



A study on the influence of green advertising design and environmental emotion on advertising effect

Tsai-Feng Kao^a, Yi-Zhan Du^b

^a School of Arts, Minnan Normal University, Fujian, China

^b School of Education Science, Minnan Normal University, Fujian, China

ARTICLE INFO

Article history:

Received 24 February 2019

Received in revised form

21 June 2019

Accepted 4 September 2019

Available online 5 September 2019

Handling editor: Dr Sandra Caeiro

Keywords:

Self-reference

Argument quality

Green design

Green marketing

Consumer

ABSTRACT

In the discussion on advertising effect, the self-reference effect and argument quality are regarded as the factors affecting consumption judgment. This research aims to discuss the advertising effect of advertising design and the environment-protecting emotion of graphic configuration of self-reference and argument quality, as well as their effect on advertising effect. With the use of the quasi-experimental research method, this research adopts the Between Subject Factorial Design of advertising design (with self-reference and strong arguments, with self-reference and weak arguments, with no self-reference and strong arguments, and with no self-reference and weak arguments), and environment-protecting emotion (positive and negative) is adopted, with a total of 4 experimental situations, in order to manipulate the variables and measure the advertising effect. The results find that the advertising design with self-reference and strong argument has the best advertising effect; positive moral emotion and social emotion have better advertising effect; and under the action of emotion, the subjects' preference for advertising design will also change. This research is helpful to establish and optimize the green advertising design to understand the relationship between factors affecting the advertising effect and the benefits of green marketing.

© 2019 The Author. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

As public concern regarding sustainable development has reached its peak, the promotion and design of sustainable production and consumption are of great significance (Ülkü and Hsuan, 2017). Under this context, the number of companies developing green products is growing rapidly, and consumers are more and more interested in such products. Therefore, only by understanding green products and consumers' expectations can good green marketing strategies be established (Dangelico and Vocalelli, 2017) as a part of the green campaign of consumers for environmental protection. Green advertising is one of the methods marketers use to position their products as green products in the minds of consumers (Eren-Erdogmus et al., 2016). Green advertising affects individual attitudes towards advertising, and their intention to be friendly to the environment (Kim et al., 2019). Researchers generally agree that green advertising plays a role in marketing; nevertheless, regarding the effectiveness of green requirements in

advertising, the communication strategies remain unclear, and there is no comprehensive theory of green requirements (Kong and Zhang, 2014). Therefore, green advertising in marketing could be combined with other marketing strategies to seek cooperation to achieve social goals (Wiener and Doescher, 1991).

Among the marketing strategies favored by consumers, connecting consumers' past memories and experiences through advertising clues to produce advertising effect is called self-reference (Meyers-Levy and Peracchio, 1996). Self-reference information, with its rich and strong coding process, has the advantage of better recall and facilitating memory, as compared with other-reference information. In the aspect of the human information processing system, its operation mode deeply participates in, processes, interprets, and recalls personal past information, which affects the manifestation of personal attitudes (Rogers et al., 1977). Self-reference encourages consumers to receive advertising information, which links brands or products to their personal past experiences and memories, in order to achieve the persuasion effect expected by the advertisements (Joan and Laura, 1996). In advertising, self-reference has positive effect, as it can make consumers produce positive advertising attitude or psychological simulation,

E-mail address: g9730808@gmail.com (T.-F. Kao).

and then, affect brand attitude (Chang, 2005; Escalas, 2004); therefore, it is very suitable to apply the concept of self-reference to advertising to improve advertising effect (Martin et al., 2007). In the discussion of advertising effect, another factor affecting advertising judgment is argument quality, which means the quality of the message received by an individual, that is, whether the message watched by the receiver is persuasive, effective, and relevant (Cacioppo et al., 1983). It has certain influence on consumers' advertising attitude, and is often discussed together with various forms of advertising or other influencing factors (Hautz et al., 2014; Pechmann and Esteban, 1994; Petty et al., 1981, 2001; Priester et al., 2004; Slater and Rouner, 1996). The issue of advertising arguments can be regarded as a factor affecting the consumption process; when individuals are exposed to product messages with different argument quality, they will have different consumption intentions (Park et al., 2007; Priester et al., 2004; Pechmann and Esteban, 1994). The higher the argument quality, the more helpful it is to meet the consumers' needs for information; on the contrary, a low-quality argument will be immediately questioned, resulting in an opinion of low credibility, and thus, will be regarded as untrustworthy. Generally, for complex, detailed, and effective arguments, content is regarded as the basic requirement that organizations should provide (Hautz et al., 2014), thus, the self-reference effect and argument content of advertising are both important factors affecting product advertising attitude and brand image. Therefore, this study intends to explore whether the effect of green product advertising increases under the influence of the self-reference effect and argument quality in marketing strategy.

Although scholars and marketers believe that green positioning is a key factor for the success of products and service markets, little attention has been paid to how green design affects consumer information processing, and its effectiveness (Hartmann and Apaolaza-Ibáñez, 2012). While green advertising is important, advertising alone cannot solve all the problems of green marketing. An important strategy to achieve green advertising is to determine the individual factors affecting consumer behavior. Marketing personnel must understand the characteristics of consumers who buy green products, and clarify the relationship between green advertising and purchase intention. Only in this way can it be helpful for practical actions on environmental protection (Khandelwal and Bajpai, 2013). Under rational circumstances, individual behavior can be judged by a theoretical framework; however, human's volitional control will be affected by various intrinsic factors, such as individual difference, emotions, and forgetting (Ajzen, 1991). Consumers' choice of purchase intention is not always the result of individual cognition, meaning many uncontrollable intrinsic factors will result in responses of consumption intention (Koenig-Lewis et al., 2014). Among them, emotions play an important role in people's behavior in the process of thinking and reaction, and can explain some of their non-spontaneous behavior more completely (Ajzen, 2011; Mellers et al., 1999). Emotion is a powerful variable that helps explain friendly environmental behavior or rejection. The types of emotions people generate about friendly environments include moral emotions, emotional affinity with nature, and ecological fear (Koenig-Lewis et al., 2014). In summary, in order to achieve the goal of green marketing, we should understand the influence of emotional type on the attitude formation process, as well as its position in the persuasion process.

At present, there are no studies that focus on argument quality or self-reference on the relationship between green product advertising design and emotions (Caudek, 2014; Chang, 2005; Escalas, 2004, 2007; Hautz et al., 2014; Pechmann and Esteban, 1994; Meyers-Levy and Peracchio, 1996; Yoon and Park, 2012; Zhang et al., 2014). Emotional researches include emotional types,

behavioral predictions, reactions etc. (Carrus et al., 2008; Koenig-Lewis et al., 2014; Perugini and Bagozzi, 2001; Pornpitakpan et al., 2017). According to the foregoing discussion, advertising plays a role in marketing; however, there is no relevant research about the effect of emotions on the changing mechanism of consumers' perceptions of advertising design types. Therefore, this study intends to explore the impact of consumers' environment-protecting emotions on the advertising design of marketing green products. The advertising design pattern uses the two important factors of self-reference and argument quality in marketing, in order to understand the advertising effect under the interactions between advertising design (self-reference and argument quality) and emotions. This research takes the studies of Escalas (2004) and Hautz et al. (2014) for methodological citation and discussion, while revising the concept of emotion, as proposed by Böhm (2003), Koenig-Lewis et al. (2014) and Ou and Verhoef (2017), to fit the research of green product advertising. Finally, this study could help to understand the influencing factors of consumers' judgment on green advertisements, and the changing mechanism of consumers' attitudes under the influence of emotions. The results of this study can be used as reference for future research of consumers' environmental emotions and the types of advertising design in green marketing, which is helpful for green marketing.

2. Theoretical background

2.1. Self-reference and argument quality of green advertising

Green advertising is defined as a promotional message that attracts consumers' needs and desires related to the environment (Zinkhan and Carlson, 1995). Green advertising is regarded as an integral part of a company's overall environmental marketing strategy, which can help it gain sustainable competitive advantage and achieve excellent performance (Leonidou et al., 2011). Green products are more environmentally friendly than competitors' traditional products (Matthes et al., 2014), thus, advertisers should include the maximum information about products, media, argument credibility, relevance, perceived validity of the information, and environmental behavior in the development of green advertising (Ahmad et al., 2010). For consumers, green advertising has the role of disseminating green image and building environmental awareness (Grillo et al., 2008).

The existing marketing strategies of green products are generally combined with other marketing strategies (Wiener and Doescher, 1991; Kong and Zhang, 2014). Green marketing can be explored by using the consumer theory; the existing consumer behavior theory holds that consumers often have better understanding of information related to themselves and consistent with their personal beliefs and values (Teng et al., 2014). This kind of autobiographical memory retrieval could affect the individuals' processing of information images. When a memory is produced by spontaneous induction, it will arouse people's sympathetic affections toward certain types of advertising, meaning people will regard themselves as the characters and situations in the advertisement, and make less analysis of the product (Baumgartner et al., 1992). In the marketing process, self-reference will improve the description of product characteristics and advertising information, which will trigger consumer memories. Therefore, in the process of persuasion, self-reference can make product information parameters and product functions seem more powerful (Burnkrant and Unnava, 1995). Consumers will have more positive attitudes toward advertisements designed with self-reference, and then, increase the possibility of trying and buying the product. Such advertisement texts usually involve positive emotions, which are positively correlated to brand chain, brand attitudes, and

behavioral intention (Escalas, 2004).

Another marketing strategy is to apply the effect of argument quality, which can be divided into two categories: strong arguments and weak arguments; the logical relationship between the contents of strong arguments and conclusions is clear (Edwards and Smith, 1996); while the quality of weak arguments comes from information sources with low credibility. Therefore, the verification of statistical data, highly credible information sources, and verified information are regarded as strong argument quality, while unsubstantiated information is regarded as weak argument quality (Wood et al., 1985). Generally speaking, discussions on argument quality focus on its moderating effects in the persuasion process, such as the impact of information quality and the attributes of the information source on consumer assessment (Slater and Rouner, 1996), the credibility of the information source and professional knowledge moderated through argument quality (Hautz et al., 2014), or the role of argument quality in advertising type and brand consistency (Priester et al., 2004). There are also studies that have explored the relationship between the strength of argument quality and individual emotions (Bambauer-Sachse and Gierl, 2009). It can be ascertained that the quality of information will directly affect consumers, and have mediating effect on the subsequent credibility evaluation of the information source, which changes their original beliefs (Slater and Rouner, 1996). The higher the argument quality, the more helpful it is to satisfy consumers' needs for information (Hautz et al., 2014).

2.2. Graphic effect of self-reference and argument quality

Advertisers have long been aware of the importance of psychological images, as created by advertisements in the buyer's mind, thus, they carefully consider how to create effective advertising instructions and use visual images to trigger consumers' psychological images (Rossiter, 1982). After viewing pictures, consumers will evaluate the attributes of products, and the evaluation result will influence their advertising attitude and brand attitude (Mitchell, 1986), as the images in advertisements show strong communication effects, which will generate brand attitude and purchase intention. When the image participates in the moderating process, its moderating effect depends on whether the picture conveys product-related information, and the thought triggered in the consumer's mind by the picture plays an important role (Miniard et al., 1991). Therefore, advertising pictures can be regarded as an important factor affecting advertising attitude and brand impression in the consumer's mind regarding the product shown in the advertisement.

In addition to the effect of pictures, the combination of words and pictures (e.g. whether words and pictures are in line with the cultural background of the subjects) is a factor affecting the positive response of the subjects (Teng et al., 2014). Cauberghe et al. (2010) discussed the influence of pictures and words on interactive ads, and concluded that, when an interactive ad only has a text message, it will not increase the click-through rate of the subjects; however, when the interactive ad combines words and pictures, it will cause the subjects to improve their attention, and result in a higher click-through rate.

Usually, the degree of self-reference effect can be dealt with through the wording of the advertisement text and the shooting angle of the advertisement photo (Meyers-Levy and Peracchio, 1996). Argument quality emphasizes the persuasive power and validity of information quality, the logical reasonableness of the argument, and data validation (Cacioppo et al., 1983; Edwards and Smith, 1996; Hautz et al., 2014; Wood et al., 1985). Enhancement of the argument can provide individual-related thinking, manipulate the relevance between the theme of the information and the

individual, and change the number and quality of the arguments in the information (Hautz et al., 2014). Strong argument quality requires persuasive information content, and emphasizes logic, comparability, and highly credible proof of facts; while weak argument quality is the opposite (Priester et al., 2004). Studies in the past generally supported that the persuasive effect of strong argument quality is higher than that of weak argument quality (Cacioppo et al., 1986); therefore, manipulating the persuasive power of information, the validity of the content, and the relevance of products, can be used as the design basis of strong and weak argument quality. In addition, self-reference visual picture symbols can be added to increase self-association. Accordingly, we believe that advertising design with self-reference pictures and strong argument quality will have the best advertising effect, thus, we make the following hypothesis:

H1a. Advertising design with the pairing of different self-reference and argument quality will have different advertising effects

H1b. Advertising design with the pairing of self-reference and strong argument quality will have the best advertising effect

2.3. Effect of emotions

Emotion is an important topic in market research, as exploring consumer emotions is helpful for explaining changes in the consumers' decision-making process (Ou and Verhoef, 2017). Emotions usually last for a limited period of time, from a few minutes to several hours, and tend to occur in specific situations. There are generally positive and negative emotions (Koenig-Lewis et al., 2014), and emotion is regarded as one of the factors affecting behavior; expected positive and negative emotions can be used as factors affecting behavioral intentions (Perugini and Bagozzi, 2001). Carrus et al. (2008) emphasized that positive anticipatory emotions and past behaviors have significant prediction ability for engaging in friendly environmental actions, and emotion is directly related to past behaviors and intentions. Swim et al. (2011) conducted research on environmental-protection packaging products, and concluded that positive and negative emotional moderation has significant impact on consumers' willingness to buy environmental protection products. Lee et al. (2008) proposed four key factors for successful green marketing: (1) peer-to-peer network (social influence); (2) emotional requirements (environmental issues); (3) brand image (focusing self-image on environmental protection); (4) validity of behavior (perceived validity of environmental behavior).

People's emotions of friendly environment behavior mainly covers three areas: (1) Moral emotions reflect the individual's response of acceptance or rejection of ecological standards and responsibilities; for example, being angry with the insufficient efforts of relevant politicians on pollution control and environmental protection commitments, or angry about too much pollution control and restrictions. (2) Emotional affinity with nature, which is regarded as the strongest emotion in the relationship between humans and nature, and is also an index to predict friendly environmental behavior. (3) Ecological fear refers to when individuals make judgments on the risk of climate change, and worry becomes the strongest emotional response. However, strong emotional distress, as caused by some environmental problems, may trigger the psychological defense mechanism, leading to non-individual engagement in environmental protection behavior. Such defenses include the sense of incapability, entrustment (rejection of personal responsibility), negative evidence, indifference, and rational alienation, and these individual defense mechanisms will generate

negative emotions, including fear, anxiety, guilt, and the sense of incapability, which inhibit friendly environmental behavior (Koenig-Lewis et al., 2014). Another important factor in assessing environmental risk is emotion, which is presented by emotional reactions. There are four types of individual emotional responses to environmental risks, prospective (e.g. fear) and retrospective (e.g. sadness) consequence-based emotions, and other-related (e.g. anger) and self-related (e.g. guilt) ethics-based emotions (Böhm, 2003).

Consumer's environmental protection emotion is considered as an intrinsic factor, and relevant studies have confirmed the influence of emotions on advertising effects; for example, Carrus et al. (2008) explored the attitudes of friendly environmental behavior with two models, the goal-directed behavior model and the theory of planned behavior, which both follow the predictions of friendly environmental behavior intention: subjective norms, perceptual control, expected emotion, and the role of past behavior and desire. Swim et al. (2011) considered that, through positive and negative emotional moderation, participants' perception of the benefits of environmental protection packaging had significant indirect impact on purchase intention. It can be known from the above that emotional response to environmental protection involves various aspects, such as moral, responsibility, environmental risk, and natural emotions, thus, environmental protection emotions are classified into three categories: (1) Moral emotion: moral emotion response is related to personal self-conscience, and based on morality; (2) Social emotion: emotions generated by individuals on pollution control or environmental protection commitment, which belong to the perception of social action; (3) Ecological emotion: concerns about climate change and emotions of ecological care. Individuals' care for the environment would affect emotional responses, and have predictive power on behavior, thus, the following hypotheses are put forward:

H2. Positive environmental protection emotion has better advertising effect than negative environmental protection emotion.

H2a. Positive moral emotions have better advertising effect than negative moral emotions

H2b. Positive social emotions have better advertising effect than negative social emotions

H2c. Positive ecological emotions have better advertising effect than negative ecological emotion

In order to better understand the role of individual emotions in persuasion, this study adopts the Elaboration Likelihood Model (ELM) to clarify the change mechanism of emotions in consumer attitudes. The important argument of ELM is that people's thinking models follow two different routes. One is the central route model, i.e., people have higher concerns about the processing of information; individuals have enough motivation and capability to pay attention to the clarification of information about product attributes, product functions, etc. in the information content. After careful evaluation and thinking of the information content, if the individual concludes that the information is persuasive, it will form a positive attitude; however, if the information content is not credible or persuasive, it will produce a negative attitude. The other thinking model is the peripheral route; the individual has no motivation to deal with the information itself, but depends on other irrelevant information to influence decision-making judgment. Consumers have low involvement in the advertised product, and insufficient motivation and capability to deal with some information in the advertising, thus, they will rely on simple clues to carry out the principle of peripheral processing (Jaeger and MacFie, 2001; Kim et al., 2010; Petty and Cacioppo, 1984, 1986).

Regarding the moderating effect of emotion, there are currently two different opinions in related research. One is that positive emotions tend to consider and process information more carefully, and belongs to central route thinking activities (Aylesworth and MacKenzie, 1998). The other theory uses reduced elaboration; while consumers have positive environmental emotions, they use frontier routes with low involvement situations and will not bother to process the information (Bless et al., 1990). These two different opinions are mainly about the influence of emotion on the route of reduced elaboration. In terms of moderating effect, the studies of Pornpitakpan et al. (2017) suggested that emotions can partially/complementarily moderate the impact of salespersons' retail service quality on impulse buying. In terms of purchase quantity, emotions can fully moderate the impact of salespersons' retail service quality on impulse buying; in terms of purchase intention and revisit intention, emotion can partially/complementarily moderate the impact of salespersons' retail service quality on impulse buying. Ursavas and Hesapci-Sanaktekin (2013) argued that negative emotions will inhibit the ability to estimate duration, and lead to fewer recalls and recognition. Peterson and Malhorta (1998) also believed that stimulus triggered by emotions often involves understanding of the received information.

It can be confirmed from the above literature that, while emotions can moderate consumer attitudes, there is no fixed model for the change of positive and negative emotions, especially in the research of green advertising design. This study believes that individuals' positive (negative) environmental emotion will cause a change of view in advertising design; continuing **H1**: advertising design with the pairing of self-reference and strong argument quality will have the best advertising effect. More specifically, this study assumes that, if consumers have positive environmental emotion, their optimistic and pleasant emotions will make them ignore the type of advertising, which belongs to the reduced elaboration situation; while negative emotion would arouse greater concerns in the individuals, meaning they will take the central route of thinking, meaning they care about the persuasiveness of the advertising and the perfection of the argument data. That is to say, positive/negative emotions will moderate consumers' views of advertising design. Under the effect of positive emotions, consumers' views of advertising design will have reduced elaboration, instead of the original preference for advertising design with strong arguments; however, they do not care about the design types of advertisements; on the contrary, under the influence of negative emotions, consumers take the central route of thinking, and they still like the design of advertising with strong arguments. Let's assume the following:

H3. The impact of green advertising design on consumers' advertising effect is moderated by environment-protecting emotion (Consumers' views on green advertising design will be moderated by environmental emotions)

H3a. When the subjects are under positive moral emotions, there is no significant difference in the advertising effect of any kind of advertising design; in the case of negative moral emotions, the advertising design with strong arguments has the best advertising effect.

H3b. When the subjects are under positive social emotions, there is no significant difference in the advertising effect of any kind of advertising design; in the case of negative social emotions, the advertising design with strong arguments has the best advertising effect.

H3c. When the subjects are under positive ecological emotions, there is no significant difference in the advertising effect of any kind

of advertising design; in the case of negative ecological emotions, the advertising design with strong arguments has the best advertising effect.

3. Method

3.1. Research design and subject

This research discusses the effect of the interaction between different advertising designs and emotional reactions on advertising effect (see Fig. 1). Therefore, the Between Subject Factorial Design of advertising design (with self-reference and strong arguments, with self-reference and weak arguments, with no self-reference and strong arguments, and with no self-reference and weak arguments) for environment-protecting emotion (positive and negative) was adopted, with a total of 4 different experimental situations, in order to manipulate the variables and measure advertising effect. Lastly, the hypotheses were verified and emotion classification was distinguished according to the subject's selected questionnaire.

This study adopts the sampling method of "convenience cluster sampling"; the students of 2 universities in central and southern Taiwan are the subjects, and the experimental participants were randomly allocated to different experimental groups according to their class. In addition to the test explanation, a gift was given to the subjects to encourage them to fill in the questionnaire. The personal willingness of subjects rejecting to fill in the questionnaire was also respected. There were 40–60 subjects in each experimental situation, for a total of 180 subjects participating in the experiment. After invalid questionnaires were removed, a total of 160 valid questionnaires were gained, among which males account for 32.5% (totaling 52 males) and females account for 67.5% (totaling 108 females), and their ages are between 18 and 22 years old.

3.2. Stimulant

The advertisement stimulant was produced in the pre-test. With environmentally friendly sports shoes as the object product, ShoesMen was used as the virtual brand. In terms of the stimulant selection, the advertisements related to environmentally friendly shoes were collected from the advertising industry through a network, and a total of 6 self-referenced advertising pictures and 16 argument quality advertising messages (8 advertising messages, respectively, for strong and weak argument) were summarized. The subjects in the pre-test were 42 students from one university in the south of Taiwan. In the questionnaire, 3 items, including "I think this picture is related to me", "This picture can arouse my sympathy", and "This picture enables me to recall my experience" were adopted to measure whether the advertising picture design in the experiment is in line with the self-referenced feeling; regarding the self-referenced feeling, the subjects chose the items according to their degree of feeling. A Likert seven-point scale was adopted for

scoring to measure whether the subjects perceived the self-reference degree in the experimental advertising pictures, and each item was given 1 point (Strongly disagree) to 7 points (Strongly agree) to calculate the total scores. The valid sample is $n = 42$, and the results show that No. 6 picture gained the highest score ($M_6 = 14.1$, $SD = 4.33$), thus, this picture was used as being representative of a self-reference advertisement, and a single color was used in the groups without self-reference.

After the argument quality advertising message was selected, a staggered arrangement was made, in order to avoid the situation that the subjects were faced with the same type of words and phrases, which would form deviation in completing the questionnaire. In the questionnaire, the instruction phrases, including "the advertising message with strong argument quality refers to highly credible facts, information, and specific data or a reliable data source, and the argument is strong and persuasive in this advertising message." and "the advertising message with weak argument quality means that there are no highly credible facts or information, it only contains ambiguously narrated information and appeal, and the argument is weak and unconvincing.", will allow the subjects to understand the features of the 2 advertising messages, and then, the subjects were required to choose the items according to the degree that the advertising message in the experiment was in line with the strong or weak argument qualities. The scoring method is the same as the aforesaid method. According to the results, No. 1, No. 13, and No. 11 advertising messages were selected as being representatives of weak argument quality appeal ($M_1 = 4.26$, $SD = 1.449$; $M_{13} = 4.0$, $SD = 1.448$; $M_{11} = 3.93$, $SD = 1.455$).

The contents are, respectively: 1) this company is the world's largest shoemaking company where plastics are used as the material. The commodity's main raw material is PVC material, and leather has never been used in the recent 30 years; 13) as the global climate becomes increasingly serious, we redouble our efforts to reduce the enterprise's carbon footprint to achieve the goal of slowing down global warming; 11) we have understood that the business operation contains commerce, fairness, and justice, and we are committed to reducing the impact on the environment to improve our community and gain benefits in line with moral standards. In terms of the representative slogans of strong argument quality, No. 4, 15, and 7 were selected ($M_4 = 5.69$, $SD = 1.297$; $M_{15} = 5.32$, $SD = 1.186$; $M_7 = 5.29$, $SD = 1.255$). In order to coordinate with the weak argument quality, only No. 4 document was selected: up to 99% recoverable PVC materials are used by the company, which meets the environmental protection standard of an advanced country. In the meantime, the company has been verified by world-level channels, such as Wal Mart, Payless, Mel-discos, Target, Deichmann, and Foot Locker, and become a production manufacturer authorized by various organizations and brands, such as FIFA (World Football League), Barbie, Disney, and PPG.

Finally, the screened pictures and text slogans were integrated and designed into 4 groups of different advertisement stimulants (see Figs. 2–5). In order to reduce other interference factors, which could affect the experimental results, the 4 advertisements have the same layout design, with the exception of the differences in text contents and pictures.

3.3. Variable description

3.3.1. Advertising design

According to the above description, meaning that the advertising picture plays a communication role in marketing (Cauberghe et al., 2010; Teng et al., 2014. Chowdhury et al., 2011), the picture has the feature of inspiring people's imagination (Miniard et al., 1991; Sojka, and Giese, 2006; Teng et al., 2014), and the degree of self-reference effect can be addressed from 2 dimensions according

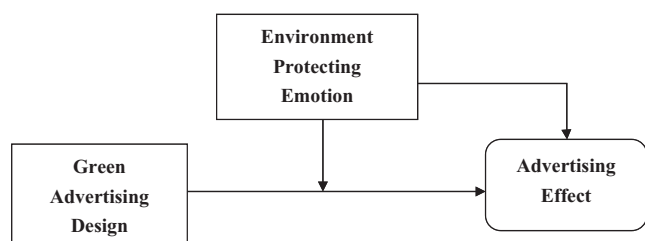


Fig. 1. Research structure.



Fig. 2. Advertisement with the self-reference and strong argument (Ad1).



Fig. 3. Advertisement with the self-reference and weak argument (Ad2).



Fig. 4. Advertisement with no self-reference and strong argument (Ad3).



Fig. 5. Advertisement with no self-reference and weak argument (Ad4).

to the wording of the advertisement copy and the shooting angle of the advertisement picture (Meyers-Levy and Peracchio, 1996). As a result, when the picture is used to trigger the self-reference effect, it can help the subjects recall the self-reference effect. However, Hautz et al. (2014) thought that argument quality statements will affect the advertising effect, thus, this research adopts the text statement as the information of argument quality. In terms of strong and weak argument quality, the opinions of Priester et al. (2004) are adopted, namely, strong argument quality must have persuasive information contents and emphasize logic, a comparative nature, and highly credible proof according to the facts, while weak argument quality is contrary.

3.3.2. Environment-protecting emotion

It is generally believed that emotion is produced under certain circumstances. In terms of the effect of emotion on behavioral intention, emotions are usually classified into positive and negative emotions (Perugini and Bagozzi, 2001; Koenig-Lewis et al., 2014; Swim et al., 2011), and positive and negative emotions affect the development of attitude (Carrus et al., 2008). This research adopted the emotion classification method of Koenig-Lewis et al. (2014) as the dimension for consumer's emotional reaction. The 3 kinds of emotion items are, respectively: "When you know that this product is produced by a factory in line with the green mark, and uses natural ingredients and recoverable materials, you will feel ...", "In face of the current efforts society has made to the environment and ecology, as well as the measures taken by the public for environmental protection action, you will feel ...", and "In terms of the current climate change produced by environmental problems and the ecological situation, you will feel ...". Regarding emotion detection, 10 kinds of emotional expressions are used, including joy, optimism, enthusiasm, pride, satisfaction, tension, worry, disappointment, sadness, and anxiety; where the former 5 kinds of emotions are positive emotions, while the latter 5 emotions are negative emotions; the negative emotions adopted reverse scoring, where the scoring result was distinguished according to positive and negative emotions.

3.3.3. Advertising effect

Consumer belief and attitude are important indicators to measure advertising effect. In terms of consumer attitude and belief, general advertising research has 2 classic viewpoints: firstly, the 2 constructs of belief and attitude are equal and interchangeable, and they can be conceptualized and operated. Secondly, belief and attitude are basically different; specifically speaking, belief refers to stating the attribute and result of one affair, while attitude refers to the overall evaluation of this affair. One person's attitude originates from belief and is the antecedent of attitude (Wang and Sun, 2010). The advertising effect is the communication effect of advertising performance, namely, testing the effect on the product after consumers accept the advertisement, including advertising performance, brand attitude, and investigation into purchase intention (Wang et al., 2002). In terms of the measurement of the advertising effect of the dependent variable, this research adopts the following argument: the final aim of advertisements is to persuade consumers to purchase the products and increase product sales, and the change in consumer attitude is indeed related to purchase behavior. Advertising effect is the communication effect of advertising performance, namely, testing the effect on the product after consumers accept the advertisement. Therefore, this research classifies advertising effects into the 3 dimensions of advertising attitude, brand attitude, and product attitude, for observation.

3.4. Experimental step

The formal experiment was carried out 4 times in the manner of collective testing. The questionnaire contents used by all the groups are the same, and only the viewed advertisements varied with the groups. At the beginning of the experiment, the research purpose was described, and then, the questionnaires were distributed. Part 1 of the questionnaire contains the descriptions and basic information, while Part 2 contains the subject's advertising attitude test. After the subjects filled in Part 1, the testing personnel played the advertisement stimulant; after observing the advertisement stimulant, the subjects continued to fill in Part 2 of the questionnaire; lastly, they completed Part 3: the test of environment-protecting emotion. After completing the questionnaire, the testing personnel expressed their thanks by giving a little gift. The entire

experimental process lasted for about 20 min.

4. Results analysis

4.1. Reliability and validity analysis

The questionnaire contents, including "advertising attitude", "brand attitude", and "product attitude" in this research were prepared and compiled by referencing relevant research literature (Mitchell and Olson, 1981; Tu et al., 2013), and the scale has reliable content validity. After the questionnaires were retrieved, they were encoded and SPSS statistical software was used for data analysis. Firstly, the internal consistency reliability of the experiment was tested, and the results show that, advertising attitude $\alpha = 0.898$, brand attitude $\alpha = 0.894$, product attitude $\alpha = 0.912$, and Cronbach's α value is greater than 0.70, and a Cronbach's α value greater than 0.70 is regarded as having high-reliability. This result shows that the data obtained by this research have quite high reliability.

Regarding validity testing, factor analysis was used to test the construct validity of the 10 items in the questionnaire, and the principal axis factor analysis results show that the communality estimation values, as measured by each item of "advertising attitude", "brand attitude", and "product attitude", are 0.752–0.889, 0.829–0.646, and 0.78–0.867, respectively. This result shows that the scale has suitable construct validity.

4.2. Hypothesis testing

This research aimed to analyze the effect of the 2 independent variables (advertising design and environment-protecting emotion) on the dependent variable (advertising effect). According to the aforesaid literature, environment-protecting emotions are classified into 3 types: moral emotion, social emotion, and ecological emotion, and these 3 types can be further classified into positive and negative emotions. The advertising effects contain advertising attitude, brand attitude, and product attitude, thus, Two-way ANOVA was conducted 3 times, and the results are shown in Table 1. The following tests are based on the hypotheses.

4.2.1. Effect of advertising design and emotion on advertising effect

H1a believes that the advertising design with the pairing of different self-reference and argument quality will have different advertising effects, and the advertisement with the pairing of having self-reference and strong argument quality has better advertising effect. The results in Table 1 show that the advertising design in individual factors has significant difference on the dependent variables of advertising attitude, brand attitude, and product attitude. By means of Scheffe post-hoc comparison of the average of the advertising designs, the following results are found: in terms of advertising attitude, the advertising attitude of Ad 1 (having self-reference and strong argument) is significantly higher than that of Ad 4 (having no self-reference and weak argument) ($M_{\text{advertising attitude}} = 21.02$ vs. 16.25, $F_{(3, 159)} = 6.708$, $p < .01$); the advertising attitude of Ad 3 (having no self-reference and strong argument) is significantly higher than that of Ad 4 ($M_{\text{advertising attitude}} = 20.93$ vs. 16.25, $F_{(3, 159)} = 6.708$, $p < .01$); in terms of brand attitude, the brand attitudes of Ad 1, Ad 2 (having the self-reference and weak argument), and Ad 3 are significantly higher than that of Ad 4 ($M_{\text{brand attitude}} = 17.95$ vs. 17.65 vs. 17.26 vs. 13.69, $F_{(3, 159)} = 8.149$, $p < .01$); in terms of product attitude, only the product attitude of Ad 1 is significantly higher than that of Ad 4 ($M_{\text{product attitude}} = 23.02$ vs. 19.62, $F_{(3, 159)} = 3.02$, $p < .5$). Therefore, H1a is true, namely, when the subjects viewed the advertising design with different self-reference and argument quality, the produced advertising effect differed significantly. In addition, Ad 1 with the

Table 1
Results of ANOVA (advertising design and emotion).

Source of variation	ANOVA _S	ANOVA _S	ANOVA _S
	Advertising attitude F value	Brand attitude F value	Product attitude F value
Advertising design (AD)	6.708***(.000)	8.149***(.000)	3.02*(.032)
Moral emotion (ME)	6.272*(.013)	14.093***(.000)	17.465***(.000)
AD × ME	.148 (.931)	.994 (.397)	2.18 (.093)
Advertising design (AD)	7.739***(.000)	8.886***(.000)	3.353*(.021)
Social emotion (SE)	4.878*(.029)	6.006*(.015)	3.987*(.048)
AD × SE	3.1035*(.028)	1.788 (.152)	.497 (.685)
Advertising design (AD)	7.704***(.000)	9.82***(.000)	3.953*(.01)
Ecological emotion (EE)	.346 (.557)	.709 (.401)	1.194 (.276)
AD × EE	1.454 (.23)	3.22*(.024)	2.343 (.075)

***p < .001 **p < .01 *p < .05.

pairing of self-reference and strong argument quality has better advertising attitude, brand attitude, and product attitude than Ad 4 with the pairing of no self-reference and weak argument quality, and they have significant difference. The brand attitudes of the other 2 ads (Ad 2, Ad 3) are significantly higher than that of Ad 4, the product attitude of Ad 3 is significantly higher than that of Ad 4, and others have no significant difference, meaning the advertising design with the pairing of self-reference and strong argument quality has better advertising effect, thus, H1b is true.

H2 puts forward that positive environment-protecting emotion has better advertising effect than negative environment-protecting emotion. It can be found from Table 1 that 3 kinds of environment-protecting emotions have partial significant difference in the dependent variables. By means of Scheffe post-hoc comparison, the average results are shown, as follows:

First, moral emotion was analyzed. In terms of advertising attitude, positive moral emotion is significantly higher than negative moral emotion ($M_{\text{advertising attitude}} = 20.53$ vs. 18.26 , $F_{(1, 159)} = 6.272$, $p < .05$); in terms of brand attitude, positive moral emotion is significantly higher than negative moral emotion ($M_{\text{brand attitude}} = 18.01$ vs. 15.27 , $F_{(1, 159)} = 14.09$, $p < .001$); in terms of product attitude, positive moral emotion is significantly higher than negative moral emotion ($M_{\text{product attitude}} = 23.64$ vs. 19.89 , $F_{(1, 159)} = 17.47$, $p < .001$). Therefore, the subjects with positive moral emotion will have better advertising attitude, brand attitude, and product attitude than those with negative moral emotion, meaning positive moral emotion has better advertising effect than negative moral emotion, thus, H2a is true.

Next, social emotion was analyzed. In terms of advertising attitude, positive social emotion is significantly higher than negative social emotion ($M_{\text{advertising attitude}} = 20.43$ vs. 18.47 , $F_{(1, 159)} = 4.878$, $p < .05$); in terms of brand attitude, positive social emotion is significantly higher than negative social emotion ($M_{\text{brand attitude}} = 17.59$ vs. 15.77 , $F_{(1, 159)} = 6.01$, $p < .05$); in terms of product attitude, positive social emotion is significantly higher than negative social emotion ($M_{\text{product attitude}} = 22.76$ vs. 20.86 , $F_{(1, 159)} = 3.99$, $p < .05$). Therefore, the subjects with positive social emotion have better advertising attitude, brand attitude, and product attitude than those with negative social emotion, meaning positive social emotion has better advertising effect than negative social emotion, thus, H2b is true.

Finally, ecological emotion was analyzed. In terms of advertising attitude, brand attitude, and product attitude, positive ecological emotion and negative ecological emotion have no significant difference in advertising attitude ($M_{\text{advertising attitude}} = 19.27$ vs. 19.82 , $F_{(1, 159)} = 0.346$, insignificant); $M_{\text{brand attitude}} = 16.43$ vs. 17.07 , $F_{(1, 159)} = 0.709$, insignificant); $M_{\text{product attitude}} = 21.28$ vs. 22.34 , $F_{(1, 159)} = 1.19$, insignificant), meaning positive ecological emotion does not have better advertising effect than negative ecological emotion,

thus, H2c is not true.

4.2.2. Test of advertising design and emotion on advertising effect

H3 discusses the relationship between advertising design and 3 kinds of environment-protecting emotions. The results in Table 1 show that only advertising design and social emotion are significant in the interaction with advertising attitude ($F_{\text{advertising design} \times \text{social emotion}} = 4.878$, $p = .029 < 0.001$), while the others are insignificant in the interaction. In order to examine whether the hypotheses in this paper are true, the effects of environment-protecting emotion on advertising effect were continuously discussed under different situations of advertising design. Therefore, the "simple main effect" testing of advertising design and environment-protecting emotion were carried out, respectively, and the test results are shown in Table 2.

As shown in Table 2, the subjects with positive moral emotion have no significant difference in advertising attitude, brand attitude, or product attitude for the different advertising designs. On the contrary, the subjects with negative moral emotion have better advertising attitude, brand attitude, and product attitude towards Ad 1 and Ad 3, ($M_{\text{Ad 1}} = 19.95$; $M_{\text{Ad 3}} = 20.24 > M_{\text{Ad 4}} = 14.79$, $F = 4.938$, $p = .004 < 0.01$) than Ad 4; in terms of the performance of brand attitude, the subjects with negative moral emotion have better brand attitude towards Ad 1, Ad 2, and Ad 3 ($M_{\text{Ad 1}} = 16.47$; $M_{\text{Ad 2}} = 16.53$; $M_{\text{Ad 3}} = 16.65 > M_{\text{Ad 4}} = 11.42$, $F = 9.373$, $p = .000 < 0.001$) than Ad 4; in terms of the performance of product attitude, the subjects with negative moral emotion have better product attitude towards Ad 1, Ad 2, and Ad 3 than Ad 4 ($M_{\text{Ad 1}} = 20.84$; $M_{\text{Ad 2}} = 21.33$; $M_{\text{Ad 3}} = 21.35 > M_{\text{Ad 4}} = 16.04$, $F = 4.901$, $p = .004 < 0.01$).

The results are sorted in Figs. 6–8, which show that the subjects with negative moral emotion gained the lower scores in Ad 4's advertising attitude, brand attitude, and product attitude, meaning Ad 4's advertising effect has no self-reference and weak argument, and thus, is worse than the other 3 advertisements. However, the subjects with positive moral emotion have no significant difference in their preference for advertising design; in other words, under the action of different moral emotions, the subjects' preferences for advertising design are different. When consumers know that a product is produced by a factory in line with the green mark, and uses natural ingredients and recoverable materials, they will produce positive emotion, thus, the advertising effect will not vary with the advertising design; therefore, H3a is true.

(2) Advertising design and social emotion

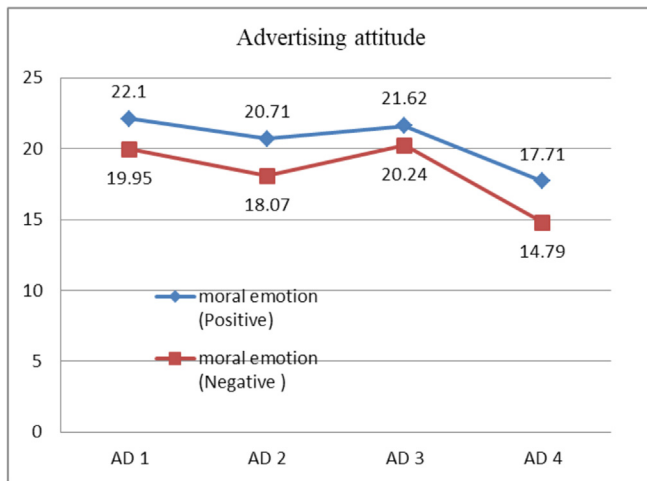
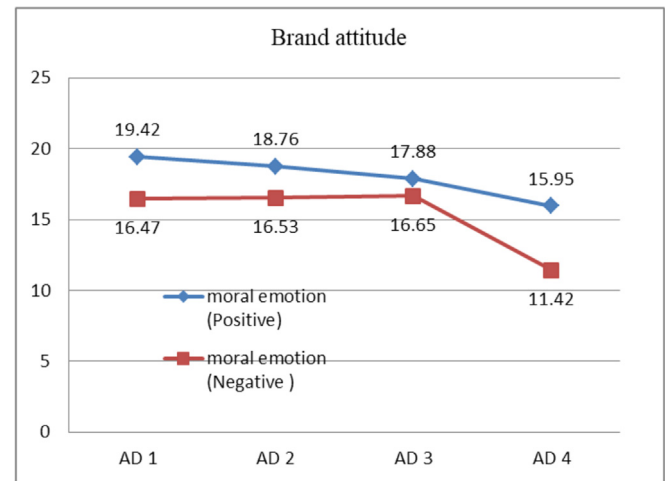
It can be seen from Table 2 that subjects with positive social emotions have significant differences in advertising attitudes and brand attitudes toward different advertising designs. From the

Table 2

Summary table of variance analysis of the simple main effect of advertising design and emotion.

(1) Advertising design and moral emotion

Source of variation	Simple main effect		
	Advertising attitude F value	Brand attitude F value	Product attitude F value
Advertising design			
Positive moral emotion	2.301	1.853	.682
Negative moral emotion	4.938**	9.373***	4.901***
Moral emotion			
Ad 1	1.53	4.702*	10.301**
Ad 2	1.748	1.573	.856
Ad 3	.639	.874	1.035
Ad 4	2.731	10.509**	12.569**
Advertising design			
Positive moral emotion	6.708***	8.59***	1.885
Negative moral emotion	3.916	2.516	1.972
Social emotion			
Ad 1	1.016	2.371	1.387
Ad 2	15.579***	7.931**	4.37*
Ad 3	.092	.302	.068
Ad 4	.314	.01	.478
Positive moral emotion	5.299**	6.967***	3.849*
Negative moral emotion	3.526*	5.361**	2.25
Ecological emotion			
Ad 1	.879	.067	.452
Ad 2	3.078	5.008*	4.168
Ad 3	.286	4.277*	3.343
Ad 4	.479	1.121	.974

*** $p < .001$ ** $p < .01$ * $p < .05$.**Fig. 6.** Run chart of the means of Advertising design and Moral emotion on advertising attitude.**Fig. 7.** Run chart of the means of Advertising design and Moral emotion on Brand attitude.

perspective of advertising attitudes, subjects with positive social emotions have better advertising attitudes toward Ad 1, Ad 2 and Ad 3 than Ad 4. ($M_{Ad 1} = 22$; $M_{Ad 2} = 22.75$; $M_{Ad 3} = 21.33 > M_{Ad 4} = 15.65$, $F = 6.708$, $p = .000 < 0.001$). From the perspective of brand attitudes, subjects with positive social emotions have better advertising attitudes toward Ad 1, Ad 2 and Ad 3 than Ad 4. ($M_{Ad 1} = 9.16$; $M_{Ad 2} = 20$; $M_{Ad 3} = 17.76 > M_{Ad 4} = 13.45$, $F = 8.59$, $p = .000 < 0.001$). From the perspective of product attitudes, subjects with positive moral emotions do not have significant differences toward the four advertising designs. On the contrary, subjects with negative social emotions have no significant difference in advertising attitudes, brand attitudes, or product attitudes toward different advertising designs.

The results, as summarized in Figs. 9–11, show that advertising design and social emotions interact with advertising attitudes.

Therefore, advertising design and social emotions interact with advertising attitudes, while the trend lines of brand attitudes and product attitudes do not show obvious intersection signs, or do not intersect at all, indicating that there is no interaction between the two. Subjects with positive social emotions have lower preferences of advertising attitudes and brand attitudes for advertisements with no reference and weak arguments than the other three kinds of advertisements, while subjects with negative social emotions have no significant differences in their opinions of different advertising designs. Regarding the performance of product attitudes, subjects with positive and negative social emotions have similar opinions on advertising design, thus, H3b “when the subjects are under positive social emotions, there is no significant difference in the advertising effect of any kind of advertising design; in the case of negative social emotions, the advertising

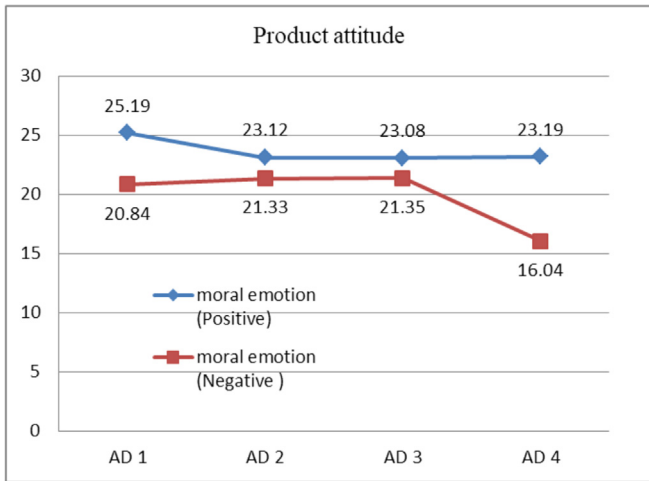


Fig. 8. Run chart of the means of Advertising design and Moral emotion on Product.

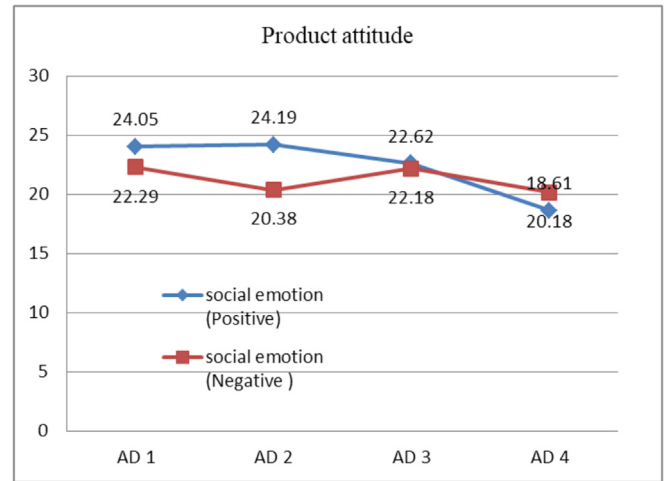


Fig. 11. Run chart of the means of Advertising design and Social emotion on Product Attitude.

(3) Advertising design and ecological emotion

Attitude

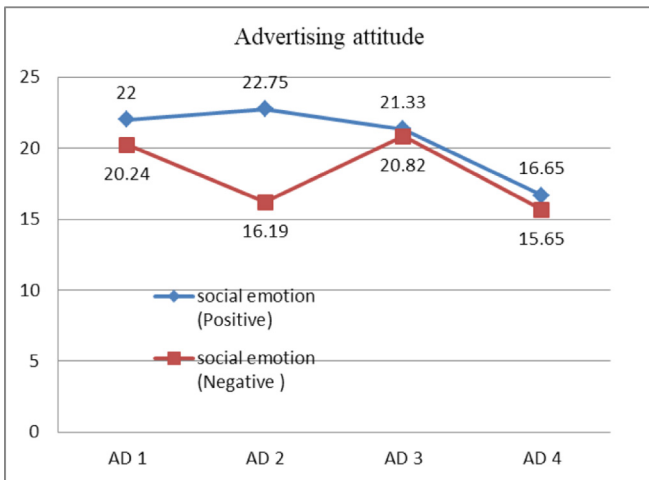


Fig. 9. Run chart of the means of Advertising design and Social emotion on advertising attitude.

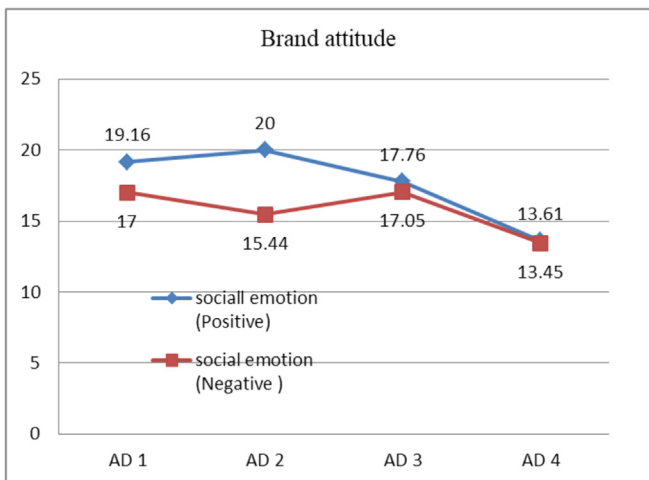


Fig. 10. Run chart of the means of Advertising design and Social emotion on Brand attitude.

design with strong arguments has the best advertising effect”, is not true. That is to say, in the case of positive social emotions, the subjects have different opinions on advertising design, and the worst advertising attitudes and brand attitudes are towards Ad 4 (no-reference and weak-argument advertisement). In the case of negative social emotions, there is no significant difference in the opinions of advertising design, and this result is contrary to the research hypothesis.

Table 2 shows that the subjects with positive ecological emotion have significant difference in advertising attitude, brand attitude, and product attitude for different advertising designs. In terms of advertising attitude, the subjects with positive ecological emotion have better advertising attitude towards Ad 1 and Ad 3 than Ad 4 ($M_{Ad 1} = 20.44$; $M_{Ad 3} = 21.58 > M_{Ad 4} = 15.31$, $F = 5.299$, $p = .002 < 0.01$); in terms of brand attitude, the subjects with positive ecological emotion have better brand attitude towards Ad 1 and Ad 3 than Ad 4 ($M_{Ad 1} = 18.27$; $M_{Ad 3} = 18.64 > M_{Ad 4} = 12.44$, $F = 6.967$, $p = .000 < 0.001$), in terms of the performance of product attitude, the subjects with positive ecological emotion have better product attitude towards Ad 3 than Ad 4, and they have significant difference ($M_{Ad 3} = 24.05 > M_{Ad 4} = 17.88$, $F = 3.849$, $p = .013 < 0.05$).

The subjects with negative ecological emotion have significant difference in advertising attitude and brand attitude for different advertising designs. In terms of advertising attitude, the subjects with negative ecological emotion have better advertising attitude towards Ad 1, Ad 2, and Ad 3 than Ad 4 ($M_{Ad 1} = 22.44$; $M_{Ad 2} = 21.54$; $M_{Ad 3} = 20.67 > M_{Ad 4} = 16.62$, $F = 3.526$, $p = .018 < 0.05$); in terms of brand attitude, the subjects with negative ecological emotion have better brand attitude towards Ad 1 and Ad 2 than Ad 4 ($M_{Ad 1} = 17.88$; $M_{Ad 2} = 20 > M_{Ad 4} = 14.14$, $F = 5.361$, $p = .002 < 0.01$), in terms of the performance of product attitude, the subjects with negative ecological emotion have no significant difference in the 4 advertising designs.

That is to say, in terms of advertising attitude and product attitude, whether consumers have positive or negative emotions due to climate change or ecological conditions, as caused by environmental problems, they have similar views toward advertising design, especially for Ad 1, meaning its preference is significantly higher than that for Ad 4. Regarding product attitude, subjects have different views on different advertising designs because of the role of ecological emotions. H3c is not true: When the subjects have

positive ecological emotions, there is no significant difference in the advertising effect of any kind of advertising design; in the case of negative ecological emotions, the advertising design with strong argument has the best advertising effect.

In view of the above research results, it is impossible to conclude whether H3 is true. As the results of subjects with three emotions have inconsistent views of advertising design, the research hypothesis cannot be deduced: under positive environmental emotions, subjects tend to have consistent opinions of advertising design, while under negative emotional situations, advertisements with reference and strong arguments can be favored by subjects. Although the results of H3a, b, and c are different, it can be ascertained that the subjects did change their opinions of advertising design due to emotional effects. Therefore, consumers' opinions of green advertising design are indeed moderated by environmental emotions, thus, H3 is true.

5. Discussion and conclusions

In this research, 4 different advertisements are designed according to the text descriptions, where the self-reference picture and argument quality are combined to discuss the effect of advertising design and environment-protecting emotion on advertising effect. H1's result shows that consumers' preference for advertisements with no reference and weak argument is obviously lower than the other 3 designs; and the advertising effect with a reference and strong argument is significantly superior to that with no reference and weak argument. This result is in line with the positive effect of the self-reference effect in the course of marketing (Burnkrant and Unnava, 1995; Escalas, 2004; Rogers et al., 1977; Teng et al., 2014), as well as the theory that strong argument quality satisfies consumer's demands, which produces trust (Hautz et al., 2014; Slater and Rouner, 1996). Thus, a self-reference picture that triggers consumer's recognition and advertising appeal with actual data and strong argument has the better advertising effect. Therefore, the advertising design of green products should emphasize environmental protection data, and combine it with pictures that can trigger viewers' mental reference, in order to easily gain consumer's favor.

H2 focuses on discussing the effect of environment-protecting emotion on advertising effect. According to the results, moral emotion and social emotion have different reactions to advertising attitude, brand attitude, and product attitude, and consumers with positive moral emotion and social emotion have significantly better advertising effect than those with negative emotions. In terms of the wording of moral emotion, as used in this research, the consumers were mainly asked about their emotional reaction to products produced by a factory in line with the green mark, and with the use of natural and recoverable materials. Social emotion emphasizes consumer's emotions, as produced for environmental protection actions in society, as well as the current status of such measures. In literature, various researches emphasized the action of emotions, and agreed that emotions have significant effect on consumer's purchase intention (Carrus et al., 2008; Perugini and Bagozzi, 2001; Swim et al., 2011). The research results verify that, when consumers have positive emotions for products in line with the requirements of environmental protection, there will be better advertising effect; meanwhile, when they have positive emotions for the environmental protection measures in society, the advertising effect will be better, as compared with negative emotions.

This study verifies H3, i.e. consumers' opinions on green advertising design will be moderated by environmental emotions. The results are in line with previous literature, verify that emotions play a moderating role in consumers' purchase intention (Pornpitakpan et al., 2017; Swim et al., 2011; Ursavas and Hesapci-

Sanaktekin, 2013), and that emotions influence consumers' opinions of advertising (Hesapci-Sanaktekin, 2013; Meyers-Levy and Peracchio, 1996; Peterson and Malhorta, 1998). However, it could not verify the emotional moderating routes. From literature, we already know that there are two different views about the routes of emotions affecting attitudes: one is the central route thinking activity and the other is the peripheral route (Aylesworth and MacKenzie, 1998; Bless et al., 1990), and these two divergent views are mainly about the influence of emotions on the elaboration route. The hypothesis of this paper is that, when consumers have optimistic and pleasant (positive) emotions, they will produce reduced elaboration, thus, different green advertising content will not affect their advertising attitude, brand attitude, or product attitude; meaning that, when they are happy, the presentation of advertising content is not an important factor affecting attitudes; conversely, with negative emotions, they will object to the types of advertising, and prefer advertisements with reference and strong arguments. The results of this study show that, under the moderation of three different environmental emotions, there are three different situations of advertising effect on consumers, and only moral emotion is in line with the hypotheses of this paper. The hypotheses of this study infer emotions based on the Elaboration Likelihood Model (ELM), which holds that consumers would take different routes of thinking, and thus, have different attitude reactions. This theory also emphasizes that there are many internal and external factors that influence the changes of routes (Jaeger and MacFie, 2001; Kim et al., 2010; Petty and Cacioppo, 1986); therefore, although the results of this study are not as expected, it verifies that there is no fixed model of emotions in the process of attitude change. It may be easier to clarify the change mechanism from environmental emotion to attitude change by adding involvement degree into the route of consumers' attitude formation, in order to judge the changes of consumers' involvement degree after the emotional effect.

In summary, this study confirms that green advertising design with self-reference effect and good argument quality has the best advertising effect. Previous studies have not discussed the topic of argument quality and self-reference in green product advertising design. This study concludes that, green advertising design that combines these two qualities will produce better advertising effect, and can be used as a reference for green marketing design. The second focus of this study is the role of emotions. This study found that the advertising effect will be better under the situations of positive moral emotions and social emotions. This situation gives us some enlightenment, meaning that green marketing should return to the overall sustainable development of the environment and society; it would be easy to promote green marketing activities if a sustainable social environment can be established to make consumers feel pleasant, optimistic, and happy. The final focus of this study is the moderation functions of emotions in the attitude formation process. This study verifies that emotions have moderating effects, but cannot understand the routes of attitude formation. In order to understand route development from the external design to internal emotions, and finally, to attitudes, we propose to add the consumer involvement factor, and explore the three factors of external design, emotion, and involvement, which can serve as reference for future research on green marketing.

6. Limitations and future studies

This study mainly explores the design methods and emotional moderation of green advertising. In order to control the research situation, a virtual brand is used to avoid interference, which effectively controls the experimental situation, but limits the external effectiveness of the research. Because virtual advertising is

still far from actual green advertising, and consumers are very likely to be exposed to green advertising in their daily life, it is suggested that future studies may try to select real green advertising as the research stimulus to make the research results closer to reality.

The involvement of products is not the scope of this study. The research stimulus is aimed at environmental protection sneakers as the subject products. This study did not explore the impact of consumer attributes, involvement degree (product and individual involvement), or product attributes on advertising effect. According to the research results, it has been found that emotions can moderate consumer attitudes, but cannot verify the transformation mechanism of moderation routes. Future research can include consumer involvement, product involvement, and other influencing factors in the ELM theory as the research directions, which could help to clarify the mechanism of emotions in the process of attitudes.

In addition, this study makes verification the experimental method. In order to control the research situation, the questionnaire samples are limited to college students. Whether the conclusion can be inferred to all consumers remains to be verified by future studies.

Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Acknowledgment

The authors wish to thank anonymous reviewers for their valuable suggestions on this manuscript, and all the respondents who participated in the survey. The authors also sincerely thank the School of Arts of Minnan Normal University for endorsing the research project.

References

- Ahmad, H., Shah, I.A., Ahmad, K., 2010. Factors in environmental advertising influencing consumer's purchase intention. *Eur. J. Sci. Res.* 48 (2), 217–226.
- Ajzen, I., 1991. The theory of planned behavior. *Organ. Behav. Hum. Decis. Process.* 50 (2), 179–211.
- Ajzen, I., 2011. The theory of planned behavior: reactions and reflections. *Psychol. Health* 26, 1113–1127.
- Aylesworth, A.B., MacKenzie, S.B., 1998. Context is key: the effect of program-induced mood on thoughts about the Ad. *J. Advert.* 27 (2), 17–31.
- Bambauer-Sachse, S., Gierl, H., 2009. Can a positive mood counterbalance weak arguments in personal sales conversations? *J. Retail. Consum. Serv.* 16 (3), 190–196.
- Baumgartner, H., Sujan, M., Bettman, J.R., 1992. Autobiographical memories, affect, and consumer information processing. *J. Consum. Psychol.* 1 (1), 53–82.
- Bless, H., Bohner, G., Schwarz, N., Strack, F., 1990. Mood and persuasion: a cognitive response analysis. *Personal. Soc. Psychol. Bull.* 16 (2), 331–345.
- Böhm, G., 2003. Emotional reactions to environmental risks: consequentialist versus ethical evaluation. *J. Environ. Psychol.* 23, 199–212.
- Burnkrant, R.E., Unnava, H.R., 1995. Effects of self-referencing on persuasion. *J. Consum. Res.* 22 (1), 17–26.
- Cacioppo, J.T., Petty, R.E., Morris, K.J., 1983. Effects of need for cognition on message evaluation, recall, and persuasion. *J. Personal. Soc. Psychol.* 45 (4), 805–818.
- Carrus, G., Passafium, P., Bonnes, M., 2008. Emotions, habits and rational choices in ecological behaviours: the case of recycling and use of public transportation. *J. Environ. Psychol.* 28, 51–62.
- Cauberghe, V., Pelsmacker, V.D., Janssens, W., 2010. Simultaneous exposure to a program and advertising content in an interactive context: perceptual and semantic interference and reinforcement. *J. Bus. Res.* 63 (9–10), 972–978.
- Caudek, C., 2014. Individual differences in cognitive control on self-referenced and other-referenced memory. *Conscious. Cognit.* 30, 169–183.
- Chang, C., 2005. Ad-self-congruency effects: self-enhancing cognitive and affective mechanism. *Psychol. Mark.* 22 (11), 887–910.
- Chowdhury, R.M.M.I., Olsen, G.D., Pracejus, J.W., 2011. How many pictures should your print ad have? *J. Bus. Res.* 64, 3–6.
- Dangelico, R.M., Vocalelli, D., 2017. Green Marketing: an analysis of definitions, strategy steps, and tools through a systematic review of the literature. *J. Clean. Prod.* 165, 1263–1279.
- Edwards, K., Smith, E.E., 1996. A disconfirmation bias in the evaluation of arguments. *J. Personal. Soc. Psychol.* 71, 5–24.
- Eren-Erdogmus, İ., Lak, H.S., Çiçek, M., 2016. Attractive or credible celebrities: who endorses green products better? *Procedia - Social and Behavioral Sciences* 235, 587–594.
- Escalas, J.E., 2004. Narrative processing: building consumer connections to brands. *J. Consum. Psychol.* 14 (1&2), 168–180.
- Escalas, J.E., 2007. Self-referencing and persuasion: narrative transportation versus analytical elaboration. *J. Consum. Res.* 33, 421–429.
- Grillo, N., Tokarczyk, J., Hansen, E.N., 2008. Green advertising developments in the U.S. forest sector: a follow-up. *For. Prod. J.* 8 (5), 40–46.
- Hartmann, P., Apaolaza-Ibáñez, V., 2012. Consumer attitude and purchase intention toward green energy brands: the roles of psychological benefits and environmental concern. *Journal of Business Research. Journal of Business Research* 65 (9), 1254–1263.
- Hautz, J., Füller, J., Hutter, K., Thürridl, C., 2014. Let users generate your video ads? The impact of video source and quality on consumers' perceptions and intended behaviors. *J. Interact. Mark.* 28 (1), 1–15.
- Jaeger, S.R., MacFie, H.J.H., 2001. The effect of advertising format and means-end information on consumer expectations for apples. *Food Qual. Prefer.* 12 (3), 189–205.
- Joan, M.L., Laura, A.P., 1996. Moderators of the impact of self-reference on persuasion. *J. Consum. Res.* 22 (4), 408–423.
- Khandelwal, U., Bajpai, N., 2013. A study on green advertisement and its impact on consumer purchase intention. *J. Creat. Commun.* 6 (3), 259–276.
- Kim, J.U., Kim, W.J., Park, S.C., 2010. Consumer perceptions on web advertisements and motivation factors to purchase in the online shopping. *Comput. Hum. Behav.* 26, 1208–1222.
- Kim, W.H., Malek, K., Roberts, K.R., 2019. The effectiveness of green advertising in the convention industry: an application of a dual coding approach and the norm activation model. *J. Hosp. Tour. Manag.* 39, 185–192.
- Koenig-Lewis, N., Palmer, A., Dermody, J., Urbye, A., 2014. Consumers' evaluations of ecological packaging - rational and emotional approaches. *J. Environ. Psychol.* 37, 94–105.
- Kong, Y., Zhang, L., 2014. When does green advertising work? The moderating role of product type. *J. Mark. Commun.* 20 (3), 197–213.
- Lee, K., 2008. Opportunities for green marketing: young consumers. *Market. Intell. Plan.* 26 (6), 573–586.
- Leonidou, L.C., Leonidou, C.N., Palihawadana, D., Hultman, M., 2011. Evaluating the green advertising practices of international firms: a trend analysis. *Int. Mark. Rev.* 28 (1), 6–33.
- Martin, B., Veer, E., Pervan, S., 2007. Self-referencing and consumer evaluations of larger-sized female: a weight locus of control perspective. *Mark. Lett.* 18 (3), 197–209.
- Matthes, J., Wonneberger, A., Schmuck, D., 2014. Consumers' green involvement and the persuasive effects of emotional versus functional ads. *J. Bus. Res.* 67, 1885–1893.
- Mellers, B., Schwartz, A., Ritov, I., 1999. Emotion-based choice. *J. Exp. Psychol. Gen.* 128, 332–345.
- Meyers-Levy, J., Peracchio, L.A., 1996. Moderators of the impact of self-reference on persuasion. *Journal of Consumer Research* 4, 408–423.
- Miniard, P.W., Bhatla, S., Lord, K.R., Dickson, P.R., Unnava, H.R., 1991. Picture-based persuasion processes and the moderating role of involvement. *J. Consum. Res.* 18 (1), 92–107.
- Mitchell, A.A., 1986. The effect of verbal and visual components of advertisements on brand attitudes and attitude toward the advertisement. *J. Consum. Res.* 13 (1), 12–24.
- Mitchell, A.A., Olson, J.C., 1981. Are product attribute beliefs the only mediator of advertising effects on brand attitude? *J. Mark. Res.* 18 (3), 318–332.
- Ou, Y.C., Verhoef, P.C., 2017. The impact of positive and negative emotions on loyalty intentions and their interactions with customer equity drivers. *J. Bus. Res.* 80, 106–115.
- Park, D.H., Lee, J., Han, I., 2007. The effect of on-line consumer reviews on consumer purchasing intention: the moderating role of involvement. *Int. J. Electron. Commer.* 11 (4), 125–148.
- Pechmann, C., Esteban, G., 1994. Persuasion processes associated with direct comparative and noncomparative advertising and implications for advertising effectiveness. *J. Consum. Psychol.* 2 (4), 403–432.
- Perugini, M., Bagozzi, R.P., 2001. The role of desires and anticipated emotions in goal-directed behaviours: broadening and deepening the theory of planned behaviour. *Br. J. Soc. Psychol.* 40, 79–98.
- Peterson, M., Malhorta, N.K., 1998. Measuring the appraisal of ad-based affect with ad promises. *J. Bus. Res.* 42 (3), 227–239.
- Petty, R.E., Cacioppo, J.T., Goldman, R., 1981. Personal involvement as a determinant of argument-based persuasion. *J. Personal. Soc. Psychol.* 41 (5), 847–855.
- Petty, R.E., Cacioppo, J.T., 1984. The effects of involvement on responses to argument quantity and quality: central and peripheral routes to persuasion. *J. Personal.*

- Soc. Psychol. 46 (1), 69–81.
- Petty, R.E., Cacioppo, J.T., 1986. *Communication and Persuasion Central and Peripheral Routes to Attitude Change*. Springer-Verlag, New York.
- Petty, R.E., Fleming, M.A., Priester, J.R., Feinstein, A.H., 2001. Individual- versus group-interest violation: surprise as a determinant of argument scrutiny and persuasion. *Soc. Cogn.* 19 (4), 418–442.
- Pornpitakpan, C., Yuan, Y., Han, J.H., 2017. The effect of salespersons' retail service quality and consumers' mood on impulse buying. *Australas. Market J.* 25 (1), 2–11.
- Priester, J.R., Godek, J., Nayakankuppum, D.J., Park, K., 2004. Brand congruity and comparative advertising: when and why comparative advertisements lead to greater elaboration. *J. Consum. Psychol.* 14 (1–2), 115–123.
- Rogers, T.B., Cuiper, N.A., Kirker, W.S., 1977. Self-reference and the encoding of personal information. *J. Personal. Soc. Psychol.* 35 (9), 677–688.
- Rossiter, J.R., 1982. Visual imagery: applications to advertising. *Adv. Consum. Res.* 9, 101–106.
- Slater, M.D., Rouner, D., 1996. How message evaluation and source attributes may influence credibility assessment and belief change. *Journal. Mass Commun. Q.* 73 (4), 974–991.
- Sojka, J.Z., Giese, J.L., 2006. Communicating through pictures and words: understanding the role of affect and cognition in processing visual and verbal information. *Psychol. Mark.* 23 (12), 995–1014.
- Swim, J.K., Stern, P.C., Doherty, T.J., Clayton, S., Joseph, P.R., Weber, E.U., Robert, G., Howard, G.S., 2011. Psychology's contributions to understanding and addressing global climate change. *Am. Psychol.* 66, 241–250.
- Teng, L., Ye, N., Yu, Y., Wu, X., 2014. Effects of culturally verbal and visual congruency/incongruency across cultures in a competitive advertising context. *J. Bus. Res.* 67 (3), 288–294.
- Tu, J.C., Kao, T.F., Tu, Y.C., 2013. Influences of framing effect and green message on advertising effect. *SBP (Soc. Behav. Pers.)* 41 (7), 1083–1098.
- Ülkü, M.A., Hsuan, J., 2017. Towards sustainable consumption and production: competitive pricing of modular products for green consumers. *J. Clean. Prod.* 142 (4), 4230–4242.
- Ursavas, B., Hesapci-Sanaktekin, O., 2013. What happens when you're lost between happiness and sadness? Effects on consumers' cognitive responses. *J. Bus. Res.* 66 (7), 933–940.
- Wang, K.C., Hsieh, A.T., Chen, W.Y., 2002. Is the tour leader an effective endorser for group package tour brochures. *Tour. Manag.* 23, 489–498.
- Wang, Y., Sun, S., 2010. Assessing beliefs, attitudes, and behavioral responses toward online advertising in three countries. *Int. Bus. Rev.* 19, 333–344.
- Wiener, J.L., Doescher, T.A., 1991. A framework for promoting cooperation. *J. Mark.* 55 (2), 38–47.
- Wood, W., Kallgren, C.A., Preisler, R.M., 1985. Access to attitude-relevant information in memory as a determinant of persuasion: the role of message attributes. *J. Exp. Soc. Psychol.* 21, 73–85.
- Yoon, S.J., Park, J.E., 2012. Do sensory ad appeals influence brand attitude. *J. Bus. Res.* 65 (11), 1534–1542.
- Zhang, T., Zhu, Y., Wu, Y., 2014. Losing oneself upon placement in another's position: the influence of perspective on self-referential processing. *Conscious. Cognit.* 27, 53–61.
- Zinkhan, G.M., Carlson, L., 1995. Green advertising and reluctant consumer. *J. Advert.* 24 (2), 1–6.