04	-0.09	-0.21***	-0.12	0.47***	1	-	-	-	-	-	-	-
8	-0.10	0.27***	0.09	0.15*	0.10	-0.16*	-0.07	1	-	-	-	-	-	-
9	0.01	0.17***	0.08	0.06	0.021	-0.07	0.00	0.67***	1	-	-	-	-	-
10	-0.00	0.18**	-0.04	0.00	0.06	0.04	0.07	0.18**	0.18**	1	-	-	-	-
11	-0.03	0.06	-0.04	0.04	0.05	0.07	0.06	0.16*	0.16**	0.84***	1	-	-	-
12	0.17**	0.03	-0.13*	-0.25***	-0.28***	0.29***	0.26***	-0.05	0.05	0.10	0.16	1	-	-
13	-0.09	0.15*	0.04	0.15*	0.24***	-0.17**	-0.15*	0.10*	0.12*	0.14*	0.10	-0.26**	1	-
14	-0.16**	0.15*	0.08	0.19**	0.31***	-0.23***	-0.22***	0.16*	0.15*	0.11	0.09	-0.26**	0.72***	1

* $p < .05$ - ** $p < .01$ - *** $p < .001$

5. DISCUSSION

Consumers' attitudes as concern towards food waste and moral attitudes (i.e., feelings of guilt when discarding food), determine their intention not to waste food, as expected based on the TPB model (Ajzen, 1991; Stefan et al., 2012). The present study shows that the consumers are aware about the amount and the kind of food that they throw away. They are trying not to throw away food because they feel guilty and worried. They are aware that food waste is a problem for environmental despite it is natural and biodegradable. Probably they try to reduce food waste and so its environmental impact planning meals in advance for several days ahead as show the positive correlation between the variables Planning Routines and Awareness of environmental problem. The consumers are also conscious about the amount of money that they spend weekly for food waste due to the fact that they buy too much food, more than they plan to buy.

The respondents that check the inventories before to go to shopping trip they not buy any surplus food. The frequency of shopping has a strong influence on shopping habits as consumers who go once a week tend to buy more food than they need. Consumers' routines with regard to planning and shopping for food are important constructs to consider when studying food waste, since these determine the amount of food disposed. Moreover, models of consumers' food waste should take into account both general and moral attitudes, together with consumers' perceived behavioural control. Food waste may be perceived mainly as a food-related behaviour embedded in consumers' routines and not driven by conscious intentions.

6. CONCLUSIONS

Our study has been designated for being a starting point at Italian level in order to design the system of waste management and policies. The aims was to provide insights aimed at changing consumers' behaviour on food waste, providing consumers with skills and tools to deal with their food-related activities. Avoiding food wastes is for the world, a key challenge to increase consumer ethics behaviour and sustainability approach in the agri-food sector. The consumer and business level approach is essential as food losses and waste occur during the entire supply chain and, in quality of recipients of food products; so it is important to take into account specific methods to affect their behaviours (Fiore et al., 2015).

Waste prevention approaches should focus on avoiding returns, transfer of best practices, information and education of employees and customers as well as strengthening the donation to social services (Lebersorger and Schneider F., 2014). Furthermore, it is important to design packages that protect the food properly and allow the consumer to use the product fully (Silvenius et al., 2014).

In line with other works (Liang, 2014), the authors believes that the conclusions of this study may be used by the food policy to avoid food-related habits in consumers' everyday lives not respecting the issues of the food waste. It can be underlined that new models to address behaviour consumer have to be identified in order change eating habits and attitudes.

Following the work of Stefan et al. (2012) that is our starting point of research, the main contribution of this study is that it could provide essential knowledge for promoting campaigns aimed at decreasing the level of food waste generated at the household level. The results suggest that such interventions should be expected at influencing consumers' choices related to buy and consumer food, such as changing their planning and shopping routines. Because of culture is known to have an impact on consumers' food waste behaviour (Stuart, 2009), it may be, also, interesting to compare our results with ones of the similar past studies, that involved other countries. This further steps can be crucial to provide basic guidelines for developing policies and campaigns aimed at decreasing the level of food waste generated in household.

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