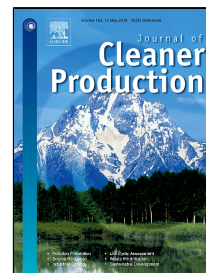


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The Influence of Greenwashing Perception on Green Purchasing Intentions: the mediating role of Green Word-of-Mouth and moderating role of Green Concern



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Title Page

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The Influence of Greenwashing Perception on Green Purchasing Intentions: the mediating role of Green Word-of-Mouth and moderating role of Green Concern

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The influence of greenwashing perception on green purchasing intentions: the mediating role of green word-of-mouth and moderating role of green concern

Abstract With consumers' increasing awareness of environmental problems, green marketing is becoming an important approach for firms to gain a competitive advantage. However, green marketing decoupled from substantive action tends to be perceived as greenwashing by consumers. Compared to a large body of green marketing research, little work has focused on consumers' greenwashing perceptions and its associated consequences. Thus, based on the attitude-behaviour-context theory, this study explored whether and how consumers' greenwashing perceptions influence their green purchasing intentions by integrating the mediating role of green word-of-mouth (WOM) and the moderating role of green concern. Using a questionnaire survey of 553 consumers of batteries in China, the results demonstrate that consumers' greenwashing perceptions not only have a direct negative impact on green purchasing intentions, but also have indirect negative effects via green WOM. Further, green concern strengthens the negative relationship between greenwashing perceptions and green purchasing intentions. Hence, this study suggests that firms should promote substantive environmental initiatives rather than greenwashing to ensure consumers and increase sales.

Keywords: Greenwashing perception; green word-of-mouth (green WOM); green purchasing intentions; green concern

List of abbreviations

WOM: word-of-mouth;

GWP: greenwashing perception;

GPI: green purchasing intentions

GC: green concern;

ABC: attitude-behavior-context

CSR: corporate social responsibility

1. Introduction

With the energy crisis and increasingly serious environmental problems, green consumption has been given more and more attention by companies and consumers. Consumers are keen to purchase green products that are environmentally friendly due to environmental considerations (Chen et al., 2015; Goh and Balaji, 2016). The growing demand for green consumption drives firms to develop green marketing strategies to show consumers their good corporate image and social responsibility. However, green marketing may be regarded as “greenwashing” by consumers when they believe that firms “promise more environmental benefit than they deliver” (Dahl, 2010: A247). Greenwashing is a firm’s over-communication about their environmental performance (Delmas and Burbano, 2011). More than 75% of the S&P 500 companies regularly disclose information about their environmental policies and performance on their websites and approximately 98% of products with environmental claims mislead consumers by committing one or more aspects of the “seven sins of greenwashing”, including “sin of the hidden trade-off”, “sin of no proof”, “sin of vagueness”, “sin of irrelevance”, “sin of the lesser of two evils”, “sin of fibbing” and “sin of false labels” (Choice, 2010).

Existing research has mainly focused on the construct, practice and antecedents of greenwashing. However, there is little knowledge of its impacts on consumers’ green purchasing intentions, or the extent to which consumers are willing to buy environmentally friendly products or services (Lyon and Montgomery, 2015; Newton et al., 2015). When consumers perceive that firms fulfill their social responsibility, they may be more willing to buy the products of these firms, even at a higher price (Grimmer and Bingham, 2013). However, if the consumers realize that firms are greenwashing, they tend not to buy those firms’ products (Chen et al., 2014). Current literature demonstrates that greenwashing perceptions amongst consumers negatively affect their green purchasing intentions (Chen and Chang, 2013), but the influencing mechanism is under-explored.

The purpose of this study is to explore whether and how greenwashing perceptions influence consumers' green purchasing intentions in pollution-intensive and highly visible industries. Based on the attitude-behaviour-context (ABC) theory (Goh and Balaji, 2016), we propose an integrated research model and focus our attention on the mediating role of green word-of-mouth (WOM) and the moderating role of environmental concern.

Consumers often convey products' environmental messages through WOM, i.e. verbal communications between consumers in social and professional settings, which affects their purchasing behaviours (Chaniotakis and Lymperopoulos, 2009; Chen et al., 2014). A great deal of research has shown that WOM affects choice, diffusion, and sales (Berger and Iyengar, 2013). Chen et al. (2014) extended WOM into the environmental field and proposed the construct of "green WOM", the extent to which a consumer would inform others about positive environmental messages related to products and brands. Firms' greenwashing behaviours can lead to negative green WOM, which affects consumers' purchasing intentions. Also, the extent of reduction in purchasing intentions caused by corporate misconduct is affected by consumers' characteristics, among which green concern is an important factor (Newton et al., 2015). Green concern, a consumer's affective evaluation of environmental issues, is often regarded as an antecedent to environmental purchasing intentions (Newton et al., 2015; Zhang et al., 2015). We argue here that greenwashing perceptions have negative effects on consumers' purchasing intentions and green WOM mediates the relationship, while green concern plays a moderating role.

This study was conducted to make a contribution to the literature on greenwashing. First, unlike mainstream research, which focuses on investors or general stakeholders, this paper, based on the attitude-behaviour-context theory, addresses the recent call for research into green marketing and studies the consequences of greenwashing from the perspective of consumers (Du, 2015; Lyon and Montgomery, 2015) by examining greenwashing perceptions and their role in purchasing intentions. Second, this research extends our understanding of the process and context by which greenwashing affects consumers' purchasing intentions.

Specifically, this research examines the mediating role of green WOM as well as the moderating role of green concern in the relationship between greenwashing and consumers' purchasing intentions. Previous studies seldom consider the mechanism of green WOM. The literature often questions whether green concern acts through a mediating mechanism (Goh and Balaji, 2016) or has moderating effects (Kwon et al., 2016); our study supports its role as a moderator. Third, anchored in marketing literature, this research also provides contributions to other fields, such as sustainability and communication. This study offers an integrative perspective on how firms and consumers can be more innovative regarding sustainability and extends communication research, especially WOM, to the context of sustainable development. Finally, in contrast to research based on developed countries, this study examines greenwashing in an emerging economy, in China, whose environment is deteriorating with rapid economic development while lacking sound rules or regulations in recent decades, whose society has a tradition of harmony between human and nature, and whose consumers value relationships with acquaintances very much, and adds value to theoretical completeness (Han and Li, 2015; Li et al., 2016; Li et al., 2017).

The remainder of this paper is structured as follows: Section 2 presents a literature review and hypotheses; Section 3 describes the methodology and measurement; Section 4 is empirical analysis; Section 5 shows the discussions; and the final section provides research conclusions and implications.

2. Literature review and hypotheses

2.1. Attitude-behavior-context (ABC) theory and consumer green behaviors

This paper relies on the attitude-behaviour-context (ABC) theory to get a better understanding of the impact of consumers' greenwashing perceptions on their green purchasing intentions (Guagnano et al., 1995). The ABC theory is based on a means-end approach, in which individuals act according to the gains that they expect from certain behaviours (Feldmann and Hamm, 2015). Hence, the theory provides a useful framework for investigating how attitudes result in certain behaviours (Goh and

Balaji, 2016).

Attitude here means the evaluative rating of an object, which consists of beliefs, perceptions and the evaluation of outcomes. It is at the centre of attempts to predict and explain behaviour (Ajzen, 2005). However, attitude does not always translate into expected behaviours, as behaviours are also dependent on a series of contextual factors such as costs, personal relationships, availability, and societal trends (Feldmann and Hamm, 2015). Context serves to facilitate and constrain certain behaviours. It can be a mediator between individuals' attitudes and their behaviours, but can also reinforce the relationship between attitude and behaviour (Sirieix et al., 2013). Hence, the interaction between consumers' attitudes and contextual factors is an important dimension of the ABC theory (Salonen and Ahlberg, 2012).

It is therefore necessary to consider situational or contextual factors that may foster or impede customers' green behaviours. Building on the ABC theory, this research models the mediating role of green WOM and the moderating role of green concern in the relationship between greenwashing perceptions and consumers' purchasing intentions.

2.2 Greenwashing perceptions and green purchasing intentions

Greenwashing is firms' intentionally misleading or cheating customers with false claims about their environmental actions and impacts to repair public reputation or further shape a good public image (Delmas and Burbano, 2011; Lyon and Montgomery, 2015; Marquis et al., 2016), a selective disclosure of positive information about a company's environmental performance while failing to disclose negative environmental information (Lyon and Maxwell, 2011; Bowen and Aragon-Correa, 2014; Marquis et al., 2016; Seele and Gatti, 2017). In recent years, the number of references to greenwashing in the literature has increased rapidly and the types and consequences of greenwashing have become a research hotspot (Bowen and Aragon-Correa, 2014; Lyon and Montgomery, 2015; Seele and Gatti, 2017). Scholars classify firms into vocal green firms, silent green firms, silent brown firms, greenwashing firms (Delmas and Burbano, 2011); greenwashing firms, false greenwashing firms, potential greenwashing firms and no greenwashing firms (Seele

and Gatti, 2017). Regarding the consequences of greenwashing, the practice not only has a negative impact on the reputation and financial performance of firms (Walker and Wan, 2012; Leonidou, 2013), but also affects the interests of consumers, shareholders, investors, regulators, environmental protection departments and even the entire society (Du, 2015; Guo et al., 2017). Table 1 briefly illustrates the definitions, types and consequences of greenwashing outlined in previous literature.

Table 1 here

Since most of Chinese consumers are frequently subject to inferior goods and are not free of money, they always pay more attention to the price and quality of products. But with the increasingly serious environmental pollution problems in China, they are becoming aware of corporate greenwashing. Therefore, consumers are intended not to purchase the products from the firms which are perceived as greenwashers by consumers. Greenwashing perceptions refers to consumers' recognition of firms' increased communication regarding the environment accompanied by a lack of action, which may discourage them from buying the firm's products (Nyilasy et al., 2014). As shown in Fig. 1, by integrating the perspectives of firms and consumers with the level of pollution that firms produce and general corporate visibility, there are four kinds of industries: high pollution/high visibility; high pollution/low visibility; low pollution/high visibility; and low pollution/low visibility. Consumers in high pollution/high visibility industries care strongly and are more sceptical about firms' environmental words and actions, while for high pollution/low visibility firms, consumers care less but are still sceptical. Also, consumers shopping for products from low pollution/high visibility and low pollution/low visibility industries care less but are still sceptical.

Fig.1. here

Green purchasing intentions refers to the likelihood that a consumer will buy a particular product resulting from his or her environmental views, and represents the extent to which consumers are prepared to purchase products and services from firms with a reputation for being environmentally friendly (Netemeyer et al., 2005; Newton et al., 2015). However, customers may become sceptical about a firm when they see

that it is not practicing what it preaches and sceptical consumers may change their responses toward the firms' products when faced with sufficient proof of greenwashing (Goh and Balaji, 2016). They may form negative opinions about the motives and ulterior motives of the enterprise. Such attribution, in turn, "upsets" the process of attitude formation and discourages purchasing intentions (Nyilasy et al., 2014). If companies use greenwashing to cheat their consumers, their consumers may not be willing to establish trust or long-term relationships with them and ultimately, this reduces their purchasing intentions (Leonidou et al., 2013; Chen and Deng, 2016). In addition, consumers may be confused by false green information, which perplexes them when they want to buy a real green product (Maichum et al., 2016) and ultimately leads to more cautious purchasing behaviours in the future to avoid falling victim to greenwashing. For example, Volkswagen's "Clean Diesel" campaign gave the company a bad reputation amongst green-minded buyers after its emissions scandal, and now it is grappling with a consumer backlash in several important markets. Thus, this study proposes the following hypothesis:

Hypothesis 1 Greenwashing perception is negatively related to green purchasing intentions in China.

2.3 Greenwashing perception and green WOM

Word-of-mouth (WOM) refers to verbal communication between consumers and other people or parties, such as channels, product or service producers, experts, friends and relatives (Chaniotakis and Lympelopoulos, 2009). WOM can convey consumers' pleasant experiences (positive WOM) and also unpleasant experiences through complaints and rumours (negative WOM) (Anderson, 1998). Extending WOM to the environmental field, Chen et al. (2014) propose that green word-of-mouth (green WOM) is the extent to which customers inform their friends, relatives and colleagues about the positive environmental messages and the environmentally friendly nature of a product or a brand.

When a firm "walks the walk" regarding environmental management, customers may think highly of the firm and deliver positive WOM about its green actions. But, as the Chinese saying goes, bad news has wings, which indicates that people are often

willing to expose and promote the weakness rather than finding and publicizing the merits. Therefore, if a firm misleads its consumers through greenwashing, the victimized consumers will spread word of the misconduct and warn, or even deter, others from purchasing the product (Chen et al., 2014). This may suggest a situation whereby once a consumer is aware of greenwashing, a number of consumers will be more sceptical and may refuse to purchase and deter others from purchasing firm's products, especially in an era of social media where information spreads widely and very quickly (Lim et al., 2013). So, it can be assumed that greenwashing perceptions have negative impacts on green WOM (Chaniotakis and Lymperopoulos, 2009; Chen et al., 2014). Thus, this study proposes the following hypothesis:

Hypothesis 2 Greenwashing perception is negatively related to green WOM in China.

2.4 Green WOM and purchasing intentions

Other peoples' recommendations are likely to encourage consumers to change their consumption preferences and decision-making (Zhao and Xie, 2011). WOM is important for consumers' decision-making and many firms adopt it as an effective marketing strategy (Yang et al., 2012). WOM has a direct effect on consumers' decision making because people tend to make decisions by referring to information that reduces the uncertainty of their decision making (Chen et al., 2014). China is undergoing huge social transformation, which will inevitably lead to more obvious changes in people's ideology, values and behavior, and will result in more serious asymmetric information. Then, many Chinese consumers are likely to make decisions based on the reputation evaluation. Keller and Fay (2012) propose that positive WOM can bring a high degree of credibility so consumers are likely to make purchasing decisions when they hear others relating positive information about products. When consumers are surrounded by but confused about so-called "green products", those with better green WOM are more likely to win the trust of consumers and enhance their green purchasing intentions (Chen et al., 2011). According to the above analysis, the following hypothesis is proposed:

Hypothesis 3 Green WOM is positively related to green purchasing intentions in China.

2.5 The moderating effect of green concern

Green concern is an individual's awareness of environmental problems and his/her willingness to tackle the problem (Akehurst et al., 2012). Most research regards this concern as a direct or indirect antecedent of consumers' green purchasing intentions (Chen et al., 2015; Newton et al., 2015), but seldom does any study explore its moderating role between corporate misconduct and consumers' purchasing intentions. In fact, consumers with a high degree of green concern are more likely to have a strong sense of environmental responsibility and practice environmentally-friendly behaviours (Biswas and Roy, 2015), such as energy-saving, recycling, and buying environmentally-friendly products. They are also more likely to identify corporate greenwashing and be aware of its negative impacts, thus reducing the consumption of such products (Newton et al., 2015). Further, Kwon et al. (2016) regard green concern as a moderator between third-party environmental ratings and brand greenness perception. In China, the prevailing idea of the harmony between human and nature, leads people to pay more attention to natural environmental protect. With the guidance of this thought, in consideration of the severe natural environmental pollution, Chinese consumers with high green concern are likely to impose their green beliefs onto green consumption habits and reduce their irresponsible purchasing intentions (Johnstone and Tan, 2015). Therefore, we argue that green concern moderates the relationship between greenwashing perceptions and purchasing intentions. According to the above analysis, the following hypothesis is proposed:

Hypothesis 4 The influence of greenwashing perception on green purchasing intentions is moderated by green concern in China. The higher the green concern is, the more negative impact on green purchasing intentions the greenwashing perception will be.

This study proposes that greenwashing perceptions negatively affect green purchasing intentions, while green WOM mediates, and green concern moderates the relationship. The research framework is shown in Fig. 2.

Fig. 2. Here

3. Methodology and measurement

3.1 Data collection and the sample

Due to the fact that the unit of analysis in this research is the consumer-level, and by referring to Chen et al. (2014), this paper chose the questionnaire survey method to test the proposed hypotheses. This study focused on consumers who have experience buying products from energy companies, such as battery enterprises, which are high pollution/high visibility industries. Given that consumers in the energy industry are more sceptical about firms' environmental words and actions, energy companies are the main focus of this study, considering that there are many organizations that run a high risk of being accused of greenwashing communications about their environmental policies. Also, these companies are typically regarded as profit-focused polluters rather than as environmentalists (Muralidharan et al., 2011). People may believe that energy companies adopt environmental policies fraudulently due to the burning of 'dirty' fossil fuels to produce energy.

The questionnaire began with a short description of the environmental claims and actions of a virtual enterprise, LvNENG Battery Technology Co., Ltd. First, their positive vision and green claims were presented. Then, a negative environmental violation was depicted.

'LvNENG Battery Technology Co., Ltd., a green power energy manufacturer committed to become the leading green energy supplier in the world, advocates both "economic benefits" and "ecological benefits". But recently, the enterprise was troubled with a lead pollution incident where the children nearby were found to have blood lead content exceeding the standard, some of whom have severe lead poisoning. However, the enterprise does not seem to take any responsible actions to prevent the spread of lead pollution.'

After reading the background information, the respondents were asked to answer some questionnaire items, which mainly referred to prior research and the English version was translated into Chinese by three experts who were proficient in both languages in this research field. Translation and retroversion was used to ensure the

accuracy in statements and meanings. All the questionnaire items were measured by means of “five-point Likert scale from 1 to 5” rating from 'strongly disagree' to 'strongly agree'.

Before the formal questionnaire survey, we randomly distributed 30 questionnaires to check whether ambiguities existed in the questions and their meanings, and then corrected and perfected them. The data collection procedure included an online survey (via QQ and Wechat) and a traditional face-to-face survey, which was conducted in Shanghai, Changsha and Chengdu, representing the east, centre and west of China, respectively. Since social media, such as Wechat and QQ, is quite popular in China now, we intended to get data from various sources to see whether there are any differences between online and face-to-face respondents. To make the online sample more representative and prevent the likelihood of sharing via instant communication tools, we required the respondents NOT to share the link to the electronic questionnaires with their friends.

The questionnaires were handed out and data was collected through 350 electronic questionnaires sent via the internet (150 copies by QQ and 200 copies by WeChat) and 360 paper questionnaires handed out face-to-face (120 copies in Shanghai, 130 copies in Changsha, and 110 copies in Chengdu). The electronic and paper questionnaires had the exactly same content. A total of 710 questionnaires were distributed and 645 completed copies were returned. 92 questionnaires were excluded because of incomplete information, leaving 553 valid questionnaires, 252 online (98 from QQ and 154 from WeChat) and 301 face-to-face (98 in Shanghai, 108 in Changsha, and 95 in Chengdu). Fig.3 shows a flow chart of the sampling methodology. Among these valid questionnaires, 55.3 percent of the respondents were male while 44.7 percent of the respondents were female. The demographic characteristics of the respondents are presented in Table 2.

Fig. 3. Here

Table 2 here

3.2 Measurements of variables

Greenwashing perception. Greenwashing perception is consumers' recognition

of corporate acts to mislead consumers regarding corporate environmental practices or environmental benefits (Parguel et al., 2011). Referring to Laufer (2003) and Chen and Chang (2012), we developed five items to measure greenwashing perceptions from the consumers' perspective: (1) the product misleads with words regarding its environmental features; (2) the product misleads with visuals or graphics regarding its environmental features; (3) the product is associated with a green claim that is vague or seemingly un-provable; (4) the product overstates or exaggerates what its green functionality actually is; (5) the product leaves out or masks important information, making the green claim sound better than it is.

Green WOM. Green WOM is a positive reference by others regarding products' or firms' environmentally-friendly nature. To measure the extent to which a customer would inform their friends, relatives and colleagues about positive environmental information of a product, we developed four items according to Molinari et al. (2008): (1) I would highly recommend this product to others because of its environmental image; (2) I would positively recommend this product to others because of its environmental functionality; (3) I would encourage others to purchase this product because it is environmentally-friendly; (4) I would say good things about this product to others because of its environmental performance.

Green purchasing intentions. According to Abdul-Muhmin (2007) and Goh and Balaji (2016), we designed three statements to measure green purchasing intentions: (1) I will purchase lead acid batteries from this company because of its environmental concern; (2) I am willing to buy other battery products from this company because of its environmental performance; (3) I am happy to purchase this company's battery products because they are environmentally friendly.

Green concern. In terms of green concern, which refers to consumers' general attitudes toward the cognitive and affective evaluation of environmental issues, a four-item measure was designed according to Lee (2008) and Paladino and Ng (2013): (1) I am worried about the worsening of the quality of environment; (2) the environment is a major concern for me; (3) I am passionate about environmental protection issues; (4) I often think about how the condition of the environment can be

improved.

Control variables. Gender, age, education and income of the respondents were taken as control variables since these factors may affect their greenwashing perception (Matthes and Wonneberger, 2014). Gender was measured by a dummy variable, 0 denotes male, 1 female. Age was measured by year and divided into five groups (“1” to “5”, denotes less than 20 years old, 21-30 years old, 31-40 years old, 41-50 years old and over 50 years old, respectively). Education was measured and divided into three groups (“1” to “3”, denotes high school or below, junior college or undergraduate, postgraduate or above, respectively). Income was measured by money and divided into three groups (“1” denotes less than 3,000 yuan a month, “2” 3,000 - 7,000 yuan a month, “3” over 7,000 yuan a month).

4. Empirical results

4.1 Independent t-Test: online versus offline data

In order to see if there are any differences between data collected online and offline, we conducted the independent t-test by checking whether both means were significantly different. The results of t-test revealed that, except for the gender and age, there were no significant differences in the means for the main constructs from the 252 online questionnaires and the 301 offline questionnaires. Therefore, there were no differences between data collected online and offline at the significance level of 0.01, which provided support for combining online and offline data. The results of the independent t-test were presented in Table 3.

Table 3 here

4.2 Reliability and validity

The Kaiser-Meyer-Olkin (KMO) is performed to examine the sample adequacy for the variables. The overall KMO value of the scale is 0.788 and Bartlett’s Test of Sphericity is significant ($p < 0.01$), above the acceptable threshold.

This study tests the reliability of the constructs by examining Cronbach’s α coefficients. As shown in Table 4, the Cronbach’s α coefficient of greenwashing perception, green WOM, green concern, and green purchasing intentions are 0.843,

0.819, 0.749 and 0.795, respectively, all above the minimum level of 0.7, indicating acceptable reliability.

Construct validity, content validity and criterion validity are three main types of validity. Construct validity of scale includes discriminant validity and convergent validity. First, the factor loading of each variable is above 0.6, showing acceptable structure validity of the measurement. Average Variance Extracted (AVE) is used to assess the discriminant validity of the measurement (Fornell and Larcker, 1981). It requires that the square root of construct's AVE should exceed the correlations between the construct and the other ones in the research model. As shown in Table 3, the square root of all construct's AVEs are higher than the correlations among all the constructs in Table 4, indicating the acceptance of the discriminant validity of the measurement. In addition, the AVEs of greenwashing perception, green WOM, green concern and green purchasing intentions are 0.594, 0.611, 0.559 and 0.674, respectively, all above the minimum level of 0.5, demonstrating that the convergent validity of the measurement is also acceptable. Content validity is ensured by utilizing the existing scales that have been proved reasonable through being empirically tested. Criterion validity is analyzed by correlation analysis (see Table 4), which presents that the constructs perform in a credible manner.

Social desirability bias (SDB) which means the tendency of respondents to fill in questionnaires in a manner that is viewed favorably by others would affect the validity of questionnaire survey. Most respondents would pretend not to violate green trend or CSR, so a SDB problem would appear in this study. To eliminate this problem, we guaranteed the respondents that the survey was for academic use only and that they could write down the answers anonymously. Also we designed some reverse items in the questionnaire.

Table 4 here

4.3 Descriptive statistics and correlation analysis

As shown in Table 5, the means, standard deviations and correlation matrix are calculated. The data suggests that greenwashing perception is significantly negatively

correlated with both green WOM and green purchasing intentions ($p < 0.01$). Further, green WOM is positively correlated with green purchasing intentions ($p < 0.01$).

Table 5 here

4.4 The Common Method Bias

Since all the variables are measured through the same instrument, Harman's single factor test is applied to measure the common method bias in this study (Podsakoff and Organ, 1986). Four factors with eigenvalues greater than 1 are extracted with non-rotating analysis and the cumulative total explanatory variables are 65.48%. Moreover, the first factor has an eigenvalue of 4.23 and the total explanatory variables are 26.44%, indicating that the common method bias in this study is not serious.

4.5 Hypothesis testing

Structure equation modeling (SEM) is widely used to test the research model with mediating effect; however, our study not only explored the mediating role of green word-of-mouth but also the moderating role of green concern, it is difficult to use SEM to test the developed hypotheses simultaneously. So we test the relationships with hierarchical regressions.

Main effect

The main effect analysis is to test the relationship between greenwashing perception and green purchasing intentions through hierarchical regression. As results shown in Table 6, Model 1 is the relationship among control variables and the dependent variable, Model 2 introduces the independent variable. The result indicates that greenwashing perception is significantly negatively related with green purchasing intentions ($\beta = -0.361, p < 0.01$), which means the higher the green perception is, the lower the green purchasing intentions will be, so Hypothesis 1 is supported. In addition, education in Model 2 is significantly positively related with green purchasing intentions ($\beta = 0.075, p < 0.1$), indicating education is an important tool to increase consumers' environmental knowledge and purchasing intentions.

Mediating effect

This paper tests mediating effect with regression equations, consisting of four steps (Baron and Kenny, 1986). First, we need to test whether the independent variable significantly affected the dependent variable; second, we test whether the mediator is significantly affected by the independent variable; third, we test whether the mediator has a significant impact on the dependent variable; and fourth, we put the mediator into the equation meanwhile and test whether the independent variable still significantly affects the dependent variable. Under the condition that the effects are significant in the first three steps, if the effects become insignificant or still significant but the β coefficient decreases in the fourth step, it is proved that a mediating effect exists.

This section tests the mediating effect of green WOM between greenwashing perception and green purchasing intentions. Model 2 has shown a significant negative relationship between greenwashing perception and green purchasing intentions. Model 3 is the regression model of the independent variable on green WOM, and the result shows that greenwashing perception is significantly negatively associated with green WOM ($\beta = -0.335, p < 0.01$). Therefore, Hypothesis 2 is supported. Also, education is significantly positively related with green WOM ($\beta = 0.072, p < 0.1$), while gender is significantly negatively related with green WOM ($\beta = -0.137, p < 0.01$), showing females are more likely to communicate green WOM.

Model 4 is the regression model of green WOM on green purchasing intentions, and the result reveals that green WOM is significantly positively related with green purchasing intentions ($\beta = 0.543, p < 0.01$). So Hypothesis 3 is supported.

Model 5 is generated based on Model 2 by introducing a mediating variable and the result indicates that greenwashing perception is still significantly negatively associated with green purchasing intentions ($\beta = -0.202, p < 0.01$), while green WOM is significantly positively related with green purchasing intentions ($\beta = 0.476, p < 0.01$), so green WOM partially mediates the relationship between greenwashing perception and green purchasing intentions.

Moderating effect

To test whether green concern plays a moderating role, two procedures are

carried out. First, to prevent the situation that variables do not contribute equally to the analysis due to the measurements from different scales, we standardize the independent variable and the moderator, then create an interaction term of the standardized independent variable and moderator. Second, we put the dependent variable into the equation, then the control variables, the independent variable and the moderating variables are added in sequence. Model 6 shows that green concern is significantly negatively related to green purchasing intentions ($\beta = -0.176, p < 0.01$). Third, similar to the second step, the interaction term of the standardize independent variable and the moderating variable is introduced. Model 7 indicates that green concern does moderate the relationship between greenwashing perception and green purchasing intentions, and it enhances the negative impact of greenwashing perception on green purchasing intentions ($\beta = -0.530, p < 0.1$). Therefore, Hypothesis 4 is supported.

Table 6 here

In order to demonstrate the moderating effects of green concern, we plotted the relationships at two levels of the moderator (i.e., above and below one standard deviation from mean, representing high and low levels, respectively) (Li and Tang, 2010). Fig. 4. shows the moderating effect of green concern: when green concern is low, the green purchasing intentions decline only from 0.249 to -0.017; when green concern is high, the green purchasing intentions decline from 0.138 to -0.364.

Fig. 4. Here

4.6 Robustness test

Since the five-point Likert scale variables on both sides of the equation are indeed ordinal, we adopted optimal scaling technique as an alternative to check the robustness of the results (Nishisato and Inukai, 1972). The results presented in Table 7 show that our findings still held and no significant difference exists across the two approaches, indicating a good robustness in our hypothesis testing.

Table 7 here

5. Discussions

Although previous research has suggested that greenwashing plays a negative role in consumers' purchasing intentions, there has been limited research incorporating green WOM and green concern to investigate the process and context by which greenwashing perceptions affect green purchasing intentions. By considering the roles of green WOM and green concern in the relationship between consumer greenwashing perceptions and green purchasing intentions, we have generated the following findings.

First, greenwashing perceptions are significantly negatively related to consumers' purchasing intentions, which is consistent with the findings from Nyilasy et al. (2014) and Rejikumar (2016). With increasingly serious environmental problems and increased consumer awareness of environmental protection in China, consumers are paying more attention to consuming green products or services that are beneficial for the environment (Leonidou and Skarmeas, 2017). Through watching TV news, searching on the internet and engaging in social media, consumers come to know about companies' misconduct, which have negative impacts on consumer behaviours and discourages purchases (Lim et al., 2013). When consumers perceive that firms are exaggerating their green performance, they may discount the credibility of corporate actions and form negative evaluations of those companies. What's more, corporate greenwashing behaviours, such as the false or exaggerated portrayal of products and services as environmentally friendly can even lead to reduced product quality perceptions amongst consumers. Purchasing intentions are negatively affected by this "greenwashing discount" (Lyon and Montgomery, 2015). Also, if customers feel cheated by a firm's greenwashing, they may be sceptical of the firm's sustainability initiatives and may be unwilling to establish a long-term relationship with the firm. Hence, greenwashing perceptions may reduce customers' purchasing intentions.

Second, this study demonstrates that the relationship between greenwashing perceptions and purchasing intentions is partially mediated by green WOM. Green WOM is usually viewed as more reliable information than firm-initiated

communications and thus, it strongly affects the purchasing intentions of consumers (Allsop et al., 2007). When consumers have the perception that a company is greenwashing, they are likely to voice their doubts to friends and people in their networks to warn others about the dissemination of false product information (Ferguson et al., 2011; Leonidou and Skarmeas, 2017). Therefore, to vent their frustration and attain retribution for their dissatisfaction, consumers may not only reduce their own purchasing intentions in response to greenwashing, but they may also persuade, warn, and even deter their relatives, friends and others from purchasing products (Lim et al., 2013; Chen et al., 2014).

Finally, the moderating role of green concern is supported in this study, in line with Goh and Balaji (2016). This may be because consumers with higher green concern are more cautious about real environmental impacts of products, are more able to distinguish substantive greening from symbolic greening and are more inclined to purchase authentic green products. In addition, in a sense, green concern represents consumers' perceptions of their own environmental responsibility, which drives them to be conscious of their role in easing environmental problems and to behave responsibly by reducing their purchases from greenwashing firms. Therefore, the higher the consumer's green concern is, the stronger the intention will be for not purchasing products when they perceive greenwashing behaviours.

6. Research conclusions and implications

6.1 Conclusions

Based on the attitude-behavior-context theory, this study explored the influence mechanism of greenwashing perception on green purchasing intentions by considering the mediating role of green WOM and the moderating role of green concern. With the collection of 553 questionnaires from consumers in battery industry in China, we find that greenwashing perception is negatively correlated with green purchasing intentions, and that green WOM plays a partial mediating role, while green concern strengthens the negative relationship between greenwashing perception

and green purchasing intentions.

6.2 Practical implications

These findings have several implications. First, the findings imply that decreasing greenwashing perceptions can increase consumers' purchasing intentions. Companies must seize the opportunity for green consumption to truly focus on environmental protection with substantive actions rather than greenwashing, in order to make them truly worthy of the title of "green business". Thus, enterprises, especially those in high pollution/high visibility industries, should be more careful about their environmental words and actions to "walk the talk", strengthen their substantive green management and green images to reduce consumer scepticism, which will lead to a win-win strategy to achieve both environmental and market performance (Jackson et al., 2016; Park et al., 2016).

Second, the significant mediating effect of green WOM indicates that companies need to strengthen green WOM to encourage consumers' purchasing intentions and reduce the negative impacts of greenwashing perceptions. The products and brands with positive green WOM will win consumers' trust. Therefore, it's necessary for firms to monitor levels of scepticism toward green products or services among consumers by undertaking interviews and surveys and considering the feedback when communicating their green claims (Goh and Balaji 2016). With the help of information technology, the spread of WOM today is not limited to face-to-face communication, but is increasingly dependent on social media, so companies should pay more attention to understanding consumers' views and suggestions for green improvements (Lyon and Montgomery, 2015).

Third, customer green concern leads to more reduction in green purchasing intentions when they perceive a firm's greenwashing behavior. This means that consumers with higher green concern would be more capable of figuring out the real green claims or products from the greenwashing ones. So firms should encourage and educate consumers to increase their green concern to gain the knowledge and ability to identify the authenticity of green products, green services or green claims and give up the greenwashing products to help build a more equitable market to achieve

sustainable development.

Fourth, as we know, green consumption is at the beginning stage in China, therefore, the green consumption awareness of China's consumers is still weaker than the west, and Chinese consumers may be reluctant to take green initiatives. Consequently, it is necessary to encourage green awareness and consumption among Chinese consumers. Policymakers and firms should play a vital role in promoting green consumption through effective environmental communication (Jaiswal and Kant, 2018). Also, some effective measures should be taken, such as strengthening environmental education of Chinese consumers, implementing strict certification programs with environmentally-related labels (Lai and Cheng, 2016).

Fifth, to promote the development of green market in China, it's not enough to rely solely on the effort of firms, but the government should be deeply involved. Policy-makers should make efforts to develop and implement initiatives to alleviate consumer scepticism. They could focus on both regulatory and supportive policies for firms to improve their communication of environmental claims to consumers. For example, policy-makers may introduce strict penalties for those greenwashers with misleading and even false environmental claims. Also, energy and environmental labelling, which provides consumers with appropriate and reliable information about the energy consumption and environmental impacts of a product, would be a promising policy. These initiatives may reduce consumer scepticism about firms' environmental claims.

6.3 Limitations and future research

This study was subject to several limitations. First, though we aimed to explore whether and how greenwashing perception affects green purchasing intentions, we only studied the mediating role of green WOM and the moderating role of green concern, with other possible mediating and moderating mechanisms, such as green skepticism and environmental knowledge, neglected. Thus, future research should incorporate these factors into consideration. Second, this paper doesn't identify different types of greenwashing (e.g., decoupling, impression management, attention deflection, deceptive manipulation, etc.) and the measure of greenwashing perception

is limited for the short description of the focal company, so it is necessary to enlarge the scope and develop more proper situation and measurements of greenwashing practices in the future research. Third, this study mainly focuses on the Chinese context, which may not be able to expand to other countries, so comparative studies with different cultural backgrounds and environmental situations should be a further research direction.

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Pollution Level	High	High pollution/ Low visibility	High pollution/ High visibility
	Low	Low pollution/ Low visibility	Low pollution/ High visibility
		Low	High
		Visibility	

Figure 1 Industries of different pollution level and visibility

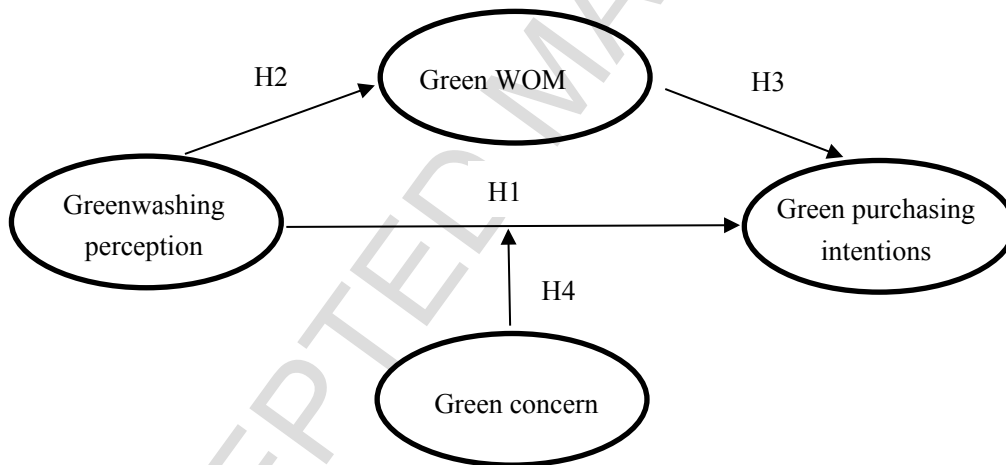


Figure 2 Research framework

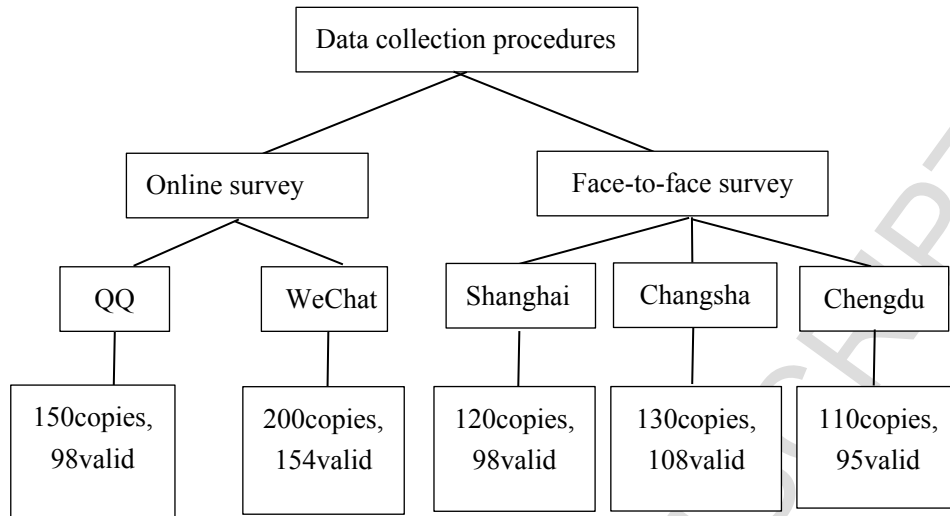


Figure 3 The flow chart of data collection process

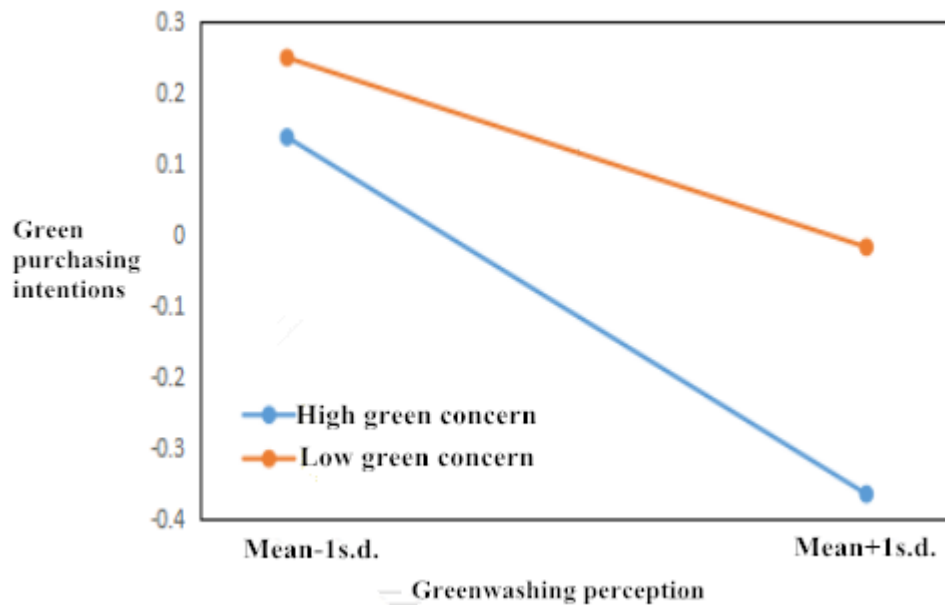


Figure 4 Moderating effect of green concern

Highlights

The influence of greenwashing perception on consumers' green purchasing intentions is explored.

Greenwashing perception has a direct negative effect on green purchasing intentions.

Green WOM plays a partial mediating role between greenwashing perception and green purchasing intentions.

Green concern plays a moderating role between greenwashing perception and green purchasing intentions.

Table 1
Definitions, types and consequences of greenwashing.

	Contents	References
Definitions	A firm puts forward fewer substantive claims but more posturing claims in environmental advertising	Polonsky (2010)
	Firms' intentionally misleading or cheating customers with false claims about their environmental actions and impacts to repair public reputation or further shape a good public image	Delmas and Burbano (2011); Lyon and Montgomery (2015); Marquis et al. (2016)
	A selective disclosure of positive green information about a company's environmental performance, while ignoring the disclosure of negative information on these aspects, in order to create a positive corporate image	Lyon and Maxwell (2011); Bowen and Aragon-Correa (2014); Marquis et al. (2016); Seele and Gatti (2017)
	A company has poor environmental performance but communicates a lot about its positive environmental performance	Delmas and Burbano (2011); Siano et al. (2017)
	Greenwashing exists when a misleading message or company is accused by the stakeholders.	Seele and Gatti (2017)
Types	Decoupling and attention deflection	Lyon and Maxwell (2011); Pope and Wæraas (2016); Siano et al. (2017)
	Vocal green firms, silent green firms, silent brown firms, and greenwashing firms	Delmas and Burbano (2011); Marquis et al. (2016)
	Greenwashing firms, false greenwashing firms, potential greenwashing firms and no greenwashing firms	Seele and Gatti (2017)
Consequences	A negative impact on the reputation and the financial performance of firms	Walker and Wan (2012); Leonidou (2013)
	A negative impact on the interests of consumers, shareholders, investors, regulators, environmental protection departments	Du (2015)
	A negative impact on the entire society	Guo et al. (2017)
	The negative link between greenwashing and green trust	Chen and Chang (2013)
	The construct of perceived consumer skepticism as the extended consequence of greenwashing	Aji and Sutikno (2015)

Table 2
Respondent demographics.

	N	%
Gender		
Male	306	55.3
Female	247	44.7
Age		
Under 20 years	93	16.8
21-30 years	182	32.9
31-40 years	152	27.5
41-50 years	71	12.8
Over 50 years	55	10
Education		
High school or below	106	19.1
Junior college or undergraduate	305	55.2
Postgraduate or above	142	25.7
Income		
Under 3000yuan a month	55	10
3000-7000 yuan a month	395	71.4
Over 7000 yuan a month	103	18.6

Table 3
Independent t-test: online versus offline data.

Variables	Means		Std. Deviation		Sig. (2-tailed)
	Online	Face-to-face	Online	Face-to-face	
1.Greenwashing perception	3.99	3.89	0.61	0.61	0.072 ^{NS}
2.Green WOM	2.07	2.16	0.79	0.79	0.169 ^{NS}
3.Green purchasing intentions	1.95	2.02	0.74	0.74	0.275 ^{NS}
4.Green concern	3.96	3.96	0.64	0.64	0.882 ^{NS}
5.Gender	0.50	0.40	0.50	0.50	0.013
6.Age	2.70	2.62	0.51	0.50	0.038
7.Education	2.08	2.04	0.32	0.26	0.146 ^{NS}
8.Income	2.14	2.04	0.59	0.54	0.262 ^{NS}

Notes: NS=Not Significant. N online= 252; N offline= 301.

Table 4The items' loadings (λ) and the Cronbach's α coefficients and AVEs of the constructs.

Constructs	Items	λ	Cronbach's α	AVE	The square root of AVE
Greenwashing perception	GWP1	0.856	0.843	0.594	0.771
	GWP2	0.729			
	GWP3	0.727			
	GWP4	0.812			
	GWP5	0.721			
Green WOM	GWOM1	0.723	0.819	0.611	0.782
	GWOM2	0.748			
	GWOM3	0.825			
	GWOM4	0.826			
Green concern	GC1	0.688	0.749	0.559	0.748
	GC2	0.756			
	GC3	0.850			
	GC4	0.684			
Green purchasing intentions	GPI1	0.739	0.795	0.674	0.821
	GPI2	0.813			
	GPI3	0.902			

Table 5

Descriptive statistics and correlation analysis.

	Mean	SD	1	2	3	4	5	6	7	8
1.Greenwashing perception	3.94	0.61	1							
2.Green WOM	2.12	0.79	-0.350**	1						
3.Green purchasing intentions	1.99	0.74	-0.366**	0.543**	1					
4.Green concern	3.96	0.64	0.277**	-0.054	-0.264**	1				
5.Gender	0.45	0.50	0.160**	-0.179**	-0.096*	0.128**	1			
6.Age	2.67	0.50	-0.002	-0.036	0.043	0.018	-0.007	1		
7.Education	2.06	0.29	0.060	0.035	0.043	-0.020	0.155**	-0.014	1	
8. Income	2.09	0.56	-0.093*	-0.017	0.047	0.098*	0.016	0.274**	-0.122**	1

Notes: * $p < 0.05$; ** $p < 0.01$ (Two-tailed). N = 553.

Table 6

Hierarchical regression results.

Dependent variables	Green purchasing intentions		Green WOM	Green purchasing intentions			
	M1	M2	M3	M4	M5	M6	M7
1. Control variables							
Gender	-0.107**	-0.050	-0.137***	-0.004	0.015	-0.034	-0.034
Age	0.030	0.039	-0.029	0.050	0.053	0.037	0.042
Education	0.066	0.075*	0.072*	0.031	0.040	0.068*	0.063
Income	0.049	0.013	-0.029	0.047	0.027	0.034	0.036
2. Independent variable							
Greenwashing perception		-0.361***	-0.335***		-0.202***	-0.313***	-0.012
3. Mediating variable							
Green WOM				0.543***	0.476***		
4. Moderating variable							
Green concern						-0.176***	*-0.157
5. Moderating effect							
Greenwashing perception × Green concern							-0.530*
R^2	0.017	0.143	0.146	0.301	0.336	0.170	0.175
Adj. R^2	0.010	0.135	0.138	0.294	0.329	0.161	0.164
F	2.331*	18.199***	18.642***	47.081***	46.016***	18.684***	16.516***

Notes: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (Two-tailed). $N = 553$.

Table 7
Optimal scaling regression results.

Dependent variables	Green purchasing intentions		Green WOM	Green purchasing intentions			
	M1	M2	M3	M4	M5	M6	M7
1. Control variables							
Gender	0.084**	0.041	0.134***	0.009	0.022	0.028	0.029
Age	0.108***	0.092***	0.010	0.097***	0.096***	0.089***	0.089
Education	0.132***	0.165***	0.092***	0.107***	0.126***	0.159***	0.157***
Income	0.078***	0.021	0.048*	0.053**	0.031	0.038	0.038
2. Independent variable							
Greenwashing perception		-0.355***	-0.334***		-0.197***	-0.310***	-0.476***
3. Mediating variable							
Green WOM				0.536***	0.472***		
4. Moderating variable							
Green concern						-0.168***	-0.340***
5. Moderating effect							
Greenwashing perception × Green concern							-0.471**
R^2	0.045	0.161	0.153	0.317	0.350	0.186	0.188
Adj. R^2	0.032	0.149	0.140	0.307	0.339	0.173	0.173
F	3.641***	13.062***	12.271***	31.631***	32.436***	13.824***	12.546***

Notes: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (Two-tailed). N = 553.