

Research on the Influence of Promotion Types and Scarcity on Consumers' Purchase Intention in The Context of E-commerce Live Broadcasting

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Abstract: E-commerce live broadcasting has become a popular form of e-commerce sales. Compared with traditional marketing channels, e-commerce live broadcasting can more influence consumers' purchasing behavior. Based on relevant theories such as frame effect theory, commodity theory and scarcity effect, and combined with practical marketing problems of e-commerce live broadcasting, this paper discusses the influence of scarcity on consumers' purchase intention under different promotion methods in the context of e-commerce live broadcasting, as well as its internal mechanism. In this paper, we publish online questionnaires on the data platform to collect the required data. SPSS and AMOS software are used as analysis tools to analyze the collected data. The results of experiment 1 show that when anchors use price discount promotion in live broadcast, compared with limited time, the use of quantity limited can stimulate consumers to have higher purchase intention. When the host adopts the gift promotion method, compared with the quantity limited, the use of limited time can better stimulate consumers' purchase intention. The results of experiment 2 show that, when price discount promotion is adopted, perceived value plays an intermediary role in the influence of quantity limited on consumers' purchase intention, discount range plays a moderating role in the relationship between quantity limited and purchase intention, and discount range can effectively regulate the relationship between quantity limited and purchase intention through the intermediary of perceived value. The results of experiment 3 show that when the gift promotion method is adopted, perceptual arousal plays an intermediary role in the influence of time limit on consumers' purchase intention, and the gift correlation plays a moderating role in the relationship between time limit and purchase intention.

Keywords: Promotion mode, Limited time, Limited quantity, Perceived value, Perceived arousal, Purchase intention.

1. Introduction

With the continuous development of China's economy, strong consumer demand and popularization of network infrastructure, more and more consumers learn about and buy products through live streaming e-commerce. The live streaming e-commerce market continues to flourish. The national level attaches great importance to the construction of digital society, which provides strong support for Internet platform enterprises to further expand new forms of business. E-commerce live broadcasting is a new way to buy and sell products. Anchors show products to users through live broadcasting, answer questions for users and provide real-time services, so as to enhance the interaction with users and stimulate their purchasing behaviors. Compared with traditional e-commerce, e-commerce live streaming solves problems such as information asymmetry, poor user experience and lack of social experience. This new way of shopping is increasingly popular among consumers. In the "Online Survey Report on Consumer Satisfaction of Live Streaming E-commerce Shopping" conducted by China Consumers Association over the past 20 years, the survey results on the driving factors of live streaming e-commerce shopping show that the main reasons for consumers to watch live streaming are to learn about product information and enjoy benefits through live streaming, which account for 49.5 and 47.5 respectively. The key factors for consumers to choose live shopping are the high cost performance, price concessions and limited-time concessions. We can see from the above data that the activities of merchants, the price concessions and the limited-time concessions account for a

large proportion. At the same time, the partner of the United States ONE also pointed out in the "Watch 2020 financial Summit", the underlying logic of live streaming is limited time limited discounts.

Through the review of relevant literature, it is found that most of the existing researches combine the characteristics of live streaming e-commerce with communication. From the perspectives of information source characteristics, audiovisual experience, immersion theory, etc.(Sun, Shao et al. 2019), they study the influence of live streaming e-commerce on consumers' continuous viewing intention, participation intention, user attitude and purchase intention(Park and Lin 2020, Lu and Chen 2021, Zheng, Chen et al. 2023). However, there are few researches on the influence of e-commerce live streaming limited time promotion strategy on consumers' purchase intention. At the same time, through the review of the research on limited time, it is found that most of the current research on limited time in the context of e-commerce live broadcasting is about the limited time factor, and few research on the limited time factor in live broadcasting. At the same time, the literature on limited time mainly focuses on the traditional e-commerce or offline shopping environment. In such literature, the comparative study on limited time and limited time is carried out, the promotion method is taken as the control variable, and the conclusion is that the quantity limit can make consumers have higher purchase intention. However, in the real marketing environment, no matter it is offline, traditional e-commerce, or e-commerce live streaming, scarcity is usually used together with promotion. The promotion without limited time (such as the promotion price all year round, the

promotion frequency is too high) and the limited time without promotion will not generate additional appeal to consumers.

Based on the above analysis, this paper intends to study the influence of scarcity marketing on consumers' purchase intention under different promotion methods in the context of e-commerce live broadcasting, as well as its internal mechanism. It mainly answers the following questions: 1) Under different promotion methods in the context of e-commerce live broadcasting, which is more likely to stimulate consumers' purchase intention: limited time or limited amount; 2) According to the conclusion of question 1, explore the inner psychological mechanism. This study enriched the theoretical research on scarcity promotion, and provided a reference for further in-depth discussion on the role of scarcity promotion in e-commerce live streaming. Theoretically expand the application of commodity theory, cognitive resource theory and frame theory in the field of e-commerce live streaming; It provides reference for formulating marketing strategy of main broadcast planning.

2. Research Hypothesis

2.1. Price discount, scarcity, and purchase intention

A price discount is when the actual selling price is lower than the original price so that the customer can get a discount on the price. Since discount promotion is related to the actual price of the product, it is considered as loss-reducing promotion (Song, Choi et al. 2021). In this way of promotion, although the actual amount paid by consumers is reduced, it will emphasize how much consumers need to spend, and then the loss information will be emphasized. According to the theory of framing effect, the loss of framing information will make individuals establish higher demands and pursue higher values. Moreover, individuals are more sensitive to loss information, so they are more inclined to avoid losses and hope to have higher perceived value in the consumer process. Compared with time limit, quantity limit can bring higher perceived value to individuals. To be specific, quantitative limited refers to the limited of the marketable quantity of goods or the quantity of services, in which individuals compete with other consumers. Firstly, according to the commodity theory, competition among consumers increases the unavailability of products, and the unavailability of products increases the perceived value of products. Secondly, in the situation of limited quantity purchase, the principle of first come, first served leads to perceived uncertainty of consumers. Consumers compete to buy products. In this state, people long for the feeling of "winning". Finally, due to the principle of first come, first served in quantity limited, according to the attribution theory, individuals in this situation can seize the opportunity to buy due to internal factors' own efforts. Since people tend to hold a positive attitude towards internal factor attribution, quantity limited brings higher perceived value.

Hypothesis 1a: When the price discount is used in the live broadcast, compared with the time limit, the quantity limit is more likely to stimulate consumers' purchase intention.

Hypothesis 1b: When price discounts are used in live broadcast, perceived value plays an intermediary role in the effect of quantity limited on consumers' purchase intention.

Discount range refers to the level of discounts offered to consumers. In discount promotion activities, price discounts can reduce the payment cost of consumers, so that consumers

can obtain greater economic benefits, and a higher discount range may bring consumers higher perceived benefits [23]. Merchants can present high or low discount value by setting high or low discount range, thus affecting consumers' perception of commodity value and promoting consumers' purchase intention. Therefore, in e-commerce live broadcasting, when anchors offer larger discounts, consumers' perceived value and purchase intention will be improved.

Hypothesis 1c: The discount range plays a moderating role in the influence of quantity limited on perceived value. The larger the discount range, the higher the perceived value of consumers. Among the influences of quantity limited on purchase intention, discount range plays a moderating role. The higher the discount range, the higher the purchase intention of consumers.

2.2. Gift promotion, scarcity and purchase intention

Giveaways refer to giving free or low prices to consumers when they buy goods, which provides additional benefits to consumers. In this context, income information is highlighted. According to the theory of framing effect, when people are faced with the situation of benefits, individuals will often choose a choice with greater certainty in order to ensure that they can obtain benefits. Compared with the quantity limited, consumers can enjoy the benefits provided by the broadcast room as long as they make the purchase decision within the time specified by the anchor. However, the uncertainty brought by the quantity limited is greater. Even if the consumers can roughly estimate the potential competitors in the live broadcast room according to the number of online viewers and the situation of bullet screen, there is still competition with other consumers in this process. Making the quantity limit more uncertain. Therefore, in the case of giveaway promotion, time limit can make consumers more willing to buy than quantity limit. Under the condition of limited time, consumers must make the purchase decision within the specified time. The greater time pressure will make consumers produce nervous or anxious psychological reaction, increase the sense of urgency of consumers and make them enter the state of arousal. Weng et al. found through research that subjects may have obvious psychological and physiological reactions when facing time pressure (Worchel 1975).

Hypothesis 2a: When free gift promotion is used in live broadcast, time limit is more likely to stimulate consumers' purchase intention than quantity limit.

Hypothesis 2b: When giveaway promotion is used in live broadcasting, perceived arousal plays a mediating role in the influence of time limit on consumers' purchase intention.

The correlation degree of gifts refers to the matching degree between promotional products and gifts, and more importantly, the mutually enhanced correlation between gifts and products in terms of performance or use (Jung 2004). The degree of correlation between products and gifts is the key factor affecting the success of gift promotion. When the degree of correlation is high, the promotion is easier to succeed. In the gift promotion activities, the gift promotion group with high correlation will be closer to the main interests sought by consumers and more in line with consumers' demands for maximization of interests, so as to improve consumers' attention to products and purchase intention.

Hypothesis 2c: In the influence of time limit on perceived

arousal, the gift correlation plays a moderating role, and the higher the gift correlation, the higher the perceived arousal of consumers; In the influence of time limit on purchase intention, gift correlation plays a moderating role. The higher the gift correlation is, the higher the purchase intention will be.

3. The Effect of Scarcity on Purchase Intention Under Different Promotion Methods

3.1. Pretest

3.1.1. Time setting

In the past, the setting of time scarcity was the offline marketing environment and the traditional e-commerce marketing environment. In the above two environments, the time setting was mostly based on Aggarwal, and the time limit was set to 1 day. However, the time-limit characteristics in the e-commerce live broadcast environment are different from those in the previous shopping environment, so the pre-experiment is conducted to determine the time limit level before the formal experiment. The online questionnaire was released through the data mart of the data platform, and the subjects were asked: "Suppose you want to buy a product recently. When you browse an e-commerce app, you accidentally click on the broadcast room recommended on the home page (1000 online viewers). In the broadcast room, the anchor is explaining the product, which is exactly what you want, and the product is being promoted at the same time. How many minutes do you think the anchor will limit buying time to make you feel time constrained? (Unit: minute)". The time limit of the subject's response was regarded as the high time limit level. A total of 51 valid questionnaires were collected (excluding 3 questionnaires that had not watched live e-commerce broadcasting), and the average value of the data was 5.2. Therefore, 5 minutes was selected as the time limit in this paper.

3.1.2. Quantity setting

When setting the quantity limit, in order to ensure that the appeal of the time limit and the limit to consumers are equivalent, the subjects were asked: "Suppose you want to buy a product recently. When you browse an e-commerce app, you accidentally click on the live broadcast room recommended on the home page (1000 online viewers). The anchor in the live broadcast room is explaining the product, and the product is being promoted. A total of 47 valid questionnaires were collected in the experiment, and the mean value of data was 143.3, and the mode was 100 (16/47). Therefore, 100 was taken as the quantity limit in this paper.

3.2. Experimental design

The intergroup experimental design with purchase limited (time limit: quantity limit) X promotion (price discount: gift) was adopted, and there were four experimental situations. GPower was used for pre-efficacy analysis, and the minimum sample size required for the experiment was 180. Data was collected by online questionnaire published by data Mart, a data viewing platform, in the formal experiment.

3.3. Procedure

The subjects were asked to "imagine that you want to buy a Bluetooth headset recently, when you browse an e-commerce app, you accidentally click on the broadcast room

recommended on the home page (1000 people watched online), and the anchor in the broadcast room is explaining a Bluetooth headset of a certain brand and the product is about to be put on the shelf". After each subject entered the experiment, The system will randomly display one of the four experimental situations to the subjects. In order to make the experimental materials more close to the real live broadcast, we use a real live broadcast picture after the description of the experimental situation, and then attach the experimental operation materials after the picture. The text description of the manipulated materials is divided into time-limited discount, time-limited discount, time-limited gift and time-limited gift. After entering an experimental scene, the subjects carefully read the experimental materials and completed the relevant questions. The questions they answered included the specific information questions of the experimental scene, the experimental manipulation questions, the system screening questions and the purchase intention questions. Finally, the subjects filled in demographic information.

3.4. Result analysis

Manipulation test: The scarcity manipulation set by time and quantity in the experiment is tested. The question about time manipulation is "When you read the above live broadcast situation information, you feel the purchase time of the commodity in this live broadcast:"; the question about quantity manipulation is "When you read the above live broadcast situation information, you feel the salable quantity of the commodity in this live broadcast: ", using a seven-point Likert scale ranging from "very abundant" to "very scarce". In the time limited group, the average score of the time scarcity degree was 5.53, and in the quantity limited group, the average score of the quantity scarcity degree was 5.43. Consumers felt different degrees of scarcity in the experimental situation, and the time limited and quantity limited were successfully manipulated.

Hypothesis test: In the price discount group, the independent sample t test is used to analyze whether there are differences in the influence of time limit and quantity limit on purchase intention under the condition of price discount. The results show that $M_{LTS}=4.42$, $SD=1.465$, $M_{LQS}=5.37$, $SD=1.025$, $p<0.01$, $M_{LTS}=4.42$, $SD=1.465$, $M_{LQS}=5.37$, $SD=1.025$, Therefore, under the condition of price discount promotion, the influence of time limited and quantity limited on consumers' purchase intention is significantly different, and the mean value of quantity limited group is greater than that of time limited group, $M_{time\ limited}=4.42 < M_{quantity\ limited}=5.37$. In the gift promotion group, the independent sample T test was also used to analyze the data, and the results showed that $M_{time\ limit}=6.05$, $SD=0.875$, $M_{quantity\ limit}=5.00$, $SD=1.547$, $p<0.01$. Therefore, under the gift promotion condition, there are significant differences in the influence of time limit and quantity limit on consumers' purchase intention. The value of the time limit group is greater than the value of the quantity limit group. The value of $M_{time\ limit}=6.05 > M_{number\ limit}=5.00$. It can be seen from the analysis results that when the way of promotion in live broadcast is price discount, consumers have higher purchase intention under the condition of quantity limited compared with time limited. When the way of promotion in live broadcast is free gifts, consumers have higher purchase intention under the time limited condition compared with the quantity limited.

3.5. Discussion

Through the above experimental analysis, there are significant differences in the influence of time-limited marketing strategies on consumers' purchase intention under different promotion methods in e-commerce live broadcasting. Specifically, when the way of promotion in the live broadcast is price discount, the limited marketing strategy adopted by the host can better stimulate consumers' purchase intention. When the promotion method in the live broadcast is giveaway, the use of limited-time marketing strategy by the anchor can better stimulate consumers' purchase intention, which verifies hypothesis 1a and 2a.

4. Influence of Limited Quantity on Consumers' Purchase Intention Under Price Discount

4.1. Experiment design

An intergroup experimental design with 2 discount range (high discount: low discount) and quantity limit (limited: unlimited) was adopted. There were four experimental situations. GPower was used to conduct pre-*efficacy* analysis, and the minimum sample size required for the experiment was 210. Data was collected by online questionnaire released by data Mart, a data-viewing platform, in the formal experiment.

4.2. Procedure

The subjects were asked to "imagine that you want to buy self-heating hot pot recently, when you browse some e-commerce app, you accidentally click on the broadcast room recommended on the home page (1000 online viewers), the anchor in the broadcast room is explaining a self-heating hot pot, which meets your expectations in all aspects, and the product will soon be put on the shelves". After each subject entered the experiment, The system will randomly display one of the four experimental situations to the subjects. In order to make the experimental materials more close to the real live broadcast, we use a real live broadcast picture after the description of the experimental situation, and then attach the experimental operation materials after the picture. The text description of the manipulated materials is divided into limited high discount, unlimited high discount, limited reasonable discount, and unlimited reasonable discount.

After entering an experimental scene, the subjects carefully read the experimental materials and completed the relevant questions. The questions they answered included the specific information questions of the experimental scene, the experimental manipulation questions, the system screening questions and the purchase intention questions. Finally, the subjects filled in demographic information.

4.3. Result analysis

Manipulation test: The quantity scarcity manipulation in the experiment was tested. The questions about quantity scarcity in the questionnaire were "I think the supply of this product is very limited, I think the product will be sold out soon, I think many people will buy this product, and I think the limited offer of this product will attract many people to buy". The items were all on 7-Likert scale. From "strongly disagree" to "strongly agree." In this study, data were collected experimentally. In the questionnaire filled out by the subjects, the perceived scarcity of the test item with quantitative limited was included (7-Likert scale was

adopted). In the quantitative limited group (limited to 100 items), the mean score of the perceived scarcity of the subjects was 5.85 and the standard deviation was 0.976. The mean value and standard deviation of the perceived scarcity score of the subjects were 5.13 and 1.09. T-test limited the perceived scarcity difference between the two groups was significant ($t=5.37$, $p<0.01$), so the quantitative limit manipulation was successful.

Hypothesis testing:

The effect of quantity limited on purchase intention. As can be seen from the following table, the mean value of consumers' purchase intention is 5.4833 ($SD=0.6603$, $N=120$) in the quantity limited scenario, and 5.0625 ($SD=0.64597$, $N=120$) in the reasonable discount range. The independent sample t test was used to test whether the difference of purchase intention under the quantity limit was limited. If the difference was significant, it was proved that the quantity limit had an impact on purchase intention. According to the T-test results. According to the Sig value of F statistic in Levene test was $0.348>0.05$, which proved that the variances were equal. Therefore, the result of T-test was referred to the result in the first row, and the two-side Sig value of T-test was less than 0.05, that is, at the significance level of 0.05, it was considered that the quantity limited could affect the purchase intention.

Since the measurement of purchase intention in the experiment was obtained under the combination of price discount and quantity limited situation, and both variables were category variables, this paper used multivariate analysis of variance to verify the influence of price discount and quantity limited on purchase intention. The interactive effects of price discount and quantity limited are tested by multivariate analysis of variance, and the results are shown in the table below. The data in the table show that the interaction of price discount and quantity limited has a significant difference on the influence of purchase intention ($F=13.340$, $p<0.001$).

Mediation effect analysis: According to the method of HayesAF, Taylor et al., this paper uses process4.1 in Bootstrap to analyze the mediation effect of perceived value. Compared with traditional mediation effect analysis methods, this method can carry out the sequential test method and Bootstrap method at the same time. Have high testing power and strong interpretation ability. Model 4 was selected from the process plug-in, and 5000 Bootstrap repeated sampling was conducted to determine whether 0 was included in the 95% confidence interval to test whether the mediation effect existed. The results show that quantity limited has a significant effect on purchase intention, with an effect value of -0.2235 and a 95% confidence interval of [-0.3748, -0.0721], excluding 0. Quantitative limited has a significant effect on purchase intention through perceived value. The effect value is -0.1974, and the 95% confidence interval is [-0.3007, -0.1058], excluding 0. Therefore, perceived value plays a mediating role in the effect of quantitative limited on consumers' purchase intention, and hypothesis 1b is verified.

Moderating effect analysis: Model8 in Bootstrap analysis was used to test the moderating effect of discount range. Quantitative limit was taken as the independent variable, purchase intention as the dependent variable, perceived value as the mediating variable, and discount range as the moderating variable. The results show that the mediating effect of perceived value on the relationship between quantity limited and purchase intention is significant ($\beta=-0.1550$;

LLCI=-0.7477, ULCI=-0.3590); When the product was a reasonable discount range, the mediating effect of perceived value on the relationship between quantity limited and purchase intention was not significant (β =-0.0652; LLCI=-0.3660, ULCI=0.0040); According to the index value of the moderated mediation effect is -0.0898, 95% CI is [-0.1889, -0.0146], and the interval does not contain 0, it can be inferred that there is a significant moderated mediation effect in the model.

4.4. Discussion

In this chapter, situational experiment is adopted to study the influence of quantitative limited on consumers' purchase intention in the context of e-commerce live discount promotion. The results show that perceived value plays a partial mediating role in the influence of quantitative limited on consumers' purchase intention in the context of e-commerce live discount promotion, and hypothesis 1b is verified. At the same time, discount range plays a moderating role in the relationship between quantity limited and purchase intention, that is, when the discount range is larger, quantity limited has a greater impact on purchase intention, which verifies hypothesis 1c.

5. The Influence of Limited Time on Consumers' Purchase Intention in The Context of Giveaway Promotion

5.1. Experiment design

The inter-group experimental design with 2 gift correlation degree (high correlation: low correlation) and time limit (limited time: unlimited time) was adopted. There were four experimental situations. GPower was used to conduct pre-*efficacy* analysis, and the minimum sample size required for the experiment was 210. Data was collected by online questionnaire released by data Mart, a data-viewing platform, in the formal experiment.

5.2. Procedure

The subjects were asked to "imagine that you want to buy a shampoo recently, when you browse some e-commerce app, you accidentally click on the broadcast room recommended on the home page (1000 online viewers), the anchor in the broadcast room is explaining this shampoo, this shampoo meets your expectations in every aspect, and the product will be released soon". After each subject entered the experiment, The system will randomly display one of the four experimental situations to the subjects. In order to make the experimental materials more close to the real live broadcast, we use a real live broadcast picture after the description of the experimental situation, and then attach the experimental operation materials after the picture. The text description of manipulated materials is divided into time-limited high-relevance gifts, time-limited high-relevance gifts, time-limited low-relevance gifts, and time-limited low-relevance gifts.

After entering an experimental scene, the subjects carefully read the experimental materials and completed the relevant questions. The questions they answered included the specific information questions of the experimental scene, the experimental manipulation questions, the system screening questions and the purchase intention questions. Finally, the subjects filled in demographic information.

5.3. Result analysis

Manipulation test: Test the correlation degree of gifts and time scarcity manipulation in the experiment. The questions about the correlation degree of gifts in the questionnaire are "gifts are very suitable for the product, gifts are a logical choice for the product, and gifts have a good correlation with the product". The questions about time scarcity in the questionnaire were "in this situation, I must act quickly to avoid missing the activity, in this situation, I feel very stressed when the time is approaching, in this situation, I feel time is rushed, in this situation, I do not have enough time". The items were all on a 7-point Likert scale, from "strongly disagree" to "strongly agree". In the group with high gift correlation, the average score of the subjects on gift correlation was 5.9174 and the standard deviation was 0.83031; in the group with low gift correlation, the average score of the subjects on gift correlation was 4.7731 and the standard deviation was 1.564. T-test limited the difference of gift correlation between the two groups was significant ($t=7.095$, $p<0.01$), so the gift correlation manipulation was successful. At the same time, the use of time constraint items was tested. In the time limit group, the average score of time pressure was 4.8822, and the standard deviation was 1.28171. In the unlimited time group, the mean score and standard deviation of time pressure were 4.3571 and 1.46266. T-test results showed that there was a significant difference in event pressure between the two groups ($t=2.959$, $p<0.01$), so the time limit manipulation was successful.

Direct effect analysis: The effect of time constraints on purchase intention. As can be seen from the following table, the mean value of consumers' purchase intention is 5.5868 (SD= 0.65567, N=121) in the case of limited time. In the unlimited time scenario, the average purchase intention of consumers is 5.0819 (SD=.99634, N=119). The independent sample t test was used to test whether the difference of purchase intention in the time constraint situation was significant. If the difference was significant, it was proved that the time constraint had an impact on purchase intention. According to the T-test results. According to the Sig value of F statistic in Levene test was $0.004<0.05$, which proved that the variances were not equal. Therefore, the result of T-test was referred to the result of the second line, and the two-side Sig value of T-test was less than 0.05, that is, at the significance level of 0.05, it was considered that the time limit could affect the purchase intention.

Analysis of mediating effect: bootstrap method was used to test the mediating effect of perceptual arousal. Model4 was selected for data analysis, and 5000 times of Bootstrap repeated sampling was conducted to determine whether 0 was included in the 95% confidence interval to test whether the mediating effect existed. The Bootstrap method gives the result of the mediation test and gets the corresponding coefficient. The results show that the direct effect of time limit on purchase intention is significant, 95% confidence interval is [-0.5645, -0.1351], without including 0, and the indirect effect of time limit on purchase intention is significant, 95% confidence interval is [-0.2520, -0.754], without including 0. Therefore, Perception arousal plays a partial mediating role in the effect of time limit on purchase intention, and hypothesis 2b is verified.

Adjustment effect analysis: Model8 in Bootstrap analysis was used to test the adjustment effect of gift correlation degree, with time limit as the independent variable, purchase intention as the dependent variable, perception arousal as the

mediating variable, and gift correlation as the moderating variable. The results show that under the condition of high gift correlation, time limit has a significant impact on consumers' purchase intention, with effect value of $-.2008$ and interval of $[-.4483, -.0466]$, excluding 0; under the condition of low gift correlation, the direct effect is not significant, with effect value of $-.8835$ and interval of $[.1.1492, 0.6179]$. Contains 0; In the case of high and low correlation degree of gifts, indirect effect was not significant, and the interval contained 0. Therefore, the correlation degree of gifts plays a moderating role in the influence of time limit on purchase intention, but has no significant moderating role in the indirect effect. Therefore, hypothesis 2c is partially verified.

5.4. Discussion

In this chapter, situational experiment is adopted to study the influence of time limit on consumers' purchase intention in the context of e-commerce live gift promotion. The results show that perceptual arousal plays a partial mediating role in the relationship between time limit and purchase intention in the context of e-commerce live gift promotion, which verifies hypothesis 2b. At the same time, the correlation degree of gift plays a moderating role in the influence of time limit and purchase intention, that is, when the correlation degree of gift and main product is greater, the influence of time limit on purchase intention is greater. Hypothesis 2c is partially verified.

6. Conclusion and Prospect

6.1. Research conclusion

Based on the framework effect theory, commodity theory and scarcity effect theory, this study studied the impact of promotion methods and scarcity on consumers' purchase intention in the context of e-commerce live broadcasting through situational simulation experiments, and mainly solved the following two problems: 1) Consumers' preference for purchase limiteds under different promotion methods in e-commerce live broadcasting, that is, in the context of discount promotion, whether consumers prefer limited time or limited amount of promotion; 2) Based on question 1, the internal mechanism of the influence of time limit or quantity limit on consumers' purchase intention under different promotion methods was studied. In order to answer the above two questions, it is subdivided into three studies. Study 1 mainly explores consumers' preference for purchase limited types under different promotion methods in e-commerce live broadcasting; Study 2 mainly explores the internal mechanism of the influence of quantity limited on consumers' purchase intention under the background of discount promotion in e-commerce live broadcasting; Study 3 mainly explores the background of gift promotion in e-commerce live broadcasting. The internal mechanism of the influence of time limit on consumers' purchase intention. The following conclusions are drawn from the above research.

In study 1, the data obtained by the situational experiment method was analyzed, and the following conclusions were drawn: In the context of e-commerce live broadcasting, when the product promotion method was discount promotion, compared with the time limit, the strategy of limiting quantity and scarcity adopted by anchors could better stimulate consumers' purchase intention. When the product promotion method is gift promotion, compared with quantity limited, the anchor adopts the time-limited scarcity strategy to stimulate

consumers' purchase intention more.

According to the conclusion of Study 1, Study 2 was conducted to analyze the data obtained through the situational experiment, and the following conclusions were drawn by using the situational experiment method: In the context of e-commerce live discount promotion, perceived value plays a partial mediating role in the influence of quantitative limited and consumers' purchase intention. Meanwhile, discount range plays a moderating role in the relationship between quantitative limited and perceived value, that is, when the discount range is larger, the quantitative limited has a greater impact on perceived value. Discount range plays a moderating role in the effect of quantity limited on purchase intention. When the discount range is larger, quantity limited has a greater effect on purchase intention.

Study 3 analyzed the data obtained through the situational experiment and drew the following conclusions: In the context of live gift promotion of e-commerce, perceptual arousal plays a partial mediating role in the influence of time limit and consumers' purchase intention. Meanwhile, the correlation degree of gift plays a moderating role in the relationship between time limit and purchase intention, that is, when the correlation degree of gift and main product is greater, the influence of time limit on purchase intention is greater.

6.2. Contributions and implications

6.2.1. Contributions

This study complements and improves the theoretical system of e-commerce live promotion methods and scarcity. There are many factors affecting consumers' purchase intention, among which two important ones are promotion methods and product scarcity. In previous studies, most of them combined the characteristics of e-commerce live broadcasting with communication, and studied the impact of e-commerce live broadcasting on consumers' continuous viewing intention, participation intention, user attitude and purchase intention from the perspectives of information source characteristics (Guo, Lu et al. 2020), audiovisual experience (Palazon and Delgado-Ballester 2013) and immersion theory (Gong, Ye et al. 2020). However, there are few studies on the impact of e-commerce live broadcast promotion methods and product scarcity on consumers' purchase intention. Therefore, the study in this paper has a certain contribution to the study on the impact of e-commerce live broadcast promotion methods and product scarcity on consumers' purchase intention.

Based on the framework effect theory, commodity theory, cognitive resource theory, etc., this study explores consumers' preferences for purchase limited types under the background of different promotion methods in e-commerce live broadcasting, enriched the research literature on promotion, and complements the research on consumers' purchase intention. Although existing literature has discussed the influence of promotion methods and scarcity on purchase intention, most of the studies in such literature conducted comparative studies on limited time and limited quantity, took promotion methods as the control variable, and reached the conclusion that quantity limited can make consumers have higher purchase intention (Luo, Pan et al. 2022). However, in the real marketing environment, Whether offline, traditional e-commerce or e-commerce live streaming, scarcity is usually used in combination with promotion.

Finally, this study verified the mediating effect of perceived value on the relationship between quantity limited and

purchase intention, and the moderating effect of discount range on the relationship between quantity limited and purchase intention. The mediating effect of perceptual arousal on time limit and purchase intention, and the moderating effect of gift correlation between time limit and purchase intention. The research further deepens the cognition of the internal structure and relationship of price discount, gift, discount range, gift correlation, perceived value and perceived arousal in the context of e-commerce live broadcasting.

6.2.2. Implications

This study provides important marketing enlightenment on how to enhance consumers' purchase intention through the combination of promotion and scarcity in the context of e-commerce live broadcasting. According to the experimental research results, this paper draws the following enlightenment:

1) Different promotion methods will have different marketing effects. Anchors should select appropriate scarcity according to different promotion methods. In marketing practice, both time limit and quantity limit will promote consumers' purchase intention, and thus influence consumers' purchase decision. When consumers watch the live broadcast, they find that products are being promoted in the live broadcast, which will attract consumers' attention to some extent, and the scarcity of promotion will further influence consumers' purchase intention. Through study 1, this paper finds that when anchors adopt discount promotion, consumers will have higher purchase intention under the condition of quantity limitation and scarcity. When the host adopts the gift promotion, the consumers have stronger purchase intention under the condition of time scarcity. Therefore, in marketing practice, anchors should pay attention to the fine management of sales promotion, and should not blindly carry out sales promotion activities. Instead, they should formulate promotion mix mode according to the promotion methods.

2) Through study 2, this paper finds that in the limited discount promotion strategy, consumers' purchase intention is affected by perceived value. The higher the perceived value, the stronger the purchase intention of consumers. Therefore, in the e-commerce live broadcast, anchors can highlight the value of the promotional products, for example, by comparing the event price with the daily price of the product or other prices in the live broadcast. At the same time, study 2 also draws a conclusion that discount range plays a regulating role between quantity limited and purchase intention, so anchors should make appropriate discount range with reference to multiple parties when formulating product discount.

3) Through study 3, this paper finds that consumers' purchase intention in the limited-time giveaway promotion strategy is influenced by perceived arousal, and the higher the perceived arousal, the stronger the purchase intention of consumers. In this situation, the time limit will bring time pressure to consumers, so the anchor should highlight the scarcity of time to buy and emphasize the passage of remaining time in the live broadcast. For example, the preferential activity of this product is only limited to the period of product explanation, and the payment will be paid in a few minutes. At the same time, study 2 also concluded that the correlation degree of gifts plays a regulating role between time limit and purchase intention. Therefore, anchors should pay attention to the selection of gifts when choosing products, and try their best to choose gifts with high correlation degree with main products, so as to stimulate the purchase to a greater extent.

4) The research conclusions have guiding significance for consumers to correctly understand e-commerce live broadcast marketing strategies and improve consumers' rational purchasing. In the process of watching e-commerce live broadcasting, consumers may attach too much importance to the product promotion information and scarce information delivered by anchors and fall into the trap of merchants' promotion, leading to their own blind consumption behavior.

6.3. Limitations and future research directions

Although some conclusions are drawn in this paper, there are still many deficiencies, which need to be improved in the follow-up research.

1) This study collects experimental data through online platforms, which may be difficult to fully represent the entire consumer group of live streaming. Therefore, in future studies, appropriate sampling methods should be selected to understand the purchase information of live streaming consumers, further expand the scope of investigation, and collect more comprehensive and real consumer data, so as to improve the external validity of the research conclusions.

2) In terms of experimental materials, live broadcast pictures are used in the experiment, so there is a certain gap between the experimental environment and the real live broadcast scene. Therefore, video or real live broadcast can be used as experimental materials in future research to ensure the authenticity of experimental materials.

3) There are various promotion methods in e-commerce live broadcasting. In this study, only price discount and gift promotion are discussed, and scarcity is only studied in terms of time scarcity and quantity scarcity. Future studies can focus on exploring other promotion methods and scarcity.

4) This study has not considered the influence of other important factors, such as product type, gift type, brand awareness, consumer personality and other factors. More factors can be included in the study in the future, so as to enrich the research in this subfield.

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