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Exploring the Factors Influencing the Behavioral Intention of Waste Classification - Based on the Theory of Planned Behavior

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Abstract: Sustainable development is receiving more attention as a result of the swift advancements in science, technology, and the global economy. As an effective means of environmental protection, waste classification still has a lot of development restrictions and limitations at present. Also, there are some differences in the results of existing researches on the intention of waste classification based on the theory of planned behavior. The goal of this study is to learn more about the variables that influence waste classification behavior. This study constructed a scale based on the planned behavior theory and collected data from a questionnaire survey of urban residents. SPSS was used to analyze the collected data, and correlation analysis, ANOVA, linear regression analysis, and other methods were used to analyze the relationship between variables. Finally, it was concluded that “attitude”, “subjective norms” and “perceived behavioral control” all affected the behavioral intention of waste classification of samples and showed a significant positive correlation with them. Through this study, the factors that influence urban residents' willingness to classify their waste could be understood, allowing for the systematic and all-encompassing promotion and development of waste classification as well as motivational enhancement of target individuals' waste classification behavior.

Keywords: TPB, waste classification, questionnaire, ANOVA

1. Introduction

Along with the enhancement of modern social economy, and the theory of sustainable development, the world has gradually begun to attach great importance to environmental protection. The generation of a large amount of waste means the accumulation and incineration of a large amount of waste, which releases several harmful substances, undoubtedly causing great pressure on environmental protection. Human activities will produce waste is unchangeable, so how to deal with the waste, and reduce the damage to the environment has become an important topic. As an important means to effectively relieve environmental pressure, waste classification has been gradually popularized in the world in recent years. Otherwise, waste classification has only been systematically popularized in a few developed countries, so it is still necessary to explore the prospects of systematic development of waste classification.

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The theory of planned behavior (TPB) has been defined as "a psychological theory that links beliefs to behavior" [1]. Therefore, this paper proposes hypotheses for variables in the three directions of attitude, subjective norm, and perceived behavior control designs questionnaires, and conducts data analysis on the sample results through SPSS to verify whether the hypotheses are valid, to explore the main factors affecting the behavioral intention of waste classification.

2. Literature Review

2.1. Sustainable Development

Sustainable development strategy first be released by Brundtland in a report titled "Our Common Future" in 1987 [2]. Scholars Sneddon, Howarth, and Norgaard further analyzed the report in 2005. This investigation contends that Brundtland's definition of sustainable development is the most frequently acknowledged place for academics and professionals interested in [3]. However, the existing unmet requirements of a sizeable portion of the global population are where the conflicts between environment and development begin. A realistic approach for resolving the difficulties of sustainable development, such as enduring severe poverty, environmental degradation, and political and economic inequality, was given by Jeffrey D. Sachs in 2015 [4].

2.2. Waste Classification

Waste emissions are an unavoidable byproduct of urbanization and are growing every year as the global economy expands. The classification and treatment of waste can effectively reduce and eliminate the pollution caused by waste to the environment, save native resources and improve environmental quality. From then on, many scholars began discussing waste classification and treatment methods. In 2014, Bernstad discussed the importance of necessary infrastructure regarding household waste recycling [5]. Dorina Grazhdani analyzed the factors affecting waste discharge in modern society and the waste management policy of the government in 2016 [6]. In addition, it was found that policy factors such as the investment of relevant departments in educating residents' waste classification knowledge will also impact waste classification and recycling. The recycling of urban solid waste is restricted by many factors, such as the difference in public perception matters [7]. As a result, the waste recycling process varies in different countries, and developed countries have relatively mature experience and practices in waste classification. Therefore, it is still required to look at ways to improve trash classification from the standpoint of attitude in order to advance waste classification globally.

2.3. The Theory of Planned Behavior

The Theory of Planned Behavior (TPB) was initially put out by Ajzen in 1985, which was revised and refined many times in 1987, and 1991 [1, 8]. This theory contends that behavioral intention, which directly influences behavior, may be accurately anticipated over a range of behavioral intentions, from attitude to behavior, subjective norms (SN), and perceived behavioral control (PBC). It seems reasonable that those who view a specific action more positively will be more likely to partake in it. The study's findings demonstrate that the positive attitude of people might encourage their desire to classify their waste [9]. The formation of subjective norms depends on the expectations of the environment for individuals, including those from friends and family, which is also positively correlated with waste classification behavior. Additionally, people are more inclined to engage in an action when they have a strong sense that it would lead to social understanding [10]. Given the foregoing, the research suggests the following hypotheses:

H1: Individual hold a positive attitude is with a higher possibility to adopt garbage classification.

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H2: Individual hold a positive subjective norm is with a higher possibility to adopt garbage classification.

H3: Individual hold a negative perceived behavioral control is with a lower possibility to adopt garbage classification.

3. Methods

3.1. Sample and Procedure

This study conducted a questionnaire survey on waste classification among adult urban residents through Sojump. The survey was conducted over two days from Sept 6 to 7, 2022. A total of 441 samples were collected, including 435 valid samples. Gender, age, and education background were used as control variables in the questionnaire, of which the male sample was about 40.7%, and the female sample was about 59.3%. Most of the samples were urban residents aged 35 and above, accounting for 57.0%.

3.2. Measures

3.2.1. Demographic Variables

The urban demographic variables identified in this study included gender (1= male, 2= female, 40.69% male), age (1~5=35 years old and below, 6=35 years old and above, 57.01% above 35 years old), educational background (M=3.49, bachelor's degree, SD=0.914).

3.2.2. Attitude

Attitudes were measured using Ajzen's scale [11]. Participants assessed their attitudes toward waste classification behavior on the following dimensions :(a) unpleasant/pleasant, (b) worthless/valuable, and (c) unenjoyable/enjoyable, using a seven-point Likert scale. These items are averaged to form a composite index. A higher score indicates a more optimistic view on waste classification (M=5.87, SD=1.48, Cronbach's alpha=0.873)

3.2.3. Subject Norms

Ajzen's scale was also used to measure subjective norms [11]. Participants assessed their subjective norms of waste classification behavior on the following dimensions :(a) "Most of my close friends and family members believe that I should classify waste", which the sample from 1 (totally disagree) to 7, the scale (totally agree); (b) "It is expected of me that I extremely likely do waste classification", with the sample rating from 1 (totally disagree) to 7 (totally agree); (c) "The people in my life whose opinions I value would approve of my waste classification action", which the sample rates from 1 (disagree totally) to 7 (totally agree). (M=5.67, SD=1.24, Cronbach's alpha=0.906).

3.2.4. Planned Behavioral Control

Perceived behavioral control was measured using Ajzen's scale [11]. Participants assessed their perceived behavioral control over waste classification behavior along the following dimensions :(a) "I have relevant knowledge of waste classification," which the sample from 1 (totally disagree) to 7, the scale (totally agree); (b) "The infrastructure for garbage sorting is perfect", with the sample rating from 1 (disagree totally) to 7 (totally agree); (c) "I have enough time to sort the garbage",

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which the sample scores 1 (totally disagree) through 7 (totally agree). (M=4.74, SD=1.30, Cronbach's Alpha =0.806).

3.2.5. Behavioral Intention

The behavioral intention was measured using the scale of Lou, S et al. [9]. Participants assessed the intensity of their behavioral intention on the following dimensions :(a) "I would like to take part in the waste sorting activity" which the sample rated from 1 (totally disagree) to 7 (totally agree); (b) "I am willing to advise others to do waste classification" which the sample rates from 1 (totally disagree) to 7 (totally agree); (c) "I would like to pay attention to the policy on waste classification" which the sample rates from 1 (totally disagree) to 7 (totally agree). (M=5.671, SD=1.30, Cronbach's alpha=0.944).

3.3. Data Analysis

In this study, SPSS was used for data analysis. Descriptive statistics of frequency and description of control and independent variables were performed for 435 valid samples. Firstly, the reliability analysis of the three scales of the four independent variables was carried out. Secondly, after converting the three measurement scales associated with each independent variable into a new variable, a bivariate Pearson correlation analysis was conducted among the dependent variable and the four independent variables. Finally, linear regression analysis was carried out to obtain the significance of R square and ANOVA.

4. Results

In this study, descriptive statistics of frequency and description of control variables and independent variables of 435 valid samples were carried out, and the mean value, standard deviation, and variance of each variable were obtained (Table 1).

Table 1: Statistics.

		gender	age	Education background	Attitude	Subjective norms	Perceived behavioral control
Number of cases	valid	435	435	435	435	435	435
	missing	0	0	0	0	0	0
Mean		1.59	5.06	3.49	5.8682	5.6713	4.7379
Standard Deviation		.492	1.276	.914	1.48244	1.24474	1.29526
Variance		.242	1.628	0.836	2.198	1.549	1.678

The reliability of four independent variables, attitude (Cronbach's alpha=0.873), subjective norm (Cronbach's alpha=0.906), and PBC (Cronbach's alpha=0.806) were analyzed. Bivariate correlation analysis was conducted between the new variables obtained after conversion calculation and the dependent variable, and it was concluded that the significance (two-tailed) of the four independent variables of attitude, subjective norm, and PBC were all close to 0.000. Pearson correlation coefficient was as follows: attitude =0.765**, subjective norm =0.819**, and PBC =0.677**, all of which were positively correlated with the dependent variable behavioral intention at 0.01 level (Table 2). Thus, hypotheses 1-3 are correct. Finally, the linear regression analysis was carried out on the variables, the R square obtained was 0.732, and the adjusted R square was 0.728. The significance of ANOVA is close to 0.000 (Table 3), and the significance coefficient of attitude,

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subjective norm, and PBC are all close to 0.000 (Table 4). According to the above data analysis results, it can be concluded that the independent variables “attitude”, “behavioral intention”, “PBC” are all significantly positively correlated with the dependent variable “behavioral intention”. This result further proves the reliability of the previous analysis results and the correctness of the hypothesis.

Table 2: Correlation.

		Behavioral intention	gender	age	Education background	Attitude	Subjective norms
Pearson Correlation Coefficient	Behavioral intention	1.000	-.058	.259	-.097	.765	.819
	gender	-.058	1.000	-.159	.093	-.074	-.066
	age	.259	-.159	1.000	-.278	.340	.241
	Education background	-.097	.093	-.278	1.000	-.170	-.128
	Attitude	.765	-.074	.340	-.170	1.000	.782
	SN	.819	-.066	.241	-.128	.782	1.000
	PBC	.677	-.123	.063	-.195	.603	.691
Significance (one-tailed)	Behavioral intention	.	.112	.000	.022	.000	.000
	gender	.112	.	.000	.027	.062	.085
	age	.000	.000	.	.000	.000	.000
	Education background	.022	.027	.000	.	.000	.004
	Attitude	.000	.062	.000	.000	.	.000
	SN	.000	.085	.000	.004	.000	.
	PBC	.000	.005	.096	.000	.000	.000
Number of cases	Behavioral intention	435	435	435	435	435	435
	gender	435	435	435	435	435	435
	age	435	435	435	435	435	435
	Education background	435	435	435	435	435	435
	Attitude	435	435	435	435	435	435
	SN	435	435	435	435	435	435
	PBC	435	435	435	435	435	435

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Table 3: ANOVA.

model		Sum of squares	DOF	Mean square	F	significance
1	regression	49.737	3	16.579	10.508	.000
	residual	680.032	431	1.578		
	total	729.769	434			
2	regression	534.311	6	89.052	195.000	.000
	residual	195.458	428	.457		
	total	729.769	434			

Table 4: Coefficient.

model		U Coefficients		S Coefficients	t	significant
		B	The standard error	Beta		
1	(constant)	4.585	.453		10.131	.000
	gender	-.043	.124	-.016	-.350	.727
	age	.254	.050	.250	5.106	.000
	Education background	-.036	.069	-.026	-.527	.598
2	(constant)	-.159	.292		-.544	.587
	gender	.057	.067	.022	.850	.396
	age	.066	.029	.065	2.288	.023
	Education background	.092	.038	.065	2.446	.015
	Attitude	.239	.037	.273	6.473	.000
	SN	.473	.047	.454	10.110	.000
	PBC	.210	.037	.210	5.733	.000

5. Discussion

The study aims to explore the factors that affect the behavioral intention of waste classification and analyze them based on PBC and its scale. Firstly, the study shows that the attitude (β = 0.765, P < 0.001) more positive people are more likely to do waste classification. This is consistent with recent research [12]. According to the study, optimistic attitude and waste classification behavior are positively correlated. According to earlier research findings, the PBC in hypothesis 3 (= 0.677, p 0.001) is also similarly strongly positively connected with the behavioral intention of waste classification [13].

Subjective norms (β = 0.819, p < 0.001) showed a significant positive correlation with the behavioral intention of waste classification. In Liu et al.'s study [14], the conclusion of significant correlation was also reached. Otherwise, there was no significant link with waste classification behavior in the Tian, M. et al. investigation [15]. This disparity might be attributed to the study's disparate backgrounds. The pressure produced by the immediate environment varies according to the degree of publicity and promotion of waste classification in each location.

6. Conclusion

Exploring the methods of environmental protection, cultivating the concept of sustainable development of urban residents, how to maximize the reduction of environmental pollution, and how to realize the recycling of resources are perpetual topics explored by all mankind. As an

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effective measure under the topic of environmental protection, waste classification still has infinite space for development and improvement at present.

In this study, based on TPB, three variables affecting the behavioral intention of urban residents to classify waste were explored: attitude, subjective norms and PBC. In order to learn more about the desire of 435 urban inhabitants to classify waste, a questionnaire study was carried out. Through SPSS data analysis, the results illustrates that the four variables of PBC, SN, and attitude are prominently positively relevant to the behavioral intention of garbage classification of urban residents.

In conclusion, the high Cronbach's alpha of the three variables from TPB confirms the scientific and accuracy of TPB. These three independent variables are highly significantly correlated with the dependent variable, which proves that attitude, subjective norm, and PBC can indeed determine people's behavioral intention extremely accurately.

The part on waste classification under the heading of environmental protection is the focus of this essay. Firstly, it is of significance to the information sender such as ecological protection association and waste classification department. From the three perspectives of TPB theory, the information on waste classification can be transmitted to the recipient through the media, to promote the intention and behavior of the recipient. Secondly, the government should also continue to improve the waste classification policy to provide a strong background guarantee for the action of the information sender.

The current study still has many limitations that need to be further improved. First, the questionnaire was only issued for two days, and 435 valid samples were collected, which was a small number of samples. In addition, in the setting of the questionnaire, each variable is measured by only three questions, so the accuracy needs to be improved. Second, most of the research samples selected residents living in Chinese cities, and a small part of the research samples were Chinese students living overseas, which did not cover the research of residents in underdeveloped areas and suburbs. So, the results don't fully represent the situation in China, nor do they reflect the global situation.

References

[1] *Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In Action control (pp. 11-39). Springer, Berlin, Heidelberg.*

[2] *Brundtland, G. H. (1987). Our common future—Call for action. Environmental Conservation, 14(4), 291-294.*

[3] *Sneddon, C., Howarth, R. B., & Norgaard, R. B. (2006). Sustainable development in a post-Brundtland world. Ecological economics, 57(2), 253-268.*

[4] *Sachs, J. (2015). The Age of Sustainable Development. New York Chichester, West Sussex: Columbia University Press.*

[5] *Bernstad, A. (2014). Household food waste separation behavior and the importance of convenience. Waste management, 34(7), 1317-1323.*

[6] *Grazhdani, D. (2016). Assessing the variables affecting on the rate of solid waste generation and recycling: An empirical analysis in Prespa Park. Waste Management, 48, 3-13.*

[7] *Wang, Y., Hao, F. (2020). Public perception matters: Individual waste sorting in Chinese communities. Resources, Conservation and Recycling, 159, 104860.*

[8] *Ajzen, I. (1991). The theory of planned behavior. Organizational behavior and human decision processes, 50(2), 179-211.*

[9] *Lou, S., Zhang, X., Zhang, D. (2022). What influences urban residents' intention to sort waste?: Introducing Taoist cultural values into TPB. Journal of Cleaner Production, 133540.*

[10] *Espada, J. P., Griffin, K. W., Gonzálvez, M. T., Orgilés, M. (2015). Predicting alcohol-impaired driving among Spanish youth with the theory of reasoned action. The Spanish journal of psychology, 18.*

[11] *Ajzen, I. (2002). Constructing a TPB questionnaire: Conceptual and methodological considerations*

[12] *M. Tian, B. Pu, Y. Chen, Z. Zhu (2019). Consumer's waste classification intention in China: an extended theory of planned behavior model. Sustainability, 11 (24) (2019), pp. 6999-7017*

DOI: 10.54254/2753-7048/5/20220690

[13] Wang, Y., Long, X., Li, L., Wang, Q., Ding, X., Cai, S. (2021). Extending theory of planned behavior in household waste sorting in China: The moderating effect of knowledge, personal involvement, and moral responsibility. Environment, Development and Sustainability, 23(5), 7230-7250.

[14] X. Liu, Z. Wang, W. Li, G. Li, Y. Zhang (2019). Mechanisms of public education influencing waste classification willingness of urban residents. Resour. Conserv. Recycl., 149 (2019), 381-390

[15] Tian, M., Pu, B., Chen, Y., & Zhu, Z. (2019). Consumer's waste classification intention in China: An extended theory of planned behavior model. Sustainability, 11(24), 6999.