# Student Awareness on
# 3R's Behavior in Food Waste

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**ABSTRACT**

Food production requires an honest kind of resources, like energy, water, and land, responsible for most greenhouse gas (GHG) emissions caused by households. Most of the waste in South Sumatra, the maximum amount as 38.83 per cent, is dominated by food waste. Household waste dominates the maximum amount as 63.55 per cent compared to other waste. This research uses quantitative research. The sample during this paper is 274 people. The research technique uses non-probability sampling using purposive samples. In collecting the questionnaire, Google Forms contains statements related to dimensions related to the variables measured. The measurement scale used employs a Likert scale. The info analysis technique uses descriptive analysis, testing data instruments validly and reliability tests, simple rectilinear regression analysis, classical assumption tests, and conducting model feasibility tests with the assistance of SPSS V.25 software. We found a significant positive effect between awareness variable (X) on 3R behaviour (Y). during this study, we found that student awareness influences 3R behaviour, especially in food waste.

*Keywords: awareness, 3Rs Behaviour, Food Waste.*

## 1. INTRODUCTION

Food production requires a wide variety of resources, such as energy, water and land, and they are responsible for most of the greenhouse gas (GHG) emissions caused by households. [1]. When food is not consumed but thrown away, this results in more GHG emissions, overuse of resources, and more significant changes in biodiversity than necessary [2]. Based on SIPSN, most of the waste in South Sumatra, as much as 38.83 per cent, is dominated by food waste. Consumers in South Sumatra dispose of more waste than other types of waste, such as wood/twigs, paper, plastic and others [3].

Most of the piles of waste come from household waste. Household waste dominates as much as 63.55 per cent compared to other waste [3]. As household consumers who are the largest producers of food waste, previous studies were investigating consumer behaviour related to food waste [4] [5][6]. According to [7], to date, the topic of awareness has not received much research attention, and comprehensive models that can explain consumer food waste behaviour are lacking. Therefore, the present study aims to research the factors which will change people's behaviour to treat garbage.

Awareness of the public in choosing waste is a factor that causes more and more piles of waste that should be processed [8]. Especially food waste or referred to as organic waste. Consciousness refers to people's perceptions and intellectual responses to what conditions they experience [9]. In this study, awareness is measured by how people are aware of food waste that should be processed.

Research from [10][11] [12] found that awareness influences behaviour [13][14]. Likewise, in research

[10][11], It was found that awareness has the influence to clarify consumer intentions in buying behaviour.

The findings [15] show that awareness directly influences buying behaviour. It is often concluded from this research that there's a big relationship between awareness and buying behaviour. This research is also in line with research from [16][17], which examines attitudes towards the environment, awareness, environmental values, environmental care and awareness of environmental problems. On the other hand, few authors have explored concerns about the awareness to recycle waste [18][19]

It is often concluded from this research that there is a significant relationship between awareness and buying behaviour. The research is also in line with those who examine attitudes towards the environment, awareness, environmental values, environmental care and awareness of environmental problems. On the other hand, only a few authors have explored concerns about awareness of recycling waste. Waste reduction behaviour is usually administered using promotions to increase public awareness [20]. Raising awareness about the waste problem is a serious matter, and all individuals should contribute to reducing waste. Therefore, it is imperative to raise a higher awareness of personal responsibility if they understand that when they produce too much waste, it can be a motivation for waste reduction.

## 2. LITERATURE REVIEW AND HYPOTHESIS

### 2.1. 3R'S Behaviour

This study examines behaviour by applying the 3R concept -reducing, reusing and recycling, which are essential practices for managing waste. Reduce food indicates avoidance of use. Many countries have undertaken campaigns to educate, raise awareness and encourage people to consume products that produce less waste [21].

### 2.2. Awareness

Awareness is often defined as "knowing the impact of human behaviour on the environment". Some cognitive and emotional limitations limit consciousness. Cognitive limitations include the immediacy of many ecological problems, the slow and gradual destruction of ecology and the complexity of environmental problems that can seriously compromise an individual's willingness to act on the environment. Emotional limitations include emotional non-engagement and emotional reactions. It is believed that his ecological behaviour can increase an individual's environmental awareness.

For example, people can buy products with environmentally friendly labels, eat organic food, and participate in recycling programs to increase their awareness of environmental issues. Some people stop using hairspray after realizing the serious consequences of releasing chlorofluorocarbons (CFCs) and the resulting depletion of the ozone layer. In examining the attitudes of hotel employees towards environmental management systems, [22] showed that environmental awareness is enhanced by environmental awareness and increased individual understanding of the system. As a result of their increased environmental awareness, they apply that knowledge in their daily life. [15] Said awareness has a direct positive influence on buying behaviour. From these studies, there is a significant relationship between awareness and behaviour. On the other hand, little research discusses awareness to recycle [18][19].

H0 : Awareness has no effect on 3Rs Behavior

H1 : Awareness affects 3Rs Behavior

Graphically the relationship is built between the variables studied can be made as shown below:



**Fig.1 Conceptual Framework**

## 3. RESEARCH AND METHODOLOGY

This research uses quantitative research. The research population is all students of the Faculty of Economics, Tridinanti University, Palembang, in 2020 and 2021, totalling 869 people. The research technique uses non-probability sampling using purposive samples. The sample used is by using the Slovin formula with the following calculations:

$$n = \frac{N}{1+Ne^2}$$

$$n = \frac{869}{1 + (869 \times 0{,}05^2)} = \frac{869}{1 + 2{,}1725} = \frac{869}{3{,}172} = 273{,}9 = 274$$

So that the research sample totalled 274 people, in collecting the questionnaire, it was done using Google Forms which contained statements related to dimensions related to the variables measured. The measurement scale used is using a Likert scale. The data analysis technique was carried out using descriptive analysis, testing data instruments with validity and reliability tests, simple linear regression analysis, classical assumption tests, and conducting model feasibility tests with the help of SPSS V.25 software.

## 4. RESULT AND DISCUSSION

### 4.1. Validity Test

As we know that the data's r-table value is 274, then the value of df (n-2) = 274 – 2 = 272 with a 5% significance level of 0.1190, the value below this table comes from the SPSS results above. It is said to be valid if r-count > r-table.

**Table 1 Validity Test**

| Variable | r table | r count | Result |
|---|---|---|---|
| A.1 | 0,1190 | .810 | Valid |
| A.2 | 0,1190 | .838 | Valid |
| A.3 | 0,1190 | .793 | Valid |
| B.1 | 0,1190 | .553 | Valid |
| B.2 | 0,1190 | .483 | Valid |
| B.3 | 0,1190 | .850 | Valid |
| B.4 | 0,1190 | .795 | Valid |
| B.5 | 0,1190 | .796 | Valid |
| B.6 | 0,1190 | .797 | Valid |

Source : Primary data were processed in 2021

### 4.2. Reliability Test

For the instrument reliability test, the closer the reliability coefficient is to 1.0, the better. In general, reliability less than 0.6 is considered flawed, reliability in the range of 0.6 to 0.7 is acceptable, and more than 0.8 is good. The following is a table of Cronbach's alpha values for each instrument.

**Table 2 Realibility Test**

| Variable | cronbach's alpha | Result |
|---|---|---|
| A.1 | 0.649 | Reliabel |
| A.2 | 0.627 | Reliabel |
| A.3 | 0.701 | Reliabel |
| B.1 | 0.820 | Reliabel |
| B.2 | 0.831 | Reliabel |
| B.3 | 0.752 | Reliabel |
| B.4 | 0.769 | Reliabel |
| B.5 | 0.767 | Reliabel |
| B.6 | 0.765 | Reliabel |

Source : Primary data were processed in 2021

### 4.3. Normality Test

**Table 3 Normality Test**

| One-Sample Kolmogorov-Smirnov Test | | Unstandardized Residual |
|---|---|---|
| N | | 274 |
| Normal Parameters[a,b] | Mean | .0000000 |
| | Std. Deviation | 3.52207865 |
| Most Extreme Differences | Absolute | .054 |
| | Positive | .054 |
| | Negative | -.050 |
| Test Statistic | | .054 |
| Asymp. Sig. (2-tailed) | | .053[c] |
| a. Test distribution is Normal. | | |
| b. Calculated from data. | | |
| c. Lilliefors Significance Correction. | | |

Source : Primary data were processed in 2021

Based on the normality results above, the value of Asy, p Sig is 0.053 > 0.05, so there is no normality problem in this study.

### 4.4. Heteroskedasticity Test

**Table 4 Heteroskedasticity Test**

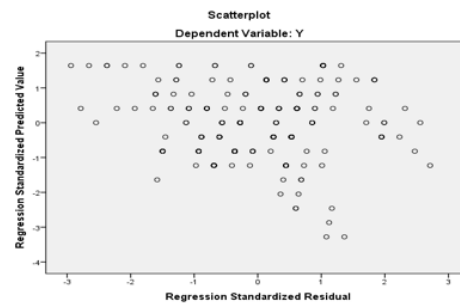| | | Coefficients[a] | | | | |
|---|---|---|---|---|---|---|
| | | Unstandardized Coefficients | | Standardized Coefficients | | |
| Model | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 1.495 | .588 | | 2.542 | .012 |
| | X | .119 | .052 | .137 | 1.785 | .053 |
| a. Dependent Variable: Abs_Res | | | | | | |

Source : Primary data were processed in 2021

Based on the table above, using the heteroscedasticity test, the probability value for the independent variable in the study is above 0.5. In this study, there is no heteroscedasticity problem because the Sig value > 0.05.

### 4.5. Heteroskedasticity Test (Scatter Plot)

**Fig. 2 Heteroskedasticity Test**



Source : Primary data were processed in 2021

The picture above shows that the points spread randomly do not have a clear pattern, spread above and below 0 on the Y-axis. As shows that the variables in this study do not occur heteroscedasticity and have met the requirements as a simple linear regression model.

### 4.6. Multicollinearity Test

**Table 5 Multicollinearity Test**

| | | Coefficients[a] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Unstandardized Coefficients | | Standardized Coefficients | | | Collinearity Statistics | |
| Model | | B | Std. Error | Beta | t | Sig. | Tolerance | VIF |
| 1 | (Constant) | 11.645 | .986 | | 11.805 | .000 | | |
| | X | .848 | .088 | .506 | 9.687 | .000 | 1.000 | 1.000 |
| a. Dependent Variable: Y | | | | | | | | |

Source : Primary data were processed in 2021

Based on the results of the multicollinearity test, we can see that in the table above, in the Centered VIF column. The VIF value of all variables is not more than 5 or 10 (there is literature that says no more than 10), so it says that there is no multicollinearity in the independent variables in this study. Based on the classical assumptions of linear regression with OLS, an excellent linear regression model is free from multicollinearity. Thus, the above model is free from multicollinearity.

### 4.7. Simple Linear Regression Analysis

**Table 6 Simple Linear regression**

**Coefficients<sup>a</sup>**

| Model | | Unstandardized Coefficients B | Unstandardized Coefficients Std. Error | Standardized Coefficients Beta | t | Sig. |
|---|---|---|---|---|---|---|
| 1 | (Constant) | 11.645 | .986 | | 11.805 | .000 |
| | X | .848 | .088 | .506 | 9.687 | .000 |

a. Dependent Variable: Y

Source : Primary data were processed in 2021

α  = Constant
X = Awareness
e = Error term

From the above equation, this can be explained that:
1) The constant value of 11.645 indicates that if the dependent variable, namely behaviour, is zero, the 3R behaviour is a constant of 11.645%.
2) Awareness coefficient value of 0.848 indicates that an increase in Awareness in one number will increase 3R behaviour by 0.848%, assuming other variables are constant.

### 4.8. F-Test (Simultaneous Test)

The results of SPSS data processing on the F test to see whether or not there is a joint influence of the independent variables on the dependent variable and to test whether the model used to be fixed or not.

**Table 7 F Test**

**ANOVA<sup>a</sup>**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 1168.246 | 1 | 1168.246 | 93.830 | .000<sup>b</sup> |
| | Residual | 3386.575 | 272 | 12.451 | | |
| | Total | 4554.821 | 273 | | | |

a. Dependent Variable: Y

b. Predictors: (Constant), X

Source : Primary data were processed in 2021

The data processing results in table 7 above show a significant value at 0.0000 (sig 0.00000 <0.05). It means that the regression equation obtained is reliable or the model used is fixed so that there is a joint or simultaneous influence between the awareness variables on 3R behaviour.

### 4.9. Coefficient of Determination ($R^2$)

**Table 8 Coefficient of Determination**

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .506<sup>a</sup> | .256 | .254 | 3.52855 |

a. Predictors: (Constant), X

Source : Primary data were processed in 2021

The Coefficient of Determination aims to see or measure how far the model's ability to explain the dependent variable is. From the SPSS output display in table 3 above, the amount of Adjusted R Square is 0.256; this indicates that the contribution of the variable X (k is 25.6%, while other factors determine the remaining 74.4% (100-25.6). Outside, the model is not detected in this study.

Results of Hypothesis Testing with t-Test The decision to reject or accept the hypothesis with a total of 274 data and a significance level of 5% with the formula t table = t(α/2;nk-1) = t(0.05/2;274 -1 -1 ) = (0.025;272) so that the selected t-table value on data 272 is 1.9687 based on the following criteria.

1) If t count < 0,05, then H0 is accepted, and Ha is rejected (there is no effect).
2) If t count > 0,05, then H0 is rejected, and Ha is accepted (there is an effect).

Then the results of the t-test from Table 6 is: There is a significant positive effect between the awareness variable (X) on 3R behaviour (Y) because the t-count > t-table (9.687 > 1.9687). So,  there is an influence between the Awareness variable (X) on 3R Behavior (Y), or in other words, H0 is rejected, and Ha is accepted.

## 5. CONCLUSION

In this study, we found that awareness influences 3R behaviour in food waste. The foremost objective of this research is to provide basic knowledge to develop a campaign that aims to reduce the extent of food waste that's still generated at the household level Awareness of students will impact 3R behaviour. We hope that increasing student awareness will have an impression on reducing food waste within the surrounding environment.

## 6. LIMITATION AND STUDY FORWARD

This study only examines student awareness with a sample of 274 people. For further research, we expected to examine other variables such as social media and the intention to recycle. Further research can also add the number of samples and objects studied, such as the 3R behaviour on plastic, wood or twigs, and glass.

## REFERENCES

[1]    A. Tukker and B. Jansen, "Environmental impacts of products: A detailed review of studies," *J. Ind. Ecol.*, vol. 10, pp. 159–182, 2006.

[2]    FAO, "Food wastage footprint: impacts on natural resources. Summart report," Rome, 2913.

[3]    sipsn.menlhk.go.id,    "Timbulan    Sampah," *Sipsn.Menlhk.Go.Id*,  2021.  [Online].  Available: https://sipsn.menlhk.go.id/sipsn/public/data/timb ulan.

[4] E. Graham-Rowe, D. C. Jessop, and P. Sparks, "Identifying motivations and barriers to minimising household food waste," *Resour. Conserv. Recycl.*, vol. 84, pp. 15–23, 2014.

[5] V. H. M. Visschers, N. Wickli, and M. Siegrist, "Sorting out food waste behaviour: A survey on the motivators and barriers of self-reported amounts of food waste in households," *J. Environ. Psychol.*, vol. 45, pp. 66–78, 2016.

[6] M. Hebrok and C. Boks, "Household food waste: Drivers and potential intervention points for design – An extensive review," *J. Clean. Prod.*, vol. 151, pp. 380–392, 2017.

[7] V. Stefan, E. van Herpen, A. A. Tudoran, and L. Lähteenmäki, "Avoiding food waste by Romanian consumers: The importance of planning and shopping routines," *Food Qual. Prefer.*, vol. 28, no. 1, pp. 375–381, 2013.

[8] H. Harun, "Gambaran Pengetahuan dan Perilaku Masyarakat Dalam Proses Pemilahan Sampah Rumah Tangga Di Desa Hegarmanah," *J. Apl. Ipteks untuk Masy.*, vol. 6, no. 2, pp. 86–88, 2017.

[9] A. R. Ambali and A. N. Bakar, "People's Awareness on Halal Foods and Products: Potential Issues for Policy-makers," *Procedia - Soc. Behav. Sci.*, vol. 121, no. September 2012, pp. 3–25, 2014.

[10] Y. A. Aziz and N. V. Chok, "The Role of Halal Awareness, Halal Certification, and Marketing Components in Determining Halal Purchase Intention Among Non-Muslims in Malaysia: A Structural Equation Modeling Approach," *J. Int. Food Agribus. Mark.*, vol. 25, no. 1, pp. 1–23, 2013.

[11] H. Hamdan, Z. M. Issa, N. Abu, and K. Jusoff, "Purchasing Decisions among Muslim Consumers of Processed Halal Food Products," *J. Food Prod. Mark.*, vol. 19, no. 1, pp. 54–61, 2013.

[12] A. Abd Rahman, E. Asrarhaghighi, and S. Ab Rahman, "Consumers and halal cosmetic products: Knowledge, religiosity, attitude and intention," *J. Islam. Mark.*, vol. 6, no. 1, pp. 148–163, 2015.

[13] S. Krishnan, M. H. H. . Aderis, M. . Azman, and M. N. . Kamaluddin, "Halal food: Study on non-muslim acceptance.," *Am. J. Econ.*, vol. 7(1), pp. 41–45, 2017.

[14] Z. Zakaria, M. D. Abdul Majid, Z. Ahmad, Z. Jusoh, and N. Z. Zakaria, "Influence of Halal certification on customers' purchase intention," *J. Fundam. Appl. Sci.*, vol. 9, no. 5S, p. 772, 2018.

[15] A. M. Bashir, A. Bayat, S. O. Olutuase, and Z. A. Abdul Latiff, "Factors affecting consumers' intention towards purchasing halal food in South Africa: a structural equation modelling," *J. Food Prod. Mark.*, vol. 25, no. 1, pp. 26–48, 2019.

[16] A. D'Amato, S. Mancinelli, and M. Zoli, "Complementarity vs substitutability in waste management behaviors," *Ecol. Econ.*, vol. 123, pp. 84–94, 2016.

[17] K. Stoeva and S. Alriksson, "Influence of recycling programmes on waste separation behaviour," *Waste Manag.*, vol. 68, pp. 732–741, 2017.

[18] M. Tonglet, P. S. Phillips, and M. P. Bates, "Determining the drivers for householder pro-environmental behaviour: Waste minimisation compared to recycling," *Resour. Conserv. Recycl.*, vol. 42, no. 1, pp. 27–48, 2004.

[19] C. Wan, G. Q. Shen, and S. Choi, "A review on political factors influencing public support for urban environmental policy," *Environ. Sci. Policy*, vol. 75, no. May, pp. 70–80, 2017.

[20] A. Minelgaitė and G. Liobikienė, "Waste problem in European Union and its influence on waste management behaviours," *Sci. Total Environ.*, vol. 667, pp. 86–93, 2019.

[21] M. Ahmadi, "Evaluating the Performance of 3Rs Waste Practices: Case Study-Region One Municipality of Tehran," *Adv. Recycl. Waste Manag.*, vol. 02, no. 02, 2017.

[22] E. S. W. Chan and R. Hawkins Rebecca, "Attitude towards EMSs in an international hotel: An exploratory case study," *Int. J. Hosp. Manag.*, vol. 29, no. 4, pp. 641–651, 2010.