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The role of social norms and behavior on household food waste

Rocel Apolonio* and Rutcher Lacaza

Far Eastern University, Manila, Philippines.

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ABSTRACT

Studies have shown how food loss and waste occur in the various stages of the food supply chain. Among these stages, household food waste in the consumption stage has been identified as a key contributor to food waste generation. Several dimensions such as food preparation and handling; consumer behavior, environmental awareness and concern; social norms and many other variables were posited by scholars as predictors of food waste generation. There is no consensus albeit as to what among the aforementioned dimensions influences food waste at the household level and the role of consumer values and social norms has not been thoroughly explored. This research was conducted to focus on the gaps, utilized a semi-structured interview for three hundred three (303) household respondents, and adopted Partial Least Square-Structural Equation Modelling (PLS-SEM) for data measure and analysis. The findings of this research reveal that food habits such as food conservation and acceptance of expiration date-based prices and suboptimal food determine the extent of food waste generation. Materialism is found to have a direct impact on food waste behavior while an environmental concern, on the other hand, supports waste prevention and recycling behavior. Moreover, environmental concern was positively linked to descriptive and injunctive norms. To explain, households who hold strong environmental norms manifest environmental concerns such as opposing waste and wasting less.

Keywords: Food waste behavior, food waste generation, household food waste, social norms.

*Corresponding author. E-mail: rapolonio@feu.edu.ph.

INTRODUCTION

Two types of wasted food were enumerated – food loss and food waste. To differentiate, food loss occurs at any point of the food chain – from farm, fishing, processing and distribution; food waste, on the other hand, are food discarded by retailers due to suboptimality or expiration or at household or restaurants where there are meals half-eaten or uneaten.

In many developed countries, a bigger share of food is wasted by the household (FAO, 2014). Predictors with categorizations of food waste have emerged from articles and literature. In the review and analyses of this literature, food waste is treated as a multi-faceted issue such that it involves various variables and not just a single variable (Schanes et al., 2018). Food handling at the household level has been identified as an antecedent to household food waste (Diaz-Ruiz et al., 2018; Porpino et al., 2015). How consumer purchases food products were also taken into account (Stefan et al., 2013). Waste management behavior, whether an individual has a practice of reusing or recycling was also delved into (Diaz-Ruiz et al., 2018), while expiration-date-based pricing and food conditions such as suboptimality were posited to generate food waste (Theotokis et al., 2012). Consumer values such as environmental concern and materialistic behavior were also investigated to capture how these can influence food waste generation (Diaz-Ruiz et al., 2018).

These sets of predictors, albeit identified by scholars as contributors to food waste generation, there is not much extant literature that underpins the impact of behavior and values, as well as social norms, on an individual's environmental concern and related behavior, and

ultimately, the amount of food waste that is generated.

On a separate note, in the Philippines, there is not much literature on food waste, specifically, the antecedents to food waste generation considering the significant amount of food losses in the agricultural stage of the food supply chain and food waste generated in the business sector – retail and restaurants, and the household level.

However, there are extant food loss researches, notably, in the study of Mopera (2016), which reiterated that post-harvest losses account for up to 50% and the biggest contributors to these food losses are: (1) inherent nature of the produce, (2) the tropical setting of the country, (3) lack of post-harvest facilities, and (4) handling and distribution system. The Philippine Center for Postharvesting Development and Mechanization recognizes the perennial problem of food loss hence the need to address and curb the loss immediately (PhilMech, 2021).

A plate waste survey was conducted by the Food and Nutrition Research Institute in 2015. The survey measured food consumption loss per plate and data revealed that 14 grams, which is equivalent to one tablespoon of rice and were wasted among Filipino households.

Relatively, this study focuses on the factors influencing household food waste. The lack of research on the antecedents to food waste generation permitted researchers to extend the literature by investigating the relationship between behavior and food waste generation, and incorporating social norms as a predictor as posited in extant literature.

FOOD PREPARATION, HANDLING AND MANAGEMENT

In the food waste paradox of Porpino et al. (2015), the last stages of the itinerary for household food waste are associated with food disposal - food inventory/stocking, food preparation, food consumption, and lastly, food storage. This holds in the study of Diaz-Ruiz et al. (2018), who brought together food waste management variables. In their research, drivers of food waste were categorized into the following: (1) food purchase, which involves the behavior of consumers when buying food, (2) food storage, which is described by how households keep food to prolong shelf life, (3) food preparation to serving the meal, (4) food consumption and (5) lifestyle (which will be discussed in another literature subset).

Several pieces of literature have inferred that food management and preparation influence the amount of food waste. A recent study by Bravi et al. (2019), revealed that a significant amount of waste in the consumption behavior of millennials resulted from food products that are opened and went unfinished or unconsumed. Moreover, not knowing how to manage purchased food among the young generation contributed significantly to food waste generation. Katajajuuri et al. (2014) posited that spoilage, leftovers, and food overpreparation as the main drivers of food disposal.

Similarly, findings in the study of Apolonio (2020) revealed that food habits, such as food conservation and treatment of food or produce conditions are important considerations in determining the extent of food waste generation. Knowledge on food preservation particularly influences food waste amount generation, albeit moderated by age since the older age group, expectedly, are more conscious and/or knowledgeable about methods and ways to conserve food.

As regards visual consumption which is also a popular variable in research, the use of large dinnerware in meal preparations inside the household resulted in a bigger quantity of food served, which ultimately resulted in more food wasted. As mentioned by Wansink and van Ittersum (2013), such visual consumption practices taking into account the size of dinnerware impact the quantity of food being served and later on wasted.

In 2018, Stangherlin and de Barcellos in “Drivers and Barriers to Food Waste Reduction” mentioned that consumer behavior is what significantly influences food waste generation. Some behavioral variables are challenging to alter or change, but some are flexible and easier to modify such as shopping or purchasing behavior and food handling or management if efforts to transform into an “anti-wastage” behavior will involve retailers’ engagement and awareness campaign of food waste issue are implemented.

PURCHASING BEHAVIOR AND EXTRINSIC CUES

A survey among consumers in Romania was conducted to investigate intentions to prevent food waste. Constructs such as planning and shopping behavior, awareness of food waste, and perceived behavioral control on self-reported food waste were measured. Findings of the study revealed that planning and shopping behavior are controlled by moral attitudes and perceived behavioral control over food waste. In the same vein, Stefan et al. (2013) identified some important predictors of consumer food waste. These are consumers’ planning and shopping behavior.

Over-shopping or excessing purchasing is another variable presented in many studies. Porpino et al. (2015) found a relationship between over-purchasing and food waste, specifically among the low-income class respondents. On the other hand, Diaz-Ruiz et al. (2018) determined antecedents to food waste generation – (1) purchasing discipline which was explained as buying only what is needed or making a shopping list, (2) price importance, as well as, (3) dietary importance. The desire to consume only the freshest and best quality food diminishes the acceptance of suboptimal food, thus,

contributing to food waste (Neff et al., 2015).

On a separate note, a major part of the farm-to-fork value chain that contributes to food waste can be attributed to low acceptance of visually optimal products, either in buying or consumption. In the study of Stancu and Lähteenmäki (2022), an individual's behavior like getting easily disgusted by food cues such as past best before dates, food discoloration, deformed shape, etc. relates to food disposal. Food waste can be reduced if there is a willingness to purchase, accept, or consume food that is suboptimal (Rohm et al., 2017). Stancu and Lähteenmäki (2022) posited that motivation to reduce food waste and a lower likelihood of throwing away food past the best-before date or near expiration date are associated with consumer frugality. But information related to best-before labels or expiration dates should be oriented or disseminated to consumers. Although they reflected positive responses or attitudes toward food waste reduction or prevention, approximately 40% misunderstood the meaning of best before date including expiration dates (Abeliotis et al., 2014).

To define further, expiration-date-based pricing or EDBP occurs when a seller drops the price of perishable food products according to their shelf life. Discounts and price drop because of near expiration date incur bigger demand for goods or commodities resulting in excessive purchases by consumers. Perceived brand quality of EDBP goods, however, led to poor or negative evaluations of the goods according to Theotokis et al. (2012).

Another variable augmented research on food waste. An exploratory study by Williams et al. (2012) suggested packaging components relative to food waste: (1) large-sized and difficult-to-empty packages; (2) passed "best before date." Findings of their study reveal that around 25% of food waste was brought by big-sized packaging and best-before date label such. Some participants, however, were more conscious of food packaging and these are individuals with high environmental consciousness. They waste less food and recognize its role in food waste reduction (Williams et al., 2012).

Preference for large packages when purchasing or bulk-buying for economic reasons makes household members overprepare. Overpreparation then leads to unfinished and unconsumed food, which consequently ends in the garbage bin (Porpino et al., 2015). The authors posited that unconsumed foods were generally due to over-purchase, overstocking, and EDBP buying.

ENVIRONMENTAL BEHAVIOR

In the approach to discern and understand food waste antecedents, Diaz-Ruiz et al. (2018), investigated the impact of environmental and materialism values on food waste. The research findings suggested that waste prevention behavior and materialism values are food waste predictors. High commitment to the prevention of food waste is associated with reduced food waste generation. On another note, greater materialistic values which are manifested by buying more than what is needed or not having a disciplined or controlled purchasing behavior are associated with a greater amount of food waste generated. These findings were also supported by the study of Melbye et al. (2017) which posited that individuals with high environmental concerns are averse to throwing away food. Interestingly, Graham-Rowe et al. (2014) delineated two motivations that influence food waste reduction – waste concerns, and living with principles such as "do the right thing" or it is bad to waste food." "Doing the right thing," was identified as a motivation for reducing household food waste (Graham-Rowe et al., 2014), by many food purchasers for a variety of reasons.

One motivation for food waste reduction leans toward financial concerns - the natural tendency of correlating wasted money to wasted food. Wasted money brought by wasted food leads to a "guilt-feeling". Neff et al. (2015) in their study presented the effect of saving money as well as enculturating children on food waste reduction by setting examples.

Moreover, Graham-Rowe et al. (2014) delineated barriers to food waste reduction - the "good provider" identity, lack of priority, and exemption from responsibility. In the article, "lack of priority" signified a lack of concern and engagement with food waste problems or issues and not giving much consideration to food waste issues. The food waste issues were not seen as a serious predicament. According to those with a "lack of priority," there are bigger issues in society that call and need attention.

Another barrier to food waste reduction mentioned in their research was the "exemption from responsibility." Consumers' perception and belief are that food waste issues should be the responsibility of the retailers, supermarkets, or food and FMCG industries which are in a better position to control, and manage on a macro scale.

Neff et al. (2015) argued that concerns about the environmental impacts of food waste are considered a minor motive in food waste reduction. Although consumers are somewhat aware of environmental issues such as global warming due to the perennial issues of exploitation of resources, environmental concern as a variable, falls behind other factors as regards intention to reduce food waste (Tucker and Farrelly, 2016; Graham-Rowe et al., 2014; Quested et al., 2013; Stefan et al., 2013).

SOCIAL NORMS

In the household food waste research of Schanes et al. (2018), food waste was perceived to be an accepted

social norm.

To define, a social norm is the accepted behavior that a person is expected to conform to or follow in a specific community or group. The kinds of social group norms include descriptive and injunctive. Cialdini et al. (1990) defined descriptive norms as norms based on one's perception of the behavior of the people around him/her, whereas injunctive norms are referred to as moral norms since behavior is governed by the moral values of a person.

Various research on the role of social norms on intention and action to reduce food waste have emerged and appealed to many scholars. Personal or injunctive norms turn out to be a significant and direct predictor of food waste generation. This implies that if individuals hold strong personal norms that go against food waste, they are inclined to waste less (Visschers et al., 2016). In this context, descriptive norms which describe an individual's perception of whether the social surroundings avoid certain food waste behaviours are not a significant predictor (Graham-Rowe et al., 2014).

Injunctive norms inform social rules (Lapinski and Rimal, 2005) and to gain the approval of individuals, they abide by them (Melnyk et al., 2013). Behavior from these norms can represent an action to conform positively to meet others' expectations (Deutsch and Gerard, 1955).

As mentioned by Melnyk et al. (2013), injunctive norms have a bigger effect on attitudes, whereas descriptive norms have a bigger effect on behavior. Rimal and Real (2005) posited that injunctive norms and descriptive norms operate independently from each other. Individuals, though, tend to deny the influence of normative influences. In a survey, consumers rated descriptive norms as the least influencing factor on their behaviour. However, a field experiment showed in the same study that descriptive norms had the strongest effect on consumers' behaviour toward energy conservation (Nolan et al., 2008). This effect suggests that social norms influence behaviour unconsciously (Göckeritz et al., 2010).

RESEARCH METHODOLOGY

Food handling and management, purchasing behavior, external cues, consumer values, environmental behavior, and social norms are the observable phenomena in this research. The aforementioned variables were reduced to the simplest operational elements which provided data that lent itself to statistical analysis and inferences. The researcher adopted a descriptive-correlational type of research design and random probability sampling. Three hundred three (303) households were taken as respondents in the study and the representative for each household is the principal purchaser, meaning, the member involved in buying food and grocers as well as involved in meal preparations. The method for data collection was structured by espousing a quantitative measurement technique (Saunders et al., 2009).

A seven-point Likert scale was indicated for each question in the survey form for respondents' assessment, evaluation, and measurement of answers. The questions were segmented into dimensions: the amount and frequency of food waste, the measurement scales for food waste behavior, and indicators for social norms that influence food waste generation.

Internal consistency reliability was measured through pretesting. The pilot testing involved thirty (30) participants. Cronbach alpha showed that latent variables' values were above 0.7 which is an indication of good internal consistency reliability.

For external population validity, a significant number of the sample was extrapolated from the population of a household community. This community in Quezon City District of the National Capital Region is comprised of households belonging to socio-economic income classes A, B and C. Verbal and written consent was sought before conducting the research investigation.

Marcoulides and Saunders (2006) recommended and presented guidelines such as the minimum quantity in generating sample size. Partial Least Square – Structural Equation Modelling (PLS-SEM) was espoused to explain and draw inferences.

The guideline created by Marcoulides and Saunders (2006) presented sample sizes that are dependent on the maximum number of arrows pointing at the latent variables.

RESULTS AND ANALYSIS

Tables 1 to 3 show the path coefficients of all hypotheses and their t-values with the associated p-value. Based on the results, there is a significant and negative association between food conservation and food waste generation (path.coeff. = -0.121, t-value = -1.821), and a significant and positive association between food condition and food waste (path.coeff. = 0.218, t-value = 3.508) at 10% and 5% level of significance, respectively. Food waste has a positive association with materialistic values, descriptive norms, injunctive norms, avoidance of leftovers, spoilage, visual inspection, prices, and packaging, although the results are not statistically significant at a 5% level of significance. With regards to other model paths, there is significant and positive association between environmental concern and recycling behavior (path.coeff. = 0.217, t-value = 3.856) and between environmental concern and prevention behavior (path.coeff. = 0.225, t-value = 4.007) at 5% level of significance. Lastly, environmental concern was significantly and positively linked with both types of social norms, the descriptive norms (path coeff. = 0.453, t-value = 6.979) and the injunctive norms (path.coeff. = 0.337, t-value = 5.248).

Table 1. Mean and SD of responses on food handling, purchasing behavior, external cues, the freshness of food, environmental concern, and descriptive and injunctive norms based on a 7-point Likert scale.

	Mean	SD	*Distribution within 7-point Likert Scale (%)*		
			1 – 3	4	5 – 7
Overpreparation					
I prepare food in large servings to have remainder for the next meal.	4.07	1.82	29.37	29.37	41.25
I like to prepare food in large servings to save time.	4.04	1.83	32.34	25.08	42.57
I prepare food in large servings to have sufficient or more than enough food for my family.	4.06	1.99	34.32	20.79	44.88
I prepare food in large servings because it makes me feel I'm a good provider.	3.17	1.97	56.10	16.17	27.72
Mean Response	*3.83*	*1.90*			
Avoidance of leftover					
If there is leftover after a meal, I store it in the fridge.	5.50	1.77	13.20	10.23	76.56
If there is leftover, I just leave it in the fridge because the food might have lost its freshness.	3.63	2.05	47.52	15.84	36.63
If leftover is served, I usually ignore it and prefer the newly cooked dish.	2.97	1.90	61.38	17.16	21.45
Mean Response	*4.03*	*1.91*			
Inappropriate food conservation					
I have adequate knowledge/experience in food storage.	5.04	1.60	15.84	19.47	64.68
I store leftovers properly in the fridge.	5.64	1.42	7.62	12.58	79.80
I know how to preserve and recook leftovers.	5.43	1.51	11.55	13.86	74.58
Mean Response	*5.37*	*1.51*			
Spoilage					
I discard food because they easily get spoiled or molded	3.56	1.83	48.51	20.79	30.69
I put the leftover in the fridge and are left to spoil after some time.	3.27	1.85	51.48	23.10	25.41
Mean Response	*3.42*	*1.84*			
Visual consumption					
I use large pots and pans when cooking.	4.10	1.77	32.34	27.39	40.26
I use large dinnerware when preparing and serving meal.	3.79	1.74	37.95	30.03	32.01
I use large plates for household members when eating.	3.88	1.91	40.92	20.46	38.61
Mean Response	*3.93*	*1.80*			
Purchasing behavior					
I usually buy only the things I need.	5.32	1.64	15.51	15.84	68.64
I have a shopping list of what I need when I go shopping.	5.21	1.80	17.16	15.18	67.65
I stick to my shopping list even if there are promotional activities offered.	4.47	1.86	30.36	17.16	52.47
Mean Response	*5.00*	*1.77*			

Table 1. Continues.

Price					
It is important to me that the food I consume is cheap.	4.07	1.66	33.00	28.05	38.94
When I see the "buy one, take one" promotion, I end up buying even if the product is available at home.	3.87	1.83	38.61	23.43	37.95
Mean Response	*3.97*	*1.75*			
EDBP					
When food is near the expiration date, I throw the food away.	3.13	2.01	62.04	10.23	27.72
When food is beyond the best-before date, I throw it away.	4.09	2.17	41.58	14.52	43.89
Mean Response	*3.61*	*2.09*			
Suboptimal					
When the food has discolored, I throw it away.	5.35	1.85	16.83	13.53	69.63
When the food has an odd shape or is deformed, I throw it away.	4.14	2.06	38.74	17.22	44.04
I buy suboptimal food at a discount.	3.00	1.88	58.74	18.81	22.44
Mean Response	*4.16*	*1.93*			
Package					
I buy food in large packages.	3.89	1.65	32.67	35.97	31.35
My food in the large package is difficult to empty.	3.49	1.70	50.82	24.09	25.08
Mean Response	*3.69*	*1.67*			
Recycling behavior					
I recycle glass	5.02	1.77	17.49	19.80	62.70
I recycle paper	4.79	1.82	21.52	22.19	56.30
I recycle packaging	4.73	1.83	20.86	22.85	56.29
I recycle organic waste	4.16	1.94	33.77	21.52	44.71
Mean Response	*4.67*	*1.84*			
Prevention behavior					
I use my bag when shopping, rather than what is provided by or sold in the shop	4.81	1.82	21.12	20.79	58.08
I buy products that can be used again, rather than disposable items	5.22	1.50	11.22	19.47	69.30
I try to repair/fix things before buying new items	5.34	1.46	9.60	21.85	68.54
I reuse paper	4.88	1.76	18.87	21.52	59.61
Mean Response	*5.06*	*1.63*			

Table 2. Mean and SD of responses on materialism, environmental concern, and social norms based on a 7-point Likert scale.

	Mean	SD	Distribution within 7-point Likert Scale (%)		
			1 – 3	4	5 – 7
Materialistic values					
My life would be better if I owned things, I don't have.	4.10	1.55	31.02	23.10	45.87
I would be happier if I could afford to buy more things	3.97	1.55	35.31	24.75	39.93
I admire people who have expensive homes, cars and clothes	4.15	1.54	29.04	25.41	45.54
Some of the most important achievements in life include acquiring possessions	4.20	1.46	29.04	23.10	47.85
Mean Response	*4.11*	*1.52*			
Environmental concern					
The so-called ecological crisis facing humankind has been exaggerated.	4.20	1.28	29.04	22.77	48.18
If detrimental things continue on their present course, we will soon experience a major ecological catastrophe	5.04	1.20	7.59	17.82	74.58
I consider food waste a serious and crucial problem.	5.37	1.23	7.59	8.91	83.49
Mean Response	*4.87*	*1.24*			
Descriptive norms					
A lot of people do not mind throwing away food in the garbage bin.	5.44	1.07	14.52	43.56	41.91
During celebrations, I see people not consuming/finishing their food.	5.45	1.18	4.29	10.23	85.47
People sort their garbage and dispose of them properly.	4.74	1.37	16.17	20.46	63.36
Documentaries are showing how much food is wasted from harvest.	5.23	1.03	3.63	14.85	81.51
Documentaries are showing the number of people who are hungry, and people getting food from the garbage.	5.35	1.10	3.96	13.53	82.50
Mean Response	*5.24*	*1.15*			
Injunctive norms					
I buy suboptimal food because I am aware of the food waste issue.	5.03	1.16	7.59	20.13	72.27
I do not have leftovers after a meal because this is what my family taught me.	5.23	1.13	5.28	17.16	77.55
I do not throw away food because it is the right thing to do.	5.38	1.05	2.97	13.20	83.82
I must take steps to prevent food waste because there is a lot of food waste.	5.50	0.98	1.65	9.90	88.44
I believe it is critical to prevent wasting food when there are so many hungry people in the world.	5.53	1.11	3.30	8.25	88.44
It is shocking to see how much food people are wasting.	5.63	1.12	3.30	6.27	90.42
Mean Response	*5.38*	*1.09*			

Table 3. Relationship between behavioral variables and food waste generation.

Hypotheses	Path	Path coefficient	t-value	p-value
H1	MAT->FW	0.021	0.335	0.738
H2	DN->FW	0.039	0.375	0.708
H3	IN->FW	0.077	0.763	0.446
H4	ENV->FW	-0.004	-0.044	0.965
H5	OPRE->FW	-0.008	-0.132	0.895
H6	AVOID->FW	0.020	0.274	0.784
H7	FP->FW	-0.121	-1.821	0.070*
H8	SPOIL->FW	0.071	1.060	0.290
H9	VIS->FW	0.023	0.332	0.740
H10	PUR->FW	-0.105	-1.582	0.115
H11	PRICE->FW	0.100	1.596	0.112
H12	FRESH->FW	0.218	3.508	0.001*
H13	PACK->FW	0.010	0.152	0.879
H14	REC->FW	-0.022	-0.339	0.735
H15	PREV->FW	-0.048	-0.697	0.487
H16	MAT->ENV	0.038	0.998	0.319
H17	DN->ENV	0.453	6.979	0.000*
H18	IN->ENV	0.337	5.248	0.000*
H19	ENV->REC	0.217	3.856	0.000*
H20	ENV->PREV	0.225	4.007	0.000*

* *p*-value = 0.05.

CONCLUSIONS AND RECOMMENDATIONS

Food waste can be prevented through food conservation and acceptance of suboptimal food conditions as well as expiration date-based priced food. Another predictor is materialism, which is found to have a direct impact on food waste behavior since greater materialistic values result in a higher amount of food waste. Environmental concerns, on the other hand, support waste prevention and recycling behavior, such that households who have environmental values are more inclined to recycle and reduce waste. Moreover, environmental concern was significantly and positively linked with both types of social norms, the descriptive norms and the injunctive norms. To explain, households who hold strong environmental norms manifest environmental concerns such as opposing waste and wasting less.

In view of the foregoing, the following are recommended: the retail sector should create awareness campaigns and policies that lean toward responsible consumerism. The retail sector can create promotional discounts on perishable products but reminder advertising to cut back on food waste can be implemented in the acceptance of sub-optimal food and expiration date-based priced products. On another note, institutions such as schools, communities, and the business sectors should communicate to their sphere that the food waste predicament is a critical environmental issue as this turns out to be indirectly associated with environmental issues. Residential communities can promote food security by means of food conservation and management.

This research extends the study of Apolonio (2020) on the behavioral and demographic antecedents to household food waste by including social norms, specifically, the impact of descriptive and injunctive norms on household food waste generation. Therefore, future researchers can augment this study by increasing the number of respondents through a culture-wide coverage in data-gathering.

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