# Research on Influence of Shopping APP's Characteristic on Consumer's Impulse Buying

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## Abstract

Based on the SOR theory, this study examined the influence of the knowledge, convenience and entertainment of APP on the consumer's intention to buy, with 624 consumers who had APP shopping experience. The mediating variable of this study was the sense of pleasure and arousal of psychological emotion. The study findings showed that: 1) shopping APP's knowledge, convenience and entertainment represented the most obvious features of shopping APP; 2) pleasure was completely mediated by the shopping APP's knowledge and entertainment on impulse buying intention, partly mediated by the convenience on impulse buying intention; 3) arousal was completely mediated by the shopping APP's knowledge and convenience on impulse buying intention, partly mediated by the entertainment on impulse buying intention.

## Keywords

Psychological Emotion, Impulse Buying, Eating Role, Sopping APP

## 1. Introduction

With the rise of e-commerce and the popularity of mobile terminals, consumer shopping channels in China have gone through several stages: entity sales, pc e-commerce and mobile e-commerce. Mobile e-commerce has become the most important retail scene at this stage. Since the advent of e-commerce in the 1990s, China's online retail market has grown rapidly, whose transactions of 2016 have reached 532.88 billion, accounting for the nearly 15% of total social retail sales. The growth of mobile e-commerce is obvious. Its market transactions have reached 447.26 billion, which have become an important way of shopping. The rapid growth of mobile e-commerce is due to the rapid spread of mobile terminals and the mobile Internet users. By the end of 2016, China's mobile phone users have reached 1.32 billion, and mobile phone's shipments have reached up to

560 million. With the popularity of Internet, China's mobile phone users have reached 724 million, accounting for 96.3% of the total number of Internet users, which account for 52.35% of the total population. More than half of the people use mobile to surf. CNNIC's report pointed out that 514 million of internet users have experience in online shopping, in which 480 million use mobile shopping. Mobile shopping has gradually becoming the most frequent pattern of consumption. In this context, the relationship between mobile e-commerce and consumer psychology has gradually become a hot topic of academic interest.

Impulse buying is a common and unique way of consumption in the daily life [1], which involves many cross disciplines, such as psychology and consumer behavior. Because of its complexity, there is no standardized definition of impulse buying. But there is a high proportion of impulse buying in daily consumption. Hausman [2] research showed that 90% of people have had impulse buying behavior. And in all shopping processes, 30% to 50% of the behavior could be considered impulse buying. Scholars have conducted in-depth research on the causes of impulse buying and its application in various fields. The research showed that the main causes of impulse buying include three aspects: external environment stimulation, purchase situation and personality characteristics of consumers [3]. Because mobile products are social, it is more likely to produce impulsive buying. The mobile e-commerce is more prone to impulse buying. And the impulse buying of some products has accounted for 80%. The academic circles also begin to focus on online shopping especially mobile terminal impulse buying. Tan Zhu summed up three research modes of online impulse buying: based on SOR mode, online impulse buying process model, impulse buying value decision model. This study investigated the influence and transmission mechanism of impulse buying intention and shopping APP's characteristics. And the study referenced the perspective of environmental psychology.

Many shopping platforms make shopping APP as a tool for consumers shopping on the mobile terminal. There are thousands of shopping apps on the market, including comprehensive e-commerce, group purchase e-commerce, vertical e-commerce, special selling e-commerce and so on. How to stand out from so many apps and let consumers eventually purchase are the focus of the academia and commercial circles. Previous studies tucked in the relationship between traditional shopping and online shopping with impulsive buying, but did not deep into the shopping APP, which is a specific and representative shopping scene. The popularity of APP shopping makes it possible to study its relationship with impulse buying intention, and then from the perspective of empirical research to reference for shopping APP's design and marketing has a significant practical and theoretical meaning.

This study referred to the "stimulus-organism-response (SOR) model" and "impulsive buying influencing factor model". This study took the characteristics as independent variable, the "pleasure" and "arousal" of the consumer's psycho-

logical mood as mediation variable, the "intention of impulse buying" as the dependent variable. The aim was to explore the transmission mechanism between the characteristics of the shopping APP and the consumer's impulse buying behavior.

## 2. Literature Review and Research Hypothesis

### 2.1. The Relationship between the Characteristics of Shopping APP and Impulse Buying Intention

In the traditional consumption process, the purchase intention and behavior would be affected by the environment, so the merchants attach great importance to the design of the shop environment in order to achieve the final purchase behavior. In the context of the Internet, especially mobile Internet, strong information technology support has created a new shopping experience for consumers. Shopping APP is a mobile terminal shopping platform based on mobile network and mobile phone, which has both shopping and entertainment properties. This study selects the following dimensions to describe the characteristics of shopping APP.

1) Knowledge

When using APP shopping, whether the APP provides a wealth of information to help consumers looking for specific goods, querying commodity prices and making efficiently screening, comparing products and obtaining enough high reliability information is the first step on the shopping decisions. Wu Zhaoming divided the information provided by the website into "subject information" and "peripheral information". Kim and Letmon [4] research indicated that the more information the store provides, the lower the perceived risk of consumers, and the higher the willingness of shopping. In the mobile side, consumers and stores can't communication face to face, shopping APP's knowledge would affect the consumer's awareness of goods and services. The richer information is, the more quickly requirement matched. And then consumer will enable to produce impulsive buying behavior. So, this study proposes the following assumptions:

H1a: Shopping APP's knowledge will impact impulse buying intention positively.

2) Convenience

Davis's research [5] pointed out that convenience referred to the user ease of operation of the system for users. When users think that a system is difficult to operate, it will affect their acceptance. Because of the limitations of shopping APP interface, the APP's page structure design and user interaction require a higher interaction. There are many factors that affect usability, such as search function, page navigation, operation interaction, payment process and so on. A complete user behavior loop can be formed only if the consumer is given the necessary information in order to complete the final purchase. It also allows consumers to feel respected, resulting in impulse to buy. So, this study proposes

the following assumptions:

H1b: Shopping APP's convenience will impact impulse buying intention positively.

3) Entertainment

With the development of the times, the mobile terminal shopping has become an important way for consumers to spend their fragmentation time in daily life. With the development of modern information technology, businesses can use gravity sensing, speed sensing, pressure sensing and LBS positioning in the shopping APP to achieve a variety of operating activities, increasing the fun of shopping activities. ICLICK research pointed out that a more interesting mobile shopping virtual environment can increase the impulse of visitors to shop. Liu & Arnett [6] research showed that "entertainment" is one of the important factors that affect the quality of customer evaluation websites. Most consumers want to meet their hedonic needs in the course of shopping. Therefore, shopping website's entertainment will affect the consumer's purchase experience, and an interesting shopping would let consumer produce buying impulse. So, this study proposes the following assumptions:

H1c: Shopping APP's entertainment will impact impulse buying intention positively.

## 2.2. The Relationship between Shopping APP Characteristics and Impulsive Buying Intention

Individuals will experience immediate, intense emotional responses and influence subsequent behavior when stimulated by the environment. Dube [7] synthesized the previous research results and hold that psychological emotion was an extremely complex physiological phenomenon caused by internal and external factors. Mehrabian and Russell [8] presented the emotion model PAD, P (pleasure) denoted happy, contented, relaxed state; A (arousal) denoted arousal and excitement; D (dominance) denoted mastery, control, and self-command. Mehrabian [9] found that the PA model had been able to better describe the psychological mood of the consumer shopping process. And PA for the mobile side of the behavior could accurately explain the shopping process of psychological response.

In addition to the final purchase results, the customer will pursue emotional satisfaction in the process of APP shopping, so consumers' psychological emotion has a positive impact on their buying intention. When consumers are in a more exciting state, they will enlarge their demand and be too optimistic about their economic ability, so they are more likely to have shopping impulse in the cheerful state. Rook [10] believed that the desire to buy, as a result of the product and related stimuli, was difficult to resist if positive emotions are created during the shopping process. And pleasure and arousal were positively related to impulse buying. Impulse buying is accompanied by a strong mental and emotional fluctuation. Consumers feel very strong emotional swings before they make their shopping, resulting in impulse buying intention. Willingness is an important

forward-looking indicator of behavior. This study believes that the influence of psychological emotion on impulsive buying intention is mostly from the positive promotion of psychological emotion. Impulsive buying intention is related to psychological emotion transfer.

APP or the site provides a wealth of information is an important reason for people to choose online shopping. Childers *et al.* [11] believed that the rich content of the site would enable consumers to have a sense of enjoyment, which affected their shopping experience. Wulf *et al.* [12] pointed out that online shopping had access to the website to obtain timely information. When the information is matched, it will affect shopping experience and make consumer feel happy. High load information also makes individuals feel stimulated and excited, in which impulse buying will be more intense.

Mobile devices are one of the essential things that people carry around anytime. They can use mobile devices to do shopping anytime and anywhere. Mobile shopping allows consumers to consume the lowest energy costs and gain shopping experience. Jarvenpaa [13] empirical studies showed that 40% of individuals have had negative emotions during online shopping, and APP was more demanding for convenience due to its unique operating environment. A convenience mobile shopping website allows consumers to browse goods without burden, helps them to generate positive emotions, and ultimately leads consumers to buy.

APP UI design, music and animation and other forms can bring entertainment to consumers. "A shake, a red envelope" and other marketing methods allow consumers to experience the entertainment of shopping, enrich the emotional experience of consumers during shopping, and bring forward positive emotions. Positive emotional stimulation can lead to impulse buying.

The SOR model proposed by Mehrabian and Russel is used to explain the causes of human behavior, and the application in the consumer domain shows that the purchasing behavior of consumers is caused by various stimulate. Under the influence of a variety of factors, individual emotions are affected, causing the desire to buy, so as to make a purchase decision and generate purchasing behavior. Eroglu [14] applied SOR to the online shopping environment, and online shopping could enrich shopping experience through multimedia technology. In the reaction mechanism of mobile virtual environment shopping, the knowledge, convenience, entertainment of virtual environment can be used as environmental stimulus, and the arousal and pleasure of individual psychological emotion are psychological changes, Impulse buying intention is the reaction of individuals, which is an important prospective variable of impulsive buying behavior. In the process of shopping, the customer's psychological emotion will be affected by the environmental characteristics of mobile websites, which will directly influence the generation of unplanned impulse buying intention.

So, this study proposes the following assumptions:

H2a: A sense of pleasure plays a completely mediating role in the relation between the shopping APP'S knowledge and impulse buying intention.

H2b: A sense of pleasure plays a completely mediating role in the relation between the shopping APP'S convenience and impulse buying intention.

H2c: A sense of pleasure plays a completely mediating role in the relation between the shopping APP'S entertainment and impulse buying intention.

H3a: A sense of arousal plays a completely mediating role in the relation between the shopping APP'S knowledge and impulse buying intention.

H3b: A sense of arousal plays a completely mediating role in the relation between the shopping APP'S convenience and impulse buying intention.

H3c: A sense of arousal plays a completely mediating role in the relation between the shopping APP'S entertainment and impulse buying intention.

## 3. Research Methods

### 3.1. Research Samples and Procedures

In this study, questionnaires were used to distribute questionnaires to consumers in Guangdong, Hunan and Hubei provinces, who had online shopping experience and APP shopping experience. In this study, a questionnaire was issued to 700 consumers, and 624 valid questionnaires were collected (the effective recovery rate was 89.14%). Among them, 500 questionnaires were sent in Guangdong Province and 367 valid questionnaires were collected; 150 questionnaires were sent in Hunan Province and 123 valid questionnaires were collected; 150 questionnaires were sent in Hubei Province and 134 valid questionnaires were collected. In the valid sample, male accounted for 46.2%, female accounted for 53.8%; age 20 and below accounted for 2.9%, 21 - 30 years old accounted for 95.5%, more than 30 years old accounted for 1.6%; education was high school and below, accounted for 1.9%, college accounted for 10.3%, undergraduate accounted for 50%, graduate students and above accounted for 37.8%; the average daily shopping APP time in 1 hours or less accounted for 72.1%, 1 - 2 hours accounted for 18.9%, 2 - 3 hours accounted for 5.4%, more than 3 hours accounted for 3.5%; 1 years of online shopping experience accounted for 2.6%, 1 - 2 years accounted for 6.1%, 2 - 3 years accounted for 9.9%, more than 3 years accounted for 81.4%. From the overall distribution of the sample, the subjects' gender, age, educational background, shopping experience, and the time of browsing matched shopping APP user characteristics, and the sample had a certain representation.

### 3.2. Variable Measurement

In this study, we used the Likert 7 point scale for scoring, and "1" means "very disagree", and "7" means "very agree". In order to ensure the reliability and validity of the variable measurement, this study made use of the mature scale already used in the existing literature at home and abroad. As part of the original scale was an English scale, this study was further revised on the basis of the existing localization studies and the translation of scales. The pre-test (N = 80) were conducted to evaluate the reliability and validity of each item, and the

questionnaire was tuned according to the pre-test result. Finally, a definite questionnaire was formed.

### 3.2.1. The Characteristics of Shopping APP

Shopping APP's knowledge, convenience and entertainment were made according to the scales designed by Wan (2004), Wang Zhongli (2003), Lin Zhenxu (2007). There were 12 items in the scale; among them, there were 4 items of knowledge, such as "the shopping APP shows a wide variety of goods and a reasonable classification". There were 4 items of convenience, such as "I can easily find the information I want in the shopping APP". There were 4 items of entertainment, such as "The shopping APP interface design is vivid and interesting". The Cronbach's $\alpha$ of knowledge, convenience and entertainment were 0.709, 0.740 and 0.727 respectively. The results of CFA showed that the indexes of knowledge ($\chi^2/df$ = 5.44, RMSEA = 0.07, CFI = 0.98, TLI = 0.94), convenience ($\chi^2/df$ = 4.73, RMSEA = 0.07, CFI = 0.96, TLI = 0.92) and entertainment ($\chi^2/df$ = 5.32, RMSEA = 0.07, CFI = 0.96, TLI = 0.95) reached acceptable levels.
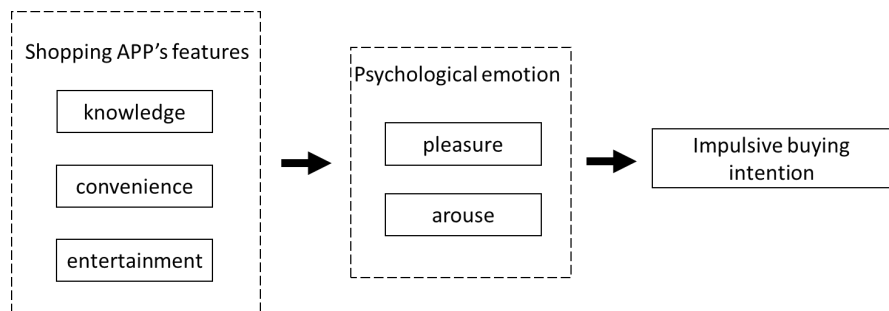


### 3.2.2. Psychological Emotion

This study used psychological mood measurement scale developed by Mehrabian and Russell. There were 6 items in the scale; among them, there were 3 items of pleasure, such as "shopping in the APP made me feel happy"; there are 3 items of arousal, such as "shopping in the APP made me feel excited". The Cronbach's $\alpha$ of pleasure and arousal were 0.90 and 0.86 respectively. The results of CFA showed that the indexes of pleasure ($\chi^2/df$ = 4.56, RMSEA = 0.07, CFI = 0.98, TLI = 0.97) and arousal ($\chi^2/df$ = 5.93, RMSEA = 0.08, CFI = 0.95, TLI = 0.92) reached acceptable levels.

### 3.2.3. Impulse Buying Intention

This study used the impulse purchase intention scale developed by Beatty and Ferrel. There were 5 items in the scale, such as "In the course of APP shopping, I suddenly had the desire to buy certain goods". The Cronbach's $\alpha$ of Impulse buying intention was 0.94. The results of CFA shows that the indexes of Impulse buying intention ($\chi^2/df$ = 5.05, RMSEA = 0.07, CFI = 0.86, CFI = 0.85) reached acceptable levels.

### 3.2.4. Control Variables

Previous studies had showed that demographic variables (gender, age, and edu-

cational background) influence the predictive variables. And Browsing shopping APP time and shopping experience also had an impact on these relationships. Therefore, control variables were gender, age, educational background, shopping experience and browsing shopping APP time.

## 4. Findings

### 4.1. Common Method Biases

The data of this study mainly come from college students, which might lead to common method bias. Therefore, this study controlled the common method bias on multiple programs: 1) Through the Chinese and English translation, expert revision, pre-test and other methods to make the scale easy to understand; 2) Ensure the anonymity of the questionnaire, and try to make the research objects express their true ideas; 3) Reverse the score of the questionnaires; 4) The research object is from different regions and different schools to increase the spatial difference of data sources. After the data collection, the Harman single factor test was used to diagnose the common method bias. The results showed that the eigenvalues of 5 factors were greater than 1, and the variance explained by the first factor was 30.83%. In the critical standard of 40%, the common method bias of this study was not obvious.

### 4.2. Related Analysis

The mean, standardization and correlation coefficients of each variable were shown in Table 1. The results showed that the knowledge of shopping APP had a significant positive correlation with impulse buying intention (r = 0.27, p < 0.001). The results showed that the convenience of shopping APP had a significant positive correlation with impulse buying intention (r = 0.33, p < 0.001). The results showed that the entertainment of shopping APP had a significant positive correlation with impulse buying intention (r = 0.37, p < 0.001). H1a, H1b, H1c were established.

### 4.3. Hypothetical Test

The data was analyzed by multilevel linear regression, and the predictive variables were dealt with before the analysis. The results were shown in Table 2 and Table 3.

1) The mediating role of pleasure on shopping APP's knowledge and impulsive buying intention.

① Shopping APP's knowledge had a significant effect on impulsive buying intention, which H1a results had supported; ② Shopping APP's Knowledge had a significant effect on the sense of pleasure(model 2, $\beta$ = 0.49, P < 0.001); ③ The sense of pleasure had a significant effect on impulsive buying intention (model 9, $\beta$ = 0.40, P < 0.001); ④ With impulsive buying intention as dependent variable, APP's knowledge and pleasure at the same time entered the regression model, the effect of pleasure on impulsive buying intention was still

**Table 1.** Mean value, standard deviation and correlation coefficient of each variable.

| variable | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1) Gender | 1.54 | 0.50 | | | | | | | | | | |
| 2) Age | 1.99 | 0.21 | −0.06 | | | | | | | | | |
| 3) Education level | 3.36 | 0.74 | −0.04 | 0.23*** | | | | | | | | |
| 4) Browse for APP time | 1.40 | 0.75 | 0.07 | 0.01 | −0.07 | | | | | | | |
| 5) Online shopping experience | 3.70 | 0.70 | −0.03 | 0.08 | 0.25*** | 0.08 | | | | | | |
| 6) Knowledge | 5.43 | 0.91 | −0.04 | 0.03 | 0.15 | 0.06 | 0.23*** | | | | | |
| 7) Convenience | 5.20 | 1.17 | −0.03 | −0.08 | 0.00 | 0.08 | 0.18** | 0.39*** | | | | |
| 8) Entertainment | 4.62 | 1.23 | 0.00 | −0.01 | −0.03 | 0.09 | 0.07 | 0.41*** | 0.40*** | | | |
| 9) Pleasure | 5.16 | 1.07 | −0.04 | 0.05 | 0.05 | 0.08 | 0.21*** | 0.51*** | 0.51*** | 0.56*** | | |
| 10) Arousal | 4.51 | 1.32 | −0.04 | 0.07 | −0.05 | 0.15* | 0.11*** | 0.39*** | 0.33*** | 0.60*** | 0.59*** | |
| 11) Impulse buying intention | 5.04 | 1.22 | 0.12* | 0.01 | −0.01 | 0.16** | 0.09 | 0.27*** | 0.33*** | 0.40*** | 0.41*** | 0.50*** |

PS: n = 624; *means $P < 0.05$, **means $P < 0.01$, ***means $P < 0.001$.

**Table 2.** The results of multilevel linear regression (1).

| | Pleasure | | | | Impulsive buying Intention | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 | Model 9 | Model 10 | Model 11 | Model 12 |
| Gender | −0.03 | −0.02 | −0.02 | −0.03 | 0.11 | 0.12* | 0.12* | 0.11* | 0.12* | 0.12* | 0.12* | 0.12* |
| Age | 0.03 | 0.04 | 0.07 | 0.03 | 0.01 | 0.01 | 0.04 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 |
| Education level | −0.01 | −0.06 | 0.01 | 0.02 | −0.02 | −0.05 | −0.02 | −0.01 | −0.02 | −0.03 | −0.02 | −0.10 |
| Browse for APP time | 0.07 | 0.04 | 0.04 | 0.02 | 0.15* | 0.13* | 0.13* | 0.11* | 0.12* | 0.12* | 0.11* | 0.11* |
| Online shopping experience | 0.21*** | 0.11* | 0.12* | 0.17** | 0.09 | 0.03 | 0.03 | 0.06 | 0.00 | −0.01 | −0.01 | 0.01 |
| Knowledge | | 0.49*** | | | | 0.27*** | | | | 0.09 | | |
| Convenience | | | 0.49*** | | | | 0.32*** | | | | 0.16* | |
| Entertainment | | | | 0.55*** | | | | 0.39*** | | | | 0.24 |
| Pleasure | | | | | | | | | 0.40*** | 0.36*** | 0.32*** | 0.27*** |
| F | 3.38** | 19.63*** | 20.07*** | 27.11*** | 2.8* | 6.32*** | 8.32*** | 12.02*** | 12.51*** | 11.09*** | 11.95*** | 13.50*** |
| $R^2$ | 0.052 | 0.279 | 0.283 | 0.348 | 0.044 | 0.111 | 0.141 | 0.191 | 0.197 | 0.203 | 0.216 | 0.237 |
| $\Delta R^2$ | 0.037 | 0.264 | 0.269 | 0.335 | 0.028 | 0.093 | 0.124 | 0.175 | 0.182 | 0.185 | 0.198 | 0.22 |

significant (model 10, $\beta = 0.36$, $P < 0.001$); however, the significance of shopping APP's knowledge on impulsive buying intention had changed, which was changed from significant to non-significant(model 10, $\beta = 0.09$, $P = 0.14$). Therefore, a sense of pleasure played a completely mediating role in the relation between the shopping APP'S knowledge and impulse buying intention. Hypothesis H2a was supported.

2) The mediating role of pleasure on shopping APP's convenience and impulsive buying intention.

Table 3. The results of multilevel linear regression (2).

| | Arousal | | | | Impulsive buying Intention | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 | Model 9 | Model 10 | Model 11 | Model 12 |
| Gender | −0.04 | −0.03 | −0.03 | −0.04 | 0.11 | 0.12* | 0.12* | 0.11* | 0.13* | 0.13** | 0.13* | 0.13 |
| Age | 0.07 | 0.08 | 0.10 | 0.08 | 0.01 | 0.01 | 0.04 | 0.01 | −0.03 | −0.02 | −0.01 | −0.02* |
| Education level | −0.08 | −0.12* | −0.08 | −0.06 | −0.02 | −0.05 | −0.02 | −0.01 | 0.02 | 0.01 | 0.02 | 0.02 |
| Browse for APP time | 0.13* | 0.11* | 0.11 | 0.08 | 0.15* | 0.13* | 0.13* | 0.11* | 0.08 | 0.08 | 0.08 | 0.08 |
| Online shopping experience | 0.11 | 0.03 | 0.05* | 0.06 | 0.09 | 0.03 | 0.03 | 0.06 | 0.03 | 0.02 | 0.00 | 0.03 |
| Knowledge | | 0.39*** | | | | 0.27*** | | | | 0.09 | | |
| Convenience | | | 0.323*** | | | | 0.32*** | | | | 0.18 | |
| Entertainment | | | | 0.59*** | | | | 0.39*** | | | | 0.15* |
| Arousal | | | | | | | | | 0.49*** | 0.46*** | 0.44*** | 0.40*** |
| F | 2.51* | 11.32*** | 8.22*** | 30.74*** | 2.8* | 6.32*** | 8.32*** | 12.02*** | 19.40*** | 17.09*** | 18.91*** | 17.84*** |
| $R^2$ | 0.039 | 0.182 | 0.139 | 0.377 | 0.044 | 0.111 | 0.141 | 0.191 | 0.276 | 0.282 | 0.303 | 0.291 |
| $\Delta R^2$ | 0.024 | 0.166 | 0.122 | 0.365 | 0.028 | 0.093 | 0.124 | 0.175 | 0.262 | 0.266 | 0.287 | 0.275 |

① Shopping APP's convenience had a significant effect on impulsive buying intention, which H1b results had supported; ② Shopping APP's convenience had a significant effect on the sense of pleasure(model 3, $\beta = 0.49$, P < 0.001); ③ The sense of pleasure had a significant effect on impulsive buying intention(model 9, $\beta = 0.40$, P < 0.001); ④ With impulsive buying intention as dependent variable, APP's convenience and pleasure at the same time entered the regression model, the effect of pleasure on impulsive buying intention was still significant(model 11, $\beta = 0.32$, P < 0.001); however, the significance of shopping APP's convenience on impulsive buying intention had changed, which was changed from significant to partial significant(model 11, $\beta = 0.16$, P < 0.05). Therefore, a sense of pleasure played a partial mediating role in the relation between the shopping APP'S convenience and impulse buying intention. Hypothesis H2b was not supported.

3) The mediating role of pleasure on shopping APP's entertainment and impulsive buying intention.

① Shopping APP's entertainment had a significant effect on impulsive buying intention, which H1c results had supported; ② Shopping APP's entertainment had a significant effect on the sense of pleasure(model 4, $\beta = 0.55$, P < 0.001); ③ The sense of pleasure had a significant effect on impulsive buying intention(model 9, $\beta = 0.40$, P < 0.001); ④ With impulsive buying intention as dependent variable, APP's entertainment and pleasure at the same time entered the regression model, the effect of pleasure on impulsive buying intention was still significant(model 12, $\beta = 0.27$, P < 0.001); however, the significance of shopping APP's entertainment on impulsive buying intention had changed, which was changed from significant to non-significant (model 12, $\beta = 0.24$, P =

0.21). Therefore, a sense of pleasure played a completely mediating role in the relation between the shopping APP'S entertainment and impulse buying intention. Hypothesis H2c was supported.

4) The mediating role of arousal on shopping APP's characteristics (knowledge/convenience/entertainment) and impulsive buying Intention.

Refer to Table 3 and above four-step analysis: ① Shopping APP's knowledge/convenience/entertainment had a significant effect on impulsive buying intention, which H1 results had supported; ② Shopping APP's knowledge/convenience/entertainment has a significant effect on the sense of arousal (model 2/3/4, $P < 0.001$); ③ The sense of arousal had a significant effect on impulsive buying intention (model 9, $\beta = 0.49$, $P < 0.001$); ④ With impulsive buying intention as dependent variable, APP's characteristic (knowledge/convenience/entertainment) and arousal at the same time entered the regression model. As for shopping APP's knowledge, the effect of arousal on impulsive buying intention was still significant (model 10, $\beta = 0.46$, $P < 0.001$); however, the significance of shopping APP's knowledge on impulsive buying intention had changed, which was changed from significant to non-significant (model 10, $\beta = 0.09$, $P = 0.13$). Therefore, a sense of arousal played a completely mediating role in the relation between the shopping APP'S knowledge and impulse buying intention. Hypothesis H3a was supported. As for shopping APP's convenience, the effect of arousal on impulsive buying intention was still significant (model 11, $\beta = 0.44$, $P < 0.001$); however, the significance of shopping APP's convenience on impulsive buying intention had changed, which was changed from significant to non-significant (model 11, $\beta = 0.18$, $P = 0.39$). Therefore, a sense of arousal played a completely mediating role in the relation between the shopping APP'S convenience and impulse buying intention. Hypothesis H3b was supported. As for shopping APP's entertainment, the effect of arousal on impulsive buying intention was still significant (model 12, $\beta = 0.40$, $P < 0.001$); however, the significance of shopping APP's entertainment on impulsive buying intention had changed, which was changed from significant to partial significant (model 12, $\beta = 0.15$, $P < 0.05$). Therefore, a sense of arousal played a partial mediating role in the relation between the shopping APP'S entertainment and impulse buying intention. Hypothesis H3b was not supported.

## 5. Conclusion and Revelation

Based on the questionnaire survey data of 624 consumers, this study investigated the characteristics of shopping APP and its relationship with arousal and pleasure. Based on the SOR theory and impulsive buying influencing factors, this study introduced the psychological emotion as the mediator variable to study the transmission mechanism of shopping APP's characteristics and impulsive buying intention. The results showed that shopping APP's knowledge, convenience and entertainment could represent the most obvious features of shopping APP, which had a significant positive effect on impulse buying intention. The sense of pleasure played a completely mediating role in the relation between the shop-

ping APP'S knowledge entertainment and impulse buying intention, and played a partial mediating role in the relation between the shopping APP'S convenience and impulse buying intention. Meanwhile, the sense of arousal played a completely mediating role in the relation between the shopping APP'S knowledge convenience and impulse buying intention, and played a partial mediating role in the relation between the shopping APP'S entertainment and impulse buying intention. The results showed that the two psychological emotions could mediate the relationship between shopping APP's characteristics and impulsive buying intention. Whether the product information in shopping APP is complete, wealth is an important premise for consumers to produce impulse buying intention. After knowing the basic information, consumers are more likely to have impulse buying intention after being stimulated by external factors, such as the surrounding environment. The convenience of shopping APP is mainly mediated by the sense of arousal to generate impulse buying intention. Whether shopping APP is simple and easy to operate, and convenient to find, mainly makes consumers feel respected and can't reach the happy state, and not fully produce pleasant psychological emotion to ultimately produce impulse buying intention. The entertainment of shopping APP mainly generates impulse buying intention by making consumers feel pleasure. Intention is an important prospective variable in behavior. The study of the mechanism of impulsive buying intention has great reference value for the study of the impact mechanism of impulse buying behavior. Overall, the conclusion of this research has certain theoretical and practical significance.

1) Theoretical significance

This study is based on the mobile APP shopping scene, combined with the characteristics of APP shopping information system, environmental psychology, and consumer's impulse buying intention formation process. And this study makes up for the lack of domestic and international research on mobile shopping, especially shopping APP impulse buying behavior. Since this study is based on the APP mobile terminal shopping, consumers in the APP shopping scene is facing the virtual environment generated by mobile devices, which is lack of physical proximity. The validity of the model gives the key points of shopping APP features, and also proves the applicability of SOR theory in the context of mobile APP shopping.

2) Practical significance

Consumers often have a lot of impulsive buying in their daily lives, which is an irrational behavior. Some scholars believe that the rise of online shopping will increase the probability of impulsive buying behavior. With the rapid development of mobile Internet, consumers can experience rich and colorful environment and browse a lot of goods at anytime and anywhere through mobile phones, in which they are more likely to have impulse buying intention, and eventually turn into impulse buying behavior. More and more e-commerce enterprises enter the mobile field from the PC side, and they develop a variety of shopping APPs to attract consumers, such as TMAll JD Vipshop. But shopping

on the phone is significantly different from offline shopping and traditional PC-side online shopping. Therefore, businesses need to further understand the behavior of mobile shopping and consumer psychology, so as to better grasp the unique features and processes of mobile shopping, especially the APP shopping.

Through empirical research, we find that the recreational performance of shopping APP can effectively arouse the psychological mood of consumers' pleasure to stimulate impulse buying intention. Therefore, businesses should improve the entertainment of shops and make shopping more interesting. For example, with the maturity of virtual technology, APP adds "virtual fitting room" function in shopping environment, which can strengthen the sense of proximity of consumers in mobile shopping environment. Consumers can increase the interest in the process of different clothing collocation, and then it can promote the impulse buying intention of consumers to a greater extent. In the analysis results, the convenience of shopping APP can trigger the impulse buying intention by promoting the arousal emotions of consumers. Due to the limitation of screen size, mobile devices require a very high level of interactive experience. In the APP design, we need to change the large and all-inclusive idea from the original PC side website design. We must display the core and important information in a limited page space with an important standard of convenience. Then it will allow consumers to quickly see the information they need most and avoid consumer visual fatigue in the process of browsing.

## 6. Research limited Position Prospect

### 6.1. Limitations of the Study

Although this paper refers to a large number of domestic and foreign research literature, seriously study the past scholars' scientific research methods, but due to the lack of research experience and research conditions, it is inevitable that there are some deficiencies in the process of research.

1) It is lack of representativeness of the respondents. According to the "China online shopping report" data , white collar workers are the main participants in online shopping in China, accounting for more than 40% of the total, but the subjects of this study are students. In addition, the survey objects are mainly concentrated in high-income areas such as Guangdong and Hubei, and the geographical distribution is not wide enough.

2) This paper uses questionnaire to collect data, although it can quickly complete data collection, but comparing to in-depth investigation, the questionnaire is not enough in-depth, it is difficult to accurately grasp the perceptual vision behind its behavior.

3) According to the references in this paper, the classification and definition of virtual environment features are partly based on the PC network environment, which is different from the mobile shopping website.

### 6.2. Research Prospect

This section will provide some directions for further research of impulse buying

behavior based on mobile shopping websites.

In this paper, the questionnaire is used to collect the data, and then the data is analyzed by SPSS, so as to explore the related factors that trigger the impulse buying intention. The relevant research suggests that the experimental method can be used to expose the interviewees to the set virtual environment, and to explore the differences of impulse buying decisions made by consumers in different virtual environments by controlling variables. For consumers' emotions, it is more possible to use biological techniques to measure them accurately. Through the above methods, the accuracy of the research can be improved.

In this paper, the definition of virtual environment for mobile online shopping is only limited to the virtual environment created by mobile devices. But in the real life, the perception of consumers in the process of mobile shopping is not only affected by the virtual environment, but also affected by its surrounding environment. This is also in line with our common sense in life, the more comfortable the online shopping environment is, the more likely it is to produce pleasant emotions. Therefore, the future research on mobile environment should not be confined to the virtual environment, but should be combined with the real environment in which consumers are located.

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