



The Influence of the Characteristics of Virtual Youtuber Live Commerce on Purchase Intention

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Abstract. Live commerce, as a new model of online shopping service, combines the dual characteristics of traditional shopping and live streaming. With the diversification of host formats, virtual YouTubers have gradually entered the public view in live commerce. In this context, the characteristics of virtual YouTubers have a significant influence on stimulating consumers' purchase intentions. This paper focuses on the characteristics of virtual YouTubers in live commerce to explore their impact on consumer purchase intentions. This study uses situational questionnaires and other quantitative research methods to set the degree of recognition, degree of virtualization, degree of interaction, and degree of audience preference matching as the independent variables of this research. It selects social presence and processing fluency as mediating variables, and sets purchase intention as the dependent variable, conducting the research based on this model. We define recognition level as whether the virtual YouTuber's image used in the live streaming for product promotion is a self-created character by the brand, a famous virtual IP, or a generic virtual human template; we define virtualization level as the degree of virtualization of the virtual YouTuber themselves; we define interaction level as the frequency and effectiveness of the virtual YouTuber's interactions with the surrounding environment and the live audience; and we define audience preference match degree as whether the audience's subjective preference for the type of virtual YouTuber aligns with the virtual YouTuber's image in the live stream. Through

the research in this paper, we can get the respondents' preference and viewing frequency for live broadcast, live streaming with goods, virtual YouTuber live broadcast and virtual YouTuber live streaming with goods, etc. On this basis, we can carry out experiments and finally collect the scale measurements of the respondents after watching the virtual YouTuber live streaming with goods. After that, the experimental program will be further improved and relevant data analysis will be completed on the collected data, which will lead to the final conclusion of this study.

Keywords: Social presence, Processing fluency, Virtual YouTuber, Live commerce

1 Introduction

Nowadays, livestreaming has become a popular marketing method, particularly in the context of virtual YouTubers conducting livestream shopping. According to the research by Li and Zhang (2021), virtual YouTuber livestream shopping has a positive impact on consumers' purchase intentions[1]. They found that the perceived authenticity of virtual celebrities in live streaming plays a mediating role in purchase intention. In addition to the study by Li and Zhang (2021), research by Wang and Sun (2020) also indicates that product involvement moderates the effect of virtual celebrities livestream shopping. They discovered that when consumers are more engaged with the product, the impact of virtual YouTuber livestream shopping on purchase intention is more significant[2].

In addition, Chen and Xie's (2019) study explored the positive impact of virtual YouTuber live streaming with goods on consumers' purchase intention and found that social interactions played a mediating role. They pointed out that virtual YouTubers live streaming with goods enhanced consumers' purchase intention by establishing social connections between virtual anchors and consumers. Similarly, the study by Liu and Li (2020) found that social media engagement moderates the impact of virtual celebrities' live-streaming sales. They believe that the higher the level of consumer engagement on social media, the more pronounced the influence of virtual celebrities' live-streaming sales on purchase intentions[3-4].

Currently, virtual YouTubers are mainly used in entertainment live streams, and there are still relatively few merchants and brands applying virtual YouTubers to live

streaming sales. Consequently, research on virtual YouTubers in live streaming sales is also quite limited. Existing studies have employed qualitative analysis to examine the current state of virtual YouTuber live streams, analyze their current consumer audiences, and provide reasonable guidance for the adolescent audience group[4]. Additionally, some studies have used a combination of questionnaires and eye-tracking experiments to explore the mediating and moderating mechanisms of virtual YouTuber interactivity on consumers' purchase intentions in e-commerce live streaming. However, research on the impact of virtual YouTuber characteristics on viewers' purchase intentions remains scarce.

In summary, this study adopts a quantitative research approach to verify the mechanism of the main characteristics of virtual YouTubers in the Internet live-streaming bandwagon on consumers' purchase intention.

2 Literature Review and Hypothesis Derivation

2.1 Social Presence

Social presence refers to the degree to which individuals perceive the presence of others during the communication process, that is, whether users can experience a sense of intimacy or direct sensation of interpersonal interaction through the communication medium. Social presence plays a crucial role in live-stream shopping, especially when buyers in the live stream cannot directly interact and communicate with sellers. According to the research by Huang, Zhang, and Watson (2017), social presence has a significant impact on user purchase decisions. They found that when users feel social interaction and engagement during online shopping, they are more likely to make immediate purchases. Social presence provides a sense of interaction and communication with others, making users more susceptible to the influence and suggestions of others, thereby increasing the likelihood of purchase decisions[5]. Thus, we propose:

H1: The social presence perceived by viewers has a positive effect on purchase decisions.

2.2 Processing Fluency

Processing fluency refers to the degree of difficulty of the human brain in different information processing, which is a kind of subjective feeling of an individual about

the difficulty of information processing in the decision-making process, and a kind of feeling about cognitive operations[6]. Evaluation metrics for processing fluency can include the speed of information processing and processing accuracy[7-8]. According to the research by Huang and Kuo (2018), processing fluency has a positive impact on user purchase decisions. They found that when users perceive high processing fluency while watching live broadcasts — meaning a smooth and effortless information processing experience — they are more likely to make purchase decisions[9]. The study by Liu, Li, and Hu (2020) further supports the influence of processing fluency on user purchasing decisions. They found that processing fluency affects purchasing decisions by enhancing users' perceived enjoyment. When users experience high processing fluency in the online shopping process, they are more likely to feel enjoyment and satisfaction, thereby increasing their willingness to purchase[10]. Based on this, we propose:

H2: Perceived processing fluency by the audience has a positive effect on purchase decisions.

2.3 Degree of Recognition

The degree of identification refers to whether the virtual YouTuber image used in live streaming for merchandise promotion is a self-created character by the brand, a famous virtual IP, or a general virtual human template. According to the research by Jin and Bartsch (2018), the exclusivity of a virtual YouTuber has a significant impact on social presence. They found that when a virtual YouTuber can maintain a consistent character image and storyline, the audience is more likely to experience social presence. This is because the audience can establish a stronger emotional connection and sense of identification, viewing the virtual YouTuber as a real individual[11]. Furthermore, the research by Huang and Back (2018) found that when virtual characters can maintain consistency and coherence, the audience is more likely to establish emotional resonance with them and experience social presence. The audience's emotional resonance with virtual YouTubers enhances their sense of participation and willingness to interact[12].

We hereby propose:

H3: The degree of exclusivity of the virtual YouTuber has a positive effect on social presence.

2.4 Degree of Virtuality

The degree of virtuality refers to the extent to which the virtual YouTuber is virtualized. When the appearance and behavior of a virtual character are closer to that of a real human, the cognitive load on users may be reduced, as they can use their existing knowledge and experience of real humans to understand and interpret the behavior of the virtual character (Biocca et al., 2003). Therefore, the degree of virtuality of the virtual YouTuber may enhance the processing fluency of the users[13].

Virtual characters in live broadcasts can influence the psychological state of consumers. Research by Wang et al. (2014) indicates that the use of virtual characters can enhance consumers' social presence on B2C websites, making them perceive a hedonic value and develop a positive attitude. The closer the virtual character is to a human, the more it can make the audience feel a sense of realism.

Therefore, we propose:

H4: The degree of virtuality of the broadcaster positively affects social presence and processing fluency.

2.5 Degree of Interaction

The degree of interaction refers to the frequency and effectiveness of interactions between the virtual YouTuber and the surrounding environment, as well as the viewers who are watching the livestream. Firstly, the degree of interaction between the virtual character and the users can enhance the users' sense of social presence (Schroeder, 2006).

Secondly, the degree of interaction with the virtual YouTuber may affect users' processing fluency. Studies have shown that when users can interact more with virtual characters, their cognitive load may decrease because they can more directly understand and interpret the virtual characters' behaviors (Hou, Nam & Peng, 2012).

Therefore, the degree of interaction with the virtual YouTuber may enhance users' processing fluency.

From this we propose:

H5: The extent of interaction between virtual YouTubers and audience/products/hosts has a positive moderating effect on social presence and processing fluency.

2.6 Audience Preference Matching Degree

The matching degree of audience preference refers to whether the audience 's subjective preference for the type of virtual YouTuber is consistent with the image of the virtual YouTuber in the live broadcast room. First, when the audience's preferences match those of the virtual YouTuber, they are more likely to establish emotional resonance with the virtual YouTuber. Research shows that emotional resonance can enhance the audience's emotional investment in the virtual YouTuber and make them feel closer and more connected (Bailenson et al., 2008).

Secondly, the alignment of preferences between the audience and the virtual YouTuber may enhance the audience's sense of self-identity. When audiences feel that the virtual YouTuber shares similar preferences with them, they are more likely to view the virtual YouTuber as their representative or spokesperson, thereby increasing their identification with the virtual YouTuber (Oh & Bailenson, 2020)[14].

Therefore, the degree to which the preferences of the virtual YouTuber and the audience align may have a positive effect on social presence.

Thus, we propose:

H6: The degree of preference alignment between the virtual YouTuber and the audience has a positive effect on social presence.

In summary, the hypothesized model proposed in this paper is as follows:

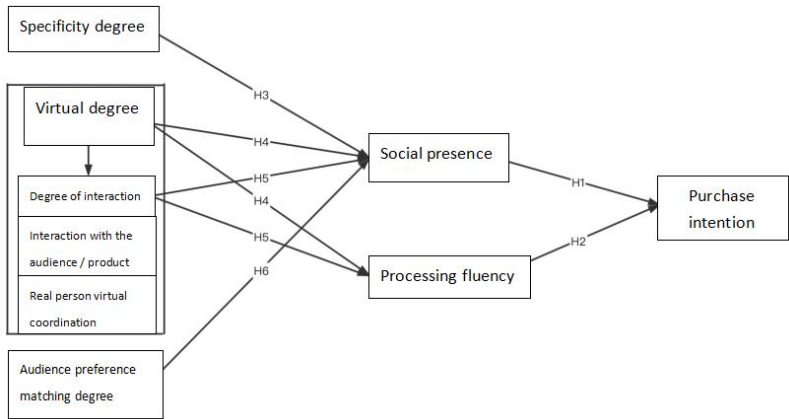


Fig. 1. Hypothetical Model

3 Research Design

3.1 Pre-survey Design

This implementation first selects 6 video screenshots of the virtual YouTuber live broadcast, with an average time of 1 minute 24 seconds. Respectively: 1. A virtual image live streaming facial cleanser; 2. A skincare set live streamed in collaboration between Li Jiaqi and Luo Tianyi; 3. A children ’ s toothbrush live streamed by a generic virtual YouTuber template; 4. By the virtual uploader XingTong and its team cooperation live spicy halogen snack package; 5. A projector live streamed by a realistic virtual person; 6. Milk is live streamed by the Tmall Supermarket avatar. The criteria for selecting the videos include meeting all factors hypothesized and ensuring that each factor is presented in at least two forms, high and low.

The pre-survey first invited 18 college students (10 females and 8 males, with an average age of 21.35 years) to watch the above 6 videos, and independently scored each virtual image and live content. The Likert 7 scale was used for scoring. The questions include: 1. How do you think the virtual YouTuber is identified; A score of 1 means completely unmemorable, while a score of 7 means the character is highly recognizable or has unique characteristics. 2. How lifelike do you find this virtual YouTuber? A score of 1 means very unrealistic, while a score of 7 means very lifelike. 3. How interactive do you find this host? A score of 1 means incapable of interacting with the audience, products, or others in the live stream room, while a score of 7 means the host provides an excellent interactive experience. After question 3, there were further inquiries about the host's interactions with the products, the audience, and others in the live stream room, with a score of 1 indicating no interaction at all and a score of 7 indicating excellent interaction.

The table below shows the scores of each video, with the average score calculated after removing the highest and lowest scores.

Table 1. Survey Statistics Table

Degr ee of identific	V irtu al	Inte raction degree	Inte raction with	Interact ion with the	Interactio n with the broadcast
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	ation	degr ee		goods	audience	room
Facial cleanser	3.8125	4.62 5	4.0625	3.9375	3.1875	5.375
Skin care products	6.5625	5	4.75	4.375	2.8125	4.125
Tooth brush	1.625	3	1.4375	1.375	1.375	1.25
Spicy marinate d food	6	5.56 25	6.6875	5.9375	5.9375	6.5625
Projec tor	3.8125	6.75	2.375	2.1875	1.875	2
Milk	7	1.25	6	3.5	5.8125	3.4375

3.2 Consumer Survey

In this study, the virtual situation experiment method was used to invite college students as subjects to watch randomly. Before watching the videos, the subjects first filled out relevant personal information and ranked their preference for the drawing (modeling) styles of virtual characters. In the scenario manipulation part, subjects were required to read the following information: "Now assume that you just want to buy a certain brand of a product, click on the phone suddenly find that the virtual anchor sells exactly what you want, and the price is reasonable." After reading the experimental scenario material, the subjects watched a recorded broadcast of the live-streamed shopping and filled out a scoring questionnaire. A total of 312 questionnaires were distributed in this study, and after excluding invalid responses, 301 valid questionnaires remained, with an efficiency rate of 96.5%. Among the subjects, 205 were female, accounting for 68%, and 96 were male, accounting for 31.9%.

Table 2. Survey Statistics Table

Measured variable	Measurement item	Reference	Load factor	Scale reliability
Social presence	I can feel the real presence of the streamer and the audience when watching the live broadcast.	Meng Lu [19] and Xie Ying et al. [20]	0.832	Cronbach's $\alpha=0.929$
	I feel a sense of socializing while watching the live broadcast.		0.900	
	When watching the live broadcast, I think I can exchange information with the anchor and the audience.		0.868	
	I can feel the enthusiasm when watching the live broadcast		0.914	
	When watching the live broadcast, I will be infected by the emotions of the anchor.		0.900	
Processing fluency	I think the product information presented by the host is easy to understand.	Meyvis et al. [21]	0.863	Cronbach's $\alpha=0.860$
	I think the product information presented by		0.84	

	the host is consistent and continuous.	8	
	I think the anchor's behavioural actions match the merchandise information very well.	0.85 3	
	I think the anchor's image matches the merchandise information.	0.80 3	
Purchase intention	I am willing to buy goods from this anchor.	Fen g Wentin g et al. ^[22]	0.96 2 0.96 2
	I would recommend this anchor to others.		Cronbac h's $\alpha=0.918$

3.3 Measurement Tools

To ensure the reliability and validity of the questionnaire, this study employed well-established scales, as shown in Table 2. Social presence scale was adapted from the studies by Meng Lu and Xie Ying et al.[15-16], comprising five items (Cronbach's $\alpha=0.929$). Processing fluency scale was adapted from Meyvis et al. and modified to better fit the context of this study, including four items (Cronbach's $\alpha=0.860$). Purchase intention was measured using the scale referenced by Feng Wenting et al., consisting of two items (Cronbach's $\alpha=0.918$). All four variables were measured using a seven-point Likert scale, where 1 indicates "strongly disagree" and 7 indicates "strongly agree."

4 Conclusion

This paper first establishes a research model where the independent variables include recognition degree, virtualisation degree, interaction degree, and the match between audience preferences and virtual anchor characteristics. The mediating variables are

social presence and processing fluency, with purchase intention as the dependent variable. Specifically, we define recognition degree as whether the virtual YouTuber image used in live commerce streams is a brand self-created character, a famous virtual IP, or a general virtual human template; virtualisation degree as the extent to which the virtual YouTuber itself is virtual; interaction degree as the frequency and effectiveness of interactions between the virtual YouTuber, the surrounding environment, and the viewers within the live stream; and the match of audience preference as the alignment between the viewers' subjective preferences for the type of virtual YouTuber and the virtual YouTuber image used in the live stream.

On the basis of this model, we carried out a pre-survey, and selected 6 video partial screen recordings of the virtual YouTuber live broadcast with the shipment, including all the considerations in the hypothesis, and each factor has at least two presentation forms of high and low. After watching the videos, participants rated each video on several criteria: recognizability, degree of virtuality, level of interaction, interaction with the product, interaction with the audience, and interaction within the livestream environment. After collecting all the scores from the participants, we processed the data to obtain the average scores for each criterion for each video. Finally, we conducted a consumer survey, inviting participants to complete a questionnaire before watching the videos to gather basic consumer information and their experiences with livestream shopping. We also performed reliability and validity analyses on the questionnaire data using established scales.

References

1. Li, J., & Zhang, J. (2021). The Impact of Virtual Celebrity Livestreaming on Consumer Purchase Intention: The Mediating Role of Perceived Authenticity. *Journal of Interactive Advertising*, 21(1), 1-15.
2. Wang, Y., & Sun, S. (2020). The Effect of Virtual Celebrity Livestreaming on Consumer Purchase Intention: The Moderating Role of Product Involvement. *Journal of Retailing and Consumer Services*, 55, 102156.
3. Chen, Y., & Xie, J. (2019). The Influence of Virtual Celebrity Livestreaming on Consumer Purchase Intention: The Mediating Role of Parasocial Interaction. *Computers in Human Behavior*, 92, 123-131.

4. Liu, Y., & Li, H. (2020). The Impact of Virtual Celebrity Livestreaming on Consumer Purchase Intention: The Moderating Role of Social Media Engagement. *Journal of Retailing and Consumer Services*, 55, 102051.
5. Huang, L., Zhang, J., & Watson, R. T. (2017). Social presence and online impulse buying. *Information & Management*, 54(3), 275-286.
6. Oppenheimer, D. M.. The Secret Life of Fluency. *Trends in Cognitive Sciences*, 2008, 12(6): 237-241.
7. Reber, R., Wurtz, P., Zimmermann, T. D.. Exploring “Fringe” Consciousness: The Subjective Experience of Perceptual Fluency and Its Objective Bases. *Consciousness & Cognition*, 2004, 13(1): 47-60.
8. Wurtz, P., Reber, R., Zimmermann, T. D.. The Feeling of Fluent Perception: A Single Experience from Multiple Asynchronous Sources. *Consciousness & Cognition*, 2008, 17(1): 171-184.
9. Huang, L., & Kuo, P. (2018). The Influence of Perceived Flow on Purchase Intention in Live Streaming Contexts. *International Journal of Information Management*, 38(1), 311-321.
10. Liu, Y., Li, H., & Hu, F. (2020). The Role of Perceived Flow in Online Shopping: A Study of the Mediating Effect of Perceived Enjoyment and the Moderating Effect of Perceived Risk. *Information & Management*, 57(5), 103285.
11. Jin, S. A. A., & Bartsch, A. (2018). Parasocial Interaction with Virtual Characters: Effects of Interaction Mode on Perceived Social Presence and Reality of Illusion. *Journal of Communication*, 68(4), 774-797.
12. Huang, A. H., & Back, M. D. (2018). Virtual Self-Modeling: The Effects of Vicarious Reinforcement and Identification on Exercise Behaviors. *Journal of Health Psychology*, 23(7), 956-968.
13. Biocca, F., Harms, C., & Burgoon, J. K. (2003). Toward a more robust theory and measure of social presence: Review and suggested criteria. *Presence: Teleoperators & Virtual Environments*, 12(5), 456-480.
14. Herrera F , Oh S Y , Bailenson J N .Effect of Behavioral Realism on Social Interactions Inside Collaborative Virtual Environments[J].*Presence Teleoperators & Virtual Environments*, 2020, 27(2):163-182.DOI:10.1162/pres_a_00324.
15. Meng Lu, Liu Fengjun, Chen Siyun etc. Can I arouse you —Research on the influence mechanism of different types of live web celebrity information source characteristics on consumers ' purchase intention [J].*Nankai Management Review*, 2020,23 (01) : 131-143.

16. Xie Ying, Gao Peng, Li Chunqing. Live Social Presence Research : Scale Development and Validity Test [J].Nankai Management Review, 2021, 24 (03) : 28-36.

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