

The Influence of Privacy Concern on Advertising Persuasion Effect under Intelligent Recommendation

Junfeng Liao^{1,2}, Yongyu Liao¹, Chufang Huang¹ and Quzhen Zhaxi³

¹Department of Electronic Business, South China University of Technology, Guangzhou, Guangdong, China

²College of Economics and Management, Kashi University, Kashi, Xinjiang, China

³School of International Relations and Public Affairs, Shanghai International Study University, Shanghai, China

Keywords: Privacy Concern, Intelligent Recommendation, Affective Response, Cognitive Response, Advertising Persuasion Effect.

Abstract: This paper discusses the relationship and mechanism between consumers' privacy concerns, cognitive responses and advertising persuasion effect. Based on the stimulus response (SOR) model, this paper uses SPSS and AMOS to analyze the collected questionnaire, and concludes that consumers' privacy concerns are negatively correlated with advertising persuasion effect under intelligent recommendation. Emotional response (positive emotion and negative emotion) plays a mediating role between privacy concern and advertising persuasion effect. Under intelligent recommendation, consumers' cognitive response is positively correlated with advertising persuasion effect. There is a positive correlation between advertising persuasion effect and attitude has a positive effect on the intention of continuous use by positively affecting the willingness to accept.

1 INTRODUCTION

In recent years, with the rapid development of the media driven by various high and new technologies, the advertising industry has embraced the era of intelligent advertising. As the future development trend of online advertising, intelligent advertising has received more and more attention. With its precision and personalization of advertising, intelligent advertising has attracted the attention of the majority of advertising industry, which reduces the cost of advertising and provides convenience and personalized experience. However, the subsequent tracking of users' network behavior data will lead to the disclosure of users' privacy. With the development of smart advertising and the awakening of people's privacy awareness, an in-depth understanding of the impact of privacy concern under intelligent recommendation on consumer psychology and behavior has played a vital role in the development of smart advertising as a whole.

The research on information privacy in academia mainly starts from three perspectives: concept definition, privacy attitude and behavior, and "privacy concern" is accepted by the public as an indicator of privacy attitude. But privacy concerns of

this paper emphasizes the intelligent recommendation of Internet privacy concerns, expanding the research category of privacy concerns. In terms of advertising persuasion effect, Xu (Xu, 2010) believes from the perspective of communication that when consumers have a certain attitude change, it is a general persuasion. When advertising not only changes the audience's attitude, but also leads to behavior change, it is a meaningful persuasion. In addition, this behavior and attitude change lasts for quite a long time, which indicates that advertising persuasion effect is successful. At present, the literature about the influence of privacy concern and advertising persuasion effect is almost blank, and the related theories are scattered in the related research of privacy concerns and consumers' attitudes or behavioral willingness to behavior-oriented advertising.

Therefore, in the context of intelligent recommendation, this article regards consumers' attitudes towards advertising, willingness to accept, and willingness to continue to use advertisement as the three progressive levels of advertisement persuasion effect, and creatively introduces the SOR theoretical model. Emotional response is used as an intermediate variable to study the relationship

between privacy concerns and the persuasive effect of advertising. And targeted countermeasures are put forward in the end according to the research results.

2 MATERIALS AND METHODS

2.1 Cognitive Response, Affective Response and Advertising Persuasion Effect

In this paper, positive emotion refers to the degree to which an individual feels happy, or pleasurable when watching the intelligent advertisement. Negative emotion refers to the extent to which individuals feel displeasurable or disgust watching intelligent advertisement. As an important factor affecting individual behavior, cognitive response has been widely recognized, and emotional response also plays a role that can not be ignored. SOR model believes that consumers' emotional response will affect consumer behavior. The cognition and emotion of consumers constitute the basis and motivation of their consumption intention. Pham et al. (Pham, et al, 2001) proposed that emotion, with its rapidity and consistency, can directly guide people to think about external stimuli, and has higher critical value compared with cognitive evaluation of target things. When the subject thinks that the external stimulus is related to its needs, it will produce subjective feelings, and then generate the motivation of behavior intention. In online consumption, consumers' strong emotional and cognitive responses can enhance their consumption intentions. Therefore, it is proposed that: H5: The positive emotion of consumers is positively correlated with the attitude of intelligent advertising. H6: Consumers' negative emotions are negatively correlated with their attitudes towards intelligent advertising. H11: The cognitive response of consumers is positively correlated with their attitude towards intelligent advertising.

The cognitive process of the subject to the external stimulus should precede the emotional response, that is the subject generates the emotional response based on the cognitive evaluation of the attribute and function of the object. In the online consumption, consumers will first generate cognitive evaluation and then form emotion in the face of all kinds of intelligent advertisements, and the cognitive response will enhance the emotional response. Thus, we propose: H1: The cognitive response of consumers is positively correlated with positive

emotions. H2: The cognitive response of consumers is negatively correlated with negative emotions.

2.2 The Relationship between Advertising Persuasion Effect

This paper studies the persuasion effect of intelligent advertising, emphasizing the psychological change process of consumers to accept intelligent advertising. This paper draws lessons from three levels of persuasion effect, using attitude, accepting willingness and continuing willingness to use to measure the persuasion effect of intelligent advertising. For intelligent advertising, consumers' attitudes affect their willingness to continue using through their willingness to accept. Based on these arguments, we propose: H7: Consumers' attitude towards intelligent advertising is positively correlated with their willingness to accept it. H8: Consumers' willingness to accept intelligent advertisements is positively correlated with their willingness to continue using them.

2.3 Privacy Concern, Emotional Response and Advertising Persuasion Effect

Intelligent recommendations can capture the needs of users more accurately, but it also brings some privacy issues. Cockcroft and Heales (Cockcroft, Heales, 2005) proposed that consumers' privacy concerns were negatively correlated with their transaction intentions, with risk as a mediating variable. Eastlick and Lotz (Eastlick, Lotz, 2006) proposed that consumers' privacy concern was negatively correlated with their purchase intention through trust and loyalty, and trust and loyalty were regarded as intermediary variables. In this study, consumers' concern about privacy affects their thoughts and behaviors, which indirectly affects the effectiveness of intelligent advertising. Under any circumstances, emotional response plays a crucial role. Therefore, we can put forward the hypothesis: H3: Consumer privacy concerns are negatively correlated with positive emotions. H4: Consumer privacy concerns are positively correlated with negative emotions. H9: Emotional response plays a mediating role between consumers' privacy concerns and their attitudes towards intelligent advertising. H10: Consumer privacy concerns are negatively correlated with attitudes towards intelligent advertising.

To sum up, this paper proposes the following research models:

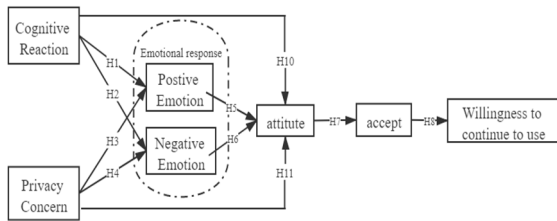


Figure 1: Theoretical model diagram.

3 RESEARCH DESIGN

This paper adopts the Likert five-point scale, each variable is measured with reference to the mature scale related to it at home and abroad, and combined with the characteristics of intelligent advertising in this paper and the results of small-scale interviews. The measurement of privacy concern was based on the scales of Malhotra (Malhotra 2004) and Hong (Hong 2013). Assessment of cognitive response was made by reference to the scale of Shih (Shih 2013). The evaluation of emotional responses refers to the scale of Dholakia (Dholakia 2000). The scales of Taylor & Todd (Taylor, Todd 1995), and Xu (Xu 2007) are the main references for the attitude of advertising effect, and the scale of Merisavo (Merisavo 2007) is the reference for the measurement of acceptance intention. Intention to continue use was measured by the scale of Bhattacharjee A (Bhattacharjee 2001).

In this paper, a total of 500 questionnaires were collected online, of which 419 were valid. The effective rate of the questionnaire was 83.9%.

4 RESULTS & DISCUSSION

The Cronbach's α value of each variable in the questionnaire scale is all greater than the standard of 0.7, which has good internal consistency and good reliability. The KOM coefficients of all variables are above 0.7, and the significance probability of Bartlett's sphere test is 0.000, indicating that this questionnaire scale has high reliability and validity and is suitable for subsequent analysis.

4.1 Model Fitting Index

When testing the model, multiple fitting indexes provided by SEM should be considered comprehensively instead of relying solely on a single index. As shown in the table below, this paper comprehensively used a variety of fitting indicators,

and the results were as shown in the table. All indicators reached the standard level, indicating that the model fitted well.

Table 1: Integration of fitting index results.

Fitting index	CMIN /DF	GFI	AGFI	RMSEA	SRMR	NFI	CFI	IFI	TLI	RFI
Recommend value	<3	>0.8	>0.8	<0.08	<0.08	>0.9	>0.9	>0.9	>0.9	>0.9
Measured value	2.33	0.88	0.85	0.05	0.05	0.91	0.95	0.95	0.94	0.90

4.2 Hypothesis Testing and Path Analysis

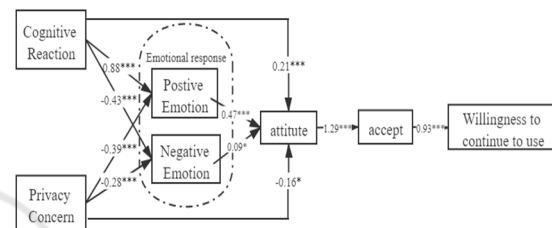


Figure 2: Model path diagram.

We can conclude from the path coefficients in the model path analysis that all relevant assumptions are valid. Consumer privacy concern has a negative impact on advertising persuasion effect. The higher the degree of privacy concern, the worse the advertising persuasion effect. Advertising to convince the audience is a progressive process, under the background of intelligent recommendation. The persuasion process of smart advertising is to influence the audience's attitude towards advertising on the first level, influence the audience's willingness to accept advertising on the second level, and influence the audience's willingness to continue using smart advertising on the third level. Attitude has a positive influence on willingness to continue to use through positive influence on acceptance.

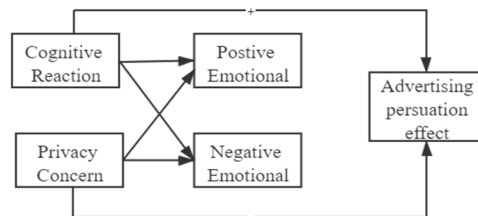


Figure 3: Relationship between cognitive response and privacy concern and advertising persuasion effect.

The influence of privacy concerns and cognitive responses on the persuasive effect of advertising through emotional responses (positive emotions &

negative emotions) is shown in Figure 3. It can be found that cognitive response positively (negative) affects positive (negative) emotions, and positively affects the persuasive effect of advertising, while privacy concerns negatively (positively) affect positive (negative) emotions and negatively affect the persuasive effect of advertising. That is, not only the role of privacy concern and cognitive response on advertising persuasion effect is opposite, but also the mechanism of both through emotional response (positive emotion & negative emotion) on advertising persuasion effect is opposite.

4.3 Mediating Effect of Affective Response

This article refers to the comparison method proposed by Mayer & Davis (1999), constructs nested models as shown in Table 2, and then conducts path analysis for each model separately.

Table 2: Nested model settings.

M	Mediation-free Models MC0	Mediation-free Models MC1	Complete mediation Models MC2	Mediation-free models MC3
Original model	Remove privacy concerns → positive emotions; Privacy concerns → negative emotions	Delete positive emotions → attitudes; Negative emotions → attitude	Delete privacy concerns → attitude	Remove privacy concerns → positive emotions; Positive emotions → attitude; Privacy concerns → negative emotions; Negative emotions → attitude

Table 3: Test of main path relationship of each competition model.

Rode	M		MC0		MC1		MC2		MC3	
	Est	P	Est	P	Est	P	Est	P	Est	P
Privacy Concern → Positive Emotional	-0.39	***			-0.49	***	-0.40	***		
Privacy Concern → Negative Emotional	0.28	0.00			0.31	***	0.28	####		
Positive Emotional → attitude	0.47	***	0.48	***			0.50	***		
Negative Emotional → attitude	-0.09	0.02	-0.09	0.01			-0.11	####		
Privacy Concern → attitude	-0.16	0.00	-0.16	0.00	-0.44	***			-0.29	***

From the above results, it can be seen that the path coefficient from privacy attention to attitude on the basic model (M) is smaller than the non-mediation model (MC0, MC1, MC3) and the complete

mediation model (MC2). That is, after the emotional response is added, the relationship between privacy attention and attitude is still significant but weakened, indicating that emotional response plays a part of the mediating role in the relationship between privacy attention and attitude. Therefore, emotional response has a mediating role between privacy concerns and attitudes towards smart advertising. That is, the higher the degree of privacy concern, the stronger the negative emotions, and the worse the advertising persuasion effect; the lower the degree of privacy attention, the stronger the positive emotions, and the better the advertising persuasion effect. The hypothesis H9 is verified.

5 CONCLUSIONS AND IMPLICATIONS

5.1 Research Conclusion

In the context of intelligent recommendation, this paper builds a theoretical model based on the stimulus-response theory, adds cognitive response as another independent variable, and introduces consumer emotional response as an intermediary variable. After analysis of the results, the following conclusions can be drawn for the research problems in this paper:

First, the privacy concern has a significant negative impact on the advertising persuasion effect, the higher the consumer privacy concern, the worse the advertising persuasion effect. Second, the higher the consumer cognitive response, the better the advertising persuasion effect and the cognitive response has a significant positive impact on the advertising persuasion effect. Third, positive and negative emotions play a partial mediating role between consumer privacy concern and advertising persuasion effect. The higher the negative emotion of users with high privacy concern, the worse the advertising persuasion effect; the higher the positive emotion of users with low privacy concern, the better the advertising persuasion effect. Fourthly, the influence mechanism of privacy concern and cognition on advertising persuasion effect through emotional response is completely opposite. Privacy concerns affect the positive (negative) emotion in the negative (positive) direction, and negatively affect the persuasive effect of advertising; while the cognitive response affects the positive (negative) emotion in the positive (negative) direction, and positively affect the persuasive effect of advertising.

5.2 Practical Inspiration

In order to better improve the shopping experience of consumers, to achieve good advertising persuasion effect, and then enhance the attraction of the website to consumers, based on the above research results, this paper tries to put forward the following suggestions for shopping websites:

5.2.1 Subdivide Users with Composite Labels

Privacy concern and cognitive response, as two important factors affecting the persuasive effect of intelligent advertising, can be considered as a new label for user segmentation. Among them, users in the (high cognitive response \times low privacy concern) group should be the most suitable users to be pushed smart ads, while (low cognitive response \times high privacy concern) group should be the least suitable users. Different marketing strategies should be adopted for different groups of users. For users in the (high cognitive response \times low privacy concern) group, they should focus on analyzing user data, mining user preferences, and continuously optimizing intelligent advertising. It is obviously not a good idea to push smart ads to users in the (low-cognition reaction \times high-privacy concern) group. Other methods should be used to help users improve the shopping experience, such as recommending products on the list.

5.2.2 Develop Two Parallel Lines to Cultivate Users

Intelligent advertising is in the development stage, and many users have no clear understanding of the difference between it and the ordinary advertising. Considering marketing means, word of mouth communication, opinion leader recommendation and friend recommendation are all helpful to form users' cognition of intelligent advertising. Of course, in the long run, we need to work together to create a good industry atmosphere for the development of intelligent advertising and e-commerce, including enterprises' respect and practical protection for user privacy, government and relevant departments' supervision and safety of online privacy legislative protection and consumers' general increased awareness of privacy and rights protection. After all, what really disgusts and cares about users of high privacy concerns is not the smart advertisement itself, but the risk of personal privacy leakage hidden

behind the smart advertisement. The control and prevention of such risks cannot be achieved overnight.

5.2.3 Pay Attention to the Emotional Response of Users and Optimize the Service in Time

At present, the after-sales evaluation of products on online shopping websites is mainly centered on product quality, store services and logistics. We can consider increasing the user's evaluation of the use of intelligent advertising (for users through intelligent advertising transactions), analyze whether the users' emotional response to smart advertising is positive or negative through user evaluation, and then adjust the service policy to find out where users are dissatisfied with smart advertising as much as possible and make timely improvements. This will help keep users in the (high cognitive response \times low privacy concerns) group, which will have a positive impact on users in other groups.

ACKNOWLEDGEMENTS

Thanks for the support from The National Social Science Fund of China (18BGL110).

REFERENCES

- Bhattacharjee A. (2001). An empirical analysis of the antecedents of electronic commerce service continuance. *Decision Support Systems*, 32(2):201-214.
- Crossler R. E. (2011). Privacy in the digital age: a review of information privacy research in information systems. Society for Information Management and The Management Information Systems Research Center.
- Dholakia U. M. (2000). Temptation and resistance: An integrated model of consumption impulse formation and enactment. *Psychology & Marketing*, 17(11):955-982.
- Gao Lin, Li Wenli, Ke Yulong. (2017). The Influence of Internet Word of Mouth on Consumers' Purchasing Intentions in Social Commerce: The Mediating Effect of Emotional Response and the Moderating Effect of Curiosity. *Chinese Journal of Management Engineering*, 31(4): 15-25.
- Pham M. T., Cohen J. B., Pracejus J. W. (2001). Affect Monitoring and the Primacy of Feelings in Judgment. *Journal of Consumer Research*, 28(2):167-188.
- Xiaojuan Xu. (2010). On the Persuasion Effect of Advertising. *Journal of Beijing Business University (Social Sciences Edition)*, (02):79-83.

- Zhang Jianqiang, Liu Juan, Zhong Weijun. (2019). Advertising accuracy and advertising effects: field experiments based on privacy concerns. *Management Science*, 32(06): 123-132.
- Zhu Qiang, Wang Xingyuan, Xin Luqi. (2018). Research on the Influence Mechanism of Privacy Concerns on Click Intention of Online Precise Ads—The Role of Consumers' Risk Perception and Self-Efficacy. *Soft Science*, 32(4): 115-119.

