

Effects of users' province disclosure in social platforms on their behavior: take Weibo as an example

Yaru Ren ^{1,*}, Linji Li ^{2, a}

¹WeBank Institute of Fintech, Shenzhen University, Shenzhen; 518000, China;

²WeBank Institute of Fintech, Shenzhen University, Shenzhen; 518000, China.

*ryr123099@163.com, ^alinwindraind@163.com

Abstract. On April 28, the information of the user's province is publicly displayed in Weibo, but whether this move can effectively improve the network environment has not been verified. Through a questionnaire survey, we studies the changes of users' verbal aggression and willingness to express under three Weibo states: not displaying users' information, displaying users' province and displaying users' province and age simultaneously. We find that the measure to show users' provinces is conducive to reducing the aggressiveness of comments and improving the network environment, but it leads to a significant decline in users' willingness to express. However, the impact on users' behavior is small if user's age is further disclosed on the basis of displaying province. This study provides a new idea for purifying the network environment, and gives a warning for social platforms to pay attention to the loss of users due to the opening of user information.

Keywords: disclosure of user's province; verbal aggression; self-closure willingness.

1. Introduction

With the rapid development of Internet technology, social media such as Weibo, Zhihu, Intagram, etc. are gradually emerging at home and abroad, and people are more and more inclined to comment and share their lives on social platforms. According to the financial report of the first quarter of 2022 released by Weibo, the monthly active users in Weibo reached 582 million, an increase of 51 million over the same period last year. With the prosperity and development of social media, people can get news information from all over the world and discuss it anytime and anywhere, which greatly reduces the cost of obtaining information and expressing opinions. At the same time, however, as many users discuss some hot news and topics of public interest on social media, they often encounter malicious comments full of aggression or even abuse from the water army or dissidents, which causes serious psychological harm to the news parties, so that many people are unwilling to express their views or even fall into depression due to the network abuse [1]. For example, Liu Xuezhou, a relative-seeking boy, committed suicide by cyber violence, and the owner of a barbecue restaurant in Tangshan was abused innocently. According to the questionnaire, 88.32% of users think that there are a large number of offensive remarks such as insults, slanders or threats in the social platform "Weibo".

In order to maintain a healthy and orderly online discussion atmosphere and reduce malicious comments, rumors and other bad behaviors, Weibo issued an announcement on April 28th, announcing that the province where the user is located would be displayed in the comment and personal home pages. Subsequently, Zhihu, Official account of Wechat and other major platforms followed suit, and displaying users' province became a hot topic for everyone to discuss. However, it has not been verified whether showing users' province can effectively reduce the number of malicious comments and improve the network environment. Therefore, taking Weibo as an example, we mainly studies the following two questions: firstly, can the disclosure of users' province on social platforms effectively improve the network environment? Secondly, Will the disclosure of users' province reduce willingness to express themselves on the platform?

Previous studies about the influence of information disclosure on users' behavior on social platforms mainly focused on the two states of complete anonymity and real name. For example, Lea

and Spear [2] show that the anonymous status in the network environment would significantly improve the level of group polarization. Siegel et al. [3] found that the anonymous subjects were more open in sharing their opinions, and they produced more and more novel opinions than the real-name subjects. Suler [4] finds that the anonymity may foster aggressive behavior in online communication because it makes people feel less inhibited in cyberspace than offline. Because there is no attempt to disclose part of information such as users' province in social platforms at home and abroad, there is almost no research on this aspect. By studying the impact of partial information disclosure on user behavior, this paper mainly makes the following two contributions: On the one hand, we give the answers and theoretical reasons that the disclosure of users' province can reduce verbal aggression for the first time, which provides a new idea for how to improve the network environment. On the other hand, we verify that the willingness expressed by users is declining with the disclosure of users' province. The above two points put forward a warning to the platform that information disclosure has both advantages and disadvantages.

Verbal aggression refers to any behavior that uses words to attack others to do harm, such as insults, defamation, or threats [5]. The phenomenon of flaming in computer mediated communication (CMC) is defined as "hostile and aggressive interactions via text-based CMC" [6][7]. There are two main reasons why the disclosure of province where users are located can reduce verbal aggression in computer mediated communication.

First of all, Anonymity refers to the unidentifiable state due to the lack of information. Identity information usually includes 11 categories, such as behavior characteristics, appearance characteristics, geographical location, beliefs and social relationships and so on (Jasso, 2002). Some scholars have defined anonymity as the degree to which people do not know the true identity of the subject in social activities, which emphasizes the difference of anonymity [8]. When social platforms such as Weibo show the current location information of users, the unknowability of users' real identities is reduced, that is, the anonymity of users decreases. Previous studies have shown that anonymity is the key reason for verbal aggression [9][10]. The theory of deindividuation proposed by Zimbardo [11] states that when people are anonymous, they will lose their inner constraints and feel less self-aware, inhibited, and responsible for their behavior which makes them more likely to act against the norms. The losing of constraint may lead to toxic consequences in CMC, such as uncivil language, harsh criticism, threats, or hate speech in online comments [12]. Therefore, with the reduction of user anonymity in the network, the verbal aggression in CMC will decrease.

Secondly, human society is composed of many groups, and groups are the premise of human survival and development. According to the social identity theory, inner groups provide emotional meanings for group members, and group members internalize group identification as a part of self-concept. They gain positive identity satisfaction and maintain positive self-esteem through favorable comparison with related outer groups [13][14]. The preference for inner groups drives individuals to improve the status and advantages of their own groups through self-improvement [15]. Regional identity is a special form of social identity, which refers to the regional inner group formed by the emotional connection of people in the same geographical environment [13]. Province which divides people into many different groups is one of the main identities of Chinese. and the phenomenon of "fellow villagers" is enough to prove Chinese identity with their own provinces [15]. Therefore, the motivation to maintain the image of the province to a certain extent constrains individuals and makes them behave more civilized. To sum up, We believe that verbal aggression in CMC will be reduced by showing the users' province due to group identity and the decreased anonymity.

Self-disclosure refers to the process in which people express their personal information, opinions, thoughts and feelings to others in communication [18]. Posting short articles or commenting on others' views on social platforms such as Weibo is one of the self-disclosure behaviors. Compared with face-to-face communication, people are more willing to express their true thoughts and inner feelings on the Internet [19]. Joinson [20] shows that individuals reveal four times more information about themselves in CMC than in face-to-face communication [21]. A series of studies found that

the anonymity of the Internet is an important factor to promote people's self-disclosure [22]. People tend to express more thoughts, opinions and feelings about themselves when they perceive that the true identity is not exposed [23]. The complete anonymity in the Internet enables individuals to publicly vent their emotions regardless of the cost [24]. However, when the user's location is public on the social platform, the degree of anonymity decreases. At this time, users' output on social platforms will be reduced because they are worried about the exposure of their true identity and the consequences of their identity exposure [25]. Therefore, the display of users' province in Weibo will reduce the self-disclosure willingness of users.

2. experimental design

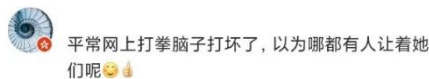
In this paper, the influence of displaying users' province in Weibo on users' behavior is analyzed by questionnaire. The questionnaire is divided into five parts: the first part is the basic information of users; the second-fourth part takes a hot event as an example to examine whether the degree of verbal aggression changes after the disclosure of the user's province; the fifth part investigates whether users' self-disclosure willingness changes through the same example.

Hot events in Part Two-Five: two seniors, who are about to graduate, hired a student to help them finish the graduation thesis in the name of "doing a project" on the second-hand platform "Xianyu". After the student completed the project as required, the two seniors made use of the loopholes of Xianyu platform to report and blackmail him on the grounds that they "did not meet certain needs" and "did not reply in a second". They repeatedly asked the student who completed the project to transfer money to them. The details of the incident were exposed on Weibo, causing a heated discussion. Some real comments about the incident are as follows:

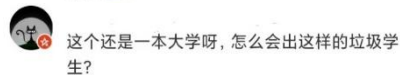
Comment 1:



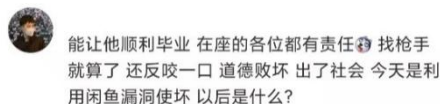
Comment 2:



Comment 3:



Comment 4:



Comment 5:



Comment 6:



The second part of the questionnaire investigates the views of users on the aggressiveness of the above comments. The surveyed users scored the above six comments respectively, with 0 indicating no aggressiveness and 10 indicating extremely aggressiveness. Among the above six comments, three comments with the highest score are selected as aggressive ones.

The third part of the questionnaire investigates the users' willingness to post above offensive comments under different information disclosure conditions in Weibo, in which -5 indicates that they are very reluctant to post, and 5 indicates that they are very willing to post. In order to more effectively distinguish the influence of different Weibo's information disclosure degree on users' behavior, we set up three kinds of information disclosure states, namely, not displaying any user information, displaying users' province and simultaneously displaying users' province and real age.

There is a phenomenon of hiring "water army" to post the required comments in Weibo, in which "water army" refers to the network personnel who are employed by definite organizations or individuals to conduct hype [26]. According to the survey in this paper, 96.3% of users think that there are a large number of "water army" hired to make required comments in Weibo. According to the herd effect theory, A large number of required comments from "water army" can incite public sentiment, and even manipulate public opinion, resulting in cyber violence [27][28]. However, a certain cost exists in hiring "water army", so the behavior of hiring "water army" will be reduced if the cost goes up a lot. Therefore, the fourth part of the questionnaire investigates whether the minimum remuneration required by users is different in the above three Weibo states if users can obtain certain rewards by posting specific comments. The optional range is 0 to 100 yuan.

The fifth part of the questionnaire explores the influence of displaying users' province on their self-disclosure willingness. The display of users' information affects users' willingness to express their own opinions by increasing their perception of identity exposure and the consequences of exposure [29]. Therefore, we survey users' perception of risks in this part, including the risk of real identity disclosure, the risk of identity information being used by criminals, and the risk of cyber violence when they post their opinions on the above three states of Weibo [30].

3. experimental results

A total of 216 questionnaires were collected in this paper, among which the subjects were aged between 18 and 30. The "Weibo Hot search list trend report" released by Weibo in the first half of 2021 shows that hot users are mostly between the ages of 19 and 29 in Weibo, accounting for 76% of the total users. Therefore, the age of the surveyed users is in line with the actual age distribution of users in Weibo. In addition, the subjects are all users who have used Weibo, and 68.05% of them use Weibo frequently.

3.1 The impact of displaying user information on the verbal aggression of Weibo

The average aggressiveness scores of the six real comments on the above-mentioned hot events are shown in Figure 1. It can be seen that the aggressiveness scores of Comment 2, Comment 3 and Comment 5 rank in the top three, so they are regarded as the aggressive comments.

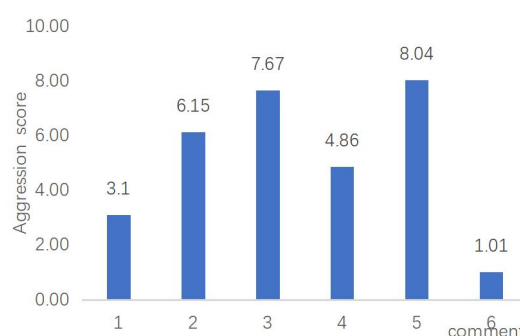


Figure 1 Aggression score of comments

The willingness of users to post the above three aggressive comments in Weibo is shown in Figure 2. Because the above comments are highly aggressive to the parties involved in the incident, the average score of willingness is negative no matter which state. In Figure 2, we find that the highest score is obtained when no user information is displayed in Weibo, and the lowest score is obtained when the province and real age of users are disclosed at the same time. T-test is carried out for the differences in three states of Weibo, and the results are shown in Table 1. We find that the difference of willingness to post between the two states of no user information displayed and users' province displayed is significantly positive among the above three comments, so displaying users' province will significantly reduce users' willingness to make the above offensive comments. In the third line, the difference between the two states of no user information displayed and users'

province and age displayed in Weibo is also significantly positive and larger than the difference in the first line. However, there is no significant difference between only displaying users' province and displaying users' province and age at the same time, that is, if the user's age is further disclosed on the basis of displaying province, their behavior is little affected.

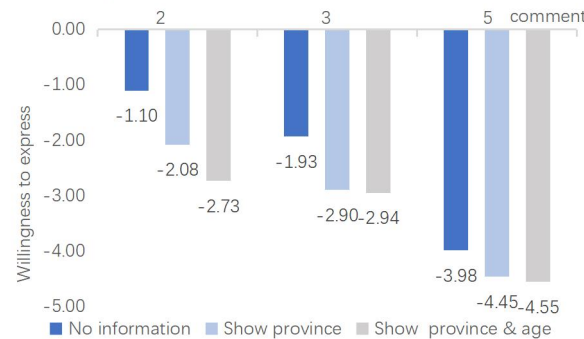


Figure 2 Willingness score to post the comment

Table 1 the difference of users' willingness in three states

State difference	comment 2	comment 3	comment 5
No information – show province	0.98	0.73	0.55
	2.20**	1.74*	2.14**
Show province – show province & age	0.65	0.15	0.24
	1.58	0.39	1.28
No information – show province & age	1.63	0.88	0.79
	3.76***	2.08**	3.45***

Figure 3 shows the minimum payment required for users to be hired to make specific comments in different states. As shown in Figure 3, the more aggressive the comments are, the higher the remuneration required for posting them. And with the increase in information disclosure, the minimum remuneration required by users increases. T-test is carried out on the average difference of the minimum acceptable payment for posting specific comments in three Weibo states, and the results are shown in Table 2.

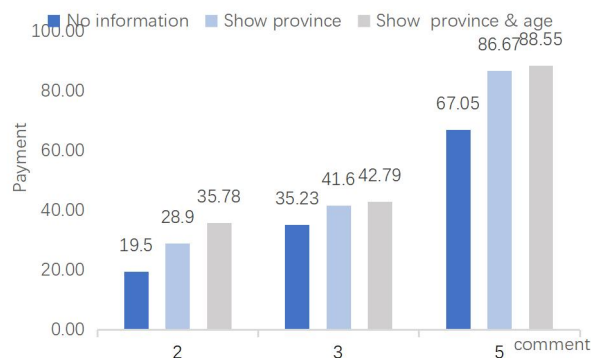


Figure 3 the minimum payment for users to make specific comments

Table 2 Difference of minimum payment to make specific comments in three states

State difference	comment 2	comment 3	comment 5
No information – show province	-9.40	-6.38	-15.48
	-6.5677***	-3.0534***	-12.1939***
Show province – show province & age	-6.88	-1.1875	-1.88
	-7.1051***	-0.7513	-1.9527*
No information – show province & age	-16.28	-7.56	-21.50
	-11.536***	-4.43***	-16.6704***

It can be seen that from the table 2, similar to the results of comment willingness, the difference between the two states of not displaying any user information and displaying users' province is significantly positive. If users' province is displayed, the required minimum

remuneration will increase by 9.4, 6.38, 15.48 respectively for posting the above three offensive comments. In the third line, the difference between not displaying any user information and displaying the users' province and age at the same time is also significantly positive. But in the second line, we find that the difference between only displaying users' province and displaying users' province and age simultaneously is only significant in comment 2 at the 1% level and not significant in comment 5 which verifies again if the user's age is further disclosed on the basis of user's province, the influence on users behaviors is smaller than the disclosure of provincial information.

To sum up, After the disclosure of users' province, the users' willingness to post aggressive comments decreases, and the cost of employing "water army" to post specific content increases which further leads to less in aggressive comments. But the disclosure of user's age on the basis of the province has a little impact on user's behavior. Therefore, the first problem raised in this paper has been solved, that is, the disclosure of users' province helps to reduce aggressive comments and improve the network environment.

3.2 The impact of displaying user information on users' self-disclosure willingness

Showing users' province is beneficial to improve the network environment, but at the same time, users' willingness to self-disclose may be reduced due to the increased risk of real identity exposure. We divides users' perception of risks into three parts, namely, the risk of real identity exposure, the risk of identity information being used by criminals, and the risk of cyber violence. As shown in Figure 4, we find that the perception of the above three risks is almost the lowest when no information is disclosed, and the highest when users' province and age is disclosed simultaneously.

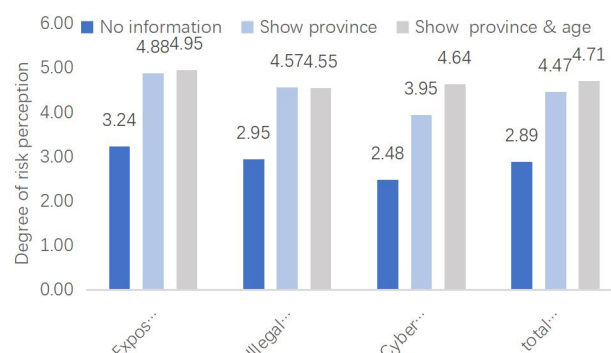


Figure 4 Risk perception in three states

The T-test results of risk perception differences in the three states are shown in Table 3. In the first line, we find that the difference of three risks perception between the states of no user information displayed and users' province displayed is significantly negative and the total difference is -1.58 with a t-statistic of -6.85. Therefore, users perceive greater risks when their province is disclosed in Weibo. In the third line, the difference between no user information displayed and users' province and age displayed is also significantly positive and the total difference is -1.83 with a t-statistic of -8.08. There is no significant difference between displaying only users' province and displaying users' province and age at the same time, that is, if user's age is further disclosed on the basis of the province, their perception of risk did not increase significantly.

Table 3 Differences of risk perception of users in three states

State difference	Exposure of true identity	Illegal use of information	Cyber violence	total risk
No information – show province	-1.64	-1.62	-1.48	-1.58
	-6.32***	-5.89***	-5.32***	-6.85***

Show province – show province & age	-0.07	0.02	-0.69	-0.25
	-0.27	0.11	-2.52	-1.28
No information – show province & age	-1.71	-1.60	-2.17	-1.83
	-6.51***	-5.80***	-7.65***	-8.08***

Therefore, when users' province is disclosed in Weibo, the users obviously perceive the increased risk, thus reducing their own self-disclosure willingness. The second problem raised in this paper has been solved.

4. Discussion

In this paper, the influence of the province where users are displayed on their behavior in Weibo is studied by questionnaire. Furthermore, we also explore the impact of disclosing other information on the basis of province. So the status of Weibo is divided into three categories, namely, not disclosing any user information, disclosing users' province and disclosing users' province and age at the same time. The research on user behavior includes two aspects: first, whether the offensive comments will be reduced; Second, whether the willingness to express in Weibo will decrease. The results show that when users' province is disclosed in Weibo, the tendency of users to post offensive comments obviously declines, and the cost of hiring water army to post offensive comments increases significantly. Therefore, the disclosure of users' province is beneficial to improve the network environment. But at the same time, users' willingness to express also obviously decreases. If the user's age is further displayed, although the tendency of users to post offensive comments and their willingness to express have declined, it is not significant. Two possible explanations are as follows: first of all, the display of the user's province not only reduces the anonymity in the network, but also stimulates the users' sense of group identity. However, the sense of group identity of peers is weaker than that of people in the same province. Therefore, the disclosure of users' province has a greater impact on their behaviors than the disclosure of their age. Secondly, the degree of information disclosure from never disclosing any information to disclosing province of users changes qualitatively, while the change from disclosing province to disclosing province and age of users simultaneously is quantitative, so the latter has less influence than the former on users' behavior. However, the details need to be further studied. In a word, the research in this paper found that the disclosure of users' province has both advantages and disadvantages. Although the number of offensive comments is reduced in the network, it leads to users' reluctance to speak on social platforms. The best balance of disclosing information between improving the network environment and maintaining users' willingness to express should be the next research focus.

Reference

- [1] Pfeffer J, Zorbach T, Carley K M. Understanding online firestorms: Negative word-of-mouth dynamics in social media networks[J]. *Journal of Marketing Communications*, 2014, 20(1-2): 117-128.
- [2] Lea M, Spears R. Computer-mediated communication, de-individuation and group decision-making[J]. *International journal of man-machine studies*, 1991, 34(2): 283-301.
- [3] Siegel J, Dubrovsky V, Kiesler S, et al. Group processes in computer-mediated communication[J]. *Organizational behavior and human decision processes*, 1986, 37(2): 157-187.
- [4] Suler J. The online disinhibition effect[J]. *Cyber Psychology & Behavior*, 2004, 7(3): 321–326.
- [5] Rsnier L, Krmer N C. Verbal Venting in the Social Web: Effects of Anonymity and Group Norms on Aggressive Language Use in Online Comments[J]. *Social Media + Society*, 2016, 2(3).
- [6] O'sullivan P B, Flanagan A J. Reconceptualizing 'flaming' and other problematic messages[J]. *New Media & Society*, 2003, 5(1): 69-94.
- [7] Coe K, Kenski K, Rains S A. Online and uncivil? Patterns and determinants of incivility in newspaper website comments[J]. *Journal of Communication*, 2014, 64(4): 658-679.

- [8] Zhu Jingyan, Wang Chao. Right and wrong of network real name system -- Based on the perspective of constructing network public sphere[J]. Journal of Chongqing University of Posts and Telecommunications, 2014, 26(01): 50-54.
- [9] Coffey B, Woolworth S. "Destroy the scum, and then neuter their families:" the web forum as a vehicle for community discourse? [J]. Social Science Journal, 2004, 41(1): 1-14.
- [10] Santana A D. Virtuous or vitriolic: The effect of anonymity on civility in online newspaper reader comment boards[J]. Journalism practice, 2014, 8(1): 18-33.
- [11] Zimbardo P G. The Human Choice: Individuation, Reason, and Order Versus Deindividuation, Impulse, and Chaos[J]. University of Nebraska Press, 1969.
- [12] Christopherson K M. The positive and negative implications of anonymity in Internet social interactions: "On the Internet, Nobody Knows You're a Dog"[J]. Computers in Human Behavior, 2007, 23(6): 3038-3056.
- [13] Tajfel H, Turner J. An integrative theory of intergroup conflict[J]. social psychology of intergroup relations, 1979, 33: 94-109.
- [14] Baumgartner T, Götte L, Gügler R, et al. The mentalizing network orchestrates the impact of parochial altruism on social norm enforcement[J]. Human brain mapping, 2012, 33(6): 1452-1469.
- [15] McAuliffe K, Dunham Y. Group bias in cooperative norm enforcement[J]. Philosophical Transactions of the Royal Society B: Biological Sciences, 2016, 371(1686): 20150073.
- [16] Dixon J, Durrheim K. Dislocating identity: Desegregation and the transformation of place[J]. Journal of environmental psychology, 2004, 24(4): 455-473.
- [17] Jiang Yongzhi, Zhang Haizhong, Zhang pengying Theoretical exploration and empirical research on the psychological effect of Chinese villagers [J]. Progress in psychological science, 2012, 20 (08): 1237-1242.
- [18] Derlega V J, Metts S, Petronio S, et al. Self-disclosure[M]. Sage Publications, Inc, 1993.
- [19] Banyard P, Joinson A. Psychological aspects of information seeking on the Internet[C]. Aslib Proceedings, New Information Perspectives, 2002, 54(2): 95-102.
- [20] Joinson A N. Self-disclosure in computer-mediated communication: The role of self-awareness and visual anonymity[J]. European journal of social psychology, 2001, 31(2): 177-192.
- [21] Tian Hui. Empirical research on Self Disclosure Based on SNS network[J]. Contemporary communication, 2013(06): 75-78.
- [22] Tidwell L C, Walther J B. Computer-mediated communication effects on disclosure, impressions, and interpersonal evaluations: Getting to know one another a bit at a time[J]. Human communication research, 2002, 28(3): 317-348.
- [23] Joinson A N, Woodley A, Reips U D. Personalization, authentication and self-disclosure in self-administered Internet surveys[J]. Computers in Human Behavior, 2007, 23(1): 275-285.
- [24] Yang Fuzhong. Constitutional protection of citizens' right to anonymous expression on the Internet -- Also on the legitimacy of the network real name system [J]. Law and business research, 2012, 29(05): 32-39.
- [25] Crespo Á H, Del Bosque I R, Salmones M M G. The influence of perceived risk on Internet shopping behavior: a multidimensional perspective[J]. Journal of Risk Research, 2009, 12(2): 259-277.
- [26] Li Biao, Zheng Manning. A study on the influence and effectiveness of the Network Water Army in the Network Public opinion Communication in the Weibo era -- taking 26 network events participated by the Network Water Army in recent years as an example [J]. International Press, 2012, 34 (10): 30-36.
- [27] Chen Yu. The flood of "network water army" and the perfection of network public opinion monitoring [J]. Young journalist, 2011 (15): 69-70.
- [28] Guo Chonghui, Wang Xin, Sun Leilei. Simulation study on the influence of Internet Water Army on Internet Culture Market [J]. Journal of Dalian University of Technology. 2014, 35 (03): 27-32.
- [29] Chen Xi. Research on anonymity and real name in network society [D]. Beijing University of Posts and telecommunications, 2014.
- [30] Hassan A M, Kunz M B, Pearson A W, Mohamed F A. Conceptualization and measurement of perceived on online shopping[J]. Market Management, 2006, 16(1): 138-147.