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# MODERATED MEDIATION OF THE LINK BETWEEN LIVE STREAMING INFORMATION CONTENT AND IMPULSE PURCHASE: THE ROLE OF PSYCHOLOGICAL DISTANCE AND STREAMER ADMIRATION

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## Abstract

*With the boom of mobile Internet and the popularization of smartphones, live streaming platforms have become an important marketing tool for online and physical stores. Based on signal theory and cognitive psychology, this paper discusses how the information content on live streaming platforms influences the impulse purchase of consumers, and how the influence is affected by psychological distance and streamer admiration of consumers. First, several hypotheses were put forward about the mediation role of psychological distance and the moderation role of streamer admiration. Then, the research data were collected through a questionnaire survey among the audience of live streaming platforms, and were analyzed through hierarchical regression to test the hypotheses. The results show that the information content of live streaming platforms has a significant positive impact on the impulse purchase of consumers; this impact is mediated by the psychological distance; the relationship between information content and psychological distance is moderated by streamer admiration. The research results provide new insights into the marketing effect of live streaming platforms and live streamers.*

**Key words:** Information Content, Psychological Distance, Impulse Purchase, Streamer Admiration.

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## INTRODUCTION

Social media is a set of Internet-based applications based on the ideas and technologies of Web 2.0 that allows the content to be created and exchanged among users (Cai & Wohn, 2019), which can provide a platform for social interaction to promote online shopping. As a new way of social media, live streaming has

developed rapidly since 2011 (Twitch, 2017). According to the 42nd Statistical Report on the Development of the Internet by the China Internet Information Center (CNNIC), as of December 2018, the number of live streaming users in mainland China had reached 397 million, and the corresponding market shares exceeded 30 billion yuan. Specifically, as live streaming carriers, live streaming platforms, such as YouTube Live, Twitch, and Periscope, consist of a streamer, a scene and substance, and public audio and video content, which draw the audience's attention through real-time games, special events, and behind-the-scenes tours (Todd & Melancon, 2018). More recently, researchers have realized the significance of live

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streaming for business development (Hilvert-Bruce, Neill, Sjöblom et al., 2018; Liem, Hwang, Nikoukar et al., 2018), for example, it can trigger different user activity patterns and identify the influences of the users' factors (Li, Zhang, Xu et al., 2018), and so on.

Admittedly, understanding customer behavior in a social-commerce environment has become a crucial competitive advantage for companies (Busalim, Hussin, & Iahad, 2019). For a long time, impulse purchase, which is a decision-making style featured by the immediate, continuous, strong, compelling, and spontaneous desire to purchase products, has attracted wide attention (Goldenson, 1984; Rook & Fisher, 1995; Wolman, 1973; Parboteeah, 2009). In particular, in the e-commerce environment, the factors promoting impulse purchase have attracted great interest (Chen, 2018). Previous studies have shown that external environmental factors influence the emotional states of the consumer (Verhagen & Van Dolen, 2011; Liu, Li, & Hu, 2013). Psychological distance refers to the subjective distance between the self and external things within the psychological scope of an actor, which can unify different dimensions of distance into the same psychological space (Kim, 2008; Thomas & Tsai, 2012). After continuous improvement by many scholars, psychological distance has developed from a single time dimension into multiple dimensions including time distance, space distance, social distance, and uncertainty (Trope & Liberman, 2010), and it is widely used to explain consumers' value evaluation and behavior choices. In addition, values and ideological systems with specific cultural backgrounds usually influence consumer behavior, regulate the relationship between emotional appeal and audience attractiveness, dominate people's attitudes, and influence people's behaviors (Han & Ling, 2016). Admiration is generally considered to be a uniquely human emotion (Haidt & Seder, 2009) of respect for someone or something deemed worthy of praise or excellence (Becker & Luthar, 2007; Immordino-Yang, McColl, Damasio et al., 2009; Schindler, 2013), and it is also considered to be involved in positive behavior among social groups (Cuddy, 2007; Onu, 2015). In recent years, scholars have gradually introduced the concept of admiration from the field of psychology to management. Meanwhile, in the process of watching live streaming, consumers

have a sense of streamer admiration.

More recently, live streaming has become a topic that warrants further study. Previous studies have mainly focused on the technical issues of live streaming media systems (Wang, Chen, Wang et al., 2018); others have focused on user-generated content, streaming media motivation, and audience motivation (Zhang, Xiang, & Hao, 2019; Yu, Jung, Kim et al., 2018); and some have focused on regulating governance and copyright protection (Wong, 2015). Despite its importance, consumer behavior in live streaming has largely been ignored, and no previous studies have used an integrated conceptual framework to demonstrate the processing mechanism by which impulse purchase is influenced by information content in a live streaming context. Against this backdrop, the fundamental questions addressed in this research were as follows: Do consumers have purchase impulsive after being exposed to live streaming? How can the information content presented in a live streaming scenario impact impulse purchase? Hence, this paper presents a particular analysis about the direct role of information content on impulse purchase, the mediating and moderating role of streamer admiration and psychological distance in enhancing the streaming effect under the live streaming context.

The rest of this paper is organized as follows: Section 2 introduces the theoretical background and hypothesis development. Section 3 introduces the methodology and also presents an analysis of the empirical results. Section 4 presents our conclusions, the limitations of this study, and directions for future studies.

## METHODS

### Information content and impulse purchase

The content display provides services and designs to demonstrate how to present content in a customer-attractive way (Huizingh, 2000). Similar to e-stores, the live streaming platform includes all communication materials and information content available on the interface (Montoya-Weiss, Voss, & Grewal, 2003, Cai & Wohn, 2019). Specifically, this contains product features, price incentives, return policies, contact information, and more (Floh & Madlberger, 2013). The higher the quality the information content is, the greater the

stimulation will be to consumers and the more obvious the impulsive purchasing behavior of consumers will be. The proposed correlation between customers' impulse purchase and information content in e-stores has already been verified by several empirical examples. Song & Zinkhan, (2008) found that consumers had higher controllability, communication, and responsiveness to personalized information based on a study of the interactions between information types and perception. In other words, consumers experience personalized information better. Studies by Chung and Austria, (2012) suggest that attitudes toward product information presented on social media can influence impulse shopping behavior, though they did not clearly distinguish whether the information came from marketers, or consumers, or neither. Online reviews have become an important component of information content that influences consumers' online shopping behaviors (Zhang, Xu, Zhao et al., 2018). Chen et al. (2019) tested the impact of product recommendations on consumer impulse buying in social media based on signaling theory, the results of which demonstrated that impulse buying is influenced by referee-related signals (information quality and similarity) and product-related signals (alternative expression and aesthetic attraction). Although the influences of information content have been verified theoretically, the correlation between impulse purchase and information content has barely been tested empirically. In this paper, we propose that the information content of live streaming platforms can drive consumers' impulse purchase. The following hypothesis is provided:

**Hypotheses H1.** *The more adequate, up-to-date, and timely the information on a live streaming platform is, the higher a platform user's intention to purchase the products/services recommended by the streamer of the platform will be.*

#### **The moderating role of streamer admiration**

Admiration can stimulate people's sense of intimacy and trust (Becker & Luthar, 2007), and emotional commitment to admired objects is enhanced (Buunk & Gibbons, 2007; Vianello, Galliani, & Haidt, 2010). In addition, the awe contained in admiration can encourage further attention and recognition being given to the information being provided (Rudd, Vohs, &

Aaker, 2012; Piff, Dietze, Feinberg et al., 2015). With the development of positive psychology, research on the connotations, formation, and effects of admiration has become increasingly mature and the findings have been applied to marketing and leadership (Chen, Wu, Fang et al., 2011; Onu, 2016). Existing studies on celebrity admiration have shown that admiration is an essential factor in cultivating loyalty among fans and attracting large-scale followers (Pimental & Reynolds, 2004). Fans' fanaticism and obsession with celebrities is largely due to admiration (Wohlfeil & Whelan, 2012), which prompts them to buy celebrity endorsed products (Aureliano-Silva, Lopes, Bandeira et al., 2015). In this case, television media controls the rhythm of information transmission.

In contrast, members of the audience are more like passive receivers. The audience's attention will unconsciously shift from the message itself to the persuader, prompting them to focus on external clues such as the charm of the streamer (Chaiken & Eagly, 1983). As the content creator of the live streaming platform, the streamer can upload real-time video and audio content, such as video games, talent performances, and snapshots of daily life, to meet the diverse needs of the users. Live streaming platforms allow flat, equal, and real-time communication between users and hosts and among users themselves. This narrows the distance between the platform and individuals as well among various individuals. In this paper, we argue that high-admiration individuals are more easily influenced by the information content of a live streaming platform, which then shortens the psychological distance between the streamer and platform. The following hypothesis is therefore proposed:

**Hypothesis H2.** *Streamer admiration moderates the impact of information content on psychological distance in a positive way. That is to say, when consumers have a higher sense of admiration for the streamer, the information delivered by the live streaming platform will shorten the psychological distance between the platform, streamer, and consumer.*

#### **The mediating role of psychological distance**

(1) Information content and psychological distance

Signaling theory is often used to explain the situation of asymmetric information, that is, when both parties (such as the seller and the

buyer) have access to different information (Spence, 1973; Connelly, Certo, Ireland et al., 2011; Shen, 2015). Chen et al. (2019) validated the mechanism of product recommendation on impulse buying based on signaling theory. According to this theory, a signal is a message sent by one side to the other to achieve the desired result (Mavlanova, Benbunan-Fich, & Lang, 2016). As the sender of the signal, the live streaming platform transmits the information content to the audience through the screen, which shortens the psychological distance between the platform, the streamer, and the consumers. Elder et al. (2017) examined an unexplored difference in imagery: the psychological distance across the five sensory modalities. They found that imagined sensory experiences operate from a self-centered reference point and affect distance judgment. Indeed, psychological distance has a strong correlation with a plethora of factors, taking product message framing as an example (Mogilner, Aaker, & Pennington, 2008). Although the influences of information content have been verified theoretically, the correlation between psychological distance and information content has hardly been tested. In this paper, we argue that the provision of better information content may affect the consumers' intimacy with the platform and streamer, thus closing the consumers' psychological distance to the platform and streamer, and reducing the psychological distance. We, therefore, propose the following hypothesis:

**Hypothesis H3.** *The more adequate, up-to-date, and timely the information on a live streaming platform is, the closer the psychological distance between the platform, streamer, and consumer is.*

(2) Psychological distance and impulse purchase

Changes in the online psychological distance reflect changes in the consumers' perceptual perceptions, which will affect their subjective perceptions of commodities and value utility evaluation. In particular, in the context of consumers, due to the correlation between the psychological distance (social and temporal distance) and consumer behavior, research has usually focused on psychological distance (Kim, Zhang & Li, 2008; Zhao & Xie, 2011; Chung & Park, 2017). Huang et al. (2004) argued that the emotions and perceptions of customers about shopping often affect their responses and

evaluation of their consumption in the e-commerce era. When consumers have a high psychological distance from online retailers, they show concrete actions (Martin, 2012; Zhou & Jia, 2017) and may have reduced responses to strong stimuli (McGraw, Warren, Williams et al., 2012; Theodorakis, 2018). According to Aspara et al. (2015), the smaller the information distance is, the more likely it is that consumers will buy the product or service being advertised. Using two experiments, Chung and Park (2017) studied the influence of psychological distance on the consumers' evaluation of enterprises and their products when the enterprise's behaviors on social media were contradictory mediators of morality or ability. Furthermore, psychological distance provides a more extensive channel for consumer behavior, which can promote the purchasing impulse of customers under the live streaming scene. The following hypothesis is formulated correspondingly:

**Hypothesis H4.** *The closer the psychological distance between the platform, streamer, and consumer, the higher the platform consumer's intention to purchase the products/services recommended by the streamer of the platform is.*

In addition, cognitive psychology holds that people can build their cognitive perceptions and provide behavioral feedback by acquiring and processing information. In general, besides looking directly at the content of the opinion, consumers form purchasing intention through the processing of psychological information or subjective evaluation. Fiedler (2007) believes that psychological distance can help consumers organize and analyze information. If consumers have more product information, the smaller the psychological distance is, and the greater the possibility of consumers buying and even impulsive buying will be. Thus, the psychological distance can promote the diffusion of information content among consumers and increase the streaming scale effect on impulse purchase. Therefore, the following hypothesis is formulated:

**Hypothesis H5.** *Mediating effects of psychological distance exist between the information content and impulse purchase. That is to say, the more adequate, up-to-date, and timely the information on a live streaming platform is, the closer the psychological distance between the platform, streamer, and consumer is and thus the higher the consumer's intention to purchase the products/services recommended*

by the streamer of the platform will be.

A mediation model based on hypotheses 1-5 was proposed to test the relationship between information content and impulse purchase. As shown in Figure 1, the model incorporates psychological distance as a mediator and streamer admiration as a moderator.

**METHODS**

**Samples and Data**

Data collection was carried out to test the study hypotheses. A questionnaire was designed to examine the influence of information contained in a live-streaming on the impulse purchase of consumers as well as the mediating and moderating roles of psychological distance and streamer admiration in the link between information content and impulse purchase. In

order to ensure the quality of the questionnaire, the mature foreign language scale was used in the back-translation test to ensure standardization and accuracy of the expression in the development and design of the items.

The questionnaire design included anonymous items, writing and filling out instructions, and completion only by individuals with experience in the consumption of live streaming platforms (including game live value-added services and virtual props purchase, star reality show gifts and electronic shopping, professional live streaming pay-for-view, entertainment live streaming member commission payments, etc.). The contents of the questionnaire were available for academic use only. Considering that young people, especially college students, are the main audiences of live streaming platforms, this study chose college students as the primary sample.

Figure 1. Conceptual model

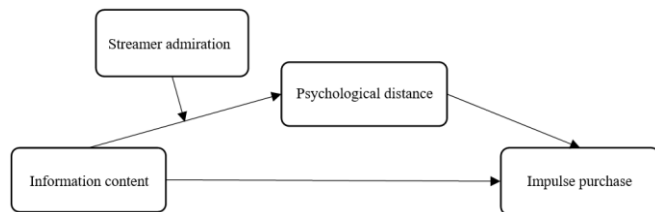


Table 1. Sample demographics (N=681)

Control variable	Specific options	Frequency	Percentage
Gender	Male	245	36.0
	Female	436	64.0
Age	Under 20 years old	222	32.6
	21 to 25 years old	319	46.8
	26 to 30 years old	106	15.6
	Over 30 years old	34	5.0
Marital status (MS)	Unmarried	585	85.9
	Married	96	14.1
Education level (EL)	Primary school and below	3	0.4
	Junior middle school	12	1.8
	Senior High School/Technical Secondary School	48	7.0
	Junior College	65	9.5
	Undergraduate college	407	59.8
Monthly income level (MIL)	Master and above	146	21.4
	No income	310	45.5
	Less than 500 yuan	38	5.6
	501-1000 yuan	43	6.3
	1001-1500 yuan	47	6.9
	1501-2000 yuan	28	4.1
	2001-3000 yuan	49	7.2
	3001-5000 yuan	65	9.5
	5001-10000 yuan	74	10.9
	10001-20000 yuan	20	2.9
More than 20,000 yuan	7	1.0	

First, a pre-survey was conducted to revise and adjust the research items. A questionnaire was distributed to 100 undergraduates and postgraduates, and a random cash red envelope was obtained by the participants when the questionnaire had been completed. Specifically, the people who completed the questionnaire received an envelope with a 1/3 probability of getting a certain amount of money. Then, we used the "Questionnaire Star" platform to collect a larger sample of participants by sharing links through the micro-messaging groups and friend circles of the members of the research group, and pushing through the social circle of "online celebrity". After the elimination of those without basic individual information and the questionnaire was filled out within 100 seconds, 681 valid questionnaires were found. The composition and distribution of valid samples are shown in Table 1

#### Variable Measurement

To guarantee the validity and reliability of the data, the authors used the maturity scale of related research. A five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (totally agree) was used to line up the answers to various statements in the survey. The items were tested for homogeneity, and items with correlation coefficient scores of less than 0.4 and those with a p-value of less than 0.05 were excluded. A reality test was then conducted on the scale. A score of  $\alpha = 0.875$  was score, which is higher than 0.8; therefore, the internal consistency of the items was assumed to be ideal for the research. A principal factor analysis was also conducted that excluded items with a factor loading value of smaller than 0.45 or items with extraction values smaller than 0.2.

The value of the KMO (Kaiser–Meyer–Olkin) test was 0.892, which, according to Kim and Mueller, (1978), is sufficient for this type of study. The Bartlett sphericity test was also conducted, the value of which was 7798.407 with 136 degrees of freedom. Given this, it can be assumed that there was a significant effect. An MSA (measurement system analysis) was conducted on the diagonal data of the anti-image correlation coefficient matrix, and the score was greater than 0.5, suggesting that there are common factors among the coefficients that satisfy the standards of the factor analysis. As Table 2 suggests, the major coefficients such as impulse purchase, information content,

streamer admiration, and psychological distance were extracted via exploratory factors.

Table 2. Rotating component matrix

	1	2	3	4
IC1	-0.012	0.266	<b>0.810</b>	0.177
IC2	-0.049	0.214	<b>0.867</b>	0.185
IC3	-0.058	0.242	<b>0.842</b>	0.203
SA1	<b>0.815</b>	0.015	0.022	0.097
SA2	<b>0.783</b>	-0.065	0.085	0.086
SA3	<b>0.830</b>	0.022	-0.047	0.038
SA4	<b>0.852</b>	0.042	-0.041	-0.014
SA5	<b>0.798</b>	0.166	-0.025	0.000
SA6	<b>0.873</b>	0.071	-0.046	0.020
SA7	<b>0.869</b>	0.096	-0.071	0.023
PD1	0.037	0.229	0.190	<b>0.835</b>
PD2	0.046	0.301	0.189	<b>0.807</b>
PD3	0.103	0.276	0.200	<b>0.809</b>
IP1	0.076	<b>0.781</b>	0.220	0.285
IP2	0.082	<b>0.857</b>	0.173	0.207
IP3	0.061	<b>0.844</b>	0.216	0.171
BI4	0.058	<b>0.792</b>	0.209	0.229

Furthermore, the single factor test method promoted by Harman was applied to test the common method bias of the data and hence guarantee the data quality. With no further rotation, 33.694% could be explained by the first factor. It can be seen from the results that no in the analysis could account for the majority of the variables, suggesting that the common method bias was low.

#### Information content (IC)

This study used a 3 item measurement of boundary-spanning, as suggested by Floh and Madlberger, (2013). The items included "The information of the live streaming platform can meet my needs", "Adequate product/service information is available on the live streaming platform", and "The information on the live streaming platform is up-to-date and timely". The three indices recorded a Cronbach's alpha value of 0.876.

#### Psychological distance (PD)

This study adopted the 3 item measurement of psychological distance designed by Gunia, Sivanathan, and Galinsky, (2009), Miller et al. (1998), and Galinsky et al. (2005). The items included "The live streaming platform closes the distance among individuals", "I am closer to the heart of the live platform", and "Reduces the strangeness with the platform." The three indices recorded a Cronbach's alpha value of 0.861.

### Streamer admiration (SA)

This study used a 7 item measurement of streamer admiration proposed by Algoe & Haidt, (2009), Sarapin et al. (2015). The items included "I appreciate the streamer of this platform", "I respect the streamer of this platform", "Some of the stories of the platform's streamers are amazing", "Some of the deeds of the streamer of the platform are moving", "I'm proud to talk to others about the streamer of the platform", "Some of the stories of the platform's streamers are encouraging", and "Some of the deeds of the platform's streamers are awesome". The seven indices recorded a Cronbach's alpha value of 0.927, which shows a high degree of internal consistency reliability.

### Impulse purchase (IP)

This study applied a 4 item measurement of impulse purchase designed by Beatty & Ferrell, (1998). The items included "When I saw the streamer live, I wanted to have the product or send gifts to them immediately", "When I saw the streamer live, I had a strong desire to buy the products/services recommended by the streamer of the platform", "When I saw the product (service) recommended by the streamer live streaming, I thought it was what I wanted", and "I saw a lot of things that I hadn't planned to buy before, but I wanted to buy or send gifts when I saw the live recommendation of the streamer". The four indices recorded a Cronbach's value of 0.900, which shows a high degree of internal consistency reliability.

### Controls

The control variables included several individual demographics to minimize systematic variance, not because of the variables of interest (Koch & McGrath, 1996), but to promote the

internal validity of our research. Through the overview of previous studies, it has been found that differences in gender, age, marital status, education, and monthly income levels have significant impacts on the individual's impulsive purchase intentions. Therefore, in this study, these factors were used as control variables.

## RESULTS

### Reliability and Validity

The consistency and stability of the measurement outcomes were tested by analyzing their reliability. Table 3 gives the descriptive statistical results and correlation coefficient values of each variable, which are presented as means and standard deviations (SD). It can be seen that the lowest value of composite reliability (CR) for each variable was 0.861, which is ideal. Meanwhile, the average variance extracted (AVE) was used to test the convergence validity of the variables. From the calculation results in Table 3, we can see that the AVE value of each variable was greater than 0.5. Therefore, it was assumed that the internal quality of the model was ideal. Moreover, the square root of each variable's AVE value was higher than the correlation coefficients between them, which shows that each variable had good discriminatory validity. In addition, the validation factor analysis of variables by AMOS 21.0 showed that the fitted indexes of the model met the required standards ( $\chi^2/df = 3.445$ , RMSEA = 0.060, GFI = 0.941, NFI = 0.951, IFI = 0.964, TLI = 0.957, CFI = 0.964), indicating that the model was well adapted.

### Regression Analysis

The hierarchical regression analysis was adopted in this study, as shown in Table 4. First, according

Table 3. Descriptive statistics and correlation coefficients

Variables	Mean	SD	1	2	3	4
Information content	2.978	0.891	<b>0.840</b>			
Streamer admiration	3.367	0.800	-0.039	<b>0.804</b>		
Psychological distance	2.955	0.862	0.479**	0.123**	<b>0.821</b>	
Impulse purchase	2.512	0.920	0.516**	0.142**	0.572**	<b>0.834</b>
AVE			0.706	0.647	0.674	0.695
CR			0.878	0.927	0.861	0.901

Note:  $n = 681$ ; \*\*  $p < 0.01$ . The AVE square root of the corresponding variable is the diagonal data, and the square root should be larger than the absolute value of the correlation coefficient, indicating that the variables have discriminatory validity.

Table 4. Hypothetical test and regression analysis

Variables	Psychological distance (M1→M4)				Impulse purchase (M5→M8)				
	M1	M2	M3	M4	M5	M6	M7	M8	
Gender	2.368* (0.092)	2.599** (0.089)	2.450** (0.083)	2.609*** (0.079)	1.518 (0.059)	1.662 (0.056)	0.204 (0.007)	0.600 (0.018)	
Age	0.498 (0.026)	0.624 (0.029)	0.566 (0.026)	1.484 (0.060)	0.022 (0.001)	0.089 (0.004)	-0.318 (-0.014)	-0.198 (-0.008)	
Control Variables	Ms	1.178 (0.059)	1.568 (0.068)	1.430 (0.062)	2.002* (0.077)	-0.147 (-0.007)	0.078 (0.003)	-0.994 (-0.041)	-0.658 (-0.026)
	EI	-1.397 (-0.058)	-2.598** (-0.095)	- (-0.116)	-2.433* (-0.079)	0.357 (0.015)	-0.697 (-0.025)	1.400 (0.048)	0.463 (0.015)
Independent Variable	Mil	2.801** (0.131)	1.633 (0.067)	0.981 (0.040)	1.309 (0.048)	1.519 (0.071)	0.071 (0.003)	-0.094 (-0.004)	-0.697 (-0.026)
	IC		14.168*** (0.480)	14.658** (0.491)	13.027*** (0.400)		15.559*** (0.519)		9.198*** (0.316)
Moderating Variables	SA			4.442*** (0.151)	6.541*** (0.200)				
Mediating Variables	PD						18.009*** (0.574)	12.354** (0.423)	
Interaction	IC×SA			0.239*** (0.404)					
Model Summary	R <sup>2</sup>	0.022	0.246	0.268	0.417	0.008	0.270	0.330	0.405
	F	2.984*	36.680***	35.132** *	60.018***	1.050	41.537***	55.349***	65.413** *
Model Summary	ΔR <sup>2</sup>	0.022	0.225	0.021	0.149	0.008	0.270	0.322	0.075
	ΔF	2.984*	200.742** *	19.729** *	171.803** *	1.050	242.097** *	324.331** *	84.607** *
	MAX (VIF)	1.886	1.886	1.886	1.894	1.886	1.886	1.886	1.887

Note: n = 681; \*\*\* p < 0.001, \*\* p < 0.01, \* p < 0.05; standardized beta coefficient is in parentheses. 4.3. Hypothesis Test

to the research problems and features of the sample data, all control variable items were virtualized. Second, to prevent the multicollinearity of interaction terms and independent variables as well as moderating variables, all variables were processed through the concentration of the mediating effect test. Third, the variance inflation factor (VIF) of each regression equation was also tested. The results indicate that the VIF of each equation was smaller than 2, suggesting that the sample data had low multicollinearity.

First, hypothesis 1 predicts that the information content exerts a positive impact over consumers' impulse purchase. The results show that for M6 in Table 4, the information content has a significant positive impact (t = 15.559\*\*\*, β = 0.519) on impulse purchase. Therefore, it can be assumed that hypothesis 1 is verified.

Second, hypothesis 2 suggests that the information content exerts a positive influence on psychological distance. It promotes that impulse purchase can be positively influenced by the information content. According to Table 4, in model M2, the psychological distance is positively influenced by the information content (t = 14.168\*\*, β = 0.480), and in model M7, the impulse purchase is positively impacted by the psychological distance (t = 18.009\*\*\*, β = 0.574). Therefore, hypotheses 2 and 3 are verified. Third, the impulse purchase is significantly positively impacted by the psychological distance (t = 12.354\*\*\*, β = 0.423) and information content (t = 9.198\*\*\*, β = 0.316) of M8. Thus, there is a mediating effect of the psychological distance on the impulse purchase and information content.

Finally, after a hierarchical regression analysis of streamer admiration, interactions, and the



**Table 5. Bootstrap moderation analysis**

		Coeff	SE	T	LLCI	ULCI	Summary	Outcome
M4	Gender	0.141	0.054	2.609**	0.035	0.247		
	Age	0.011	0.007	1.484	-0.003	0.025		
	Ms	0.191	0.095	2.002*	0.004	0.378	R = 0.646	
	El	-0.076	0.031	-2.433*	-0.137	-0.015	R2 = 0.417	
	Mil	0.014	0.011	1.309	-0.007	0.036	F = 60.018	PD
	IC	-0.387	0.030	13.027***	0.329	0.446	p < 0.001	
	SA	0.215	0.033	6.541***	0.151	0.280		
	IC×SA	0.336	0.026	13.107***	0.285	0.386		
$\Delta R^2 = 0.149, F = 171.803, p < 0.001$								

Note: n = 681; LLCI, lower limit confidence interval; ULCI, Upper limit confidence interval; \*\*\* p < 0.001, \*\* p < 0.01, \* p < 0.05.

psychological distance from information content, M3 and M4 were both shown to be significant. Meanwhile, there was an improvement in R2 based on the original model. Thus, the relationship between psychological distance and information content is moderated by streamer admiration.

**Moderation Analysis**

A hierarchical regression analysis was used to prove the moderating effects of streamer admiration on the psychological distance and information content. The relationships among the variables are demonstrated in the test results in Table 4 (M2, M3, and M4). The interactions between information content and streamer admiration in centralization were processed using SPSS PROCESS Model 1. The bootstrap equaled 5000 while the confidence interval was 95%. The results of the moderation analysis are presented in Tables 5 and 6.

**Table 6. Conditional effects of X on Y at values of moderators**

SA	Effect	SE	T	LLCI	ULCI
-0.800	0.119	0.040	2.995**	0.041	0.197
0.000	0.387	0.030	13.027***	0.329	0.446
0.800	0.656	0.032	20.449***	0.593	0.719

Note: n = 681; \*\*\* p < 0.001.

The interaction coefficients of psychological distance and streamer admiration are presented in Table 4 (M4) and Table 5 (M5). These coefficients were obtained to demonstrate the moderating role of streamer admiration on the relationship between the psychological distance and information content. The coefficients were

as follows: 13.107 (p < 0.001), the region value of interactions (0.285, 0.386) does not contain 0, and  $\Delta R2 = 0.149, p < 0.001$ . These coefficients indicate the presence of a moderating effect. Our results suggest that streamer admiration can fully moderate the effects of psychological distance and information content. Table 6 demonstrates the interval values of streamer admiration at various levels: low (0.041, 0.197), medium (0.329, 0.446), and high (0.593, 0.719). A critical analysis of the table indicates that there were no 0 values. A graph of the moderating effect of streamer admiration on the psychological distance and information content was drawn using the standard deviations of the means  $\pm 1$  (Figure 2) and the mean values. The results reveal positive moderating effects of streamer admiration on psychological distance and information content at low, medium, and high levels. Thus, hypothesis 5 is verified.

**Figure 2. Graph/scatterplot = IC with PD by SA. \* Estimates are based on setting covariates to their sample means**

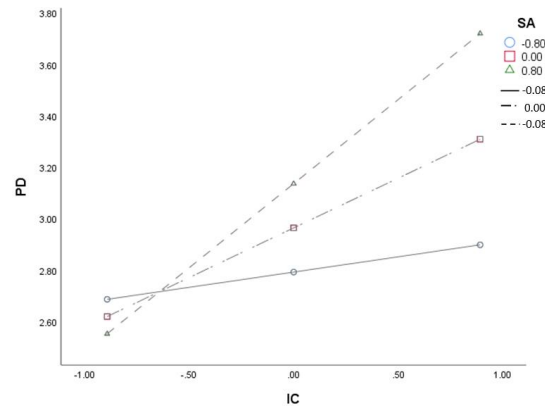


Table 7. Bootstrap mediator analysis

		Coeff	SE	T	LLCI	ULCI	Summary	Outcome
M2	Gender	0.159	0.061	2.599	0.039	0.280		PD
	Age	0.005	0.008	0.624**	-0.011	0.021	R = 0.490	
	Ms	0.170	0.108	1.568	-0.043	0.382	R2 = 0.246	
	EI	-0.091	0.035	-2.598**	-0.159	-0.022	F = 36.680	
	Mil	0.020	0.012	1.633	-0.004	0.044	p < 0.001	
M4	IC	0.465	0.033	14.168***	0.400	0.529		BI
	Gender	0.107	0.064	1.662	-0.019	0.234		
	Age	0.001	0.009	0.089	-0.016	0.018	R = 0.520	
	Ms	0.009	0.114	0.078	-0.214	0.232	R2 = 0.270	
	EI	-0.026	0.037	-0.697	-0.098	0.046	F = 41.537	
M5	Mil	0.001	0.013	0.071	-0.025	0.026	p < 0.001	BI
	IC	0.536	0.034	15.559***	0.468	0.603		
	Gender	0.035	0.059	0.600	-0.080	0.150		
	Age	-0.002	0.008	-0.198	-0.017	0.014	R = 0.636	
	Ms	-0.068	0.103	-0.658	-0.269	0.134	R2 = 0.405	
M5	EI	0.015	0.033	0.463	-0.050	0.081	F = 65.413	BI
	Mil	-0.008	0.012	-0.697	-0.031	0.015	p < 0.001	
	IC	0.326	0.035	9.198***	0.256	0.396		
	PD	0.452	0.037	12.354***	0.380	0.523		

Note:  $n = 681$ ; LLCI, lower limit confidence interval; ULCI, Upper limit confidence interval; \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ .

Table 8. Total, direct, and indirect effects

	Effect	SE	T	LLCI	ULCI
Total	0.536	0.034	15.559***	0.468	0.603
Direct	0.326	0.035	9.198***	0.256	0.396
Indirect: PD	0.210	0.023 (BootSE)		0.164 (BootLLCI)	0.256 (BootULCI)

Note:  $n = 681$ ; \*\*\*  $p < 0.001$ .

### Mediation Analysis

The moderating effect tests were conducted by SPSS PROCESS Model 4. The bootstrap equaled 5000, and the confidence interval was 95%. The mediating effect was analyzed. X refers to the information content, M is the psychological distance, and Y stands for the impulse purchase. Tables 7 and 8 present the test results.

According to the data presented in Table 7, there is a moderating effect of psychological distance between impulse purchase and information content. This further verifies the regression analysis outcomes of Table 4. Table 8 presents the data related to the direct, indirect, and total effects between impulse purchase and information content. Both direct and mediating effects were observed. For both direct, (LLCI = 0.256; ULCI = 0.396) and mediating (BootLLCI = 0.164; BootULCL = 0.256) effects, 0 was not included in the interval and  $p < 0.001$ . Therefore, hypothesis 4 is verified. However, even though mediating effects exist between impulse purchase and information content, the information content has direct effects on

impulse purchase. Thus, the psychological distance has a partial mediating effect.

### Test of Moderated Mediating Effects

Figure 1 shows a theoretical research model, which represents the first stage of moderated mediation. Several important outcomes were demonstrated from this study via mediation analysis, moderation analysis, and regression analysis. First, a relationship between psychological distance and information content was established. Second, the existence of a significant correlation between impulse purchase and psychological distance was verified. Third, streamer admiration was shown to fully moderate the psychological distance and information content. The impulse purchase (Y) was found to be indirectly impacted by the information content (X) via streamer admiration (W), and the psychological distance mainly determines the strength of this indirect influence.

This research presents a comparison of different moderating variables including how the mediating effects are moderated by low,

Table 9. Bootstrap moderated mediation analysis

		Coeff	SE	T	LLCI	ULCI	Summary	Outcome
M8	Gender	0.141	0.054	2.609**	0.035	0.247		
	Age	0.011	0.007	1.484	-0.003	0.025		
	Ms	0.191	0.095	2.002**	0.004	0.378	R = 0.646	
	EI	-0.076	0.031	-2.433*	-0.137	-0.015	R2 = 0.417	PD
	Mil	0.014	0.011	1.309	-0.007	0.036	F = 60.018	
	IC	0.387	0.030	13.027***	0.329	0.446	p < 0.001	
	SA	0.215	0.033	6.541***	0.151	0.280		
	IC×SA	0.336	0.026	13.107***	0.285	0.386		

Note:  $n = 681$ ; \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ .

Table 10. Direct and indirect effects, index of moderated mediation

Direct effect of X on Y	Effect	SE	T	LLCI	ULCI
	<b>0.326</b>	<b>0.035</b>	<b>9.198***</b>	<b>0.256</b>	<b>0.396</b>
Conditional indirect effect(s)	Effect	Boot SE		BootLLCI	BootULCI
of X on Y at values of the	0.076	0.018		0.042	0.112
moderator(s)	0.163	0.019		0.126	0.200
	0.271	0.030		0.212	0.328
INDEX OF MODERATED MEDIATION: PD					
Index = 0.152; SE(Boot) = 0.023; BootLLCI = -0.107; BootULCI = -0.195					

Note:  $n = 681$ ; \*\*\*  $p < 0.001$ .

medium, and high values of streamer admiration. Whether the indirect impact of information content over the impulse purchase changes correspondingly with the streamer admiration's moderating role was also analyzed. The bootstrap was selected to be 5000, while the confidence interval was 95%. The psychological distance's mediating effects were tested via streamer admiration, and the results are presented in Tables 9 and 10.

Variable W determines the values of both direct and indirect mediating effects. Therefore, for the moderating variables, +1 SD and -1 SD are usually selected as the higher and lower values of moderating variables; then, the differences of mediating effects can be examined if the values of the confidence interval of differences do not include 0. A significant moderated mediation effect was observed ( $p < 0.001$ ), as shown in the general model, M8, in Table 9. As illustrated in Table 10, 0 was not included in the low, medium, and high levels of interval values for the moderated mediation effects. Further, 0 was not included in the interval values of the moderated mediating psychological distance (BOOTCLLI = -0.107; BOOTULCI = -0.195). It was concluded that corresponding to the increase of the moderating effects of streamer admiration over the psychological distance and information content,

there would be an increase in the mediating effects of information content over impulse purchase.

## CONCLUSIONS AND IMPLICATIONS

### Discussion

This study investigated the influences of the mechanisms and boundary conditions of the information contained on live streaming platforms on consumers' purchasing impulse based on signal theory and psychological factors. A total of 681 live streaming consumers participated in the survey. The conclusions reached through this study are as follows:

First, the information content of live streaming platforms can help to stimulate consumers' purchasing impulses. This echoes the research conclusions of Floh & Madlberger, (2013) and further expands the practicability of the conclusions from e-commerce to live-streaming commerce. From the perspective of stimulating consumers' purchasing impulses, this conclusively proves that the information content is an effective new method of live streaming marketing.

Secondly, streamer admiration plays a moderating role between information content and psychological distance. This echoes the

conclusion reached by Berndersky & Hays, (2012), which illustrates that status conflict can reduce team performance and further verifies the negative impact of status conflict on team effectiveness from the perspective of behavior. As a kind of love and respect for the excellence of those considered models, positive emotions are generated when seeing the admirable behaviors or qualities of others (Becker & Luthar, 2007; Immordino-Yang, McColl, Damasio et al., 2009).

Third, psychological distance plays an intermediary role between the information content and consumers' purchasing impulse. On one hand, this verifies the positive effect of psychological distance on consumer behavior (Bar-Anan, Liberman, & Trope, 2006; Hardisty & Weber, 2009); on the other hand, it suggests the influencing mechanism of its function. By providing high-quality information content, live streaming platforms can guide consumers by enhancing their sense of admiration for the streamer and shortening their psychological distance from the platform and the streamer, thereby improving the efficiency of live streaming marketing.

#### **Theoretical contribution**

This research has the following theoretical contributions: First, we studied the consumer behavior of live streaming platforms and further broadened the knowledge on the role of signal theory scenarios. Second, we explored the moderating role of streamer admiration in the process of transforming information content into purchasing impulse and clarified the boundary conditions of personal streamer admiration. Only limited attention has been paid to the sense of admiration in the literature, especially in the field of consumer behavior. The role of streamer admiration in the formation of impulse purchase has not been fully clarified either. Third, the information content–psychological distance–impulse purchase mechanism, which opens the “black box” of impulsive buying, was analyzed.

#### **Practical enlightenment**

Based on the conclusions of this study, the following management implications can be drawn. First, live streaming should make full use of its powerful social functions and provide entertaining, interesting, and accurate content to attract the audience's attention. Meanwhile,

it is of great importance to establish the “consumer-centered” concept, subdivide the vertical field of live streaming, accurately dock the psychology and needs of consumers, and provide timely follow-up to the problems and needs of the “live” audience during streaming. These factors will allow consumers to actively enter the sales market of products as well as make the differentiation and aggregation of internet traffic in various fields clearer. Second, the streamer has the roles of “salesman” and “spokesperson” of the live-streaming, so a streamer that matches the brand image should be chosen and their characteristics should be used to carry out live marketing, develop the fans into sticky customers, and actively guide consumer behavior. Finally, the topics mentioned in the live streaming must have a “discussion value”, which can arouse audience resonance, stimulate audience discussion, and deepen the interactions among the platform, streamer, and consumers in the discussion process.

#### **Limitations and Directions for Future Research**

This study inevitably has some limitations. First, the scales used in this paper are all mature Western scales, which is conducive to improving the scientificity of the measurements but may also ignore the impacts of the traditional Chinese cultural context and background. There may be significant differences in the consumption habits between Chinese and Western groups. In the future, it is essential to further develop conceptual measurement tools that are suitable for Chinese management practice situations. Second, although the hypotheses of this study were supported by data and the samples were representative, due to time and cost constraints, this paper adopted a cross-sectional design, which may have led to some limitations in the causality tests of variables. Compared with longitudinal studies, the cross-sectional design has a slight defect in testing the causality and influence mechanisms between variables. Therefore, in the future, longitudinal exploration or causal inference experimental research should be used. Third, the impact of the content of live streaming platforms as a whole on consumers' impulse purchase was discussed in this paper. In the future, we will compare whether different types of live streaming platforms (for example, integrated live

streaming, game live streaming, show live streaming, business live streaming, etc.) can stimulate different types of impulse purchase and whether the internal mechanisms related to these are different.

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