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Food Waste Self-Reported Behavior: An Investigation Among Malaysian Youth

Nor Farhana Selahudin *
Universiti Tenaga Nasional
Email: SFarhana@uniten.edu.my

Sharina Mohd Salleh
Universiti Tenaga Nasional

Nik Amalena Najebah Nik Azman
Universiti Tenaga Nasional

Norlaila Mazura Mohaiyadin
Universiti Pertahanan Nasional Malaysia

** Corresponding Author*

Abstract
Purpose: To examine the relationship between knowledge and awareness about food waste, its cause and related issues, and level of concern about food waste towards the self-reported behavior among Malaysian youth.
Design/methodology/approach: 482 data has been collected among youth in Pahang as sample of the study via survey questionnaire. Statistical Power Analysis (G*Power) was used in this study as it is one of the most popular approaches in the behavioral sciences in calculating the required sample size to determine the validity, reliability, and structural model.
Findings: The finding of this study shows that the increase of youth's knowledge and awareness about food waste, its cause, and related issues will lead to the increase of self-reported behavior.
Research limitations/implications: There were difficulties in terms of collecting the questionnaires and obtaining the actual number of youth population in Malaysia. This study would like to recommend adding more variables such as body mass index (BMI) of the respondent, number of households, and type of food waste. Future research also is suggested to make comparison between youth and adult on food waste related issues.
Practical implications: This study provides information for both social marketers and policy makers. New educational campaigns against food waste should be carried out by providing them with a realistic perception of food waste.
Originality/value: This study will contribute to the current literature of food waste in Malaysia.

Keywords: Knowledge, Concern, Self-Report, Food Waste, Youth

Introduction

Each household in Malaysia is responsible in producing large amount of food wastage which leads to large scale environmental impacts. Study made by National Solid Waste Management Department (JPSPN) in 2012 stated that food waste is the highest waste generated in Malaysia approximately about 31% to 45% of the total volume waste generated every day. According to the Solid Waste Management and Public Cleansing Corporation (SWCorp), by 2020 the total

amount of food waste can certainly fill up 16 of Malaysia's Petronas Twin Towers. Furthermore, Malaysians waste about 16,688 tonnes of food per day, an amount that can easily feed around 2.2 million people, three times a day (News Straits Time, September 29, 2019). According to Quested, Marsh, Stunell, and Parry (2013), the best way to reduce the impact of food waste on the environment is to minimize food waste at home. By identifying the experiences of household self-reported behavior, Malaysian authorities and non-governmental organizations should be able to develop effective and efficient intervention for food waste. However, the amount of food that is going to be wasted is unpredictable due to the multiple interactions that could influence self-reported behavior (Quested et al., 2013; Graham-Rowe, Jessop, & Sparks, 2015). Thus, this study aims to examine the relationship between knowledge and awareness (KNOWLEDGE) about food waste, its cause and related issues and the youth's level of concern (CONCERN) about food waste related issue towards self-reported behavior (REPORT). Nik Amalena, Nor Farhana, Sharina, and Norlaila (2018) stated that wasteful practices need to be addressed more aggressively by educating the youth. They should be well-prepared with the right knowledge, responsibility, and concern regarding the important of food waste reduction in Malaysia.

Literature Review

Self-reported behavior

Self-reported behavior is referring to the how people behave to report any undesirable food waste situation to the authorities. Van der Werf, Seabrook, and Gillilandv (2020) reported that people are inconsistent in self-reported behavior of food intake data that may lead to misleading conclusions. According to Van der Werf, Seabrook, and Gilliland (2020), theory of planned behavior was used to measure the self-reported behavior in the issue of food waste. Leverenz, Moussawel, Maurer, Hafner, Schneider, Schmidt, and Kranert (2019) found that improvement of waste reduction occurred within online-based self-reporting. Construct of instrument tool for self-reported included amount of food waste, intention to avoid food waste, personal and financial attitudes, perceived health risks, perceived behavioral control, personal and subjective norms, knowledge of use-by dates and of food storage, household planning habits, and the good provider identity (Visschers, Wickli, & Siegrist, 2016).

Knowledge and awareness about food waste, its cause and related issues

Martin-Rios, Demen-Meier, Gössling, and Cornuz (2018) stated that the meaning of awareness was referring to beliefs, knowledge, goals, and actions. Therefore, researchers' opinion on knowledge about food waste is coinciding with awareness about food waste. Fox, Ioannidi, Sun, Jape, Bawono, Zhang, and Perez-Cueto (2018) found that Taiwan has the highest level of knowledge and awareness on consumer-generated food waste as compared to Denmark, Greece, and Indonesia. Knowledge on food waste included subjective knowledge such as environmental, economic, and ethical implications of food waste and objective knowledge such as global and consumer-generated food waste and the Sustainable Development Goals (Fox et al., 2018). Awareness on food waste included awareness on food waste and initiatives targeting food waste (Fox et al., 2018). Fox et al. (2018) found out that respondents from Denmark, Greece, Indonesia, and Taiwan have less knowledge about food waste but agreed that food waste is an environmental and ethical issue that leads to the loss of economic and natural resources. On the other hand, Richter (2017) found that with the highest observed level of knowledge about food waste, consumers increasingly plan more on their meals and food purchases. Pinto, Pinto, Melo, Campos, and Cordovil (2018) found that to raise the awareness about food waste, institutions need to suggest 'how-to' actions for reducing food waste. Pinto et al. (2018) also mentioned that the educational practices raised awareness on food waste.

Level of concern about food waste related issue

Even if the definition and measurement of environmental concern vary in research, studies agree on a certain number of characteristics of environmental and could be applied to the question of food waste at the individual level, interpersonal level, and global level (Borgne, Siriex, & Costa, 2016). Concern on food waste attached with food waste consequences affected the experience of food waste and integrated into an 'antecedents-concern-behavior (Borgne et al., 2016). Borgne et al. (2016) found out that there were significant relationships between meal lists, shopping lists, checking fridge, and cupboard before shopping, consuming leftovers as soon as possible with the level of individual concern. Borgne et al. (2016) also found that there was significant relationship between consuming leftovers as soon as possible with the level of global concern. Principato, Secondi, and Pratesi (2015) found that the more aware youths are concerning on food waste, the more likely they are to reduce leftovers. According to Principato et al. (2015), the concern about food waste is a significant indicator that leads towards food waste reduction. Hence, it encourages the intention and behavior to reduce food waste.

Theoretical Framework and Hypothesis Development

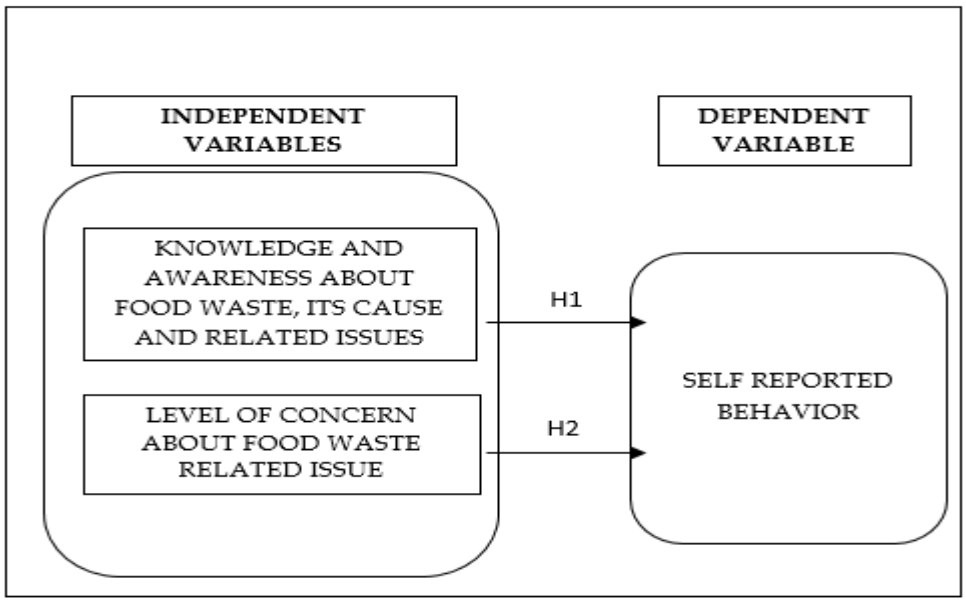

Figure 1: Schematic Diagram

Knowledge and awareness about food waste, its cause and related issues towards self-reported behaviour

Fox et al. (2018) mentioned that even knowledge is not sufficient to make real changes, it is still a necessary and good starting point for people to reflect and realise the seriousness of food waste. Based on the researchers' opinion, knowledge and awareness about food waste are related to the self-reported behavior. Leverenz et al. (2019) found that a comprehensive strategy such as the combination of self-reporting and awareness raising actions can lead to significant of avoidable food waste in households. Neff, Spiker, and Truant (2015) suggest that substantial receptivity on waste prevention activities, with a high self-reported baseline level of awareness and knowledge. Hence, this hypothesis has been proposed:

Hypothesis 1 (H_1): *There is a significant relationship between knowledge and awareness about food waste, its cause and related issues towards the self-reported behavior.*

Level of concern about food waste related issue towards self-reported behavior

Van der Werf et al. (2020) also found out self-reported behavior was more strongly influenced by perceived behavioural control than intention in London, Ontario, and Canada. Based on the researchers' opinion, this literature is leading to the level of concern because concern is part of behaviors. Additionally, Van der Werf et al. (2020) found that self-reported behaviors were significantly associated with personal attitude, number of people per household, gender, and employment status besides perceived behavioural control. The substantial receptivity on waste prevention activities, with a high self-reported baseline level of positive attitudes and moderate rates of desired behaviors (Neff et al., 2015). Hence, this hypothesis has been proposed:

Hypothesis 2 (H_2): *There is a significant relationship between the level of concern about food waste (CONCERN) towards the self-reported behavior.*

Method

Globally, there has been much attention on avoiding or reducing food loss and food waste. But recent research has shown that young adults have a higher tendency to waste compared to other age groups (Principato et. al., 2015), hence, this study used youth as sample of the study. In Malaysia, "Youth" has been defined by The Youth Societies and Youth Development Act, 2007 as ***"a person not less than 15 years old and not more than 40 years old"***. The youth in the state of Pahang was selected because Pahang is the largest state in peninsular Malaysia. There are 842.4 thousand people that are ranging from the age of 15 years old to 44 years old in Pahang which were recorded by Department of Statistics Malaysia (DOSM) as at 2019. Hence, the purposive sampling technique has been used in this study and 1,000 surveys using questionnaires were distributed to the selected respondents in Pahang. However, only 531 respondents return the questionnaire and final sample of the study after excluding the invalid and incomplete feedback from respondents was 482. This amount is considered sufficient to get a result that reflects the population as precisely as needed according to Statistical Power Analysis (G*Power) as the minimum sample size required by the G*Power, is only 68.

G*Power is one of the most popular approaches in the behavioural sciences in calculating the required sampling size (Faul, Erdfelder, Lang, & Buchner, 2007). According to Cohen (1988), in order to determine the adequate sample size, the value of statistical level of significance, effect size, statistical power, and number of predictors have to be determined. Thus, this study used 0.05 value of significance level which are 0.05, 0.15 effect size, 80% statistical power, and two predictors as the number of independent variable in this study is two (KNOWLEDGE and CONCERN). The power of statistical test is defined as the probability that a statistical significance test will lead to the rejection of the null hypothesis for a specified value of an alternative hypothesis (Cohen, 1988).

The questionnaire consists of 4 sections including the section of demographic profile of respondents. The questions in independent variables were measured with the measurement of 5-point Likert scale. It is used to measure the level of agreement or disagreement towards the statement given with five different scale rates that range from (1) = Strongly Disagree to (5) = Strongly Agree. Meanwhile, the dependent variable of this study is self-reported behavior. The scoring approach used for dependent variable is based on dichotomous measure where an item scores one "1" if the answer is "Yes" and zero "0" if the answer is "No". All variables were adapted from Principato et al. (2015). In ensuring this study achieves its objectives, all the related analysis was tested using Partial Least-Squares (PLS).

Assessment of the measurement model is comprised of two parts, which are validity (assessed via demonstration of construct validity, convergent, and discriminant validity) and reliability (assessed via both internal consistency and indicator reliability). Three steps for assessing the

structural model of PLS-SEM have been used in this study including assessment of collinearity by using variance inflation factors (VIF), significance, and the relevance of the structural model path coefficients by running bootstrapping procedure in PLS (Tenenhaus, Vinzi, Chatelin, & Lauro, 2005) and coefficient of determination (R^2).

Findings

For construct validity analysis, all of the items are measuring a particular variable which are greater than 0.50 on those particular variables, and less than 0.50 on the other variable, thus confirming construct validity. An iterative process is adopted for elimination of the variables by considering Henseler, Ringle, and Sinkovics (2009) suggestion as loading values between 0.4 and 0.7 should be reviewed before elimination and discard or otherwise maintain the factors if elimination of these indicators increases the composite reliability. Thus, 8 items were removed which consists of three items from KNOWLEDGE (A1, A7, A10) and 5 items were dropped from CONCERN (B6, B7, B9, B10, B11). After removing items with loadings less than the recommended value, all measurement items loaded significantly and highly between 0.402 and 0.876. Convergent validity of the first-order constructs in this research is examined via Average Variance Extracted (AVE) and all first-order constructs were between the ranges of 0.303 to 0.553. According to Fornell and Larcker (1981), if AVE is less than 0.5, but composite reliability is higher than 0.6, the convergent validity of the construct is still adequate (Farrell, 2010). Discriminant validity assesses the extent to which a construct is truly distinct from other constructs in the model and thus captures a single unique phenomenon (Hair, Ringle, & Sarstedt, 2013). Thus, the results as per Table 1 proved that convergent validity exist for the constructs of this study. Discriminant validity in this study was assessed via heterotrait-monotrait ratio (HTMT) and HTMT criterion has been fulfilled for this research because the value was less than a threshold value of 0.90.

Table 1: HTMT result

Variable	KNOWLEDGE	CONCERN	REPORT
KNOWLEDGE		0.740	0.308
CONCERN			0.207
REPORT			

The reliability of the reflective measurement model is checked by applying the composite reliability. Composite reliability is used instead of Cronbach's alpha because composite reliability considers that indicators have different loadings. The constructs resulted for composite reliability as reported in Table 2 were between 0.704 and 0.753 which is well above the threshold value of 0.70 (Litwin & Fink, 2003).

Table 2: Composite Reliability Result

Variable	Composite Reliability
KNOWLEDGE	0.744
CONCERN	0.753
REPORT	0.704

The main aim of the structural model assessment is to answer the research questions by testing the proposed research hypothesis. This study has two research hypotheses which are H1: There is a significant relationship between knowledge and awareness about food waste, its cause, and related issues towards the self-reported behavior and H2: There is a significant relationship between the level of concern about food waste (CONCERN) towards the self-reported

behavior. As proposed by Hair et al. (2013), the results of three steps for assessing the structural model of PLS-SEM were reported as per Table 3 and Table 4. Firstly, the VIF result for assessment of collinearity in Table 3 shown that the threshold of a high level of collinearity VIF values maintained below 5 and there are no serious multi-collinearity issues among independent variables (Hair et al., 2013).

Table 3: Composite Reliability Result

Variable	REPORT
KNOWLEDGE	1.282

Next, Table 4 shows the result of the significance and the relevance of the structural model path coefficients computed by running bootstrapping procedure in PLS. The path coefficient for all the paths in the proposed model is positive because t-value greater than 1.96 is significant at 5% level of significance ($t > 1.96$; $p < .05$). After evaluating the significance of the relationships between the constructs, it is essentials to evaluate the relevance of the significance of the relationships (Hair et al., 2013). Furthermore, in many cases, the path coefficients are significant, while its size is very small to deserve managerial consideration (Hair et al., 2013). Consequently, paying attention to analyze the relevance of the structural model relationship is essential for results' interpretation (Hair et al., 2013).

The results revealed that H1 is accepted with $\beta = 0.129$, $t = 2.012^*$ at $p < 0.05$ significance level. According to researchers' opinion, knowledge and awareness about food waste are related to the self-reported behavior. This finding is supported by previous study from Leverenz et al. (2019) which found that a comprehensive strategy such the combination of self-reporting and awareness raising actions can lead to the significant of avoidable food waste in households. Richter (2017) also found that with the highest observed level of knowledge about food waste, consumers increasingly plan more of their meals and food purchases which is sign as self-reported behavior.

However, H2 is rejected with $\beta = 0.010$, $t = 0.109$ as shown in Table 4. This finding is consistent with the study by Van der Werf et al. (2020) which found that self-reported behavior was more strongly influenced by perceived behavioral control than intention because concern is part of behaviors. Additionally, Van der Werf et al. (2020) found that self-reported behaviors were significantly associated with personal attitude, number of people per household, gender, and employment status besides perceived behavioral control only. The R2 is a measure of the model's predictive accuracy and it can also be viewed as the combined effect of the exogenous variables on endogenous variables. The result in Table 4 below shows that, KNOWLEDGE and CONCERN have small (0.020) effect in predicting self-reported behavior among youth in state of Pahang. Since R2 is embraced by a variety of disciplines, researchers are advised to rely on a "rough" guide in relation to an acceptable R2 (Cohen, 1988).

Table 4: Significance and the Relevance of the Structural Model Path Coefficients

Hypothesis		Standard Data	Standard Error	t-value	Decision	R^2
H1	KNOWLEDGE & REPORT	0.129	0.152	2.012*	Accepted	0.020
H2	CONCERN & REPORT	0.010	0.078	0.109	Rejected	

*Note: t-value more than 1.645 at *p<0.05, t-value more than 2.33 at **p<0.01*

Discussion and Conclusion

The first objective of this study is to assess the relationship between knowledge and awareness about food waste, its cause, and related issues towards the self-reported behavior among Malaysian youth. From the finding, there is significant positive relationship between knowledge and awareness about food waste, its cause, and related issues towards the self-reported behavior. This study concludes that the more knowledge and awareness about food waste, its cause, and related issues, the more it will increasing self-reported behavior among people that are ranging from the age of 15 years old to 44 years old in Pahang. By having the knowledge about food waste, the young people will understand the consequences and impact of food waste from several perspective including environment, financial, economy, ethics, and management skills. In fact, having a proper management skill, Malaysian youth may plan the types of foods to be bought, the quantity, and considering the expiring date or freshness of the food to maintain its quality and to avoid the risk of food waste. Thus, the loss of purchase cost may be avoided, and it helps to maintain a good environment because the risk of food waste reduces and develop ethical awareness in oneself by respecting the food to not be wasted and the person that have no ability to acquire proper food.

The second objective of this study is to assess the relationship of level of concern about food waste towards the self-reported behavior among Malaysian youth. From the result, there is no significant relationship between the level of concern about food waste and the self-reported behavior among Malaysian youth in Pahang. This study concludes that the level of concern about food waste towards the self-reported behavior is insufficient to lead the young generation for self-reported. Other factors may influence the relationship including the attitude and knowledge towards food waste. In order to have a concern, the youth must gain knowledge about food waste first. Afterwards, they need to motivate themselves to help to reduce the risk of food waste as one of the mechanisms towards self-reported.

In conclusion, Malaysian youth have knowledge and awareness about food waste to lead self-reported but concerns among youth are insufficient enough to lead the Malaysian youth towards self-reported. However, youth are expected to become more aware and concerned about food waste related issue. With further awareness on food waste, we will able to tackle this problem and reduce food waste in the future. This would not only help the environment and our economic, but also improve our ethical and moral values.

Although this study has reached its objectives, there are limitations as well. There were difficulties in term of collecting the questionnaires and obtaining the actual number of youth population in Malaysia. However, the limitation mentioned above will not invalidate the findings of the study.

This study would like to recommend adding more variables such as body mass index (BMI) of the respondent, number of households, and type of food waste. Future research also is suggested to make comparison between youth and adult on food waste related issues.

References

Ameerah H., Z. (2019). Waste Not, Want Not – It's Time We Get Serious About Food Waste. *News Straits Time, September 29, 2019.*

Borgne, G. Le, Siriex, L., & Costa, S. (2016). Consumer's Concern for Food Waste: Conceptualization and Proposition for a Measuring Scale. (October).

Cohen, S. (1988). Perceived Stress in a Probability Sample of the United States in S. Spacapan & S. Oskamp (Eds.), *The Claremont Symposium on Applied Social Psychology*. The Social Pshychology of Healt, 31-67.

Farrel, M., A. (2010). Insufficient Discriminant Validity: A Comment on Bove, Pervan, Beatty and Shiu (2009). *Journal of Business Research,* 63(3), 324-327.

Faul, F., Erdfelder, E., Lang, A. & Buchner, A. (2007). G* Power 3: A Flexible Statistical Power Analysis Program for the Social, Behavioral and Biomedical Sciences. *Behavior Research Methods,* 39(2), 175-191.

Fornell, C. & Larcker, D. (1981). Structural Equation Modeling and Regression: Guidelines for Research Practice. *Journal of Marketing Research*, 18(1), 39-50.

Fox, D., Ioannidi, E., Sun, Y. T., Jape, V. W., Bawono, W. R., Zhang, S., & Perez-Cueto, F. J. A. (2018). Consumers with High Education Levels Belonging to The Millennial Generation from Denmark, Greece, Indonesia and Taiwan Differ in The Level of Knowledge on Food Waste. *International Journal of Gastronomy and Food Science,* 11(February), 49–54. https://doi.org/10.1016/j.ijgfs.2017.11.005

Graham-Rowe, E., Jessop, D.C., and Sparks, P. (2015). Predicting Household Food Waste Reduction Using an Extended Theory of Planned Behaviour. *Resources, Conservation and Recycling Jounal,* 101, 194–202.

Hair, J., F., Ringle, C., M. & Sarstedt, M. (2013). Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance. *Long Range Planning,* 46(1-12), 1-12.

Henseler, J., Ringle, C., M. & Sinkovics, R., R. (2009). The use partial Least Squares Path Modeling in International Marketing. *New Challenge to International Marketing.*

Leverenz, D., Moussawel, S., Maurer, C., Hafner, G., Schneider, F., Schmidt, T., & Kranert, M. (2019). Quantifying The Prevention Potential of Avoidable Food Waste in Households Using a Self-Reporting Approach. Resources, Conservation and Recycling, 150(November 2018), 104417. https://doi.org/10.1016/j.resconrec.2019.104417

Litwin, M., S. & Fink, A. (2003). How to assess and interpret Survey Psychometrics. *Sage.*

Martin-Rios, C., Demen-Meier, C., Gössling, S., & Cornuz, C. (2018). Food waste management innovations in the foodservice industry. *Waste Management*, *79*(September), 196–206. https://doi.org/10.1016/j.wasman.2018.07.033

Neff, R. A., Spiker, M. L., & Truant, P. L. (2015). Wasted Food: U.S. Consumers' Reported Awareness, Attitudes, and Behaviors. *PLoS ONE,* 10(6). https://doi.org/10.1371/journal.pone.0127881

Nik Amalena Najebah, N.A., Nor Farhana. S., Sharina, M.S., Norlaila, M.M. (2018, Special Issue). Does Food Waste Contribute To Renewable Energy?. *Global Business and Management Research: An International Journal.* 10 (4).

Pinto, R. S., Pinto, R. M. dos S., Melo, F. F. S., Campos, S. S., & Cordovil, C. M. dos S. (2018). A Simple Awareness Campaign to Promote Food Waste Reduction in a University Canteen. *Waste Management*, 76(March), 28–38. https://doi.org/10.1016/j.wasman.2018.02.044

Principato, L., Secondi, L., & Pratesi, C. A. (2015). Reducing Food Waste: An Investigation on the Behavior of Italian Youths. *British Food Journal*, 117(2), 731–748. https://doi.org/10.1108/BFJ-10-2013-0314

Quested, T.E., Marsh, E., Stunell, D., Parry, A.D., (2013). Spaghetti Soup: The Complex World of Food Waste Behaviours. Resour. *Conserv. Recycl.* 79, 43–51, http://dx.doi.org/10.1016/j.resconrec.2013.04.011

Richter, B. (2017). Knowledge and Perception of Food Waste Among German Consumers. *Journal of Cleaner Production*, 166, 641–648. https://doi.org/10.1016/j.jclepro.2017.08.009

Tenenhaus, m., Vinzi, V. E., Chatelin, Y. & Lauro, C. (2005). Computional Statistics & Data Analysis 48(1), 159-205.

Van der Werf, P., Seabrook, J. A., & Gilliland, J. A. (2020). Food for Thought: Comparing Self-Reported Versus Curbside Measurements of Household Food Wasting Behavior and The Predictive Capacity of Behavioral Determinants. Waste Management. 101, 18–27. https://doi.org/10.1016/j.wasman.2019.09.032

Visschers, V. H. M., Wickli, N., & Siegrist, M. (2016). Sorting Out Food Waste Behaviour: A Survey On the Motivators and Barriers of Self-Reported Amounts of Food Waste in Households. *Journal of Environmental Psychology*, 45, 66–78. https://doi.org/10.1016/j.jenvp.2015.11.007