Factors Influencing Behavior to Reducing Household Food Waste in Indonesia

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Abstract

The introduction of the determining factor is presumed to be powerful medium to promote a powerful intrusion into household waste management in Indonesia. This study expands the variables theory of planned behavior, the theory of interpersonal characteristics, and a complete model of environmental behavior by using intentions, attitudes, subjective norms, perceived behavioral control, habits, emotions. The sample in this study found 132 people, data processed using SEM Amos version 24. Statistical results and discussion showed that significant factors for behavior to reduce food waste were intentions, habits, attitudes, and perceived behavioral control. And that habits play an essential role in this research, so it is necessary to focus on the importance of the practice to get rid of addictions and be worth emphasizing.

Keywords: food waste, theory of planned behavior, habits

1.   INTRODUCTION

An alarming amount of food is wasted every year: an estimated one-third of the food consumed and produced for human use (Graham-Rowe et al., 2014; Göbel et al., 2015). For society, food waste is a substantial financial burden. There are environmental and resource costs and emissions associated with food production and waste that should be considered. When waste is created by individuals, a new problem arises.

Food waste a big issue that has been around for a long time and is now a serious matter for all people to pay attention to. The impacts that affect various sectors include Indonesia's economy, environment, and society. Economically it is detrimental, a lot of food is wasted if it is calculated, it can reach 4-5 percent of Indonesia's GDP. And what is wasted if it equivalent to feeding 61 million to 125 million people. When viewed from the environmental sector, the emission of

Greenhouse Gases (GHG), the wasted food produces 1.73 gigatonnes of CO_2 in accumulation or an average of 7 percent of Indonesia's total GHG emotions in a year (Noorca, 2021)

As a result of a vast number of research, several studies have explored the factors that impact consumer food waste behavior (Visschers et al., 2016). More attention has been paid to consumer food waste behavior than to the overall impact of our food system on our planet. More study is needed, in our opinion, to fully understand the factors that influence food waste behavior. Thanks to this study, initiatives to minimize household food waste will have a stronger foundation in the coming years.

There is now just one form of study available on food waste; qualitative studies (Evans, 2011; Quested et al. 2013; Graham-Rowe et al. 2014). This research has revealed that consumer perceptions of food waste play a significant effect in consumers' food waste behavior, notwithstanding the limitations of these investigations. In further research, it has been found that food waste behavior is greatly impacted by perceived norms, attitudes, and control over one's actions (Visschers et al. 2016). There is still more work to be done, even if each of these research has been advanced to the next level. It is because of this lack of attention on the cognitive components of food waste, prior study has been deficient. According to environmental behavior research, non-cognitive elements like habits and emotions have an important impact in human behavior and decision-making. There have been just a few of quantitative research looking at what elements are directly linked to food waste behavior, and current evaluations have not found any studies that address that issue (Hebrok and Boks, 2017).

This study will provide findings that examine the cognitive and affective determinants of consumer food waste behavior by utilizing the theory of planned behavior, interpersonal theory, and a comprehensive model of environmental behavior using a conceptual model of food waste behavior based on three theories (Cohen, 1968; Ajzen, 1991; Klöckner, 2013). It was possible to model and identify the role of sentiment or emotion as a stimulant for subsequent residual behavior as a result of our prior work (Weiss and Beal, 2005; Bamberg and Möser, 2007).

2. LITERATURE REVIEW

In order to better understand the causes of food waste, we created a comprehensive model that integrates a variety of theoretical approaches. Our findings confirm the hypothesis of planned behavior (Ajzen, 1991), which is based on interpersonal interaction (Russell et al., 2017). An environmental behavior model (Klöckner, 2013) is also used in this investigation. As shown in Figure 1, this is our ideal research model from which we build our hypothesis.
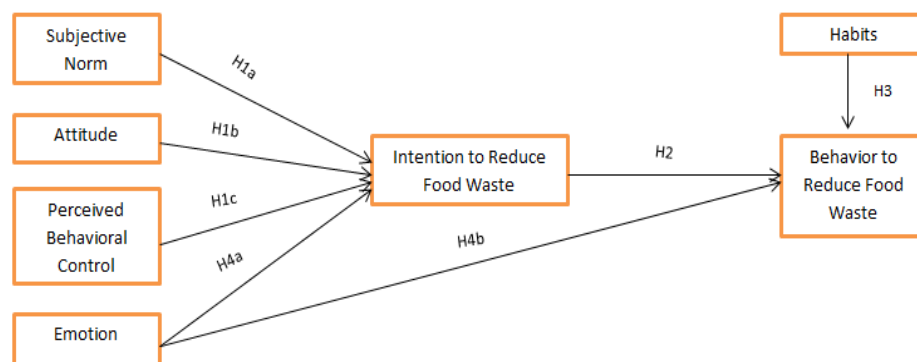
Figure 1.Research Model

Source: Russell *et al.* (2017)

2.1. Theory of Planned Behavior

Several studies built a conceptual model for a behavior towards food waste which was developed from the TPB model by Ajzen (Mondéjar-Jiménez et al., 2016; Russell et al., 2017; Aktas et al., 2018; Janssens Kim, Wim Lambrechts, Annet van Osch, 2019). The TPB model has been widely used in various cases to analyze behavior. TPB has proven to claims to related to the environment, including household behavior towards recycling and waste prevention behavior (Steg and Vlek, 2009; Bortoleto et al., 2012). Behavior towards food waste (Mondéjar-Jiménez et al., 2016; Russell et al., 2017; Abdelradi, 2018; Aktas et al., 2018; Fami et al., 2019; Janssens et al., 2019). Ajzen (1991) explains the TPB model can apply to various models of behavior and situations, but the results may vary. Figure 1 shows the conceptual model of the TPB.

Wide variety of attitudes (attitude toward conduct), subjective standards, and perceived behavioral control may be used to accurately and precisely anticipate a wide range of behaviors with high behavioral accuracy and precision (Ajzen, 1991). Actions, subjective criteria, and behavioral control perceptions can all be utilized to predict household food waste reduction intentions (Graham-Rowe et al., 2015). A person's attitude relates to how they feel about situation, whether it's positive or negative. The term "subjective norms: is used to describe social elements such as perceived social pressure to do or refrain from performing a behavior (Ajzen, 1991). "Thoughts" about "what the individual should do" that originate from others who are significant to a person take on new significance when they become a critical component of normative subjectivity. "What has been done" is a descriptive standard, whereas: what ought to be done" is an idealistic one. These two motivational sources have been separated since they are unique (Deutsch and Gerard, 1955). Finally, the perception of behavioral control relates to the perceived difficulty or difficulty in carrying out an activity and is impacted by prior experiences as well as obstructions and hurdles that are violated. The following is based on (Ajzen, 1991). A person's motivation to engage in a certain activity is influenced by their subjective views and standards, as well as how much control they believe they have over their actions.

H1a: Attitude has a significant effect on the intention to reduce food waste.
H1b: Subjective norms has a significant effect on the intention to reduce food waste
H1c: Perceived behavior control has a significant effect to reduce food waste

Intention to influence behavior produces motivation and individual effort to influence particular behavior (Ajzen, 1991). Botetzagias et al. (2015) argues that individuals behave pro to environment when they have the intention to do so. The choice to reduce, reuse and recycle food waste increase participation in food waste management. Therefore, the hypothesis in this study is

H2: Intention to reduce food waste has a significant effect on behavior to reduce food waste

2.2. Habits

Shopping habits, including planning what they need to buy in the household, are crucial factors that will affect food waste in their families because people who make small amounts of food have affective food management tactics. The habit of making good shopping plans and, of course, not buying excessive food Visschers et al. (2016) means that good household habits can encourage the behavior to reduce food waste.

H3: Habits has a significant effect on behavior to reduce food waste

2.3. Emotion

Emotions are essential in decision making and their ability to drive behavior (Weiss and Beal, 2005; Graham-Rowe et al., 2014). Emotions are responses to objects or events and include feelings and cognitive components (Lerner and Keltner, 2000). In addition, another definition of emotion is in two directions, namely positive or negative (Forgas, 1994).

Other studies have illustrated that emotions influence conservation decisions (Vining and Ebreo, 2002). Bamberg and Möser (2007) the importance of guilt as a motivating factor for behavior to do something and positive predictors of moral norms are part of guilt, namely behavior. Responsibility generally has a positive effect on pro-environmental behavior (Grob, 1995).

There is evidence that positive emotions also affect pro-environmental behavior (Webb et al., 2013), positive emotions that avoid positively influence intentions and behavior Bissing-Olson et al. (2016) results from emotions drive future choices and behavior

H4a: Emotions have a significant effect on the intention to reduce food waste
H4b: Emotions have a significant effect on behavior to reduce food waste

3. METHODOLOGY

Data collection methods include observation techniques to make direct observations of the research object, distributing questionnaires using a google form, and conducting interviews. The population in this study were household consumers who had shopped for food aged 10 and over. SEM analysis requires a sample of at least five times the number of parameter variables to be analyzed. The number of pieces in this study is six times the number parameter variables, so

the sample calculation is 22 x 6 – 132 people. The sampling technique used is convenience sampling consisting of willing and easy for the researcher to fill out the questionnaire (Ferdinand, 2014). Questionnaires distribute in Indonesia from November 2021 to January 2021. The analytical was SEM AMOS version 24.

4. RESULT AND DISCUSSION
4.1. Characteristics of Respondent

Respondent profile based on gender, age, last education level, and occupation.

Table 1. Characteristics of Respondent

Descprition	Quantity	Presentage
Gender		
Female	85	64,4%
Male	47	35,6%
Age		
21-30	65	49,2%
31-40	11	8,4%
41-50	50	37,9,%
>50	6	4,5%
Last Education Level		
High School	46	34,8%
D3	7	5,3%
S1	61	46,3%
S2/S3	13	9,8%
Others	5	3,8%
Occupation		
Student	17	12,(%
Entrepreneur	12	9,1%
Housewife	12	9,1%
Government employees	44	33,3%
Private employees	24	18,2%
Others	23	17,4%

Source: data processed by researchers

Characteristics of respondents by gender consisted of 64,4% female and 35,6% male; for the age dominated by the age of 21-30 years by 49,2%, and followed by the age of 41-50 years by 37,9%; there are 46,3% undergraduate degree respondents and 33,3% jobs as government employees.

4.2. Validity and Reliability

At the stage will test the indicator whether the indicator can explain the latent variable, which is carried out through validity and reliability tests as shown in table 2 below:

Table 2. Result Validity and Reliability

Variable	Factor Loading	AVE	CR
Attitude			
ATT1	0,691		
ATT2	0,637	0,392	0,676
ATT3	0,820		
ATT4	0,103		
Subjective Norm			
SN1	0,666		
SN2	0,678	0,515	0,760
SN3	0,802		

Variable	Factor Loading	AVE	CR
Perceived Behavioral Control			
PBC1	0,773		
PBC2	0,724	0,517	0,762
PBC3	0,656		
Emotion			
EM1	0,695	0,636	0,838
EM2	0,793		
EM3	0,892		
Habits			
HB1	0,623	0,514	0,758
HB2	0,835		
HB3	0,676		
Intention to Reduce Food Waste			
INT1	0,756	0,501	0,750
INT2	0,652		
INT3	0,711		
Behavior to Reduce Food Waste			
BHV1	0,750	0,519	0,764
BHV2	0,727		
BHV3	0,683		

Source: data processed by researchers

The indicator in this study there is one indicator that is not valid, namely ATT4 with a value of 0,103 that does not comply with the provisions of factor loading > 0,5 so that the ATT4 indicator remove to produce CR 0,762 and AVE 0,519 according to the criteria, namely AVE 0,5 and CR 0,7(Hair *et al.*, 2012). On the other hand, it is by existing regulations.

4.3. Goodness of Fit

This section demonstrates the fit between the research model and the sample and population. The following shows the results of the goodness of fit that process using SEM AMOS version 24.

Table 3. Goodness of Fit

	Criteria	Result	Conclusion
Cmin/df	≤ 5	2,765	Good fit
RMSEA	≤ 0,08	0,116	Poor fit
CFI	≥ 0,90	0,886	Marginal Fit
TLI	>0,90	0,836	Marginal Fit

Source: data processed by researchers

Table 3 illustrates that the goodness of fit benchmarks, including RMSEA, CMIN/df, CFI, TLI determine one measure with the standards of poor fit, marginal fit, and good fit. Sarstedt et al. (2017) if one size fits, the model is declared fit. The model in this study was declared fit.

4.4. Structural Model

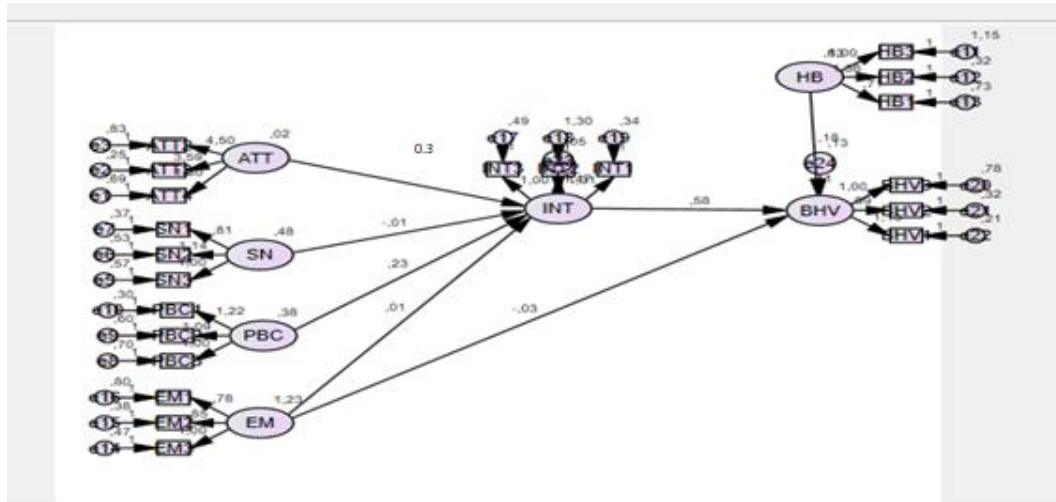At this stage, we will look at causal relationships between latent variables. As shown in Figure 2 below:

Figure 2. Structural Model

The structural model in Figure 2 shows the hypothetical relationship of the recommended research model to produce a Chi-square value of 503.181; dof 182 and a probability of 0.000.

Tabel 4. Summary of Hypothesis Testing

Hypothesis	Estimate	P	
INT <--- ATT	0,395	0,012	Accepted
INT <--- SN	-0,014	0,856	Rejected
INT <--- PBC	0,227	0,015	Accepted
INT <--- EM	0,07	0,886	Rejected
BHV <--- EM	-0,32	0,474	Rejected
BHV <--- HB	0,179	0,012	Accepted
BHV <--- INT	0,576	0,000	Accepted

Source: data processed by researchers

4.4.1. Effect of Attitude on Intention to Reduce Food Waste

The results show that attitude positively influences the intention to reduce food waste. This result is in line with research (Ariyani and Ririh, 2020) which concludes that the two variables go hand in hand when consumers have a positive attitude towards reducing food waste. Perspectives that emerge in this study indicate of positive things such as feeling guilty when throwing away food. They believe that reducing food waste will save money, and reducing food waste is their responsibility, the dominance of the respondent's characteristics in terms of employment. These, namely civil servants, are accustomed to clear rules at work to apply them in their household environment.

4.4.2. Effect Subjective Norm on Intention to Reduce Food Waste

Based on results of this study, found that the subjective norm did not affect the intention to reduce food waste. The majority in this study is 21-30 years old. They are part of the millennial generation, and they do not care about the people around them. They are busy with things that please them. Environmental influences do not affect their attitudes towards behavior, such as reducing food waste. This result

contrasts the research made by Russell et al. (2017), where people's expectations regarding behavior will affect their intention to do something.

4.4.3. Effect Perceived Behavioral Control on Intention to Reduce Food Waste

The findings revealed that perceived behavioral control had a substantial impact on food waste reduction. This is in accordance with the research conducted by Botetzagias et al. (2015). In this survey, the majority of customers hold a bachelor's degree. This indicates that the vast majority of these customers are environmentally aware. They understand the importance of reducing food waste. It is not difficult to reduce food waste at home; there is a sense of security in preparing food from leftovers, and the environment encourages people to digest food more efficiently. They also have a thorough understanding of food waste and are familiar with information-gathering activities connected to food waste, particularly those from generations Y and Z who are accustomed to using technology. This is what motivates them to decrease food waste.

4.4.4. Effect Intention on Behavior to Reduce Food Waste

The intention to influence behavior to reduce food waste is in line with research (Ajzen, 1991; Russell et al. 2017; Ariyani and Ririh, 2020). When respondents have a positive attitude towards something, they will intend to reduce food waste. In this study dominated by women, they understand the household's needs very well, so can estimate the demand for food in the house. If there is excess food, the steps to be taken are to save by re-cooking the food or processing leftover food into new food.

4.4.5. Habits on Intention to Reduce Food Waste

Habit has a positive effect on the intention to reduce food waste, and this is line with the research of Visschers et al. (2016); the reason for this findings is because before preparing food, consumers will consider exactly how much to qualify, they arrange food to see all expired products. Of course, female consumers are accustomed to writing a shopping list before they shop; this drives them. To reduce food waste, consumers believe that everything they do brings benefits to the environment and themselves.

4.4.6. Emotion on Intention and behavior to Reduce Food Waste

Based on the results of research that emotion does not affect intentions and behavior to reduce food waste, this is, of course, contrary to (Weiss and Beal, 2005; Webb et al., 2013; Graham-Rowe et al. 2014; Bissing-Olson, Fielding and Iyer, 2016). Emotions are not an essential factor for generation Y in making decisions and driving behavior. According to them, generation Y tends to do things because of the principle of truth, not because of emotional factors; they feel guilty if they don't do something. The intention and behavior to reduce food waste are not due to emotions but other factors. It could be because of concern for oneself or selfishness; the consideration is that as long as family does not make a problem and does not limit the purchase of food in large quantities, it will continue to be maintained. Of course, guilt and responsibility are not the foundation for Generation Y.

5. CONCLUSION

This study has described that attitudes, perceived behavioral control, habits, and intentions to reduce food waste influence behavior to reduce food waste. Our results focus on the importance of practices for wasting habits and being worthy of emphasis. The results of this study ate consequential for future researchers and practitioners to create absolute new patterns. The activity of reducing food is a significant and significant confrontation as we advance. This study provides knowledge about critical factors to reduce food waste in the household. Elements that did not influence behavior to reduce food waste in this study were subjective norms and emotions.

The results of our study present implications for theorists and practitioners; the focus is on the importance of habits, attitudes, perceived behavioral control, and intention to reduce food waste in describing behavior to reduce food waste. The matter of habit and perceived behavioral control over the conduct of leftovers suggests that targeting habits can be a valuable avenue for instructional strategies. Placing instructions on the packaging can reduce wasting food waste in the short and long term is education on how to plan and store food but focus on paying attention to expiration dates. To increase education and public awareness about the importance of managing household waste through social activities and educational programs and reducing and even reducing food waste.

Theoretically, the vital role of this research is to examine and analyze the relationship between habits, emotions, and cognitive determinants of behavior that are most often studied (attitudes, subjective norms, perceived behavioral control) on the intention to reduce food waste. And its implications for behavior to reduce food waste. The results show that food waste is a complex behavior, and habit becomes a control in determining household food waste. Out invention has implications for theoretical models of food waste behavior. We argue that the measurable contribution of variables in influencing behavior to reduce food waste cannot estimate the dynamics of habits and does not sufficiently take psychological models of food waste behavior.

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