The Promotion Effect of Green Consumption Behavior of College Students Based on Digital Era

Huan Yang[1],*

[1]Modern Agricultural and Forestry Engineering College, Ji'an college, Ji'an 343000, Jiangxi, China.

Corresponding authors: Huan Yang (e-mail: yanghuan2216@163.com).

Abstract Green development plays an important role in promoting low-carbon economy. In the construction of digital modernization, college students are in the main position, and the cultivation of green consumption concept promote overall development of college students. College students are not enthusiastic in consuming green products, their green consumption actions do not keep pace with their green consumption consciousness, and there may be deviations in the choice of green consumption methods. Based on the above problems, this paper explores the strategies of cultivating green consumption among college students by using literature research, questionnaire analysis and evolutionary game analysis from society, school, family and themselves.

Index Terms digital era, college students, green consumption, green development concept

I. Introduction

With the advent of the digital era, consumption scenes are extended from offline to online, consumption decisions are decided by the products themselves to those decided by the information around the products, consumers carry out online information acquisition, interaction and sharing, and to some extent the precise information embedded in the consumption scenes directly determines consumer consumption behavior [1], [2]. The Implementation Opinions on Accelerating the Greening of Lifestyle (Huanfa [2015] No. 135), the Implementation Plan for Promoting green (Development and Reform Employment [2022] No. 107) and other related documents propose to establish a green life information platform to help consumers obtain green information and guide green behavior [3].

In the new era, the update of science and technology has provided a strong boost to social progress, and the public's own demand for material materials has been satisfied based on the natural environment, and the expansion of the scale of public consumption has promoted changes in the natural environment. Promote the sustainable development of society, necessary have a correct understanding of the concept of green development, grasp its development value, and properly deal with the relationship between human beings and nature, so as to establish the basis for the harmonious development of human beings and nature [4]. In this new stage, it is necessary to recognize the importance of green economy and the important role of green in the ecological environment, since economic growth with "greening" as the engine makes the market economy more vital [5]. In society, college students are a special group, and they are at a critical stage of development, and the establishment of values is important for their lifelong development. In the field of consumer society, the comprehensive development of college students is greatly influenced by their individual consumption tendencies, and they are an important force in the field of future social consumption [6], [7]. However, some college students lack reasonable and healthy consumption tendencies and behaviors, which makes it urgent to implement green education and ensure the integration of green concept in all aspects of the college student group [8]. This is why it is necessary to implement green education and ensure the integration of the concept of green in all aspects of college students' life, improve the quality of talents, ensure the comprehensive and comprehensive development of college students, and ensure the coordination and sustainability of social, economic and natural development [9], [10].

The formation of fuel-based NO_X, the relative position of the coal injection pipe, and the three winds of the various all depend on the concentration of O_2, which in turn affects the distribution of oxygen concentrations [4]. In order to address this issue, this paper uses a CFD numerical calculation method to alter the amount of coal dust near the three winds of the coal spraying area in order to study the impact of the decomposition furnace near the three winds on temperature and NO distribution. A site thermal calibration process found that in a place near the three winds at the coal pipe, there is a local high temperature phenomenon and NOX reached 1100 ppm.

II. Related Work

In terms of research related to green consumption, foreign research started earlier and has achieved remarkable results, mainly in the following aspects: In terms of origin of green consumption, [11] put forward concept of "green consumption" and made provisions for limited consumer goods, believing that goods used should not cause damage to subject's life and health, and goods used should avoid large resource consumption, rare production materials, symbolic goods, etc., and need to ensure usefulness of goods. The concept of "green consumption" was introduced in [12], it is stipulated that goods used should not be harmful to life and health of subject, and goods used should avoid consumption of large amount of resources, rare production materials, symbolic goods, etc., and should be practical. In terms of green consumption, [13] believes that environmental awareness enhances consumers' ecological consciousness and that corporate environment has a potential impact on green and has a certain role in promoting green behavior. In terms of relevant relationship, [14] emphasizes that in field of consumption, role played by consumers is crucial for environmental behavior to be reflected in green consumption, and that there is a close relationship between consumers' interests and green consumption. For consumers, they need to update their mindset and concepts and establish a green concept based on concept of sustainable development. In terms of consumption and environment, [15] states that environmental problems are closely related to consumption problems, and that status of consumption problems is more obvious, with human consumption behavior profoundly affecting biosphere, and pressure on environmental development is enormous, with ecological problems being particularly serious and requiring great attention.

After 21st century, China has carried out relevant researches in field of green consumption, and relevant contents are as follows: In concept and connotation of green consumption, [16] it is stated that green is in an important position in modern society, and it is affirmed as a new trend to replace traditional consumption mode by green and control waste of resources, which is of significance for harmonious coexistence between human and nature and sustainable social development, It can promote improvement of human life quality and international competitiveness of industrial and agricultural products. In aspect of green ethics, [17] emphasizes that human consumption should be reflected, evaluated and regulated, and rationality of consumption should be evaluated based on sustainable survival, supported by theory of survival. As for cultivation of green concept, [18] proposes that, taking ecological civilization as starting point, green in new era is an important way with ecological characteristics, which can guide concept of green in an appropriate way, create a good social culture, improve social consumption environment, and successfully build a resource-saving society in general environment of sustainable development [19], [20].

Therefore, investigate effective strategies to cultivate green concept of contemporary college students and to pay attention to organic combination of greenand ethical consumption.

Based on objective analysis of real situation, this paper takes concept of green development and sustainable development as starting point, grasps connotation, characteristics and theoretical sources of greenconcept, elaborates on greenconcept, and carries out specific analysis on factors influencing greenconcept of college students, further explores strategy of cultivating greenconcept, with aim of cultivating green behavior of college students.

III. Green Consumption Mechanism

For basic connotation of green consumption, as shown in Figure 1, international community summarizes its behavior as 5R (Reduce, Reevaluate, Reuse, Recycle, Rescue), "constant temperature (reducing greenhouse gas emissions)", "economy (reducing resource consumption)" and "safety (reducing impact of consumption results on living environment)". (reducing harm to living environment as a result of consumption)", "sustainable (protecting consumption capacity of future generations)", and "new frontier (developing low-carbon technologies)" characteristics of consumption. Therefore, greenbehaviors studied in this paper specifically include green purchasing behavior, resource-saving behavior, recycling behavior (including sorting and recycling), and ecological environment protection behavior.
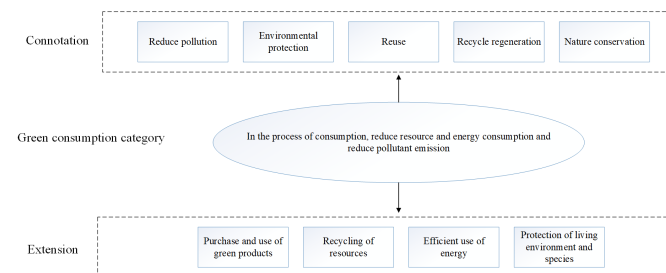

Figure 1: The connotation and extension of green consumption

In order to effectively promote occurrence of green consumer behavior, researchers have conducted a lot of analysis on influencing factors of green consumption. As shown in Figure 2, by summarizing domestic and international studies, influencing factors of existing studies include consumer factors, external intervention factors, socio-economic, cultural and environmental factors, and corporate and market factors.
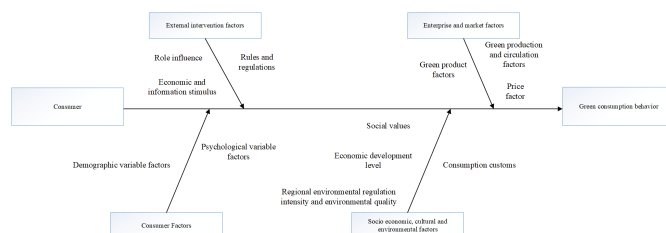

Figure 2: Factors influencing green consumption behavior

Through analysis of green research trends, we summarize evolution of green in international and Chinese domains, and

we find that green in China and abroad show similar evolutionary paths, i.e., in first stage, both pay attention to production responsibility at production end, in second stage, both pay attention to leading role of government policies, and in third stage, both begin to explore ways to stimulate consumers' green emotions. In this paper, we refer to these three stages as green 1.0, green 2.0 and green 3.0, respectively, and we can see that green 3.0 is focus of international development (see Figure 3).
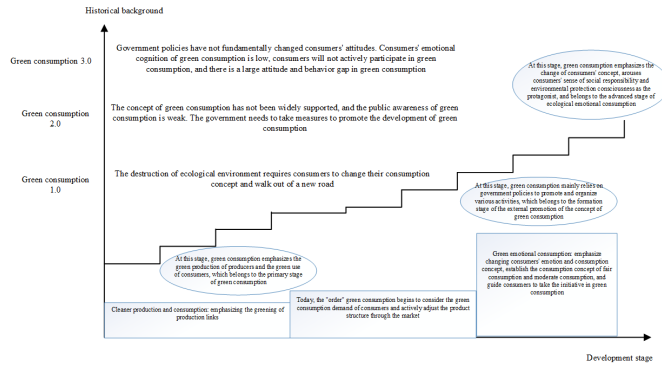

Figure 3: Evolution of green consumption

The Theory of Planned Behavior (TPB) is widely used by researchers to explain mechanisms and underlying mechanisms of consumer behavior, and is one of most applied and mature theories in current research on green consumer behavior. TheTPB is believed to have originated from Theory of ReasonedAction (TRA). As shown in Figure 4, Theory of ReasonedAction only considers aspects of individual will, such as attitudes (behavioral beliefs) and subjective norms (subjective normative beliefs). The TPB argues for an extension to include involuntary aspects on this basis. As shown in Figure 5, TPB incorporates perceived behavioral control into decision-making process of individual behavior. Specifically, TPB posits that a person's actual behavioral performance is determined by their behavioral intentions, which are described as "how much effort people are willing to exert and how much effort they intend to exert in order to behave in a certain way."
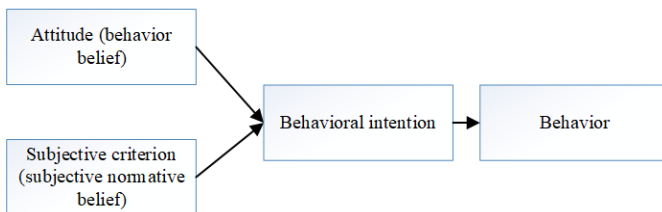

Figure 4: Rational behavior theory

Decision models provide a more comprehensive theoretical background to explain occurrence of individual behavior. Among them, consumer decision models are one of most applied and mature theories in research, and these models are also more widely used in field of green consumer behavior.
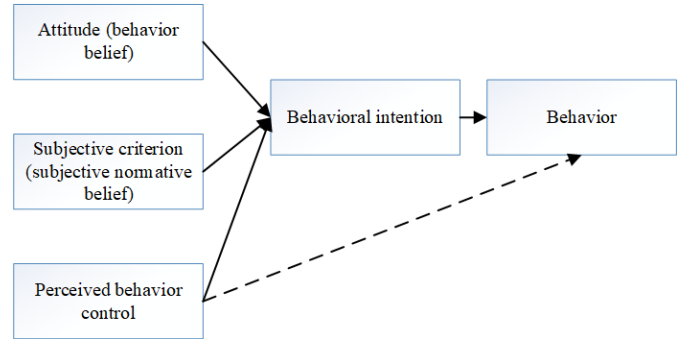

Figure 5: Theory of planned behavior

Based on analysis of literature [12], Responsible environmental behavior model of Hines was proposed. As shown in Figure 6, model suggests that environmental behavior intention is influenced by knowledge of action strategies, knowledge of environmental issues, action skills, and personality variables. The model also suggests that situational factors are important external factors in implementation of environmental behaviors.
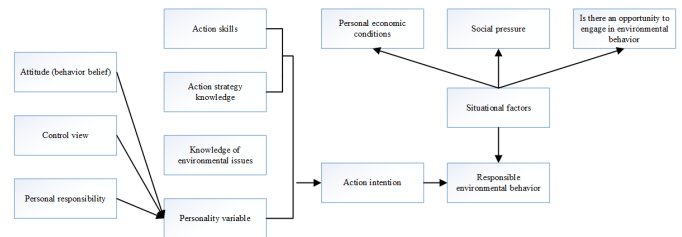

Figure 6: Responsible Environmental Behavior Model

IV. Evolutionary Game Analysis Method

1) In green 3.0 regulatory game system, expected benefit function of government's choice of regulatory strategy is:

$$u_{11} = YZ(H - C_1 - E_1) + Y(1 - Z)(H - C_1 - E_1). \quad (1)$$

The expected payoff function for government not choosing a regulatory strategy is:

$$u_{12} = Y'Z'\left(H - C_1'\right) + Y'\left(1 - Z'\right)\left(H - C_1'\right). \quad (2)$$

The average expected return for government is:

$$\overline{u_1} = X'u_{11} + (1 - X)u_{12}. \quad (3)$$

The differential of replication dynamic equation in government's choice of regulatory strategy is:

$$\frac{dX}{dt} = X'\left(u_{11} - u_{12}\right) = X'\left(1 - X'\right)\left(u_{11} - u_{12}\right). \quad (4)$$

2) Solving dynamic equations for business replication

In green 3.0 regulatory game system, expected benefit function for firms to participate in green production is:

$$
\begin{aligned}
u_{21} =& X'Z'(R_2 + \lambda S_1 + E_1 - C_2 - H_1) \\
& + X'(1 - Z')(R'_2 + E_1 - C_2 - H_1) \\
& + (1 - X')Z'(R_2 - C_2 - H_1).
\end{aligned} \quad (5)
$$

The expected revenue function for firms not participating in green production is:

$$
\begin{aligned}
u_{22} =& X'Z'(R'_2 - C'_2 - H_1 - \lambda S_2) \\
& + X'(1 - Z')(R'_2 - C'_2 - H_1) \\
& + (1 - X')Z'(R'_2 - C'_2 - H_1).
\end{aligned} \quad (6)
$$

The average expected return of firm is:

$$
\overline{u_2} = Y'u_{21} + (1 - Y')u_{22}. \quad (7)
$$

The differential of replication dynamic equation when firms are involved in green production is:

$$
\frac{dY}{dt} = Y'(1 - Y')(C'_2 - C'_2 + X'Z'\lambda S_1 + X'Z'\lambda S_2). \quad (8)
$$

3) Consumer replication dynamic equation solving

In green 3.0 regulatory game system, expected benefit function of consumers' choice of green mode is

$$
\begin{aligned}
u_{31} =& R'_3 - C'_3 - H_2 + Y'[(R_3 - C_3) \\
& - (R'_3 - C'_3)] + X'Y'Z'T_1.
\end{aligned} \quad (9)
$$

The expected benefit function for consumers choosing traditional consumption model is:

$$
u_{32} = R'_3 - C'_3 - H_2 - X'Y'(1 - Z')T_2. \quad (10)
$$

The average expected benefit to consumers is:

$$
\overline{u_3} = Z'u_{31} + (1 - Z')u_{32}. \quad (11)
$$

The differential of replication dynamic equation when consumers choose a green pattern is:

$$
\begin{aligned}
\frac{dZ}{dt} =& Y'(R_3 - R'_3 + C'_3 - C_3) \\
& + X'Y'Z'T_1 + X'Y'(1 - Z')T_2.
\end{aligned} \quad (12)
$$

In order to find a stable strategy for green 3.0 regulatory game system under government order regulation approach, replication dynamic equations of government, firms and consumers are made zero, i.e.

$$
\frac{dX}{dt} = 0, \frac{dY}{dt} = 0, \frac{dZ}{dt} = 0. \quad (13)
$$

In this game model, Jacobian matrix of equilibrium points in two-party game is applied to three-party game. We can know that $x_1 = 0$ and $x_2 = 1$ are two possible stable strategies for government: similarly, $H_1 = 0$ and $y_2 = 1$ are two possible stable strategies for firms, and $z_1 = 0$ and $z_2 = 1$ are two possible stable strategies for consumers. According to evolutionary game theory, game players eventually tend to stabilize their strategies. Therefore, above Ω region is value domain of equilibrium solution of game model, namely:

$$
\Omega = \{(X, Y, Z) \mid 0 \leqslant X \leqslant 1, 0 \leqslant Y \leqslant 1, 0 \leqslant Z \leqslant 1\}. \quad (14)
$$

There is usually an equilibrium solution S=(X,y,Z), which satisfies Eq. (15) in Ω region. Under government order regulation approach, green consumption30 regulation game system will reach equilibrium state when expected returns of mixed strategies of three participating agents in game model are equal.

$$
\Omega = \{(X, Y, Z) \mid 0 \leqslant X \leqslant 1, 0 \leqslant Y \leqslant 1, 0 \leqslant Z \leqslant 1\}. \quad (15)
$$

In green 3.0 regulatory game system, make $u_{21} = u_{22}$ to obtain optimal probability solution of government in equilibrium of green 3.0 game system. Therefore, $R_2 - C_2 - H_1 + XE_1 = R'_2 - C'_2 - H_1 - XF_1$ the optimal probability solution of government in equilibrium of game model is

$$
X = \frac{C_2 - C'_2}{E_1 + F_1}. \quad (16)
$$

In green 3.0 regulatory game system, make $u_{31} = u_{32}$ and substitute Eq. (16) to obtain optimal probability solution of enterprises in equilibrium of green 3.0 game system $Y(R_3 - C_3) + XYE_2 + R'_3 - C'_3 - H_2 - Y(R'_3 - C'_3) = R'_3 - C'_3 - H_2 - XYF_2$. Therefore, optimal probability solution of enterprise in equilibrium of game model is:

$$
Y = \frac{(C_2 - C'_2)F_2}{(E_1 + F_1)[(R'_3 - C'_3) - (R_3 - C_3)] - (C_2 - C'_2)E_2}. \quad (17)
$$

In green 3.0 regulatory game system, let $u_{11} = u_{12}$ and substitute Eq. (17) to obtain optimal probability solution of consumers in equilibrium of game model. $H - C_1 - YE_1 - ZE_2 = H - C'_1$. Therefore, optimal probability solution of consumers in equilibrium of game model is:

$$
Z = \frac{C'_1 - C_1}{E_2} - \frac{(C_2 - C'_2)F_2}{E_2(E_1 + F_1)[(R'_3 - C'_3) - (R_3 - C_3)] - (C_2 - C'_2)(E_2)^2}. \quad (18)
$$

V. Results

This questionnaire was developed based on collection of relevant data for study.36 questions were included in questionnaire, including single and multiple choice questions.The

questionnaire was divided into two parts: first part was a survey on basic information such as gender, grade and major; second part was a thematic survey on three aspects of green concept, awareness and practice. Out of total 200 questionnaires, after deleting invalid questionnaires, there were 186 valid questionnaires, with 93.0% of valid recovery. Among them, 82 were male students and 102 were female students, as shown in Table 1.

-	-	-	Frequency	Percentage(%)
Gender	Male		82	44.5
Gender	Female		102	55.5
Grade	Freshman		38	19.3
	Sophomore		44	22.7
	Junior		34	23.8
	Senior		30	18.9
	Graduate student		83	15.4
Major	Arts		63	44.2
	Science and Engineering		17	34.5
	Medicine		11	9.8
	Agronomy		9	5.2
	Art and sports		13	6.3

Table 1: Basic information of survey respondents

The natural resources themselves are wealth, and natural advantages create a virtuous development of economic and social advantages, and ecological-oriented modern development'. As shown in Figure 7, 90% of students agreed with assertion that "green mountains are silver mountain of gold". This shows that most of university students can maintain a correct attitude towards relationship between economic development and ecological protection, and that they should no longer demand from nature, but should find a harmonious way to deal with relationship between economy and ecology, so as to ensure a high degree of unity between two, to play a positive role in environmental protection, and to provide feasible conditions for transformation of ecological advantages into economic advantages.
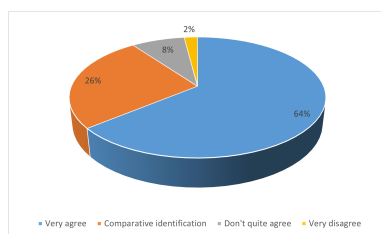

Figure 7: Survey of situation of "green water and green mountains are silver mountain of gold"

The harmony between human and nature should be maintained, which provides important support for socialist development in new era. The essence of green development has been fully highlighted, and root of it lies in harmonious coexistence between human beings and nature. In this concept, 96% of people agree with it, as shown in Figure 8. This shows that college students can recognize that human and nature are a community of life, and have a strong ecological consciousness, which promotes formation and practice of green

concept. Based on Marxist view of nature, human beings are one of components of nature, and if environment is destroyed by human beings, they will be retaliated by nature and harm themselves; if human beings can protect nature properly, they will be rewarded by nature. Therefore, human beings should respect, respond to and protect nature.
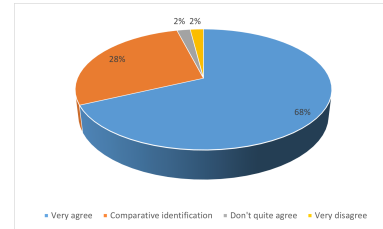

Figure 8: Survey on "Harmonious coexistence between human beings and nature"

Green consumption, as one of consumption patterns, has characteristics of rationalization, health and moderation, and is of significance to sustainable development of human beings. In cause of socialist construction, college students are one of most important groups. They have received higher education and are quick to accept new knowledge and new ideas, which is clearly reflected in learning and practice of green consumption. In survey of "How do you think about green consumption", 83% of people think it is necessary; 10% think it is not important; 7% think it is not necessary, as shown in Figure 9. Through survey, it can be seen that about 80% of college students have a positive attitude towards green consumption, and they can correctly understand value of green consumption.
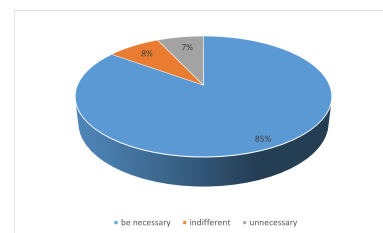

Figure 9: Survey chart on how to view green consumption

In survey on college students' willingness to understand and learn about green consumption, 86% of them said they were willing, 6% said they were not willing, and 8% said they did not care, as shown in Figure 10. This shows that most college students agree that they are willing to learn about green consumption. As a high quality group, college students can quickly adapt to changes in social environment and actively accept to learn new cultural knowledge and internalize power of knowledge to have a deeper understanding of concept of green consumption.

Through construction of green low-carbon recycling economy system, green development can be promoted and concept of green can be practiced. Public's demand for ecological environment has been significantly increased, and green has
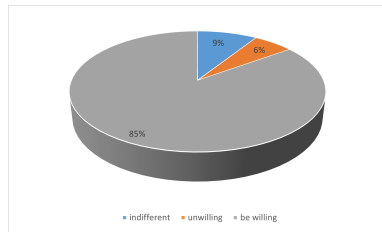
Figure 10: Survey on willingness to understand and learn about green consumption

Figure 12: Questionnaire on reasons for college students' participation in green activities

become representative of rational consumption, advocating concept of green consumption. Alipay advocates users to consume green, encourages green travel, accumulates energy by donating steps, and plants a real tree in a remote area in desert by virtual planting online. In order to grasp participation of college students in green activities, a specific survey was conducted, and results showed that 54% of them would participate, 37% would occasionally participate, and only a small number would not participate, as shown in Figure 11. It can be seen that there is a subjective willingness of college students to participate in green activities, and implementation of these activities can advocate people to participate in green activities, which is crucial to development of green concept.
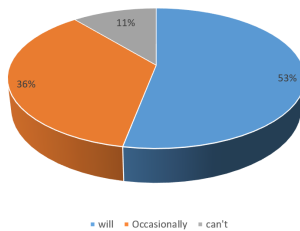
survival and development needs of future generations and not to threaten interests of future generations. In order to clarify understanding of college students on green consumption, we conducted a specific survey, as shown in Figure 13 and Figure 14, which shows that college students basically understand green consumption, but there are still imperfections, and most of them focus on a certain part of it, which has a narrow concept of green consumption. Among them, highest percentage of sustainable consumption is 87%; many students understand green based on sustainable consumption and clean consumption; only 25% of students think that all four options are green meanings, and most people choose two of them.

Figure 11: Survey map in terms of participation in green consumption activities

Figure 13: Survey chart on meaning of green consumption

Based on this, we conducted a survey on reasons for college students' participation in green activities, as shown in Figure 12. Forty-eight percent of college students thought that green activities are very beneficial to environmental protection and contribute to sustainable development of society; 37% thought that green is good for their own health, and only a small percentage thought that green is a trend. This shows that college students have certain knowledge about environmental protection and sustainable development, and are willing to contribute their own efforts in sustainable development.

The concept of green has a strong comprehensive, for this concept is mainly reflected in four aspects: first is economic consumption, that is, in process of resource and energy consumption as far as possible to control consumption, so that it is at lowest level; second is clean consumption, that is, in process of consumption to ensure that generation of waste and pollutants is minimal. The third is safe consumption, which means that consumption should not be harmful to physical and mental health of others; and fourth is sustainable consumption, which means that consumption should aim to satisfy
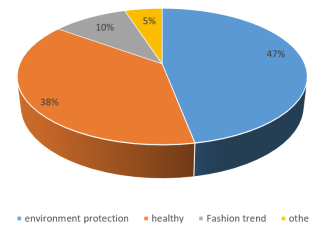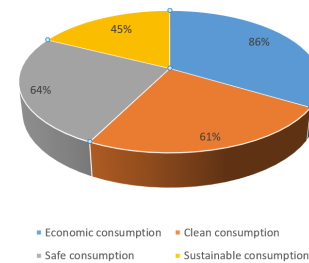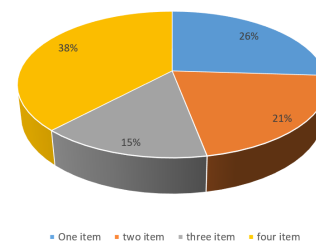

Figure 14: Map of survey on meaning of green consumption (number of items)

To grasp awareness of green products among college students, we can start from recognition of green logo. The results of survey on "how do you recognize green products" are shown in Figure 15. 37% chose "listening to introduction of shopper" and 27% chose "looking at green logo", which indicates that college students prefer "listening to introduction of shopper", and green products are most "directly proved" by green logo. This indicates that college students prefer to

"listen to introduction of shopper", while green product with green logo as most "direct proof" is not first choice for college students to identify green products, but prefer to be guided by external information, which shows their bias.
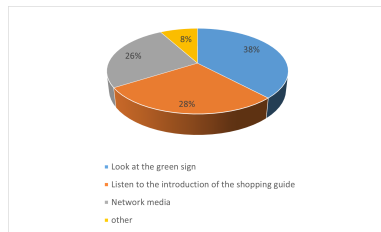

Figure 15: Survey chart on how to identify green products

In social life, environmental, energy efficiency, green food, water conservation, energy saving products and other logos are more common, and results of survey on college students' awareness of green logos are shown in Figure 16. In terms of green food logo, college students have highest awareness, but awareness of other green logos is low, so it can be seen that overall awareness of college students in green products is low.
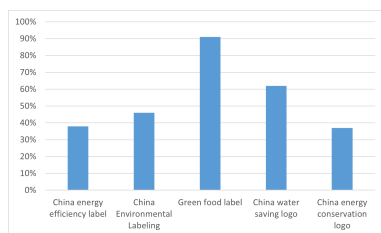

Figure 16: Survey map of green logo awareness

The results of survey on content of green products are shown in Figure 17, highest proportion is green food, some college students intuitively think that green products are green food, which is a manifestation of wrong green concept, it can be seen that college students have one-sided and not in-depth problems in cognition of green products, and pay limited attention to green clothing, clothing construction, etc.
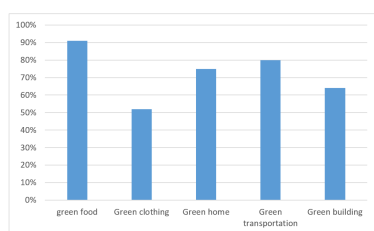

Figure 17: Survey map of content of green products

Green products need to ensure that they carry "green mark", which means that production process or nature of product should meet requirements of low carbon and environmental protection, save energy, and have recyclable and renewable characteristics. The question of "How often do you buy green products" was used to investigate consumption enthusiasm of college students in green products, and results are shown in Figure 18. The majority of students said they bought green products occasionally, and only a small number of students said they bought green products frequently.
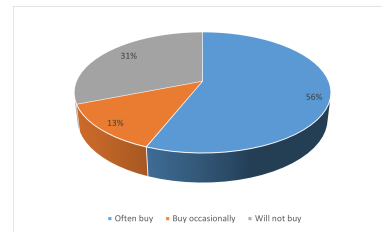

Figure 18: Survey map of content of green products

The survey was conducted around question of "the most concerned factors in consumption process", as shown in Figure 19. The factors of price and quality are relatively high. The production cost of green products is influenced by raw materials, production technology and transportation conditions, resulting in higher costs and higher prices than ordinary products, but difference in quality between two is not obvious, which makes price factor an important factor influencing college students' low consumption of green products.
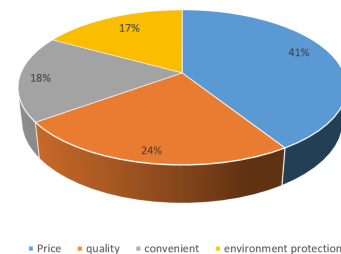

Figure 19: Questionnaire on most concerned factors in process of consumption

The level of green consciousness can be understood through actions, which in turn affects concept of green consumption, and green ideas are expressed through actions. The results of survey on "the use of shopping bags when going to supermarket" are shown in Figure 20. 39% of respondents chose to buy plastic bags because of their low price and convenience, and high frequency of use, but use of disposable products can seriously threaten ecological environment. Although college students understand that disposable plastic products are difficult to metabolize and seriously pollute environment, they lack good habits, which leads to phenomenon of positive thinking but negative action, and lack of environmental protection of consumption behavior.

The results of survey on question "Would you choose a gift with simple packaging" are shown in Figure 21. Only 26% of college students chose to buy simple gifts; in survey of "Would you buy a product you don't need on impulse? "Only 12% of students said they would not buy products they did not need on spur of moment. It can be seen that some college students are influenced by factors such as competitive consumption and
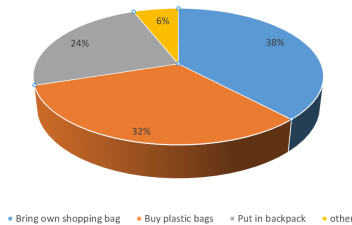
Figure 20: Go to supermarket on use of shopping bags survey map

existence of irrational and unhealthy thoughts such as "I want to have what others have" is not conducive to development of college students.
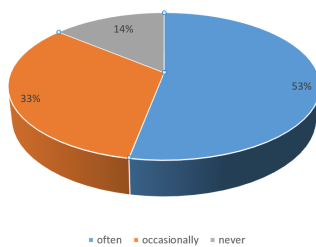

Figure 21: Survey graph of purchasing unwanted products due to impulse

In social consumption, college students are mainstream force, and their consumption ability is gradually increasing. However, their minds are still immature, and situation of comparison consumption, excessive consumption and extravagant consumption is more common, which often affects college students as a non-green method. According to Baudrillard, cult of brand is derived from symbolic value of symbols, and existence of commodity brands will lead to creation of additional value and symbolic meaning, and investigation of individual status can be realized through individual consumption. Some college students do not consider their own economic conditions and necessity of life, and blindly consume in order to obtain a sense of psychological superiority, which urgently needs to change unhealthy consumption concept in order to successfully practice concept of green consumption.

VI. Conclusion

In recent years, public is committed to exploring new development models, and concepts such as sustainable development, low-carbon economy, and green development are gradually emerging. College students are builders and main force of socialist cause, and through their consumption attitude, we can perceive consumption concept of people in an era. In this paper, we take microscopic perspective of college students as starting point to investigate cultivation strategy of green concept. The paper investigates current situation of green concept of contemporary college students through questionnaire analysis and evolutionary game analysis, and then investigates scientific strategy of cultivating green concept from four as-

pects: school, family, school and oneself. It is beneficial to overall development of college students, promotes creation of a good green atmosphere in whole society, and provides an inherent contribution to sustainable development of society.

Funding

References

[1] Pu, R., & Jiang, S. (2021). Understanding the consumption behaviors in online education towards promoting the sustainable development goals (SDGs). *Academy of Entrepreneurship Journal, 27*(6), 1-16.

[2] Ali, M., Ullah, S., Ahmad, M. S., Cheok, M. Y., & Alenezi, H. (2023). Assessing the impact of green consumption behavior and green purchase intention among millennials toward sustainable environment. *Environmental Science and Pollution Research, 30*(9), 23335-23347.

[3] Xie, S., & Madni, G. R. (2023). Impact of social media on young generation's green consumption behavior through subjective norms and perceived green value. *Sustainability, 15*(4), 3739.

[4] Tang, H., Xu, Y., Lin, A., Heidari, A. A., Wang, M., Chen, H., ... & Li, C. (2020). Predicting green consumption behaviors of students using efficient firefly grey wolf-assisted K-nearest neighbor classifiers. *Ieee Access, 8*, 35546-35562.

[5] Ye, Q., Zhou, R., Anwar, M. A., Siddiquei, A. N., & Asmi, F. (2020). Entrepreneurs and environmental sustainability in the digital era: Regional and institutional perspectives. *International Journal of Environmental Research and Public Health, 17*(4), 1355.

[6] Yıldırım, S. (2021). Do green women influencers spur sustainable consumption patterns? Descriptive evidences from social media influencers. *Ecofeminism and Climate Change, 2*(4), 198-210.

[7] Al-Azzam, A. F., & Al-Mizeed, K. (2021). The effect of digital marketing on purchasing decisions: A case study in Jordan. *The Journal of Asian Finance, Economics and Business, 8*(5), 455-463.

[8] Alagarsamy, S., Mehrolia, S., & Mathew, S. (2021). How green consumption value affects green consumer behaviour: The mediating role of consumer attitudes towards sustainable food logistics practices. *Vision, 25*(1), 65-76.

[9] Aboalsamh, H. M., Khrais, L. T., & Albahussain, S. A. (2023). Pioneering perception of green fintech in promoting sustainable digital services application within smart cities. *Sustainability, 15*(14), 11440.

[10] Cuc, L. D., Pelau, C., Szentesi, S. G., & Sanda, G. (2022). The Impact of Green Marketing on the Consumers'intention to Buy Green Products in the Context of the Green Deal. *Amfiteatru Economic, 24*(60), 330-345.

[11] Jasrotia, S. S., Darda, P., & Pandey, S. (2023). Changing values of millennials and centennials towards responsible consumption and sustainable society. *Society and Business Review, 18*(2), 244-263.

[12] Seyfi, S., Hall, C. M., Vo-Thanh, T., & Zaman, M. (2023). How does digital media engagement influence sustainability-driven political consumerism among Gen Z tourists?. *Journal of Sustainable Tourism, 31*(11), 2441-2459.

[13] Ali, H., Li, M., & Hao, Y. (2021). Purchasing behavior of organic food among Chinese university students. *Sustainability, 13*(10), 5464.

[14] Chunjiong Zhang, Byeong-hee Roh, and Gaoyang Shan. 2023. Poster: Dynamic Clustered Federated Framework for Multi-domain Network Anomaly Detection. In Companion of the 19th International Conference on emerging Networking EXperiments and Technologies (CoNEXT 2023). *Association for Computing Machinery*, New York, NY, USA, 71–72.

[15] Zhang, Z., Zhang, N., & Wang, J. (2022). The influencing factors on impulse buying behavior of consumers under the mode of hunger marketing in live commerce. *Sustainability, 14*(4), 2122.

[16] Ali, M. (2021). A social practice theory perspective on green marketing initiatives and green purchase behavior. *Cross Cultural& Strategic Management, 28*(4), 815-838.

[17] Khan, M. I., Khalid, S., Zaman, U., José, A. E., & Ferreira, P. (2021). Green paradox in emerging tourism supply chains: achieving green consumption behavior through strategic green marketing orientation, brand social responsibility, and green image. *International Journal of Environmental Research and Public Health, 18*(18), 9626.

[18] Al Hamli, S. S., & Sobaih, A. E. E. (2023). Factors influencing consumer behavior towards online shopping in Saudi Arabia amid covid-19: Implications for E-businesses post pandemic. *Journal of Risk and Financial Management, 16*(1), 36.

[19] Us, Y., Pimonenko, T., Lyulyov, O., Chen, Y., & Tambovceva, T. (2022). Promoting green brand of university in social media: Text mining and sentiment analysis. *Virtual Economics, 5*(1), 24-42.

[20] Boca, G. D. (2021). Factors influencing consumer behavior in sustainable fruit and vegetable consumption in maramures county, Romania. *Sustainability, 13*(4), 1812.

●●●