

# Self-determination Theory-based Express Packaging Research on Influencing Factors of Recycling Behavior

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## Abstract

**A large amount of express packaging waste has been called one of the major resource environmental problems facing human society. In combination with the characteristics of express packaging's own recyclability, based on the self-determination theory's sense of autonomy, sense of competence and sense of relatedness to explore consumers, from the perspective of consumers' basic psychological needs, to explore the mechanism of the fulfillment of basic psychological needs on consumers' express packaging recycling willingness and behavior. Using the questionnaire survey method, 348 samples were collected for empirical testing, and the results show that basic psychological needs significantly affect express packaging recycling willingness and behavior, in which the sense of competence of basic psychological needs has the greatest influence on express packaging recycling willingness, followed by the sense of autonomy and sense of association. The findings provide ideas for the government and express and e-commerce companies to drive consumer express packaging recycling behavior.**

## Keywords

**Basic Psychological Needs; Express Packaging; Recycling Behavior.**

## 1. Introduction

Express delivery business is developing rapidly under the rapid development of online shopping, and according to the data of the National Post Bureau, in 2022, the cumulative volume of mail delivery business in the postal industry completed 139.10 billion pieces, an increase of 2.7% year-on-year. The surge in the volume of courier business has also generated a large amount of courier packaging waste, bringing serious environmental pollution, resource waste and increased social management costs and other issues. The overall recycling rate of China's packaging is lower than the lower, building a resource-saving society puts forward requirements for the recycling of these packages. Consumers as an important party to carry out green packaging recycling, its recycling willingness and behavior of the entire express packaging recycling system has a significant impact. At present, due to consumer participation in express packaging recycling enthusiasm is not strong, express packaging recycling behavior is difficult to achieve. Therefore, how to promote consumer participation in express packaging recycling behavior, improve the recycling rate, and realize the greening of express packaging recycling is an important issue to be solved by researchers at present. As a classic theory to explain individual motivation, self-determination theory believes that the generation of individual behavior is driven by both internal and external motivation, and that attention needs to be paid to the roles of self-energetic and external situational interventions in the formation of individual motivation [1]. Basic psychological needs theory, as its core subtheory, believes that every individual will produce the basic psychological needs for self-development, and divides this basic psychological needs into autonomy needs, competence needs and affiliation needs, and when the individual's sense of autonomy, competence and affiliation are satisfied can effectively activate the individual's internal behavioral motivation [2].

In this paper, from the perspective of consumers, we study the influencing factors of express packaging recycling behavior of consumers in China, analyze the influence of social factors and psychological factors on express packaging recycling behavior, in order to effectively achieve the promotion of express packaging recycling, put forward management suggestions for the promotion and development of express packaging recycling of the country and enterprises, promote the green development of the express industry, and make contributions to the construction of green logistics.

## 2. Theoretical Foundations and Research Hypotheses

### 2.1. Self-determination Theory

Self-determination theory is a classic theory proposed by American psychologists Deci et al. in the 1980s to explain the motivation of individual behavior, which consists of four branches: basic psychological needs, organic integration theory, cognitive appraisal theory and attributional orientation theory<sup>[3]</sup>. The theory explains the individual behavioral excitation and driving process from the perspective of motivation, and the self-determination theory believes that individuals have the basic psychological needs for self-development, which include autonomy needs, competence needs, and affiliation needs, and when the three needs of individuals are satisfied, they can promote the internal behavioral motivation of the individual<sup>[4][5]</sup>. Autonomy needs mean that consumers can control their own behavior, without being forced by the outside world, when the individual's autonomy needs to be satisfied, will produce a sense of autonomy, the higher the sense of autonomy of the individual, the higher the positivity and initiative to implement a certain behavior. Competence need indicates the individual's ability to face and deal with things, which can be understood as the individual's experience of the utility of things, when the individual's competence need is satisfied, the resulting sense of competence will make the individual think that he or she has the ability to control and deal with things, and be able to grasp the information and make decisions in a complex environment. The need for association refers to the individual as a member of the social environment, in the interaction and contact with others, the need for recognition, support and attention from others, when the individual's need for association is satisfied, the individual out of the psychology of being concerned and recognized, so as to make altruistic behavior.

At present, the autonomous motivation emphasized by self-determination theory has shown positive effects in various application fields such as school and family education<sup>[6][7]</sup>, psychotherapy<sup>[8]</sup>, and organizational management<sup>[9]</sup>. Many scholars have adopted self-determination theory to explain the motivation of consumers' behaviors and behavioral choices, and Xue Hanxin<sup>[10]</sup>, taking new energy automobiles as an example, explored the driving mechanism of the public's green consumption pattern from the perspective of motivation. Wang Litong<sup>[11]</sup> and others introduced consumer innovativeness from the perspective of self-determination theory to explore the driving mechanism of consumers' green purchasing behavior, and Luo Yunxiang<sup>[12]</sup> explored the influence of self-determination theory on users' participation in online social communication behavior. The above studies provide a theoretical basis for this paper to explain the influence mechanism of consumer express packaging recycling behavior based on the motivation perspective.

### 2.2. Direct Effect of Basic Psychological Needs on Recycling Willingness and Recycling Behavior

When an individual's basic psychological needs are satisfied, he or she will have higher control over his or her own behavior, which results in the formation of an individual's internal motivation, and this internal motivation can increase the consumer's willingness to participate in a certain behavior<sup>[13]</sup>. Sweeney<sup>[14]</sup> et al. concluded that positive word-of-mouth publicity

enhances the consumer's sense of autonomy, competence, and relatedness, and enhances the consumer's energy-saving behavior. Xia Hong sheng<sup>[15]</sup> et al. found that basic psychological needs enhance customer commitment and improve customer avoidance behavior. Gilal<sup>[16]</sup> et al. stated that the sense of autonomy, competence, and relatedness generated when basic psychological needs are satisfied can effectively promote consumers' internal motivation and realize their green purchasing behavior. Reading previous studies, we found that scholars have applied self-determination theory to the study of recycling, which confirms the theoretical explanatory power of the theory in the study of recycling behavior. Villacorta<sup>[17]</sup> and Kaplan<sup>[18]</sup> found that in the face of environmental problems, individuals with a strong sense of autonomy, competence, and relatedness pay more attention to environmental issues, and are more willing to participate in environmental protection activities, such as recycling, and more actively implement beneficial activities for the environment. Cho<sup>[19]</sup> integrated self-determination theory with other theories to examine the factors affecting college students' willingness to recycle and actual recycling behavior on campus, and found that self-determined motivation affects consumers' willingness to recycle and recycling behavior.

Thus, basic psychological needs contribute to consumers' willingness to recycle and their recycling behavior. Specifically, individuals with a higher sense of autonomy have a higher degree of self-satisfaction, are more "self-directed" and have a stronger self-determination ability, which allows them to decide their own behavior based on self-selection. When faced with the choice of recycling behavior, consumers with a high sense of autonomy, driven by strong autonomous motivation, will show positive and active recycling willingness, and follow their own recycling willingness to practice recycling behavior. Individuals with a strong sense of competence will believe that they are equipped with the ability to deal with problems, can rely on themselves to achieve the task, have the energy and time to deal with it, and can take responsibility for solving the problem. When consumers are faced with the decision to recycle, those with a strong sense of competence believe that their recycling behavior can provide useful help in solving the relevant environmental problems, and they believe that they have the energy and ability to carry out recycling activities, thus generating a positive willingness to recycle, and carrying out more recycling behaviors. Individuals with a strong sense of connectedness are more concerned about their position in the group and want to play their role in the social group, and therefore expect to maintain their connection with the social group through more actions that benefit the group. Since recycling behavior is an environmentally friendly behavior that benefits the society, when consumers make recycling decisions, consumers' associative motivation will drive them to show their environmental image through recycling behavior and gain higher group recognition and support. Based on the above analysis, the following hypotheses are proposed:

H1a: Sense of autonomy has a positive effect on express packaging recycling willingness.

H1b: sense of competence has a positive effect on express packaging recycling willingness.

H1c: sense of association has a positive effect on express packaging recycling willingness.

H2a: sense of autonomy has a positive influence on express packaging recycling behavior.

H2b: sense of competence has a positive influence on express packaging recycling behavior.

H2c: sense of association has a positive influence on express packaging recycling behavior.

### **2.3. The Impact of Recycling Willingness on Recycling Behavior, the Mediating Role of Recycling Willingness**

Express packaging recycling willingness is the possibility of consumers to assess their own participation in express packaging recycling behavior, the stronger the recycling willingness, the greater the possibility of participating in recycling behavior, and vice versa. In the research on recycling willingness on recycling behavior, the role of recycling willingness on recycling

behavior has been widely confirmed, Jia<sup>[20]</sup> and other studies have shown that the classification willingness significantly improves the classification behavior of rural residents' domestic waste. Many scholars not only explore the influence of factors on willingness and behavior, but also study the influence of factors on recycling behavior by influencing the willingness to recycle, i.e., the mediating role of willingness to recycle between influencing factors and recycling behavior. For example, Varma<sup>[21]</sup> and other researchers studied the factors affecting household e-waste recycling behavior, indicating that factors such as attitude affect recycling willingness, and recycling willingness has a significant positive effect on waste recycling behavior. The studies that have been conducted have shown the existence of the mediating role of willingness to recycle in exploring the influence of various antecedent factors on behavior.

Based on the theory, it has been assumed in the previous section that the sense of autonomy, sense of competence and sense of relatedness included in the basic psychological needs will have an effect on both the willingness to recycle and the recycling behavior, and it has been assumed that the material rewards, the environmental responsibility, and the convenience of recycling included in the external factors will have an effect on both the willingness to recycle and the recycling behavior. Willingness to recycle affects consumers' recycling behavior; the higher the willingness to recycle, the more positive consumers' recycling behavior is, and the lower the willingness to recycle, the more negative consumers' recycling behavior is. Therefore, it can be considered that "basic psychological needs - willingness to recycle - recycling behavior" and "external factors - willingness to recycle - recycling behavior" two influence paths exist. can be considered as the existence of two influence paths. Based on the above analysis, the following hypotheses are proposed:

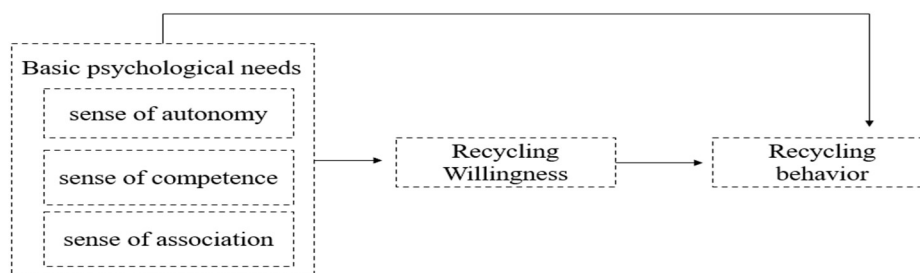
H3: Willingness to recycle has a positive effect on consumers' participation in express packaging recycling behavior.

H4a: Recycling willingness mediates the effect of sense of autonomy on recycling behavior.

H4b: Recycling willingness mediates the effect of sense of competence on recycling behavior.

H4c: Recycling willingness mediates the effect of sense of association on recycling behavior.

Based on the above theoretical analysis, this study constructs a theoretical model as shown in Figure 1.



**Figure 1.** Theoretical Model Diagram

### 3. Research Design

#### 3.1. Questionnaire Design and Variable Measurement

In this study, the variables including sense of autonomy, sense of competence, sense of connection, willingness to recycle and other related variables were all referred to and quoted from existing mature scales to ensure the overall reliability and validity of the scales, and some of the questions were modified to take into account the specific scenarios of courier packaging recycling. The questionnaire is based on a 7-point Likert scale, with 1 representing "strongly

disagree" and 7 representing "strongly agree", and the respondents make their choices according to the actual situation.

Regarding the measurement of basic psychological needs, we refer to the studies of Johnston [22], Xie [23] and Yu [24]. Among them, the sense of autonomy includes four items, such as "When recycling express packaging, I can choose multiple recycling companies"; the sense of competence includes four items, such as "I am confident that I can complete the recycling activities when recycling express packaging"; Competence includes 4 questions such as "I am confident that I can complete the recycling activities for express packaging recycling"; and affiliation includes 3 questions such as "I will observe the recycling situation of the people around me for express packaging recycling". For the measurement of consumers' willingness to participate in express packaging recycling, reference was made to the studies of Wang [25] and Cho [19], which included five items, such as "I will prioritize the recycling of express packaging when I have recyclable packaging". For the measurement of consumers' recycling behavior of courier packaging, the studies of Wang [26] and Li zin [27] were referred to, including four items such as "I will persuade people around me to recycle courier packaging".

### 3.2. Data Collection

By sending the questionnaire link online to invite others to fill in, in order to ensure the relevance of the sample data, the research survey object is consumers with online shopping experience. A total of 400 questionnaires were distributed, 376 questionnaires were recovered, and 348 valid questionnaires were obtained after deleting some invalid questionnaires, the effective recovery rate of the questionnaire was 92.5%.

## 4. Empirical Analysis and Hypothesis Testing

### 4.1. Common Method Bias Test

Considering the existence of common variance bias among the research data, which will cause the phenomenon of spurious relationship among the variables, this paper examines the measurement results through the Harman's one-way test, and no single factor is obtained and the first principal component explains 39.032% of the variance, which is lower than the critical value of 40%, indicating that there is no serious common method bias in this study.

### 4.2. Reliability and Validity Test

Reliability responds to the degree of reliability of the measurement data, usually using SPSS software to analyze the reliability of the data, Cronbach's coefficient was used to test the reliability of the questionnaire, the alpha coefficient is greater than 0.7, indicating that the reliability is acceptable. The results of the reliability analysis showed that the alpha values for variables such as sense of autonomy were greater than 0.85, indicating good reliability of the data. KMO value and Bartlett's spherical test were used to test the validity, and the KMO value of 0.91 was obtained, which was greater than 0.8, and the Bartlett's spherical test value was 8337.632 with sig=0.000, which indicated that the validity of the scale was good and it was suitable for factor analysis.

The variables were tested for convergent validity and discriminant validity using AMOS software, and in general, the CR values of the variables were all greater than 0.7, and the AVE values were greater than 0.5, indicating that the convergent validity of the scales was better, and the square root of the AVE of each variable was greater than the correlation coefficient between the variable and any of the variables, indicating that the discriminant validity of the scales was better. The results of the test are shown in Table 1, from which it can be seen that the CR values of the variables are greater than 0.7, the AVE values are greater than 0.5, and the AVE square root of each variable is greater than the correlation coefficient between that variable and any variable, indicating that the scale has good convergent validity and

discriminant validity. On the basis of validity passing, the model fitness was tested. As can be seen from Table 2, each fitting index (RMSEA = 0.060,  $\chi^2 / df = 2.250$ , CFI = 0.971, GFI = 0.895) reaches the standard value, indicating good model fit.

**Table 1.** Validity and correlation coefficient of each variable

Variable	CR	AVE	SA	SC	SR	RW	RB
SA	0.93	0.77	0.877				
SC	0.95	0.83	0.148**	0.911			
SR	0.91	0.79	0.246**	0.285**	0.888		
SW	0.94	0.78	0.286**	0.443**	0.288**	0.883	
SB	0.95	0.83	0.349**	0.524	0.391**	0.547	0.911

\*\* and \* denote 1% and 5% significance levels, respectively, hereafter; angular values are square roots of AVE

**Table 2.** Table of model fit coefficient

Fitness index	Evaluation criteria	Numerical	Evaluation results
RMSEA	<0.08	0.060	adapter
$\chi^2 / df$	1-3	2.250	adapter
CFI	>0.9	0.971	adapter
GFI	>0.9	0.895	acceptable
TLI	>0.9	0.935	adapter

### 4.3. Hypothesis Testing

#### 4.3.1. Direct Effect Test

AMOS software was used to build the model diagram for hypothesis analysis to test the effect of sense of autonomy, sense of competence, sense of relatedness, on the willingness to recycle and recycling behavior, and the effect of the willingness to recycle on the recycling behavior, i.e., to verify the hypotheses H1a, H1b, H1c, H2a, H2b, H2c, and H3. The results are shown in Table 3, which shows that the hypotheses H1a, H1b, H1c, H2a, H2, H2c and H3 have p-values less than 0.05, indicating that the hypotheses are all supported.

**Table 3.** Hypothesis validation results

Hypothetical	Standardized path coefficient	standard error	P
H1a	0.197	0.042	***
H1b	0.132	0.047	0.014
H1c	0.379	0.049	***
H3	0.31	0.059	***
H2a	0.172	0.043	***
H2b	0.313	0.052	***
H2c	0.17	0.047	***

#### 4.3.2. Mediating Effect Test

Structural equation modeling analysis using AMOS to verify the role of recycling willingness in the path of the influence of autonomy, competence, and relatedness on recycling behavior, the influence of autonomy, competence, and relatedness on recycling behavior is called the direct effect, and its effect on recycling behavior through recycling willingness is called the indirect effect. Through the bootstrap analysis method, the upper and lower intervals do not contain 0, indicating that the mediating effect is established. As can be seen from Table 4, the confidence intervals of the three paths do not contain 0, and the P-values are less than 0.05, indicating that

the mediating effect of willingness to recycle is significant in the effect of sense of self-organization, sense of competence and sense of association on recycling behavior.

**Table 4.** Results of the mediation effect hypothesis test

Hypothetical	Pathway	Effect value	Inaccuracies	Lower	Upper	P
H4a	ind1	0.057	0.021	0.027	0.098	0
H4b	ind2	0.041	0.021	0.011	0.08	0.026
H4c	ind3	0.123	0.033	0.08	0.191	0

## 5. Conclusion and Implications

### 5.1. Research Conclusion

Based on the self-determination theory, this study explores the three dimensions of autonomy, competence and relatedness on the influencing factors of consumers' participation in express packaging recycling behavior based on the theory of basic psychological needs to empirically study the following conclusions: (1) The sense of autonomy, competence and relatedness in basic psychological needs have a significant positive influence on express packaging recycling behavior. This means that the stronger the sense of autonomy of the individual will perceive their own greater autonomy of choice, thus triggering its spontaneity of environmental protection, so that it is more willing to express the packaging disposal recycling; sense of competence of the individual recycling behavior of their own consequences of more importance, in the decision-making process is more likely to produce a sense of responsibility for the environment and tends to express the packaging recycling behavior; sense of connection of the individual is more likely to be influenced by the relationship group, out of a sense of responsibility for the express packaging recycling behavior. affected by the relationship group, out of the pursuit of a sense of belonging and choose the courier packaging recycling behavior. (2)Willingness to recycle mediates the positive effects of sense of autonomy, sense of competence and sense of connectedness on express packaging recycling behavior. Consumers with a strong sense of autonomy are more willing to engage in express packaging recycling activities in order to obtain the ability to make self-choice; consumers with a strong sense of competence are more confident in their own ability and are more willing to learn about express packaging recycling, generate positive recycling willingness, and then choose express packaging recycling behaviors; and consumers with a strong sense of association are willing to engage in express packaging recycling behaviors in order to obtain a sense of social acceptance and belonging.

### 5.2. Practical Implications

Pay attention to the basic psychological needs of consumers and activate their internal motivation. Express packaging recycling behavior is not only reflected in daily life, but also a profound change in people's basic psychological level. Consumers can not only focus on the low level of satisfaction, but also should meet people's autonomous needs, associated needs and competence needs, so it is necessary to strengthen the construction of basic psychological needs of consumers. Concerned about the autonomous needs of consumers, in respect of consumer recycling choices, express delivery enterprises and e-commerce companies should provide a variety of recycling pathways, strengthen the publicity, so that consumers can be more aware of, and thus have more choices for the express packaging recycling behavior. Attention to consumer competence needs, enterprises should pay attention to the dissemination of information related to express packaging recycling, so that consumers understand more about express packaging recycling information, enhance consumer awareness of recycling information, so that consumers believe that they have the ability to

participate in express packaging recycling activities. To meet the associated needs of consumers, courier packaging as the life of the easy to produce recyclables, the construction of a green society has a huge impact, the government and enterprises need to create a favorable environment for courier packaging recycling, so that everyone feels the recovery of this behavior of pro-environmental, activate the associated needs of consumers.

pay attention to the cultivation of consumer recycling willingness, recycling willingness to play an intermediary role in the basic psychological needs of the impact of express packaging recycling behavior, which itself will directly affect the consumer's recycling behavior, the stronger the willingness to recycle, the higher the possibility of consumers to participate in express packaging recycling behavior, and vice versa. The government and enterprises should pay attention to the cultivation of consumers' willingness to participate in express packaging recycling, through the creation of a good recycling environment, improve the convenience of recycling and other measures to improve the recycling enthusiasm of consumers from multiple perspectives.

## References

- [1] Deci E L, Ryan R M. The general causality orientations scale: Self-determination in personality[J]. *Journal of research in personality*, 1985, 19(2): 109-134.
- [2] Ryan R M, Connell J P. Perceived locus of causality and internalization: examining reasons for acting in two domains[J]. *Journal of personality and social psychology*, 1989, 57(5): 749.
- [3] Deci E L, Ryan R M. *Intrinsic motivation and self-determination in human behavior*[M]. Springer Science & Business Media, 2013.
- [4] Deci E L, Eghrari H, Patrick B C, et al. Facilitating internalization: The self-determination theory perspective[J]. *Journal of personality*, 1994, 62(1): 119-142.
- [5] Gagné M, Deci E L. Self-determination theory and work motivation[J]. *Journal of Organizational behavior*, 2005, 26(4): 331-362.
- [6] Orsini C, Evans P, Binnie V, et al. Encouraging intrinsic motivation in the clinical setting: teachers' perspectives from the self-determination theory[J]. *European Journal of Dental Education*, 2016, 20(2): 102-111.
- [7] Yumei Fan, Zaibo Long. Research on the relationship between basic psychological needs and academic English motivation input of college students under the perspective of self-determination theory[J]. *Modern Foreign Languages*, 2022, 45(03): 406-417.
- [8] Ryan R M, Deci E L. A self-determination theory approach to psychotherapy: The motivational basis for effective change[J]. *Canadian psychology*, 2008, 49(3): 186.
- [9] Chuanpeng YU, Zhanfeng LAI, Baosheng YE. The effect of authentic leadership on employees' knowledge hiding behavior under the perspective of self-determination theory[J]. *Journal of Hainan University (Humanities and Social Sciences Edition)*, 2023, 41(03): 148-160. DOI: 10.15886/j.cnki.hnus.202205.0061.
- [10] Hanxin Xue. Driving Mechanisms and Policies of Public Green Consumption Patterns--Taking New Energy Vehicles as an Example[J]. *Journal of University of Science and Technology Beijing (Social Science Edition)*, 2022, 38(03): 325-334.
- [11] WANG Litong, SONG Yang, SHENG Guanghua, MU Xin-tian. A study on the driving mechanism of residents' green purchasing behavior under the perspective of self-determination theory[J]. *Journal of Nanjing University of Technology (Social Science Edition)*, 2022, 21(03): 61-73+116.
- [12] Luo Xiangyun. A study of social e-commerce users' motivation to participate in communication-based on self-determination theory[J]. *China Collective Economy*, 2022, No.701(09): 120-122.
- [13] Van den Broeck A, Ferris D L, Chang C H, et al. A review of self-determination theory's basic psychological needs at work[J]. *Journal of management*, 2016, 42(5): 1195-1229.
- [14] Sweeney J C, Webb D, Mazzarol T, et al. Self-determination theory and word of mouth about energy-saving behaviors: an online experiment[J]. *Psychology & Marketing*, 2014, 31(9): 698-716.

- [15] Xia Hongsheng , Xiao Shulan. A study on the impact of customer fit behavior on customer commitment--an examination based on the perspective of self-determination sense[J]. Journal of South China University of Technology (Social Science Edition),2017,19(06):34-46.
- [16] Gilal F G, Chandani K, Gilal R G, et al. Towards a new model for green consumer behaviour: A self-determination theory perspective[J]. Sustainable Development, 2020, 28(4): 711-722.
- [17] Villacorta M, Koestner R, Lekes N. Further validation of the motivation toward the environment scale[J]. Environment and Behavior, 2003, 35(4): 486-505.
- [18] Kaplan H ,Madjar N . Autonomous Motivation and Pro-Environmental Behaviours Among Bedouin Students in Israel: A Self-Determination Theory Perspective[J]. Australian Journal of Environmental Education,2015,31(2).
- [19] Cho M . Campus sustainability: An integrated model of college students' recycling behavior on campus[J]. International Journal of Sustainability in Higher Education,2019,20(6).
- [20] Jia Yajuan, Zhang Xinqi. Influence of environmental cognition and perceived benefits on consumers' willingness to participate in the sorting and recycling of express packaging and behavioral deviations[J]. Resource Science,2022,44(10):2060-2073.
- [21] Varma R V ,Mathi M K ,Satyanarayana P , et al. Exploring e-waste recycling behaviour intention among the households: Evidence from India[J]. Cleaner Materials,2023,7.
- [22] Johnston M M ,Finney J S . Measuring basic needs satisfaction: Evaluating previous research and conducting new psychometric evaluations of the Basic Needs Satisfaction in General Scale[J]. Contemporary Educational Psychology,2010,35(4).
- [23] Xie DJ, Wang LG, Bai Y et al. Revision of the Chinese version of the Basic Psychological Needs Satisfaction Scale[J]. Chinese Journal of Behavioral Medicine and Brain Science,2012(05):465-467.
- [24] YU Chengfu, ZHANG Wei, ZENG Yiyi et al. The relationship between gratitude, basic psychological needs and pathological Internet use among adolescents[J]. Psychological Development and Education,2012,28(01):83-90.
- [25] WANG Yuehui, LIU Shuang, WANG Xi, TANG Shengnan. Influential factors of urban residents' participation in express packaging recycling behavior - An empirical test based on 452 valid samples[C]//. China Soft Science Research Association 2019 China Soft Science Anthology. [Publisher unknown],2020:146-158.
- [26] Qingzhou Wang et. al. Intention in use recyclable express packaging in consumers' behavior: An empirical study. [J]Resources, Conservation and Recycling Volume 164, 2021. PP 105-115.
- [27] LIZIN S, VAN D M, VAN P S. Battery pack recycling: behavior change interventions derived from an integrative theory of planned behavior study[J]. Resources, Conservation and Recycling, 2017, 122:66-82.