

EMOTIONAL PROFILING FOR SEGMENTING CONSUMERS: THE CASE OF HOUSEHOLD FOOD WASTE

Mario AMATO

Post Doc, Department of Political Sciences, University of Naples Federico II, Naples, Italy, mario.amato2@unina.it

Roberto FASANELLI

Assistant Professor, Department of Social Sciences, University of Naples Federico II, Naples, Italy, roberto.fasanelli@unina.it

Roberta RIVERSO

Assistant Professor, Department of Political Sciences, University of Naples Federico II, Naples, Italy, roberta.riverso@unina.it

ABSTRACT

Following previous studies which show that emotions are a powerful predictor of behaviour, in the current work we explored the potential predictive role of emotions in the case of household food waste. Based on a sample of 183 Italian subjects, we analysed the relationship between a set of emotions towards food waste and the intention to waste. The analysis was carried out in three steps. First, a Principal Component Analysis was performed on emotions in order to synthesise few complex indicators of the way people feel when thinking to food waste. In a second step, a cluster analysis was carried out, based on the PCA components scores, to derive different profiles of individuals as far as their emotions towards food waste are concerned. Third, by means of ANOVA and post-hoc tests differences across groups have been tested with respect to socio-demographic variables and the intention to reduce food waste. Results confirm the link between emotions and intention against food waste and highlight that socio-demographic characteristics are not relevant to affect the emotions' profile. Emotions allow a meaningful segmentation of consumers, which is not possible to draw using sociodemographic characteristics

KEYWORDS

Food waste, Consumer segmentation, Emotions, Cluster analysis

INTRODUCTION

Emotion or emotional experience is one of the most complex constructs of psychology. Emotions have been defined as a multi-component process, which is activated when the subject is exposed to a stimulus (Frijda, 1988), external or internal (e.g., a memory) perceived as salient. When a subject is exposed to a stimulus, he/she makes a cognitive evaluation of the event (appraisal), which is immediate and automatic, therefore not necessarily aware, and dependent on previous experiences. There is an overall agreement about the idea that emotional experience is not determined by the event/stimulus itself, but from the subjective meaning that individuals give to that event (Scherer et al., 2001). That is, it is not the event itself that activates the emotion, but rather the meaning and value that the subject attributes to the event through the activation of a cognitive evaluation. Cognitive evaluation influences the other components of emotional experience: the neurophysiological component involving the central nervous system and/or the endocrine system (sweating, paleness, increased heart rate); facial expressions; motivational component that implies a tendency to action, understood as a tendency to implement a behavior; actual behavior. Several theories have tried to make a classification of emotions (Woodworth, 1938; Plutchik, 1983), but currently is dominant the theory of Ekman (1992), which distinguishes between primary and secondary emotions. Ekman has shown that a) primary emotions are innate and b) the reactions of the motor component (facial expressions) are universal. This means that all individuals, regardless of their culture, have the same primary emotions, which determine the same facial expressions. These innate and simple emotions are not affected by any cultural mediation. Example of primary emotions are fear, anger, surprise, sadness, and disgust. On the other hand, secondary emotions (e.g., resignation, forgiveness, envy, shame, jealousy, nostalgia) are more complex, they are built through social learning and interaction, therefore they are strongly influenced by culture and contexts (Galli et al., 2018). Importantly, there is a number of studies which show that emotions are a powerful predictor of behaviour. They can affect behaviour either directly and indirectly, for instance, by providing feedback and stimulating retrospective appraisal, thus promoting learning and influencing future behaviour (see Baumeister et al., 2007, for a review). In addition, social psychology has shown the importance of the distinction between primary and secondary emotions as regards social behaviour (Haslam, 2006; Leyens et al., 2001). This notwithstanding, predictive models of behaviour often hold emotions in very low regard. In the current study, we explored the potential predictive role of emotions in the case of household food waste. There is a growing interest of researchers about household food waste and food consumption sustainability (Gorgitano and Sodano, 2014; Rusciano et al., 2017, 2018; Civero et al., 2018; Coppola et al., 2015; Giampietri et al., 2018; Pomarici et al., 2015; Maietta and Gorgitano, 2016; Amato et al., 2018; Gorgitano and Pirilli, 2016). A third of the global food production is lost or wasted along the entire supply chain (FAO, 2011). But, a first distinction has to be made between food losses, which is referred to the decrease of edible mass that might happen throughout the food supply chain (from production to processing stage), and food waste, which instead occur at the end of the food chain and is, therefore, related to retailer and consumers. As it is, food waste is a well-known global paradox, affecting the three pillars of sustainability (social, economic and environmental). In fact, it causes soil depletion and greenhouse gas emissions (Quested et al., 2013), it increases price inflation (FAO, 2014) and also it compromises food safety (Godfray et al., 2010). In developed countries, the largest share of waste is concentrated at the household level (Priefer et al., 2016). In particular, in the EU-28, over 170 kg of food per capita are wasted every year (Stenmarck et al., 2016), representing an annual cost of over 680 pounds per family (WRAP, 2013). In Italy, 48% of the total food waste, estimated at 6.5 million tons/year, is concentrated at household level (Segrè and Falasconi, 2011). Of course, minimising household food waste is the best option to reduce its impact upon environment, yet this is not an easy achievement because many different behaviours interact and can influence the amount of food that goes wasted, as many scholars pointed out (Quested et al., 2013). Thus far, many scholars analysed diverse pathways in order to understand how the final stages of the supply chains deal with food waste (Amato and Musella, 2017; Di Talia et al., 2019; Riverso et al., 2017; Sodano, 2016).

Previous qualitative research tried to catch key motivations in order to minimise household/consumers' food waste (Graham-Rowe et al., 2015; La Barbera et al., 2016); other studies, instead, applied the well established theoretical framework of the Theory of Planned Behaviour in order to assess the psychological drivers behind food waste (Verneau et al., 2017; La Barbera et al. 2016, Rivero et al., 2017).

Like many other topics, food waste has been investigated from a theoretical point of view which is mostly cognitive. Nonetheless, there are some indication in previous research that emotions could be very relevant as regards food waste-related intentions and behaviors. Bedford et al. (2011) suggested that guilt can be used as a motivational tool in order to promote pro-environmental behaviour, but with caution since it might lead to compensation behaviours such as denial. La Barbera and colleagues (2016) showed the important role of fear. The aim of the current work is to explore whether emotions may be fruitfully integrated into predictive models of intention to reduce household food waste.

2. MATERIALS AND METHODS

2.1. Overview of the procedure

Participants were recruited via social media advertisements and word of mouth, in particular bystanders have been invited to take part in a study "looking at people's eating habits", therefore, with no reference towards food waste. Data were collected via online questionnaires between June and July 2018. A total of 183 questionnaires were administered to a national Italian sample (127 females; $M_{AGE} = 41,65$; $SD_{AGE} = 14,30$). A complete description of the sociodemographic characteristics is provided in table 1.

Table 1. Sociodemographic characteristics of the sample

Variables	Frequency	Sample (%)
Gender		
Male	56	30,6
Female	127	69,4
Age		
18 – 34	79	43,1
35 – 54	55	30,1
+55	49	26,8
Household Members		
0 – 3 members	99	54,1
More than 3 members	84	45,9
Education		
Up to High School	71	38,8
Degree or Higher	112	61,2
Occupation		
Employed	121	66,1
Unemployed	9	4,9
Retired	13	7,1
Students	32	17,5
Houseworkers	8	4,4

Source: Authors' elaboration

2.2. Measures

In order to measure participants' emotive reaction elicited by food waste, they were asked to think about food waste for a few moments. After this task, they were asked to indicate, on a scale ranging from *not at all* [1] to *very much* [7] how much they were feeling each of the emotions listed. The list contained 13 different emotions, selected among positive, negative, primary and secondary, which were intermixed and presented in randomized order to each participant. Moreover, in order to measure participants' intention to reduce food waste, four *ad-hoc* items were used (e.g. "In general, I try not to throw away food"), asking participants to which extent they agreed with the statements, using a Likert-type scale ranging from *strongly disagree* [1] to *strongly agree* [7]. Items were, afterwards, averaged in a single score, showing a good reliability ($\alpha = .75$). In addition, at the very end of the questionnaire, interviewees were asked to indicate, on a slider bar ranging from 1 to 100, the ease with which they manage to reach the end of the month. This variable, called *wellbeing perception*, can be used as a proxy of the income ($M_{WELLBEING} = 68.8$; $SD_{WELLBEING} = 25.8$). The measures reported were part of a larger study exploring food waste behaviour.

3. RESULTS

As a first step and in order to explore the underlying emotions structure, a principal component analysis was performed. Three factors with eigenvalue > 1 were extracted, overall explaining the 61% of total variance. The Kaiser–Meyer–Olkin Measure of Sampling Adequacy was 0.840 and the Bartlett's Test of Sphericity was 908.48 ($p < 0.001$), indicating that the dataset was factorable. The rotated solution is reported in Table 2. Negative emotions, both primary and secondary, loaded on the first factor, which was indeed labeled as "*Negative Emotions*", whereas two positive emotions (Joy and Gaiety) were represented by the second factor, which was labeled "*Positive Emotions*". Resignation and Forgiveness loaded, instead, upon the third factor, which was accordingly labeled "*Indulgence*".

Table 2. Principal component analysis of the emotion items (Varimax rotation)

	Component		
	1	2	3
Anger	,803		
Disappointment	,772		
Shame	,765		
Offense	,765		
Disgust	,734		
Contempt	,714		
Sadness	,671		
Anxiety	,600		
Fear	,596		
Gaiety		,916	
Joy		,893	
Resignation			,751
Forgiveness			,733

Source: Authors' elaboration

As a further step and in order to identify different groups of people according to the set of emotions the subject attributes to food waste, a cluster analysis was performed, based on the PCA components scores. A k-means cluster analysis was used, choosing the number of groups that minimizes the ratio of variance within and between groups. The profile of each group can be derived by the centroids reported in Table 3. The aspect that mainly characterizes group 1 (only 5 respondents; 2.7% of the sample) is the high level of component 2 scores, that is emotions like Joy and Gaiety that respondents associate to food waste. Thus, this group includes people we could label as the "Opulents". That could be explained by the feeling of wealth that often is coupled to food abundance, while the positive value of the third component, Resignation and Forgiveness emotions, confirms that waste is seen as a necessary consequence of the abundance feeling. An opposite characterization can be found in group 2 that contains 79 respondents, more than 43% of the sample. They show a high positive value of component 1, or emotions such as Anger, Disappointment, Shame, Offence and so, which are the ones that food waste mainly reminds to them. Therefore, this group has been labelled as the "Fighters": they show strong emotions against the waste and the negative sign of the third component means that they don't think people should resignate to it. On the contrary, the high negative value of the component 1 identifies group 3 (55 respondents; 30% of the sample) composed by mostly "Apathetic" people: they do not associate food waste to negative emotions, and they do not really differ from the average of the sample as emotions related to components 2 and 3 are concerned. The last group (group 4) includes 44 respondents (24% of the sample): the low relevance of components 1 and 2 and the highest importance of Resignation and Forgiveness emotions draw a profile of people more lenient and with higher propensity to forgive (the Forgiving).

Table 3. Cluster analysis: centroids of the groups

Components	Group 1 "Opulents"	Group 2 "Fighters"	Group 3 "Apathetic"	Group 4 "Forgiving"
Component 1 "Negative Emotions"	0,467	0,705	-1.114	0,120
Component 2 "Positive Emotions"	4,046	-0,133	-0,190	-0,180
Component 3 "Indulgence"	0,611	-0,55	-0,324	1,355
Numbers of respondents	5	79	55	44

A synoptic picture of group characteristics is presented in Graph 1, where the box-plots represent the distribution of components by group.

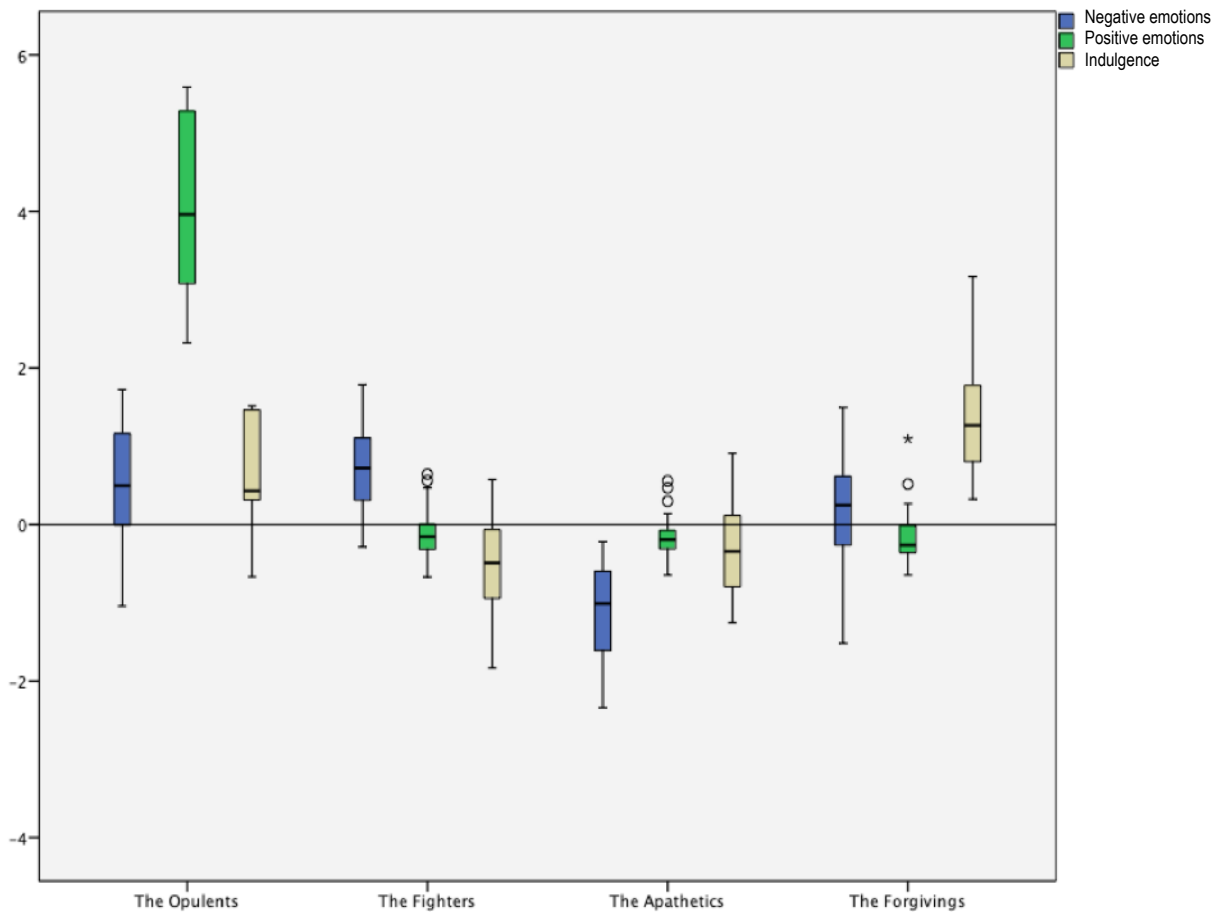


Figure 1. Distribution of components by groups

To test whether people emotions towards food waste were related to socio-demographic characteristics, we carried out ANOVAs to test the hypothesis of equal means of values across the clusters, or chi-tests to verify the hypothesis of equal frequencies, in case of continuous or discrete variables, respectively. Results show that groups are not statistically different as regard sex, age, number of family members and number of children, whereas a statistical difference has been found with reference to education ($\text{Chi}^2 = 10.22$; $p = .017$). In this last case, the frequency of degree and post degree education is the lowest in the Opulents group (20%), followed by Fighters (51%), whereas is more than 70% in the other groups. As far as income is concerned, a marginally significant difference emerged in the wellbeing perception among groups $F_{(3, 182)} = 2.51$, $p = .06$. Post-hoc test (LSD method) showed that, paradoxically, the Opulents express a level of wellbeing which is significantly lower compared to the other three groups. The potential role of emotions in the case of intention to reduce food waste has been analysed testing differences among groups. The Anova showed a significant difference between the scores on intention of the four groups, $F_{(3, 182)} = 4.65$, $p < .01$. Post-hoc test (LSD method) highlighted significant differences between Fighters on one hand, Opulents and Apathetics on other hand. In addition, a significant difference emerged between Forgivings and Opulents.

Table 4. Descriptive statistics of wellbeing and intention by group

Groups	Wellbeing Perception			Intention		
	N	Mean	SD	N	Mean	SD
The Opulents	5	38,80	30,54	5	5,60	2,05
The Fighters	79	69,01	25,88	79	6,59	0,61
The Apathetics	55	71,47	22,85	55	6,17	0,93
The Forgivings	44	68,50	27,45	44	6,35	0,71
Total	183	68,80	25,83	183	6,38	0,82

Source: Authors' elaboration

DISCUSSION AND CONCLUSIONS

In order to, at least, minimise food waste, upstream actions are required. Mixing different efforts, anti-waste behaviours can be stimulated by different actors of the food supply chain and consumers can be influenced when purchasing and using food products. Therefore, food marketers, policy makers and retailers share an important role in this task, trying to help consumers to waste less *via*, for example, communication actions aimed at specific population targets, which rely on certain factors. In the present study it

has been shown that emotions that people feel when thinking about food waste can be different, and individuals might be classified according to different emotional profiles. Four different profiles have been identified: the “Opulents”, the “Fighters”, the “Apathetic” and the “Forgiving”. From the analysis, it stands out that interviewees reacted differently when asked to think about food waste. In particular, our findings show that food waste can evoke negative emotions, as previous scholars have pointed out (Hamilton et al., 2005), and these emotions are shared by the majority of our sample, gathered in the “Fighters” group that, in addition, showed less positive emotions and indulgence when compared with the other three groups. Importantly, the four groups we identified cannot be profiled using socio-demographic characteristics. Taking into account that these different groups are associated with different intentions towards food waste, it seems that this emotional profiling analysis is of great value for designing effective anti-consumer-food-waste interventions. Even if this type of segmentation fails in segmenting market over sociodemographic characteristics, allows to isolate specific groups of consumers characterized by well defined emotional profile, could be an interesting path for research on food waste-related consumer behavior.

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