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# The Impact of Virtual Anchors' Social Presence on Consumer Behavior

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## Abstract

**With the rapid advancement of artificial intelligence and virtual reality technologies, virtual anchors have emerged as a crucial medium for consumer interaction in the digital economy era. In 2021, the State Council of China issued a national plan to strengthen and expand the digital economy, under which some e-commerce platforms have begun to extend their livestreaming practices into the field of virtual digital anchors. Drawing on the theory of social presence, this study collected 340 valid survey responses and employed SPSS 26.0 and other data analysis tools to examine how the social presence of virtual anchors on the Douyin platform influences consumer behaviors such as purchase decisions and brand preference, as well as the practical implications of these effects. The findings reveal that shared awareness has a significant negative impact on purchase behavior, contradicting the initially hypothesized positive relationship. Meanwhile, psychological involvement, intimacy, and behavioral congruence showed no statistically significant associations with purchase behavior. These results highlight the complex mechanisms of social presence theory in the context of virtual anchors and provide empirical evidence to inform the optimization of interactive design for virtual anchoring.**

## Keywords

**Virtual anchors; Social presence; Douyin livestreaming; Consumer behavior.**

## 1. Introduction

With the rapid evolution of digital technologies, virtual anchors—emerging as a product of the integration between artificial intelligence and content creation—are gradually penetrating the e-commerce sector and becoming an indispensable medium form in the digital economy era. In 2021, China's State Council released the *14th Five-Year Plan for Digital Economy Development*, injecting fresh momentum into digital transformation. At the same time, the gradual improvement of policy and regulatory frameworks has delineated the ethical and legal boundaries for technological innovation and commercialization. Under the dual impetus of technological progress and supportive policy, the commercial value of virtual anchors is increasingly prominent.

Compared with traditional e-commerce, livestreaming e-commerce offers a more diverse experiential environment, stronger realism, and more interactive effects, earning strong endorsement from both merchants and consumers [1]. As a benchmark in the short-video industry, Douyin boasts a massive monthly active user base. In 2024, Douyin's e-commerce gross merchandise value (GMV) reached 3.43 trillion RMB, ranking third in the industry. In 2025, Douyin introduced nine supportive policies aimed at fostering a healthier and more dynamic business environment for merchants. Consequently, the platform has become a primary venue for e-commerce livestreaming. Among Douyin's diverse livestreaming formats, virtual anchor livestreaming is emerging as a promising new mode. With the increasing involvement of virtual anchors in e-commerce livestreaming, it remains a critical question whether they can influence consumer behavior as effectively as real human anchors.

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Social presence theory emphasizes users' psychological perception of "others being present" within a mediated environment. Existing studies on livestreaming e-commerce confirm that real anchors' instant feedback and emotional expressions significantly enhance user trust, whereas the "non-human" attributes of virtual anchors may risk weakening such presence. Nevertheless, recent practices show that through high-precision motion capture, natural language processing, and immersive scene design, virtual anchors can simulate—or even surpass—the interactive effects of real anchors. Virtual livestreaming environments on platforms like Douyin create unique "digital mimetic settings," whose social attributes may reconstruct the conventional logic of social presence generation.

Research on virtual anchors in e-commerce livestreaming has mainly employed qualitative methods, focusing on application cases to examine their current development, advantages, limitations, and prospects [2]. A smaller body of work has conducted empirical investigations using surveys [3]. Most scholars emphasize the functional characteristics of anchors and the technological pathways of implementation, finding that interactivity significantly influences user trust and that anthropomorphism shapes consumer acceptance of virtual anchors. However, few studies examine from the perspective of users' psychological perception and human–digital interaction, analyzing how the "para-social relationships" constructed by virtual anchors affect consumer decision-making. Research specifically exploring how the social presence of virtual anchors influences consumer behavior remains limited.

Therefore, this study, grounded in social presence theory and employing SPSS 26.0 for data analysis, investigates the impact mechanisms of psychological involvement (H1), shared awareness (H2), perceived intimacy (H3), and behavioral congruence (H4) on consumer purchase behavior. The findings aim to provide a theoretical basis for optimizing virtual anchor persona design and enhancing platform interaction mechanisms, while also offering practical insights into the implementation of the *Interim Measures for the Administration of Generative Artificial Intelligence Services*. Ultimately, the study seeks to contribute to balancing social and commercial values in the development of the digital human industry within a compliant regulatory framework.

## 2. Literature Review

### 2.1. Definition and Characteristics of Virtual Anchors

Virtual anchors represent an emerging form of livestream hosts, functioning as virtual embodiments of real performers. By leveraging digital technologies such as 3D modeling, real-time rendering, and motion capture, they create a symbolized body that can interact with audiences in livestreams or videos.

Moreover, virtual anchors integrate multimodal technologies, including 3D modeling, motion capture, real-time rendering, speech synthesis, and natural language processing, to construct digital personas. Their appearance, personality, and attire can be customized according to enterprise needs, supporting diverse stylistic demands ranging from anime-style to hyper-realistic designs, thereby transcending physical constraints. Virtual anchors demonstrate dual forms of interactivity: human-driven virtual anchors allow real-time interactions with consumers through mechanisms such as live comments or gesture-triggered coupons, while fully AI-driven anchors rely on pre-programmed scripts, which limit flexibility due to "agenda-setting" constraints.

### 2.2. Social Presence Theory

The theory of social presence was first proposed by Short et al. [4] to measure the degree to which individuals perceive a "real interpersonal presence" during mediated communication. It is widely regarded as a key factor influencing online consumer behavior [5]. Izzhizaka Alessio,

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building on the theory of social facilitation, explained why consumers tend to exhibit more purchasing behavior when they perceive others' presence. This line of research confirmed the potential impact of social presence on consumer purchasing [6].

The theory encompasses four core dimensions—psychological involvement, co-presence, intimacy, and behavioral congruence. These dimensions interact dynamically in a cyclical manner and ultimately manifest as increased purchase intention, strengthened brand loyalty, and enhanced social sharing. In the context of livestreaming platforms, Zhou Yongsheng (2020) argued that both cognitive and affective presence significantly influence consumers' conformity-driven purchasing intentions [7]. Liu Zhilin (2021) further proposed that social presence—encompassing situational, communicative, and emotional presence—positively impacts consumers' purchase intentions [8].

According to this theory, real-time interaction, dynamic representations, and contextualized expressions break through physical spatial limitations, generating a sense of "co-embodiment." Livestream content and interactive rituals become shared focal points between users and anchors. This collective focus is further reinforced by algorithmic recommendations aligned with user preferences, resulting in highly homogeneous community networks. Virtual anchors convey emotional signals through anthropomorphic facial expressions, tone, and narrative strategies, which foster emotional resonance among users. The degree to which users accept a virtual anchor's persona, interactive style, and recommended content directly affects their depth of psychological involvement. When an anchor's behavior strongly aligns with user preferences, the trust-building cycle can be significantly shortened.

### 2.3. The Relationship between Virtual Anchors and Social Presence

Psychological involvement drives individuals to invest emotional and cognitive resources in order to deeply engage with interactions. Co-presence fulfills people's psychological need for companionship and shared experiences. Intimacy provides individuals with emotional support and a sense of belonging, while behavioral congruence helps them integrate more seamlessly into the group.

## 3. Research Hypotheses

In the context of virtual anchor livestreaming, consumers' psychological involvement refers to their emotional investment and cognitive focus on interactive content. When viewers are highly immersed in the livestream atmosphere, their attention and interest are continuously stimulated, making them more inclined to express approval of the content through purchasing behaviors. Heightened psychological involvement strengthens users' perception of product value, shortens decision-making hesitation, and ultimately promotes purchase intention. Accordingly, the following hypothesis is proposed:

H1: Psychological involvement has a significant positive effect on consumers' purchasing behavior.

On e-commerce livestreaming platforms, co-presence refers to users' awareness of the presence of others and their mutual influence [9]. Co-presence enhances the depth of interaction between consumers and anchors by creating an immersive experience of "virtual presence." Real-time feedback and dynamic atmospheres in livestream settings blur the boundaries of physical space, allowing audiences to feel as if they are "personally present." This deepened immersion not only prolongs viewing time but also evokes emotional resonance, fostering positive attitudes toward recommended products and ultimately encouraging purchasing behavior. Therefore, the following hypothesis is proposed:

H2: Co-presence positively influences consumers' purchasing behavior by enhancing immersion.

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Intimacy, as the core of emotional bonding, is reinforced through the personalized expression and individualized interaction of virtual anchors. Compared to traditional e-commerce environments, livestreaming allows anchors to interact with users in real time, creating feelings of reliability and friendliness [10]. When anchors convey closeness through language, facial expressions, or actions, viewers tend to form emotional dependence and bonds of trust. This emotional connection reduces consumers' psychological defenses, enhances their favorability toward the brand, and increases their likelihood of accepting purchase recommendations. Thus, the following hypothesis is proposed:

H3: Intimacy positively influences consumers' purchasing behavior by strengthening emotional bonds.

Behavioral congruence reflects the degree of alignment between users and virtual anchors in their interaction patterns. When the anchor's behavioral style and product recommendations align closely with audience preferences, interactions become more natural and fluid. Such congruence not only enhances user satisfaction with participation but also reduces cognitive dissonance, thereby reinforcing the certainty of purchase decisions. Accordingly, the following hypothesis is proposed:

H4: Behavioral congruence has a significant positive effect on consumers' purchasing behavior.

## 4. Research Methodology

### 4.1. Research Design: Questionnaire Survey

This study adopted a questionnaire survey method, distributing questionnaires through WeChat Moments and other social media platforms. To ensure the scientific rigor and applicability of the research instrument, the development of the scale followed standardized procedures. Based on established measurement tools from prior studies, and considering the characteristics of livestreaming e-commerce and virtual interaction scenarios, the wording of items and the dimensional structure were adapted to form the initial questionnaire.

A small-sample pilot test ($n = 50$) was conducted, and SPSS 26.0 was used to examine item analysis and reliability/validity. Internal consistency reliability was confirmed with Cronbach's $\alpha > 0.7$, and convergent validity was confirmed with AVE > 0.5.

In the theoretical model, psychological involvement, co-presence, intimacy, and behavioral congruence were set as independent variables, while purchasing behavior was the dependent variable. Specifically, psychological involvement contained six measurement items, co-presence six, intimacy six, behavioral congruence four, and purchasing behavior six, yielding a total of 28 observed items.

### 4.2. Questionnaire Design and Distribution (Demographics and Scale Items)

The questionnaire was distributed via social media platforms such as WeChat Moments, and responses were collected using a 5-point Likert scale. To ensure participants met research requirements, screening questions were included before formal distribution: "Have you ever watched a Douyin virtual anchor livestream?" and "Please write the name of a virtual anchor you frequently watch." Responses failing these criteria were excluded to ensure validity.

A total of 375 questionnaires were collected, of which 340 were valid after eliminating unqualified responses, resulting in a 92% effective response rate. Descriptive statistics of the sample are presented in Table 4.2.1. The demographic distribution (gender, age, viewing frequency, and social engagement) was consistent with the typical characteristics of Douyin's virtual anchor livestream audience, ensuring representativeness.

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Table 4.2.1. Descriptive Statistics

| Variable | Category | Sample Size | Percentage |
|---|---|---|---|
| Gender | Male | 135 | 39.7% |
| | Female | 205 | 60.3% |
| Age | Under18 | 43 | 12.6% |
| | 18-24 | 146 | 42.9% |
| | 25-30 | 93 | 27.4% |
| | 31-40 | 40 | 11.8% |
| | 41 and above | 18 | 5.3% |
| Viewing Frequency | Almost daily | 130 | 38.2% |
| | 1-3 times/week | 137 | 40.3% |
| | 1-3 times/month | 73 | 21.5% |
| Social Engagement | Passive viewer | 117 | 34.4% |
| | Occasional interaction | 150 | 44.1% |
| | Frequent interaction | 73 | 21.5% |

Descriptive analysis shows that among the 340 respondents, 135 were male (39.7%) and 205 were female (60.3%), indicating a female-majority sample. In terms of age, most respondents were concentrated in the 18–30 range, with 18–24-year-olds comprising the largest group (42.9%). Viewing frequency analysis showed that 38.2% watched almost daily, 40.3% watched 1–3 times per week, and 21.5% watched 1–3 times per month. Regarding social engagement, 34.4% were passive viewers, 44.1% interacted occasionally, and 21.5% interacted frequently.

## 4.3. Data Analysis (Reliability, Validity, SEM, and Regression Analysis)

To minimize common method bias, anonymity and time separation were applied during the survey. Harman's single-factor test showed five factors with eigenvalues greater than 1, with the first factor explaining 13.307% of the variance, below the 50% threshold, indicating no serious common method bias. The extracted factors explained 53.112% of total variance, which was acceptable.

Normality testing showed skewness values ranging from 0.006 to 0.400 and kurtosis values between 0.303 and 0.898, all within ±1.96, indicating normal distribution.

### 4.3.1. Reliability and Validity Testing

Cronbach's α was used to test internal consistency. Results (see Table 4.3.1.1) show that all constructs exceeded the 0.7 threshold, confirming acceptable reliability.

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Table 4.3.1.1. Cronbach's α Coefficients

| Variable | Items | Cronbanch's α |
|---|---|---|
| Psychological involvement | 6 | 0.738 |
| Co-presence | 6 | 0.786 |
| Intimacy | 6 | 0.810 |
| Behavioral congruence | 4 | 0.786 |
| Purchasing behavior | 6 | 0.875 |

KMO and Bartlett's test results indicated sampling adequacy (KMO = 0.802 > 0.7). Bartlett's test was significant ($\chi^2$ = 2936.607, p < 0.001), suggesting suitability for factor analysis. Confirmatory factor analysis (CFA) was thus conducted.

Table 4.3.1.2. Rotated Component Matrix

| Variable | Items | Component Loadings | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| Purchasing behavior | PB1 | 0.751 | | | | |
| | PB2 | 0.793 | | | | |
| | PB3 | 0.776 | | | | |
| | PB4 | 0.757 | | | | |
| | PB5 | 0.801 | | | | |
| | PB6 | 0.820 | | | | |
| Intimacy | ITM1 | | 0.703 | | | |
| | ITM2 | | 0.718 | | | |
| | ITM3 | | 0.678 | | | |
| | ITM4 | | 0.729 | | | |
| | ITM5 | | 0.720 | | | |
| | ITM6 | | 0.735 | | | |
| Co-presence | CC1 | | | 0.680 | | |
| | CC2 | | | 0.710 | | |
| | CC3 | | | 0.665 | | |
| | CC4 | | | 0.730 | | |
| | CC5 | | | 0.642 | | |
| | CC6 | | | 0.732 | | |
| Psychological involvement | PE1 | | | | 0.603 | |
| | PE2 | | | | 0.691 | |
| | PE3 | | | | 0.582 | |
| | PE4 | | | | 0.664 | |
| | PE5 | | | | 0.680 | |
| | PE6 | | | | 0.716 | |
| Behavioral congruence | BF1 | | | | | 0.896 |
| | BF2 | | | | | 0.816 |
| | BF3 | | | | | 0.542 |
| | BF4 | | | | | 0.814 |

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The results showed clear alignment between extracted components and the intended constructs, with no significant cross-loadings, confirming good construct validity.

### 4.3.2. Correlation and Multicollinearity Analysis

Pearson correlations and VIF values were examined (see Table 4.3.2.1).

Table 4.3.2.1. Correlation and Multicollinearity Analysis

| Variable | PI | CP | ITM | BF | PB | VIF |
|---|---|---|---|---|---|---|
| Psychological involvement (PI) | 1.000 | -0.116 | 0.156 | -0.127 | -0.132 | 1.004 |
| Co-presence (CP) | 0.116 | 1.000 | 0.194 | -0.121 | -0.159 | 1.000 |
| Intimacy (ITM) | 0.156 | 0.194 | 1.000 | -0.125 | 0.149 | 1.013 |
| Behavioral congruence (BF) | 0.127 | -0.021 | -0.125 | 1.000 | 0.114 | 1.002 |
| Purchasing behavior (PB) | -0.132 | -0.159 | 0.049 | 0.114 | 1.000 | |

Correlation results indicate weak direct relationships between independent variables and purchasing behavior, with coefficients ranging from -0.159 to 0.114. VIF values were all close to 1 (< 5), and tolerance values > 0.9, suggesting no multicollinearity problems.

## 4.4. Hypothesis Testing

Hypothesis testing revealed that only co-presence showed a statistically significant negative relationship with purchasing behavior, contradicting the hypothesized positive relationship. Other variables were not significant: psychological involvement ($r = -0.132$, $p = 0.063$), intimacy ($r = 0.049$, $p = 0.493$), and behavioral congruence ($r = 0.114$, $p = 0.109$).

This may reflect sample size limitations ($n = 340$), where weak effects could not be captured. The negative effect of co-presence may suggest that an "excessive sense of presence" created by virtual anchors triggers psychological resistance among users. Overall, the explanatory power of independent variables on purchasing behavior was limited, implying that moderating or mediating variables should be introduced in future models.

Although statistical significance was insufficient, effect sizes ($|r| < 0.2$) suggest that actual associations between variables are weak. Future studies may adopt experimental designs to strengthen causal inference.

# 5. Conclusion

At present, academic research on virtual anchors from the perspective of user experience still leaves significant room for exploration. Grounded in social presence theory, this study systematically investigated and analyzed virtual livestreaming scenarios on the Douyin platform, aiming to provide new perspectives and empirical materials for a more comprehensive and multi-dimensional understanding of virtual digital humans. However, the results of hypothesis testing diverged considerably from the initial expectations.

The findings indicate that co-presence exerts a significant negative impact on purchasing behavior, suggesting that when virtual anchors overemphasize a sense of "being together," it may trigger psychological resistance among users. Meanwhile, psychological involvement, intimacy, and behavioral congruence did not demonstrate statistically significant effects on purchasing behavior. These results may have been constrained by sample size limitations or the weak effects of variables, and future research could explore these relationships further through experimental designs or by incorporating moderating variables.

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This study provides detailed insights into the roles of psychological involvement, co-presence, intimacy, and behavioral congruence in virtual anchor livestreaming. It contributes empirical evidence for optimizing virtual anchor business models and managing consumer behavior. At the same time, certain limitations must be acknowledged. The study focused exclusively on Douyin's virtual anchors, and given the platform's unique user demographics, content ecosystem, and social attributes, the findings may not be directly generalizable to other livestreaming platforms. This restricts the universality of the conclusions. Moreover, the research centered solely on consumer behavior, without considering other key actors such as virtual anchor operation teams and content creators, resulting in a lack of comprehensive analysis of the broader virtual anchor industry ecosystem.

Looking ahead, future research could conduct cross-platform comparative studies to examine behavioral differences among consumers of virtual anchors across different platforms, thereby deriving multi-scenario adaptation strategies. Another promising direction is the exploration of multi-stakeholder collaboration mechanisms: by integrating perspectives from operation teams, content creators, and platform algorithm engineers, researchers can investigate the collaborative pathways of technology development, content production, and business monetization. Such efforts could help construct a dynamic "human–machine–environment" influence model, enriching both theoretical and practical understandings of the virtual anchor ecosystem.

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