

Plastic Waste Reduction Measures on a Consumer Level based on Determinants of Environment-Conscious Behavior

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INTRODUCTION

From the perspectives of marine plastic pollution, resource constraints and climate change, the plastic waste problem has become a global concern. To reduce plastic emissions, Japan adopted the Resource Circulation Strategy for Plastics in 2019 and began charging fees for single-use plastic bags in July 2020. However, the consumption of takeaway food has expanded due to the COVID-19 pandemic, leading to an increase in plastic waste from households. Thus, more measures are needed to encourage behavioral change to reduce plastic waste at the consumer level. This study focuses on plastic bags and plastic cutlery used with takeaway food, with the aim of clarifying the determinants of environment-conscious behavior and examining effective measures to promote behavioral change to reduce plastic waste.

RESEARCH METHODS

Questionnaire survey

From November 23 to December 12, 2020, a questionnaire survey was conducted using an online Google survey form, targeting students at the Shibaura Institute of Technology and residents of Saitama City. Based on Hirose (1994) and Kurishima et al. (2012), the survey items shown in Table 1 were set as the determinants of environment-conscious behavior, in order to ascertain objective intentions and behavioral intentions on the occasion of receiving plastic bags and plastic cutlery for takeaway. Responses were on a four-level Likert scale.

Table 1. Items of questionnaire survey

Objective intention formulation	Behavioral intention formulation	Attributes
<u>Regarding plastic waste</u>	<u>Regarding rejection of plastic bags</u>	Gender
Interest	<u>and cutlery with takeaway</u>	Age
Knowledge	Evaluation of feasibility	Knowledge of SDGs
Attribution of responsibility (consumer)	Evaluation of benefits	Current environment-conscious behavior
Attribution of responsibility (government)	Evaluation of effectiveness	Attitude on fees for plastic bags
Awareness of impacts of behavior	Evaluation of social norms	Attitude on fees for plastic cutlery
Objective intention	Evaluation of implementation by others	Frequency of takeaway / home delivery
	Behavioral intention	

Analytical method

In addition to cross-tabulation by respondent attribute, factor analysis of objective intention formation and behavioral intention formation were conducted by maximum likelihood method using JMP Pro 15. Then, multiple regression analysis using Excel 2016 was conducted for determinants of environment-conscious behavior. Objective intention or behavioral intention (separately for plastic bags and cutlery) were set as the explained variables, and representative items from different factors were set as the explanatory variables based

on the results of factor analysis. The significance level was set to $p < 0.05$.

RESULTS AND DISCUSSION

Results of survey

One hundred responses were received. The male-female ratio was approximately 50:50, and 81% of respondents were youth from the teens to twenties. The score of knowledge, evaluation of benefits and evaluation of implementation by others were low (means below 3.0), while the objective intention and evaluation of feasibility for plastic bags were high (means above 3.5). As a whole, the scores regarding rejection of plastic cutlery were lower than for plastic bags, indicating that people are getting used to rejecting plastic bags. Cross-tabulation of the results showed that those who have a higher awareness about SDGs and those who are in favor of fees being charged for plastic bags tended to have higher scores overall. On the other hand, people who use takeaway frequently tended to have lower scores.

Results of analysis

The factor analysis extracted two factors for the formulation of objective intention, and four factors for the formulation of behavioral intention. Multiple regression analysis revealed that “interest” was the most important determinant for the formulation of objective intention, which suggests that awareness raising about plastic waste problems should be promoted for consumers. “Evaluation of effectiveness” followed by “evaluation of implementation by others” were important determinants for behavioral intention formation regarding the rejection of plastic bags. For cutlery, “evaluation of benefits” of rejecting plastic cutlery is the most important determinant, as shown in Table 2. This suggests that an effective measure to increase the reduction of plastic cutlery would be to enhance the benefits for consumers when they reject plastic cutlery. Examples might include giving a discount or offering points.

Table 2. Result of multiple regression analysis (behavioral intention to reject plastic cutlery)

	Coefficient	Standard error	t-value	p-value
Intercept	0	0.082	0	1
Objective intention	0.286	0.088	3.263	0.002
Evaluation of s	0.365	0.089	4.114	0
Evaluation of implementation by others	0.226	0.084	2.683	0.009

$P < 0.05$, adjusted $R^2 = 0.331$

CONCLUSION

This study explored effective measures to promote plastic waste reduction behavior at the consumer level. The results indicate the importance of awareness-raising about the impacts of plastic waste problems and enhancement of benefits for consumers who exhibit environment-conscious behavior. In terms of evaluation of implementation by others, the behavior of rejecting plastic bags has been generally accepted in society, so policies to create social norms for a plastics-free lifestyle should be considered. Japan has the world's second highest per capita generation of plastic packaging waste, so further measures for social systems are needed.

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