

Environmental social marketing and consumer food waste reduction: a stimulus–organism–response perspective

Angga Pandu Wijaya^{1,*}, Euis Soliha¹, Endang Sutrasmawati¹, Made Virma Permana¹, Lennora Putit²

¹Department of Management, Faculty of Economics and Business Universitas Negeri Semarang, Semarang, Indonesia

²Department of Management, Faculty of Business and Management, Universiti Teknologi MARA, Selangor, Malaysia

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Abstract

This study examines the effects of environmental knowledge and environmental concern on food waste reduction behaviors, represented by recycling, reducing, and reusing, through the mediating role of environmental attitude. Social marketing has increasingly intersected with consumer behavior, particularly in addressing food waste, which remains a critical environmental issue due to overconsumption. The Stimulus–Organism–Response (SOR) framework is used to explain cognitive and concern-based factors shape behavioral responses through internal psychological mechanisms. A quantitative approach with a causal research design was employed. Using purposive sampling, data were collected from 379 respondents and analyzed through structural equation modeling. The findings reveal that environmental knowledge and environmental concern do not directly influence recycling, reducing, and reusing behaviors. However, both significantly affect environmental attitude, which positively influences all dimensions of food waste reduction. Mediation analysis confirms that environmental attitude fully mediates the relationship between environmental knowledge, environmental concern, and food waste reduction behavior. These results highlight the importance of internal psychological processes in shaping sustainable consumer behavior. Therefore, social marketing strategies should emphasize attitude-based interventions, such as emotional appeals and nudging, as knowledge and concern are insufficient to encourage behavioral change.

Keywords: *environmental knowledge, environmental concern, environmental attitude, food waste reduction.*

Introduction

Social marketing has evolved significantly by applying marketing principles and techniques to influence behavioral changes that benefit both individuals and society. It is closely linked to the concept of empowerment, particularly in relation to post-consumption activities associated with environmental sustainability. Empowerment serves as a crucial foundation in fostering social change by encouraging active participation within communities (Kamin et al., 2022). Social marketing plays an important role in promoting positive environmental behaviors, for instance through campaigns that integrate communication strategies with consumer behavior approaches (Sutinen, 2022). The issue of waste has increasingly developed into a complex environmental problem, as it directly affects environmental quality through various forms of pollution. Data from 2025, reported by the National Waste Management Information System of the Ministry of Environment of the Republic of Indonesia, indicate that the largest proportion of waste in Indonesia

originates from the household sector, with food waste dominating at 56.79%. This figure highlights that consumption patterns and food management practices at the household level are key contributors to national waste generation. Food waste reflects a significant loss of resources utilized across the entire food and beverage supply chain, from upstream to downstream processes (Zulu & Muposhi, 2025). Efforts to reduce food waste fall within the domain of social marketing, which plays a vital role in driving such behavioral changes through strategies that emphasize consumer participation in fostering environmentally responsible awareness.

Research on food waste continues to expand with the aim of reducing the volume of discarded food, highlighting the important role of individual behavior in minimizing resource waste. Even small changes in individual behavior can generate significant cumulative effects in reducing food waste. However, the factors that drive the formation of food waste reduction behavior have not yet been fully and clearly identified. Previous studies have often linked such behavior to environmental-related factors, as shown in the works of Jeswani et al. (2021) and Piras et al. (2023). One key factor in shaping this behavior is environmental knowledge, defined as an individual's level of understanding of issues related to environmental management. Environmental knowledge plays an important role in encouraging food waste reduction, as individuals become more aware of the environmental impacts of food waste and inefficient consumption (Mumtaz et al., 2022). This understanding is associated with the development of awareness and a sense of responsibility in managing food. Such awareness tends to encourage individuals to avoid over-purchasing, which often leads to food waste, and to make more optimal use of leftover food. In this sense, environmental knowledge serves as a cognitive foundation underlying food waste reduction behavior. Environmental knowledge represents the cognitive dimension of pro-environmental behavior, whereas environmental concern reflects a psychological factor associated with food waste reduction. Environmental concern refers to an individual's level of care for environmental conditions and awareness of ecological issues arising from human activities (Nguyen, 2025). It fosters sensitivity toward the negative environmental impacts of food waste. This concern encourages individuals to take action in managing food more responsibly and to avoid unnecessary waste. Individuals with higher environmental concern tend to adopt a broader perspective, taking into account the long-term consequences of their consumption behavior. In this regard, environmental concern functions as an internal driver that shapes the intention to engage in environmentally responsible behavior (Baran et al., 2024).

Previous studies have revealed inconsistencies in findings, indicating that cognitive and psychological factors do not always have a direct influence on environmentally responsible behavior, including food waste reduction. Shan et al. (2025) found that pro-environmental behavior is not automatically formed based solely on individual knowledge, rather, it is mediated by other factors, particularly perception. In line with this, Hossain et al. (2022) and Masykuroh et al. (2024) reported similar findings, showing that trust serves as a mediating variable linking knowledge to environmentally responsible actions. Furthermore, Thanh and Cong (2025) emphasized that environmental concern does not directly influence pro-environmental behavior but operates indirectly through perceived behavioral control. These findings suggest that even when individuals possess substantial environmental knowledge and a high level of concern, such conditions do not necessarily

translate into pro-environmental actions, including food waste reduction. This phenomenon reflects a gap between what individuals know and feel and what they actually do, often referred to as the intention–behavior gap. This gap contributes to inconsistencies in research findings: while some studies report a significant relationship between environmental knowledge and environmental concern and actual behavior, as shown by Hossain et al. (2022) and Karvounidi (2025), others find no significant effect. Such inconsistencies highlight the need for a clearer understanding of the mechanisms that bridge intention and action.

Prior research has identified attitude as a prominent factor in determining actual behavior. Attitude plays a crucial role by shaping individuals' evaluations of a particular behavior, whether it is perceived positively or negatively (Cayolla et al., 2023). These evaluations, influence individuals' tendencies to act consistently with their beliefs. Attitude toward food waste encompasses individuals' beliefs regarding the importance of reducing food waste and the positive outcomes that such actions can generate for the environment and society. A positive attitude toward environmental issues encourages individuals to manage food consumption more efficiently and to avoid unnecessary waste (Herrera et al., 2025). Therefore, attitude can be considered a strong driver that directs individuals toward environmentally responsible behavior.

The Stimulus–Organism–Response (SOR) model originates from environmental psychology, as developed by Mehrabian and Russell (1974), and explains that individual behavior is the result of interactions between external stimuli and internal processes. The SOR framework emphasizes that stimuli do not directly produce responses; instead, they are first processed within the organism through cognitive and affective components (Jacoby, 2002). Earlier approaches tended to view behavior as a direct response to external stimuli, without considering individuals' internal processes. This limitation led to the development of more comprehensive models by incorporating internal components. This study emphasizes the formation of the organism component, represented by environmental attitude. Limited research in food waste reduction has examined the linkage between stimulus and response through a detailed internal mechanism. Therefore, this study extends prior work by applying the SOR framework to provide a more comprehensive explanation of behavioral change through individuals' psychological processes (Talwar et al., 2022). In this research, environmental knowledge and environmental concern are positioned as stimuli. Environmental attitude is conceptualized as the organism, representing the internal processes through which individuals interpret and respond to the stimuli they receive. The response in this study is food waste reduction, referring to individuals' actual behavior in minimizing environmental harm by reducing food-related waste through practices such as reduce, reuse, and recycle. The internal processing of values and understanding encourages individuals to act consistently with those values, thereby strengthening their motivation to reduce food waste within the SOR framework (Chang et al., 2024). Consistent with SOR theory, which emphasizes the role of cognitive and affective components in shaping behavior, environmental knowledge represents the cognitive aspect, while environmental concern reflects the affective dimension. Both cognitive and affective environmental stimuli play a crucial role in shaping food waste reduction behavior.

The state of the art in this research lies in positioning attitude as a key component that drives the behavioral mechanism. Previous studies have not extensively examined

environmental attitude specifically in food waste reduction, indicating the need for further investigation. Much of the existing literature has approached food waste reduction through the Theory of Planned Behavior (TPB), which primarily explains the reasons behind individuals' actions, as reflected in studies by Li et al. (2025) and Malau et al. (2025). However, these approaches have not fully captured the mechanism through which knowledge and psychological factors are translated into actual behavior. This study addresses this gap by employing the Stimulus–Organism–Response (SOR) framework, which offers a more nuanced explanation of how individuals internally process external stimuli to produce behavioral responses. The novelty of this research lies in integrating perspectives from social marketing and consumer behavior to better understand the role of internal processes in shaping individuals' actions in reducing food waste. It builds upon prior research that has largely focused on behavioral intentions, by advancing the discussion toward the internal mechanisms that underpin actual behavior.

Methods

This study adopts a quantitative approach, which involves measuring data in numerical form and applying statistical analysis to examine the relationships among variables in the research model. The research design employed is causal research, which aims to test the influence between variables within a given construct (Sekaran & Bougie, 2016). Specifically, this study examines the effects of environmental knowledge and environmental concern on food waste reduction, measured through three dimensions: reduce, reuse, and recycle, with environmental attitude serving as a mediating variable. This approach is selected because it enables an empirical explanation of causal relationships among the variables under investigation.

The population of this study consists of individuals involved in food waste-related activities in their daily lives, particularly those responsible for post-consumption decisions or actions, including reducing, reusing, and recycling food waste. The sample was drawn from individuals residing in major cities in Indonesia, where facilities supporting reduce, reuse, and recycle practices are generally available and environmental literacy is relatively more established. This selection aims to better represent the knowledge dimension related to environmental awareness. The sampling technique employed is non-probability sampling using a purposive sampling approach. The criteria for respondents include individuals aged at least 17 years and those who have engaged in reducing, reusing, or recycling food waste. The required sample size was determined using the formula proposed by Tabachnick and Fidell (2007), which is expressed as $N \geq 50 + 8p$, where p represents the number of predictors. Given that this study involves three independent variables, the minimum sample size was calculated as $50 + 8(3)$, yielding $50 + 24 = 74$ respondents. However, in consideration of the recommendation by Hair et al. (2014), which suggests a minimum sample size of 100 for multivariate analysis, the final sample size adopted for this study exceeded the calculated threshold to ensure greater statistical reliability.

Based on these considerations, this study successfully collected data exceeding the required threshold, with a total of 379 respondents from several major cities in Indonesia. This larger sample size was intended to ensure better representation and improve the quality of the data obtained. Data for this study were collected using a survey distributed to respondents across several major cities in Indonesia. The survey was conducted offline to

obtain primary data directly from respondents. The data collection process was supported by trained enumerators who first explained the purpose and content of the survey and then asked for respondents' willingness to participate. Enumerators ensured that respondents met the predefined sampling criteria. In addition, they assisted by reading the questionnaire items aloud, which helped minimize potential bias arising from misinterpretation or inattentiveness in reading (Kadam et al., 2025). The survey instrument consisted of a structured questionnaire using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) to measure respondents' level of agreement with the given statements. The measurement items were adapted from prior studies. Environmental concern was measured using four indicators adopted from Goh & Balaji (2016). Environmental knowledge was measured using three indicators from Mostafa (2007). Environmental attitude was measured using four indicators adapted from Borin et al. (2011) to assess consumers' evaluations of food waste. Food waste reduction was measured through three dimensions, namely reduce, reuse, and recycle, based on Attiq et al. (2021). The study successfully collected the required sample, and the demographic characteristics of the respondents are presented using descriptive statistics, as shown in Table 1.

Table 1. Descriptive Statistics Results

Criteria	Category	N	Frequency
Gender	Male	168	44.33%
	Female	211	55.67%
Age	18–25	48	12.66%
	26–33	70	18.47%
	34–41	71	18.73%
	42–49	68	17.94%
	50–57	56	14.78%
	58–65	39	10.29%
	Over 65	27	7.12%
Education	High School	18	4.75%
	Diploma	34	8.97%
	Bachelor's	222	58.58%
	Master's	73	19.26%
	Doctoral	32	8.44%
City of Origin	Jakarta	86	22.69%
	Bandung	36	9.50%
	Semarang	43	11.35%
	Yogyakarta	41	10.82%
	Surabaya	53	13.98%
	Denpasar	46	12.14%
	Medan	34	8.97%
	Makassar	32	8.44%
	Others	8	2.11%

Table 1 shows a relatively balanced gender composition, with 211 females (55.67%) and 168 males (44.33%), indicating slightly higher female participation. The female respondents largely represent women who serve as homemakers and are primarily responsible for managing household food consumption. Respondents are distributed across different age groups, although the largest proportions fall within the 26 to 41 age range, suggesting that the sample is dominated by individuals in their productive years rather than

very young or elderly groups. In terms of education, most respondents hold a bachelor's degree (58.58%), followed by those with a master's degree (19.26%), indicating a predominantly well-educated sample that is capable of comprehending structured survey instruments. Geographically, respondents are drawn from major cities in Indonesia, with Jakarta (22.69%) and Surabaya (13.98%) contributing the largest shares, while other cities are represented in smaller yet meaningful proportions. This distribution supports a diverse urban representation, as practices such as recycling, reducing, and reusing are more commonly supported by facilities available in large cities in Indonesia.

Variance Based Structural Equation Modeling (VB-SEM) is applied as a multivariate analytical approach to examine the proposed constructs. This method is particularly suitable for analyzing complex models, as it allows for the simultaneous assessment of relationships among latent variables while evaluating both the measurement model (outer model) and the structural model (inner model) (Ringle et al., 2024). The analysis includes the assessment of construct validity and reliability through tests of convergent validity, discriminant validity, and composite reliability (Henseler et al., 2015). The structural model is then evaluated to examine the strength and significance of the relationships among variables, based on path coefficients and their statistical significance.

Result and Discussions

The outer model assessment aims to evaluate the quality of the research instrument in representing the latent constructs. This assessment includes tests of validity and reliability. Validity is examined using factor loadings with a threshold of 0.7 or higher, and Average Variance Extracted (AVE) with a minimum threshold of 0.5. Reliability is assessed using Composite Reliability and Cronbach's Alpha, both of which require values of at least 0.7. The results of the validity and reliability tests are presented in Table 2.

Table 2. Results of Validity and Reliability Tests

Indicator	Code	Loading	CA	CR	AVE
Environmental Concern					
Concern about environment	EnvCon1	0.905	0.916	0.941	0.799
Environment affects health	EnvCon2	0.885			
Willingness to sacrifice for environment	EnvCon3	0.881			
Individual responsibility for environment	EnvCon4	0.905			
Environmental Knowledge					
Knowledge about food waste issues	EnvKnow1	0.947	0.946	0.965	0.903
Comparative knowledge on food waste	EnvKnow2	0.962			
Knowledge of how to reduce food waste	EnvKnow3	0.942			
Environmental Attitude					
Eco-friendly product preference	EnvAtt1	0.936	0.949	0.963	0.867
Global warming concern	EnvAtt2	0.922			
Importance of reducing, reusing, and recycling	EnvAtt3	0.924			
Willingness to pay for eco-friendly products	EnvAtt4	0.941			

Recycle					
Reselling food for economic reasons	Rcc1	0.932	0.969	0.976	0.890
Reselling food for recycling purposes	Rcc2	0.948			
Reselling food to save money	Rcc3	0.952			
Reselling food to reduce landfill	Rcc4	0.956			
Preference for reselling over discarding food	Rcc5	0.929			
Reuse					
Environmental benefit of reusing food	Reus1	0.873	0.966	0.973	0.880
Maximizing use of leftover food	Reus2	0.960			
Cost-saving through reusing food	Reus3	0.948			
Reusing instead of buying new	Reus4	0.959			
Reusing to reduce landfill impact	Reus5	0.947			
Reduce					
Careful purchasing to reduce food waste	Rdc1	0.954	0.959	0.973	0.924
Meal management to reduce food waste	Rdc2	0.964			
Seeking information about food waste impacts	Rdc3	0.966			

Based on Table 2, the results indicate that all constructs meet the required criteria for validity and reliability. Convergent validity is assessed through factor loadings and Average Variance Extracted (AVE). All indicators have factor loadings above the minimum threshold of 0.70, indicating that they adequately represent their respective constructs. In addition, the AVE values for all variables exceed the cutoff value of 0.50, suggesting that each latent variable is able to explain more than half of the variance of its indicators. The reliability assessment demonstrates consistent results. Cronbach's alpha values for all constructs are ≥ 0.70 , indicating good internal consistency. This is further supported by composite reliability values that exceed the minimum threshold of 0.70, confirming that the constructs are reliable. The purpose of model fit testing is to ensure that the proposed model adequately represents the empirical data. The results of the model fit assessment are presented in Table 3.

Table 3. Model Fit Test Results

Model Fit	Saturated Model	Estimated Model
SRMR	0.042	0.057
d_ULS	0.540	0.975
d_G	1.220	1.562
Chi-Square	1032.866	1206.756
NFI	0.917	0.906

Based on the model fit results presented in Table 3, the SRMR value for the saturated model is 0.042 and for the estimated model is 0.057, both of which are below the cutoff value of 0.08, indicating a good level of model fit. The NFI values are 0.917 for the saturated model and 0.906 for the estimated model, both exceeding the minimum threshold of 0.90, suggesting that the model demonstrates an acceptable level of goodness of fit. Meanwhile,

the values of d_{ULS} , d_G , and Chi Square show differences between the saturated and estimated models. However, these indices are considered supplementary and are not the primary criteria in evaluating model fit. The model fit results confirm that the model meets the recommended adequacy criteria.

The inner model assessment is conducted to evaluate the relationships among latent constructs in the research model in order to test the proposed hypotheses. This assessment includes several key indicators, namely the coefficient of determination (R^2), significance testing using t statistics or p values, and effect size (f^2) to determine the contribution of each exogenous variable to the endogenous variables. The results of the coefficient of determination are presented in Table 4.

Table 4. Results of Coefficient of Determination Test

Variable	R Square	R Square Adjusted
Environmental Attitude	0.840	0.838
Recycle	0.823	0.820
Reduce	0.843	0.840
Reuse	0.876	0.873

Based on the results of the coefficient of determination (R^2) presented in Table 4, the findings indicate the ability of the independent variables to explain the variation in the dependent variables within the research model. The results show that the obtained R^2 values demonstrate that the endogenous constructs are strongly explained by the exogenous constructs, as indicated by values equal to or greater than 0.80. These findings confirm that the research model has sufficient explanatory power in capturing the influence of independent variables on food waste reduction behavior. The analysis is then extended by examining the effect size (f^2), the results of which are presented in Table 5.

Table 5. Results of Effect Size (f^2) Test

Variable	Env. Attitude	Env. Concern	Env. Knowledge	Recycle	Reduce	Reuse
Environmental Attitude				0.689	0.842	1.076
Environmental Concern	0.071			0.001	0.004	0.008
Environmental Knowledge	0.663			0.000	0.001	0.002

The results of the effect size (f^2) test presented in Table 5 indicate varying levels of contribution from each exogenous variable to the endogenous variables in the research model. Environmental attitude demonstrates a very strong influence on recycling, reducing, and reusing, as reflected in the respective f^2 values. Environmental knowledge shows a strong effect on environmental attitude. However, environmental concern exhibits a relatively small influence on other variables, categorized as weak. These effect size findings suggest that environmental attitude serves as the dominant factor in shaping food waste reduction behavior.

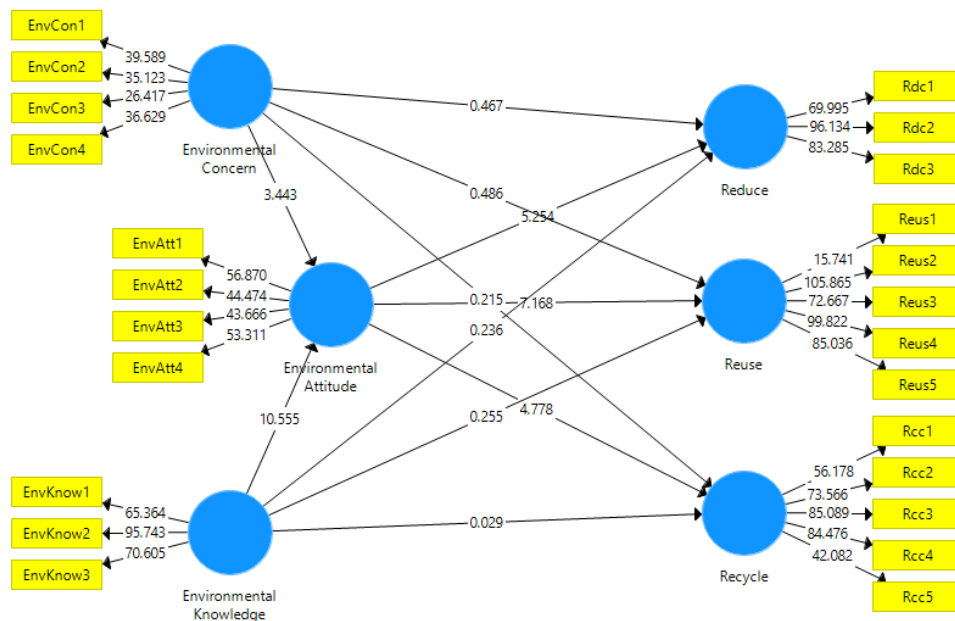


Figure 1. Research Framework

Hypothesis testing was conducted through direct and indirect effect analyses, as presented in Tables 6 and 7, with the framework illustrated in Figure 1.

Table 6. Direct Effects Testing

Hypothesis	β	STDEV	T Statistics	Decision
Environmental Knowledge → Recycle	0.006	0.218	0.028	Not Supported
Environmental Knowledge → Reduce	0.041	0.177	0.229	Not Supported
Environmental Knowledge → Reuse	0.045	0.184	0.246	Not Supported
Environmental Knowledge → Environmental Attitude	0.706	0.076	9.338**	Supported
Environmental Concern → Recycle	0.035	0.176	0.198	Not Supported
Environmental Concern → Reduce	0.054	0.123	0.439	Not Supported
Environmental Concern → Reuse	0.073	0.162	0.449	Not Supported
Environmental Concern → Environmental Attitude	0.231	0.075	3.097*	Supported
Environmental Attitude → Recycle	0.872	0.180	4.833**	Supported
Environmental Attitude → Reduce	0.909	0.184	4.938**	Supported
Environmental Attitude → Reuse	0.914	0.137	6.688**	Supported

(** indicates $p < 0.001$; * indicates $p < 0.01$)

The results of the direct hypothesis testing, as presented in Table 6, indicate that environmental knowledge does not have a significant effect on recycle ($\beta = 0.006$; $t = 0.028$), reduce ($\beta = 0.041$; $t = 0.229$), or reuse ($\beta = 0.045$; $t = 0.246$), and therefore these three hypotheses are not supported. However, environmental knowledge is found to have a positive and significant effect on environmental attitude ($\beta = 0.706$; $t = 9.338$; $\text{sig} = 0.000$). The findings show that environmental concern does not significantly influence recycle ($\beta = 0.035$; $t = 0.198$), reduce ($\beta = 0.054$; $t = 0.439$), or reuse ($\beta = 0.073$; $t = 0.449$). Nevertheless,

it has a positive effect on environmental attitude ($\beta = 0.231$; $t = 3.097$; $\text{sig} = 0.05$). In contrast, environmental attitude demonstrates a positive and significant influence on recycle ($\beta = 0.872$; $t = 4.833$; $\text{sig} = 0.000$), reduce ($\beta = 0.909$; $t = 4.938$; $\text{sig} = 0.000$), and reuse ($\beta = 0.914$; $t = 6.688$; $\text{sig} = 0.000$).

Table 7. Indirect Effects Testing

Hypothesis	β	STDEV	T Statistics	Decision
Environmental Knowledge → Environmental Attitude → Recycle	0.615	0.148	4.163*	Supported
Environmental Knowledge → Environmental Attitude → Reduce	0.641	0.151	4.234*	Supported
Environmental Knowledge → Environmental Attitude → Reuse	0.645	0.123	5.224*	Supported
Environmental Concern → Environmental Attitude → Recycle	0.201	0.068	2.952**	Supported
Environmental Concern → Environmental Attitude → Reduce	0.210	0.071	2.935**	Supported
Environmental Concern → Environmental Attitude → Reuse	0.211	0.067	3.161**	Supported

(** indicates $p < 0.001$; * indicates $p < 0.01$)

The results presented in Table 6 indicate that environmental knowledge has a positive indirect effect on recycling through environmental attitude ($\beta = 0.615$; $t = 4.163$; $\text{sig} = 0.05$), reduce ($\beta = 0.641$; $t = 4.234$; $\text{sig} = 0.05$), and reuse ($\beta = 0.645$; $t = 5.224$; $\text{sig} = 0.05$), meaning that all hypotheses are supported. Similarly, environmental concern is found to have a positive indirect effect on recycle through environmental attitude ($\beta = 0.201$; $t = 2.952$; $\text{sig} = 0.000$), reduce ($\beta = 0.210$; $t = 2.935$; $\text{sig} = 0.000$), and reuse ($\beta = 0.211$; $t = 3.161$; $\text{sig} = 0.000$). These findings confirm that environmental attitude fully mediates the relationship between environmental knowledge and environmental concern and food waste reduction, which is represented through recycle, reduce, and reuse behaviors.

The findings of this study indicate that environmental knowledge does not have a direct effect on food waste reduction, including recycle, reduce, and reuse behaviors. This result reinforces the view that environmental knowledge, as a cognitive aspect, does not directly translate into food waste reduction behavior. In line with Aydin & Yildirim (2021), knowledge consists of information, facts, or concepts acquired through various processes such as learning, as highlighted by Sitompul et al. (2025). Environmental knowledge functions as a foundation for shaping ways of thinking, but it does not necessarily translate into corresponding actions. This study confirms that knowledge is an important basis, yet it does not automatically lead to behavioral change. A similar pattern is observed for environmental concern, which does not have a direct effect on food waste reduction. This finding suggests that concern is not sufficient to drive actual behavior. The results support Schrank et al. (2023), who found that environmental concern does not directly influence positive waste management behavior. On the other hand, this study finds that environmental attitude has a positive effect on food waste reduction across all dimensions, including recycling, reducing, and reusing. This is consistent with Kumar et al. (2025), who argue that attitude represents an evaluative process that leads to behavior formation, as it

is closely related to underlying values. Individuals whose values align with their understanding are more likely to evaluate and translate these into actions such as recycling, reducing, and reusing food waste.

The study demonstrates that environmental knowledge and environmental concern exert indirect effects on food waste reduction through environmental attitude. These findings highlight the presence of an internal mechanism that transforms knowledge and concern into actual behavior, namely attitude. Based on the knowledge they possess, individuals recognize that the environment will be negatively affected if food waste continues to occur. Knowledge supports the evaluation process, leading to the formation of judgments that serve as a foundation for behaviors such as recycling, reducing, and reusing. Similarly, environmental concern provides the basis for shaping attitudes, particularly by fostering a sense of discomfort toward environmental degradation and resource waste. This study demonstrates that attitude plays a substantial role in shaping behavior, grounded in both knowledge and concern. The findings are consistent with Fabio et al., (2025), who emphasize that attitude is a psychological factor that evaluates and strongly drives behavior. Furthermore, this study addresses the intention–behavior gap that has not been fully explained in previous research using the Theory of Planned Behavior, as seen in studies such as Malau et al., (2025) and Valentin et al., (2024). The results provide a clearer explanation by highlighting the role of psychological mechanisms that have been difficult to capture in prior research. In line with the SOR framework, stimuli do not directly influence responses, but instead require an internal mechanism in the form of environmental attitude. These findings offer new insights by emphasizing the importance of attitude as a key factor in driving food waste reduction behavior. They underline the critical role of individuals' internal mechanisms in shaping and influencing environmentally responsible actions.

Conclusion

The study was conducted to examine the effects of environmental knowledge and environmental concern on food waste reduction through environmental attitude. The findings reveal that behavior is not directly shaped by environmental knowledge and environmental concern. Instead, environmental attitude emerges as the key determinant that drives individuals to engage in food waste reduction behaviors, including recycling, reducing, and reusing. The findings provide important insights by demonstrating that environmental attitude is a central factor in shaping and transforming behavior. Environmental attitude is formed through knowledge and concern, which support individuals in evaluating environmental issues. The results contribute to addressing the intention–behavior gap that has remained unresolved in prior research. From a social marketing perspective, the results suggest that behavior is driven by attitude, highlighting the need for organizations to focus on shaping values that align with those held by individuals. Values play a crucial role in the evaluative process, as they influence individuals perceive a behavior as positive or negative. Therefore, campaigns should be designed around themes related to environmental sustainability while fostering emotional engagement, such as evoking a sense of guilt when food is wasted unnecessarily.

Future studies are encouraged to examine other psychological and social factors that may influence food waste reduction behavior, such as environmental self-identity, and personal values. Since this study employed a cross-sectional design, future research may

adopt longitudinal or experimental approaches to provide a deeper understanding of behavioral change over time.

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