

Soft Economic Incentives and Soft Behavioral Interventions on the Public's Green Purchasing Behaviour - The Evidence from China

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Purpose: To explore the effects of “soft” behavioral intervention policies (eg, green emotions, social norms) and “soft” economic incentive policies (eg, high-intensity subsidies, low-intensity subsidies) and their combinations on the public's green product purchasing behavior.

Participants and Methods: An online questionnaire experiment was conducted on Chinese users using Credamo online questionnaire platform to explore the effects of different “soft” intervention policies on consumers' green purchasing behavior, and the sample data were examined using multiple regression. In Study 1, a total of 460 valid samples were collected to explore the differences in the effects of single intervention policies; in Study 2, a total of 556 valid samples were collected to explore the effects of a combination of soft policies.

Results: In the area of green product purchasing, both behavioral interventions and economic incentives alone can promote green consumption behavior; economic incentives have a more positive impact on guiding consumers to green consumption; the combination of “soft” behavioral interventions and “soft” economic incentives has a positive impact on green consumption. The combination of “soft” behavioral intervention policies and “soft” economic incentive policies is more effective than the individual policies.

Conclusion: The experimental results of Study 1 show that the policy effects of both behavioral intervention policies and economic incentive intervention policies are evident for goods with different value attributes. Meanwhile, comparing the two types of soft intervention policies, we find that the effect of economic incentive intervention policies is stronger than that of soft behavioral intervention policies. In Study 2, the empirical analysis of the policy mix shows that the policy mix is more effective. The combination of “soft” economic incentive policies and “soft” behavioral intervention policies can effectively increase the salience of policy instruments, and the effect of policy combinations is greater than that of single policies.

Keywords: green consumption, intervention policy, policy mix

Introduction

Climate change and resource crisis have become a great challenge for the world. In the face of ecological destruction and resource constraints, governments are actively exploring new ways of development in which humans and nature can live in harmony.^{1,2} Especially after the massive outbreak of COVID-19, the public is increasingly concerned about human and nature.^{3,4} The public began to realize that while industrial civilization has brought convenience to public life, it has also brought many environmental problems, both in terms of waste of resources and pollution, and in terms of hazards to human survival and health. Solving environmental problems and achieving sustainable development goals require residents to choose greener lifestyles in their daily lives, ie, green consumption.⁵ Green consumption minimizes human consumption of resources and energy, and minimizes the health risks to the consumer by promoting the choice of green products that contribute to public health. China has become the world's second largest consumer market in 2021, with consumption now accounting for more than 50% of GDP (GROSS domestic product) and expected to surpass the

United States in the coming years, according to China's Ministry of Commerce United States. Further promoting green consumption in China is of great importance to the world's sustainable development. However, to transform the public's consumption behavior, it is not enough to rely on the public to consciously raise their level of green and low-carbon awareness and to engage in low-carbon behavior spontaneously. External intervention policies must be introduced to guide, promote, and strengthen the public's low-carbon consumption behavior.⁶⁻⁹ For quite a long time, relevant Chinese government departments have been actively advocating green consumption and have introduced many guiding intervention policies. These policies are mainly manifested as mandatory laws and regulations, but their effects are not well reflected in practice,¹⁰ for the reason that these rigid legislative measures often play an indirect effect. In some cases, the enforcement of laws and regulations can lead to a public backlash.¹¹ Therefore, how to design more effective intervention policies to encourage residents to consume green has attracted increasing research attention. Among them, "soft" voluntary measures (eg, monetary economic incentives and non-monetary interventions) have received considerable attention.¹⁰ Compared with mandatory legislative measures, "soft" interventions (eg, monetary economic incentives and non-monetary interventions) require fewer resources and administrative costs.¹² In addition, "soft" voluntary measures can directly stimulate the public's motivation and psychology to buy green, enabling them to proactively take action to save energy. Therefore, the effects of these "soft" interventions may be more sustainable.¹³

However, empirical evidence suggests that the policy effects and research progress of different intervention types of "soft" measures to promote public green consumption vary relatively widely. Some studies suggest that "soft" economic incentives are effective. In some environmental areas, they have been studied extensively. For example, incentives have been successfully applied to promote waste management and recycling,¹⁴ energy conservation.¹⁵ The application of incentives has also been found to be effective in other pro-social domains. For example, in the areas of dieting,¹⁶ and exercise,¹⁷ improving work performance,¹⁸ and promoting recycling.^{14,19} However, some researchers have put forward a different view that financial incentives are not always effective.²⁰ The reason for this is that some researchers have found that economic incentives, represented by monetary subsidies, are mainly based on the "rational economic man" hypothesis model.²¹ This hypothesis assumes that there is a monotonic relationship between incentives and behavior, and that green consumption behavior reflects the public's trade-off between the benefits and costs of behavior.^{22,23} Real-world behavior does not follow this monotonic assumption. Numerous findings from behavioral economics and decision psychology also suggest that individual behavior is not entirely rational, and that human behavior is more likely to be influenced by a variety of psychological factors, such as emotions, mood, and culture, in addition to being driven by profit. Consumers do not always follow rational choice theory to make decisions.²⁴ Thus, some scholars argue that non-monetized "soft" behavioral interventions based on the assumption of "limited rationality" have a greater impact on individuals' environmental attitudes and behaviors than monetized economic incentives.²⁵ Compared to "soft" economic incentives based on "perfectly rational motives", "soft" non-monetized measures represented by behavioral interventions focus more on consumers' psycho-emotional factors such as The influence of irrational factors on their green consumption behavior, ie, the stimulation of the individual's internal environmental attitudes and emotions, leads to sustainable and significant resource and energy savings. In promoting green consumption, attention should be paid not only to the rational induction of consumers' behavioral motivations, but also to the guided transformation of policies on consumers' environmental intuitive emotions and attitudes. At the same time, these claims are not supported by rigorous quantitative comparisons. In general, the "soft" economic incentives based on the "full rationality assumption" are well studied, while the "limited rationality assumption" is not. The research on "soft" behavioral intervention policies is not sufficient, and there is a lack of quantitative evaluation and comparison of the effects of the two types of policies. Research on the effects of a combination of "soft" economic incentives and "soft" behavioral interventions on public low-carbon behavior is even more limited.²⁶

To fill this gap, this study uses a between-group behavioral experiment to systematically assess and compare the effects of "soft" intervention policies (single and combined). Based on the above analysis, this study asks three core research questions:

1. What kinds of "soft" interventions are more effective in promoting green consumption among the public?

2. How effective are “soft” behavioral interventions compared to “soft” economic incentives (eg, monetary subsidies)?
3. If “soft” economic incentives (eg, typical monetary subsidies) are combined with “soft” behavioral interventions, does it have a superimposed effect on the change of consumers’ green consumption behavior?

Based on this, the objectives of this study are as follows: first, whether soft intervention policies can promote consumers to switch to green consumption; second, which “soft” intervention policies are more effective in the context of green low-carbon purchase and consumption. Through an empirical approach, we explore the effects of “soft” behavioral intervention policies (eg, green emotions, social norms) and “soft” economic incentives (eg, high-intensity incentives, low-intensity incentives) on the public’s purchase behavior of green and low-carbon products. Third, whether the combination of “soft” intervention policies is more significant. Third, whether the combination of “soft” intervention policies is more significant, ie, on the basis of comparing the effect sizes of the two types of “soft” intervention policies, and then exploring the effect of the combination of “soft” economic incentive policies and “soft” behavioral intervention policies on The study also explores the impact of the combination of “soft” economic incentives and “soft” behavioral interventions on the public’s green low-carbon purchasing behavior. The research ideas and findings of this study are important for policy makers to effectively and timely grasp the psychological characteristics of the public and formulate more effective policies to change green consumption behavior.

Potential research value of this study:

1. this paper provides an innovative framework for policy analysis of external policy interventions affecting consumers’ green consumption behavior. By constructing a “soft” policy intervention framework, this paper uses two policy experiments for the first time to explore the effects of “soft” economic subsidy policies and “soft” behavioral intervention policies on We also analyze the impact of the combination of “soft” economic incentives (high-intensity incentives and low-intensity incentives) and “soft” behavioral interventions (green emotions and social norms) on the public’s green and low-carbon purchasing behavior. The impact of the combination of “soft” economic incentives (high intensity incentives and low intensity incentives) and “soft” behavioral interventions (green emotions and social norms) on the public’s green and low-carbon purchasing behavior. It is useful to deepen the key clues under different policy dimensions and reveal the unique behavior change impacts under different policy combinations.
2. previous studies have focused on pro-environmental behaviors such as recycling and energy saving,^{14,15} and there is insufficient research in the pro-environmental area of green product purchases (high-value products vs low-value products). This study, on the other hand, focuses the attention of policy interventions on consumers’ green product purchases. Particular emphasis is placed on the impact effects of different intervention policies under different value attribute products (high-value products and low-value products).
3. this paper effectively improves the scientificity of the analysis through an online between-groups experiment by embedding policy intervention scenarios into the questionnaire environment and recruiting sample data of subjects (the sample covers the vast majority of Chinese provinces) in the creadamo data crowdsourcing platform.

The remainder of this study is organized as follows. In the second part, the literature review reviews the impact of economic incentives (monetary subsidies) and behavioral interventions on green consumption, and analyzes the mechanisms of different “soft” interventions on green consumption behavior. It provides a theoretical framework for proposing “soft” intervention policies to influence public green consumption behavior. The third part introduces the research methodology and data collection of this paper. The experimental methods, data analysis methods and data sources used in this paper are described in detail. [Research Results](#) presents the results of the data analysis obtained from the experimental data analysis, and compares in detail the differences in the effects of different intervention policies under different product value attributes. The combined effects of the intervention policies are also evaluated and compared. Finally, conclusions, insights, and recommendations for future research are discussed in the final section.

Literature Review and Hypothesis Formulation

Literature Review

“Soft” Behavioral Intervention Policies and Green Consumption Behavior

As a behavioral intervention strategy, the “soft” behavioral intervention strategy is based on the assumption of “limited rationality” and uses a combination of cognitive, emotional and social norms to solve the public’s psychological dilemma without their consciousness, thus changing the consumer’s. It is voluntary in nature and promotes green and sustainable lifestyles.

The soft behavior intervention policy proposed in this paper is mainly based on the behavior intervention theory derived from behavioral economics. The use of behavior change techniques (eg, labels, social norms, educational activities, default settings, incentive option sets) is emphasized to fuel consumers to change their behavior.²⁷ The general steps of behavioral interventions are to identify candidate contexts for behavior change, psychological barriers to change, and focus on motivating consumers to achieve positive behavior change from a psychological perspective.^{28,29} It is often complementary to typical regulatory tools (eg, taxes, mandates, bans).^{30,31} Soft intervention strategies focus more on guiding the psychological factors of policy targets. Compared with traditional intervention strategies, soft intervention strategies emphasize more on stimulating the conscientiousness of the members of society. Compared to traditional intervention strategies, researchers have found that “soft” interventions are more acceptable and welcomed by the public.^{32–34} Typical soft intervention strategies of are green emotional strategies and social normative strategies.

The normative intervention strategy proposed in this paper is a typical behavioral intervention policy based on VBN theory, identity-based motivation (IBM) theory,³⁵ value-belief-norm theory (VBN),³⁶ and social-cognitive (SC) theory,³⁷ which suggests that consumer behavior is driven by norms and values associated with individuals or groups and that dominant identities motivate action.^{29,38,39} The normative intervention policy in this paper refers to the provision of normative information to see if consumers change their consumption behavior in response to social normative pressure. Social identity salience occurs when individuals are motivated to act in a manner consistent with group norms, values, and goals,^{29,38,39} and IBM theory and related VBN theories claim that consumer behavior is motivated by individually or group-related norms and values that motivate it. Salient identities motivate actions, for example, when personal identity salience is present, then emphasis is placed on achieving personal norms, values, goals, and strategies to achieve agency and control. People are often influenced by the attitudes and behaviors of others and tend to follow norms that reflect socially approved norms ie descriptive norms. By providing information about social norms, social comparisons are made so that other consumers can follow the behavior of others and conform to social norms, ie, the explicit and implicit “rules”, norms, or behavioral expectations of a group or society. They shape what is considered to be normal or desirable. Based on a postal survey of 1200 Swedish households, their empirical results show that cost, environmental attitudes and social interactions are important determinants of electricity savings in Swedish households.⁴⁰ Although the provision of social norms information plays an important role in promoting pro-environmental behavior among consumers as a means of behavior change, there are still scholars who offer different perspectives. Some scholars have found that when social norms behavioral interventions are compared to other interventions, the effects of social norms are smaller although they are generally effective.⁴¹

In addition, stimulating the public’s environmental emotions by providing them with emotional information is another typical soft intervention strategy. This approach can help improve the public’s environmental attitudes and environmental values, raise awareness of green consumption, and motivate behavioral change.^{42,43}

“Soft” Economic Incentives and Consumer Green Consumption Behavior

If the “soft” behavioral intervention strategies (green emotions and social norms) focus mainly on changing individual consumers’ green consumption intentions by acting on their psychological factors (environmental values, environmental attitudes) through non-monetary incentives, the “soft” economic incentives represented by monetary subsidies “economic incentives focus mainly on changing consumers’ consumption behavior habits by changing their self-interested motives. Given the increasing prominence of the use of incentives in environmental policy,⁴⁴ rewards to increase the frequency of desired behaviors and penalties to decrease the frequency of undesired behaviors. Researchers have extensively studied the effects of economic incentive policies and pro-environmental behaviors. For example, in other areas of environmental

behavior,⁴⁵ found that economic incentives prompted to make people make public transport trips; incentives have been successfully applied to promote household energy consumption,⁴⁶ energy saving.¹⁵

Although some studies have demonstrated that economic incentives effectively influence consumers' green behavior decisions. However, their policy effects are not necessarily better than those of non-economic policies. Instead, some additional factors constrain the impact of economic incentives on human decisions and behavior, such as the rebound effect of economic incentives and the time distance to receive them.^{20,47} When compared to other intervention policies, researchers have found that although economic incentives play an important role in changing individual consumption behavior, for example, in the area of energy efficiency and low-carbon consumption,¹⁵ found that economic incentives have a longer impact on reducing energy consumption than moral appeals, and in the area of health mention that the provision of economic incentives can promote long behavior change or habit formation among consumers. However, in most cases, the effects of economic incentives are short-lived unless they are accompanied by additional interventions.⁴⁷

The cost of green low-carbon products is generally higher than that of traditional high-carbon products. Therefore, government subsidies are necessary in the start-up phase to stimulate consumer acceptance and purchase of green and low-carbon products. Moreover, lower subsidies do not significantly improve the demand for green products,⁴⁸ while increased subsidies are more beneficial to guide the public to engage in pro-environmental behavior.⁴⁹ Meanwhile, different populations have different price sensitivity with green products,⁵⁰ argue that differentiated subsidies can improve environmental quality and social welfare more effectively than uniform subsidies, thus this paper designs different levels of subsidy intervention policies to examine different levels of incentives (ie, low-intensity versus high-intensity subsidies) strategies to observe consumers' In this paper, we design an experimental design to examine the purchasing behavior of consumers under different subsidies. In the experimental design section of this paper, the low-intensity subsidy amount is used as the base point, and the subsidy amount that is double the base point is used as a proxy for the high-intensity economic incentive.

Theoretical Mechanisms of “Soft” Economic Incentive Interventions and “Soft” Behavioral Interventions

The theoretical basis for “soft” economic incentives to promote behavior change is the Theory of Rational Behavior model.⁵¹ According to this model, human beings are utility maximizers with perfect information processing capabilities, and individuals can make the most perfect and rational decisions based solely on the information available to them, weighing the pros and cons. However, as early as the 1950s, relevant cognitive psychologists, social psychologists, and even economists questioned these assumptions about the perfect rationality of human nature. Research in psychology and behavioral economics has recognized that people do not have stable values when making decisions,⁵² and that the individual's dominant behavior is based on two main thinking systems in the brain: system 1 fast (intuitive) and system 2 slow (analytical).⁵³ Of these, System 1 emphasizes intuition and irrationality; System 2 emphasizes analytical rationality. Most of the existing strategic tools for changing people's sustainable consumption behavior target system 2. Both coercive and motivational tools rely on the availability of information about individuals' access to consumption decisions and their respective cognitive abilities to process the information and make rational choices. Therefore, there is a strong need to design System 1-based intervention strategy tools to promote green consumption in contexts that take into account the limited rationality of consumers.

Specifically, the “soft” behavioral intervention policy and the “soft” economic incentive policy rely on two separate paths to influence consumers' green consumption behavior: the “soft” behavioral intervention policy is The “soft” behavioral intervention policy influences consumers' irrational system (intuitive emotions) through unconscious social comparison and emotional arousal, and changes consumers' non-green consumption behavior through emotional empathy and social normative pressure; the “soft” economic incentive policy influences consumers' rational analysis system through monetary subsidies, so that consumers' rational The “soft” economic incentive policy is to influence consumers' rational analysis system by means of monetary subsidies, so that consumers can make rational consumption decisions based on cost-benefit analysis and stimulate their self-interest motivation. The psychological path of the “soft” behavioral intervention policy and the motivational path of the “soft” economic incentive policy can be explained as follows.

First, one pathway of soft behavioral intervention policies to influence consumers' green consumption behavior is to change consumers' intuitive and non-thoughtful behavior by influencing their irrational emotional factors (eg, environmental attitudes, environmental values, environmental emotions). This is done by providing emotional and normative information, or a combination of the two, in order to maximize the induced change in consumer behavior in a given context. Identity-based motivation (IBM) theory,³⁵ value belief-norm (VBN) theory,³⁶ and social cognition (SC) theory can help us understand this issue more specifically.³⁷ IBM theory and the related VBN theory argue that consumer behavior is driven by individual or group driven by associated norms and values. By highlighting identity-motivated behaviors, emphasizing the fulfillment of personal norms, or providing emotional information stimuli that fantasize about consumer environmental emotions, consumer green consumption compliance behaviors can be effectively triggered. This type of salience is more likely to be triggered in situations where consumers make individual choices. As in sustainable consumption behavior, social identity salience occurs when individuals behave in ways that are consistent with the norms, values, and goals of the group.²⁹ The social norms formed by the shared values of familiar colleagues and friends regarding green consumption will be a powerful influence, and individual consumers will change their non-green decisions under the pressure of collective action. And compared to traditional intervention strategies, emotional and normative soft behavioral intervention policies can enhance the effectiveness of intervention strategies by increasing consumers' acceptance of the strategies. This is because it can help people to avoid apparently identifiable mistakes that they are prone to make due to not understanding complex information or not paying attention to less relevant issues.

Second, the path of economic incentive policies to promote consumers to engage in green consumption behavior is to reduce the cost of consumers' behavior, ie, to promote them to engage in green consumption by increasing their benefits. Generally speaking, human behavior is influenced by a variety of factors, and there is a reciprocal relationship between the change of the actor and the intervention of external strategies in terms of stimulus response. The flexible intervention strategy gives positive economic incentives to consumers by means of incentive subsidies and stimulates their second system of rational analysis, which leads to green consumption by weighing the pros and cons. In general, the price of green products is generally higher than that of conventional goods, which means that consumers need to sacrifice more in their own interest in order to protect the environment. If the economic cost and even the time cost of green consumption is too high, consumers will largely abandon green consumption. The standard economic model assumes that consumers' consumption decisions and behavior are based solely on the consideration of maximizing personal utility, so there is a monotonic relationship between desired incentives and performance. The higher the economic incentive, the greater the resulting effort and performance,^{21,47} while in the absence of extrinsic incentives, effort and performance are expected to be minimal.⁵⁴ Thus, high intensity financial incentives may be more effective than low intensity incentives.

Review

Although most studies have shown that "soft" behavioral interventions and "soft" economic incentives are effective in changing consumer behavior, their effects are still controversial, especially in different application areas. The existing studies have also done some comparative studies on the policy effects of "soft" economic incentives and other policies (eg, information intervention policies), but there are no studies on the policy effects of "soft" economic incentives and "soft" behavioral intervention policies. However, no comparative study has been conducted on the policy effects of "soft" economic incentive policies and "soft" behavioral intervention policies. Therefore, this paper will conduct an exploratory study on this gap in the context of a green low-carbon goods purchase scenario. In the next experiment, we will quantitatively assess the difference in the effects of "soft" economic incentives versus "soft" behavioral interventions through a between-group experiment.

In addition, a growing body of research points to the need to combine different policy instruments (ie, policy combinations) to maximize their impact on green pro-environmental behavior.^{55,56} A combination of incentives and soft behavior change policies such as cues to promote green consumption among consumers has been continuously proposed by researchers, especially because the latter is cheaper to implement.⁵⁷ A mix of instruments achieves a reduction in energy use, combining different intervention policies is generally more effective.⁵⁸ Overall, there is a lack of rigorous quantitative empirical studies on the policy mix of economic incentive policies and behavioral intervention policies. In this paper, we provide empirical evidence on the effects of the combination of the two types of "soft" policies.

Research Hypothesis

This paper classifies the “soft” behavioral intervention policies to promote green consumption into: green emotional intervention strategies and social normative flexible intervention strategies. The “soft” economic incentive policies are divided into two categories: high-intensity subsidy policies and low-intensity subsidy policies. In addition, this paper also hypothesizes two types of intervention policies for two types of combinations.

Green Emotional Intervention Strategy

Emotional intervention strategies are often considered to be relatively typical of soft intervention strategies. Moral and rational perspectives are not sufficient to adequately explain behavior. Instead, emotions may underlie behavior.⁵⁹ Emotions play an important role in general consumer behavior, including in particular intentions regarding sustainable consumption.^{60,61} Positive and negative emotions have direct and indirect effects on the purchase of ecological packaging.⁶² Psychological and emotional factors significantly influence consumers’ pro-environmental purchases.^{63,64} In order to promote green consumption in the digital economy, it may be better to “rationalize” with consumers than to “move” them emotionally. Emotional responses may stem from perceptions of pro-environmental behavior and may inspire future pro-environmental behaviors and attitudes. Specifically, people may feel guilty if they believe they are not taking environmental action. Thus, guilt may have a significant impact on people’s decisions to engage in environmental behaviors.⁶⁵ Furthermore, emotions combined with other psychological constructs can influence consumers’ willingness to switch from disposable to reusable mugs.⁶⁶ Meanwhile, consumers are more likely to form positive green consumer attitudes towards “interesting” and “attractive” green emotional messages.⁶⁷ Therefore, in order to promote green consumer behavior, especially at the purchase stage, it is necessary not only to enhance consumers’ environmental awareness through general promotional tools, but also to increase the role of emotional messages in guiding their behavior.

This leads to hypothesis 1a: among the intervention strategies to promote green consumption, the green emotion-based intervention strategy has a positive effect on consumers’ green consumption behavior.

Social Norm Intervention Strategy

Norm (Norm), originally meaning a rule in the hands of a carpenter, was later applied in the field of social science to study the social behavior of individuals. Although there is no clear concept, the academic community generally considers it as a standard, a guideline. Individuals’ green consumption decisions are strongly influenced by the words and actions of others, ie, Social Norms (SNs). Normative intervention strategies aim to use information about social norms to influence individual consumers’ purchasing and consumption behavior under social pressure. Social comparisons can stimulate the public’s sense of competition and increase their green pro-environmental behavior.⁶⁸ In addition, social comparison feedback can correct for biases caused by individual feedback.⁶⁹ Effect of using descriptive normative information to enhance the energy saving behavior of community residents depended on the household electricity consumption of the residents in the base period,⁷⁰ and households with high electricity consumption could significantly reduce their electricity consumption after being informed of the average electricity consumption of the community residents in the next explored the effect of descriptive norms on repeated towel use behavior by using hotel customers’ repeated towel use behavior,⁷¹ dividing hotel customers into two groups, one presenting standard environmental information and one presenting normative environmental information, and found that the results of the study found that the normative information group of customers increased towel reuse behavior. Other studies have shown that individuals or organizations such as family members, neighbors, colleagues, government, and environmental associations are important reference groups that influence residents’ waste separation, and their expectations and perceptions often influence individuals’ behavioral choices.

This leads to Hypothesis 2a: Among the soft intervention strategies to promote green consumption, the normative intervention strategy has a positive impact on consumers’ green consumption behavior.

Economic Incentive-Based Intervention Policies (High-Intensity Subsidies and Low-Intensity Subsidies)

Incentive-based intervention strategies generally refer to the intervention of consumer behavior through economic instruments such as tax penalties and economic subsidies. Thus, a considerable number of scholars categorize

incentive-based intervention strategies into the category of rigid strategies. The incentive strategy is treated as a strong binding behavioral intervention strategy. However, it classifies the instruments for greening household energy consumption into positive incentives, negative incentives, and restrictive incentives. Positive incentives are economic subsidies and negative incentives are restrictive constraints such as taxes. Consumers in FL, USA prefer financial subsidies.⁷² Financial subsidies and income tax breaks can significantly influence consumers' home energy efficiency retrofitting behavior.⁷³ In contrast, coercive incentives such as taxes have a weak impact on local residents' energy efficiency behavior.⁷⁴ In addition, there is considerable prior research that demonstrates that the necessary economic instruments can increase the level of green behavior, and the classical school of economics views individual behavioral motivation as a result of economic reasons, considering the consumer as both a "doer" who is satisfied with survival and a "calculator" scientist. Therefore, economic incentives can promote pro-environmental consumer behavior. Increasing the subsidy coefficient can significantly increase the public demand for green products.⁷⁵ Other studies confirm that lower subsidies do not significantly improve the demand for green products,⁴⁸ while increasing subsidies are more conducive to directing the public to engage in pro-environmental behavior.⁴⁹ Thus, different levels of incentives may promote different levels of change in consumers' willingness to make green purchases.

This leads to Hypothesis 3a: high-intensity economic incentives have a positive effect on consumers' green consumption behavior.

Hypothesis 4a: low-intensity economic incentives have a positive effect on consumers' green consumption behavior.

Although based on the standard economic model that assumes that public decisions and behaviors are based solely on the consideration of maximizing personal utility, there is a positive relationship between economic incentives and expected behaviors.^{21,47} However, real-world behaviors do not follow this monotonic assumption. Although some researchers claim that economic incentives can drive individuals to engage in green pro-environmental behavior by stimulating monetary motivation in individual members of the public.^{76,77} However, some studies have also shown that non-monetary interventions (social norms, goal orientation, awareness education, etc.) have a greater impact on individuals' environmental attitudes and behaviors compared to monetary measures will lead to sustainable and significant energy savings by stimulating individuals' intrinsic motivation.^{78,79} In the field of green consumption behavior, consumers' consumption behavior is also not primarily driven by economic incentives and rational pursuit of material benefits.⁸⁰ Used a random effects meta-analysis to systematically assess and compare the energy saving effects of monetary and non-monetary interventions.⁸¹ The results show that non-monetary interventions are more effective than monetary interventions, implying that the use of low-cost, efficient non-monetary interventions is a promising strategy for promoting green behavior. In comparing the comparative advantages of economic incentives and informational interventions, found that both positive economic incentives and informational incentives aimed at increasing consumers' recycling knowledge positively affect consumer recycling behavior, but the impact of informational incentives is more persistent than that of economic incentives.⁸² Scholars increasingly believe that the "soft" incentives created by the provision of information are more effective in promoting recycling behavior than economic incentives.⁸³

Thus we have hypothesis 5a.

Hypothesis 5a: Soft behavioral intervention policies are more effective than economic incentive intervention policies.

"Soft" Policy Mix Intervention Strategies

In addition to analyzing the single effects of different intervention strategies, it is also necessary to focus on the effects of different policy combinations of "soft" intervention policies and "soft" economic incentive policies. Previous studies have confirmed that the combination of multiple intervention strategies works better than the implementation of a single intervention strategy. Therefore, a combined implementation framework of policy interventions may better promote green consumption among consumers. This paper focuses on the effects of a two-by-two combination of "soft" intervention policies and "soft" economic incentive policies, including low-intensity subsidy intervention + normative information intervention (L+G), low-intensity subsidy intervention + emotional information intervention (L+Q), high-intensity subsidy intervention + normative information intervention (L+Q), and high-intensity subsidy intervention + normative information intervention (H+G), and high-intensity

subsidy intervention + affective information intervention (H+Q). This paper then proposes the hypothesis of flexible intervention strategy combinations;

Hypothesis 1b: Policy intervention combinations have a positive effect on consumers' green consumption behavior.

Hypothesis 2b: The combination of policy intervention strategies has a greater impact on consumers' green consumption behavior than a single intervention policy.

Research Methodology

Study Design

In this study, the intervention strategy conditions were transformed into dummy variables as independent variables and substituted into the multiple linear regression equations in two experiments. The previous hypotheses were tested by using a multiple linear regression model (Hierarchical Regression Model) through stata software, and the strategic intervention model is shown below.

$$y_i = \alpha + \sum_{k=1}^k \beta_k X_k + \sum_{m=1}^m \delta_m Z_{im} + \mu_i$$

The variables in the model are denoted as, Y_i denotes the intensity of consumer i 's willingness to buy green, α is the intercept term of the model, μ_i is the random disturbance term, X_k denotes the policy intervention dummy variable, Z_{im} represents the socio-demographic characteristics variable of resident i , and β_k and δ_m represent the coefficients corresponding to these two types of independent variables, respectively. In the regression process, this paper firstly conducted a multicollinearity test, and due to the weak correlation of the factors and the VIF of all variables is less than 10, the sample data of both Study 1 and Study 2 do not have serious cointegration problems; secondly, to avoid the bias caused by the heteroskedasticity phenomenon on the test results, we uniformly adopt Robust Regression (RR). In both Study 1 and Study 2, we first analyzed the low-value laundry detergent, ie, Models 1 and 2, in which Model 1 only included control variables such as the social characteristics of the sample population, while Model 2 further included dummy variables for strategic interventions; and then analyzed the high-value desk lamp, ie, Models 3 and 4.

Study I Design

Experimental Design

This study develops a research design through a questionnaire experiment to specifically study the respective policy effects of soft behavioral intervention policies and economic incentive policies, and to compare the policy effect sizes of both. With the development of behavioral economics, a large number of causal inference methods, represented by experimental methods, have emerged. The representative experimental research methods are field experiments, laboratory experiments, natural experiments, and survey experiments. The questionnaire experiment is an innovative method that combines experimental investigation with social survey. The questionnaire experiment is similar to the traditional questionnaire survey in terms of specific experimental operations, but they have significant differences. Questionnaire experiments are often controlled by external interventions in the survey, and the information related to the experimental design is embedded in the social survey. Operationally, questionnaire experiments conduct causal analysis by using randomized grouping and between-group testing, where subjects are randomly divided into groups to apply the experimental intervention and between-group testing is conducted. The questionnaire experiment ensures the external validity of causal inferences by generalizing the results of the experiment for specific subgroups to the aggregate. In this paper, considering the difficulty of conducting field experiments during epidemic prevention and control, an online questionnaire experiment is mainly used to explore the effects of soft behavioral intervention policies and economic incentive policies to maximize the validity of causal inferences.

This part of the study divides the policy experiment scenario into five sections. Specifically, Volume A (intervention group with the policy intervention condition simulating a green emotional intervention policy), Volume B (intervention group with the policy intervention condition simulating a social norm intervention tool), Volume C (intervention group with the policy intervention tool simulating a low intensity incentive), Volume D (intervention group with the policy intervention condition simulating a high intensity economic incentive), and Volume E (control group). Since the study subjects were the more common individual green purchasing behaviors in life, to minimize the problem of weak control

in the experimental setting, the study simplified the intervention descriptions as much as possible in the strategy intervention design to avoid reading difficulties for the subjects and to improve the manipulation success rate.

The stimulus materials for different intervention policies were as follows: Group A received the intervention “At present, the ecological environment in China is under great pressure, environmental pollution, energy consumption is still very serious, rivers are dried up, the environment is polluted, and energy is depleted, all this comes from our ungreen consumption habits, because our daily traditional purchasing behavior is inadvertently damaging and neglecting the environment. The same earth, the same world, limited resources, infinite cycle. Low carbon green consumption, let the earth stop sighing!” the intervention received by Group B is “In order to better guide green consumption, the government has added labels with environmental information on relevant products, so refer to such messages and make your choice. Domestic Ali platform survey shows that green consumers have increased 14 times in the past four years, and 45% of consumers who have purchased energy-saving products. Among them, consumers who have purchased environmentally friendly products are more than 90%. In the population classification, young consumers between 29–35 years old, especially young hot mothers, on average, there is one green consumer in two people”; Group C received the intervention “According to statistics, because green logo products are generally 30% higher than the price of traditional goods. Therefore, in order to change people’s consumption habits and promote a low-carbon green lifestyle, the government decided to issue a green credit of 2RMB per bag for consumers who choose to buy green laundry detergent with the green logo, and a green credit of 10RMB per unit for consumers who buy energy-saving table lamps”; Group D received the intervention “According to statistics, since green-labeled products are generally 30% more expensive than traditional goods. Therefore, in order to change people’s consumption habits and promote a low-carbon green lifestyle in society, the government decided to issue a green credit voucher of 4RMB per bag for consumers who choose to buy green cleaning laundry detergent with the green logo; and a green credit voucher of 20RMB per unit for consumers who buy energy-saving table lamps.” group E was the control group, described only in the questionnaire as “We want to protect the environment and consume low-carbon”.

Variable Measurement

The dependent variable was selected as “willingness to buy green”, which is the subjects’ overall willingness to buy green. The experimental subjects in this paper were low-value laundry detergent and high-value desk lamp. This variable is measured by two questions: “Among the two categories of green and non-green laundry detergent, how willing you are to buy green laundry detergent” and “Among the two categories of energy-saving desk lamps and ordinary desk lamps, how willing you are to buy energy-saving desk lamps”. The overall willingness to purchase green products was measured.

The subjects were asked to make a purchase decision after reading the product presentation. Relative willingness to purchase was measured by,³⁹ who used a 7-point Richter scale, with 1 being “not at all willing to purchase” and 7 being “completely willing to purchase”, to obtain a more accurate relative willingness to purchase green products by giving them a choice between two products. “completely willing to buy”.

The final part measured the demographic variables of the subjects. For the measurement of demographic variables, the variables that were more common in the questionnaire experiment were first selected, including gender, age group and education level, etc. In addition, to maximize the control of the experimental setting, other demographic variables that may interfere with green purchasing were controlled for in the literature, including: gender, age, marriage, income level, education level, subject’s occupation, subject’s city of residence, and so on. These control variables were set as dummy variables, for example, gender, where 0 means “female” and 1 means “male”.

Study 2 Design

After examining the single policy effects of each of the soft behavioral intervention policies and the economic incentive policies, this part of the study will continue to explore in depth the effects of implementing a policy combination of soft behavioral intervention policies and economic incentive policies. The study of the combination of soft intervention policies still adopts the experimental method, and the experimental process is the same as that of the single intervention policy. The stimulus material for the combination of soft behavioral intervention policies and economic incentives

policies is a two-by-one combination of the above materials. According to the analysis of the policy intervention framework, there are four classifications of policy combinations of soft behavioral intervention policies and economic incentive policies: two-dimensional combinations, three-dimensional combinations, and four-dimensional combinations. Due to the limitation of research space, this paper only conducts an exploratory study on the implementation effects of two-dimensional combinations of policy portfolios (ie, two-by-two combinations), of which there are four types and four soft policy combinations can be seen in Table 1. The experimental content design consists of five parts. Specifically, Volume A (intervention conditions simulating the policy combination of green affective intervention + high-intensity subsidy intervention), Volume B (policy combination of social norm intervention + high-intensity subsidy), Volume C (policy combination of low-intensity subsidy intervention + green affective intervention), Volume D (policy combination of low-intensity subsidy + social norm), and Volume E (control group). The soft policy combinations and their intervention materials are in Table 1.

Table 1 Soft Policy Mix Stimulus Materials

Policy mix	Contents of Stimulus Materials
(H+Q)	<p>“At present, China’s ecological environment is under enormous pressure, environmental pollution, energy consumption situation is still very serious, rivers dry up, environmental pollution, energy depletion, all this comes from our not green consumption habits, lies in our daily traditional purchasing behavior on the environment inadvertently damage and neglect. The same earth, the same world, limited resources, infinite cycle. Low carbon green consumption, let the earth no longer sigh!”/“ According to statistics, as green logo products are generally 30% more expensive than traditional goods. Therefore, in order to change people’s consumption habits and promote a low-carbon green lifestyle in society, the government has decided to issue green credit vouchers of 4 RMB per bag for consumers who choose to purchase green cleaning laundry detergent with the green logo; and 20 RMB per unit for consumers who purchase energy-saving table lamps”</p>
(H+G)	<p>“In order to better guide green consumption, the government adds labels with environmental information on relevant products, refer to such news and make your choice. Domestic Ali platform survey shows that green consumers have increased 14 times in the past four years, and consumers who have purchased capital-saving and energy-saving products reached 45%. Among them, consumers who have purchased environmentally friendly products are more than 90%. In the population classification, young consumers between 29–35 years old, especially young hot mothers, an average of two people have a green consumer”/ “According to statistics, as green logo products are generally 30% higher than the price of traditional goods. Therefore, in order to change people’s consumption habits and promote a low-carbon green lifestyle in society, the government decided to issue a green credit of 4RMB per bag for consumers who choose to purchase green cleaning laundry detergent with the green logo; and a green credit of 20RMB per unit for consumers who purchase energy-saving table lamps”</p>
(L+Q)	<p>“According to statistics, as green-labeled products are generally 30% more expensive than traditional goods. Therefore, in order to change people’s consumption habits and promote a low-carbon green lifestyle in society, the government has decided to issue green credit vouchers of 2RMB per bag for consumers who choose to purchase green laundry detergent with the green logo; and 10RMB per unit for consumers who purchase energy-saving table lamps”/“At present, China’s The pressure on the ecological environment is huge, environmental pollution, energy consumption is still very serious, rivers dry up, environmental pollution, energy depletion, all this comes from our not green consumption habits, in our daily traditional purchasing behavior on the environment inadvertently damage and neglect. The same earth, the same world, limited resources, infinite cycle. Low carbon green consumption, let the earth no longer sigh!”</p>
(L+G)	<p>“According to statistics, as green-labeled products are generally 30% more expensive than traditional goods. Therefore, in order to change people’s consumption habits and promote a low-carbon green lifestyle in society, the government has decided to issue green credit vouchers of 2RMB per bag for consumers who choose to purchase green laundry detergent with the green logo; and 10RMB per unit for consumers who purchase energy-saving table lamps”/“In order to better In order to better guide green consumption, the government is adding environmental information labels on relevant products, so refer to such news and make your choice. Domestic Ali platform survey shows that green consumers have increased 14 times in the past four years, and 45% of consumers who have purchased energy-saving products. Among them, consumers who have purchased environmentally friendly products are more than 90%. In the population classification, young consumers between 29–35 years old, especially young hot mothers, an average of two people have a green consumer”.</p>

Research Sample

The data applied in Study 1 were obtained from a nationwide user survey conducted by a green consumer team at a Chinese university from October to December 2021 using the credamo online questionnaire platform (similar to the international survey monkey data survey platform). The survey collected a total of 500 research samples, and after eliminating extreme values such as short response times, incorrect answers to calibration questions, and irregularities, a final sample of 460 valid samples was obtained, with an effective recall rate of 92%. In order to make the sample structure as reasonable as possible. The study in this paper has samples of adults who are already working and employed in many other fields, in addition to the sample of college students. Also, in order to reasonably screen out the valid sample, our questionnaire used a response quality control technique by adding two reverse questions to determine whether the respondents were serious about their responses. A cash return of 2–3RMB was given to the valid sample that passed the response quality control technique. In Study 1, the samples of college students were all around 31.5%, and the remaining close to 68.5% of the samples were working adults, and so the samples obtained were distributed from the score in each class of cities in China.

Descriptive statistics for each specific demographic variable are shown in [Table 2](#).

Table 2 Descriptive Statistics of the Single Intervention Policy Sample

Characteristic	Valid N	Valid Percent	Cum. Percent
Gender (valid N = 460)			
Male	159	34.6	34.6
Female	301	65.4	100.0
Age (valid N = 460)			
25 years old or less	188	40.8	40.8
26–30 years	147	31.9	72.7
31–40 years	100	21.7	94.4
41–50 years	17	3.7	98.0
51 years or above	8	1.9	100.0
Marriage (valid N = 460)			
Unmarried	216	46.9	46.9
Married	244	53.1	100.0
Education (valid N = 460)			
High school and below	18	3.9	3.9
Specialized colleges	36	7.8	11.7
College	342	74.2	85.9
Postgraduate and above	64	14.1	100.0
City of residence class (valid N = 460)			
First-tier cities	94	20.4	20.4
Provincial Capital Cities	223	48.4	68.8
Prefecture-level cities	116	25.2	93.9
County/District Cities	27	6.1	100.0
Employment (valid N = 460)			
Students	145	31.5	31.5
Manufacturing\ transportation workers	18	3.9	35.4
Service industry employees	70	15.2	50.5
Government employees, managers	55	11.9	62.5
Education and research personnel	12	2.6	65.1
Small businessmen	160	34.9	100.0
Monthly Income (valid N = 460)			
Under 2000 RMB	93	20.2	20.5
Between 2001–3500 RMB	72	15.6	35.8
Between 3501–5000 RMB	50	10.8	46.6
Between 5001–6500 RMB	54	11.7	58.4
Between 6501–8000 RMB	70	15.2	73.5
Above 8000 RMB	121	26.5	100.0

Study 2 further explored the effects of soft policy combinations on green consumption behavior by testing hypotheses 1b and 2b. In Study 2, the intervention materials for each policy combination were combined two by two into the original single policy intervention material in order to maintain consistency in the policy intervention experiment. The same random sampling method was used in the same data collection platform, and 600 questionnaires were distributed. Also, in order to reasonably screen out a valid sample, our questionnaire used a response quality control technique with two additional reverse questions to determine whether respondents were serious about their responses. After testing to exclude extreme values of check items and wrong answers, a cash refund of 2–3RMB was given to valid samples that passed the response quality control technique. A total of 556 valid questionnaires were returned, with a valid return rate of 92.6%. Among them, the sample subjects of the strategy combination were mostly male, the age distribution was mostly concentrated between 26–30 years old, the student sample accounted for 38.5%, and the adult working population accounted for 61.5%, the study sample was mostly social adult group. The distribution of specific sample demographic characteristics in Table 3 is as follows.

Table 3 Descriptive Statistics for a Sample of Policy Mix

Characteristic	Valid N	Valid Percent	Cum. Percent
Gender (valid N = 556)			
Male	292	52.5	52.5
Female	264	47.5	100.0
Age (valid N = 556)			
25 years old or less	183	32.9	32.9
26–30 years	192	34.5	67.4
31–40 years	150	27.0	94.4
41–50 years	15	2.7	97.1
51 years or above	16	2.9	100.0
Marriage (valid N = 556)			
Unmarried	241	43.3	43.3
Married	315	56.7	100.0
Education (valid N = 556)			
High school and below	14	2.5	2.5
Specialized colleges	34	6.1	8.6
College	457	82.2	90.8
Postgraduate and above	51	9.2	100.0
City of residence class (valid N = 556)			
First-tier cities	121	21.8	21.8
Provincial Capital Cities	233	41.9	63.7
Prefecture-level cities	147	26.4	90.1
County/District Cities	55	9.9	100.0
Employment (valid N = 556)			
Students	214	38.5	38.5
Manufacturing\ transportation workers,	31	5.6	44.1
Service industry employees	93	16.7	60.8
Government employees, managers	48	8.6	69.4
Education and research personnel	12	2.2	71.6
Small businessmen	158	28.4	100.0
Monthly Income (valid N = 556)			
Under 2000 RMB	104	18.7	18.7
Between 2001–3500 RMB	53	9.5	28.2
Between 3501–5000 RMB	71	12.8	41.0
Between 5001–6500 RMB	72	12.9	53.9
Between 6501–8000 RMB	103	18.5	72.4
Above 8000 RMB	153	27.6	100.0

Data Analysis

This study adopted a one-way intergroup behavioral experimental design. The randomness of subject assignment was first tested before the policy effects were assessed. The randomness of subject assignment ensured that subjects across intervention states were balanced across observable and unobservable characteristics, thus ensuring that differences in the dependent variable between groups were derived from the intervention itself, ie, identifying causal effects of the intervention on the outcome variable. Second, the study analyzes the data from Study 1 to assess the differences in the impact effects of the different “soft” intervention policies. In terms of measurement methods, this study uses mainly simple linear regressions, which are inherently good statistical properties and easy to interpret regression coefficients. Finally, the effects of the implementation of the policy mix in Study 2 are also tested using multiple linear regressions.

Research Results

Further, in order to ensure the randomness of the experimental study subjects, we needed to conduct a descriptive analysis of the study’s sample followed by a balanced test of the study’s sample data. In Study 1, we simultaneously conducted group ANOVAs for the normative information group, emotional information group, low intensity motivation group, high intensity motivation group and control group in terms of gender, age, education level, marital status, work status, income level and area of residence. In general, if the sample data met the randomness requirement, then the control variables should be equally distributed among the intervention groups. The results of the balance test in Table 4 show that there is no significant difference between the data of other variables in the intervention group and the treatment group, except for the variable of gender in the high-intensity subsidy group (policy H) ($p < 0.5$), and the experimental sample meets the requirement of randomness distribution and has a good balance effect.

Meanwhile, in the policy combination experiment of Study 2, in order to ensure the randomness of the experimental sample, we continued to conduct a balance test on the experimental sample of the policy combination of Study 2. Except for the differences in the two variables of marriage and public type in the low-intensity subsidy + green sentiment combination (L+Q) ($p < 0.5$), the sample data of the other policy instrument combinations conformed to the randomness distribution and the balance effect was better good. The results of the tests in Table 5 are as follows:

Table 4 Balance Test

Variables	PolicyQ	PolicyL	PolicyH	PolicyG
Gender	0.01	0.043	-0.100*	0.026
Age	-0.052	0.018	0.040	0.078
Marriage	-0.05	0.042	0.022	0.040
Education	0.051	0.025	-0.029	0.007
City	-0.032	-0.014	-0.030	0.053
Income	-0.04	-0.02	0.169	0.097
Job	-0.068	0.002	-0.280	0.256

Note: * $p < 0.05$.

Table 5 Policy Mix Balance Test

Variables	Polic (H+Q)	Policy (H+G)	Policy (L+G)	Policy (L+Q)
Gender	-0.005	0.008	-0.026	0.031
Age	0.073	0.047	0.029	-0.188
Marriage	0.064	-0.003	0.008	-0.111*
Education	0.034	0.008	-0.006	0.04
City	0.025	0.039	-0.031	-0.011
Income	0.061	0.101	-0.075	-0.203
Job	-0.150	-0.096	0.013	0.441*

Note: * $p < 0.05$.

Study I Findings

In one part of the study, the main purpose of the experiment is to comparatively assess the differences in the policy effects of “soft” economic incentives and “soft” behavioral interventions. In this section, the study evaluates the effects of “soft” economic incentives (high intensity subsidies, low intensity subsidies) and “soft” behavioral interventions (social norms, green emotions) in the context of low value product attributes (laundry detergent model) and high value product attributes (table lamp model), respectively. (social norms, green emotions) on consumers’ willingness to purchase green products. The findings are as follows (see Table 6).

First, the regression results for laundry detergent with low-value attributes are shown below in Table 7, Model 1 and Model 2. Overall, the effects of both types of soft intervention strategies are significant. Among the soft behavioral intervention policies, the coefficient of the intervention strategy of the green emotion category is 0.264 and significantly affects consumers’ green

Table 6 Regression Results of Policy Mix

GC Willingness	Model1	Model2	Model3	Model4
H+Q		0.479**		0.454***
H+G		0.562***		0.371**
L+G		0.426**		0.337**
L+Q		0.452**		0.347**
Gender	0.021	0.023**	-0.131	-0.13
Age	-0.122	-0.115	-0.016	-0.011
Marriage	0.259	0.247	0.182	0.181
Education	-0.026	-0.01	-0.132*	-0.117
Income	0.001	0.001	-0.011	-0.013
Job	-0.034	-0.032	-0.012	-0.011
City	-0.063	-0.057	-0.015	0.011
R-Square	0.019	0.061	0.068	0.067
F	1.239	2.657**	1.939	2.928**

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 7 Single Policy Regression Results

GC Willingness	Model1	Model2	Model3	Model4
Social Norms		0.247*		0.254*
Green Emotions		0.264*		0.168
Low-intensity subsidies		0.358**		0.259*
High-intensity subsidies		0.312*		0.342*
Gender	-0.220**	-0.224**	-0.148	-0.157
Age	0.097	0.099	0.131*	0.134*
Marriage	-0.112	-0.093	-0.194	-0.177
Education	-0.089	-0.078	-0.043	-0.037
Income	0.180***	0.181***	0.144***	0.146***
Job	0.077**	0.080**	0.029	0.033
City	0.125**	0.125**	0.098*	0.099*
R-Square	0.085	0.084	0.068	0.082
F	7.215***	5.582***	5.693***	4.384***

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

purchase intention, and hypothesis 1a is tested. The coefficient of the intervention strategy of the normative category was 0.247 and passed the significance test ($p < 0.05$), which positively influenced consumers' green purchase intention. Therefore, hypothesis 2a was proved. Meanwhile, both soft economic incentive intervention policies (high-intensity subsidies and low-intensity subsidies) have a significant effect on the dependent variable (consumers' willingness to buy green), and hypotheses 3a and 4a are both valid. Meanwhile, by comparing the soft behavioral intervention strategy and the soft economic incentive strategy, it can be found that the coefficient of the economic incentive intervention strategy is significantly higher than the coefficient value of the behavioral intervention strategy variable. That is, the economic incentive type of intervention policy is more direct and effective than the behavioral intervention strategy effect. This indicates that the economic incentive strategy has a more obvious and direct induced promotion effect on green consumption behavior, and the incentive strategy is more effective in activating consumers' self-interest motivation and promoting green consumption in the short term compared with the behavioral intervention strategy. Hypothesis 5 does not hold.

Second, the effects of soft intervention policies on the purchase choice of table lamps with high-value attributes are shown in Model 3 and Model 4 (Table 4) as follows: in the regression results of Model 3 and Model 4, three of the four types of soft intervention strategies are significant. Among the soft behavioral intervention strategies, the intervention coefficient of the normative category is 0.254 and passes the significance test ($p < 0.05$), positively affecting consumers' green purchase intention, and hypothesis 2a is proved again. At the same time, the economic incentive-based interventions (high intensity subsidies and low intensity subsidies) also have a significant effect on the dependent variable (consumers' willingness to buy green), and hypotheses 3a and 4a are confirmed again. However, the coefficient of green affective intervention strategy is 0.168 and insignificant, and hypothesis 1a does not pass the test. The economic incentive policy seems to be more effective than the behavioral intervention policy for both low-value attribute goods and high-value attribute goods.

Meanwhile, by comparing the laundry detergent with low value attribute and the table lamp with high value attribute, it can be found that the influence of soft economic incentive intervention policy has a substantial increase of consumers' green consumption intention for low value products and high value products, but the soft behavioral intervention policy has a poor status of increasing consumers' green consumption intention for high value products, in which the emotion-based intervention policy cannot initiate consumers' green purchase intention for high value products. However, the soft behavioral intervention strategies did not have a good effect on the green consumption intention of consumers for high-value products. This indicates that for high-value goods, external self-interest motivation is relatively easier to initiate consumers' green purchase intention, and built-in irrational emotional influence may fail. This reflects that consumers are more rational in the context of high-value attributes and are more likely to activate self-interested economic motives, and are more concerned with the potential cost-benefit of the purchase decision than the psychological gains and losses and environmental value considerations of whether to purchase green products.

Study II Findings

Study II uses the same multiple linear regression model as Study I. The model differs from that of Study I in that, in Study II, the policy intervention dummy variables are policy mix variables. The policy intervention combinations of soft behavioral intervention policies and soft economic incentive policies were divided into four main policy categories after conducting two two groups: including low-intensity subsidy intervention + social norm intervention (L+G), low-intensity subsidy intervention + green emotional intervention (L+Q), high-intensity subsidy intervention + social norm intervention (H+G), and high-intensity subsidy intervention + green emotional intervention (H+Q). The regression results for the implementation effects of the policy intervention combinations are shown (Table 6) as follows.

First, in terms of consumers' willingness to consume green products of low value, with the combined effect of high-intensity subsidy intervention and normative intervention strategies, we found that higher intensity economic incentives and awakening consumers' subjective norms could enhance consumers' willingness to behave green to a greater extent; with the combined strategic intervention of low-intensity incentive intervention and normative information intervention, consumers enhanced their willingness to purchase green and passed the This indicates that giving consumers some social pressure and some financial incentives can promote consumers' green decisions; the combination of high-intensity incentive intervention and emotional information intervention also significantly enhances consumers' green consumption intention. The intervention coefficient of this strategy combination is 0.479 and significant; the intervention effect is also

significant ($p < 0.05$) under the combination of low-intensity incentive intervention and emotional information intervention, which means that a certain degree of economic incentive supplemented with emotional empathy can both stimulate consumers' intrinsic motivation and improve consumers' environmental attitudes. Overall, hypothesis 1b was confirmed.

Second, the combination of soft intervention strategies also plays an important role in enhancing consumers' willingness to consume in high-value products. We can find in the implementation effect of soft intervention strategies on the influence of high-value product purchase decision: the combination of four types of soft intervention strategies (low-intensity subsidy intervention + normative information intervention, low-intensity subsidy intervention + emotional information intervention, high-intensity subsidy intervention + normative information intervention, and high-intensity subsidy intervention + emotional information intervention) are all very effective in enhancing consumers' green purchase intention. Specifically, in the combination of high-intensity subsidy intervention and normative information intervention strategy, the results were significant; in the combination of low-intensity subsidy intervention and normative information intervention strategy, consumers enhanced their green purchase intention for high-value products (coefficient 0.337 and $p < 0.05$); meanwhile, the combination of high-intensity subsidy intervention and emotional information intervention, and the combination of low-intensity incentive intervention and emotional information interventions, the intervention effects were both more significant. Hypothesis 1b was confirmed.

Third, after comparing the effect of a combination of soft intervention strategies with that of a single soft intervention strategy on low-value and high-value products, we found that the effect of a combination of soft intervention strategies on consumers was higher than that of a single soft intervention strategy for both low-value and high-value products. In particular, the effect of the combination of soft intervention strategies is greater for low-value products. Whereas, on high-value products, the combination effect of soft intervention strategies is smaller than the impact effect of the combination intervention strategy on low-value products. Alternatively, in high-value products, there is an interaction between incentive strategies and consumer intrinsic motivation induced by other intervention strategies.⁸⁴ Although the implementation of the combination of soft intervention strategies is slightly less effective in high-value products than in their low-value attribute products, its implementation is still more effective than the effect of a single intervention strategy on consumers' intention to consume green. Overall, we were able to determine that the combination of soft policy interventions was more able to increase consumer purchase intentions relative to a single soft intervention strategy. Hypothesis 2b is confirmed.

Research Conclusions and Discussion

Discussion

The purpose of this study was to examine the effects of “soft” behavioral intervention policies and “soft” economic incentives (alone and in combination) on the promotion of consumers in a low-carbon product (high-value and low-value products) purchasing environment. To this end, we tested seven hypotheses in two experiments.

Among the single intervention strategies, a “soft” behavioral intervention strategy based on limited rationality and non-economic motivation also promotes positive changes in consumers' willingness to consume green.^{33,34} Specifically, by stimulating consumers with certain emotional messages, such as values, pride, and guilt,⁸⁵ consumers are more likely to increase their green purchases under the influence of emotions, and the green emotion intervention has a better impact than the control group without interference, which leads to more positive green consumption. Green affective interventions based on limited rational, non-economic motives promoted positive changes in consumers' green consumption intentions in the low-value product scenario. This finding is similar to previous studies,⁴² by giving consumers certain emotional information stimuli, such as values, pride, guilt, etc,⁸⁵ will make consumers more likely to increase green purchases under the effect of emotions. At the same time, ie, through the soft means of social norms can promote more positive green consumer behavior.²⁹ By providing information about social norms, ie, providing that a certain behavior becomes typical for most people in a given situation,⁸⁶ the likelihood that individual consumers will make green decisions is greatly increased. Similar to previous studies, this study found that by providing information about social norms, ie, when a behavior is typical of most people in a given situation,⁸⁶ the likelihood of individual consumers making a green decision is significantly increased. At the same time, “soft” economic incentives significantly contribute to significant changes in consumer green behavior. Rational economic motivation-based economic incentive interventions increase consumers' willingness to consume green.^{87,88} This result is also in line with previous studies

in the related literature.^{15,45} Although this financial incentive is not permanent, it certainly helps to reshape daytime consumption and once this new behavior is transformed into a habit, people continue with the same schedule. Monetary incentives may be more effective than simple communication or peer comparison because it can compensate for changes in behavioral habits.⁴⁶

In contrast to previous studies, hypothesis 5a was not confirmed. In our hypothesis, the effect of soft behavioral intervention policies is greater than that of economic incentive intervention policies. However, the empirical data suggest that although economic incentives promote consumers' willingness to make green purchases, the implementation of soft behavioral intervention policies is not as effective as economic incentives. Although studies in the related field of environmental behavior suggest that soft behavioral interventions can reduce household energy consumption,⁸⁹ household water consumption,^{90,91} meat consumption,⁹² and food waste.⁹³ But our study results differ from them. The reason may lie mainly in two points: On the one hand it lies in the fact that the research scenario of this paper is in the area of green product purchases (table lamps and laundry detergent), while the research area of other researchers lies in the area of everyday low carbon behavioral use. In the case of everyday green behaviors, consumers do not consider the economic costs too much, because soft behavioral interventions can better promote green behaviors based on intuitive emotions. In contrast, in our scenario, in the area of green goods purchasing, consumers face more direct consideration of the price of goods and therefore consume green goods based on the assumption of "rational economic man". By subsidizing more green and low-carbon products, the price differential is artificially increased, satisfying a higher overall acceptance by participants.⁹⁴ And subsidies for self-consumption can increase consumer acceptance and give households a central role in combating climate change.⁹⁵ On the other hand, it may lie in the fact that economic incentive policies (high-intensity subsidies versus low-intensity subsidies) have a dual impact effect. In addition to reducing the cost of product purchases for individuals, economic subsidy policies may further enhance public awareness of environmental protection.²² To a certain extent, through economic subsidy policies, the public can equally recognize the state's emphasis on green environmental protection in addition to economic gains, and thus subsidy policies can have a certain impact on the public's psychology.⁹⁶ That is, economic subsidy policies are also informational policies for greening.

Finally, we find convincing support for hypotheses 1b and 2b that the combination of "soft" behavior change measures (social norms and green emotions) and "soft" economic incentives (high-intensity subsidies and low-intensity subsidies) interventions will lead to More positive green behavior change relative to a single intervention. The policy combination of the two interventions is the most effective in encouraging green behavior change among consumers relative to all individual interventions. The empirical analysis of the intervention policy combinations found that the combination of the strategies was more effective. Combining incentive strategies and behavioral intervention policies can effectively enhance the effectiveness of policy instruments.⁵⁷ This study found that combining green affective-emotional strategies and social normative strategies with economic incentives (high-intensity subsidies versus low-intensity subsidies), ie, giving green purchase subsidies on top of appropriate emotional or normative messages to guide consumers in their green purchase decisions, the hybrid instruments achieved significantly more green purchases compared to soft behavioral interventions or subsidy incentives alone. That is, multi-pronged interventions may be most effective for positive shifts in environmental behavior,^{31,80} especially those that include both conservation choices and incentive choices.⁹⁷

Overall, this study develops four theoretical contributions: first, while previous link policy studies have focused on pro-environmental behavior domains such as recycling and energy conservation,^{14,15} the study in this paper focuses on the effects of different intervention policies on public purchases of green and low-carbon products. Particular emphasis is placed on the impact of different intervention policies under different value attribute products (high-value products and low-value products); secondly, this study takes the variable of green emotion as a behavioral intervention policy domain. In previous studies, soft behavioral intervention policies mainly include default options, feedback, and norms, which mainly emphasize the use of unconscious soft instruments to guide consumer behavior. Third, based on a review of the effects of previous green consumer behavior intervention strategies, this study attempts to construct a comprehensive explanatory framework for consumer interventions, which includes both macro-level, fully rational, incentive-based intervention policies that focus on direct external behavior change, as well as a comprehensive framework that focuses on the impact of green consumer behavior intervention policies. The framework includes both macro-level, fully rational, incentive-based interventions that focus on direct external behavior change, as well as micro-level, soft behavior change policies that focus on consumers' intuitive emotions. It also includes a combination of different flexible intervention strategies, thus forming a more systematic and complete framework for the analysis of consumer green consumption behavior intervention strategies.

Conclusions

Overall, the results of the econometric analysis of Study 1 and Study 2 show that “soft” intervention policies (single and combined) are effective in increasing consumers’ willingness to purchase green products. The “soft” behavioral intervention policies can stimulate consumers’ green psychological emotions and make them unconsciously consume green products under the pressure of social comparison; the “soft” economic incentive policies can activate consumers’ economic motivation very effectively. The “soft” economic incentive policy can activate the economic motivation of consumers, on the basis of which the environmental information policy function of the economic policy itself can be brought into play to change the consumption behavior of consumers more strongly. Finally, a two-by-two combination of “soft” interventions can have a more significant impact on consumer behavior.

In the case of low-value products, both “soft” behavioral intervention policies and “soft” economic incentive policies have significant policy effects. However, in the high-value product context, only the coefficient of the “soft” green emotional behavior intervention policy is not significant. Thus, hypotheses 2a, 3a, and 4a are tested. Hypothesis 1a was partially tested. Meanwhile, by comparing the “soft” behavioral intervention policy with the “soft” economic incentive policy, we found that the coefficient of the economic incentive intervention policy was larger, and the effect of the economic incentive intervention policy was more significant than that of the soft behavioral intervention policy. Contrary to our hypothesis, hypothesis 5a is not confirmed. Finally, the combination of “soft” behavioral intervention policies and “soft” economic incentive policies (low-intensity incentive intervention + normative information intervention, low-intensity incentive intervention + emotional information intervention, high-intensity incentive intervention + normative information intervention, high-intensity incentive intervention + Emotional information intervention) were all very effective in increasing consumers’ willingness to buy green, and hypothesis 1 was tested. After comparing the effect of policy combination and single intervention policy on low-value and high-value products, respectively, we found that the effect of policy combination strategy on consumers was higher than that of single intervention policy for both low-value and high-value products. Hypothesis 2b also passes the test.

Implication

In practice, the relevant findings of this study can help government agencies to effectively manage and promote the public’s green consumption behavior.

First, the government should activate the self-interest motivation of consumers through economic incentive policies and use financial subsidies to give appropriate price tilts to environmentally friendly products in the living area or provide precise subsidies for specific products in order to reduce the participation cost of the target group in implementing a sustainable lifestyle and attract them to green consumption. At the same time, the government should also use emerging forces such as social media to explain the intrinsic meaning of subsidy policies and guide the public to establish a sense of ecological honor and shame. This is because good publicity or perception of the subsidy policy will further increase consumers’ psychological needs and environmental awareness.²²

Second, while the government vigorously promotes subsidy policies for various types of green products, it is necessary to pay more attention to the impact of non-monetary behavioral interventions on the public’s green consumption behavior. The intrinsic psychological motivation of individuals is stimulated through behavioral intervention policies (green emotions and social norms) to enhance the long-term ability to consume green. More importantly, it is important to pay attention to the role of social norms and give full play to the dual role of incentives and constraints of reference groups.⁹⁸ To promote the public’s green consumption behavior, social networks and educational systems can be fully utilized in the future to increase residents’ awareness and obligation to save energy. Meanwhile, green sentiment significantly influences consumers’ green purchase intentions. Both the negative emotions of environmental damage transmitted to consumers through information and the positive emotions brought to consumers by stimulating expected pro-environmental consumption choices can positively and effectively influence consumer behavior. In the future, management can use innovative communication methods (eg, stories, cartoons, videos, etc.) to stimulate strong emotions about the environment and use green emotions in an unconscious way to positively and effectively change consumer behavior.

Finally, the relevant authorities can use a combination of “soft” intervention policies to influence consumers’ green consumption choices and thus improve the effectiveness of the policies. For example, a combination of subsidy incentives, social norms, and green emotional interventions should be used to achieve greater energy efficiency.

Limitation

The main limitation of this study is the use of an online simulated contextual policy experiment design rather than a field study.^{99,100} In a real purchase consumption, it is possible that participants would not make the same choices as in our task, especially given the large influence of habits.^{101,102} At the same time, questionnaires rely on self-reporting by the public, which may introduce biases associated with data collection. The sample size collected for analysis is also limited, thus potentially biasing the generalization of results. Finally, to facilitate the implementation and feasibility of the survey, this study only analyzed the purchase behavior of green consumption and did not expand on other behavioral areas of green consumption. Future research will address these gaps by expanding the analysis to a larger scope.

Ethics Statement

We declare that participants in our research study allow us to use their data for academic research and publication. All the participants were anonymous and their data was protected. All participants provided informed consent in accordance with the Declaration of Helsinki. All the programs in our research study were approved by the Institutional Review Board of Zhejiang University of Finance & Economics.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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The authors declare that they have no conflicts of interest for this work.

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