Awareness and Responsibility of Food Waste Behavior among College Students

Alhapen Ruslin Chandra[1,2]*, Ratni Prima Lita[1], Ma'ruf Ma'ruf[1] and Dessy Kurnia Sari[1]

[1] Department of Management, Faculty of Economics and Business,
Universitas Andalas, Padang, Indonesia
E-mail: ratniprimalita@eb.unand.ac.id, maruf@eb.unand.ac.id, dessyks@eb.unand.ac.id

[2] Department of Business Administration,
Politeknik Negeri Padang, Indonesia
E-mail: alhapen@pnp.ac.id

Abstract

Indonesia is facing a substantial issue of food waste. It contributes to environmental problems and loosens up the economy. This study aimed to examine the food waste behavior of college students as part of young consumers because consumer behavior established during youth could influence their behavior in the later stages of life. Norm Activation Model was utilized to develop the research framework. The data was evaluated using structural equation modelling. The result showed that college students' awareness of negative consequences and their ascription of responsibility for food waste had a significant impact on their personal norm, which in turn influenced their intention to prevent food waste. The findings are useful to develop strategies to minimize food waste, particularly among students in higher education institutions.

Keywords: Behavior, Awareness, Responsibility, Personal Norm, Food Waste

1. Introduction

Indonesians discarded an estimated 5–19 million tons of food waste (FW) per year during 2000-2019 (Kementerian PPN/Bappenas, 2021). FW is a significant environmental issue that has financial consequences. The carbon footprint produced by FW was estimated to be more than 3.3 gigatons of carbon dioxide annually, along with cost of environmental about USD 700 billion as well as costs of social around USD 900 billion each year (FAO, 2014). In Indonesia, FW along with food loss contributed to economic loosed up to IDR 213–551 trillion annually, which accounts for 4%–5% of the gross domestic product (Kementerian PPN/Bappenas, 2021). Padang, the capital city of West Sumatra province, is also facing the food waste problem. Data from the Ministry of Environment and Forestry (2024) indicates that between 2023 and 2024, food waste accounted for 63% of the total waste in Padang. Furthermore, food waste accounts for 61% of the 500 to 600 tons of waste generated daily in this city (Rahmadhani & Wadrianto, 2024). Therefore, it is critical to deal with the issue of FW in order to achieve sustainable behavior, particularly in the city of Padang.

To effectively cope with the issue of FW, it is important to get a deep understanding of the determinant influences of consumer behavior regarding FW activities. Consumers demographic characteristics, for instance age and gender, have been identified as factors associated with FW behavior (Chammas & Yehya, 2020). Young consumers made a substantial contribution to FW issue. Research has acknowledged that young-age consumers tend to waste the food more than older consumers (Principato et al., 2015). Hence, college students, as part of the young consumer group, were likely to contribute significantly to the FW generation.

Prior studies focused on analyzing FW behavior in households (Borg et al., 2022; Kansal et al., 2022; van der Werf et al., 2020), restaurants (Chalak et al., 2021; Coşkun & Özbük, 2020), and schools (Piras et al., 2023; Vidal-Mones et al., 2022). Few studies have investigated the issue of FW in higher education institutions (Alattar et al., 2020; Gabriel et al., 2021; Qian et al., 2021). A study conducted among college students revealed that the amount of FW generated per student annually was approximately 142 pounds (Wang et al., 2023). The higher education institution could be regarded as a unique social entity, while students can be viewed as a distinct consumer demography.

College students had a significant role in society. In Padang, there were 175,675 students enrolled in higher education institutions (Kumparan, 2022). Early

adulthood was a crucial time for creating long-term behaviors and attitudes. The FW behaviors adopted during college years could have lasting effects on future consumption patterns (Tsai et al., 2020). Thus, it was crucial to comprehend the FW behavior of college students, as it had the potential to impact the achievement of sustainable consumption goals in Indonesia. Nevertheless, there were not many studies on factors that drive the FW behavior of college students (Wang et al., 2024). This study examined the determinants of FW behavior among college students using Norm Activation Model, mainly about their intention to prevent FW. NAM is appropriate for use in research on pro-environmental behavior (Obuobi et al., 2024). This research contributed to the literature of FW behavior, particularly among college students. It could be used to develop strategies for reducing the FW problem among young consumers.

2. Theoretical Background

Norm Activation Model (Schwartz, 1973), a concept rooted in behavioristic psychology that is commonly used to describe the pro-environmental behaviors. The model comprises three primary variables which are awareness of consequences, ascription of responsibility and personal norm (Schwartz, 1973). Bamberg et al. (2007) acknowledged that awareness of consequences pertains to a consumer's comprehension of the adverse outcomes associated with their actions. The FW consequences pertained to the cognitive understanding of consumers regarding the adverse outcomes resulting from the FW activities. Studies have established that the awareness of consequences affected the ascription of responsibility for environmentally responsible behavior (Joo et al., 2022; Kim, 2023; Moyal & Schurr, 2022; Sajid et al., 2024), including in the FW behavior context (Kim et al., 2022; Obuobi et al., 2024).

Furthermore, researchers also found that an individual's personal norm could be directly influenced by their level of awareness of their action's consequences (Sajid et al., 2024; Wahid et al., 2022), including in FW behavior context (Obuobi et al., 2024; Wang et al., 2022). Therefore, it is hypothesized that:

H1. Awareness of the consequences of FW positively affects the ascription of responsibility for FW.

H2. Awareness of the consequences of FW has a positive impact on personal norm.

Ascription of responsibility refers to subjective sense of responsibility experienced by individuals in relation to the negative outcomes resulting from failure to involve in environmentally sustainable behaviors (Zhang et al., 2013). Individuals were more likely to exhibit waste reduction behavior when they perceived themselves as being responsible for the duty (Chandra et al., 2024; Munerah et al., 2021).

Studies acknowledged that ascription of responsibility affect consumers' personal norms, such as in green hotel behavior context (Kim, 2023), littering in a tourism destination (Maminirina et al., 2023), and behavior of farmer (Savari et al., 2023).

Previous research of FW behavior confirmed that ascription of responsibility of FW influenced personal norms significantly (Kim et al., 2022; Obuobi et al., 2024; Wang et al., 2022). Consumers who considered the bad impact of FW would develop strategies to mitigate the consequences. This process fostered the development of personal norms regarding the issue of FW. Society and individuals are obligated to mitigate FW due to the negative impact it can cause. A specific sense of responsibility will activate consumers' personal norms regarding the FW issue. Thus, Therefore, it is hypothesized that:

H3. Ascription of responsibility of FW has a positive impact on personal norm.

Personal norm encompasses the moral requirements to engage in behaviors that benefit society (Schwartz, 1977). These behaviors were closely tied to an individual's internalized values (Biel & Thøgersen, 2007). Some research has demonstrated a substantial influenced of personal norm towards consumers' engagement in sustainable behavior (Lam et al., 2023; Shin et al., 2018) including to reduce FW intention (Al Mamun et al., 2024). The motivation behind adhering to personal norms was not primarily driven by the fear of societal sanctions but rather by the desire to elude unpleasant feeling such as shame and guilt (Schwartz & Howard, 1981).

Personal norms on FW issue pertains to individuals actively minimizing FW as a set of behavioral guidelines and moral obligation. Djekic et al. (2019) acknowledged the act of wasting food and failing to adhere to societal norms might elicit feelings of shame or guilt among consumers. These emotions could be perceived as a form of self-sanction by individuals. Consequently, individuals were motivated to minimize FW as a means of pursuing pleasant affective states and avoiding negative emotional states (Onwezen et al., 2013). Studies revealed that personal norms influence intentions for pro-environmental behavior (Kim, 2023; Savari et al., 2023), including intention to reduce FW (Kim et al., 2022; Obuobi et al., 2024; Wang et al., 2022). Hence, the hypothesis is that:

H4. Personal norm positively affects intentions to reduce FW.

Based on the discussion above, conceptual model was established as illustrated in Figure 1.
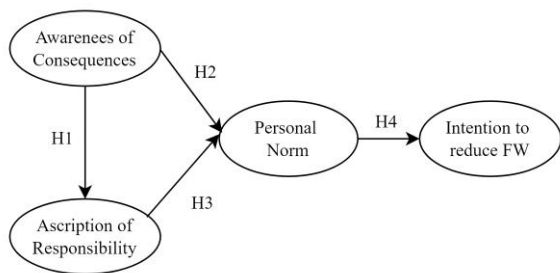
Figure 1: Conceptual Model

3. Method

This study was conducted for college students when they ate in a college canteen. College students are part of the young consumers. Compared to older consumers, younger consumers were more likely to do FW (Principato et al., 2015). There was a limited of research on FW behavior of college students (Wang et al., 2024). These are the rationales for examining the FW behavior of college students in this study.

The online questionnaire was administered in order to get insight into the factors that accounted for the FW behavior of college students when they ate at campus canteen. There were two sections in the questionnaire. Firstly, the questions about respondents' socio demographics, such as age, gender, spending, and residence, Secondly, there are four sub-sections of research questions. four items from relevant study (Filimonau et al., 2023; Obuobi et al., 2024), modified to measure awareness of consequences. Three items based on related study (Filimonau et al., 2023; Obuobi et al., 2024), were used to measure ascription of responsibility. Three items were used to measured Personal norms, derived from study of Filimonau et al. (2023). To measure intention to reduce FW, three items were used, adapted from study of Obuobi et al. (2023). Multi-item measures with five-point Likert responses were utilized for measuring the constructs.

The sample were obtained through a convenience sampling method. The participants needed roughly 7 minutes to successfully complete the questionnaire. Before they filled out the questionnaire, the participants were given an introductory statement that outlined the purpose of the questionnaire and assured their responses' anonymity. A total of 276 valid data from students of a college in Padang, West Sumatera, Indonesia, was used for analysis. The sample comprised 185 (67%) female and 91 (33%) male participants. The participants' ages ranged from 17 to 23 years old, and majority of them resided in boarding houses (47.5%) and with their parents (40.6%). Additionally, most of them spent IDR 500 thousand to IDR 1 million a month excluding the boarding house rent.

4. Result

This study performed a two-step method (Anderson & Gerbing, 1988), applying partial least squares for structural equation modeling. Evaluation of measurement model was first applied to check reliability as well as validity. Then, the evaluation of structural model was performed to test the hypotheses. SMART-PLS 4.1.0.3 software was employed to perform the both models. However, common method bias was applied before measurement model evaluation. Harman's single factor test using SPSS 24 resulted in the first factor accounting for 41.809% of total variance, lower than suggested threshold of 50% (Podsakoff et al., 2024). Additionally, common method bias through the variance inflation factor (VIF) of inner model was also performed, using SMART-PLS 4.1.0.3 software. All of VIFs' values did not exceed 3.3 (Kock, 2015), suggesting that common method bias had no effect on the model.

4.1. Measurement Model Evaluation

Examination of the measurement model found that one item of the awareness of consequences variable, AoC1, had a low factor loading, resulting in the Cronbach's alpha of the awareness of consequences construct being below the cutoff 0.7 (Hair et al., 2019). After removing AoC1, the model assessment resulted in loadings ranging from 0.728 to 0.882, as displayed in Figure 2. These numbers were above 0.708 (Hair et al., 2019), indicating the satisfactory level of reliability for the items.
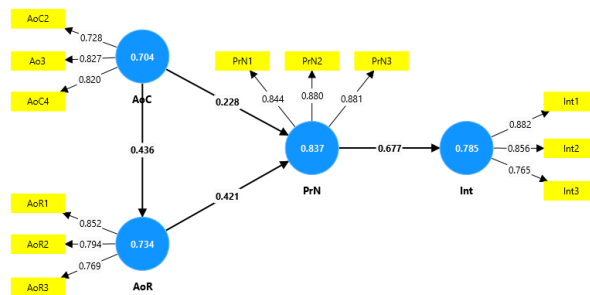

Figure 2: Measurement Model

The internal consistency reliability was checked using cronbach's alpha (CA) and composite reliability (CR). The assessment resulted in all CR values ranging from 0.835 to 0.902, indicating an acceptable level of internal consistency (Hair et al., 2019). All the CA values were above the cutoff of 0.7 (Hair et al., 2019). Convergent validity was assessed by the Average Variance Extracted (AVE). All the values were above the established criterion of 0.50 (Hair et al., 2019). Table 1 displays the evaluation.

TABLE 1

RELIABILITY AND CONVERGENT VALIDITY

Construct	CA	CR	AVE
Awareness of consequences (AoC)	0.704	0.835	0.628
Ascription of responsibility (AoR)	0.734	0.847	0.649
Personal norm (PrN)	0.837	0.902	0.754
Intention (Int)	0.785	0.874	0.699

To establish the discriminant validity of constructs, the square roots of AVE for each construct were compared to its respective correlational values. The criterion required that the square root of AVE for each construct be above the value of correlation between constructs (Fornell & Larcker, 1981), as presented in Table 2.

TABLE 2

DISCRIMINANT VALIDITY (FORNELL-LARCKER CRITERION)

	AoC	AoR	PrN	Int
AoC	0.793			
AoR	0.436	0.805		
PrN	0.412	0.521	0.869	
Int	0.475	0.644	0.677	0.836

Furthermore, this study also conducted analysis of the constructs validity using the heterotrait-monotrait ratio (HTMT). The values ranged from 0.528 to 0.844, all of which lower than threshold of 0.85 (Henseler et al., 2015), as displayed in Table 3. This provided indication for the convergence validity of the constructs.

TABLE 3

DISCRIMINANT VALIDITY (HTMT) CRITERION

	AoC	AoR	PrN	Int
AoC				
AoR	0.590			
PrN	0.528	0.639		
Int	0.630	0.844	0.824	

4.2. Structural Model Evaluation

Employing bootstrapping procedure, the evaluation of structural model resulted all the p-values fell within the acceptable range, confirming all the hypotheses. Table 4 and Figure 3 display this evaluation.

TABLE 4

HYPOTHESES TESTING

Hypothesis	Path	Estimates	T statistics	P-value	Result
H1	AoC→AoR	0.436	6.704	0.000	supported
H2	AoC→PrN	0.228	3.600	0.000	supported
H3	AoR→PrN	0.421	5.944	0.000	supported

Awareness of consequences positively influenced ascription of responsibilities for FW (β = 0.436, t = 3.600, p < 0.001), therefore supporting Hypothesis 1. Awareness of consequences of FW impacted personal norm positively (β = 0.228, t = 6.704, p < 0.001), validated Hypothesis 2. Hypothesis 3 was confirmed (β = 0.421, t = 5.944, p < 0.001), demonstrating a positive influenced of ascription of responsibilities for FW to personal norm. Furthermore, hypothesis 4 was supported (β = 0.667, t = 10.829, p < 0.001), indicating that personal norm positively impacted intention to minimize FW.

Figure 3 displays the coefficients of determination (R^2). Shmueli & Koppius (2011) acknowledge that the R^2 describes the model's explanatory power. The model's ability to predict intention to minimize FW could be considered moderate, as 45.7% of variance was explained in intention and 30.8% of the variance was explained in personal norm (Hair et al., 2011).
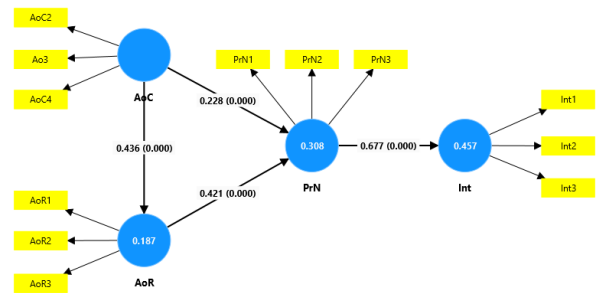

Figure 3: Structural model test

Furthermore, to assess the model's predictive ability, PLS predict was performed, by comparing the PLS SEM mean absolute error (MAE) values with a mean absolute error of linear regression model (LM) as a benchmark (Hair et al., 2019). MAE was used because the distribution of prediction error was non-symmetric (Shmueli et al., 2019). Overall, the model had medium predictive power because four of nine MAE indicators of PLS-SEM had higher prediction errors compared to LM (Shmueli et al., 2019), as displayed in Table 5.

TABLE 5

PLS PREDICT EVALUATION

	Q²predict	PLS-SEM_MAE	LM_MAE	Difference
AoR1	0.138	0.610	0.615	-0.005
AoR2	0.123	0.643	0.649	-0.006
AoR3	0.066	0.613	0.606	0.007
PrN1	0.131	0.413	0.409	0.004
PrN2	0.092	0.549	0.556	-0.007
PrN3	0.091	0.584	0.591	-0.007
Int1	0.140	0.538	0.503	0.035

Int2	0.121	0.581	0.578	0.003
Int3	0.083	0.627	0.639	-0.012

5. Discussion

The study found that the awareness of negative consequences of FW affected the ascription of responsibility for FW among college students when they eat at campus canteen. This finding aligned with others studies (Kim et al., 2022; Obuobi et al., 2024). Consistent with the NAM, this study also revealed that awareness of consequences of FW could impact positively the personal norm. When the students were aware of the negative impact of FW, it led their moral norm to reduce FW intention. This finding shared the same result with others studies which acknowledged that consumers' awareness regarding the negative impact of FW could affect their personal norm (Obuobi et al., 2024; Wang et al., 2022).

In addition, ascription of responsibility of college students was also positively related to personal norms toward intention to minimize FW. The results aligned with previous research which revealed that consumers' personal norm towards reduction intention of FW was influenced by their ascription of responsibility (Kim et al., 2022; Obuobi et al., 2024; Wang et al., 2022). Consequently, students with a strong awareness of the adverse impact of FW had strong sense of personal norm to prevent intention to FW.

This study also found that personal norm of college students affected their intention to minimize FW. This result was aligned with the theoretical framework of the NAM, which posited that an individual's behavioral intention may be predicted based on their personal norm. This was aligned with the findings of some studies which demonstrated, that personal norm plays a crucial role towards consumers' intentions to mitigate FW (Kim et al., 2022; Obuobi et al., 2024; Wang et al., 2022). The presence of personal norms has been found to exert a positive impact on intention of the students to avoid FW. Therefore, college students as consumers who experienced feelings of guilt demonstrated a heightened propensity to refrain from wasting food. This sense has the potential to prevent them from producing FW.

6. Conclusion

This study assessed college students' behavior on intention to reduce FW in college canteen. The study found that college students' awareness of FW consequences and ascription of responsibility for such waste will strengthen their personal norms to minimize the FW intention. Therefore, it is important to raise college students' awareness in order to reduce the FW behavior. Higher educational institutions or universities could participate in raising college students' awareness by incorporating knowledge about FW into their educational activities. The integration of the awareness campaign into educational programs significantly impacts the reduction of FW (Tian et al., 2022).

6.1. Theoretical Contributions

This study confirmed that NAM is useful in explaining the behavior of college canteen consumers with regard to FW. This study made significant contributions to literature of FW by established the application of the NAM in predicting behavior related to the prevention of FW among college students. This study expanded upon the NAM framework within the context of pro environmentally behavior, particularly in the field FW behavior of college students as part of young consumers.

6.2. Practical Implications

The findings of the study emphasized the importance of NAM elements in relation to preventing FW among college students when they ate at campus canteens. It is critical to provide the college students, as young consumers, with a thorough understanding of their involvement in reducing FW. This will improve a sense of collective responsibility to contribute to mitigating the FW problem. College students who are aware of the benefits of their actions in reducing FW will feel obligated to prevent it.

Universities, policymakers, and food providers or canteen owners can focus on addressing students' moral norms related to their awareness of FW implications. To improve moral norms, it is first necessary to raise awareness of FW. To increase students' awareness of this issue, they could create campaigns that highlight the negative impact of FW. In addition to incorporating FW issues into educational activities, they can also leverage social media or digital technology to create campaigns that resonate with college students and young consumers, potentially increasing their awareness of FW (Soma et al., 2020). It is expected that increasing awareness will lead to heightened moral responsibility, which subsequently will increase personal norms and reduce intention to FW.

6.3. Limitation and future research suggestions

This study offered valuable insights into the moral dimensions of FW reduction intentions. However, the study's limited sample size prevents generalizing the results. Given that young consumers actively interact with their friends during their daily activities, future studies could focus on a larger sample and integrate additional sociological factors like gender and peer pressure. Furthermore, this study was set in a canteen

context. Future studies could be applied to other contexts, such as at home, in restaurants, or at social gatherings.

References

Al Mamun, A., Ma, Y., Reza, M. N. H., Ahmad, J., Wan, H. W. M. H., & Lili, Z. (2024). Predicting attitude and intention to reduce food waste using the environmental values-beliefs-norms model and the theory of planned behavior. *Food Quality and Preference*, *120*, 105247.

Alattar, M., DeLaney, J., Morse, J., & Nielsen-Pincus, M. (2020). Food Waste Knowledge, Attitudes, and Behavioral Intentions among University Students. *Journal of Agriculture, Food Systems, and Community Development*, *9*, 1–16.

Anderson, J. C., & Gerbing, D. W. (1988). Structural Equation Modeling in Practice: a Review and Recommended Two-step Approach. *Psychological Bulletin*, *103*, 411–423.

Bamberg, S., Hunecke, M., & Blöbaum, A. (2007). Social context, personal norms and the use of public transportation: Two field studies. *Journal of Environmental Psychology*, *27*(3), 190–203.

Biel, A., & Thøgersen, J. (2007). Activation of social norms in social dilemmas: A review of the evidence and reflections on the implications for environmental behaviour. *Journal of Economic Psychology*, *28*(1), 93–112.

Borg, K., Boulet, M., Karunasena, G., & Pearson, D. (2022). Segmenting households based on food waste behaviours and waste audit outcomes: Introducing Over Providers, Under Planners and Considerate Planners. *Journal of Cleaner Production*, *351*, 131589.

Casonato, C., Garcia-Herrero, L., Caldeira, C., & Sala, S. (2023). What a waste! Evidence of consumer food waste prevention and its effectiveness. *Sustainable Production and Consumption*, *41*, 305–319.

Chalak, A., Hassan, H. F., Aoun, P., & Abiad, M. G. (2021). Drivers and determinants of food waste generation in restaurants serving mediterranean mezze-type cuisine. *Sustainability*, *13*, 6358.

Chammas, G., & Yehya, N. A. (2020). Lebanese meal management practices and cultural constructions of food waste. *Appetite*, *155*, 104803.

Chandra, A. R., Lita, R. P., Ma'ruf, M., & Sari, D. K. (2024). Investigating household food waste in Indonesia: An extended norm activation model. *Journal of Infrastructure, Policy and Development*, *8*(13), 9611.

Coşkun, A., & Özbük, R. M. Y. (2020). What influences consumer food waste behavior in restaurants? An application of the extended theory of planned behavior. *Waste Management*, *117*, 170–178.

Djekic, I., Miloradovic, Z., Djekic, S., & Tomasevic, I. (2019). Household food waste in Serbia – Attitudes, quantities and global warming potential. *Journal of Cleaner Production*, *229*, 44–52.

Filimonau, V., Coşkun, A., Yetkin Özbük, R. M., & Ermolaev, V. A. (2023). Like grandmother, like mother, like daughter? Intergenerational influence on consumer intention to reduce food waste. *Journal of Cleaner Production*, *416*, 137920.

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18*(1), 39–50.

Fraj-Andrés, E., Herrando, C., Lucia-Palacios, L., & Pérez-López, R. (2023). Informative initiatives as a useful tool to raise awareness of food waste. An application to higher education. *International Journal of Sustainability in Higher Education*, *24*(4), 840–858.

Gabriel, A., Rombach, M., Wieser, H., & Bitsch, V. (2021). Got waste: Knowledge, behavior and self-assessment on food waste of university students in Germany. *International Food and Agribusiness Management Review*, *24*(6), 951–970.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139–152.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2–24.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135.

Joo, K., Lee, J., & Hwang, J. (2022). NAM and TPB Approach to Consumers' Decision-Making Framework in the Context of Indoor Smart Farm Restaurants. *International Journal of Environmental Research and Public Health*, *19*(21), 14604.

Kansal, M., Ananda, J., Mitsis, A., Karunasena, G. G., & Pearson, D. (2022). Food waste in households: Children as quiet powerhouses. *Food Quality and Preference*, *98* (July 2021), 104524.

Kementerian PPN/Bappenas. (2021). Laporan Kajian Food Loss and Waste di Indonesia Dalam Rangka Mendukung Penerapan Ekonomi Sirkular dan Pembangunan Rendah Karbon. *Laporan Kajian Foodd Loss and Waste Di Indonesia*, 1–116. https://lcdi-indonesia.id/wp-content/uploads/2021/06/Report-Kajian-FLW-FINAL-4.pdf

Kim, W., Che, C., & Jeong, C. (2022). Food Waste Reduction from Customers' Plates: Applying the Norm Activation Model in South Korean Context. *Land*, *11*(1), 1–14.

Kim, Y. (2023). A Study of the Integrated Model with Norm Activation Model and Theory of Planned Behavior: Applying the Green Hotel's Corporate Social Responsibilities. *Sustainability*, *15*, 4680.

Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of E-Collaboration*, *11*(4), 1–10.

Kumparan, (2022, March 19). Jumlah Mahasiswa di Sumbar Capai 224.361 Orang, Terbanyak di Unand dan UNP. *Kumparan.com*. Available at: https://kumparan.com/langkanid/jumlah-mahasiswa-di-sumbar-capai-224-361-orang-terbanyak-di-unand-dan-unp-1xiTrqDhjeF/full. Accessed 9 July 2024.

Lam, D. Y. P., Koh, K. S., Gan, S. W., & Sow, J. T. Y. (2023). Religiosity and the Perception of Interreligious Threats: The Suppressing Effect of Negative Emotions towards God. *Religions*, *14*(3), 1–13.

Maminirina, R., Laila, N., Candra, G., Abbas, A., Maminiaina, R., & Sedera, H. (2023). International Journal of Geoheritage and Parks Explaining littering prevention among park visitors using the Theory of Planned Behavior and Norm Activation Model. *International Journal of Geoheritage and Parks*, *11*(1), 39–53.

Moyal, A., & Schurr, A. (2022). The effect of deliberate ignorance and choice procedure on pro-environmental decisions. *Ecological Economics*, *200*, 107512.

Munerah, S., Koay, K. Y., & Thambiah, S. (2021). Factors influencing non-green consumers' purchase intention: A partial least squares structural equation modelling (PLS-SEM) approach. *Journal of Cleaner Production*, *280*, 124192.

Obuobi, B., Zhang, Y., Adu-Gyamfi, G., & Nketiah, E. (2024). Households' food waste behavior prediction from a moral perspective: a case of China. *Environment, Development and Sustainability*, *26*, 10085–101104.

Onwezen, M. C., Antonides, G., & Bartels, J. (2013). The Norm Activation Model: An exploration of the functions of anticipated pride and guilt in pro-environmental behaviour. *Journal of Economic Psychology*, *39*, 141–153.

Piras, S., Righi, S., Banchelli, F., Giordano, C., & Setti, M. (2023). Food waste between environmental education, peers, and family influence. Insights from primary school students in Northern Italy. *Journal of Cleaner Production*, *383*, 135461.

Podsakoff, P. M., Podsakoff, N. P., Williams, L. J., Huang, C., & Yang, J. (2024). Common Method Bias: It's Bad, It's Complex, It's Widespread, and It's Not Easy to Fix. *Annual Review of Organizational Psychology and Organizational Behavior*, *11*, 17–61.

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.

Qian, L., Li, F., Cao, B., Wang, L., & Jin, S. (2021). Determinants of food waste generation in Chinese university canteens: Evidence from 9192 university students. *Resources, Conservation and Recycling*, *167*, 105410.

Rahmadhani, & Wadrianto, G. K. (2024, May 5). 500-600 Ton Sampah Harian Kota Padang, 61 Persen Sisa Makanan. *Kompas.com*. Available at: https://regional.kompas.com/read/2024/05/03/111654778/500-600-ton-sampah-harian-kota-padang-61-persen-sisa-makanan?lgn_method=google&google_btn=onetap. Accessed 9 July 2024.

Sajid, M., Zakkariya, K. A., Surira, M. D., & Peethambaran, M. (2024). The awareness of consequences, both positive and negative, influences the ascription of responsibility for environmentally responsible behavior among tourists. *Journal of Sustainable Tourism*, *32*(7), 1350–1369.

Savari, M., Damaneh, H. E., Damaneh, H. E., & Cotton, M. (2023). Integrating the norm activation model and theory of planned behaviour to investigate farmer pro - environmental behavioural intention. *Scientific Reports*, *13*, 5884.

Schwartz, S. H. (1973). Normative explanations of helping behavior: A critique, proposal, and empirical test. *Journal of Experimental Social Psychology*, *9*(4), 349–364.

Schwartz, S. H. (1977). Normative influences on altruism. *Advances in Experimental Social Psychology*, *10*, 221–279.

Schwartz, S. H., & Howard, J. A. (1981). A Normative Decision-Making Model of Altruism. In J. P. Rushton & R. M. Sorrentino (Eds.), *Altruism and helping behavior: Social, personality, and developmental perspectives* (pp. 189–211).

Shin, Y. H., Im, J., Jung, S. E., & Severt, K. (2018). The theory of planned behavior and the norm activation model approach to consumer behavior regarding organic menus. *International Journal of Hospitality Management*, 69, 21–29.

Shmueli, G., & Koppius, O. R. (2011). Predictive analytics in information systems research. *MIS Quarterly*, 35(3), 553–572.

Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J. H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: guidelines for using PLSpredict. *European Journal of Marketing*, 53(11), 2322–2347.

Soma, T., Li, B., & Maclaren, V. (2020). Food waste reduction: A test of three consumer awareness interventions. *Sustainability*, 12(3), 907.

Tian, X., Xia, Z., Xie, J., Zhang, C., Liu, Y., & Xu, M. (2022). A meta-analytical review of intervention experiments to reduce food waste. *Environmental Research Letters*, 17(6), 064041.

Tsai, W. C., Chen, X., & Yang, C. (2020). Consumer Food Waste Behavior among Emerging Adults: Evidence from China. *Foods*, 9, 961.

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.

Vidal-Mones, B., Diaz-Ruiz, R., & M. Gil, J. (2022). From evaluation to action: Testing nudging strategies to prevent food waste in school canteens. *Waste Management*, 140, 90–99.

Wahid, N. A., Fadzil, S. F. S., & Ariffin, S. K. (2022). Influences of Problem Awareness, Awareness of Consequences and Ascription of Responsibility on Consumer's Personal Norm to Prevent Water Wastage Behavior. *Environment and Ecology Research*, 10(2), 275–283.

Wang, D., Zhang, K., Lv, X., Xue, L., Yang, Z., & Li, P. (2024). Analysis of factors influencing college students' food waste behavior and evaluation of labor education intervention. *Frontiers in Public Health*, 12, 1372430.

Wang, H., Ma, B., Cudjoe, D., Farrukh, M., & Bai, R. (2023). What influences students' food waste behaviour in campus canteens? *British Food Journal*, 125(2), 381–395.

Wang, J., Li, M., Li, S., & Chen, K. (2022). Understanding Consumers' Food Waste Reduction Behavior—A Study Based on Extended Norm Activation Theory. *International Journal of Environmental Research and Public Health*, 19, 4187.

Wharton, C., Vizcaino, M., Berardy, A., & Opejin, A. (2021). Waste watchers: A food waste reduction intervention among households in Arizona. *Resources, Conservation and Recycling*, 164, 105109.

Zhang, Y., Wang, Z., & Zhou, G. (2013). Antecedents of employee electricity saving behavior in organizations: An empirical study based on norm activation model. *Energy Policy*, 62, 1120–1127.