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The Impact of Source Credibility of Live-Streaming Celebrities on Consumers' Impulse Buying Behavior in Live E-Commerce: A Stimulus-Organism-Response Perspective

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ABSTRACT

The study uses the Stimulus-Organism-Response Model to examine how live celebrity source credibility affects consumers' impulse buying behavior in live streaming e-commerce. The study treats the trustworthiness, expertise, and attractiveness of live celebrities as external stimuli, parasocial interaction and flow state as consumers' internal psychological states, and impulse buying behavior as the final behavioral response, while collecting data through online questionnaire surveys. The findings show that trustworthiness and expertise significantly and positively affect consumers' parasocial interaction and flow state; attractiveness has a significant positive effect on flow state, but its effect on parasocial interaction is not significant. Parasocial interaction not only significantly promotes flow state but also positively influences consumers' impulse buying behavior. Flow state also significantly promotes consumers' impulse buying behavior. These findings indicate that impulse buying in live streaming e-commerce is not solely driven by product information or promotional stimuli, but is formed through interaction and immersive experience between consumers and live celebrities. This study extends source credibility theory and the Stimulus-Organism-Response Model in live streaming e-commerce research, while offering practical implications for live streaming e-commerce platforms, brand merchants, and live celebrities in anchor selection, content design, and interactive strategy optimization.

Keywords: Live Streaming e-Commerce, Live Celebrities, Source Credibility, Impulse Buying Behavior, Stimulus Organism Response Model
JEL Classifications: M31, D12

1. INTRODUCTION

Driven by the rapid advancement of mobile internet and social media, livestreaming e commerce has evolved into a significant mode of online retail and digital consumption (Wang et al., 2022). Unlike conventional online retail, which mainly ueses images and text, search-based price comparison, and independent consumer decision-making, live commerce integrates item information delivery, emotional interaction, and purchase conversion into a single consumption scenario through real-time explanations, interactive communication, scenario-based presentations, limited-time promotions, and the creation of a community atmosphere (Fang et al., 2023). In this process, live streaming celebrities serve as the core source of information and interactive subjects in the live streaming room. They not only undertake the functions of product introduction and information explanation, but also influence consumers' cognitive judgment, emotional experience, and purchasing behavior through their own popularity, professional image, personality charm, and interactive methods (Yu et al., 2025). In a highly real-time, interactive, and immersive live setting, viewers become more susceptible to the combined effects of celebrity recommendations, live room atmosphere, and promotional stimuli, leading to unplanned, immediate, and impulsive purchasing behavior (Yu et al., 2025). Thus, exploring the way live celebrities affect customers' impulse buying behavior in live commerce has important theoretical and applied significance.

Existing research has conducted a rich exploration of live-commerce user behavior from the perspectives of anchor characteristics, interaction quality, social presence, consumer trust, perceived value, and purchase intention (Zhang and Wang, 2025; Ma et al., 2023). However, existing studies have centered more on the direct impact of anchor characteristics on purchase intention or behavior, and there is still insufficient explanation for how the credibility of live celebrity sources can induce impulse buying behavior through consumers' internal psychological states. In addition, previous studies have mostly explained consumer behavior through variables such as trustworthiness, perceived value, or purchase intention (Watanabe et al., 2020; Curvelo et al., 2019), with insufficient attention paid to the combined effects of parasocial interaction and flow state as two psychological mechanisms. In fact, consumers may form an emotional connection similar to interpersonal communication with live-streaming celebrities when watching live broadcasts, that is, parasocial interaction (Horton and Richard Wohl, 1956). At the same time, it may also generate highly focused, enjoyable, and immersive flow state during continuous viewing, real-time interaction, and contextualized display (Csikszentmihalyi, 1975; Hoffman and Novak, 1996).

Based on the aforementioned research gaps, the study attempts to answer the following questions:

Will the different dimensions of credibility of live celebrity sources, namely trustworthiness, expertise, and attractiveness, affect consumers' parasocial interaction and flow state?

Will parasocial interaction and flow state further promote consumer impulse buying behavior?

Can the credibility of live celebrity sources indirectly influence consumer impulse buying behavior through parasocial interaction and flow state?

The study is based on the S-O-R model, taking the credibility of live celebrity sources as external stimuli, parasocial interaction and flow state as internal psychological states of consumers, and impulse buying behavior as behavioral responses, in order to reveal the pathway of "characteristics of live streaming celebrities - consumer psychological state - impulse buying behavior" in the context of live e-commerce.

2. LITERATURE REVIEW AND THEORETICAL FOUNDATION

2.1. Source Credibility Theory

Source Credibility Theory stems from communication and persuasion theories, mainly used to explain how information receivers assess credibility according to the characteristics of information disseminators, and further form attitudes and behavioral responses (Pornpitakpan, 2004; Kwek et al., 2022). Hovland et al. (1953) stated that source credibility shapes audience acceptance of the information and attitude change. Ohanian (1990) further divided source credibility into three dimensions: trustworthiness, expertise, and attractiveness. Trustworthiness emphasizes whether the information disseminator is honest and reliable (Zhang and Lee, 2025), Expertise emphasizes whether they have relevant knowledge and experience (Qiu et al., 2021), and attractiveness emphasizes the attractiveness of their appearance, personality charm, and expression style to the audience (Maharani et al., 2025). Due to its ability to explain how information sources affect audience acceptance and behavioral tendencies, this theory is widely applied in advertising marketing, celebrity endorsements, social media influencers, and live streaming e-commerce research.

2.2. Stimulus-Organism-Response Model

The stimulus organism response model (S-O-R model) is used to explain how outside stimuli further shape behavior via internal psychological states (Pandita et al., 2021). Due to its ability to clearly reveal the logical link among stimuli, psychological mechanisms, and responses, this framework is widely used in consumer studies in retail environments, online shopping, social platforms, and live commerce (Pandita et al., 2021; Lin et al., 2023). Live streaming e-commerce has strong contextuality, interactivity, and immediacy (Dong et al., 2023). Consumers' purchasing behavior is often not entirely based on rational comparison, but is formed under the combined effects of live celebrity explanations, real-time interaction, emotional contagion, and immersive atmosphere (Xin et al., 2025). Based on the S-O-R model, the study considers the credibility of live celebrity sources as external stimuli, parasocial interaction and flow state as internal psychological states of consumers, and impulsive buying behavior as the final behavioral response. Specifically, live streaming celebrities who are trustworthy, professional, and highly attractive are more likely to enhance consumers' sense of closeness, interaction, and immersion, making them more willing to accept live streaming recommendations, reducing repeated comparisons and delayed decisions, and thus generating impulse buying behavior (Park and Lin, 2020). Therefore, this model can provide a theoretical basis for explaining the pathway of "credibility of live celebrity sources - consumer psychological experience - impulse buying behavior."

3. HYPOTHESIS DEVELOPMENT

In the context of live streaming e-commerce, the trustworthiness of live streaming celebrities is an important basis for consumers to judge whether their recommended information is true and reliable (Rungruangjit, 2022). Unlike conventional online retail, which mainly uses item pages, user reviews, and search comparisons, consumers in live streaming e-commerce understand item information more via real-time explanations, product displays, and interactive responses from live streaming celebrities (Chen et al., 2023). Therefore, when consumers believe that live celebrities are sincere, reliable, and do not exaggerate product effects, their information defense psychology will be reduced, and they tend to accept messages from live celebrities (Liu and Sun, 2024). A higher level of trustworthiness can enhance consumers' sense of security and psychological closeness, making them feel like they are interacting with acquaintances in live sessions, gradually viewing live streaming celebrities as familiar, reliable,

and accompanying interactive objects, thus forming a stronger parasocial interaction (Lim and Kim, 2011).

Meanwhile, the trustworthiness and capricious behavior of live streaming celebrities also helps to enhance consumers' flow state (Li and Peng, 2021). Flow state emphasizes the formation of a highly focused, joyful, and immersive psychological state for individuals during activities (Yang et al., 2024). In live streaming e-commerce, if consumers have doubts about the motivation and authenticity of celebrity recommendations, it is easy to develop psychological distance and information defense, which then affects viewing involvement (Shao et al., 2024). On the contrary, when consumers believe that live celebrities are trustworthiness, their doubts about live content and product recommendations will decrease, making it easier for them to focus on the host's explanation, product display, and interactive process (Liu et al., 2022). Thus, trusted live streaming celebrities can reduce information uncertainty, enhance consumers' sense of peace of mind, participation, and pleasure, thereby promoting them to enter a more focused and immersive viewing state.

Drawing on the analysis, the study sets out these assumptions:

- H_{1a}: Trustworthiness has a positive impact on consumers' parasocial interaction.
- H_{1b}: Trustworthiness has a positive impact on consumers' flow state.

In the context of live streaming e-commerce, live celebrity expertise helps users to judge whether their product recommendations have reference value (Xu et al., 2022). Due to the fact that product information is usually presented through live streaming hosts' explanations, trial demonstrations, feature comparisons, and purchase recommendations, consumers' understanding of the product largely relies on the professional expression of live streaming celebrities (Qiu et al., 2021). When live streaming celebrities can accurately explain product features, usage methods, applicable scenarios, and differences in advantages and disadvantages, consumers tend to recognize such product expertise and recommendation competence (He and Jin, 2024). Higher professionalism can not only reduce consumers' information search costs and decision uncertainty (Liu et al., 2020), but also enhance their trust and dependence on live streaming celebrities, making them see live streaming celebrities as informative providers with guiding significance, thereby enhancing psychological closeness and parasocial interaction (Guo et al., 2021).

Meanwhile, the expertise of live streaming celebrities also helps to enhance consumers' flow state (Zhang et al., 2025). Professional product explanations, clear logical expressions, and targeted purchasing suggestions can help consumers better understand product information and maintain their attention to live streaming content (Zhang et al., 2022). Compared with live content lacking professionalism, celebrities with strong professionalism are better able to enhance content value and attractiveness of such content through structured explanations, scenario-based demonstrations, and effective interactions, creating a stronger sense of participation, control, and immersion for consumers during the viewing process (Maharani et al., 2025).

Drawing on this analysis, the study sets out these assumptions:

- H_{2a}: The expertise of live streaming celebrities has a positive impact on consumers' parasocial interaction.
- H_{2b}: The expertise of live streaming celebrities has a positive impact on consumers' flow state.

In the context of live streaming e-commerce, the attractiveness of live streaming celebrities is a key driver affecting consumer attention allocation and emotional closeness (Ji et al., 2025). The attraction here not only includes physical appearance, but also comprehensive features such as language expression, personality charm, affinity, sense of humor, and interactive style (Xu and Deng, 2026). Unlike the relatively static display of products in conventional online retail, live commerce features strong interpersonal interaction attributes. Consumers not only pay attention to the products themselves when watching live broadcasts (Ma et al., 2023), but also are influenced by the personal traits and expressions of live streaming celebrities (Meng et al., 2021). When live streaming celebrities have strong appeal, consumers are more likely to develop goodwill, interest, and sustained attention, and actively participate in barrage interactions, likes, questions, or shares (Wei and Xi, 2024). As the viewing time and interaction frequency increase, consumers may gradually develop a sense of familiarity and psychological closeness towards live celebrities, thereby enhancing parasocial interaction (Yeh, 2023).

Meanwhile, the attractiveness of live streaming celebrities also helps to enhance consumer' flow state (Hsu, 2020). Highly attractive live streaming celebrities are usually able to enhance the fun and participation of live content through vivid expression, emotional contagion, and rhythmic interaction, making it easier for viewers to enter the live context (Xin et al., 2025). When consumers are attracted by the image, expression style, or interactive atmosphere of live celebrities, their attention is more likely to focus on the live broadcast process and enjoy a pleasant and relaxing experience while watching (Lv et al., 2022). Therefore, in live commerce which heavily rely on real-time interaction and situational atmosphere, the attractiveness of live streaming celebrities can enhance consumers' viewing interest and emotional investment, thereby promoting the formation of flow states. Drawing on this analysis, the study sets out these assumptions:

- H_{3a}: The attractiveness of live streaming celebrities has a positive impact on consumers' parasocial interaction.
- H_{3b}: The attractiveness of live streaming celebrities has a positive impact on consumers' flow state.

In live streaming e-commerce, parasocial interaction reflects the psychological closeness, familiarity, and affective connection formed between consumers and live streaming celebrities (Ko, 2024). Although there is no real interpersonal relationship between the two, consumers may experience psychological feelings similar to those of friends or acquaintances through continuous viewing, real-time interaction, barrage communication, and host responses (Wang et al., 2025). When consumers believe that there is a strong interactive relationship between themselves and live celebrities, their motivation for watching live broadcasts is no longer just to obtain product information, but will further transform into

emotional participation and relationship maintenance, thus more actively paying attention to live content and participating in interactions (Labrecque, 2014).

The enhancement of parasocial interaction also helps consumers form a flow state (Du et al., 2025). The flow state emphasizes the formation of a highly focused, pleasurable, and immersive psychological state in an individual during an activity, which often requires sustained attention and active emotional involvement (Norsworthy et al., 2021). The parasocial interaction in live streaming e-commerce boosts users' sense of closeness as well as participation in live streaming celebrities, making them more easily attracted to live content and gaining a sense of companionship, interaction, and pleasure during the viewing process (Hadiyati and Luthfia, 2026). Therefore, the deeper the psychological connection linking consumers with live streaming celebrities, the easier it is to improve their level of focus and immersion when watching live broadcasts.

Drawing on this analysis, the study sets out these assumptions:

- H_4: Parasocial interaction has a positive impact on the flow state.

In the context of live streaming e-commerce, parasocial interaction not only reflects the psychological closeness and emotional connection between consumers and live streaming celebrities (Hou et al., 2024), but also affects consumers' acceptance of their recommended information (Li et al., 2023). When consumers form strong parasocial interactions with live streaming celebrities, they often see them as familiar, reliable, and accompanied objects (Rungruangjit, 2022). consumers' acceptance of recommended information is no longer solely dependent on rational judgment, but will be influenced by emotional identification, relationship trust, and interactive atmosphere (Ebrahimi et al., 2022). Especially when live streaming celebrities enhance consumer engagement through real-time responses, friendly addressing, emotional contagion, and personalized interaction, consumers tend to feel a psychological experience of being followed and understood, thereby increasing readiness to accept host-recommended products (Han and Jo, 2025). The enhancement of parasocial interaction may further trigger consumers' impulse buying behavior. Impulsive buying usually has immediacy, unplanned behavior, and emotional drive, while parasocial interaction in live streaming e-commerce boosts users' affective investment and immediate response (Shi et al., 2025). Once consumers develop a strong psychological connection with live celebrities, their purchasing behavior is more susceptible to the influence of host recommendations, interactive responses, and live room atmosphere, thereby reducing repeated comparisons, delayed decisions, and rational evaluations. Meanwhile, consumers may also generate immediate purchasing impulses due to supporting live celebrities, responding to interactive relationships, or integrating into the group atmosphere of the live broadcast room (Wang, 2024). Thus, stronger parasocial interaction, increases consumers' tendency consumers to generate impulse buying behavior within live streaming e-commerce. Drawing on this analysis, the study sets out these assumptions:

- H_5: The parasocial interaction of consumers has a positive impact on impulse buying behavior.

In live streaming e-commerce, the flow state reflects the focused, joyful, and immersive state that consumers form while during live viewing (Dong et al., 2023). When consumers reach flow, their attention will be highly focused on live content, anchor explanations, product displays, and interactive processes, and they will gain strong participation and enjoyment (Wang et al., 2025). Unlike typical browsing based shopping, live streaming e-commerce continuously strengthens consumers' situational engagement through continuous explanations, real-time interactions, scene-based displays, and limited time promotions, helping them immerse themselves in the streaming atmosphere (Wang et al., 2026). Consumers' attention to live streaming content increases, their perception of external interference and time passing weakens, and their purchasing decisions are more susceptible to immediate emotional and situational stimuli.

The enhancement of flow state may further promote impulse buying behavior (Shahpasandi et al., 2020). Impulsive buying usually has suddenness, immediacy, and unplanned nature, and its formation is often related to emotional arousal, immediate satisfaction, and weakened rational control (Kalla and Arora, 2011). When consumers are in a highly immersive and enjoyable state during live streaming, their acceptance of product recommendations and promotional information will increase, while their attention to price comparison, demand assessment, and delayed decision-making may relatively decrease (Joo and Yang, 2023). At the same time, the flow state can boost consumer participation and instant satisfaction, making viewers more susceptible to the influence of limited time discounts, anchor recommendations, and interactive atmosphere, thereby generating the impulse for immediate purchases (Calvo-Porral et al., 2017). Therefore, the stronger the flow state of consumers, the higher their likelihood of impulse buying behavior in live streaming e-commerce.

Drawing on this analysis, the study sets out these assumptions:

- H_6: Consumer flow state positively influences impulse buying behavior.

4. RESEARCH METHODOLOGY

4.1. Data Collection and Procedures

The study uses quantitative methods and collects data via online questionnaire surveys (Ameer et al., 2024; Gao et al., 2025). All variables were borrowed or adapted from validated scales and refined appropriately based o on live streaming e-commerce and the characteristics of live celebrities to ensure that the content of the questions matches t the study object. The questionnaire uses a seven-point Likert. The credibility of live celebrity sources includes three dimensions: professionalism, attractiveness, and trustworthiness. The measurement items are mainly adapted from Wiedmann and von Mettenheim (2021) Social Influencer Source Reliability Scale. The measurement items of parasocial interaction are adapted from Aw and Labrecque (2020). The measurement items for flow state are adapted from Azad Moghddam and Mortimer (2025). The measurement items for impulse buying behavior are adapted from Nikolinakou et al. (2024). The questionnaire is distributed online, and participants voluntarily participate in take part before filling out the questionnaire, they are

informed that it is only for academic research, and all responses are anonymous to reduce respondents' concerns and improve data authenticity.

After the questionnaire was collected, the study further screened and cleaned the original data. A total of 500 online survey questionnaires were distributed in this study, and 452 questionnaires were actually collected. During the data cleaning process, the study excluded 135 invalid questionnaires that did not pass the screening questions, had incomplete answers, had significantly short response times, presented obvious patterns in answers, or had logical contradictions between the answers before and after. After the above screening and cleaning, 317 usable questionnaires were obtained, yielding a response rate of 63.4%.

4.2. Demographic Profile

The demographic characteristics of the respondents are presented in Table 1. Regarding gender structure, female participants formed a relatively high proportion, totaling 191, representing 60.3%; there were 126 male respondents, representing 39.7%. From the perspective of marital status, there were 209 single respondents, representing 65.9%, and 108 married respondents, representing 34.1%. From the perspective of age structure, the sample is mainly composed of young consumers group, with the highest proportion of respondents aged 25-34 at 154, representing 48.6%; The second group is under 25, totaling 98, representing 30.9%.

Regarding education, respondents were generally well educated, with the highest number of respondents having an undergraduate or college degree, totaling 189, or 59.6%; The second largest group of respondents were those with graduate degrees, totaling 78, or 24.6%. Regarding occupational profile, respondents are mostly employed personnel, with 171 employees, accounting for 53.9%; 32 self-employed individuals, or 10.1%; there are 114 in other occupational types, or 36.0%. For monthly income, the largest group had income below RMB 3000, at 108, or 34.1%; The second group is the RMB3001-RMB5000 group, totaling 88, or 27.8%.

Regarding the use of live streaming, respondents generally have some experience in using live streaming. Among them, the respondents who have been using live streaming for 3-5 years have the most, with a total of 148 people, accounting for 46.7%; 104 respondents, accounting for 32.8%, have been using live streaming for <3 years; 65 respondents, accounting for 20.5%, have been using live streaming for over 5 years. Regarding the frequency of purchasing goods through live streaming, the respondents who chose Sometimes were the most, with a total of 128 people, accounting for 40.4%; Next is Occasionally, with a total of 101 people, accounting for 31.9%; 65 respondents chose Always, accounting for 20.5%.

5. RESULTS

5.1. Common Method Bias

The Common Method Bias test assessed whether the questionnaire data had systematic biases due to the same time, questionnaire, and respondent source, which could affect the authenticity of variable relationships.

The study uses Harman single-factor test to assess common method bias. The results indicated that non rotated principal component analysis extracted 6 factors with eigenvalues above 1, and cumulative explained variance of 71.221%. Among them, the explanatory variance for the first factor was 38.666%, below the commonly used 50% criterion, suggesting that one factor did not account for most variance. Therefore, no significant common method bias exists, and the data is suitable for subsequent empirical analysis.

5.2. Evaluation of Measurement Model

Measurement model, which is also recognized as outer model, is a structural correlation among latent variables and their indicators (Fareed et al., 2016; Fareed et al., 2016). According to the reliability and validity test results reported in Table 2, the standardized loadings for all items are all above 0.7, which meets the indicator reliability judgment criteria proposed by Hair et al. (2019), showing that each item can reflect its latent variable well. Secondly, the Cronbach's α values of each construct were between 0.907 and 0.944, all above the recommended threshold of 0.7, showing good internal consistency among the scales (Nunnally and Bernstein, 1994). At the same time, the combined reliability rhooA and rhouC of each construct were both above 0.7, further verifying the reliability of the measurement model (Hair et al., 2019). In terms of Regarding convergent validity, AVE values for each construct range from 0.681 to 0.736, all exceeding the standard of 0.5, indicating that each latent variable can explain over half of item variance and shows good convergence (Fornell and Larcker, 1981). Overall, this measurement framework satisfies the recommended standards in terms of indicator reliability, internal

Table 1: Demographic profile

Variable	Category	Frequency (n)	Percentage
Gender	Male	126	39.7
	Female	191	60.3
Marital status	Single	209	65.9
	Married	108	34.1
Age group	Below 25	98	30.9
	25-34	154	48.6
	35-44	51	16.1
	45 and above	14	4.4
Highest education level	High school or below	31	9.8
	Bachelor's degree or diploma	189	59.6
	Postgraduate education	78	24.6
	Professional certificate	19	6.0
Occupation	Employed	171	53.9
	Self-employed	32	10.1
	Others	114	36.0
Monthly income level	<RMB3000	108	34.1
	RMB3001-RMB5000	88	27.8
	RMB5001-RMB7000	59	18.6
	More than RMB7000	62	19.6
Experience in using live-streaming	<3 years	104	32.8
	3-5 years	148	46.7
	More than 5 years	65	20.5
Frequency of using live-streaming to purchase commodities	Hardly ever	23	7.3
	Occasionally	101	31.9
	Sometimes	128	40.4
	Always	65	20.5

consistency reliability, combination reliability as well as aggregate validity, offering reliable basis for later structural model testing.

According to Table 3, the AVE square root values of each construct exceed their inter-construct correlations, which satisfies the criterion proposed by Fornell and Larcker (1981), indicating that each construct can effectively distinguish itself from other constructs. According to Table 4, the HTMT test results show that these values between constructs remain below the strict 0.85 threshold, consistent with the recommendations of Henseler et al. (2015) and Hair et al. (2019) regarding on discriminant validity. Therefore, these Fornell Larcker criteria and HTMT test results jointly indicate no serious of construct overlap within the measurement model of this study, while the latent variables have good discriminant validity, which can be further analyzed by structural modeling.

6. DISCUSSION OF FINDINGS

Table 5 shows the structural model hypothesis test results of this study. Trustworthiness have a significant positive effect on

Table 2: Reliability and viability

Constructs	Items	Loadings	AVE	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)
Attractiveness	Attractiveness1	0.881	0.731	0.908	0.914	0.931
	Attractiveness2	0.873				
	Attractiveness3	0.837				
	Attractiveness4	0.825				
	Attractiveness5	0.856				
Expertise	Expertise1	0.844	0.729	0.907	0.908	0.931
	Expertise2	0.864				
	Expertise3	0.864				
	Expertise4	0.847				
	Expertise5	0.849				
Flow state	Flow state1	0.821	0.681	0.933	0.934	0.945
	Flow state2	0.822				
	Flow state3	0.831				
	Flow state4	0.817				
	Flow state5	0.815				
	Flow state6	0.83				
	Flow state7	0.825				
	Flow state8	0.838				
Impulsive buying	Impulsive buying1	0.828	0.697	0.938	0.941	0.948
	Impulsive buying2	0.815				
	Impulsive buying3	0.832				
	Impulsive buying4	0.841				
	Impulsive buying5	0.847				
	Impulsive buying6	0.838				
	Impulsive buying7	0.855				
	Impulsive buying8	0.822				
Parasocial interaction	Parasocial interaction1	0.838	0.691	0.944	0.945	0.953
	Parasocial interaction2	0.845				
	Parasocial interaction3	0.831				
	Parasocial interaction4	0.839				
	Parasocial interaction5	0.822				
	Parasocial interaction6	0.837				
	Parasocial interaction7	0.826				
	Parasocial interaction8	0.822				
	Parasocial interaction9	0.82				
Trustworthiness	Trustworthiness1	0.859	0.736	0.91	0.913	0.933
	Trustworthiness2	0.867				
	Trustworthiness3	0.858				
	Trustworthiness4	0.846				
	Trustworthiness5	0.859				

Table 3: HTMT

	Attractiveness	Expertise	Flow state	Impulsive buying	Parasocial interaction	Trustworthiness
Attractiveness						
Expertise	0.51					
Flow state	0.458	0.618				
Impulsive buying	0.375	0.455	0.445			
Parasocial interaction	0.399	0.649	0.561	0.41		
Trustworthiness	0.593	0.547	0.502	0.362	0.445	

parasocial interaction (β = 0.127, t = 2.073, P = 0.038), therefore, H_{1a} is supported. In live streaming e-commerce, consumers cannot fully verify the quality of products and recommendation motivations directly. Thus, their perception of the trustworthiness of live streaming celebrities can reduce their psychological defense and information skepticism, making them more willing to accept the host's expressions and interaction, thus forming a parasocial interaction similar to acquaintance relationships. This finding aligns with source credibility theory, which suggests that the trustworthiness of information disseminators can enhance the audience's acceptance and positive attitude towards the source of information (Hovland et al., 1953; Ohanian, 1990). Meanwhile, this result also echoes the viewpoint of parasocial interaction research, which suggests that the audience's familiarity and trust in media figures contribute to the formation of affective psychological connections (Horton and Wohl, 1956; Aw and Labrecque, 2020).

Trustworthiness has a significant positive effect on flow state (β = 0.156, t = 2.714, P = 0.007), therefore H_{1b} is supported. When consumers believe that the recommendations of live celebrities are true and reliable, their doubts about the live content will be reduced, and they will be more likely to focus on product explanations, interactive processes, and purchasing scenarios, thus forming a stronger flow state. This aligns with of Wang et al. (2024), suggesting that in live streaming e-commerce scenarios, trust can reduce consumers' information uncertainty and enhance their psychological security and participation, thereby promoting the formation of immersive viewing experiences. This is consistent with the explanation of "focus, engagement, and pleasurable experience" in flow theory (Csikszentmihalyi, 1975; Hoffman and Novak, 1996), and also indicates that source credibility can serve as an important external stimulus to influence consumers' internal psychological states.

Professionalism has a significant positive effect on social interaction (β = 0.508, t = 9.358, P < 0.001), therefore H_{2a} is supported. When live streaming celebrities can clearly explain product features, applicable scenarios, and purchasing suggestions, consumers tend to view them as reliable information providers and purchasing guides, and form strong psychological dependence and emotional closeness through continuous viewing and interaction. This result indicates that parasocial interaction is not only driven by physical attractiveness or entertainment atmosphere, but is more likely to be based on consumers' recognition of the professional abilities of live streaming celebrities. This aligns with theory of source credibility, which emphasizes that professionalism can enhance information persuasiveness (Ohanian, 1990; Wiedmann and von Mettenheim, 2021), and also expands the explanation regarding parasocial interaction in live streaming e-commerce, that is, the consumer-celebrity relationship is often linked to recognition of their professional value.

Professionalism has a significant positive effect on flow state (β = 0.294, t = 4.786, P < 0.001), therefore H_{2b} is supported. Professional live streaming celebrities are usually able to make the live content more informative and continuous through structured explanations, product comparisons, usage demonstrations, and question responses, thereby helping consumers better understand the products and maintain their attention. Consumers may experience stronger cognitive engagement and viewing pleasure during the process of obtaining useful information, leading to a state of flow. This finding aligns with flow theory, as clear information feedback, high task engagement, and sustained attention contribute to the formation of immersive experiences (Csikszentmihalyi, 1975). At the same time, this finding also shows that within live streaming e-commerce, professionalism not only affects consumers' evaluation of hosts, but also enhances consumers' immersive experience by improving the quality of live streaming content.

The impact of attractiveness on social interaction is not significant (β = 0.068, t = 1.129, P = 0.259), therefore H_{3a} is not supported. Parasocial interaction emphasizes the familiarity, companionship, and emotional dependence between consumers and live celebrities,

Table 4: Fornell-Lacker

	Attractiveness	Expertise	Flow state	Impulsive buying	Parasocial interaction	Trustworthiness
Attractiveness	0.855					
Expertise	0.467	0.854				
Flow state	0.425	0.571	0.825			
Impulsive buying	0.35	0.421	0.421	0.835		
Parasocial interaction	0.373	0.602	0.529	0.391	0.831	
Trustworthiness	0.54	0.498	0.465	0.338	0.416	0.858

Table 5: Hypothesis test results

Hypothesis	Original sample	Standard deviation	T-statistics	P-values
H_{1a}: Trustworthiness→Parasocial interaction	0.127	0.061	2.073	0.038
H_{1b}: Trustworthiness→Flow state	0.156	0.057	2.714	0.007
H_{2a}: Expertise→Parasocial interaction	0.508	0.054	9.358	0
H_{2b}: Expertise→Flow state	0.294	0.061	4.786	0
H_{3a}: Attractiveness→Parasocial interaction	0.068	0.06	1.129	0.259
H_{3b}: Attractiveness→Flow state	0.113	0.055	2.058	0.04
H_4: Parasocial interaction→Flow state	0.245	0.059	4.14	0
H_5: Parasocial interaction→Impulsive buying	0.234	0.058	4.032	0
H_6: Flow state→Impulsive buying	0.297	0.057	5.255	0

which are similar to interpersonal relationships. This relational psychological state usually needs to be established on the basis of continuous interaction, trust accumulation, and value recognition, rather than solely relying on external attraction. Attraction is more likely to be an initial attentional stimulus, while parasocial interaction is a relatively stable relational experience. This result provides a meaningful supplement to the theory of source credibility: Although attractiveness is an important dimension of celebrity credibility (Ohanian, 1990), within live streaming e-commerce, its effect on relational psychological connections may be weaker than that of trustworthiness and professionalism. This discovery also indicates that the parasocial interaction between consumers and live streaming celebrities relies more on trust and professional value, rather than simply external charm.

Attractiveness has a significant positive effect on flow state ($\beta = 0.113$, $t = 2.058$, $P = 0.040$), therefore H_{3b} is supported. Unlike parasocial interactions, flow states emphasize consumers' immediate focus, pleasure, and immersion in specific contexts. Highly attractive live streaming celebrities often attract consumers' attention through their appearance, expression style, sense of humor, affinity, and interactive atmosphere, making them more willing to continue watching live content. Therefore, attractiveness is more likely to affect consumers' immediate viewing experience rather than directly forming deep level relational connections. This result aligns with flow theory's view regarding the mechanism of of attention concentration and pleasure experience formation (Dietrich, 2004; Hoffman and Novak, 1996), and also indicates that attractiveness still plays a key role within live streaming e-commerce, but its role is mainly reflected in enhancing consumers' immersion and viewing investment.

Parasocial interaction has a significant positive impact on flow state ($\beta = 0.245$, $t = 4.140$, $P < 0.001$), therefore H_4 is supported. Parasocial interaction enables consumers to no longer passively receive product information, but to participate in the live streaming process with more active emotional involvement. Consumers will continue to pay attention to live content due to familiarity, companionship, and interaction, and gain a stronger participation experience in the explanations and interactions of live celebrities. This result is consistent with the parasocial interaction theory, which suggests that emotional connections between the audience and media figures can enhance their media engagement and psychological investment (Horton and Wohl, 1956; Aw and Labrecque, 2020). Meanwhile, this result also indicates that parasocial interaction can serve as an important psychological mechanism connecting the characteristics of live streaming celebrities with the immersive experience of consumers.

Parasocial interaction has a significant positive impact on impulse buying behavior ($\beta = 0.234$, $t = 4.032$, $P < 0.001$), therefore H_5 is supported. Parasocial interaction can enhance consumers' trust, identification, and emotional dependence on live celebrities, reducing rational comparison and delayed decision-making when faced with product recommendations, making it easier for them to make purchasing decisions based on emotional reactions. In addition, consumers may also generate purchasing impulses due to their support for live streaming celebrities, response to interactive relationships, or integration into the atmosphere of the live process room. This finding aligns with explanation of emotional drive and instant gratification in impulse buying research (Rook, 1987; Beatty and Ferrell, 1998), and also echoes the view in studies of live commerce emphasizing that emphasizes anchor interaction and emotional connection may promote purchasing behavior.

The flow state has a significant positive effect on impulse buying behavior ($\beta = 0.297$, $t = 5.255$, $P < 0.001$), therefore H_6 is supported. When consumers are in a state of flow, their attention is highly focused on live streaming content, product displays, and anchor recommendations, and their perception of external interference and time passing decreases, while their acceptance of product information and promotional stimuli increases. This finding aligns with flow theory as well as impulse buying theory, which suggest that immersive and pleasurable experiences can enhance consumers' immediate reactions and purchasing tendencies (Hoffman and Novak, 1996; Rook, 1987). Meanwhile, this result further supports the explanatory logic of he Stimulus-Organism-Response Model, suggesting, which suggests that external live-commerce stimuli affect the final behavioral response through consumers' internal psychological states (Mehrabian and Russell, 1974).

7. THEORETICAL AND MANAGERIAL IMPLICATIONS

7.1. Theoretical Implications

This study extends theory of source credibility into live streaming e-commerce, further explaining how live celebrities as information sources affect consumer psychology and behavior. The study takes the trustworthiness, professionalism, and attractiveness of live streaming celebrities as the three core credibility dimensions, examines their effects on social interaction and flow state. The findings indicate that the information persuasiveness of live celebrities is not only reflected in consumers' acceptance of product recommendations, but also in their shaping of consumers' relational psychological connections and immersive experiences, thus enriching source credibility theory in in the study of live e-commerce and digital consumption behavior.

Drawing on the Stimulus-Organism-Response Model, this study reveals the internal psychological path through which the credibility of live celebrity sources affects consumer impulse buying behavior. The trustworthiness, professionalism, and attractiveness of live streaming celebrities can significantly promote their parasocial interaction and flow state, while attractiveness mainly works by enhancing flow state. Meanwhile, parasocial interaction and flow state further strongly affect impulse buying behavior, suggesting that impulse buying within live streaming e-commerce is not directly triggered by anchor characteristics or promotional

stimuli, but gradually formed through the internal psychological state of consumers, thereby expanding the explanatory power of the Stimulus-Organism-Response Model within live streaming e-commerce.

This study further distinguished the different roles of parasocial interaction and flow state in consumer behavior in live streaming e-commerce. The influence of attraction on social interaction is not significant, but it has a significant effect on flow state, suggesting that the external attraction and personal charm of live streaming celebrities are tend to stimulate instant viewing interest and immersion, but may not necessarily form deep emotional connections. In contrast, professionalism has the strongest impact on social interaction, indicating that the relational connection between consumers and live celebrities is more likely to rest on professional competence, information value, and sustained trust. This discovery contributes to deeper insight into the psychological mechanisms of consumers in live streaming e-commerce and offers a theoretical reference for distinguishing between "relational interaction mechanism" and "immersive experience mechanisms" in subsequent research.

7.2. Managerial Implications

The operation in live streaming e-commerce should consider not only the traffic scale and external attractiveness of live streaming celebrities, but also emphasize their trustworthiness and professionalism. The stable psychological connection between consumers and live streaming celebrities is not only due to the high popularity or physical attractiveness of the hosts, but also depends more on their ability to provide authentic, reliable, and valuable product information. Therefore, when selecting live streaming celebrities, platforms and merchants should focus on their product knowledge, explanation ability, recommendation experience, and past reputation, rather than simply using fan numbers, exposure, or short-term sales conversion as criteria. Meanwhile, live streaming celebrities need to enhance their credible image and increase consumers' acceptance of live streaming content through real trials, objective evaluations, professional explanations, and timely responses to consumer questions.

Brand merchants and live streaming celebrities should also pay attention to the shaping of parasocial interaction and flow state. Parasocial interaction not only directly promotes impulse buying behavior, but also further enhances consumers' flow state, which significantly promotes impulse buying behavior. Therefore, during the live streaming process, consumers' sense of participation should be enhanced through more natural interactive methods, such as timely response to barrage questions, using friendly communication language, and creating a companion style live streaming atmosphere. At the same time, consumer immersion can be enhanced through product demonstrations, scenario based explanations, timed interactions, and content rhythm design, thereby increasing viewing time and enhancing their acceptance of product recommendations.

In addition, attractiveness needs rational evaluation in live streaming e-commerce practice. Although live celebrity attractiveness can enhance consumers' flow state, their impact on social interaction is not significant, indicating that appearance, personal charm, or entertaining expressions can attract consumers' attention and increase short-term viewing interest, but may not necessarily form long-term trust and stable relationships. Therefore, platforms and merchants should not overly rely on appearance, persona, or entertainment packaging, but should combine attractiveness with professional content, authentic expression, and quality interaction. Meanwhile, platforms should ensure authentic live streaming content and standardized management of recommendations, avoid exaggerated promotion and excessive inducement of consumption, in order to achieve more sustainable consumer relationship maintenance and marketing conversion.

8. CONCLUSION

Based on the Stimulus-Organism-Response Model, the study examines the impact mechanism of live celebrity source credibility on consumer impulse buying behavior in live streaming e-commerce. The study uses trustworthiness, professionalism, and attractiveness of live streaming celebrities as external stimuli, parasocial interaction and flow state as internal psychological states of consumers, impulse buying behavior as the final behavioral response, and conducts empirical tests based on questionnaire data. The study verifies the pathway of "credibility of live celebrity sources - consumer psychological experience - impulse buying behavior", showing that impulse buying in live e-commerce is not simply triggered by product information or promotional stimuli, but is formed through the combined effects of relational interaction and immersive experience between consumers and live celebrities.

9. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Although the study yields some findings, limitations remain. The study uses cross-sectional questionnaire data, which mainly reflects consumers' perceptions and behavioral tendencies at 1 time point, making it difficult to reveal dynamic changes among live celebrity source credibility, parasocial interaction, flow state, and impulse buying behavior. Future research can use longitudinal tracking, experimental studies, or empirical sampling methods to further test the variable relationships. The study treats live streaming celebrities as a general research object, without further distinguishing celebrity types, live streaming platforms, and product categories. Star anchors, internet celebrity anchors, brand self-broadcasting anchors, and professional evaluation anchors may have different influence mechanisms, and different product categories may also affect consumers' emphasis on trustworthiness, professionalism, and attractiveness. Future research can further conduct situational comparisons. The study mainly examines two psychological mechanisms: Parasocial interaction and flow state. However, consumer impulse buying behavior in live streaming e-commerce may also be influenced by factors such as perceived trust, social presence, perceived scarcity, fear of missing out, emotional arousal, and perceived value. Future research can further introduce new mediating or moderating variables to more

comprehensively reveal the formation mechanism and boundary conditions of consumer impulse buying behavior in live streaming e-commerce.

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