

Research on The Influence Mechanism of Live Streaming Atmosphere on Consumers' Willingness to Spend Impulsively

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Abstract. With the advent of the Internet live broadcasting era, e-commerce live broadcasting has become a hot topic that has received widespread attention. The purpose of this paper is to find the factors affecting consumers' willingness to make impulse purchases and to provide improvement suggestions for live marketing platforms, in order to guide e-commerce live platforms to create a better live atmosphere and promote the benign development of the live marketing industry. The study adopts the literature research method, questionnaire survey method and empirical analysis method, firstly combing the current research status of atmosphere cues at home and abroad, and reviewing the SOR theory and social presence theory, and then constructing a research model and putting forward hypotheses. Relevant data were collected through questionnaire survey method and empirically analyzed using SPSS27 software. The results of the study show that ambient cues such as background music, anchor's ability, page design and online service in live broadcasting room significantly enhance consumers' impulse consumption. Meanwhile, social presence and identity play a mediating role between ambience cues and consumers' impulse consumption, and there is a chain mediation relationship between the two. Therefore, in the future, live marketing companies should emphasize the creation of good ambient cues to enhance consumers' sense of social presence and sense of identity, so as to increase their impulse consumption.

Keywords: E-commerce Live Streaming, Ambient Cues, Social Presence, Identity, Impulse Consumption Intentions.

1. Introduction

In the context of the arrival of the Internet live streaming era, e-commerce live streaming has become a research area of great interest. With the rapid development of live streaming platforms, how to enhance consumers' impulse consumption through effective ambient cues has become an important topic of research. Ambient cues include background music, anchor ability, page design, and online service, etc, which may significantly affect consumers' purchase decisions while enhancing the attractiveness of live broadcasting rooms. Therefore, understanding how these environmental cues affect consumers' purchasing behavior and exploring their mechanisms of action are important for optimizing live streaming marketing strategies.

This study aims to construct a theoretical model that integrates the influence of environmental cues on consumers' impulse buying intention, and verify the validity of the model through empirical analysis. The model is based on the Stimulus-Organism-Response (SOR) theory and the Social Presence theory, aiming to reveal how environmental cues affect consumers' impulse consumptions through the mediating variables of Social Presence and Sense of Identity. Specifically, the study proposes the following hypotheses: environmental cues have a positive effect on impulse consumption intentions, social presence and identity play a mediating role in this relationship, and there is a chain mediation effect between the two.

To test these hypotheses, this study used the questionnaire method to collect data and used SPSS27 software for empirical analysis. The results of the study will provide recommendations for improvement of live streaming marketing platforms in order to enhance consumers' sense of social presence and identity, thus promoting impulse buying behavior. Meanwhile, this study also provides

a theoretical foundation and practical guidance for more in-depth future research on environmental cues and their mediating variables in different cultural and technological contexts.

2. Model construction and hypothesis formulation

2.1. Model building

Study model is shown in figure 1.

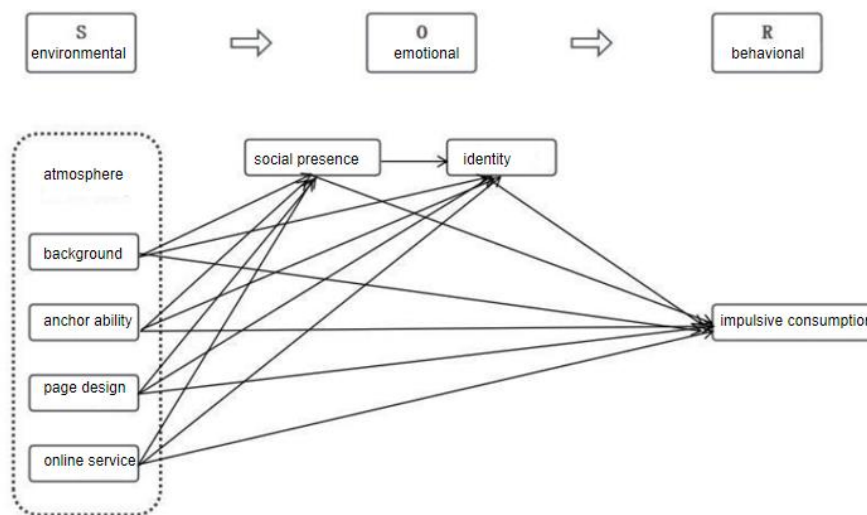


Figure 1 Study Model

2.2. Hypothesis formulation

Consumers are subtly influenced by intangible ambience when purchasing goods. Through conscious spatial design, ambience significantly influences consumer purchasing behavior. The external design and display information of live streaming platforms can also influence consumer desire^[1]. Research has shown that there is a correlation between live streaming ambient cues and impulse consumption^[2]. Factors such as musical works, the professional level of the anchor and the interactive atmosphere all have a positive effect on consumers' consumption intentions. Factors such as the function of the live broadcasting platform, the user's ease of operation and the real-time interactive atmosphere are also important factors that enhance the consumption experience^[3-5]. Therefore, this study proposes the following hypotheses:

H1a: Background music has a positive effect on impulse consumption.

H1b: Anchor ability has a positive effect on impulse consumption.

H1c: Page design has a positive effect on impulse consumption.

H1d: Online service has a positive effect on impulse consumption.

2.3. The mediating effect of social presence

Social presence is defined as “the degree to which an individual perceives the real presence of others during online communication”^[6]. With the rise of live streaming marketing, the immediacy and interactivity between anchors and viewers are enhanced, and the sense of face-to-face communication is conveyed through verbal and non-verbal cues to enhance the sense of real experience. Two important dimensions of social presence are immediacy and intimacy, and live streaming can reduce communication time and increase the sense of contact^[7].

Live streaming marketing is characterized by immediate feedback, with anchors responding instantly to pop-up questions, enhancing the sense of interpersonal communication and improving the sense of

social presence, thus influencing consumer behavior. It is found that the type and ability of the anchor affects consumers' sense of social presence and willingness to consume^[8]. The diversified two-way real-time interaction of live marketing is based on the theory of social presence^[9]. Therefore, this study proposes the following hypotheses:

H2: Social presence positively influences impulse consumption.

H3: Social presence mediates the relationship between ambient cues and impulse consumption.

2.4. The mediating effect of identity

Identity is when an individual perceives the existence of the same preferences in others and influences his or her behavior as a result. Social identity theory suggests that identity is a sense of belonging to a group of individuals with whom one shares common preferences or traits. In online shopping, consumers are often influenced by others and show emotional willingness to buy. As the sense of presence in the virtual environment increases, so does the consumer's willingness to buy. Live e-commerce will transform the traditional e-commerce mode of "human-machine contact" into a new experience of "human contact", so that consumers feel that they are in the same environment with others, thus creating a sense of identity with the live content and enhancing the emotional experience^[10]. Brands can enhance consumers' sense of identity by shaping specific atmospheric cues, and environmental factors such as store music also have an important impact on consumer behavior. In addition, during the communication process, factors such as the other party's language, appearance, and demeanor can affect the customer's level of perceived identity^[11].

H4: Identity positively influences impulse consumption.

H5: Identity mediates the relationship between ambient cues and impulse consumption.

2.5. The Chain Mediating Effect of Social Presence and Identity

Social presence can be categorized on the basis of conscious, affective and cognitive dimensions. When users perceive a context of presence with others, interaction enhances the perception of the presence of others, which in turn facilitates individual action and identity. In live streaming, communicating with other users through pop-ups and likes makes it easier for users to feel the emotions of others and develop a sense of identity^[12]. The sense of interaction, realism and social presence of live shopping influences consumers' sense of trust. Anchors mobilize users' emotions and trust through expressions and language, thus stimulating consumption. The fact that users respond to emotion, awareness and cognition to a higher degree in the live-streaming environment than in the traditional e-commerce environment provides a basis for studying the chain-mediated role of social presence and identity^[13].

H6: Social presence and identity have chain-mediated effects in ambient cues influencing consumers' impulse consumption.

3. Questionnaire design and measurement of variables

In this study, anonymous questionnaire filling method was used to collect primary data, and data were recovered online through multiple channels, aiming to broaden the source of data collection and avoid errors due to data homogenization. The content of the questionnaire consists of three parts, mainly containing screening questions, basic information questions, and scale questions.

First, this questionnaire clearly states the research direction of this questionnaire and the research use of the recovered data before the test begins, and the confidentiality of the data is promised to the research participants.

Second, this questionnaire sets screening questions at the beginning of the questionnaire, aiming to accurately select research subjects and maximize the authenticity of the collected data. After the

screening questions, respondents without live e-commerce purchasing experience were excluded, and then this questionnaire began to count the basic information of the respondents.

Third, this questionnaire is set up to measure scale items, which contain questions related to ambient cues, social presence, identity, and impulsive consumption behavior. In this paper, the questionnaire is set up using a 5-point Likert scale, and the respondents score according to their attitudes toward the topic, 5 points, 4 points, 3 points, 2 points, 1 point, and each option represents “strongly agree”, “agree”, “not sure”, ‘disagree’, ‘strongly disagree’.

Fourth, after all the questions were answered, a closing statement expressing gratitude was set up in this questionnaire as a way of expressing thanks to the respondents who participated in this survey. Measurement Scale is shown in Table 1.

Table 1 Measurement Scale

Ambient Cues	
Background Music	I think the background music playing in that live room makes me feel comfortable and relaxed.
	I think the background music in that live room reduces the boring feeling.
	I think the volume of the voice of the anchor explaining the product is appropriate.
	I think the pitch of the anchor's explanation of the product is appropriate.
Anchor Ability	I think the anchor has a unique live style and personal charm.
	I think the live host's gestures and movements can give me a kind of attraction.
	I think the anchor has a good understanding of the product and experience in using it.
	I think the live anchor can satisfy me with the explanation of the product.
	I can understand the content of the anchor's explanation well.
Page Design	I think that the live broadcast room fully demonstrates the information of the product.
	I think it is easy to browse the information in this live broadcasting room.
	I think it is easy to learn how to use the live broadcast.
	I think the structural layout of the live broadcast interface is satisfactory.
Online Service	I think the customer service is prompt and effective.
	I think the customer service updates product information in a timely manner.
	I think the anchor answers questions very promptly and positively.
	I think the anchor is very pleasant to communicate with the audience and can mobilize the atmosphere of the live broadcasting room.
	I think the anchor will show the product details according to the viewers' questions.
Social Presence	In this live marketing, I can sense the context of contact with people.
	In this live marketing, I can perceive the presence of other relevant parties.

	In this live marketing, I can sense the presence of other relevant parties.
	In this live marketing, I can have a sense of socialization.
	In this live marketing, I can exchange information with other relevant parties.
Sense of Identity	I am willing to pay attention to information related to the anchor and the development of the anchor.
	I will spread positive information about the anchor to those around me while resisting negative information.
	I feel happy when someone thinks that the live broadcast and the anchor are not bad.
	Every time I see an anchor on a live stream it's like seeing an acquaintance or friend.
	I believe that the goods recommended by the anchor have good service or quality.
Impulsive Spending	I often buy items online that I hadn't intended to buy.
	I have a lot of things that I buy online but rarely use.
	I often buy things online on impulse.
	Anchor recommendations have a significant impact on my buying decisions.

4. Data analysis and hypothesis testing

The reliability analysis was conducted using Cronbach's alpha coefficient, and in this study, 213 valid questionnaires were analyzed by SPSS 27, and the overall reliability coefficient was obtained to be 0.981, which is much higher than 0.9, indicating that the questionnaire has a good level of reliability. After deleting any question item, the reliability coefficient did not change much and all CITC values were greater than 0.4, indicating good inter-item correlation and good reliability level. The validity was analyzed using KMO values and Bartlett's spherical test, and the KMO values in this study were all above 0.8, showing that the data were suitable for extracting information; the Bartlett's test results were significant at 0, which was less than 0.01 and met the criteria. In conclusion, the reliability and validity of the data in this study are high and suitable for further analysis.

4.1. Regression analysis

The specific analysis results are as follows: the regression coefficient value of background music is 0.322 ($t=5.055$, $p=0.000<0.01$), indicating that music background music will have a significant positive impact on consumers' impulse consumption. The regression coefficient value of anchoring ability is 0.292 ($t=4.260$, $p=0.000<0.01$), indicating that anchoring ability will have a significant positive impact on consumers' impulse consumption.

In summary, it is assumed that H1, H1a, and H1b have been validated.

4.2. Hypothesis testing of social presence and identification on consumers' impulse consumption willingness

In this study, social presence (M1) and identity (M2) are used as independent variables, while impulse consumption (Y) is used as the dependent variable for linear regression analysis. The R-squared value of the model is 0.821, which means that M1 and M2 can explain 82.1% of the variation in Y. Through

F-test, the model was found to have $F=481.703$ with p-value less than 0.01, which means that at least one of M1 and M2 will have an effect on Y. The regression coefficient significance test shows that the p-values are less than 0.01, which presents a significant feature. The test for the multiple covariance of the model found that all the VIF values are less than 5, which means that the model does not have a covariance problem, and the D-W value is near the number 2, which means that the model does not have autocorrelation, and there is no correlation between the sample data, and the model is better. The specific analysis results are as follows:

The regression coefficient value of social presence is 0.614 ($t=11.065$, $p=0.000<0.01$), which means that social presence will have a significant positive influence relationship on consumers' impulse consumption.

The regression coefficient value of identity is 0.287 ($t=5.138$, $p=0.000<0.01$), which means that identity will have a significant positive influence relationship on consumers' impulse consumption.

In summary, hypotheses H2 and H4 are verified.

4.3. Testing the mediating role of social presence and identification

When ambient cues influence consumers' impulse consumption intention, both social presence and identity play a mediating role, which is analyzed as follows:

For the mediation path of “music background => social presence => impulse consumption”, the 95% confidence interval does not include the number 0 (95% CI: 0.256-0.489), which indicates that this mediation effect path exists. At the same time, the direct effect is significant, which means that social presence plays a partially mediating role in the influence of background music included in ambient cues on consumers' impulse consumption.

For the mediation path of “anchor ability=>social presence=>impulsive consumption impulse consumption”, when the anchor ability affects consumers' impulsive purchase intention, the test results of the mediation of social presence show that it does not contain the number 0 within the 95% confidence interval (95% CI:0.294-0.548). Meanwhile, the results of the direct effect are more significant, which suggests that social presence only plays a partial mediating role in the influence of anchor ability contained in ambient cues on consumers' impulse consumption.

For the mediation path “page design=>social presence=>impulse consumption”, there is no inclusion number 0 in the 95% confidence interval (95% CI:0.261-0.507), and the results show that the direct effect is significant. This suggests that the mediation path is valid and that social presence plays a partial mediating role in the impact of page design on consumers' impulse consumption.

For the mediation path of “online service => social presence => impulse consumption”, the test result of the mediation effect of social presence shows that the 95% interval does not include the number 0 (95% CI: 0.271-0.490), and the direct effect is significant. This suggests that the mediating effect exists and that social presence plays a partially mediating role in the influence of online services on consumers' impulse consumption.

For the mediation path of “music background => identity => impulse consumption”, the 95% interval does not include the number 0 (95% CI:0.013-0.137), thus indicating the existence of this mediation effect path. At the same time, the direct effect was significant, which implies that identity played a partially mediating role in the influence of background music included in ambient cues on consumers' impulse consumption.

For the mediation path of “anchor ability => identity => impulse consumption”, the test result of identity mediation shows that there is no zero in the 95% interval (95% CI:0.001-0.153), and it also shows that the direct effect is significant. This suggests that the chain mediation holds, and that identity plays a partially mediating role in the influence of anchor competence contained in the ambience cue on consumers' impulse consumption.

For the mediation path of “page design => identity => impulse consumption”, page design does not include the number 0 (95% CI:0.026-0.152) in the 95% confidence interval when it affects consumers' impulse consumption. Meanwhile, the results show a more significant direct effect, which suggests that identity only partially mediates the effect of page design included in ambient cues on consumers' impulse consumption.

For the mediation path of “online service => identity => impulse consumption”, the 95% confidence interval does not include the number 0 (95% CI: 0.023-0.139), therefore, the mediation effect path exists. The results show a significant direct effect, i.e., identity plays a partially mediating role in the influence of online services included in ambient cues on consumers' impulse consumption.

Next, the chain mediation path was analyzed. For the mediation path “music background => social presence => identity => impulse consumption”, the 95% interval did not include the number 0 (95% CI: 0.012-0.121), which indicated the existence of this mediation path. At the same time, the direct effect is significant, indicating that social presence and identity play a partial mediating role in the influence of background music on consumers' impulse consumption intention.

For the mediation path “Anchor ability=>Social presence=>Identity=>impulse consumption”, the mediation effect is tested as not including the number 0 in the 95% confidence interval (95% CI:0.001-0.103), which indicates that this mediation effect path exists. At the same time, the direct effect is significant, indicating that social presence and identity play a partial mediating role in the influence of anchor competence on impulse consumption.

To summarize, hypotheses H3, H5, and H6 are tested.

4.4. Summary of hypothesis testing results

Based on the results of the grouped regression analysis, all hypothesis tests were summarized and the results are shown in Table 2:

Table 2 Summary of Hypothesis Testing Results

hypothetical	Hypothesized content	Test Results
H1	Ambient cues positively influence impulse consumption	Passed
H1a	Background music has a positive effect on impulse consumption	Passed
H1b	Anchor ability has a positive effect on impulse consumption	Passed
H1c	Page design has a positive effect on impulse consumption	Passed
H1d	Online service has a positive effect on impulse consumption	Passed
H2	Social presence positively influences impulse consumption	Passed
H3	Social presence mediates the relationship between ambient cues and impulse consumption	Passed
H4	Identity positively influences impulse consumption	Passed
H5	Identity mediates the relationship between ambient cues and impulse consumption	Passed
H6	Social presence and identity have a chain-mediated effects in ambient cues influencing consumers' impulse consumption	Passed

5. Conclusions

This study investigates the impact of ambient cues in e-commerce live broadcasting on consumers' impulse purchasing intentions using the SOR model and social presence theory. The findings reveal that background music, anchor ability, page design, and online services all positively influence impulse consumption. Social presence and identity mediate the relationships between these ambient cues and impulse consumption, with social presence playing a partial mediating role for each cue, and identity similarly mediating the effects. Additionally, both social presence and identity act as chain mediators, indicating that they interact to enhance the impact of ambient cues on impulse consumption. For live marketing platforms, focusing on improving ambient cues can effectively increase social presence and consumer identity, thereby boosting impulse purchases. Future research should explore additional ambient cues and mediating variables across different cultural and technological contexts to further understand their effects.

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