

# The Impact of Positive Emotional Appeals On The Green Purchase Behavior

**Jianming Wang**

Zhejiang University of Finance and Economics

**Zhengxia He** (✉ [hezhengxia79@163.com](mailto:hezhengxia79@163.com))

Jiangsu Normal University

**Jianguo Wang**

Zhejiang University of Finance and Economics

**Jing Bao**

Zhejiang University of Finance and Economics

**Jian Gao**

Zhejiang University of Finance and Economics

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## Research Article

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# Abstract

**Background:** The practice of green consumption has become a common initiative of the international community. Existing studies have shown that emotional factors have an important impact on consumer behavior, but few scholars in the field of green consumption behavior have explored the relationship between positive emotions and green purchase behavior in specific dimensions.

**Methods:** This study creatively put forward two dimensions and four kinds of positive emotional appeals which include the cherishing appeal, the yearning appeal, the proud appeal and the admiring appeal. Through the conceptual model analysis based on the data, the effects of different four positive emotional appeals on consumers' perceived green value, perceived green responsibility, green purchase behaviors were confirmed.

**Conclusion:** The results indicated that the four kinds of positive emotional appeals, perceived green value, perceived green responsibility, green purchase behavior were positively correlated. Perceived green responsibility has significant mediating effect on the relationship between positive emotional appeals and green purchase behaviors. However, surprisingly, perceived green value has no mediation effect in the relationship between positive emotional appeals and green purchase behaviors. Emotional arousal and middle doctrine are not qualified moderators in any situations.

## 1. Introduction

Nowadays, the global natural ecological environment is deteriorating day by day, and a series of pollution problems emerge one after another. Therefore, it is imperative to attach importance to and actively advocate green consumption behavior. The 19th national congress of the communist party of China (CPC) once again stressed the necessity to establish and practice the concept that clear waters and green mountains are valuable assets. However, in general, residents' green purchase intention and behaviors are not popular, and people are not willing to pay a premium for the green properties of products. The government and society have made great efforts to promote environmental protection and green consumption, but they have not played a strong role in promoting it. The reason is that propaganda is mostly spread in the form of preaching, and the content is dull and unappealing. So, it is difficult to arouse consumers' green purchase desire and change their original purchase concept. Kollmuss et al. (2002) and Tanner et al. (2003) found that rational cognition had a limited effect on the factors influencing green purchase behavior. Emotional factors had a significantly higher effect on green consumption than cognitive factors (Kanchanapibul et al., 2014). Therefore, more and more scholars gradually realized emotion plays an important role in green purchase behavior. More research breakthroughs were transferred to a relatively irrational variable-emotion (Peattie k. et al., 2010). However, most scholars have not deeply explored the influence of green emotion on green purchase behavior, simply incorporated green emotion into the research about consumer's green consumption attitude or environmental protection attitude. Past research proved the relationship between emotion and green purchasing behavior to some extent. However, a series of practical problems remains, such as how emotional factors influence in consumers' green purchase behavior, which factors can mediate or moderate on this path, and which kind of emotions can significantly promote green purchase behavior, scholars have not come with sufficient conclusions. Wang (2017) pointed out that from the perspective of emotional objects, positive emotions include not only the emotion towards a good objective environment (such as love for the environment), but also the emotion towards proper human behaviors (such as pride or admiring for the proper behaviors). In our view, the positive emotional dimension for a better objective environment, "yearning" is people's expectation of better things in the future, which makes people full of hope and make continuous efforts for them. There is no doubt that people yearn for more comfortable living conditions, a more beautiful environment, and a better life. According to the report to the 19th national congress of CPC, we should "always take the people's aspiration for a better life as our goal". Therefore, it is of great practical value to deeply explore the positive emotion of "yearning". "Cherishing" is a kind of emotion opposite to "yearning", which is the satisfaction and cherishing of the beautiful things we have at present. Both of these two emotions belong to the positive emotional dimension aiming at the beautiful objective environment. In order to solve the above problems more effectively, this study creatively put forward two specific dimensions of four kinds of positive emotional appeals and make in-depth exploration. One of the dimensions is the emotion towards a better environment, including the cherishing appeal and the yearning appeal. The other dimension is the emotion towards the appropriate individual environmental behavior, including the proud appeal and the admiring appeal. According to different dimensions, this study conducted a thorough research by group on the influence path and effect of positive emotional appeals on green purchase behavior, providing theoretical support for effectively promoting consumers to practice green purchase behavior.

## 2. Literature Review And Hypotheses Development

Rajesh et al. (2001) believe that advertising appeal is a strategic way to display prominent features of products. Turley and Kelley (1997) classified advertising appeal into two types: rational appeal and emotional appeal. Rational appeal is straightforward, directly emphasizing the performance, quality and price of products; Nevertheless, emotional appeal is based on the emotional needs of consumers. Compared with rational appeal, emotional appeal has more strong emotional elements, which can stimulate consumers' purchase desire and generate

psychological identification. Chan (1996) and other scholars argued that compared with emotional appeals, rational appeals advertisements lack vividness and the content is boring, which is difficult to capture people's interest. Therefore, consumers are more likely to be attracted by emotional appeal advertisements of green product and give more optimistic comments on them. Emotional appeal advertisements can effectively grasp the real emotional needs of consumers through adding emotional attributes to products and catering to individual preferences to increase their recognition of products, and thus promote consumers voluntarily purchase relevant products. Based on the positive effect of emotional appeal advertisements, this study focuses on emotional appeal to explore its effect on consumers' green purchase behaviors.

Scholars often use the emotion dichotomy, which divides emotion into negative and positive dimensions according to the experience structure (Watson D, 1985; Watson D et al., 1999). Wang (2015) adopted qualitative research approach and sorted out the raw materials of the in-depth interviews. He found environmental emotion has dual factors (both positive and negative) and six dimensions, in which positive environmental emotions including the feeling of loving the environment, admiring and being proud of the green behavior. In the category of the feeling of loving the environment contained initial concept related to cherishing and yearning etc. Positive emotions are a series of positive feelings, including enthusiasm, gratitude, excitement, happiness, pride, etc. (Qiu, 2008). Meneses (2010) et al. conducted a special study on emotion, and the results showed that positive emotion could increase consumers' intrinsic motivation to purchase products, and the driving effect of positive emotional factors is significantly greater than negative emotional factors. According to the research results of scholars, the influence of different emotions on consumers' purchase behavior is quite different. Therefore, this paper studies two specific dimensions (emotions towards a better environment and towards the appropriate individual environmental behavior) and four positive emotional appeals as the starting point. The former includes the cherishing and yearning appeal, which respectively represent the appreciation of the present beautiful environment and the expectation of the future beautiful environment. The latter includes the proud and admiring appeal, which respectively represent the pride in one's own appropriate environmental behavior and the appreciation of others' appropriate environmental behaviors.

Fredrickson (1998) proposed broaden-and-build model of positive emotion theory and demonstrated the specific functions of positive emotion. It points out that emotion is closely related to corresponding behaviors, and defines such behaviors generated by emotions as specific behavioral tendencies, including avoidance and proximity. In addition, positive emotions have a positive effect on an individual's thoughts and actions. Based on this theory, it is not only consumers' positive emotion which has an expansive influence on their thinking and specific behavioral tendency –green purchase behavior, but also has a positive and long-term impact on their future cognition and behavior. Furthermore, Mehrabian and Russell (1974) proposed the theory of " Stimulus - Organic - Response " (SOR theory for short). In theory, stimulus was regarded as a kind of external influence, through a series of psychological response process, eventually, individuals would produce a kind of inner or outer behavioral responses. The intrinsic reaction is often characterized by the recipient's attitude or intention, and the external behavioral response is featured as close to or avoidance behavior. Based on above theory, four positive emotional appeals videos were designed to stimulate consumers, changing their psychological state, and thus having an impact on the external behavioral response of individual green purchases.

## **2.1 Direct effects**

Fredrickson (1998) proposed the broaden-and-build model of positive emotion theory, which believes that positive emotion can affect individual's psychological state, triggering individual's pleasure and then changing his thought. Under the influence of positive emotions, individual's brain will issue more positive instructions, and the cognitive level will be accordingly improved, thus remarkably enhancing the possibility of the corresponding behavioral tendency. Stimulated by positive emotional appeals, therefore, the brains will naturally make more positive reactions. Moreover, people tend to believe their green purchase behavior helps to alleviate environmental pollution and reduce the social pressure. They tend to regard themselves as environmentally responsible, being more inclined to contribute to the improvement of the ecological environment. In other words, in a positive emotional state, consumers' perceived green value and perceived green responsibility become more active. Besides, under different positive emotional appeals, consumers make different responses. The sense of cherishing is a positive emotion towards the present beautiful environment, while the sense of yearning is a positive emotion towards the future better environment. It is common sense that yearning appeals bring more expectations and motivation than cherishing, resulting in a stronger perceived green value and perceived green responsibility. Proud is a positive feeling towards one's own appropriate environmental behavior, and admiring is a feeling of appreciation for the other's appropriate environmental behavior. Although both proud and admiring appeal bring positive psychological experience to consumers. It is admitted that other's proper behavior no doubt set a good example effect for individuals, so we suggest that admiring appeal generate stronger perceived green value and perceived green responsibility than proud appeal. Hence, we propose the following:

H1: Different types of positive emotional appeals have different positive effects on consumers' perceived green value.

H1a: Compared with the cherishing appeal, yearning appeal has more positive effects on the consumers' perceived green value.

H1b: Compared with the proud appeal, admiring appeal has more positive effects on the consumers' perceived green value.

H2: Different types of positive emotional appeals have different positive effects on consumers' perceived green responsibility.

H2a: Compared with the cherishing appeal, yearning appeal has more positive effects on the consumers' perceived green responsibility.

H2b: Compared with the proud appeal, admiring appeal has more positive effects on the consumers' perceived green responsibility.

Liu (2015) believed positive emotions have the role in expanding people's thoughts and actions, having a relatively lasting influence on individuals. The expansion role is positively correlated with the intensity of positive emotions, that is, the stronger the positive emotions are, the corresponding greater expansion role on the individual's thought and actions. Moreover, scholars found that there is a significantly positive correlation between ecological consumption emotion and ecological consumption behavior through empirical studies. Individuals' ecological consumption behavior tendency is increasing with the emotions for ecological environment and social resources (Lau and Chan, 2000). In addition, the SOR model demonstrates the external stimuli acting on the organic body will produce corresponding responses, and then affect the individual to make relevant behavioral decisions. Therefore, under the stimulation of positive emotions, individuals' thinking is remarkably strengthened, and they are more inclined to explore new things and pursue more proper behavior, eventually promoting their practice of green purchase behavior.

Different types of positive emotional appeals have different effects on consumers' green purchase behavior. As far as the positive emotions for the environment are concerned, the cherishing appeal motivates individuals to adopt green purchase behaviors to maintain the beautiful environment they currently have. In contrast, the yearning appeal is an individual's expectation and desire for a better environment in the future. The imagined brilliant environment is a more powerful incentive for individuals to make continuous efforts and pursuit. As a result, people spare no effort to accomplish the established goal, and their willingness to practice green purchase behavior naturally becomes stronger. As far as the positive emotions for the individual's environmentally appropriate behavior are concerned, compared with self-recognition or self-satisfaction, recognition and appreciation from others are more effective in motivating individuals to practice proper behaviors. Furthermore, people often voluntarily learn from people or behaviors they admire sincerely. Compared with the recognition of their own environmental protection behaviors, the individual's appreciation of others' contribution to the improvement of the environment has more stimulus for them to follow their example and practice the same green purchase behavior. Hence, we propose the following:

H3: Different types of positive emotional appeals have different positive effects on consumers' green purchase behavior.

H3a: Compared with the cherishing appeal, yearning appeal has more positive effects on the consumers' green purchase behavior.

H3b: Compared with the proud appeal, admiring appeal has more positive effects on the consumers' green purchase behavior.

## 2.2 Mediating effects

According to SOR theory, individuals naturally produce specific emotions and mental states under the positive emotional stimulation, eventually making corresponding behavioral responses. Therefore, when emotional appeal is stimulated, consumers' perceived green value and perceived green responsibility tend to increase and give impetus to green purchase behavior.

Perceived green value refers to individual's subjective evaluation for the effectiveness of green products or green consumption. Liu et al. (2020) found that perceived green value plays an intermediary role between the target framework and green consumption intention. Scholars pointed out that consumers' perceived green value is significantly correlated with individuals' ecological attitudes and green consumption behaviors (Berger et al., 1992). For example, consumers believe that their green purchase behavior have a positive effect on the improvement of the ecological environment, which represents the perceived green value is strong. At that time, consumers attempt to practice more green purchase behaviors conducive to environmental protection, which plays a further strengthening role on the perceived green value. Besides, Hines (1987) argued that the level of consumers' perceived green value would affect the degree to which they adopted pro-environmental behaviors. In addition, the results of Maloney et al. (2014) indicated that consumers' perceived value was positively correlated with green purchase behavior. Hence, we propose the following:

H4: The relationship between positive emotional appeals and green purchase behavior is significantly mediated by consumers' perceived green value.

Lao (2013) defined green consumption as a responsible and sustainable consumption behavior that individuals make efforts to protect the natural environment so as to minimize the negative impact on the environment in the consumption process. As a crucial internal driving factor, environmental responsibility somehow determines the way people purchase behave. In face of green products, for example, consumers with a higher sense of environmental responsibility tend to have a higher purchase intention and be more actively in implementing green purchasing

behaviors. Hines et al. (1987) proposed responsible environmental behavior model, which demonstrates a strong correlation between the individual's sense of responsibility and the environmental behavior. Compared with the individuals without the sense of environmental responsibility, the individuals with the sense of environmental responsibility usually showed more environmentally responsible behaviors, because it indirectly affected the individual's environmental behavior. Responsibility not only affects consumers' green purchase behavior, but also mediates the relationship between consumers' psychological factors and purchase behavior. Wang and Zheng(2011), in the process of exploring the path of psychological awareness factors to consumers' ecological civilization behavior, found that sense of responsibility can be used as an mediating variable between psychological factors and ecological civilization behavior. The result showed that resource and environment emotions influence consumers' sense of green responsibility, thus affecting individuals' ecological civilization behavior. Hence, we propose the following:

H5: The relationship between positive emotional appeals and green purchase behavior is significantly mediated by consumers' perceived green responsibility.

### **2.3 Moderating effects**

Arousal degree is the individual's perception of their own activation degree, which describes the activation degree of the individual's emotional state. It is a continuous change process, and it refers to the individual's state of excitement from lethargy. The awakening of the individual state is a great preparation for the subsequent behavior. Some scholars found that emotional arousal can significantly moderate individuals' internal perception state (Stefanucci et al., 2009). Based on experimental research, Tang et al. (2019) found that emotional titer had an impact on individual behaviors, and the effect was greater under higher arousal. Wang (2007) pointed out different degrees of arousal moderate the effect of emotion on memory. The influence of individual emotion on green purchase behavior is different under different degrees of arousal. Furthermore, Lewis et al. (2007) believed that there is a high correlation between emotional titer and emotional arousal, and individual thinking activity varies according to the degree of stimulus generated by emotional vocabulary. When awakened by the positive emotional appeal video, the corresponding positive emotional arousal degree is higher, so the individuals' environmental responsibility will be more intense. Individuals initiatively create more value for the ecological environment, accordingly, be more actively involved in green purchase. Hence, we propose the following:

H6a: Emotional arousal moderates the influence of positive emotional appeals on perceived green value.

H6b: Emotional arousal moderates the influence of positive emotional appeals on perceived green responsibility.

H6c: Emotional arousal moderates the influence of positive emotional appeals on green purchase behavior.

Consumers' psychological factors and situational factors exerts a great impact on the green purchase behavior. Among multiple situational factors, individual values occupy an important position. Thøgersen et al. (2002), for example, found that values are the distal determinants of behavior, and they need to function through adjacent variables, such as perceived behavioral effectiveness. It is common sense that China has a long history of traditional culture. Values such as Taoism, Buddhism and Confucianism have a subtle influence on individuals' behaviors, shaping their unique ways of thinking and decision-making. Confucianism, the most representative of values in China, has the most profound and extensive influence (Pan et al., 2009). The middle doctrine is the core of Confucianism, embodying all Confucian values and virtues. It is not only a principle of dealing with affairs (Zhang and Jin, 1999), but also a dialectical way of thinking that rejects extreme and advocates timely adaptation (Yang, 2009). The middle doctrine is an important manifestation of Chinese traditional cultural values and a crucial component of our national social psychology (Du, 2014), which make a far-reaching consequence on individual cognition and behavior. Gong et al. (2019) hold the opinion that consumers are deeply influenced by Chinese specific cultural background, verifying that the middle doctrine observably moderates the relationship between flow experience and impulse consumption. Therefore, stimulated by positive emotions, the individuals who have a higher level of middle doctrine are likely to pay more attention to the harmony between man and nature, and viewing problems as a whole so as to pursue the balance of personal interests and social interests. It is those people who are willing to undertake the social obligations. Furthermore, they even think their green behavior helps notably enhance the natural environment, thus being more active in practicing green purchase behavior. Hence, we propose the following:

H7a: The middle doctrine moderates the influence of positive emotional appeals on perceived green value.

H7b: The middle doctrine moderates the influence of positive emotional appeals on perceived green responsibility.

H7c: The middle doctrine moderates the influence of positive emotional appeals on green purchase behavior.

Based on the broaden-and-build model of positive emotion theory, consumer behavior model and emotional arousal theory, this study deeply explores the relationship and mechanism between the positive emotional appeals and green purchase behavior, focusing on comparing

differences in stimuli effects of different types of positive emotions, at the same time investigating the moderating role of emotional arousal and middle doctrine.

The conceptual model of this study is shown in Figure 1 in which the solid line represents the influence effect and the dotted line represents the moderating effect. Positive emotional appeal is the explanatory variable, perceived green value and perceived green responsibility are mediating variables, emotional arousal and middle doctrine are moderating variables, and green purchase behavior is outcome variable.

### 3. Method

#### 3.1 The experiment design

Energy-saving refrigerators and air conditioners are often used as products in previous green consumption experiment because of their green environmental properties. After searching in various ways, this study chose a relatively novel green product – green power certificate, which can fully reflect the consumer's sense of responsibility, as the experimental product. The green certificate is an electronic certificate for the green electricity produced by power generation enterprises with a unique code identification. Governments, enterprises and individuals all can subscribe for green certificate on the information platform. On the one hand, the green certificate trading system can guide and regulate the priority consumption of renewable energy power, effectively improve the consumption of green power, reduce the speed of thermal power generation, promote the efficient use of renewable energy, which is of great significance to the governance of environmental pollution. On the other hand, China's renewable energy subsidy cumulative gap is large and unsustainable, so the introduction of green certificate system can establish a long-term mechanism for the development of renewable energy. To sum up, now that subscribing the green certificate is a kind of green purchase behavior, regarding the green certificate as an experimental product in this study is scientific and feasible.

In this study, four self-made videos (picture + text + voice + background music) were used as stimulation materials, which had a stronger sense of substitution than simple text description and enabled the respondents to have a deeper understanding of the experimental materials in a more vivid and accurate form. Each video has a short paragraph of text in front of the simple and popular introduction of green certificate, and then follow closely to reflect the corresponding feelings of green video.

By reviewing the existing relevant literature and drawing on the research experience of relevant scholars, this paper summarizes the measurement items of consumers' perceived green value, perceived green responsibility, green purchase behavior, emotional arousal, and middle doctrine in this study. Likert seven-point scale was used to measure all the items in the questionnaire. The specific measurement items of each variable are shown in Table 1 below.

Table 1 Measurement items of each variable.

Measured variables	Measurement item	Resource
<b>Perceived green value</b>	Subscribing to green electricity certificate helps to save fossil energy and improve energy structure.	Venkatesh[2003]
	Subscribing to green electricity certificate helps to cut carbon emissions and mitigate climate change.	
	Subscribing to the green electricity certificate helps to reduce air pollution and improve air quality.	
	Subscribing to the green electricity certificate helps to promote clean energy and sustainable development in China.	
<b>Perceived green responsibility</b>	I have the responsibility to do my best to save resources and protect the environment.	Abrahamse and Steg [2009]
	No matter what others do, I will save resources and protect the environment.	
	Although my personal power is very small, I also want to contribute to environmental protection.	
	In order to save resources and protect the environment, we should try our best to use clean energy.	
<b>Green purchase behavior</b>	I would like to collect and learn more about subscribing to the green electricity certificate.	Darley etc.[1993], Dodds[1991]
	I am willing to subscribe to the green electricity certificate.	
	I would like to recommend my friends and relatives to know and subscribe to the green electricity certificate.	
	This video will prompt me to subscribe to the green electricity certificate.	
<b>Emotional arousal</b>	When I watch environmental documentaries, my usual gut feeling is excited.	Design by oneself
	When I see green ads, my usual gut feeling is excited.	
	When I see environmental protection news, my usual inner feeling is excited.	
<b>The middle doctrine</b>	Everything should be kept in line and I don't go to extremes.	Yu Pan etc.[2014]
	Harmony is the most important thing. Try not to conflict with others.	
	When you make achievements, you should try to remain humble and low-key.	
	When you disagree, you should find a compromise acceptable to all.	

### 3.2 Sample description

In this study, the positive emotional appeal videos and the measurement questionnaire were edited into four online links and randomly distributed to the respondents through the Internet. The experiment was conducted through respondents watching the video and filling the corresponding questionnaire, the period of which is August to September 2018. After eliminating the invalid questionnaires, a total of 400 valid questionnaires were collected in this experiment, 100 for each group, and the sample effective rate was 90.7%. In these 400 valid questionnaires, 48.2% were male, and 51.8% were female. Age distribution is generally below 44 years old, accounting for 98.4% of the total sample size. Education is mainly concentrated in the undergraduate degree and above, because they were more capable of understanding the study and more willing to participate in the experiments.

### 3.3 Controllability test

First, we test the manipulation of four emotional awakening videos. The respondents watched four emotional awakening videos, and then they fill in the first four questions of the questionnaire. We test the validity of video by the scores of the items (7= totally agree, 1= totally disagree). The items include: (1) After watching video, I will cherish the beautiful ecological environment more. (2) After watching video, I will be more yearning for a better ecological environment in the future. (3) If I subscribe to the green power certificate, I will be proud of my behavior. (4) If someone else subscribes to the green power certificate, I will admire his behavior.

Single factor analysis of variance by 400 samples data, we found that the average score of the cherishing appeal in item (1) was significantly higher than that of other emotions, the average score of the yearning appeal in item (2) was significantly higher than that of other emotions, the average score of the proud appeal in item (3) was significantly higher than that of other emotions, the average score of the admiring appeal mean in item (4) was significantly higher than that of other emotions. This indicates that the experiment of different positive emotional appeals in this study was successfully manipulated.

### 3.4 Reliability and validity test

In this paper, the internal reliability index was used to measure the reliability of the scale. Cronbach's alpha value of all variable items was greater than 0.8, and most of them were greater than 0.9, indicating the consistency and stability of the measurement questionnaire. In addition, through the factor analysis of consumers' perceived green value, perceived green responsibility, green purchase behavior, emotional arousal, and middle doctrine, KMO value of each variable is greater than 0.7, the significance level of Bartlett's spherical test is 0.000. Therefore, it shows that the questionnaire used in the formal experiment has good reliability and validity.

## 4. Results

### 4.1 Main effect of positive emotional appeal

According to the results of correlation test, consumers' perceived green value, perceived green responsibility, green purchase behavior, emotional arousal and middle doctrine were highly correlated at the test level of 0.01. Under four different types of positive emotional appeals, the mean comparison of different positive emotions is displayed in Figure 2. As can be seen in Figure 2, compared with the other three emotions, the yearning appeal leads to the highest degree of perceived green value, perceived green responsibility and green purchase behavior.

Then we classified four kinds of positive emotional appeals into two specific dimensions, and conducted independent sample T test in different groups, the results of which are shown in Table below. It can be seen from Table 2 that there is no significant difference in the positive effects of the cherishing and yearning appeals on consumers' perceived green value, but there is a significant difference in the positive effects on consumers' perceived green responsibility and green purchase behavior, that is, compared with the cherishing appeal, the yearning appeal has a more positive impact on consumers' perceived green responsibility and green purchase behavior. Table 2 showed that the results of the proud and the admiring group are similar to those of the cherishing and yearning group, that is, there is no significant difference in the positive effects of the proud and admiring group on consumers' perceived green value, but there is significant difference in the positive effects on consumers' perceived green responsibility and green purchase behavior, that is, compared with the proud appeal, the admiring appeal has a more positive impact on consumers' perceived green responsibility and green purchase behavior. Therefore, H1, H1a and H1b are invalid, while H2, H2a, H2b and H3, H3a and H3b are accepted.

Table 2 Variables' independent sample T test.

Group	Var.	F	Sig.	t	DF	Sig.	MD	SD	95% confidence interval	
									The lower limit	The higher limit
1	PGV	1.742	0.188	-1.331	198	0.185	0.158	-0.521	0.101	1.742
	PGR	0.064	0.800	-3.067	198	0.002	0.105	-0.530	-0.115	0.064
	GPB	8.300	0.004	-2.075	198	0.039	0.165	-0.668	-0.017	8.300
2	PGV	1.570	0.212	-0.659	198	0.510	0.172	-0.452	0.226	1.570
	PGR	8.986	0.003	-2.153	198	0.033	0.137	-0.563	-0.025	8.986
	GPB	5.689	0.018	-4.096	198	0.000	0.183	-1.106	-0.387	5.689

Note: PGV =Perceived green value, PGR=Perceived green responsibility, GPB=Green purchase behavior, DF= degrees of freedom, MD= mean difference, SD=Standard error difference.

Group 1: the cherishing and the yearning group. Group 2: the proud and the admiring group.

### 4.2 Mediating effect test

Preacher and Hayes' Bootstrap method was used to test the mediating effect of perceived green value and perceived green responsibility. Four positive emotions were divided into two groups according to different dimensions to test the mediating effect. The "positive emotional appeal" was transformed into dummy variables. One group took the cherishing appeal as the control, transforming cherishing into 0 and yearning into 1. In the other group, we transform proud into 0 while admiring into 1. Through the analysis with the PROCESS 3.1, the corresponding model path coefficient diagram is shown in Figure 3 and Figure 4, and the mediating effect is shown in Table 3

Table 3 Mediating effect of theoretical model.

Explanatory variables	Mediator	Coefficient	S.E.	LLCI	ULCI
Cherishing-Yearning group	The direct effect without the mediator	0.095	0.098	-0.098	0.289
	PGV	0.146	0.110	-0.070	0.366
	PGR	0.101	0.048	0.024	0.208
Proud-Admiring group	The direct effect without the mediator	0.553	0.117	0.323	0.783
	PGV	0.060	0.092	-0.124	0.240
	PGR	0.134	0.067	0.010	0.273

Note: S.E. = Standard error, LLCI=Lower limit of the confidence interval, ULCI = Upper limit of the confidence interval; PGV =Perceived green value, PGR=Perceived green responsibility.

As for the cherishing-yearning group, according to Table 3, the confidence interval of perceived green value contains 0, indicating that perceived green value has no significant mediating effect between positive emotional appeal and green purchase behavior. The confidence interval of perceived green responsibility does not contain 0, indicating that perceived green responsibility plays a mediating role between positive emotional appeal and green purchase behavior. In the absence of mediating variables, the confidence interval of the direct effect of positive emotional appeals on green purchase behavior contains 0, indicating that the direct effect is not significant. Therefore, perceived green responsibility plays a complete mediating role between positive emotional appeal and green buying behavior. By analyzing the proud-admiring group in the same way, it can be found that the mediating effect of perceived green value is not significant, while the mediating effect of perceived green responsibility is significant. In the absence of mediating variables, the confidence interval of the direct effect of positive emotional appeal on green purchase behavior does not include 0, indicating that the direct effect is significant, which proves that perceived green responsibility plays a partial mediating role in the path of positive emotional appeal affecting green purchase behavior. In conclusion, H4 is proved to be false and H5 is accepted.

#### 4.3 Moderating effect test of emotional arousal

In this section, we test the moderating effect of the two moderators, which are emotional arousal and middle doctrine, on “positive emotional appeals-perceived green value”, “positive emotional appeals-perceived green responsibility” and “positive emotional appeals-green purchase behavior”, adopting PROCESS 3.1 for analysis. The results are displayed in Table 4, which showed that coefficients a31, a32 and c3' are not significant under all circumstances. It turns out that significant moderating effects of emotional arousal and the middle doctrine on the excepted paths above do not exist ( $p < 0.01$ ). That H6a~H6b~H6c, H7a~H7b~H7c are all proved to be false.

Table 4 Moderating effect test of emotional arousal.

Group	Moderator	Antecedent	PGV			PGR			GPB					
			Coe.	S.E.	P	Coe.	S.E.	P	Coe.	S.E.	P			
1	EA	PEA	a <sub>11</sub>	-0.221	0.551	0.688	a <sub>12</sub>	-0.386	0.363	0.289	c <sub>1</sub> '	0.425	0.355	0.232
		PGV	-	-	-	-	-	-	-	-	b <sub>1</sub>	0.621	0.058	0.000
		PGR	-	-	-	-	-	-	-	-	b <sub>2</sub>	0.207	0.088	0.019
		EA	a <sub>21</sub>	0.366	0.071	0.000	a <sub>22</sub>	0.209	0.047	0.000	c <sub>2</sub> '	0.246	0.049	0.000
		PEA*EA	a <sub>31</sub>	0.069	0.104	0.507	a <sub>32</sub>	0.128	0.068	0.063	c <sub>3</sub> '	-0.063	0.067	0.353
	MD	PEA	a <sub>11</sub>	0.891	0.688	0.197	a <sub>12</sub>	1.125	0.509	0.028	c <sub>1</sub> '	-0.031	0.609	0.960
		PGV	-	-	-	-	-	-	-	-	b <sub>1</sub>	0.637	0.070	0.000
		PGR	-	-	-	-	-	-	-	-	b <sub>2</sub>	0.272	0.094	0.004
		MD	a <sub>21</sub>	0.900	0.078	0.000	a <sub>22</sub>	0.562	0.058	0.000	c <sub>2</sub> '	0.116	0.092	0.210
		PEA*MD	a <sub>31</sub>	-0.124	0.115	0.281	a <sub>32</sub>	-0.141	0.085	0.099	c <sub>3</sub> '	-0.024	0.101	0.811
2	EA	PEA	a <sub>11</sub>	-0.096	0.593	0.872	a <sub>12</sub>	0.746	0.456	0.104	c <sub>1</sub> '	1.076	0.410	0.009
		PGV	-	-	-	-	-	-	-	-	b <sub>1</sub>	0.460	0.062	0.000
		PGR	-	-	-	-	-	-	-	-	b <sub>2</sub>	0.277	0.080	0.006
		EA	a <sub>21</sub>	0.429	0.081	0.000	a <sub>22</sub>	0.435	0.062	0.000	c <sub>2</sub> '	0.377	0.062	0.000
		PEA*EA	a <sub>31</sub>	0.016	0.114	0.887	a <sub>32</sub>	-0.111	0.087	0.204	c <sub>3</sub> '	-0.110	0.078	0.159
	MD	PEA	a <sub>11</sub>	-0.624	0.677	0.358	a <sub>12</sub>	-0.008	0.594	0.989	c <sub>1</sub> '	0.248	0.632	0.696
		PGV	-	-	-	-	-	-	-	-	b <sub>1</sub>	0.443	0.076	0.000
		PGR	-	-	-	-	-	-	-	-	b <sub>2</sub>	0.404	0.086	0.000
		MD	a <sub>21</sub>	0.744	0.078	0.000	a <sub>22</sub>	0.539	0.069	0.000	c <sub>2</sub> '	0.159	0.090	0.079
		PEA*MD	a <sub>31</sub>	0.113	0.115	0.325	a <sub>32</sub>	0.042	0.101	0.675	c <sub>3</sub> '	0.054	0.107	0.617

Note: Coe. = Coefficient, S.E. = Standard error, P=P value, PGV =Perceived green value, PGR=Perceived green responsibility, GPB=Green purchase behavior; PEA=Positive emotional appeal, EA= Emotional arousal, MD= Middle doctrine.

Group 1: cherishing vs. yearning. Group 2: proud vs. admiring.

## 5. Discussion

The aim of this study was to explore the influence effect and mechanism of positive emotional appeals on green purchase behavior, enriching the research of positive emotions on green purchase behavior. At present, scholars' researches have gradually shifted from the cognitive to the emotional level to seek the influencing factors of green purchase behavior, nevertheless, most of which are lack of relevant empirical studies. Based on the results of previous qualitative research and the direction of national policies, it is the first time that creatively introduces the two specific positive emotions into study, including the cherishing and the yearning. At the same time, combined with the Chinese traditional cultural background, this paper incorporated middle doctrine into this theoretical model as a moderating variable, which is helpful to promote the localization of positive emotion and green purchase behavior in the field of consumer behavior.

In this study, we discovered that the diverse types of positive emotional appeals exerted different influence on consumers' perceived green responsibility and green purchase behavior. Compared with the cherishing and proud appeal, the yearning and admiring appeal are more effective in promoting the perceived green responsibility and green purchase behavior. This conclusion confirms Fredrickson's (1998) broaden-

and-build model of positive emotion theory. However, it is on the contrary to the results studied by Wang (2017). He found that there is no difference between the proud and the admiring in the green purchase decision-making process.

We found that under the state of positive emotion, consumers' perceived green responsibility positively affects their green purchase behavior, and it can significantly mediate the relationship between positive emotional appeals and green purchase behavior. This finding again validates the responsible environmental behavior model proposed by Hines et al. (1986). Furthermore, this is also consistent with the research conclusions of domestic and foreign scholars Scott et al. (2000), Chen (2009), Zhang (2013), Peng et al. (2014) that the sense of responsibility notably improves green consumption. The sense of responsibility reflects the individual's internal quality, as the driving factor, affecting the individual's behavior. The individual internalizes the sense of ecological responsibility in the mind, and then obtains the embodiment from the individual's ecological behavior. Under the stimulation of positive emotional appeal, individuals perceive ecological responsibility and externalize it through ecological behavior.

Finally, both emotional arousal and middle doctrine can't distinctively moderate all the expected paths (positive emotional appeals-perceived green value, positive emotional appeals-perceived green responsibility, positive emotional appeals-green purchase behavior). That is to say, when consumers are in different degree scenarios of emotional arousal or middle doctrine, there is no significant difference in the above paths. As a matter of fact, previous research haven't tested the moderating effect of emotional arousal and middle doctrine on the positive emotion so far. Therefore, the conclusion of this study is of certain theoretical value, worthy of further study by relevant scholars.

## 6. Conclusions And Policy Implications

In short, different types positive emotional appeals have distinct effect in improving perceived green value, perceived green responsibility, and green purchase behavior. Perceived green responsibility has significant mediating effect on the relationship between positive emotional appeals and green purchase behaviors. However, perceived green value has no mediation effect. Emotional arousal and middle doctrine are not qualified moderators in any situations.

The research conclusion provides valuable marketing inspiration and policy management experience for both enterprise managers and government policymakers. Firstly, make full advantage of positive emotional appeal to guide consumers to green purchase sustainably. For enterprise, in the process of promoting the products, it is of great significance to add positive emotional attributes to capture the consumer's inner demand and arouse their inner resonance, guiding them to buy. At the same time, the government is supposed to attach prime importance to cultivating and enhancing positive emotional attainments and strengthen their recognition of ecological and environmental behaviors, so as to encourage individuals strive for a green ecological environment and actively participate in the sustainable green purchase. Secondly, the cherishing and admiring appeals should be fully valued. To be specific, enterprises can incorporate beautiful ecological environment pictures or videos into the advertisements. In addition, short films, stories or music can be broadcast to publicize individuals' green purchase behavior, in order to infect more individuals to join the team for affirming and appreciating others' environmental protection behavior. Finally, emphasize the role of green responsibility to enhance consumers' inner awareness of ecological environmental protection. When making product marketing plans, enterprises should not only comprehensively introduce the unique performance of products, but also integrate some elements which can awaken consumers' awareness of ecological responsibility, urging consumers to be willing to purchase green products.

It is undeniable that there still exist several limitations in this study. Firstly, we chose the green power certificate as the experimental subject, which is an intangible product, so it is less directly to understand than material object. Secondly, there are some interfering factors in the experimental environment, and measuring the variables in the form of questionnaire is likely to produce certain deviation, which reduces the accuracy of the conclusion. Finally, the research is lack of time variable and we didn't take long-term consumer green purchase behavior into account. Therefore, in the future, the black box of positive emotional appeal for green consumption behavior can be further explored.

## Declarations

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### Availability of data and materials

The datasets generated and/or analysed during the current study are available in the [https://figshare.com/articles/dataset/positive\\_emotional\\_appeals\\_data\\_set/14691483](https://figshare.com/articles/dataset/positive_emotional_appeals_data_set/14691483)

### Authors' contributions

Jianming Wang and Jing Bao contributed to the initial design of the research project on which this manuscript is based, all authors contributed to refinement of the design and research that is currently underway in support of this. Jianming Wang drafted the manuscript and Zhengxia He, Jianguo Wang and Jian Gao contributed to revisions. All authors read and approved the final manuscript.

### Competing interests

The authors declare that they have no competing interests.

### Consent for publication

Not applicable.

### Ethics approval and consent to participate

Ethics approval for research that is being undertaken as part of this study has been granted by Academic Ethics Committee of the Ministry of Science, Technology and Industry of Jiangsu Normal University, approval number 36[2009]. All methods in our study were carried out in accordance with relevant guidelines and regulations issued by Academic Ethics Committee of the Ministry of Science, Technology and Industry of Jiangsu Normal University. Informed consent was obtained from all subjects and/or their legal guardian(s) in the process of questionnaire survey.

### Authors information

<sup>1</sup>School of Business Administration, Zhejiang University of Finance and Economics, Hangzhou, China, 210037; E-mail: sjwjm@zufe.edu.cn. <sup>2</sup>Business School, Jiangsu Normal University, Xuzhou, China, 221116. E-mail: hezhengxia79@163.com. <sup>3</sup>School of Business Administration, Zhejiang University of Finance and Economics, Hangzhou, China, 210037; E-mail: cancou1006@hotmail.com. <sup>4</sup>School of Business Administration, Zhejiang University of Finance and Economics, Hangzhou, China, 210037; E-mail: 466629563@qq.com. <sup>5</sup>School of Business Administration, Zhejiang University of Finance and Economics, Hangzhou, China, 210037; E-mail: 17469241@qq.com.

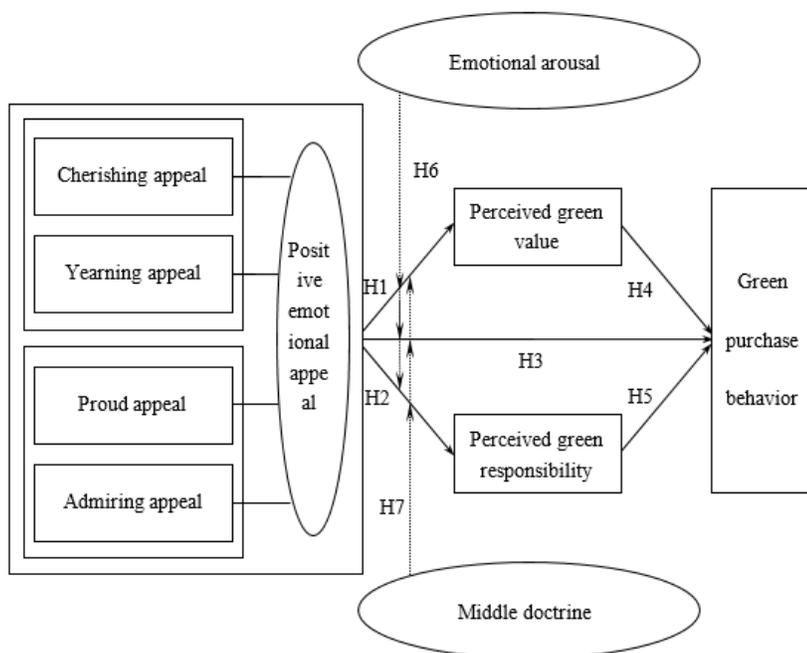
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## Figures



**Figure 1**

Conceptual model of this study

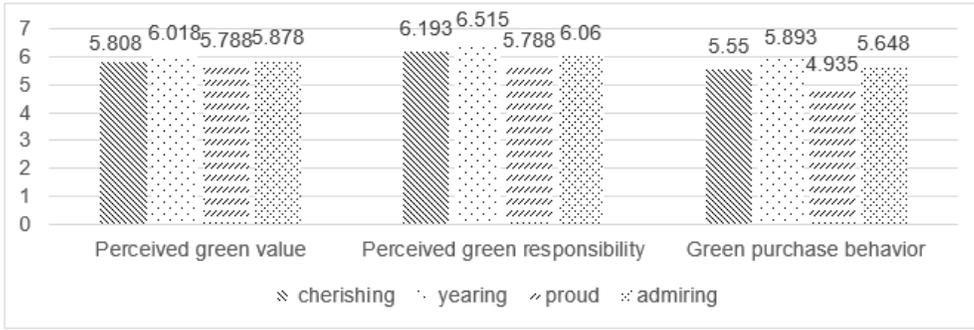


Figure 2

The mean comparison of different positive emotions.

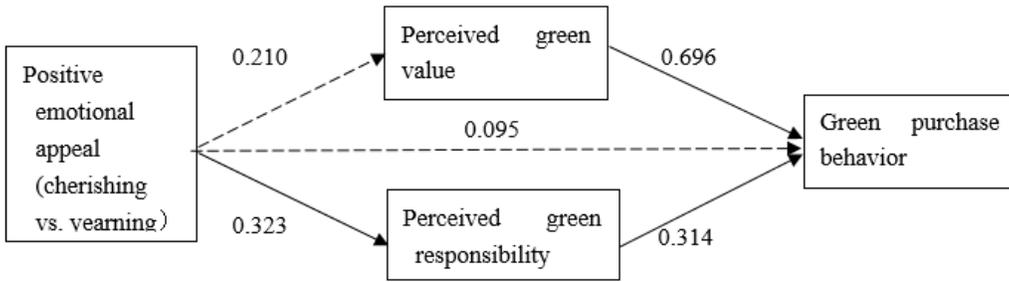


Figure 3

Mediating effect test (cherishing vs. yearning).

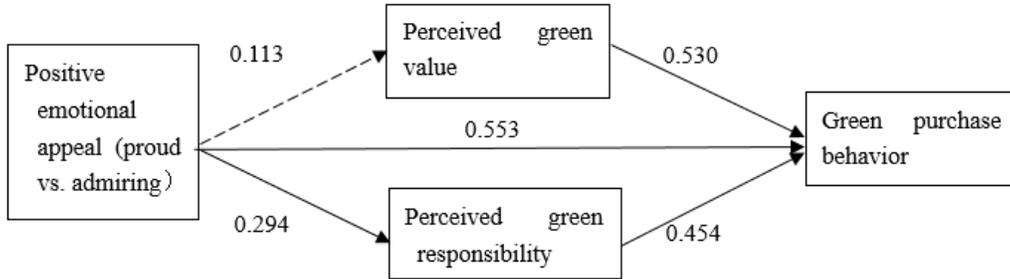


Figure 4

Mediating effect test (proud vs. admiring).