Revolutionize China’s Auto Market Setup by Chinese EV Brands? Answers from Consumers

Li Li1,2,3,*, Yijinghong Li1, Kewen Lei1, Yue Li1 and Yixi Luo1
1School of Economics and Management, Beijing Information Science & Technology University, Beijing, People’s Republic of China;
2Laboratory of Big Data Decision Making for Green Development, Beijing Information Science & Technology University, Beijing, People’s Republic of China;
3Beijing International Science and Technology Cooperation Base of Intelligent Decision Making and Big Data Application, Beijing Information Science & Technology University, Beijing, People’s Republic of China;

*liilili20111739@bistu.edu.cn

Abstract: As the foreign and joint venture brands introduced their electric vehicle (EV) into China, the pattern of China’s EV market changed quietly. Under such circumstance, whether Chinese EV brands can subvert the structure of the Chinese automobile market is a question worth studying. This article uses the discrete choice experiment (DCE) to answer this question from the perspective of consumer preference. We divided the entire EV market into mid-end and high-end EV markets, a binary logit regression model was used to analyze the possibility of consumers’ purchase choice of EVs in different markets depending on the different levels of price, range, energy efficiency, number of super charging stations, service stores and installation of automated driving system. We finally found that compared with the high-end EV market, Chinese domestic EV brands are more competitive in the mid-end market, but even in the mid-end market, Chinese brand EVs are still not as attractive to consumers as joint venture brands. Generally speaking, although Chinese domestic EV brands will cause certain changes in China’s overall automotive market structure, the changes would be very limited. In the future, the Chinese brand EVs should improve its brand-specific charging service levels which can greatly increase their competitiveness.

1. Introduction
The promotion of EVs is considered to be the most effective means to solve the transportation sector’s impact on climate change [1-3]. In China, in addition to achieving the above objectives, the development of the EV industry also was also designed to support the development of Chinese great auto brands, so as to reshape the entire automotive industry in China, which is currently almost entirely dominated by foreign brands [4]. After years of policy supporting [5], China’s EV market has developed rapidly. At present, China has formed the world’s largest EV market [6-7]. Chinese brand EVs also held a very large market share in this market. However, with the reduction of the intensity of national incentive policies and the gradual liberalization of restrictions on foreign brands, the market is quietly undergoing changes.

As shown in Figure 1, before 2018, when most foreign and joint venture brands had not launched their EVs on a large scale in China’s EV market, Chinese domestic EV brands EVs, such as BYD and BAIC, accounted for a large share of the entire market, but starting in 2018, BMW, the traditional joint venture auto
brand, began to launch its EV on the market. In 2019, Volkswagen and Toyota, China's most popular traditional auto joint venture brands, also began to launched thier EVs on the market, and quickly gained a certain level of market share. By June 2020, the market shares of BAIC, a Chinese domestic EV brand that once led the entire EV market was left behind. Since 2020, after foreign brand Tesla has launched a large number of Chinese localized model 3 in the Chinese EV market, the market share of different EV brands changed even more dramatically. Even BYD, which once represented the highest technoligical level of China EV manufacturing, lost the battle with Tesla. In market share. Faced with such a big change, we autonomous must rethink that, whether Chinese domestic EV brands, which grown up under the protection of governmental policies, when faced with strong competition from foreign and traditional joint venture brands, can revitalize Chinese auto market in the future? This work was designed to answer this question from the perspective of consumer choice.

![Figure 1. Changes in the EV market share of several major brands in China from Jan. 2017- Jun.2020](image)

From the overall point of view, consumer acceptance and recognition are the core issues that determine the development of the entire EV industry [5]. Therefore, many scholars focus their research on the consumer preferences of EV consumers. Previous studies have found that as a product, EVs have many product attributes that determine consumers’ choices, such as purchase price [8], operation cost [9], driving range [10], charging time [11], battery warranty, depreciation rate and brand [12] etc. In addition, scholars also found that other external factors, such as density of charging stations [13] and policies [14-16], also affect consumers' willingness to buy EVs. But in general, when studying consumers’ choices of EVs, policies usually have an impact on the overall trend of the EV market. Regarding the choice of a specific EV, its product attributes can better determine the specific choice of consumers. Among all the attributes, brand factors have also been extensively studied by research. In China, Li (2020) [12] believes that consumers are more willing to choose EVs from Chinese brands than European, Japanese, Korean, and North American brands. However, in the design of the Li’s (2020) research plan, the policies were combined by product attributes for consideration, when under this case, respondents will inevitably consider that Chinese brand EV brands enjoy more policy protection. This, therefore, does not fully reflect consumers’ true preference for brands under marketization. On the contrary, when studying consumers’ preference for EV brands, this article discarded the influence of policies, in order to investigate whether Chinese brand EVs are competitive under the environment of complete market competition with foreign brands.

The following research of this work is arranged like this, section 2 introduces the research method of this work, section 3 introduces the experimental design, section 4 presents the results and section 5 concludes this work.

2. Methodology
This work will use the discrete choice experiment (DCE) method to study consumers’ preference on EV brands. The DCE model is also called a selection-based combined analysis model, which was initially mainly used for product testing in marketing. It is based on the experimental design, by simulating the market competition environment of the researched product, to measure the purchase choice behavior of consumers, so as to know the key influencing factors of consumers’ purchase decision. In academic research, DCE is commonly used to study people's behavior choices, such as travel mode choice behavior [17] and consumer choice behavior [18-19]. In terms of EV consumption choices, some scholars also use DCE for research. For
example, Li et al (2020) [12] used DCE to find that the product attributes of EVs such as battery protection play a greater role in influencing people's EV consumption choices. Byun et al (2018) [13] used DCE study to find that the different implementation intensity of policies will affect consumers’ willingness to buy EVs. Noel et al (2019) [20] used the DCE study to find that the driving range and the recharging time will significantly affect people's choices for EV consumption.

The significant differences from this work and the above research in case of DCE design are: 1) First, we only considered factors in a pure market environment, so policy impacts are not within our scope of consideration; 2) We divided the EV market into mid-end and high-end markets for research. This is mainly because Chinese domestic EV brands currently have corresponding EV products in these two areas to compete with foreign brands; 3) In addition to the two important product attributes, namely purchase price and driving range, we also considered other product attributes that most previous studies have not considered, such as the autopilot system that best represents the technological innovation of an EV and the electricity consumption intensity that represents the energy consumption intensity level, as well as the number of brand-own service store and charging stations; 4) Considering the current brands competition situation in China’s auto markets, we set the brands in the mid-market as Chinese domestic other brands (such as BAIC), Chinese domestic leading brands (such as BYD), and joint venture brands (such as Volkswagen). Because the the brands in high-end auto market of China has always been occupied by joint venture brands, so we set the brands in high-end EV market as: Chinese new auto force brands (such as NIO), traditional joint venture brands (such as BMW) and foreign brands (such as Tesla).

3. Experiment design
To use DCE for research, we need to follow the following steps: 1) defining the product’s attributes and levels; 2) experiment design; 3) choice set; 4) data collection and analyzing [21].

(1) Defining the products attribute and level
Based on the above analysis, this work divided the EVs into two markets. The first is the mid-end market. The price of EVs is between 100,000 and 300,000. The product attributes and their levels are shown in Table 1. The second market is the high-end market, and the EV products’ can be also seen in Table 1, in which the price of EVs is defined to range from 300,000 to 500,000.

(2) Experiment design and Choice set
If we consider all the product attributes, there would be 3*2*3*2*2*2=432 kinds of scenarios in the mid-end market, and 3*2*2*3*2*2*2= 288 in the high-end market. In order to improve the respondents’ efficiency of choice, this paper further adopted the method of orthogonal design [22] and the Spss software to filter the scenarios and finally 16 optimal scenarios were selected. And then, we used the %ChoiceEff macro in the SAS software to perform a 16*4 combination of the scenarios selected, forming a total of 16 cards for each market to be choose, and each card contains 4 scenarios. Figure 2 shows an example of these card. Respondents were required to select the two scenarios in a card, under which they were most likely and least likely to purchase.

| Scenario | Brand          | Exem  | Price (10,000) | Charging range (km) | Electricity consumption kWh/100km | Service stores | Brand-own super charging station | Autopilot systems |
|----------|----------------|-------|----------------|---------------------|-----------------------------------|---------------|----------------------------------|-------------------|
| A        | Domestic leading | 20-30 | 400-500        | Mid:15-16           | Not very much                     | So many       | Yes with additional installation fee |
| B        | Domestic others  | 10-20 | 400-500        | Low:10-13           | So many                           | So many       | Yes with additional installation fee |
| C        | Joint venture    | 20-30 | Above 500      | Low:10-13           | So many                           | So many       | No                               |
| D        | Domestic others  | 10-20 | Above 500      | Low:10-13           | Not very much                     | So many       | Yes with additional installation fee |

Figure 2. A choice set presented as a card used in the DCE experiment

The experiment is divided into two parts. In the first part, the respondents answered some basic information questions and then by answering the question of “If you buy an electric car, which market will you consider?” with the options of "¥100,000-300,000” and "¥300,000. -500,000”, they entered the formal
DCE experiment. The experiment is carried out online. The system randomly selected 4 of 16 cards for each respondent to choose.

(3) data collection and analyzing

The experiment data is collected through the Wenjuanxing system. We recorded the most likely and least likely scenarios selected by each respondent in each experiment. For the most likely selected scenario, we assigned a value of 1, and for the least likely selected scenario, a value of 0 was assigned. The product attributes corresponding to each scenario were encoded according to the encoding method of Table 1. Based on this encoding results, we used the binary logit regression model to analyze the data, and the components are as follows:

\[
\text{logit} P(Y=1) = \ln \left[ \frac{p(Y=1|X)}{p(Y=0|X)} \right] = a + b_1 x_1 + \ldots + b_n x_n \\
\]

\[
P(Y=1) = \frac{\exp(a + b_1 x_1 + \ldots + b_n x_n)}{1 + \exp(a + b_1 x_1 + \ldots + b_n x_n)}
\]

In which, \( P(Y=1) \) represents the probability that consumers are willing to buy EVs, \( P(Y=0) \) represents the probability that consumers are unwilling to buy EVs, \( a \) is a constant, \( x_i \) is the product attribute of EVs, and \( b_i \) is the sensitivity coefficients, represents the increase in the probability that consumers are willing to buy an EV when the level of each product attribute changes.

### Table 1: Product attribute and level

| Attributes                        | Mid-market                      | High-end market                   |
|-----------------------------------|---------------------------------|----------------------------------|
|                                  | Level | Code | Level | Code |
| Brands                            |       |      |       |      |
| Domestic others                   | 1     |      | Domestic new forces | 1 |
| Domestic leading                  | 2     |      | Joint venture | 2 |
| Joint venture                     | 3     |      | Foreign | 3 |
| Purchase price                    |       |      |       |      |
| ¥100,000-200,000                  | 1     |      | ¥300,000-400,000 | 1 |
| ¥200,000-300,000                  | 2     |      | ¥400,000-500,000 | 2 |
| Driving range                     |       |      |       |      |
| 300-400km                         | 1     |      | 400-500km | 1 |
| 400-500km                         | 2     |      | Above 500km | 2 |
| Above 500km                       | 3     |      |       |      |
| Electricity consumption/100km     |       |      |       |      |
| Low: 10-13KWh                     | 1     |      | Low: 10-13KWh | 1 |
| Mid: 13-16KWh                     | 2     |      | Mid: 13-16KWh | 2 |
| High: 16-20KWh                    | 3     |      | High: 16-20KWh | 3 |
| Number of brand-own super charging stations |       |      |       |      |
| Not very much                     | 1     |      | Not very much | 1 |
| So many                           | 2     |      | So many | 2 |
| Number of brand-own service stores |       |      |       |      |
| Not very much                     | 1     |      | Not very much | 1 |
| So many                           | 2     |      | So many | 2 |
| Autopilot systems                 |       |      |       |      |
| No                                | 1     |      | Yes with additional installation fee required | 1 |
| Yes with additional installation fee required | 2 |      | Yes with no additional installation fee required | 2 |
4. Results

4.1. Descriptive statistics

A total of 821 respondents participated in our DCE experiment, and 478 valid questionnaires were screened out, with an effective rate of 58.22%. The basic demographic status of the respondents are shown in Table 2. The research in this paper does not want to discuss in detail the choice of EVs brands of all kinds of people, but only an in-depth study of the overall popularity of all kinds of people. In general, the majority of respondents are between the ages of 18 and 40, when they are most likely to buy a new car. Most people are in working and have a certain level of income, which proves that most of the respondents can afford to buy a car. At the same time, some people have relatively high income, which means that they able to buy high-end EVs. In general, the respondents selected for the experiment can meet the needs of this experiment, and the results can represent the actual demand of the EV market.

| Attributes          | Level    | Ratio  | Attributes          | Level   | Ratio  |
|---------------------|----------|--------|---------------------|---------|--------|
| Monthly income      | <¥5,000  | 42.6%  | Age                 | <18     | 1.9%   |
|                     | ¥5,000-10,000 | 28.4%  |                     | 18-25   | 39.2%  |
|                     | ¥10,000-15,000 | 18%    |                     | 26-30   | 30.3%  |
|                     | ¥15,000-20,000 | 4.5%   |                     | 31-40   | 16.7%  |
|                     | ¥20,000-30,000 | 3%     |                     | 41-50   | 10.4%  |
|                     | > ¥30,000 | 3.5%   |                     | >50     | 1.5%   |
| Working status      | Student  | 31.4%  |                     |         |        |
|                     | Working  | 62.3%  |                     |         |        |
|                     | Retired  | 0.4%   |                     |         |        |
|                     | Unemployed | 1.1%  |                     |         |        |
|                     | Others   | 3.2%   |                     |         |        |

4.2. Binary logit regression results

Figure 3 shows the frequency with which different brands are selected as the most likely to be purchased. In general, in the high-end market, Chinese domestic new forces brands with ¥300,000-500,000 are most likely to be selected as the least likely to be purchased brand, while foreign brands with ¥300,000-500,000 are most likely to be selected as the most likely to be purchased brand. In the mid-end market, joint venture brands are most likely to be selected as the most likely to be purchased brand, followed by Chinese domestic leading brands, and finally Chinese other domestic brands. This result is similar to the market share of the major brands in June 2020 as shown in Figure 1, which again proves that the survey result of this paper is close to the actual market situation.

The Spss software was further used to perform the binary logit regression, and the stepwise method was selected to analyze the factors affecting the probability of respondents’ willingness to buy EVs. The results are shown in Table 3.

It can be seen from the results that for the 100,000-300,000 mid-end EV market, the factors influencing people's preference for EVs include brand, price, driving range, the number of brand-specific supercharging stations and the installation of autopilot system. In this case, the increase in price and options of adding an autopilot system will make people less likely to purchase a mid-end EV, while the increase in driving range and the number of brand-own supercharging stations will make people more likely to purchase a mid-end EV. The factors has the highest impact is the number of supercharging stations, and 1 level increase in people’s
perception of the number of supercharging stations can increase their probability to buy an EV by 2.265 times, followed by the increase in the level of driving range, which will increase the probability of purchasing an EV by 1.571 times. On the contrary, every 1 level increase in the purchasing price will result in about 20% drops on people’ probability to purchase an EV. Surprisingly, for the mid-end market EV consumers, they do not like the markups on autopilot driving systems, rather than "markups" to enjoy such high-tech add-ons, they would rather have none at all. In addition, the results also showed that Chinese domestic other EV brands are the brands that consumers most unlikely to choose. The probability a consumer choose Chinese domestic leading EV brands is 1.191 times of Chinese domestic other EV brands, and the probability of joint venture EV brand 1.543 times of Chinese domestic other EV brands, although the gap is not big, but still showed the joint venture brand EVs will be people’ favorite choice.

For the high-end EV market, the results show that the purchasing price is not the factor that affects the probability of a consumer’s choice on a particular EV. Just like in the mid-end EV market, the driving range, number of supercharging stations and the installation of autopilot system are the factors that influence the probability of a high-end EV consumer to choose an EV, and the number of supercharging stations is still the most important influential factor. The difference, however, is that the sensitivity of the driving range and the number of supercharging stations is higher, and every 1 level of the increase in consumers’ perception on the number of supercharging stations will result in 3.037 times of the probability of consumers’ choice in that EV brand. Meantime, every 1 level increase of the driving range will increase consumers' probability of purchasing a high-end EV to 1.873 times of its original value. In addition, contrary to the preference of consumers in the mid-end EV market, high-end EV consumers prefer to occupy autopilot system in their EVs. Moreover, if the EV is equipped with autopilot system without extra charge, consumers' choice possibility will be significantly increased compared with those with extra charge. Although the electricity consumption intensity of an EV does not affect consumers’ purchasing choice in mid-end EV market, it will affect the choice of high-end EV consumers. The probability of consumers' choice will be reduced by about 50% with every increase in the electricity consumption intensity level. Again, we also found that Chinese new forces brands still are not within the range of high-end EV consumers’ favorite. In contrast, consumers’ possibility in choosing a joint venture brand in luxury EV is 1.875 times of Chinese new forces brands, and the likelihood of choosing a foreign brand is even higher, 3.865 times of that of Chinese new forces brands. This implies that in the high-end EV market, Chinese new forces brands will not only face the challenge of traditional joint venture luxury brands, a bigger challenge comes from the foreign brands. In case of this, we can conclude that Chinese domestic EV brands face greater challenges in competing in the high-end EV market than in the mid-end EV market.

**Figure 3.** Proportion of EVs bands selected as the most likely to be purchased for different brands

|                  | Mid-end markets | High-end markets |
|------------------|-----------------|------------------|
| Factors          | B               | Exp(B)           | Sig.  | Factors          | B               | Exp(B)           | Sig.  |

**Table 3.** Binary logit regression results
5. Conclusions

From the perspective of consumer preference, this paper studies the competitiveness of Chinese domestic brands EVs compared with joint-venture and foreign brands in the current market. The whole EV market was divided into the middle and high-end markets and the Discrete Choice experiment (DCE) was used to study the relationship between consumers’ EV preference and changes in brand, price, range, energy efficiency, number of supercharging stations, service stores and autopilot system. The following conclusions are found:

(1) In the high-end EV market, the challenges that Chinese domestic EVs brand faced in competing with joint venture and foreign brands is much greater than that on the mid-end EV market, which means that in the future, most of the market share that Chinese domestic EV brands owned will still be concentrated in the mid-end market. Even if in the mid-end market, compared with joint venture brands, the popularity of China’s domestic EV brands is still limited, but the gap is as big as it in the high-end market, this is much consistent with the current position of Chinese auto brands in the whole auto market to some extent, which means it is very difficult for Chinese domestic EVs brand to make dramatic changes for China’s whole auto market;

(2) the attributes that consumers concern in the mid-end and high-end EV are different, and the most significant difference is the purchasing price. In the mid-end EV market, the purchasing price will negatively affect consumers’ choice preference, but in the high-end EV market, the purchasing price is not a factor that influences people choice.

(3) similar to other studies, charging convenience has the most significant impact on consumers’ choice preference of EVs, and in the high-end market, this impact is even more significant. But the results of this work also indicated that the factor of the number of supercharging stations is more important, meaning that the consumers prefer to enjoy the brand dedicated supercharging station service, which can be considered as an expression of the brand service ability. This provides an opportunity for Chinese domestic EV brands to quickly boost its brand competitiveness.

(4) the strategy of occupying an autopilot system with extra charge is not a wise strategy in promoting consumers’ choice in purchasing the EV, and in the mid-end market, consumers prefer to choose an EV without any autopilot system installation option than the strategy of installing with extra charge. In the high-end EV market, the strategy of installing an autopilot system without an extra charge will significantly increase consumer purchasing probability.
Acknowledgement
This work was supported by Beijing Social Science Foundation under Grant [no.18GLB025; 19GLB024]; Innovation and Entrepreneurship Training Program for College Students of Beijing Information Science & Technology University; Qin Xin Talents Cultivation Program of Beijing Information Science & Technology University under Grant [no.QXTCPB201703]; Beijing Municipal College Talent Teachers Team Cultivation Program During 13th Five Years Period under Grant [no.CIT&TCD201804056]; College connotation promotion program of Beijing Information Science & Technology University.

References
[1] D.L. Greene, Sangsoo Park and Changzheng Liu, Analyzing the transition to electric drive vehicles in the U.S. Futures, 58: 34–52
[2] M. Sykes and J. Axsen, 2017. No free ride to zero-emissions: Simulating a region's need to implement its own zero-emissions vehicle (ZEV) mandate to achieve 2050 GHG targets, Energy Policy, 110: 447–460
[3] N. Melton, J. Axsen and B. Mouawd, 2020. Which plug-in electric vehicle policies are best? A multicriteria evaluation framework applied to Canada, Energy Research & Social Science, 64, article 101411
[4] Jiangzhong Li, 2020. Charging Chinese future: the roadmap of China’s policy for new energy automotive industry, International Journal of Hydrogen Energy, 45(20): 11409-11423
[5] Ning Wang, Linhao Tang, Wenjian Zhang and Jiahui Guo, 2019. How to face the challenges caused by the abolishment of subsidies for electric vehicles in China?, Energy, 166: 359-372
[6] Jingjing Li, Jianling Jiao and Yunshu Tang, 2019. An evolutionary analysis on the effect of government policies on electric vehicle diffusion in complex network, Energy Policy, 129: 1-12 (Compared with consumer purchase subsidies, production subsidies for manufacturers have better effects on EV diffusion. Neither the tax and subsidy policies nor the EV license plate restriction and EV purchase subsidy policies can realize full EV diffusion.)
[7] Deyang Kong, Quhong Xia, Yixi Xue and Xin Zhao, 2020. Effects of multi policies on electric vehicle diffusion under subsidy policy abolishment in China: A multi-actor perspective, Energy Policy, 266, article 114887 (market share of electric vehicles in China will drop by 40.39% in 2020 if the purchase subsidy scheme is abolished. The three policies discussed in this paper can make up for the negative impact of purchase subsidy policy abolishment and promote the long-term growth of EVs.)
[8] N. Wang, L. Tang and H. Pan, 2017. Effectiveness of policy incentives on electric vehicle acceptance in China: a discrete choice analysis, Transport. Res. Part A: Policy Pract., 105, pp. 210-218
[9] G. Cecere, N. Corrocher and M. Guerzoni, 2018. Price or performance? A probabilistic choice analysis of the intention to buy electric vehicles in European countries, Energy Policy, 118: 19-32
[10] S. Hess, M. Fowler, T. Adler and A. Bahreinian, 2012. A joint model for vehicle type and fuel type choice: evidence from a cross-nested logit study, Transport., 39, pp. 593-625
[11] W. Li, R. Long, H. Chen, T. Yang, J. Geng and M. Yang, 2018. Effects of personal carbon trading on the decision to adopt battery electric vehicles: analysis based on a choice experiment in Jiangsu, China. Appl. Energy, 209, pp. 478-488
[12] Lixu Li, Zhiqiang Wang, Lujie Chen and Zixuan Wang, 2020. Consumer preferences for battery electric vehicles: a choice experimental survey in China, Transportation Research Part D: Transport and Environment, article 102185 (Regarding consumer preferences for BEV brands, the respondents will prefer domestic BEVs rather than imported BEVs)
[13] H. Byun, J. Shin and C. Lee, 2018. Using a discrete choice experiment to predict the penetration of environmentally friendly vehicles, Energy, 144, pp.312-321
[14] V. Costantini, F. Crespi and A. Palma, 2017. Characterizing the policy mix and its impact on e- innovation: a patent analysis of energy-efficient technologies, Res. Policy, 46, pp. 799-819
[15] S. Wee, M. Coffman and S. La Croix, 2018. Do electric vehicle incentives matter? Evidence from the 50 U.S. states, Res. Policy, 47, pp. 1601-1610
[16] K.Y. Bjerkman, T.E. Norbech and M.E. Nordtomme, 2017. Incentives for promoting Battery Electric Vehicle (BEV) adoption in Norway, Transport. Res. Part D: Transp. Environ., 43, pp. 169-180
[17] Y. Yang, C. Wang, W. Liu and P Zhou, 2018. Understanding the determinants of travel mode choice of residents and its carbon mitigation potential, Energy Policy, 115, 486-493
[18] X. Xie, R. Verma and C.K. Anderson, 2015. Demand growth in services: a discrete choice analysis of customer preferences and online selling, Decis. Sci. 47 (3), 1450–1462.
[19] B. Ma, Y. Yu and F. Urban, 2018. Green transition of energy systems in rural China: national survey evidence of households’ discrete choices on water heaters, *Energy Policy*, 113, 559–570
[20] L. Noel, A.P. Carrone, A.F. Jensen, G.Z. de Rubens, J. Kester and B.K. Sovacoolac, 2019. Willingness to pay for electric vehicles and vehicle-to-grid applications: A Nordic choice experiment, *Energy Economics*, 78: 525-534
[21] D.A. Hensher, J.M. Rose and W.H. Greene, 2015. Applied Choice Analysis: Experimental Design and Choice Experiments, vol. 6, 189–319.
[22] Finn and J. Louviere, Determining the appropriate response to evidence of public concern: the case of food safety[J]. *Journal of Public Policy & Marketing*, 1992, 11: 12-25