The expression of social pro-environmental preference influence on green consumption behavior

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Abstract. With the increasing of social pro-environmental preference, people receive various “green” signals that influence their consumption decisions. The purpose of our work is to establish a green consumption behavior research model based on social pro-environmental preference. We explore the three expressions forms (regulation, price and public opinion) of social pro-environmental preference, and their expressions content in consumer green purchase and green disposal, as well as the influence mechanism on green consumption. The research results show that the regulatory expression of pro-environmental preference (energy-efficient certification), and the price expression of pro-environmental preference (price discount) have a significant positive effect on green disposal behaviors; environmental online public opinion has a significant positive impact both on green product purchases and green disposal behavior.

1. Introduction
With global warming becoming one of the most serious problem, green consumption is an effective way to solve the problem of global warming. In order to promote green consumption and ensure its development, government around the word have made efforts to establish long-term mechanisms, such as price incentives and regulation. Enterprises strive to promote green technology innovation, the supply scale and structure are constantly optimized to adapt to the upgrading consumer demand. With the development of new media, the concept of green consumption has become more and more popular. People’s awareness and interest in green consumption have an impact on consumers’ consumption behaviors. Preferences for pro-environmental behaviors have become ubiquitous.

Broadly speaking, green consumption is a comprehensive ethical consumerism, refers to consumers consider the impact of their own behavior on the environment when they purchasing, using, and disposing of various products, and try to minimize the negative impact and maximize the positive impact on the environment[1-2]. Green consumption can help maintain a balance between consumer demand and environment protection by affecting consumers’ entire consumption process[3-4]. As an important means for environmental protection, green consumption triggers interest of practitioners as well as researchers. And social influence has been recognized as an important force shaping personal consumption behavior[5].

The social pro-environmental preference(SPEP) is in line with social expectations, and it is a cognition, willingness and attitude beneficial to others, groups and society and the entire ecological environment. It is a manifestation of fairness, identity and mutual benefit in the social preference. With society views environmental protection as its own responsibility rather than individual. The collective action of society can better reflect people’s attention to the ecological environment and how the government and enterprises should respond accordingly[6-8]. Variety social preference may have
influence on consumer behavior in a conscious level, nurturing consumer green consumption psychology and shaping consumer green consumption behavior[9].

This study takes China’s national conditions as an example to explore the role of social pro-environmental preference in many factors affecting green consumption, identify its influencing factors and mechanisms for green consumption. Through empirical research, study on the three expressions of social pro-environmental preference that influence on two processes of green consumption. Starting from the different characteristics and contents of these expressions, through analyze the questionnaire data from consumers, investigate the consumers’ generally reaction to social pro-environmental preference. Our study explains how energy-efficient certification, price discounts and environmental online public opinion on environmental protection to effect consumers’ green purchases and disposal behaviors.

This work identifies three forms of expression of social pro-environmental preference and verifies the influence of their specific expression content on consumers’ purchase and disposal behavior. Section 2, we reviewed some recent works on social pro-environmental preference and green consumption, put out our hypothesis. In section 3, we conducted an empirical research with Chinese consumers as samples, the analyze results were shown in section 4. Section 5 was contained conclusion, practical implication as well as limitation.

2. Literature review and hypotheses development

2.1. Regulation expression of SPEP and green consumption
In the green consumption market, some favorable policies in the process of green consumption purchase, use and disposal promote green consumption. Eco-label is one of the most effective forms of regulation expression, in terms of providing timely and relevant information for consumers, which is authenticated and monitored by a third-party[10]. Since environmentally friendly products often have characteristics and advantages that are not apparent or conspicuous to consumers, eco-labels can help bridge the information gap between consumers and manufacturers. It can increase consumer awareness of environment and avoid buying counterfeit and inferior green goods. Some scholars have found that one-third of consumers prefer to regard environmentally-labeled packaging as the most important criterion in their choice[11].

Wang et al. (2018) studied green certification with the three information of energy-efficient, material saving and emission reduction how to effect enterprises’ awareness of green products[12]. Eco-labels provide consumers with a clear basis for decision-making and will influence their choices. Shen & Saijo (2009) research shows that China’s energy-efficient label has a certain impact on Shanghai consumers’ purchasing decisions on air conditioners and refrigerators[13]. In addition, there are many subsidies for energy-efficient appliances according to different energy-efficient levels, can effectively guide household appliances enterprises to transform and up-grade in the direction of low-carbon and environmental protection, so as to cater for the demand of the national low-carbon economy and future consumption trends, energy-efficient certification standards also enable consumers to better identify environmentally friendly products, and provide the necessary information support for their green purchase and disposal decisions. According to this, this paper proposes:

H1a: The regulation expression of social pro-environmental preference can positively affect customers’ green purchase behavior;

H1b: The regulation expression of social pro-environmental preference can positively affect customers’ green disposal behavior.

2.2. Price expression of SPEP and green consumption
Due to the high R&D cost of green products, the price of green products is generally higher than those ordinary products, and price has become a barrier for the purchase of green products. Merchants can guide consumers’ attitudes and intentions through discounts or promotional, thus incentives the behavioral intention to green product consumption[14-16]. The same is true for the disposal of used
household appliances. Consumers pay more attention to their own economic interests when purchasing green products as well as recycling and disposing of used appliances, whereas ignore environmental protection and aggravate environmental pollution. Chinese consumers usually sell used appliances to second-hand appliance recycling sites to obtain part of the income. Therefore, a certain price discount for consumers can make up for their economic benefits, encourage them to buy green products and use environmentally friendly methods to dispose used appliances. For example, Beijing, China, under the government's incentive policy, launched the activity of energy-efficient products entering supermarkets, and guide appliance retailers to carry out green recycling by taking green recycling as an assessment indicator. In order to effectively improve the effect of green recycling, energy-efficient supermarkets promote the promotion of consumers’ awareness of green consumption and green recycling, at the same time increase the recycling price and give consumers additional subsidies. Companies can promote green consumer behavior through green price promotion strategies. In addition, the trade-in policy, that is, accepting used products as part of the price of new products, helps to overcome consumers “garbage” aversion and promote green disposal behavior[17]. Wan et al. (2014) found that promotional measures are even more effective than providing recycling facilities and guideline in recycling behavior[18]. Therefore, this paper proposes:

H2a: The price expression of social pro-environmental preference can positively affect customers’ green purchase behavior;
H2b: The price expression of social pro-environmental preference can positively affect customers’ green disposal behavior.

2.3. Public opinion expression of SPEP and green consumption

Public opinion is the concentrated expression of personal views, attitudes and beliefs of a certain number of social groups on a specific topic. Public opinion on environmental protection is not only a manifestation of the social public’s pro-environmental preference, but also an important driving force for the development of social ecology and the green consumption. Its openness and generalized can directly or indirectly encourage individuals to participate in pro-environmental behaviors through personal social networks[19]. Consumers rely on mass media access to relevant information, can help predict consumers’ environmental attitude and green consumption behavior[20]. A public institution is the advocate of green consumption idea and culture, and an important supervisor of green consumption. With the Internet develop rapidly, the network makes the environmental information transmitted to diverse audience, and provides an online discussion platform for consumers, consumers can more easily to express their demands and spread their green consumption concept[21].

The expression of social environmental protection tendency in the form of public opinion can well cultivate the social environmental atmosphere, provide external impetus for green consumption, help customers to develop the concept of green consumption gradually, and conduct green consumption under the influence of internal psychological factors such as conformity or comparison[22]. Especially young consumers who welcome new and innovative ideas, they are influenced by more emotional attraction and the sense of environmental responsibility [23-24]. Nixon & Saphores (2009) found that consumers who got information about recycling from their families and friends were 3.24 times more likely to recycle their products than those who did not receive relevant public opinion information[25]. The public opinion expression of social pro-environmental preference brings more environmental knowledge for consumers, result in higher environmental awareness and values. Therefore, consumers are more prefer to show environmentally friendly behaviors when making purchase and disposal decisions. Hence, this paper proposes:

H3a: The public opinion expression of social pro-environmental preference can positively affect customers’ green purchase behavior;
H3b: The public opinion expression of social pro-environmental preference can positively affect customers’ green disposal behavior.
3. Data and method

3.1. Research design and sample characteristics

In order to test the hypotheses, a cross-sectional research among Chinese consumers was conducted. The data was primarily collected by means of an online research panel, Specifically, through social network platform and e-mail to send the URL link to potential Chinese consumers, including friends and acquaintance as well as those people’s friends. There are about 200 questionnaires were sent out. In total, 182 of them are usable responses which is included in the analyses. Based on the 200 initial requests, it represents a high response rate of 91%.

Of the 182 usable responses, 46.65% are female and 52.35% are male; 1.18% of the respondents are older than 46 years, 4.12% are between 36 and 45, 4.71% between 26 and 35, and the remaining 90% of the respondents are aged under 25. The sample consisted predominantly of higher educated respondents, 85.29% of the participants are university-educated, and even 5.88% of the respondents are Master-degree-educated. We consider post-high school educated persons to be an appropriate sample for the study, which can understand the content expressed in the questionnaire well, mainly driven by the social attitudes and these persons often seem to be initiators and stimulators of behavior for the general population. The personal monthly-incomes of the respondents are diversity, 6.47% of the respondents’ monthly-incomes are more than ¥6000, 17.64% are between ¥2001 and ¥4000, 26.47% are between ¥1001 and ¥2000, and the remaining 49.41% of the respondents are monthly-incomes under ¥1000. In order to assess the presence of nonresponse bias, a time trend extrapolation test was carried out, there shows not nonresponse-related problems in our data.

3.2. Questionnaire design

The items used to measure the constructs in our conceptual framework were based on consumer behavior process theory as well as previous studies related to this topic. We revise the scale through expert opinions, conduct investigation on small samples of consumers, and ensure the availability of the scale through reliability and validity testing. The consumers’ green consumption is divided into five stages, namely, attracting attention, collecting information, purchasing, using and disposing, and the specific expression signals and contents of social pro-environmental preference are combined into these stages.

Specifically, the dependent variables (the individual’s green purchase and disposal decisions to energy-efficient appliances) are measured using four items each, which were adapted from Grewal et al. (1998), who measure consumers’ purchasing intentions[26]. Expressions of energy certification, price discount and environmental network public opinion are selected as the three independents variables of social pro-environmental preference. All items are scored on a five-point Likert-type scale ranging from 1=Totally disagree, 5 =Totally agree. The descriptive statistics of the measurement items are showed in Table 1.

3.3. Analysis

In order to assess the level of internal consistency of the survey instrument, several reliability analyses were conducted. As the Cronbach’s alpha reliability values shown in Table1, all reliability values well exceed the threshold value of 0.70 as proposed by Nunnally & Bernstein (1994), providing a good internal consistency[27]. This paper refers to the developed scale with high content validity. SPSS20.0 was further used for principal component analysis of the scale, and the KMO value of social pro-environmental preference is 0.927 while the value of green consumption is 0.840. Bartlett sphericity test was significant at the 0.001 level, indicating that all the variables’ scales have good structural validity.
Table 1. Measurement items.

| Items                                                                 | M  | SD   |
|----------------------------------------------------------------------|----|------|
| The expression of social pro-environmental preference through regulation: certification of energy-efficient products ($\alpha=0.888$) |    |      |
| A product with an energy-efficient certification label attracts people more attention than a product without one. | 3.89 | 1.015 |
| Green certification policy prompts customers to collect information about energy-efficient products. | 3.61 | 0.975 |
| The certified standard of energy-efficient products prompts customers to buy them. | 3.89 | 0.917 |
| Energy-efficient certification label reminds consumers develop environmentally friendly behavior. | 3.83 | 0.897 |
| Energy-efficient certification label encourages people to participate in waste recycling. | 3.58 | 0.940 |
| The expression of social pro-environmental preference through price: price discount ($\alpha=0.909$) |    |      |
| Energy-efficient appliances attract customers’ attention through trade-in activities. | 4.06 | 0.888 |
| The discount and subsidy of energy-efficient products prompts people to collect price information. | 4.01 | 0.856 |
| Price discount encourage customers to buy energy-efficient appliances. | 4.15 | 0.897 |
| The lower usage costs, the more willing to use energy-efficient appliances. | 4.35 | 0.872 |
| If the recycling of used appliances can bring some benefits, consumers are willing to participate in the recycling of waste. | 4.19 | 0.910 |
| The expression of social pro-environmental preference through public opinion: pro-environmental online public opinion ($\alpha=0.868$) |    |      |
| There are many opinions admiring energy-efficient products can attract customers attention in Internet. | 3.88 | 0.805 |
| Online public opinion about green production encourage people to collect information about companies and products. | 3.78 | 0.832 |
| Online publicity advocating green purchasing behavior can prompt customers to buy energy-efficient appliances. | 3.94 | 0.805 |
| Online public opinion about energy and water saving can prompt people to use energy-efficient appliances. | 4.09 | 0.801 |
| Pro-environmental online public opinion about garbage classification can prompt consumers to participate in the recycling of waste. | 3.98 | 0.818 |
| Green consumption behavior: purchase ($\alpha=0.825$) |    |      |
| I will buy an energy-efficient appliance rather than the one not. | 4.09 | 0.813 |
| I as far as possible to buy appliances that are less harmful to the environment. | 4.09 | 0.816 |
| I am willing to pay the extra cost for energy-efficient appliances. | 3.61 | 0.859 |
| I use products with less environmental damage when functional requirements are met. | 4.18 | 0.772 |
| Green consumption behavior: disposal ($\alpha=0.819$) |    |      |
| I will try to repair and reuse the old products as far as possible. | 4.07 | 0.750 |
| I will not discard used appliances carelessly. | 4.11 | 0.792 |
| I will try my best to sort the waste and reuse them. | 3.92 | 0.832 |
| I will hand over used appliances to specialized personnel or institutions for disposal. | 3.76 | 0.912 |

4. Result

SPSS software was used to run the multiple linear regression analysis for direct effects. The analysis results reveal that the control variables have not significant influence on green consumption behavior including green purchase and green disposal. As shown in Table 2, pro-environmental online public opinion has a significant effect on green purchase, supporting H3a. Therefore, the expression of social pro-environmental preference though public opinion has significant positive influence on consumers’ green purchase behavior. However, the expression of social pro-environmental preference though certification and price don’t have significant influence on the green purchase, H1a and H2a are not verified. Additionally, regression results found that three expression of social pro-environmental preference have significant relation with green disposal behavior, H1b, H2b and H3b are verified.
Overall, the percentage of variance explained by the variables was 20.3% and is statistically significant.

Table 2. Regression analysis results.

|                | Green purchase | Green disposal |
|----------------|----------------|---------------|
|                | Model1 | Model2 | Model3 | Model4 |
| Gender         | 0.180*  | 0.048  | 0.108  | -0.038 |
| Age            | -0.041  | -0.095 | 0.027  | -0.025 |
| Education      | 0.015   | -0.084 | 0.100  | -0.004 |
| Income         | 0.021   | -0.019 | 0.005  | -0.020 |
| Energy-efficient certification | 0.172  | 0.217* | 0.084  | 0.209* |
| Price discount | 0.084   | 0.209* | 0.084  | 0.209* |
| Online public opinion | 0.388*** | 0.250** | 0.020  | 0.342 |
| R²             | 0.32    | 0.339  | 0.020  | 0.342 |
| F              | 1.375   | 11.885*** | 0.862 | 12.033*** |
| △F            | 1.375   | 25.096*** | 0.862 | 26.398*** |
| N              | 170     | 170    | 170    | 170    |

***p <0.001, **p < 0.01, *p < 0.05.

Model Control Variables Include: Gender, Age, Education, Income.

5. Conclusion

5.1. Discussion

As we showed in the result, energy-efficient certification, the regulation expression of social pro-environmental preference, did not have a significant impact on the green purchase. There may be several reasons: (i) the signal expressed by the energy-efficient certification is weak to consumer sense; (ii) customers get less added value from energy-efficient products; (iii) customer can’t fully recognize and trust of energy-efficient certification standard. While has a significant positive impact on green disposal behavior, indicating that certification labels can play a certain role in promoting the reuse and recycling behavior, and reducing the environmental damage caused by waste disposal.

There is neither significant relationship between price discount and green purchase, also some causes: (i) the expression of price discount content is not clear, customers do not perceive price discounts well; (ii) price discount only reduces customers’ economic cost rather than the total cost in purchasing products; (iii) the price discount reduce customer perceived value of product. These barriers will be further explored in future studies. Price discount can have a significant positive impact on green disposal behaviors such as recycling. Means that strengthen and improve the maintenance and recycling market of waste materials, and provide more price concessions and convenience can encourage green consumption of customers.

It is verified that the pro-environmental online public opinion has a significant positive effect on green purchase and green disposal. So strengthen the guidance of pro-environmental online public opinion can well enhance customers’ green consumption awareness, create good green consumption culture atmosphere, and greatly promote customers’ green consumption behavior. Different expression of social pro-environmental preference maybe influence each other in the process of consumers’ green consumption, future research should further focus on the combination of these expressions.

5.2. Practical implication

(1) Establish and improve a supervision and security system conducive to sustainable consumption, actively promote the environmental label products, organic food, and other green products. Strengthen market supervision and regulation, create a fair market circumstance for competition, in order to ensure the quality and credibility of green products and services. Improvement of green product standards (such as technical standards for environmental labelling products, green procurement standards, and green building energy-efficient design standards) as soon as possible, which will guide enterprises to provide more reliable green products and services to the consumer market.
(2) A simple price discount may not be able to stimulate customers’ consumption desire. In some cases, it may reduce customers’ perceived value, because in people’s view, green products ought to have a premium. Therefore, government should not only give some supporting policies to green product manufacturers to reduce the cost of green products but also establish a reasonable market price mechanism, so that green products with reasonable pricing can be accepted by consumers. At the same time, advertising, personnel promotion, and other marketing methods should be combined to promote each other, which made customers feel the benefits beyond material rewards. The cost consumer concerned in purchase is not only the economic cost, but also the time cost and spiritual cost. Set up more waste recycling and disposal sites is also a good way to provide more convenience for customers. Both should be included in the price expressions of socially pro-environmentally preference.

(3) From the perspective of consumers’ psychology, green consumption concept should be vigorously publicized in the society. Public opinion guidance should be carried out through the media and the Internet to make consumers realize that green consumption is not only help them to improve living standards and health, but also conducive to protecting the ecological environment and natural resources. Only truly aware of the benefits of green consumption can the concept of green consumption be deeply rooted in the hearts of people and the green consumption be realized. Consumers should also learn about the knowledge about purchasing and using green products, to improve their ability to identify green products, and resist fake products.

5.3. Limitation and suggestions for future research
This study also has certain limitations. First, our sample consisted predominantly of college students. Because most of the students have low participation in consumption decisions such as appliances purchase, take less consideration about the relevant policies and price. This may be a reason for the weak relationship between the green purchase and expression of social pro-environmental preference in regulations and price. Second, our study is focus on self-reported consumers’ intention of their behavior rather than on their actual observable consumption behavior. Thus, a follow-up study that investigates the consistency between self-reported and actual green consumption behavior (e.g., with the help of techniques such as panel experimentation) would be useful[11]. Finally, other possible intervention factors such as consumer emotions[28] and environmental knowledge should be involved in future research, to enrich the theoretical mode.

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