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Nudge to be Green? Social norms, geographical proximity and consumers' choice of green takeout packaging

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Abstract: The problem of takeaway packaging pollution is becoming increasingly prominent, while social normative information, as a nudge, plays an important role in promoting the adoption of green packaging. We conducted an online choice experiment survey using two forms of informational intervention, namely nationwide social norms information and first tier cities' social norms information, and 1,453 participants randomly entered one control group and two treatment groups. Participants' willingness to pay (WTP) differed in the degree of the greenness of different parts of the packaging, including outer packaging, lunch boxes and cutlery. Mixed Logit models and polynomial Logit models are used to estimate WTPs by attributes, while latent class models were adopted to identify key consumer groups under social norm information champion public policies. The results are as follows:1) Green outer packaging and pulp or paper-based meal boxes can improve consumers' WTPs, while sharing meal boxes and reducing tableware content may not gain significant consumer WTPs premium. 2) Nation-wide social norms information intervention is an effective tool to improve people's WTP on green takeaway packaging content. 3) Male, senior people working in hometown, high monthly income, high frequency of takeout ordering, high environmental preference and environmental peer pressure are the key groups of social norm information intervention. This study can provide a reference for food industry participants and governments to implement informational green nudges to eliminate negative environmental externalities of consumer behavior.

Key words: Social Norms; Choice experiment; Takeaway Packaging; Green consumption

1. Introduction

With the rise of digital economy and platform economy, the number of users of Online food delivery platforms in China increased from 6 million in 2011 to 456 million in 2020, and the proportion of online food delivery turnover in the total turnover of catering industry increased from 1.4% in 2015 to 16.8% in 2020.[1] However, the problem of excessive consumption of a large number of plastic packaging in takeaway packaging is becoming increasingly prominent (Bos and Owen, 2016). The 46.9m takeout orders placed daily on China's online food delivery platforms are linked to 17.12bn sets of disposable plastic cutlery, lunch boxes, and packaging bags used throughout the year; Its consumption process causes a huge negative impact on the environment and human health (Jambeck et al., 2015, Wen et al., 2019). The report to the 19th National Congress of the Communist Party of China explicitly stated that "we will implement the strictest

[1] Data Source：data.iimedia.cn

possible ecological and environmental protection system to foster a green way of development and lifestyle. "Consumers' adoption and preference formation of green products are the endogenous driving force of industrial green development (Schinkel and Spiegel, 2017, Bezin, 2019). Online takeout ordering consumers' decisions are highly dependent on platform information. If public departments require platforms to provide information about the social norms of green consumption before consumers place orders, consumers may be motivated to compare norms and adjust their consumption behaviors. So, what is the current situation of consumers' preference for green packaging? Can social normative information effectively promote green packaging choice behavior and increase willingness to pay? What is the specific mechanism of action, and how to carry out the supervision policy choice of green packaging promotion? The answers to these questions have important theoretical and practical significance for maintaining the sustainable and healthy development of the takeout industry and accelerating the process of high-quality green development.

According to relevant literature at home and abroad, takeout green packaging adoption behavior can be incorporated into quasi-public goods purchase behavior. Products with environmental benefits such as green organic foods and eco-labelled products are marketed based on their dual benefits: they provide private benefits such as nutrition, transportation and energy, as well as public benefits such as reduced pesticide use, improved local air quality and carbon neutrality (Lazaric et al., 2020). Such quasi-public goods usually have the problem of insufficient private purchase, which requires some public policies to increase the total market demand. Such as administrative regulation (Taylor, 2019), economic regulation (Eerola and Huhtala, 2008, Katare et al., 2020) and information guidance (Bezin, 2019, Sun et al., 2021) policies. The former two kinds of public policies have problems such as high cost, loss of welfare, and difficulty in avoiding rent-seeking. Information-guided policy has attracted increasing attention from public policy makers and researchers due to its advantages of low cost and flexible adjustment.

People live within the social. In real life, people will compare their abilities, feelings, circumstances and opinions with social norms to make personal behavior decisions. Therefore, social norms information, as an information-guided boosting strategy, plays an important role in behaviors (Chen et al., 2010). The influence of social norms on behaviors is reflected in conformity behavior, distributed concern and interdependent preference (Festinger, 1954).

Behavioral and Experimental Economists have found through a large number of theories and experiments that consumers are activated by social normative information to adjust their behaviors more in line with social norms and exhibit pro-social behaviors such as green consumption through comparison (He and Lu, 2021, Chen et al., 2017). Previous scholars have studied this mechanism in terms of reducing household water consumption (Ferraro and Price, 2013) and overall energy consumption (Allcott, 2011, Delmas and Lessem, 2014). Despite the increasing number of studies on social norms, the impact of social norms information on the selection of environmental protection products in the platform economy, the effectiveness of social norms information based on geographical proximity and the key groups of social norms information are still unresolved.

This paper focuses on the situation in China, which has important policy significance for promoting consumers' willingness to pay (WTP) through social normative information and increasing the market share of green takeaway packaging. Based on the primary consumer micro data, this study uses information intervention method, selection experiment method, and binary and latent category selection model to examine individual's valuation of takeaway meals with different green packaging degrees, and whether the valuation changes with the change of social norm information, and to analyze consumer heterogeneity.

In view of the current small market of green packaging takeaway food, we obtained the individual evaluation of consumers' green packaging attributes through controlled experimental methods. The selection experiment was carried out for the target takeaway consumer groups, and participants were asked to choose among the product profiles based on the situation. In the design of randomized controlled experiments, there are differences mainly in the provision of social norm information. In all groups, participants were provided with basic information about the takeaway meal, such as the type of takeaway meal. Considering the balance of the information load, consumers in the control group will also be provided with information about the choice of half of the takeout meal, regardless of the package.

The following sections of this article are arranged as follows. The second part is the literature review, the third part is the research design, the fourth part is the econometric model, the fifth part is the data, the sixth part is the results, the seventh part is the robustness test, and the last part is the conclusion and policy suggestions.

2. Literature review

This experiment aims to evaluate the changes brought by social norms information intervention on consumers' choice behavior of green packaging for takeaway food, based on the idea that social norms can influence consumers' behavior. This part will sort out relevant theories and empirical literature from the following two aspects.

First, as for the demand for environmental attribute of consumer goods, a large number of behavioral and economic literature have carried out a series of studies on the source channels, influencing factors and measurement methods of the demand for environmental attribute of products. In terms of the source channels of demand for environmental protection attribute, the research believes that the demand for environmental protection attribute comes from consumers' green preference and green consumption culture, and is promoted by green production under green technological innovation. The phenomenon of free riding causes insufficient demand for environmental attributes (Bezin, 2019, Chan and Dinelli, 2020). According to the research, the influencing factors of demand for environmental protection products and attributes include individual characteristics, cultural characteristics, psychological characteristics and situational characteristics (Takahashi, 2021, Jacobsen et al., 2012). For example, Binder and Blankenberg (2017) showed that life satisfaction and subjective well-being would increase the range and intensity of green consumption behaviors based on UK household panel data. In terms of measurement methods, The cutting-edge research on green consumption demand and preference mainly adopts the selection experiment method of stating preference (Rousseau and Vranken, 2013, Wu et al., 2020) and the auction experiment method of showing preference (Tebbe and von Blanckenburg, 2018, Barlagne et al., 2015) and real market transaction data quasi-experimental method (Sun et al., 2021);These methods aim to separate the willingness to pay of green attributes and solve the estimated endogeneity problem. The selection experiment method is flexible and efficient in collecting data, and it is a common method to measure the willingness to pay for attributes of products that have not yet entered the market. However, many studies fail to solve the problem of hypothetical bias, that is, consumers' stated choices in the selection experiment are inconsistent with their actual behaviors. Some improvements have been proposed, mainly

including cheap consultation, formal declaration, outcome intervention, etc. (Penn and Hu, 2019, Penn and Hu, 2018).

Secondly, in terms of the research on the impact of social norm information on green consumption behavior, scholars believe that social norm information, as an application form of social norm information, can change individual environmental attitudes, Thus encouraging green consumption behavior (Rousseau and Vranken, 2013, Hallstein and Villas-Boas, 2013). Empirical studies have found that the effects and directions of social norm information vary with different situations (Chen et al., 2017, Yan et al., 2021). Hunter and Roos (2016) found that guiding consumers in southern Sweden to evaluate the meat consumption patterns of people close to them and people in poor countries had different effects on stimulating the behavior of reducing meat consumption. Kim et al. (2018) found through behavioral experiments that the willingness to pay premium for organic products increased by about 90% under the processing of the results of acquaintance viewing. The extent to which consumers are influenced by social norms to produce green consumption behaviors, Influenced by individual characteristics such as gender and altruism (Fonte, 2013; Brough et al., 2016), cultural characteristics such as "unity and harmony" (Kong and Sun, 2021), and psychological situation characteristics such as optimism and friendliness (Smith and Jehlicka, 2013, Xie et al., 2019). Previous studies on information intervention of environmental social norms tend to ignore the role of social norms based on geographical proximity (Hunter and Roos, 2016, Kim et al., 2018).

It is not difficult to find that there is room for further research. Firstly, there is insufficient discussion on consumer preference and individual willingness to pay for different green attributes in the research literature on demand for environmental attributes of consumer goods. Second, in the study of the influence of social norms on green consumption behavior, there is a lack of field experimental quantitative research based on the framework of geographical proximity to social norms. Thirdly, in terms of the heterogeneity of consumers' green consumption behavior, there are few studies on classifying consumer groups by classification algorithm. This paper argues that the issue of consumer will and driving mechanism of green replacement of Chinese takeout food consumption packaging has both academic and application significance, which is helpful to study the effect of social normative information intervention policies to promote green consumption and lifestyle transformation in the digital economy, especially in the vast emerging economies.

To sum up, this study has the following academic values and policy implications. In terms of academic value, it enriches the research of social norm information on green consumption behavior, especially fills the research vacancy of social norm information on the choice of green packaging for overseas sale, and evaluates the key groups of different social norm information based on geographical proximity and alienation. By combining random information intervention with selective experiment, the endogeneity problem of willingness to pay measurement of green packaging attribute was solved effectively under different information intervention. In terms of policy implications, it is clear that social normative information intervention can achieve a relatively significant effect of green consumption intervention on takeout packaging attributes at a lower cost, providing a decision-making basis for large-scale promotion through takeout platforms. Identifying which consumers are the key groups for information intervention is beneficial to further reduce the cost of information intervention, improve the effect of information intervention, and better play the dual welfare role of social normative information in improving consumer surplus and environmental benefits.

3. Study design

The randomized field trial in this paper was conducted through an online research platform. The main design idea is: social specification information for intervention, based on the experimental method to measure the consumer to different willingness to pay (WTP) take-out packaging different green attribute level, evaluate information intervention in improving consumer willingness to pay of social norms, enlarge market share green packaging technology potential, and latent class models to identify consumer preference heterogeneity of take-away green packaging.

3.1 Experimental design of random information intervention

Packaging plays an important role in the decision of selling point. Social normative information has a guiding space in changing consumers' adoption behavior and willingness to pay for takeout green packaging (Chen et al., 2017). In order to investigate the role of social norm information based on applicable region, we mainly consider two types of social norm information applicable nationally and that applicable in developed cities.

In this study, the participants were divided into control group and two treatment groups to verify the influence of social norm information on the WTP estimation of consumers' green packaging preference. In the two intervention groups and the control group, the interviewees will be presented with the following information, respectively, to provide information intervention and balance the information load.

"According to a report by the Recycling Industry Economics Research Center at Tsinghua University's School of The Environment, 81 percent of take-out meals received by consumers from merchants are/plan to use environmentally friendly take-out packaging instead of non-biodegradable plastic packaging for traditional take-out meals."(National Social norms information intervention)

"In developed cities such as Hangzhou and Beijing, all takeout food delivered to consumers within urban built-up areas will be packaged in environmentally friendly packaging instead of using non-biodegradable plastic bags."(Information intervention of social norms in developed cities)

"Some food delivery platform merchants have introduced options such as' half portion ', which can help consumers control their total food intake, promote healthy dining and reduce food waste."(Irrelevant information of control group)

3.2 Selection of experimental design

Choice experiment is an important method to induce consumer preference, which has the advantages of convenient operation, conforming to rational man hypothesis, and reducing the motivation of false statements (Abate et al., 2018, Caputo et al., 2018). It is a good frame field experiment method (Al-Ubaydli and List, 2016), which has been widely applied in the measurement of product attribute preference and willingness to pay. Therefore, the take-away consumption situation was set up in this study, and the preferences and willingness to pay of different types of consumers for different take-away green packaging were collected based on the discrete choice experiment method, and the market value of social information intervention was obtained through the implementation of social norms information intervention.

（1） Attributes and horizontal design

In the selection of experimental design, we considered the broad selection of takeout packaging, including lunch boxes, tableware and packaging bags. Among them, the lunch box is a container for directly storing food, tableware is auxiliary eating tools such as chopsticks and

spoons, while the outer packaging bag is an integral package, and provides certain leakproof, oil release and heat preservation functions. These traditional plastic take-away packages are discarded immediately after less than one hour of use, causing significant environmental pressure;[2]These three types of takeaway packaging are also in line with national takeaway packaging waste reduction policies, such as the Online Catering Service Food Safety Supervision and Management Measures implemented in January 2018, which encourages online delivery platforms to provide biodegradable food containers (meal boxes), tableware and packaging materials (outer packaging bags). Therefore, we set the attributes related to takeaway packaging as outer packaging, lunch box and tableware, and set several corresponding levels. Considering that takeout choices may be affected by food types, we only select Chinese fast food in the context setting, which is also the most common food type on the current takeout platform. The setting and selection basis of the corresponding level of each attribute is shown in Table 1.

For takeout packaging, we set non-degradable plastic bags, degradable plastic bags, paper bags, three common packaging forms as three levels of packaging attributes. For takeout meal boxes, studies show that reducing the negative externalities of plastic packaging for takeout can rely on two alternatives -- paper material substitution and tableware sharing (Zhou et al., 2020). Paper material substitution reduced plastic pollution, but increased the total amount of Municipal Solid Waste (MSW);And sharing cutlery can reduce MSW by up to 92%, gas emissions and water use by more than two-thirds. Therefore, we set up three levels of plastic lunch boxes, pulp or paper-based laminating lunch boxes, and shared lunch boxes. For take-out tableware, standard packaging disposable tableware sets (spoons, chopsticks, paper towels, toothpicks) are common at present. We set up four sets of tableware, and only two disposable chopsticks are provided. For the price attribute of takeaway food, we set four levels of 28.5 yuan, 30 yuan, 31.5 yuan and 33 yuan. Specific reasons are as follows: According to the report of Iimedia Consulting, the average price of takeout food orders is about 30 yuan. According to the unbalanced design method of Gao et al. (2016), four price levels are obtained by the unbalanced treatment of 5%, 10% and 5% up, respectively. The premium of 1.5~3 yuan can better cover the current alternative cost of replacing green packaging.

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[2] Eleme. Takeout food Packaging - Green Behavior Research Report 2021. https://alins.ele.me/course.html?id=4402&from=uni

Table 1 Green takeout packaging attributes and level settings

Attribute	Levels	Selected Reasons
External Packaging (3)	Non-degradable plastic bag (Pck1) Biodegradable plastic bag (Pck2) Paper bag (Pck3)	The use of non-degradable plastic bags brings a lot of plastic waste; degradable plastic bags can reduce the production of plastic waste though easy to cause other problems including microplastic pollution. Paper bags bring no pollution except increasing ordinary solid waste.
Meal Boxes (3)	Plastic meal box (Box1) Pulp or paper based coated meal box (Box2) Shared meal box (Box3)	The use of plastic meal boxes brings a lot of plastic waste. Pulp or paper based covered meal boxes will only increase ordinary solid waste. Shared meal boxes can be recycled after strict cleaning, reuse, and can reduce resource consumption to the greatest extent.
Tableware (2)	Four-piece tableware set (Tbw1) Disposable chopsticks only (Tbw2)	Four-piece tableware sets usually include disposable plastic spoons, disposable bamboo/wooden chopsticks, paper towels, and toothpicks. Providing only disposable chopsticks can reduce the amount of plastic waste generated.
Price (4)	28.5 yuan 30.0 yuan 31.5 yuan 33.0 yuan	The average price of one share of teakeout meal in the online market in China is about 30 yuan per serving, according to an Iimedia report.

（2） Select experiment procedure

In each experiment group, 3×3×2×4=72 product profiles could be generated from each attribute level of the selection experiment, and 5,112 selection sets could be generated by pairway combination. Such a large number of choices is impractical in the experimental operation, and respondents will usually experience fatigue after identifying 15~20 selected contour combinations, which affects the experimental effect (Kim et al., 2018, Yin et al., 2017). Through the orthogonal experimental design program of STATA software, we get 16 selection contours;Based on the generated results, it takes 16 choices to get the result we want. After coding, these commodity Outlines are combined in pairs and provided to interviewees for selection. In addition, each selection question also contains a "choose neither" option, as shown in Figure 1. We plan to generate 2 versions of 8 questionnaires for selecting experimental questions in each version. Therefore, through STATA software, experimental cards are designed and selected based on the principle of Balanced Overlap randomization, and online questionnaires are made.

1. If you could only choose one of the following takeout meals, which one would you choose? Select the corresponding option.

External Packaging	Paper bag	Non-degradable plastic bag	
Meal Boxes	Pulp or paper based coated meal box	Shared meal box	I would choose neither of them.
Tableware	Four-piece tableware set	Disposable chopsticks only	
Price	33.0 yuan	30.0 yuan	
Selection:	A	B	C

Figure 1 Sample choice experiment task

3.3 Collection of individual and family characteristic information

After selecting experimental questions, we will also collect consumers' individual economic information, including gender, age, whether they work in their hometown, per capita income of family, frequency of takeout consumption, monthly expenditure of takeout consumption, etc., for quantitative analysis and estimation of willingness to pay.

In particular, drawing on the practice of Lazaric et al. (2020), we measure consumers' environmental preference and peer pressure on environmental protection based on questions. Consumers' environmental preferences. Participants who chose to donate to environmental projects were judged to have environmental preferences by asking which (or none) they would donate to, if possible, the environmental projects of the China Environmental Protection Fund, the Women and Children's Fund's Educational Equity program, and the China Health Foundation's national Health Promotion program. The three foundations and their projects enjoy wide popularity and good credibility in China. Received the size of the peer pressure of environmental

protection, by asking "daily communication in the family, friends, colleagues, neighbors, and whether there are some people who consume when considering environmental impact", four options are "no", "a", "about 50% of all social objects" and "the vast majority of social objects", and standardize the processing, The values are 0, 0.33, 0.67, and 1, respectively.

4. Econometric model

Referring to Lancaster (1971) and Kotchen (2005), we adopted the random utility framework of quasi-public goods demand to model consumers' choice decision of green packaging attributes for food for sale. A representative consumer has preferences for X and Y, which can be expressed as utility function, $U(X,Y)$. Among them, X feature conforms to the nature of pure private product, while Y feature satisfies the non-exclusive and non-competitive nature of pure public product.

There is a product g in the market that contains both private features (X) and public features (Y), one unit of g produced $\alpha > 0$ unit of X and $\beta > 0$ unit of Y. The relationship between X and Y can be expressed as $X = \alpha g$. As Y features with public interest, consumers enjoy their own purchase through consumption of g given the total purchase amount of Y(public interest supply) of other consumers and compulsory sources of public policy. Therefore, the relation of and can be expressed by the formula, $Y = \beta g + \tilde{Y}$. Here, $\tilde{Y}$ represents the exogenous level of Y given. Good g is called a quasi-public good.

The quasi-public goods model provides us with an analytical framework for the demand for green packaging attributes of takeaway food, while g can be interpreted as green packaging attributes of takeaway food in this paper. Considering the given situation of exogenous environmental quality ($\tilde{Y}$) and green product technology (parameters $\alpha$and β), in this study, it is assumed that takeaway consumers N are faced with T choice scenarios, and each choice scenario has J options. Consumption N selects the J-th take-away meal in scenario T, and the utility level of the public feature (green attribute) (purchase quantity) can be expressed as:

$$U_{njt} = V_{njt} + \varepsilon_{njt}, n = 1, \ldots, N, j = 1, \ldots, J, t = 1, \ldots, T. \tag{1}$$

Where, V_{njt} is the deterministic part of the utility level, and ε_{njt} is the randomness part. The decision maker tends to choose the alternative that provides the highest utility value. Referring to

the method proposed by McFadden(1974), the probability of decision maker N choosing alternative J in choice scenario T can be expressed as

$$\begin{aligned} Prob(y_{nt} = j \mid \beta) &= Prob(V_{njt} + \varepsilon_{njt} > V_{nit} + \varepsilon_{nit}, \forall i \neq j) \\ &= Prob(\varepsilon_{nit} - \varepsilon_{njt} < V_{njt} - V_{nit}, \forall i \neq j) \end{aligned} \tag{2}$$

It is assumed that the random utility parts and all obey the Gumbel distribution and are independent of each other. ε_{ij} ε_{ik} ε_{ij} ε_{ik} The Logistic distribution with parameters 0 and 1 is followed. $\varepsilon_{ij} - \varepsilon_{ik}$ So the above formula can be further rewritten as:

$$Prob(y_{nt} = j \mid \beta) = F(V_{njt} - V_{nit}) = \frac{1}{1 + e^{-(V_{njt} - V_{nit})}} = \frac{e^{V_{njt}}}{e^{V_{njt}} + e^{V_{nit}}} \tag{3}$$

In this paper, we assume that the deterministic part V_{njt} takes the form of a non-organic linear parametric utility function:

$$V_{njt} = \beta_p' \mathrm{X}_{njt} + \beta_1' T_{njt} + \beta_2' X_{njt} \times T_{njt} + \beta_p' Z_{njt}, \tag{4}$$

Among them, *p* represents the price decision maker *n* face of takeout product *i* on the market in scene t, vector *X* represents a series of dummy variables of takout features including packaging, boxes and tableware. *T* represents dummy variables of whether giving certain information intervention (no information intervention set as the base level). The vector *Z* represents individual and family characteristics of consumers. Coefficient β representing the above properties and their second-order interaction terms.

Under virtual coding, by dividing the estimated coefficients of all attribute levels and the estimated coefficients of price, we get the marginal WTP of this attribute (Yip et al., 2017).

$$W_n = -\beta' / \beta_p \tag{5}$$

To measure the effect of information intervention, we compare the changes of average willingness to pay after different information interventions and further measure social welfare.

5. data

This experiment was carried out in the form of online questionnaire, and questionnaires were distributed and data were collected by strawberry (survey.iimedia.cn), a professional network research company. The pre-survey of this study began in November 2021. We conducted the pre-survey, adjusted the questionnaire and information intervention design, and optimized the

experimental process. The formal survey was conducted in December 2021. We conducted a large-scale selection experimental survey based on information intervention, and collected some economic, social and psychological characteristics of participants through questionnaires. Referring to Hu et al. (2022), Honest priming was adopted as a quality control method. In January 2022, we evaluated the validity of the data and conducted data screening and validation. We collected responses from 1481 participants, of whom 1453 were included in the study, with a sample effective rate of 98.11%. Consumers were randomly given different types of intervention information and assigned with equal probability to two versions of the selective experimental questionnaire. Participants' information intervention information, questionnaire version information and selection information were recorded in detail.

Table 3 describes the statistical results of the data. 51.0% of participants were female, not significantly different from the sex ratio of the Chinese population. Participants aged between 18 and 30 were the most, up to 62.2%, similar to the characteristics of Chinese takeaway consumers reported by market research agency iimedia. Followed by age from 31 to 40 participants, ratio of 33.1%, and age in 41 to 50 years old and over 50 participants ratios were 8.6% and 1.8% respectively, these ratios and ai media consulting report data have certain difference, rate slightly higher than the previous ages, the report data after two ages ratio is slightly lower than the report. 66.8 percent of participants worked in their hometowns, which was not significantly different from the data reported by iimedia. The proportion of families with per capita monthly income of less than 3,000 yuan was 32.6%, accounting for the highest proportion. The proportion of 3001-5000 yuan and 5001-10000 yuan was 26.6% and 25.5%, respectively; The lowest proportion of participants over 10,000 yuan was 15.3%, and there was no significant difference between the monthly income proportion of each range and the reported data. Participants spent an average of 365.52 yuan per month on takeaway food and made 3.56 purchases per week on average. In general, the characteristics of participants in our online experiment are well representative of all Chinese takeaway consumers.

Table 3 Sample feature description statistics

	Mean	SD	For reference[1]
Gender (0=male, 1=female)	0.510	0.500	0.488
Age Group			

18-30 years old	62.15%		61.75%
31-40 years old	33.10%		27.82%***
41-50 years old	3.79%		8.64%***
>50 years old	0.96%		1.79%***
Hometown (0=no, 1=work in hometown)	0.668	0.471	0.65
Monthly disposable income			
< 3000 yuan	32.61%		31.3%
3001 ~ 5000 yuan	26.58%		25.7%
5001 ~ 10000 yuan	25.51%		26.4%
> 10000 yuan	15.29%		16.6%
Monthly delivery food cost	365.520	240.5	
Frequency (average times of ordering delivery food per week)	3.564	2.045	
Personal preference towards environment (0=no, 1=yes)	0.179	0.384	
Non - strong Peer pressure (0-1)	0.576	0.282	

Note: 1. The reference data origin from consumer survey of Chinese Takeout Market Report. data.iimedia.cn.
2. *, **, *** denote significant level of 10%, 5% and 1% respectively.

In particular, we collected consumer characteristics and found that Table 3 is the descriptive statistical results of the data. 51.0% of participants were female, not significantly different from the sex ratio of the Chinese population. Participants aged between 18 and 30 were the most, up to 62.2%, similar to the characteristics of Chinese takeaway consumers reported by market research agency iimedia. Followed by age from 31 to 40 participants, ratio of 33.1%, and age in 41 to 50 years old and over 50 participants ratios were 8.6% and 1.8% respectively, these ratios and ai media consulting report data have certain difference, rate slightly higher than the previous ages, the report data after two ages ratio is slightly lower than the report. 66.8 percent of participants worked in their hometowns, which was not significantly different from the data reported by IMedia. The proportion of families with per capita monthly income of less than 3,000 yuan was 32.6%, accounting for the highest proportion. The proportion of 3001-5000 yuan and 5001-10000 yuan was 26.6% and 25.5%, respectively;The lowest proportion of participants over 10,000 yuan was 15.3%, and there was no significant difference between the monthly income proportion of each range and the reported data. Participants spent an average of 365.52 yuan per month on takeaway food and made 3.56 purchases per week on average. Overall, participants in our online experiment have a good representation of all Chinese takeaway consumers. In terms of environmental preference and peer pressure on environmental protection, 17.9% of respondents

reflected environmental preference, and the peer pressure intensity of their environmental consumption behavior was 0.58.

According to the inter-group comparison results (see Table 4), except for individual indicators such as the proportion of participants in the 31-40 and 41-50 age groups in the parallel comparison information group, there is no significant difference in consumer characteristics between different groups. Therefore, our pre-set grouping goals were achieved and inter-group comparisons could be effectively conducted to determine the effect of informational intervention.

Table 4 Balance Test by Group

	No Info Group	Parallel Info Group	Upward Info Group	Refer: Whole Sample
Gender (0=male, 1=female)	0.490 (0.500)	0.530 (0.500)	0.530 (0.500)	0.510 (0.500)
Age Group				
18-30 years old	60.89%	63.60%	62.15%	62.15%
31-40 years old	35.21%	29.89%**	33.81%	33.10%
41-50 years old	3.11%	5.17%**	3.24%	3.79%
>50 years old	0.78%	1.35%	0.81%	0.96%
Hometown (0=no, 1=work in hometown)	0.660 (0.470)	0.670 (0.470)	0.670 (0.470)	0.668 (0.471)
Monthly disposable income				
< 3000 yuan	33.79%	30.45%	33.33%	32.61%
3001 ~ 5000 yuan	27.90%	27.27%	24.59%	26.58%
5001 ~ 10000 yuan	26.02%	26.75%	26.16%	25.51%
> 10000 yuan	12.29%	15.52%	15.91%	15.29%
Monthly delivery food cost (unit: yuan)	372.000 (239.300)	362.500 (246.800)	361.100 (236.400)	365.520 (240.5)
Frequency (average times of ordering delivery food per week)	3.565 (2.027)	3.629 (2.068)	3.503 (2.045)	3.564 (2.045)
Personal preference towards environment (0=no, 1=yes)	0.167 (0.272)	0.172 (0.384)	0.198 (0.399)	0.179 (0.384)
Non - strong Peer pressure (0-1)	0.577	0.576	0.576	0.576
Obs (N)	365	302	333	1453

Note: Standard Error values are reported in the brackets. *, **, *** denote significant level of 10%, 5% and 1% respectively.

6. Results

Through STATA software, we sorted out participants' takeout choices into panel data of participants facing multiple rounds of choices, and further analyzed them.

6.1 Baseline Results

Firstly, we adopt panel Logit regression model to obtain consumers' willingness to pay for takeout packaging with different environmental protection degrees. We conducted four rounds of regression, in which model 1 is the result of ordinary OLS regression for control. Model 2 is OLS estimation with environmental preference and social pressure control variables. Model 3 is the result of panel regression with province fixed effect controlled. Model 4 further controls the panel regression results of environmental preference and social pressure of environmental behavior. The regression results are shown in Table 5.

Comparing the regression coefficients of model 1-4, it was found that compared with the basic level of non-biodegradable plastic bag, plastic lunch box and four-piece tableware set, consumers had the highest preference for biodegradable plastic bag, followed by paper bag and pulp or paper-based laminated lunch box. In model 2 and Model 4, which control personal environment preference, consumers also have a higher preference for shared meal boxes at the significance level of 10%. Providing only disposable chopsticks did not significantly increase consumer utility. The coefficients of degradable plastic bags, paper bags, pulp or paper-based laminated lunch boxes and shared lunch boxes showed decreasing characteristics in all models, and the coefficients were similar in different models. The comprehensive comparison shows that the variables of environmental protection preference and environmental protection behavior have little influence on the model regression results. When province fixed effect is added, the logarithmic likelihood ratio of model regression results is larger and pseudo R is added[2]The regression results of model 4 were adopted to further calculate the WTP space of consumers for different green takeaway packaging. The results are shown in Table 6.

Table 5 The benchmark regression results

	Model 1-OLS	**Model 2-OLS**	**Model 3-Panel**	**Model 4-Panel**
Pck2	2.080***	2.080***	1.974***	1.974***
	(0.0341)	(0.0341)	(0.0330)	(0.0330)
Pck3	1.994***	1.994***	1.895***	1.895***
	(0.0330)	(0.0330)	(0.0320)	(0.0320)
Box2	0.324***	0.324***	0.310***	0.310***
	(0.0341)	(0.0341)	(0.0332)	(0.0332)
Box3	0.0530	0.0530	0.0493	0.0493
	(0.0340)	(0.0340)	(0.0332)	(0.0332)
Tbw2	0.0545	0.0545	0.0535	0.0535
	(0.0286)	(0.0286)	(0.0280)	(0.0280)

price	0.154***	0.154***	0.147***	0.147***
	(0.00961)	(0.00961)	(0.00940)	(0.00940)
constant	1.734***	1.734***	-	-
	(0.0216)	(0.0385)	-	-
Personal preference & peer effects controlled?	No	Yes	No	Yes
Province FE Controlled?	No	No	Yes	Yes
Obs	34872	34872	34872	34872
Log likelihood	18384.568	18384.568	15990.081	15990.081
adj. R^2	0.172	0.172	0.185	0.185

Note: Standard Error values are reported in the brackets. *, **, *** denote significant level of 10%, 5% and 1% respectively.

Table 6 The WTP space estimation results (unit: yuan)

	Pck2	Pck3	Box2	Box3	Tbw2
Mean WTP	13.547	12.987	2.110	0.346	355.
WTP space[1]	[11.799, 15.295]	[11.413, 14.560]	[1.667, 2.553]	[-. 092, 784]	[-. 003, 713]

Note: 1. The WTP space is within the 95% confidence interval.

As can be seen from Table 6, compared with the present situation of non-degradable plastic bags, plastic lunch boxes and tableware, within 95% confidence interval, consumers are willing to pay 11.80 to 15.30 yuan more for degradable plastic takeaway meals and 11.41 to 14.56 yuan more for plastic lunch boxes. Pay 1.67 yuan to 2.55 yuan more for paper bags and pulp or paper-based coated lunch boxes. It is worth noting that this part of expenditure reflects consumers' comprehensive willingness to pay for packaging, overall takeout food quality improvement and brand image of merchants. Consumers are generally less willing to pay a premium for shared meal boxes and disposable cutlery only.

6.2 Value of information intervention

Under different information intervention, participants' preference and willingness to pay showed different characteristics. We used mixed Logit model regression to obtain utility coefficients and WTP Spaces of different green packaging. Then, we used polynomial Logit model to regression and calculate WTP space again as robustness test.

Table 7 The sub-info groups mix logit model regression results

	Model 1-no info	Model 2-Parallel Info	Model 3-Upward info
Pck2	1.287***	1.278***	1.524***

	(0.0702)	(0.0724)	(0.0771)
Pck3	1.233***	1.259***	1.254***
	(0.0672)	(0.0708)	(0.0697)
Box2	0.462***	0.517***	0.382***
	(0.0726)	(0.0778)	(0.0741)
Box3	0.105	0.00351	0.0385
	(0.0651)	(0.0753)	(0.0677)
Tbw2	0.0782	0.152**	0.0324
	(0.0464)	(0.0477)	(0.0472)
price	0.125***	0.114***	0.136***
	(0.0147)	(0.0158)	(0.0154)
ASC	2.496***	2.560***	1.958***
	(0.272)	(0.278)	(0.231)
Obs	12336	10680	11856
Log likelihood	3154.348	2687.107	2975.541

Note: Standard Error values are reported in the brackets. *, **, *** denote significant level of 10%, 5% and 1% respectively.

Table 8 The sub-info groups WTP space estimation results (unit: yuan)

	Pck2	Pck3	Box2	Box3	Tbw2
No Info					
Mean WTP	10.252	9.827	3.678	837.	- 623.
WTP space[1]	[7.660, 12.845]	[7.506, 12.149]	[2.463, 4.893]	195,1.869] [-.	[1.390, 143]
Parallel Info					
Mean WTP	11.237	11.064	4.548	0308.	1.332
WTP space[1]	[7.899, 14.576]	[8.000, 14.128]	[2.994, 6.103]	[1.267, 1.329]	[- 2.295-370]
Upward info					
Mean WTP	11.244	9.250	2.817	284.	- 239.
WTP space[1]	[8.529, 13.959]	[7.110, 11.390]	[1.724, 3.910]	699,1.267] [-.	[-. 936, 458]

Note: 1. The WTP space is within the 95% confidence interval.

It can be seen from Table 8 that the parallel social norm information intervention increased the preference and average WTP of biodegradable plastic bags, paper bags, and pulp or paper-based coated lunch boxes, but did not significantly improve the preference and AVERAGE WTP of sharing lunch boxes and providing only disposable chopsticks. It is worth noting that the upward social norm intervention increased the WTP of degradable plastic bags, but did not improve the outer packaging of paper bags and pulp or paper-based coated lunch boxes, but showed a certain weakening effect. Therefore, the upward social normative information to sell green packaging adoption did not play the expected policy effect.

6.3 Market welfare analysis

From the above analysis, it can be seen that consumers have significant preference and willingness to pay for degradable plastic bags, outer packaging of paper bags and meal boxes covered with pulp or paper-based film. We calculated the average WTP of information shock based on these three green packages, as shown in Table 9. Under the parallel social norm information, the average WTP of consumers for degradable plastic bags increased by 0.99 yuan, the average WTP for paper bag packaging increased by 1.24 yuan, and the average WTP for pulp or paper-based coated lunch boxes increased by 0.87 yuan. Under the upward social norm information, the average WTP of consumers for degradable plastic bags increased by 0.99 yuan, while the average WTP for paper bag packaging and pulp or paper-based coated lunch boxes decreased by 0.58 yuan and 0.86 yuan, respectively.

Table 9 The information impact on WTPs (unit: yuan)

Impact on WTPs	**Pck2**	**Pck3**	**Box2**
Parallel Info	0.985	1.237	0.870
Upward info	0.992	- 577.	- 861.

Based on 17.12 billion takeout orders, the overall social welfare will be increased by 16.863 billion yuan to 21.177 billion yuan if parallel social norms information intervention is implemented and degradable plastic or paper bag packaging is widely implemented. And if the implementation of general parallel social norms information intervention, and the widespread implementation of biodegradable plastic bags, the overall social welfare will be increased by 16.983 billion yuan.

7. Heterogeneity analysis

In order to identify the key groups of green consumption and clarify the role of information intervention, we use the latent category model for analysis. Latent category model is a statistical method to explain the correlation between explicit indicators through potential category variables, which can divide sample data into several "groups" (classes) to maintain their local independence. This model can explain the heterogeneity at the population level without realizing the distribution form of assumed parameters. The latent category model is calculated based on THE EM iterative optimization algorithm, which can distinguish whether there are significant differences in classification and avoid the shortcoming of arbitrary determination of cut-off points in artificial sample subdivision.

The maximum likelihood estimation method was used to estimate the parameters, and the number of classification was determined based on AIC information criterion, BIC information criterion and practical meaning. Based on Bayesian theory, individuals can be classified based on probability estimation and size. If the potential category variable Y has the largest probability value in a certain category, it will be classified into the category accordingly. We limited the classification category to between 2 and 9, and recorded AIC and BIC values after Logit model regression of latent category, as shown in Table 10. In consumer classification, categories should not be too much;At the same time, according to the practical meaning, the coefficient of price in the utility function should be negative, so we finally take the category number as 5.

Table 10 The information criteria of LCM estimation results

Classes	LLF	BIC	AIC
2	9431.085	18956.83	18888.17
3	9184.562	18514.75	18409.12
4	8943.503	18083.6	17941.01
5	8859.506	17966.58	17787.01
6	8809.384	17917.31	17700.77
7	8730.641	17810.79	17557.28
8	8757.607	17915.69	17625.21
9	8670.249	17791.94	17464.50

We performed latent category Logit regression with category 5, and presented individual characteristics of each group with category 5 as reference. The results are shown in Table 12. According to the overall characteristics of the coefficient size, categories 1 to 5 can be named as: complete environmentalist group, shared dislike environmentalist group, partial environmentalist group, environmental skeptic group and price sensitive environmentalist group respectively. The total environmentalist group accounted for the highest proportion (37.5%), showing preference and willingness to pay premium for all types of green packaging. Secondly, 36.2% of the environmental protection group showed a preference for biodegradable plastic bags, paper bag packaging, pulp or paper-based laminating lunch boxes and shared lunch boxes, but showed an aversion to only providing disposable tableware. Third, the proportion of environmental protection

aversion group was 11.6%, which showed negative effect on shared meal box, but positive effect on other takeout green packaging. The price sensitive environmentalist group and the environmental doubt group accounted for 10.9% and 3.8%, respectively. The former showed a lower overall green attribute preference coefficient and a lower WTP premium, while the latter showed a negative preference for all green attributes. In general, there is room for further improvement in the adoption of green packaging by some environmentalist groups, sharing environmentalist group and environmental skeptic group. The total environmentalist group and partial environmentalist group account for the largest proportion, accounting for more than 70%, should be the key group of green consumption.

Table 11 The Latent Class Model regression results

	Class 1- Whole environmentalism	**Class 2- Hate sharing environmentalism**	**Class 3- Partial environmentalism**	**Class 4- Environmental skeptic**	**Class 5- Price-sensitive environmentalism**
Choice model parameters and average class shares					
Pck2	0.738	0.787	3.513	1.354	1.574
Pck3	0.373	3.177	3.276	1.705	4.437
Box2	0.379	2.560	1.089	1.683	2.612
Box3	0.429	0.681	0.519	1.591	2.735
Tbw2	0.047	0.956	0.489	1.751	0.269
price	0.030	0.034	0.022	0.257	1.543
Class share	0.375	0.116	0.362	0.038	0.109
Class membership model parameters					
female	0.198	0.096	0.027	0.288	0.000
age	0.018	0.026	0.004	0.019	0.000
hometown	0.194	0.007	0.040	0.331	0.000
m_inc	0.162	0.186	0.058	0.133	0.000
frequency	0.130	0.048	0.014	0.104	0.000
envr_prefer	0.160	0.304	0.356	0.022	0.000
peer_pressure	0.113	0.105	0.315	0.086	0.000
constant	2.304	0.454	1.375	1.505	0.000

Compared with price-sensitive consumers, some of the environmentalists were more male, older, more home-based, with higher monthly income, more frequent takeout purchases, and more environmental preferences and environmental peer pressure. Compared with price-sensitive consumers, total environmentalists are more female, older, work more at home, have lower monthly income, consume more frequently, have lower environmental preferences and have

higher peer pressure. Male, older, working in hometown, high monthly income, high frequency of takeout purchase, high environmental preference and environmental peer pressure are the key groups of environmental social norms information intervention.

8. Robustness Check

We performed robustness tests in two ways. First of all, considering the mixed Logit model used to evaluate willingness to pay under different intervention information above, we used polynomial Logit model again and set the price coefficient as 1 to directly estimate WTP. Secondly, considering that some participants grew up in developed cities, we performed polynomial Logit model estimation by excluding this part of the sample to evaluate the WTP estimation results of different information intervention groups.

Table 12 reports the direct WTP estimation results for the polynomial Logit model. The size, ranking and significance of the estimated results are basically consistent with Table 8. Under the intervention of national social norms, the average WTP of takeout meals using degradable plastic bags increased by 1.17 yuan, that of paper bags increased by 1.30 yuan, and that of pulp or paper-based coated meal boxes increased by 0.830 yuan. Under the intervention of social norms in developed cities, the corresponding average WTP increased by 0.91 yuan, decreased by 0.461 yuan and decreased by 0.713 yuan, respectively.

Table 12 The sub-info groups multinomial logit model WTP estimation results

	Model 1-no info	**Model 2-Parallel Info**	**Model 3-Upward info**
Pck2	10.51***	11.68***	11.42***
	(1.390)	(1.828)	(1.449)
Pck3	10.30***	11.60***	9.839***
	(1.274)	(1.712)	(1.189)
Box2	3.552***	4.382***	2.839***
	(0.614)	(0.795)	(0.563)
Box3	0.750	0.209	0.247
	(0.531)	(0.630)	(0.505)
Tbw2	0.575	1.162*	0.252
	(0.366)	(0.475)	(0.343)
price	1(fixed)	1(fixed)	1(fixed)
ASC	4.178***	7.359***	3.094***
	(0.854)	(1.366)	(0.750)
Obs	12336	10680	11856
Log likelihood	3583.057	2959.713	3378.377

Note: Standard Error values are reported in the brackets. *, **, *** denote significant level of 10%, 5% and 1%

In the second method, we deleted the samples living in China's five first-tier cities (Beijing, Shanghai, Guangzhou, Shenzhen and Hangzhou), and deleted a total of 553 samples, leaving 900 samples. The price coefficient is also set as 1, and the polynomial Logit model is used to estimate WTP, as shown in Table 13. The size, ordering and significance of the estimated results are also basically consistent with Table 8.

Table 13 The WTP estimation results with reduced sample

	Model 1-no info	**Model 2-Parallel Info**	**Model 3-Upward info**
Pck2	11.10***	13.38***	14.21***
	(2.182)	(2.841)	(2.792)
Pck3	13.45***	13.70***	12.82***
	(2.690)	(2.146)	(2.405)
Box2	3.822***	4.244***	4.010***
	(1.035)	(0.988)	(0.981)
Box3	1.359	0.684	0.886
	(0.893)	(0.795)	(0.824)
Tbw2	0.624	1.120	0.646
	(0.606)	(0.592)	(0.567)
price	1(fixed)	1(fixed)	1(fixed)
ASC	6.158***	8.112***	4.592***
	(1.681)	(1.830)	(1.383)
Obs	7968	6840	6792
Log likelihood	2335.953	1902.459	1854.140

Note: Standard Error values are reported in the brackets. *, **, *** denote significant level of 10%, 5% and 1%

9. Conclusions and Implications

In terms of promoting residents' green consumption behavior, the researchers investigated the effect of social normative information as a kind of public policy on individuals' green consumption decision-making behavior. Much attention in the literature has been paid to non-food packaging. However, few studies have focused on the impact of social norm information, especially the social norm information based on geographical proximity, on food environmental packaging choice. In order to fill this gap, this paper studies consumers' preference for green takeout packaging and their willingness to pay, as well as the influence of social norm

information, based on the information randomized intervention experiment and selection experiment method, from the perspective of consumers. This study can provide policy reference for the greening of takeaway packaging and confirm the potential "green boost" role of social information.

The study found that compared with non-degradable plastic bag packaging and plastic lunch box, Chinese takeaway consumers have higher preference and willingness to pay for degradable plastic bag and paper bag packaging, and pulp or paper-based laminating lunch box. Through the information intervention of parallel social norms, the market share of green takeaway packaging can be effectively expanded. Improper application of upward social norm information may not effectively improve consumers' willingness to green consumption, but may stimulate their psychological exemption from the responsibility of consumption environment.

In the future policy practice, takeout merchants can provide more degradable plastic bags or paper bags, and pulp or paper-based coated meal boxes for food packaging, so as to obtain a higher market premium. However, the promotion of shared meal boxes and the provision of disposable tableware cannot achieve higher market returns, and the public sector needs to adopt subsidies, publicity and guidance to improve the adoption behavior of consumers.

Future studies can further design "green nudges" RCT intervention experiments to obtain real data of green takeout consumption intervention in micro context and enhance the credibility of the conclusion.

Reference

ABATE, T. G., MORKBAK, M. R. & OLSEN, S. B. 2018. Inducing value and institutional learning effects in stated choice experiments using advanced disclosure and instructional choice set treatments. Agricultural Economics, 49, 339-351.

AL-UBAYDLI, O. & LIST, J. A. 2016. Field Experiments in Markets. NBER Working Papers.

ALLCOTT, H. 2011. Social norms and energy conservation. Journal of Public Economics, 95, 1082-1095.

BARLAGNE, C., BAZOCHE, P., THOMAS, A., OZIER-LAFONTAINE, H., CAUSERET, F. & BLAZY, J.-M. 2015. Promoting local foods in small island states: The role of information policies. Food Policy, 57, 62-72.

BEZIN, E. 2019. The economics of green consumption, cultural transmission and sustainable technological change. Journal of Economic Theory, 181, 497-546.

BINDER, M. & BLANKENBERG, A.-K. 2017. Green lifestyles and subjective well-being: More about self-image than actual behavior? *Journal of Economic Behavior & Organization, 137, 304-323.*

BOS, E. & OWEN, L. 2016. Virtual reconnection: The online spaces of alternative food networks in England. Journal of Rural Studies, 45, 1-14.

BROUGH, A. R., WILKIE, J. E. B., MA, J., ISAAC, M. S. & GAL, D. 2016. Is Eco-Friendly Unmanly? The Green-Feminine Stereotype and Its Effect on Sustainable Consumption. Journal of Consumer Research, 43, 567-582.

CAPUTO, V., LUSK, J. L. & NAYGA, R. M., JR. 2018. Choice experiments are not conducted in a vacuum: The effects of external price information on choice behavior. Journal of Economic Behavior & Organization, 145, 335-351.

CHAN, N. W. & DINELLI, M. 2020. Optimal Cost Sharing for Green Goods. Journal of the Association of Environmental and Resource Economists, 7, 1033-1068.

CHEN, Y., HARPER, F. M., KONSTAN, J. & LI, S. X. 2010. Social Comparisons and Contributions to Online Communities: A Field Experiment on MovieLens. American Economic Review, 100, 1358-1398.

CHEN, Y., LU, F. & ZHANG, J. 2017. Social comparisons, status and driving behavior. Journal of Public Economics, 155, 11-20.

DELMAS, M. A. & LESSEM, N. 2014. Saving power to conserve your reputation? The effectiveness of private versus public information. Journal of Environmental Economics and Management, 67, 353-370.

EEROLA, E. & HUHTALA, A. 2008. Voting for environmental policy under income and preference heterogeneity. American Journal of Agricultural Economics, 90, 256-266.

FERRARO, P. J. & PRICE, M. K. 2013. USING NONPECUNIARY STRATEGIES TO INFLUENCE BEHAVIOR: EVIDENCE FROM A LARGE-SCALE FIELD EXPERIMENT. Review of Economics and Statistics, 95, 64-73.

FESTINGER, L. A. 1954. A Theory of Social Comparison Processes. Human Relations, 7, 117--140.

FONTE, M. 2013. Food consumption as social practice: Solidarity Purchasing Groups in Rome, Italy. Journal of Rural Studies, 32, 230-239.

GAO, Z., HOUSE, L. & BI, X. 2016. Impact of satisficing behavior in online surveys on consumer preference and welfare estimates. Food Policy, 64, 26-36.

GORMAN, W. M. 1980. A possible procedure for analysing quality differentials in the egg market. The Review of Economic Studies, 47, 843-856.

HALLSTEIN, E. & VILLAS-BOAS, S. B. 2013. Can household consumers save the wild fish? Lessons from a sustainable seafood advisory. Journal of Environmental Economics and Management, 66, 52-71.

He, H., & Lu, K. 2021. Why are team and individual decisions different? Explanations based on interactions between team members. Economics Quarterly, 21, 1213-1232. (in Chinese).

HU, W., SUN, S., PENN, J. & QING, P. 2022. Dummy and effects coding variables in discrete choice analysis. American Journal of Agricultural Economics.

HUNTER, E. & ROOS, E. 2016. Fear of climate change consequences and predictors of intentions to alter meat consumption. Food Policy, 62, 151-160.

JACOBSEN, G. D., KOTCHEN, M. J. & VANDENBERGH, M. P. 2012. The behavioral response to voluntary provision of an environmental public good: Evidence from residential electricity demand. European Economic Review, 56, 946-960.

JAMBECK, J. R., GEYER, R., WILCOX, C., SIEGLER, T. R. & LAW, K. L. 2015. Marine pollution. Plastic waste inputs from land into the ocean. Science, 347, 768-771.

KATARE, B., WANG, H. H., LAWING, J., HAO, N., PARK, T. & WETZSTEIN, M. 2020. Toward Optimal Meat Consumption. American Journal of Agricultural Economics, 102, 662-680.

KIM, S.-W., LUSK, J. L. & BRORSEN, B. W. 2018. "Look at Me, I'm Buying Organic": The Effects of Social Pressure on Organic Food Purchases. Journal of Agricultural and Resource Economics, 43, 364-387.

KONG, Y. & SUN S. 2021. The Influence of childhood environment and life history strategy on consumer Behavior: The moderating effect of traditional values of "unity and harmony" dimension. Psychological Science, 44, 126-133. (in Chinese).

KOTCHEN, M. J. 2005. Impure public goods and the comparative statics of environmentally friendly consumption. Journal of Environmental Economics and Management, 49, 281-300.

LANCASTER, K. 1971. Consumer Demand: A New Approach, New York, Columbia University Press.

LAZARIC, N., LE GUEL, F., BELIN, J., OLTRA, V., LAVAUD, S. & DOUAI, A. 2020. Determinants of sustainable consumption in France: the importance of social influence and environmental values. Journal of Evolutionary Economics, 30, 1337-1366.

PENN, J. & HU, W. 2019. Cheap talk efficacy under potential and actual Hypothetical Bias: A meta-analysis. Journal of Environmental Economics and Management, 96, 22-35.

PENN, J. M. & HU, W. 2018. UNDERSTANDING HYPOTHETICAL BIAS: AN ENHANCED META-ANALYSIS. American Journal of Agricultural Economics, 100, 1186-1206.

ROUSSEAU, S. & VRANKEN, L. 2013. Green market expansion by reducing information asymmetries: Evidence for labeled organic food products. Food Policy, 40, 31-43.

SCHINKEL, M. P. & SPIEGEL, Y. 2017. Can collusion promote sustainable consumption and production? *International Journal of Industrial Organization, 53, 371-398.*

SMITH, J. & JEHLICKA, P. 2013. Quiet sustainability: Fertile lessons from Europe's productive gardeners. Journal of Rural Studies, 32, 148-157.

SUN, J. J., BELLEZZA, S. & PAHARIA, N. 2021. Buy Less, Buy Luxury: Understanding and Overcoming Product Durability Neglect for Sustainable Consumption. Journal of Marketing, 85, 28-43.

TAKAHASHI, R. 2021. How to stimulate environmentally friendly consumption: Evidence from a nationwide social experiment in Japan to promote eco-friendly coffee. Ecological Economics, 186.

TAYLOR, R. L. C. 2019. Bag leakage: The effect of disposable carryout bag regulations on unregulated bags. Journal of Environmental Economics and Management, 93, 254-271.

TEBBE, E. & VON BLANCKENBURG, K. 2018. Does willingness to pay increase with the number and strictness of sustainability labels? *Agricultural Economics, 49, 41-53.*

WEN, Z., ZHANG, Y. & FU, D. 2019. Assessing the environmental impact of a takeout order based on the whole industry chain. Chinese Environmental Science, 39, 4017-4024. (in Chinese).

WU, X., HU, B. & XIONG, J. 2020. Understanding Heterogeneous Consumer Preferences in Chinese

Milk Markets: A Latent Class Approach. Journal of Agricultural Economics, 71, 184-198.

XIE, F., SHENG, G. & GONG, S. 2019. Research on the influence of reference group on Chinese residents' green purchasing behavior in the context of national environmental co-governance. China Population, Resources and Environment, 29, 66-75.(in Chinese).

YAN, L., KEH, H. T. & CHEN, J. 2021. Assimilating and Differentiating: The Curvilinear Effect of Social Class on Green Consumption. Journal of Consumer Research, 47, 914-936.

YIN, S., CHEN, M., XU, Y. & CHEN, Y. 2017. Chinese consumers' willingness-to-pay for safety label on tomato: evidence from choice experiments. China Agricultural Economic Review, 9, 141-155.

ZHOU, Y., SHAN, Y., GUAN, D., LIANG, X., CAI, Y., LIU, J., XIE, W., XUE, J., MA, Z. & YANG, Z. 2020. Sharing tableware reduces waste generation, Emissions and water consumption in China's takeaway packaging waste dilemma. Nature Food, 1, 552-561.