Asia-Pacific Journal of Business (아태비즈니스연구)
Vol. 15, No. 1, March 2024 (pp.15-31)
https://doi.org/10.32599/apjb.15.1.202403.15

APJB
ISSN 2233-5900 (Print)
ISSN 2384-3934 (Online)

# Why Do We Make Impulse Purchases in Live-streaming E-commerce?

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*Received 29 February 2024, Revised 20 March 2024, Accepted 24 March 2024*

## Abstract

**Purpose** - This study explores the causes behind the high rate of impulse purchases in live streaming e-commerce.
**Design/methodology/approach** - The research model is empirically validated with survey data collected from 324 respondents in China, using the Partial Least Squares (PLS) methodology.
**Findings** - We found that the interactivity and visibility of live streaming are key in creating para-social relationships and perceived presence, leading to customers' impulse purchases.
**Research implications or Originality** - This study deepens the understanding of consumers' impulse purchases in live-streaming e-commerce, revealing that para-social relationships and perceived presence developed through real-time interactions can increase impulse buying. It also highlights the differences between relationship-oriented and task-oriented interactions in fostering customers' perceived presence and para-social relationships in live streaming.

***Keywords***: E-commerce, Live Streaming, Impulse Purchase, Para-social Relationship, Perceived Presence
***JEL Classifications***: M15, M31

## Ⅰ. Introduction

E-commerce platforms increasingly adopt live streaming channels. Taobao implemented its online live streaming (Taobao Live) in 2016, and Amazon launched the live streaming function in 2019. Despite its recency, live streaming e-commerce has already achieved a significant market scale. Taobao Live's gross merchandise volume reached 200 billion RMB (around $27.96 billion) in 2019. The COVID-19 pandemic promotes both sellers and customers turning to live-streaming e-commerce. The number of new merchants on Taobao Live increased by 719% in February 2020 compared to the previous month. In March 2020, the number of orders transacted through Taobao Live increased by more than 160% compared with last year.

E-commerce live streaming revolutionizes how sellers provide product information and interact and build relationships with their customers (Kang et al., 2021; Wongkitrungrueng and Assarut, 2020; Zhang et al., 2022). In conventional e-commerce, sellers post product in-

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formation, typically with text or static images, and may have asynchronous and optional interactions with their customers in responding to their questions or product reviews. Sellers expose their information minimally. On the other hand, in live streaming e-commerce, sellers provide vivid product information from all angles, respond to customers' questions in real time, and build a relationship with their customers through task-oriented interactions and interpersonal reactions and communications. Real-time live streaming enables the audience to see the streamers' faces and body language, and at the same time, streamers can use voice instead of text to interact with their audience. As such, streamers may shorten the psychological distance of their customers and create a comfortable shopping atmosphere. Such interpersonal appeals, coupled with immersive product information, may improve customers' shopping experience, resulting in their purchases that were not planned before they participated in the live streaming. Statistics from iiMedia Research (2020) show that 49.5% of e-commerce live-streaming customers made impulse purchases while watching live broadcasting.

Despite its unique features and a large volume of unplanned purchases, we have limited theoretical and empirical understanding regarding what drives unplanned purchases in e-commerce live streaming. While previous studies have focused on the influence of opinion leaders or streamer characteristics and the dynamics of e-commerce live streaming in boosting customers' purchase intentions, the connection between the characteristics of e-commerce live streaming and customers' unplanned purchase behaviors has received scant attention. To fill this gap, we identify two key antecedents of customers' unplanned purchases-para-social relationships and perceived presence-and investigate how task-/relationship-oriented interaction and visibility in live streaming e-commerce are associated with such antecedents. Our empirical analysis based on survey responses from 324 Taobao Live users reveals that visibility and relationship-oriented interactions are crucial in cultivating a para-social relationship and perceived presence, resulting in unplanned purchases. Task-oriented interaction also enhances the perceived presence of customers, but it is ineffective in developing para-social relationships.

## II. Theoretical Background

### 1. Visibility and Interactivity in E-commerce Live Streaming

E-commerce live broadcast is a real-time broadcast platform to promote and sell products. Typically, sellers hire professional streamers to provide product information and answer customers' questions. While well-established e-commerce platforms such as Taobao and Amazon pioneered their live broadcast, small- and medium-sized e-commerce platforms also cooperate with live-streaming media to start their live-streaming commerce.

Live streaming affords constant high visibility and unique interactivity, bringing an excellent opportunity for e-commerce. In traditional e-commerce, customers obtain product appearance, attributes, and other information through graphic or textual details. Particularly for cosmetics, clothing, or electrical products in which we seek presence (such as trials) before purchase, graphical or textual information may not be practical for meeting our shopping needs. With instantaneously delivered product images and sounds and a more understandable and intuitive

form of expression and presentation, live streaming can provide customers with fully observed capabilities (Dong and Wang, 2018).

Another significant live broadcast feature is the real-time interaction between a streamer and the audience. Audiences may send questions through the chat box during the broadcast. Such questions are not limited to product-related but are a bit personal to the streamer, building a unique interpersonal relationship.

The presence theory defines presence as the subjective experience of being in the mediated virtual environment (Witmer and Singer, 1998). The presence is also classified into telepresence and social presence. Telepresence is "the mediated perception of an environment" (Steuer, 1992) or users' ability to be psychologically transported into another area (Biocca, 1992). Social presence refers to the degree to which a person is regarded as a "real person" and the degree to which s/he perceives the connection with others in communication through media (Short, Williams and Christie, 1976). Both telepresence and social presence work for better presence.

Interactivity and vividness are the two main factors of the sense of presence (Yim, Chu and Sauer, 2017). The "response" is crucial for interactivity, transferring information from the receiving party to the topic maker. In online shopping, the response corresponds to the two-way information communication between buyers and sellers, and we may expect more protracted and more detailed responses than in traditional e-commerce. Vividness is related to the degree of richness that media can present. Vividness has two dimensions: breadth and depth. Breadth refers to the number of senses involved in the media that the participants can access when using the network media, and depth refers to the extent that a media can imitate the human body's sensory system and the quality and effect of the similarity of information replicated by the media. We may expect more vivid presentations in live-streaming e-commerce than in traditional e-commerce in breadth and depth.

## 2. Relationship-oriented and Task-oriented Interactions in E-commerce Live Streaming

Relationship marketing has gained recent academic attention. Relationship marketing significantly affects consumers' online trust and loyalty (Boateng, 2020). Salespeople are increasingly playing the role of friends or acquaintances with customers. Vendors put significant efforts into building customer relations, which is critical to the success of marketing activities (Fang et al., 2018).

Relation-oriented interactions are a series of activities that aim to develop an intimate relationship with consumers (Homburg, Müller and Klarmann, 2011). In e-commerce, low search costs allow customers to switch to other sellers quickly. Relationship marketing emphasizes that providing a good product or service is not enough, but retailers should build good social relationships with their customers to reduce churn.

In live streaming e-commerce, interactions with customers are more manageable with the live broadcast's real-time performance and visibility. Streamers interact with the audience by chatting and sharing their own lives, which narrows the psychological distance to customers and establishes an excellent interactive atmosphere. Good social relationships with the audience help to gain customer trust and promote the sale of the products.

Live streaming channels also afford task-oriented interactions between a streamer and the

audience. Task-oriented interactions are based on economic exchange (Fan and Zhang, 2018). Such task-oriented interactions are also popular in sales activities. The primary purpose of the streamer is to sell commodities; therefore, their interaction efforts involve the features of a shopping guide. Task-oriented interactions aim to complete the primary shopping goal, such as accurately describing products, identifying consumers' needs, and recommending products according to customers' needs, which can be better performed in live streaming e-commerce than in the traditional one.

### 3. Para-social Relationship

The para-social relationship is an individual's "illusion of a face-to-face relationship with a media personality" (Horton and Wohl, 1956). Rubin and Step (2000) extended its definition to "the psychological connection between users and media personalities through virtual media." Although TV viewers may not interact with celebrities and celebrities may not receive feedback from the audience, TV viewers could form a one-sided para-social relationship with such media figures (Hartmann and Goldhoorn, 2011). Essentially, people may believe they are involved in a two-way conversation as if someone else is speaking directly to them through an intermediary.

Compared to normal human relationships or interactions, para-social relationships involve a substantially weak bond (Sood and Rogers, 2000). Unlike the traditional sense of interactions and relationships, the para-social relationship is not mutual. Also, this kind of interaction is activated by media performers; thus, information is mainly delivered from media figures and received by media users.

The concept of para-social relationships has gained academic attention in understanding social media users' behavior. The para-social relationship may be vital in explaining SNS user behavior (Kim, 2005). Para-social relationships can promote purchases on social commerce platforms (Russell, Norman and Heckler, 2004; Russell and Stern, 2006).

### 4. Impulse Purchase

An impulse purchase is defined as "a purchase without planning" (Stern, 1962). Impulse purchases are more improvisational, improvised, and irresistible without carefully thinking compared to planned purchases (Engel and Blackwell, 1982). Unlike planned purchases, in the process of an impulse purchase, consumers cannot form an attitude or intention based on a cognitive structure and function. We do not spend substantial time on product research when making impulse purchases and always involve a sense of sudden, intense, irresistible urge to buy (Han et al., 1991).

External and internal stimuli can trigger impulse purchases. Typical external stimuli are marketing cues to lure consumers, such as sales promotion. Shopping environments, such as store size, atmosphere, picture appeal and attraction, and online communication, may also work for external stimuli. Internal stimuli are related to the customer, such as personality, purchase motivation, and mood at that time (Vishnu and Raheem, 2013). We believe enhanced visibility and interaction in live-streaming e-commerce could work for such stimuli, leading to a higher chance of impulse purchases than in traditional e-commerce.

## Ⅲ. Hypothesis Development

Contrary to traditional e-commerce providing product information with texts and static images, live-streaming e-commerce innovates the delivery of product information with real-time interaction between audiences and streamers. Streamers respond to audiences' requests for product information through video streaming or real-time chats, providing a more vivid sense of product and seller presence. Also, a higher sense of perceived presence may reduce customers' perceived risk in the transaction, lowering the barrier to impulse purchasing (Kang et al., 2014). Therefore, we propose that:

**H1:** Enhanced perceived presence in e-commerce live streaming encourages impulse purchases.

Enhanced perceived presence in online shopping can shorten psychological distances between audiences and streamers (Darke et al., 2016) and provides consumers with a more comfortable shopping environment (Gao et al., 2018). In traditional online shopping, consumers may have delayed communication with sellers through review boards or e-mail. On the other hand, sellers in live-streaming e-commerce interact with consumers spontaneously, developing a closer relationship between audiences and streamers. Enhanced perceived presence fosters a feeling of imagined intimacy (Rubin et al., 1985), building a para-social relationship for audiences (Rubin and Perse, 1987).

Furthermore, unlike traditional online shopping that involves private communication between sellers and buyers, communication between audiences and streamers is primarily open to all in the streaming channel. Such a systematic communication structure allows a streamer to receive attention from many audiences, forming and strengthening a para-social relationship for audiences (Kim and Song, 2016). Therefore, we propose that:

**H2:** Enhanced perceived presence in e-commerce live streaming develops audiences' para-social relationships with streamers.

The construal-level theory suggests that a closer psychological distance from streamers may lead to the process of consumers' self-persuasion and acceptance of those streamers (Trope and Liberman, 2010), leading to unintended purchases. A stronger sense of connection would favor the streamer, causing the audiences to purchase products without cautious stands. Prior studies also reveal that para-social relationships affect brand attitude and purchase intention on social media (Nagi, Tao, and Moon, 2015). Furthermore, in a brick-and-mortar context, para-social relationships encourage consumers to have impulsive consumption behaviors (Stephens, Hill, Bergman, 1996). Therefore, we propose that:

**H3:** The para-social relationship in live-streaming e-commerce promotes impulse purchases.

Compared with static product displays in traditional e-commerce, e-commerce live streaming provides audiences multi-sensory enjoyment. Streamers can foster an offline-like shopping environment by demonstrating product appearance and usages from multi-angles with commentary. Such enhanced visibility in live-streaming e-commerce would develop a sense of presence.

Nonverbal interaction is critical in building a para-social relationship perceived by audiences or customers (Wohn, Freeman and McLaughlin, 2018). Media figures express themselves to the audience through voice and body language, promoting para-social relationships (Cohen, 2014). Live streaming e-commerce brings the streamer's various non-verbal behaviors to the audience. Thus, we propose that:

**H4a:** The visibility in live streaming e-commerce develops perceived presence.
**H4b:** The visibility in live streaming e-commerce cultivates para-social relationships for audiences.

Prior studies highlight the positive role of interactivity in creating social presence and tele-presence (Kim, 2015; Lim and Ayyagari, 2018). The interaction with a streamer can build a perceived sense of social presence for audiences (Fang et al., 2018). Furthermore, getting the responses from the streamer in real time also encourages active questioning and comments, enhancing a sense of presence (Ou, Pavlou and Davison, 2014).

In live streaming e-commerce, two types of interactions between a streamer and the audience exist, task-oriented and relationship-oriented interactions. Task-oriented interactions refer to communications about product information and purchases. Relationship-oriented interactions refer to small talks between a streamer and the audience (e.g., small chats about the streamer's appearance and actions), which may develop the audience's emotional attachment to the streamer. Thus, we propose that:

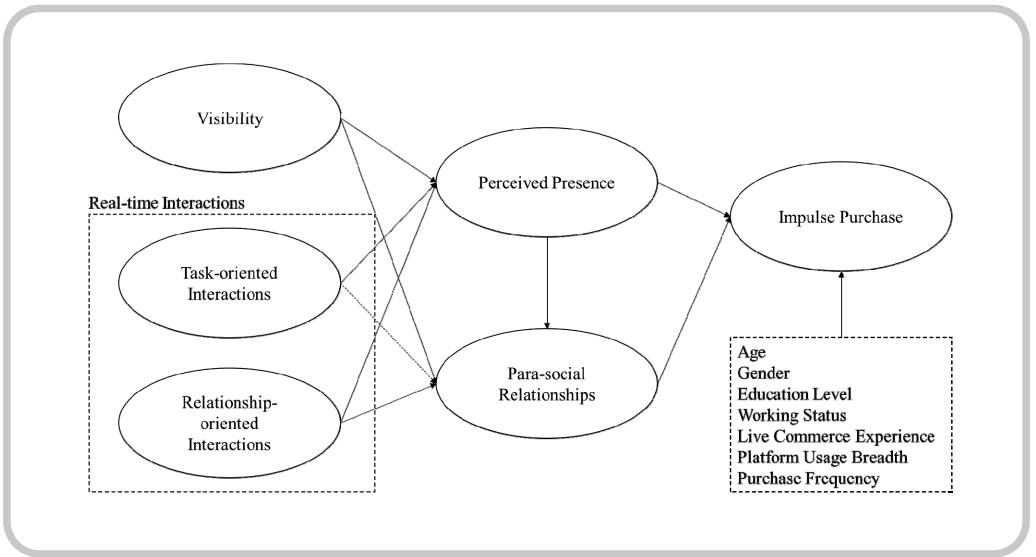
**H5a:** Task-oriented interactions in live streaming e-commerce develop the perceived presence.
**H6a:** Relationship-oriented interactions in live streaming e-commerce develop the perceived presence.

Also, the response speed and ability to communicate concerning the consumer's prior information can improve perceived interactivity (Song and Zinkhan, 2008), building a para-social relationship (Labrecque, 2014). Live streaming e-commerce facilitates real-time interactions. Further, non-verbal language could help the response-ability, strengthening the para-social relationship between performers and consumers. Thus, we proposed that:

**H5b:** Task-oriented interactions in live-streaming e-commerce cultivate the para-social relationship.
**H6b:** Relationship-oriented interaction of e-commerce live streaming cultivates the para-social relationship perceived by customers.

〈Fig 1〉 depicts our research model.

**Fig. 1.** Research Model




## Ⅳ. Empirical Approach

### 1. Data

We collected data from Taobao Live broadcast consumers who purchased food or cosmetics through the platform within the last seven days before participating in our survey. Taobao Live broadcast is a dominant live e-commerce platform in China, with a market share of 68.5% (China Consumers Association, 2020). Cosmetics and food are the top two categories, accounting for more than half of the platform's sales volume.

Before we conducted the survey, five reviewers (one Ph.D., one M.S., and three master's students), who had experience in live-streaming e-commerce, were invited to ensure clarity in the survey questionnaire. They gave us suggestions or feedback on items.

We also went through a pilot survey to further ensure the accuracy and reliability of the questionnaire. Consistent with the main survey, we distributed questionnaires through the Tencent questionnaire platform. We obtained 42 valid responses from 55 participants, showing an acceptable completion rate. Their responses were also distributed as expected; thus, we conducted the main survey.

In the main survey, we collected 410 responses, with 86 invalid responses that did not pass the screening criteria, resulting in 324 valid responses. Our screening criteria were 1) respondents must have purchased food or cosmetics through Taobao Live broadcast within seven days before answering our questionnaire, 2) their total response time should be more than 120s, and 3) they should show a negative correlation in their responses between reversed coded items. Appendix 1 contains our survey items.

〈Table 1〉 outlines the demographic profile of our sample. Among the participants, females

constitute 56.5%, marginally outnumbering males at 43.5%. A significant portion, 62.7%, are in their twenties, followed by 20% who are teenagers, indicating a demographic skew towards the younger generation on Taobao Live. In terms of education, the majority hold an undergraduate degree (73.1%) or have received lower levels of education (18.5%). Employment status among respondents varies, with 53.7% being employed, 36.1% students, and 10.2% unemployed.

Experience with live streaming shopping is diverse: 24.4% of respondents have engaged in it for less than three months, 20.4% for three to six months, 18.8% for seven to twelve months, and 36.4% for over a year. The majority (59.3%) have used two to three live shopping platforms. Shopping frequency among respondents shows a significant divide; 42.6% used the live streaming platform 1-4 times in the past year, whereas 34.9% used it ten times or more.

**Table 1.** Demographic Profiles ($N$ = 324)

| | Frequency | Percentage (%) |
|---|---|---|
| Gender | | |
| Male | 141 | 43.5 |
| Female | 183 | 56.5 |
| Age | | |
| ≤20 | 65 | 20.0 |
| 21-30 | 203 | 62.7 |
| 31-40 | 32 | 9.9 |
| 41-50 | 17 | 5.2 |
| ≥51 | 7 | 2.2 |
| Education level | | |
| High school or below | 60 | 18.5 |
| Bachelor | 237 | 73.1 |
| Master | 22 | 6.8 |
| Doctor | 5 | 1.5 |
| Working status | | |
| Student | 117 | 36.1 |
| Unemployed | 33 | 10.2 |
| Employed | 174 | 53.7 |
| Live streaming shopping experience | | |
| <3 months | 79 | 24.4 |
| 3-6 months | 66 | 20.4 |
| 7-12 months | 61 | 28.8 |
| >1 year | 118 | 36.4 |
| Platform usage breadth | | |
| 1 | 59 | 18.2 |
| 2 | 101 | 31.2 |
| 3 | 91 | 28.1 |
| 4 | 54 | 16.7 |
| ≥5 | 19 | 5.9 |
| Live shopping frequency (in the past year) | | |
| 1-4 | 138 | 42.6 |
| 5-9 | 73 | 22.5 |
| ≥10 | 113 | 3.9 |

## 2. Measurement Model Assessment

Cronbach's Alpha (CA), Composite Reliability (CR), and Average Variance Extracted (AVE) are three important indicators to measure the reliability of indicators (Hair et al., 1998). Typical cutoffs for these metrics are as follows: CA and CR should be above 0.70, and AVE should be above 0.5 (Chin, 1998). We confirm that our constructs' CA and CR were above 0.7, and AVE were all greater than 0.5, as summarized in 〈Table 2〉.

**Table 2.** Reliability and Convergent Validity

| Variable | Item | Loading values | t-value | AVE | CR | Cronbach's α |
|---|---|---|---|---|---|---|
| Visibility | VB1 | 0.811 | 38.863 | 0.655 | 0.883 | 0.823 |
| | VB2 | 0.849 | 45.188 | | | |
| | VB4 | 0.840 | 39.814 | | | |
| | VB5 | 0.731 | 19.739 | | | |
| Task-oriented Interactions | TI2 | 0.862 | 39.359 | 0.706 | 0.906 | 0.861 |
| | TI3 | 0.846 | 42.064 | | | |
| | TI4 | 0.798 | 26.564 | | | |
| | TI5 | 0.855 | 49.422 | | | |
| Relationship-oriented Interactions | RI1 | 0.870 | 55.183 | 0.710 | 0.924 | 0.898 |
| | RI2 | 0.838 | 41.852 | | | |
| | RI3 | 0.882 | 57.058 | | | |
| | RI4 | 0.848 | 43.138 | | | |
| | RI5 | 0.771 | 29.096 | | | |
| Perceived Presence | PP1 | 0.833 | 33.262 | 0.746 | 0.936 | 0.915 |
| | PP2 | 0.885 | 50.488 | | | |
| | PPI3 | 0.886 | 64.542 | | | |
| | PP4 | 0.831 | 42.942 | | | |
| | PP5 | 0.882 | 62.141 | | | |
| Para-social Relationship | PSR1 | 0.879 | 57.619 | 0.725 | 0.929 | 0.903 |
| | PSR2 | 0.880 | 52.869 | | | |
| | PSR3 | 0.877 | 55.533 | | | |
| | PSR4 | 0.888 | 51.243 | | | |
| | PSR5 | 0.723 | 24.389 | | | |
| Impulse Purchases | IB1 | 0.853 | 45.996 | 0.753 | 0.924 | 0.891 |
| | IB2 | 0.892 | 62.848 | | | |
| | IB3 | 0.885 | 53.586 | | | |
| | IB4 | 0.841 | 35.448 | | | |

**Table 3.** Discriminant Validity

| Variables | IP | PP | PSR | VB | TI | RI |
|---|---|---|---|---|---|---|
| Impulse Purchases (IP) | 0.868 | | | | | |
| Perceived Presence (PP) | 0.564 | 0.864 | | | | |
| Para-social Relationship (PSR) | 0.621 | 0.773 | 0.852 | | | |
| Visibility (VB) | 0.423 | 0.636 | 0.648 | 0.809 | | |
| Task-oriented Interactions (TI) | 0.459 | 0.681 | 0.629 | 0.761 | 0.840 | |
| Relationship-oriented Interactions (RI) | 0.473 | 0.726 | 0.617 | 0.618 | 0.650 | 0.843 |

Next, we checked the convergent and discriminant validity of our measures. The loading values of all items are greater than 0.7, along with high CR and AVE, indicating the convergent validity of our measures, as shown in 〈Table 2〉. The square root of AVE is greater than its correlation coefficients with all other constructs, as shown in 〈Table 3〉, suggesting the discriminant validity of our measures (Fornell and Larcker, 1981).

Lastly, we checked the possibility of the common method bias (Chin, 1998). We used Harman's single-factor method to assess the common method bias (Lindell and Whitney, 2001). The result shows that the total variance for a single factor is 38.7%, below 40%. Therefore, the common method bias was not a significant threat to this study.

## 3. Structural Model Assessment

〈Table 4〉 summarizes the results of our structural model. 〈Table 5〉 illustrates the test results of our hypotheses. All hypotheses are supported except for H5b.

**Table 4.** Structural Model Test

| | Standardized Coefficients | Standard Error | t-value | p-value |
|---|---|---|---|---|
| PP -> IP | 0.205 | 0.081 | 2.528 | 0.012 |
| PSR -> IP | 0.475 | 0.070 | 6.783 | < .001 |
| PP -> PSR | 0.576 | 0.059 | 9.805 | < .001 |
| VB -> PP | 0.144 | 0.069 | 2.080 | 0.038 |
| VB -> PSR | 0.232 | 0.080 | 2.901 | 0.004 |
| TI -> PP | 0.273 | 0.076 | 3.610 | < .001 |
| TI -> PSR | 0.041 | 0.063 | 0.661 | 0.078 |
| RI -> PP | 0.459 | 0.060 | 7.616 | < .001 |
| RI -> PSR | 0.329 | 0.061 | 5.597 | 0.004 |

Perceived presence may cultivate customers' impulse purchases. Para-social relationships perceived by customers may also promote their impulse purchases. Both para-social and perceived presence plays an intermediary role in stimulating impulse purchases in live-streaming e-commerce. Para-social relationships develop the perceived presence of customers.

**Table 5.** Hypothesis Test Result

| Hypothesis | Result |
|---|---|
| H1: Enhanced perceived presence in e-commerce live streaming encourages impulse purchases. | Supported |
| H2: Enhanced perceived presence in e-commerce live streaming develops audiences' para-social relationships with streamers. | Supported |
| H3: The para-social relationship in live-streaming e-commerce promotes impulse purchases. | Supported |
| H4a: The visibility in live streaming e-commerce develops perceived presence. | Supported |
| H4b: The visibility in live streaming e-commerce cultivates para-social relationships for audiences. | Supported |
| H5a: Task-oriented interactions in live streaming e-commerce develop the perceived presence. | Supported |
| H5b: Task-oriented interactions in live-streaming e-commerce cultivate the para-social relationship. | Not Supported |
| H6a: Relationship-oriented interactions in live streaming e-commerce develop the perceived presence. | Supported |
| H6b: Relationship-oriented interaction of e-commerce live streaming cultivates the para-social relationship perceived by customers. | Supported |

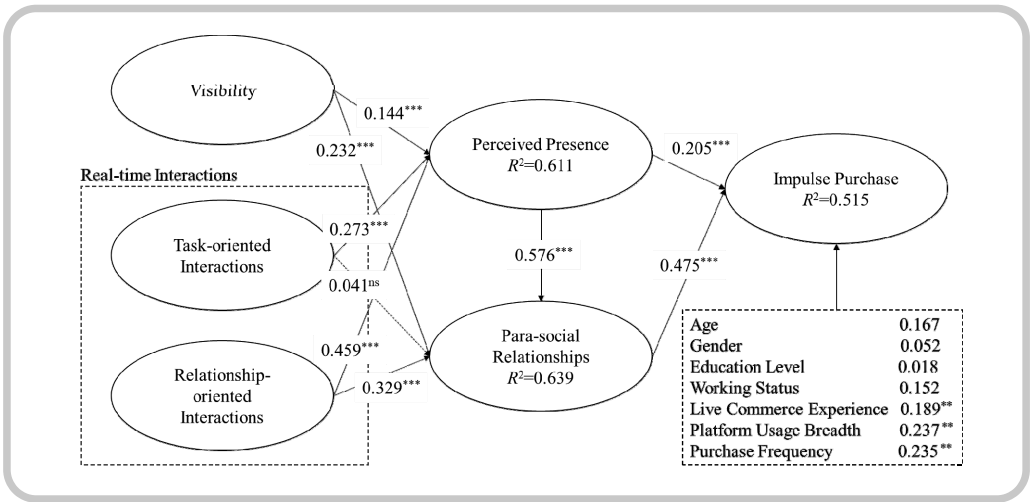
The visibility of e-commerce live broadcasting may enhance customers' perceived presence and para-social relationships. The visibility feature in live streaming supports customers to observe the use of products and interact with sellers, thus improving the perceived presence and para-social relationships.

Relationship-oriented interactions may heighten perceived presence and para-social relationships. Such interactions reduce the psychological distance between streamers and viewers, creating an interactive and more familiar atmosphere for viewers. Task-oriented interactions may also cultivate perceived presence but do not affect para-social relationships. Task-oriented interactions aim to introduce the functional aspects of products and highlight their utilities. As such, task-oriented interactions focus on the delivery of product information, leaving out para-social relationships.

One notable result is that the positive effects of relationship-oriented interactions on the perceived presence and para-social relationships are greater than task-oriented interactions. The standardized path coefficient from relationship-oriented interactions to perceived presence is significantly larger than the coefficient from task-oriented interactions to perceived presence ($t$ = -1.92). Also, the standardized path coefficient from relationship-oriented interactions to para-social relationships is significantly larger than the coefficient from task-oriented interactions to para-social relationships ($t$ = -3.29). Relationship-oriented interactions are more helpful than task-oriented interactions in increasing perceived presence and para-social relationships.

Among the control variables, live streaming experience, platform usage breadth, and the frequency of live streaming shopping positively affect impulse buying behavior.

**Fig. 2.** Structural Model Results




*p < 0.05, **p < 0.01, ***p < 0.001, ns: insignificant at the 0.05 level

## V. Discussion and Conclusion

The live-streaming channel has become a significant conduit for e-commerce. The new channel overcomes several limits of traditional e-commerce channels with vivid real-time interactions between sellers and buyers.

This paper studies how visibility and interactivity in live-streaming e-commerce play a role in customers' impulse purchases. We developed hypotheses and showed empirical evidence supporting them. Heightened visibility and relationship-oriented interactions in live-streaming e-commerce promote perceived presence and para-social relationships, encouraging impulse purchases. Task-oriented relationships also generate perceived presence but do not affect para-social relationships.

This study contributes to the research stream on consumers' impulsive purchases. Little is known about how and why viewers make impulse purchases in live-streaming e-commerce. Live streaming e-commerce supports vivid real-time interactions between sellers and buyers, developing para-social relationships and perceived presence. Para-social relationships and perceived presence may increase the chance of impulse purchases. At the same time, this study also shows the difference between relationship-oriented and task-oriented interactions in cultivating customers' perceived presence and para-social relationships in live streaming.

This paper also has significant practical implications. Our results indicate that live streamers or sellers should enhance visibility and interactivity to promote impulse purchases and increase sales. They may actively deliver body language and speeches during a live broadcast for para-social relationships and perceived presence. A comfortable and social shopping environment can promote customers' impulse purchases.

We conclude by articulating several limitations. First, while we focus on those who made

recent purchases on the live streaming platform, our survey was mainly based on the respondent's recall and may have a recall bias. However, consumers may not be able to recognize their purchases as impulse ones at the point of sale. As such, studies investigating impulse purchases might be somewhat inevitably subject to such a recall bias. Second, we focused on products with relatively low unit prices (food and cosmetics), and our results might not be generalizable to luxury products. Lastly, we obtained our sample from China, where relationship-oriented interactions are culturally critical. Consumers from individualism-oriented cultures may appreciate task-oriented interactions relatively more. Replicating our study with consumers from various cultures may provide interesting insights for international business.

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**Appendix.** Measurement Items

| Construct | Question | Reference |
|---|---|---|
| Visibility | VA1: Live streaming e-commerce provided detailed visible information about the products. | Dong and Wang (2018) |
| | VA2: Live streaming e-commerce made product attributes and characteristics visible. | |
| | VA3: Live streaming e-commerce did not visibly demonstrate product usage. (reverse coded) | |
| | VA4: Live streaming e-commerce helped me understand product usage visibly. | |
| | VA5: Live streaming e-commerce visualized products as if they were in the physical space. | |
| Task-oriented Interaction | TI1: Streamers provided information for making transactions. | Homburg et al. (2011) |
| | TI2: Streamers recommended suitable products fitted to the consumers' needs. | |
| | TI3: Streamers quickly and enthusiastically dealt with consumer complaints or questions. | |
| | TI4: Streamers explained the appearance and effects of the product. | |
| | TI5: Streamers actively promoted products. | |
| Relationship-oriented Interaction | RI1: Streamers discussed their hobbies with consumers during the live broadcast. | Homburg et al. (2011) |
| | RI2: Streamers told consumers personal information and talked about their daily lives. | |
| | RI3: Streamers talked about some other topics than products or transactions. | |
| | RI4: Streamers joked and were friendly with everyone. | |
| | RI5: Streamers brought up the topics in which the audience may be interested other than products or transactions. | |

| | | |
|---|---|---|
| Perceived Presence | PP1: I felt as if I was in an offline shopping environment instead of watching online live streaming. | Ou et al. (2014), Sun et al. (2019) |
| | PP2: I felt that I was immersed in the environment created by the streamer. | |
| | PP3: I felt I was more in the "real world" than the "computer world." | |
| | PP4: There was a sense of human contact in live streaming shopping. | |
| | PP5: I felt I was having face-to-face offline communication with the streamer. | |
| Para-social Relationship | PSR1: I felt I was familiar with the streamer. | Thorson and Rodgers (2006), Chen and Lin (2018) |
| | PSR2: I felt I had a common point with the streamer. | |
| | PSR3: I felt I knew the streamer well. | |
| | PSR4: I felt the streamer was like my friend. | |
| | PSR5: I felt I wanted to support the streamer. | |
| Impulse Purchase | IP1: I couldn't help but want to buy the commodities recommended by the streamer, even if they were not originally part of the purchase plan. | Rook and Fisher (1995), Chang (2014) |
| | IP2: I found myself buying more products than I had planned. | |
| | IP3: I was surprised that I had bought so many things. | |
| | IP4: My buying was impulsive. | |