

Boosting e-Commerce Sales with Live Streaming: A Perspective on Live Streamers' Personality Traits

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ABSTRACT

In live streaming e-commerce, streamers employ distinct styles such as humor or fervor to explain products and attract consumers to purchase them. Streamers with different personality traits give viewers a different viewing experience, which in turn affects sales performance. Personality traits play a crucial role in the cultivation and promotion of streamers, as well as in the company's selection process for streamers. However, few studies have examined the effect of streamers' personality traits on live streaming sales performance. Using a dataset from 100 live streaming rooms in a leading Chinese live streaming platform and text mining and econometric methods to analyze streamer speech, we find that: (1) Neuroticism and openness have a positive impact on sales performance; (2) For celebrity streamer, extroversion and agreeableness appear to be more important; (3) The extroversion personality trait of high-following streamers positively affects sales, whereas openness negatively affects sales. This study gives suggestions for streamers to improve their abilities, provides more scientific basis for companies to screen streamers, and lays the foundation for future research.

Keywords: Live streaming e-commerce, streamer personality traits, five factor model, online sales.

INTRODUCTION

In recent years, live streaming e-commerce (LSE) has emerged as a rapidly developing business model. As of 2023, China's live e-commerce market size reached 4.9 trillion yuan, and its live e-commerce user base exceeds 638 million (iResearch, 2024). For some consumers, watching live e-commerce for shopping has become the preferred means of shopping. In contrast to the traditional online business model, e-commerce live streaming fosters closer interaction between streamers and consumers, resembling a 'face-to-face' scenario (Tong, 2017). Streamers represent a significant distinction between live streaming e-commerce and other online business models. In live streaming, a streamer interacts instantly with consumers and provides more vivid explanations of the goods based on their experiences. This enables consumers to directly understand various information about the goods and quickly grasp other people's feelings and evaluations. Consumers can submit their ideas and questions, and the streamer will communicate with them during the product introduction. The interaction between consumers and the streamer is not limited by time or space (Tong, 2017). Live streaming e-commerce is a means of displaying products and a platform for showcasing personality and emotion. A lively and humorous streamer can easily capture viewers' attention and make the product introduction more engaging and interesting. Conversely, a reserved and affable streamer may appeal more to viewers seeking a comfortable atmosphere. The streamer serves as both the seller and promoter of the product, as well as the brand's image representative. The audience's affection and identification with the streamer significantly impact the brand's image and sales performance.

Since 2020, Chinese netizens have seen a surge of interest in personality traits, especially personality tests such as the Myers – Briggs Type Indicator (MBTI). On Weibo, the topic of personality tests has been read more than a billion times. People are eager to learn about their own and other people's personality traits, and want to be closer to what the internet refers to as a "more successful personality". Entrepreneurs have been focusing on personality traits for a long time, and in 2018, 89 of the Fortune 100 companies assessed the personality of their employees (Emre, 2018). Many companies have their own set of screening guidelines for candidates with different personalities. They believe that some personalities have something to do with being prone to better job performance (Le et al., 2011; Emre, 2018). In the realm of live streaming, the personality of streamers, whether as partners or employees, significantly influences viewer perceptions and, consequently, business outcomes. Streamers act as the face of the brand or company, making their personality traits critical in shaping consumer experiences and

affecting sales. As of 2024, the screening criteria for e-commerce streamer personalities by companies producing merchandise or multi-channel network companies (MCN companies) cannot be found online. If the personality patterns of high-performing streamers can be studied, the findings will be beneficial to e-commerce streamers, MCN companies, and all businesses that need streamers to sell their goods to make decisions. Also, consumers will be interested in the study's results as there is a social climate of making friends based on personality traits.

The impact of streamer personality traits on live streaming sales has not been adequately studied. Previous studies have shown that the performance of the streamer affects live streaming sales. Some scholars have researched the streamers' language, appearance and actions (Li et al., 2023; Peng et al., 2020), while others have examined specific characteristics of the streamers, such as professionalism, interactivity, and popularity (Jiang et al., 2024; Li et al., 2024; Meng & Lin, 2023). Prior research has mostly used questionnaires to study streamers' characteristics based on consumers' subjective feelings. In these studies, the definition of the characteristics of e-commerce streamers is generally broad, and these characteristics are difficult to quantify. There are few subdivision studies on the objective personality of streamers. In the research on game live streaming, Zhao et al. (2021) studied the influence of personality, professionalism and social affordance of game streamers on the popularity. Their study included personality traits as one of the independent variables. The style of game streamers is different from that of e-commerce streamers. Both have different styles of live streaming and different monetization method. Furthermore, the specific differences during live streaming shown by streamers between different types and different amounts of fans have not been adequately researched. According to Liu and Yu, the type of streamer and the amount of fans affects sales. Therefore, there is a need for a more in-depth discussion of the differences in the performance of various types of streamers in live streaming. In conclusion, the following research question is posed:

RQ1: How do the five factors of streamer personality traits influence live streaming sales performance?

RQ2: How does streamer types moderate the influence of streamer personality traits on sales performance?

RQ3: How does the amount of fans moderate the influence of streamer personality traits on sales performance?

This study applies the Personality Trait Theory as the theoretical basis to explore the influence of e-commerce streamers' personality traits on sales. We represent personality traits based on the Five Factor Model, which is considered to be a more comprehensive, universal, and scientific model of personality traits, with a far-reaching history of development and a wide range of applications. At the same time, we used the streamer type as well as the amount of streamer fans as moderate variables to explore whether the personality traits possessed by high-selling streamers in different situations are identical. This paper systematically analyzes the correlation between personality traits and sales efficacy among DouYin streamers, aiming to provide theoretical insights and empirical data for industry stakeholders and scholars and offer recommendations for the advancement and enhancement of the live streaming industry. It also seeks to furnish a scientific framework and reference for corporations and brands to select suitable live-streaming partners or hire new talent.

LITERATURE REVIEW AND THEORETICAL FOUNDATION

The Factors Influencing Sales Performance in Live Streaming e-Commerce

Live streaming e-commerce represents a burgeoning sales model that has swiftly gained prominence as a research focus in digital marketing. In contrast to conventional online shopping models, live streaming e-commerce integrates live streaming with e-commerce, facilitating real-time interaction, display, and promotion of products with users (Li et al., 2024). The influence of various factors on live-streaming sales has garnered significant interest among streamers, entertainment companies, and academics (Chen & Liao, 2022). Previous research has predominantly explored three primary dimensions: streamers, products, and contextual elements. Xie et al. (2021) comprehensively analyzed factors affecting consumer purchasing behaviors, identifying live streaming visibility, meta-voicing, and guided shopping as significant influences. Similarly, Zheng et al. (2023) found that social presence, interactivity, attractiveness, and expertise enhance the live-streaming experience, subsequently affecting sustained viewing intentions and purchasing behaviors. Focusing on streamers, Peng et al. (2020) examined the impact of streamers' body language on sales, while Li et al. (2023) investigated how linguistic aspects of streamers' speech and voice influence purchase intentions.

Further studies have assessed the impact of streamers' inherent qualities on sales performance, concluding that the following characteristics are pivotal (Jiang et al., 2024; Li et al., 2024; Meng & Lin, 2023): (1) Interactivity. Streamers can create a relaxed live-streaming atmosphere by identifying viewers' needs and interacting with them, positively impacting sales. (2) Expertise. The streamer's expertise can impact the audience's information search efforts and increase the likelihood of a positive streaming experience. Cognitively competent streamers can quickly identify and meet the needs of viewers. (3) Attractiveness. Streamers with good physical appearance, strong social skills, and high emotional energy will attract more viewers to stay in the live streaming room to watch the live streaming. These streamers help to evoke pleasurable emotions in viewers. (4) Social belonging. If viewers perceive the streamer to be very similar to their own, it creates a sense of identification, which positively impacts sales. (5) Visibility. When a streamer is well known, his or her reputation can endorse the product, and consumers will have a sense of trust. The bargaining power of a high-visibility streamer is also stronger, so the goods it sells will also have a price advantage.

Based on the above review, it is evident that some studies have analyzed the superficial performance of the e-commerce streamer, such as the use of words and actions. However, these studies have neglected the characteristics of the streamer, the

brand image and the psychological needs of the audience. Studies conducted from the multidimensional characteristics of the streamer have the advantage of being more comprehensive, but this also brings a problem - it is difficult to explain the influence mechanism of a single dimension. Meanwhile, most studies use a questionnaire survey method, and the questionnaires are distributed to consumers. Therefore, the results of the studies also come from the subjective feelings of the general consumers, and the mechanism of the dimensions in the model is difficult to quantify. Although some have already used the personality of the streamer as a dependent variable, the mechanism of the role of personality is still ambiguous. Based on this, this paper adopts personality trait theory as the theoretical basis, and uses text mining methods to extract the five-factor personality scores from streamers' wording and explore their effects on sales performance.

Personality Trait Theory and the Five Factor Model

A personality trait is a psychological construct that causes consistent patterns in an individual's behaviors. The theory of personality traits, represented prominently by scholars such as Gordon W. Allport, Raymond Bernard Cattell, and Hans Jurgen Eysenck, forms a critical school of thought in psychology. While humans display a vast number of different traits, a small number of these traits are believed to be central to an individual's basic personality. Personality trait theory identifies these primary traits, which can be used to describe variations in personality. An individual's personality is described based on a score indicating the strength of their expression of each of these primary traits. Personality trait theory is a relatively broad theoretical framework. The Five Factor Model represents a significant example of personality trait theory.

The Five Factor Model (FFM), known as the Big Five, is widely accepted among psychologists as a robust framework. Initially introduced by Gordon Allport in 1936, various researchers later elaborated the FFM. William McDougall, for instance, proposed that personality could be broken down into five categories: intelligence, character, temperament, disposition, and temperament, while in 1957, Cattell advanced the Big Five theory. Additionally, Zuckerman et al. identified five personality factors—impulsive non-socialized sensation-seeking, aggression-hostility, activity, sociability, and neuroticism-anxiety—based on physiological, socialization, and emotional stability considerations (Chapman & Goldberg, 2017). The Big Five personality model comprises five dimensions: Openness, Extroversion, Neuroticism, Conscientiousness, and Agreeableness. Openness measures an individual's curiosity and creativity; Extroversion measures an individual's confidence and sociability; Neuroticism measures an individual's impulse control; Conscientiousness measures an individual's self-discipline; and Agreeableness measures an individual's propensity for empathy and cooperation. Demonstrating remarkable stability, this model is applicable across various languages, cultures, and evaluators, enabling its use worldwide.

Personality traits can have a significant impact on various aspects of life, including learning, employment, political elections, travel, sports, and shopping (Barrick & Mount, 1991; Zarouali et al., 2022; Hu et al., 2023; Piepiora & Piepiora, 2021; Chang et al., 2023). This is particularly evident in the business world, where investors are influenced by personality traits when making financial decisions. In addition, research on the impact of personality traits on job performance has been extensive and well-established (Furnham and Fudge, 2008). Meta-analyses conducted by scholars such as Barrick, Mount, and Van have consistently shown that conscientiousness, one of the Big Five personality traits, significantly impacts job performance (Barrick & Mount, 1991). Le et al. (2011) used a theory-driven approach and discovered a curvilinear relationship between personality traits and job performance. Hogan et al. (2003) utilized social analysis theory based on the five-factor model to predict job performance, yielding more reliable findings. This further substantiates the significant correlation between personality factors and job performance.

The Five Factor Model of personality provides a crucial framework for investigating personality in various contexts. This study leverages technology to investigate the characteristics of streamers and their impact on sales. Building on the findings of Pennebaker et al. (1999), which suggest that each personality trait corresponds to a distinct linguistic profile, this research will attempt to extract personality traits from streamers' language use. This approach underlines the importance of employing objective and unbiased language to ensure accurate information transmission. By examining the language and performance of streamers, this study aims to delve deeper into how their personality traits influence their effectiveness and sales outcomes.

HYPOTHESIS DEVELOPMENT

As previously defined by various studies, an individual with an extroverted personality may be active, assertive, energetic, enthusiastic, outgoing and talkative (McCrae & John, 1992). Furthermore, extroverted individuals exhibit proclivity for humor, communal living, and more physical movements (Chapman & Goldberg, 2017). Consequently, streamers with extroverted personalities are more likely to express themselves more freely and to introduce merchandise in an interesting manner. These streamers interact with viewers more. The viewer generates a sense of intimacy and positive emotions with the streamer during the interaction, and these emotions can give the viewer a better psychological cue to make a purchase. Therefore, we propose:

H1: Streamer extroversion traits mined from streamer language are positively correlated with sales.

The concept of agreeableness personality is defined as appreciative, forgiving, generous, kind, sympathetic, and trusting. Individuals with this personality type are unlikely to criticize or reject others (McCrae & John, 1992). However, streamers often need to describe products in relatively exaggerated rather than humble terms. Many streamers need to use strong-arm tactics to secure a lower agreed-upon price and higher quality products. Instead, streamers with agreeableness personality are too mild to stimulate viewers to make decisions or build trust, resulting in poor sales performance. Therefore, we propose:

H2: Streamer agreeableness traits mined from streamer language are positively correlated with sales.

In McCrae & John's study(1992), it was demonstrated that the adjectives associated with the conscientious personality are: efficient, organized, planful, reliable, responsible and thorough. Those with the conscientious personality are inclined to be self-disciplined and well prepared for their work. A streamer with a conscientious personality exudes competence and responsibility (Roos & Kazemi, 2021). Comprehensive information about the product and the streamer's charisma can influence viewers' decisions, which in turn affects sales. Therefore, we propose:

H3: Streamer conscientiousness traits mined from streamer language are positively correlated with sales.

Neurotic personality corresponds to anxious, self-pitying, tense, touchy, unstable, worried, and also associates with depression and mood swings(McCrae & John, 1992). Streamers with neurotic personality may show anxiety and nervousness during live streaming, which can affect their performance and expression. These types of streamers have high mood swings, which affects the stability and consistency of the live stream. Such live streaming may create confusion and negativity in the viewer, which in turn reduces the purchase of the product. Therefore, we propose:

H4: Streamer neuroticism traits mined from streamer language are negatively correlated with sales.

People with an openness personality possess artistic, curious, imaginative, insightful, and original traits. They also have wide interests and a high level of aesthetics(McCrae & John, 1992).Moderate openness may enhance streamers' creativity and enable them to provide novel and interesting content(Chapman & Golderg, 2017). Streamers with a highly open personality tend to explore various life scenarios, which is conducive to showcasing the features of the products and attracting consumers to make purchases. Therefore, we propose:

H5: Streamer openness traits mined from streamer language are positively correlated with sales.

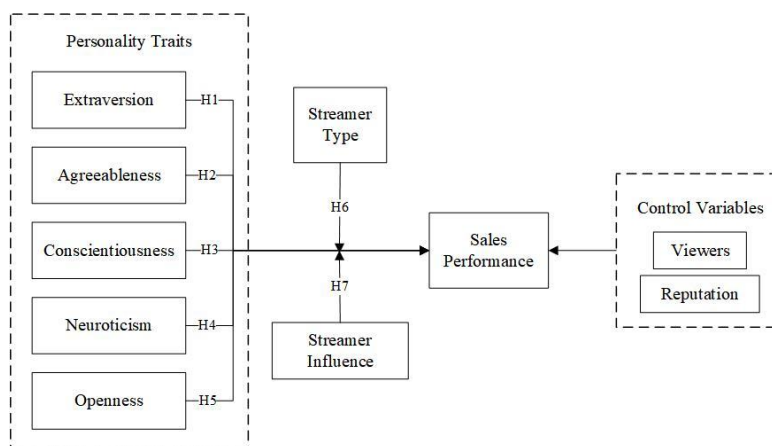
In Liu's study, the type and the amount of fans of streamer affects sales. Consumers perceive a high level of diagnosticity when a influencer streamer with many fans introduced products. There are three main types of product streamers: celebrity streamers, store streamers, and brand streamers. Celebrity streamers refer to using a recommended network celebrity or influencer as a streamer. The products are not limited to a specific brand or store, resulting in a broader range of categories such as DongFangZhenXuan, Tu Lei, XiangTaiChenLan, and more. Store streamers are mainly used to promote a specific store and its products, which are not limited to a specific brand, such as GAGAZHANG and XiaoYuNvZhuang. The brand streamers live shows to promote their products, limited to their respective brands, such as CAMEL and Duck Duck. Different types of streamers also present different styles due to different purposes. Viewers also have different purposes and expectations when clicking on different types of live streaming. The type of streamer may moderate the influence of the personality traits of the streamer on sales performance. At the same time, There's a big difference in the amount of followers that exists between streamers, which could impact sales(Qi, 2022). Fans mostly like and trust the streamers they follow. They are attracted to the personality traits of the streamer and become more tolerant as they develop a sense of intimacy. Low fans base streamers think more about how to get traffic. High fans base streamers need to juggle both traffic and fans. Therefore, we propose:

H6: Streamer type moderates the relationship between streamer personality traits and sales.

H7: The number of streamer followers moderates the relationship between streamer personality traits and sales.

Various factors, such as traffic and the word of mouth of the streamer, influence the sales volume of e-commerce live streaming. This study aims to establish a comprehensive research model that considers relevant control variables and reduces the influence of other factors, excluding the individual personality traits of the streamer and the price of the goods. After considering various factors and the difficulty of data acquisition, we have selected the streamer's reputation and the amount of viewers as control variables.

Figure 1 illustrates our hypothetical conceptual model.



Source: This study.

Figure 1: Conceptual Model.

RESEARCH METHODOLOGY

Dataset

DouYin, renowned for its vast user base and sophisticated recommendation algorithms, has made Shake live streaming exceedingly popular. Additionally, DouYin integrates e-commerce functionalities, significantly streamlining the shopping experience. Our study primarily focused on DouYin, where we randomly selected over 200 streamers of various types during specific periods for data collection. This dataset included details such as the streamer type and their follower count. We did not track and videotape all of the 200 streamers due to the irregularity of some of them and the format of their live streaming, which are not research-worthy.

Data collection occurred during the peak user activity window from 12:00 a.m. to 12:00 p.m., capturing 103 live e-commerce streams. In December 2023, our research concentrated on these live-streaming sessions. We converted the video content into text documents using a video-to-text application, segmenting the content into one-minute intervals.

Simultaneously, we extracted data on changes in fan count, sales, and livestream popularity from the HuiTun platform using Python scripts. This data underwent cleaning and preprocessing to enhance its usability for analysis. In total, we gathered over 6,000 data points related to live text sales.

We employed Linguistic Inquiry and Word Count based (LIWC-based) text analysis and the Big Five personality model to derive personality scores for our analysis. Using the SC-LIWC lexicon, we analyzed the frequency of functional words within the live text content. Furthermore, we quantified personality traits by leveraging a personality factor value mapping table developed by scholars through questionnaires and empirical research. This mapping uses the Big Five personality psychology theory to generate personality trait scores, which were then correlated with the textual data from the streamers' live sessions.

Variables

Independent Variables

Personality Traits of Streamer: Using the Big Five personality model and text analysis techniques, we analyzed of the Big Five personality traits based on the textual data from streamers' live streaming. We used LIWC text analysis to calculate Big Five personality scores and to map relationships with the Big Five personality traits.

Control Variables and Moderator Variables

Based on the assumptions presented in the previous chapter, we have selected streamer type and streamer fan volume as moderating variables. The celebrity streamer is labeled as 1, the shop streamer as 2, and the brand streamer as 3. The streamer fan volume spans a wide range as the streamers are randomly selected. For instance, Mr. Dong has 31,720,000 followers, whereas Hebei GeLi has only 29,000 followers. Therefore, the fan volume is represented as a logarithmic process. Additionally, we have included streamer word-of-mouth and live-streaming traffic as control variables. The retention index is used to measure streamer word-of-mouth, which reflects users' satisfaction and loyalty to the service, making it an important indicator of service quality and user stickiness. The number of online viewers is used to measure live-streaming traffic.

Dependent Variables

Sales Performance: This paper uses sales performance as the dependent variable. We measure sales performance by the change in sales per minute. The sales volume data is more accessible and can visually represent the audience's purchasing behavior.

Data Analysis

Descriptive Statistical Analysis

To facilitate subsequent analysis, the data on the five personality traits of streamers were uniformly normalized. A descriptive statistical analysis of each volume is presented in the following table. Since the variance of the number of fans data and sales per minute data is large, we carry out logarithmic processing on these two data.

Table 1. Descriptive Statistical Analysis Results.

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
lnSale	5,425	6.111	3.285	0.000	15.130
Extroversion(E)	5,425	0.256	0.075	0.000	1.000
Agreeableness(A)	5,425	0.616	0.123	0.000	1.000
Conscientiousness(C)	5,425	0.380	0.106	0.000	1.000
Neuroticism(N)	5,425	0.473	0.098	0.000	1.000
Openness(O)	5,425	0.545	0.081	0.000	1.000
Type	5,425	2.176	0.917	1.000	3.000
lnFans	5,425	4.339	1.563	1.065	8.062
Viewers	5,425	12.560	1.422	0.000	15.910
Retention	5,425	0.913	1.657	0.000	72.640

Source: This study.

Correlation Analysis and Collinearity Diagnosis

The variables were examined for correlation, as shown in Table 2. The results indicate that there is no significant correlation between the variables.

Table 2. Correlation Analysis Result.

	lnSale	E	A	C	N	O	Type
lnSale	1						
E	-0.041***	1					
A	-0.050***	-0.348***	1				
C	-0.068***	0.556***	0.058***	1			
N	-0.073***	0.218***	0.453***	0.750***	1		
O	0.065***	-0.217***	-0.00400	-0.794***	-0.779***	1	
Type	0.097***	0.00800	0.00600	-0.096***	-0.051***	0.062***	1
Fans	0.033**	-0.0100	-0.034**	-0.069***	-0.124***	0.098***	-0.303***
Viewers	0.091***	-0.042***	0.058***	0.00100	0.061***	-0.029**	-0.232***
Retention	0.048***	-0.0220	-0.063***	-0.00900	-0.074***	0.037***	-0.157***

Source: This study.

In order to further exclude the multicollinearity between variables, this study conducted a preliminary regression analysis using sales per minute as the dependent variable and the remaining variables as independent variables. The covariance was diagnosed using variance inflation factor, and the relevant data are presented in Table 3. Based on the results presented in Table 3, it can be concluded that there is no issue of multicollinearity in the data of the research variables in this empirical study, as the variance inflation factor of each variable is less than 10.

Table 3. Collinear Statistical Results of Each Variable.

	VIF	1/VIF
O	7.384	0.135
N	7.319	0.137
C	6.041	0.166
A	3.479	0.287
E	3.025	0.331
Fans	1.336	0.748
Viewers	1.219	0.821
Type	1.165	0.859
Retention	1.084	0.923
Mean VIF	3.561	

Source: This study.

Regression Analysis

The study establishes multiple linear regression models with sales per minute (logarithmically treated) as the dependent variable, streamer personality traits (specifically the data of the five dimensions of the five-factor model of personality) as the independent variable, and retention index and number of viewers as control variables. The study also takes into account the moderating effect of the number of fans of the streamer and the type of streamer. Equations 1 to 3 show each multiple linear regression model:

(1) Regression model involving per-minute sales, control variables, and streamer personality traits:

$$Sales = \beta_0 + \beta_1 Retention + \beta_2 Viewers + \beta_3 E + \beta_4 N + \beta_5 O + \beta_6 A + \beta_7 C + \varepsilon \quad (1)$$

(2) Regression model incorporating per-minute sales, control variables, streamer personality traits, and moderator variable (streamer type)

$$Sales = \beta_0 + \beta_1 Retention + \beta_2 Viewers + \beta_3 E + \beta_4 N + \beta_5 O + \beta_6 A + \beta_7 C + \beta_8 Type + \beta_9 Type * E + \beta_{10} Type * N + \beta_{11} Type * O + \beta_{12} Type * A + \beta_{13} Type * C + \varepsilon \quad (2)$$

(3) Regression model incorporating per-minute sales, control variables, streamer personality traits, and moderator variable (streamer fans)

$$Sales = \beta_0 + \beta_1 Retention + \beta_2 Viewers + \beta_3 E + \beta_4 N + \beta_5 O + \beta_6 A + \beta_7 C + \beta_8 Fans + \beta_9 Fans * E + \beta_{10} Fans * N + \beta_{11} Fans * O + \beta_{12} Fans * A + \beta_{13} Fans * C + \varepsilon \quad (3)$$

Sales: Per-Minute Sales; E: Extroversion; N: Neuroticism; O: Openness; A: Agreeableness; C: Conscientiousness; Type: Streamer Type; Fans: Streamer Fans; β_i (i=1,2, ...): To Be Estimated Parameters; ε : Error Term

Using Stata, this study examined and estimated parameters for the regression models based on multiple variables, and the results are presented in the table 4.

Table 4. Regression Model and Results.

VARIABLES	(1) lnSale	(2) lnSale	(3) lnSale
E	-3.842*** (-3.79)	-15.736*** (-6.14)	-4.452*** (-3.96)
A	-3.115*** (-4.67)	-9.372*** (-5.47)	-3.065*** (-4.16)
C	1.395 (1.38)	3.610 (1.41)	3.330*** (2.95)
N	2.247* (1.86)	0.938 (0.31)	1.456 (1.09)
O	5.463*** (3.71)	4.395 (1.18)	8.281*** (5.12)
Type		-3.378*** (-3.04)	
c.Type#c.E		5.032*** (4.55)	
c.Type#c.A		2.813*** (3.84)	
c.Type#c.C		-0.241 (-0.22)	
c.Type#c.N		0.644 (0.50)	
c.Type#c.O		1.141 (0.72)	
Fans			0.006*** (3.64)
c.Fans#c.E			0.005** (2.20)
c.Fans#c.A			0.002 (1.32)
c.Fans#c.C			-0.006*** (-3.20)
c.Fans#c.N			-0.000 (-0.09)

c.Fans#c.O			-0.011*** (-4.02)
Viewers	0.209*** (6.67)	0.292*** (9.13)	0.239*** (7.03)
Retention	0.061** (2.26)	0.107*** (3.97)	0.054* (1.96)
Constant	1.764 (1.60)	6.887*** (2.60)	-0.375 (-0.31)
Observations	5,425	5,425	5,425
R-squared	0.020	0.050	0.030

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: This study.

Model 1 explains 2% of the variation in per-minute sales. According to the regression results, extroversion ($\beta=-3.842$, $p<0.01$) and agreeableness ($\beta=-3.115$, $p<0.01$) in streamer personality traits have a negative impact on sales, while neuroticism ($\beta=2.247$, $p<0.1$) and openness ($\beta=5.463$, $p<0.01$) have a positive impact. Thus, hypotheses H4 and H5 are supported, while hypotheses H1, H2, and H3 are not supported.

Model 2 demonstrates higher explanatory power than Model 1, incorporating the streamer type variable. Regression results indicate that streamer type moderates the effects of extroversion ($\beta=5.032$, $p<0.05$) and agreeableness ($\beta=2.813$, $p<0.01$) on sales. Therefore, under constant conditions, influencer streamers positively influence sales based on extroversion and agreeableness traits.

Model 3 surpasses Model 1 in explanatory power, introducing the streamer fan base variable. Regression results show that streamer type moderates the effects of extroversion ($\beta=0.005$, $p<0.01$), conscientiousness ($\beta=-0.006$, $p<0.01$), and openness ($\beta=-0.011$, $p<0.01$) on sales. Thus, under constant conditions, high-fan-base streamers positively impact sales based on extroversion traits while negatively impacting sales based on conscientiousness and openness traits.

Robustness test

The time period may impact the streamer's explanation state, the group of viewers, the viewing attitude, and the purpose of viewing. To ensure the validity of the above results, it is necessary to test the analysis for robustness about the time period of live streaming. If the time value is 0, it indicates that the live streaming occurs during the daytime, before 6:00 p.m. If the time value is 1, it indicates that the live streaming occurs in the evening after 6:00 p.m. The data were divided into two subsets based on the time variable, and the regression results of the two subsets were compared with those of the original model. Table 5 displays the regression coefficients of the core variables. These results are consistent with the overall sample model, demonstrating the robustness of the empirical findings and the credibility of the conclusions drawn in this paper.

Table 5. Robustness Test Results.

VARIABLES	(1) lnSale	(2) lnSale	(3) lnSale
E	-3.842*** (-3.79)	-7.955*** (-4.8656)	-6.412*** (-4.0938)
A	-3.115*** (-4.67)	-5.654*** (-5.5045)	-2.312** (-2.2155)
C	1.395 (1.38)	-0.350 (-0.2227)	2.030 (1.2739)
N	2.247* (1.86)	10.222*** (5.6664)	3.622* (1.09)
O	5.463*** (3.71)	6.757*** (2.8822)	6.011*** (2.6771)
Viewers	0.209*** (6.67)	-0.309*** (-6.0593)	0.242*** (5.0492)
Retention	0.061** (2.26)	-0.784*** (-9.4588)	-0.088** (-2.5017)
0.time		0.000 (.)	
1.time			0.000 (.)
Constant	1.764 (1.60)	6.731*** (3.8570)	-1.693 (-1.0067)
Observations	5,425	2027	3393
R-squared	0.020	0.080	0.014

t-statistics in parentheses
 *** p<0.01, ** p<0.05, * p<0.1
 Source: This study.

DISCUSSIONS

Findings

This study utilized the text content and sales data of DouYin e-commerce live streaming for empirical research. This study carried out video voice detection as well as the analysis of the live text, extracted FFM personality scores to represent the features, and took the streamer type and streamer fan volume as moderating variables, live word of mouth and live heat as control variables, the captured empirical data and the inverse multiple regression statistics to test the hypothesis, hypothesis testing results are shown in the table 6:

Table 6. Hypothesis Test Result.

Hypothesis	Variables	relation	Result
H1	Extroversion(E)	positively correlated	×
H2	Agreeableness(A)	negatively correlated	√
H3	Conscientiousness(C)	positively correlated	×
H4	Neuroticism(N)	negatively correlated	×
H5	Openness(O)	positively correlated	√
H6	Streamer Type	moderate	√
H7	Streamer Influence	moderate	√

Source: This study.

The extroversion and agreeableness of streamers have a significant negative impact on sales, which contradicts with previous research (Li et al., 2024). In a study by McCrae & John (1992), it was shown that extroverted personalities are fun-loving and thrill-seeking, which may make viewers uncomfortable and reluctant to purchase merchandise. Highly extroverted streamers may be too attention-grabbing and overly expressive, neglecting the audience's interests, which leads to viewers being distracted from the product itself. Additionally, excessively extroverted individuals may come across as overly casual and informal, which could raise concerns about the professionalism of the streamer (Yair & Gideon, 2010). Agreeable streamers may prioritize audience interaction and relationship building, sometimes overlooking sales skills and product promotion (Leman & Timo, 2010). These content creators often avoid conflicts and negative emotions, making it difficult to use direct language like "Oh my god, buy it." This can result in decreased audience interest and purchasing intent. In a fiercely competitive live-streaming market, amiable streamers may lack a competitive edge and sales enthusiasm, as they struggle with self-promotion and fail to attract audience attention and stimulate purchase desire.

Neurotic personalities often exhibit intense emotional expression, which can be harnessed to convey enthusiasm for products and connect with the audience. In recent years, many people have become anxious about their lives, and streamers with neurotic personalities are more likely to resonate with these viewers. In addition, neurotic streamers may generate a sense of urgency and tension, which can be effective for promoting limited-time offers or special discounts, influencing viewers to make quick purchasing decisions. Openness is usually linked to creativity and imagination. Streamers with open-minded traits may experiment with innovative promotional methods and creative marketing strategies to attract audience attention, thereby increasing product exposure and sales. Additionally, individuals with open personalities are interested in new experiences and knowledge, and they have a wide range of interests (Paul & Alexander, 2020). These streamers may possess extensive knowledge and insights, effectively showcasing product features and advantages, thereby bolstering audience trust and purchase intent.

The conscientiousness of streamers does not have a significant impact on sales. While conscientious traits such as effective organization, task planning, a sense of responsibility, high perseverance, and prudence are valuable, these characteristics do not have a strong impact on sales during live-streaming.

Under consistent conditions, celebrity streamers with traits of extroversion and agreeableness have a positive impact on sales. Highly popular streamers have a positive impact on sales due to their extraverted traits, but they have a negative impact on sales due to their conscientiousness and openness traits. In celebrity live-streaming, where the majority of viewers are the streamer's fans, traits such as agreeableness and extroversion become more crucial, as fans are more willing to support the streamer's personality (Chen & Liao, 2022). For streamers with a large fans base, strong self-expression is more appealing to the audience, leading to a positive impact on sales for individuals with extroversion traits. If highly popular streamers are excessively open, it may lead to image instability, not meeting the promotional needs of certain products, and conflicting opinions with the audience, ultimately reducing sales. Highly popular streamers earn significant income, and demonstrating conscientiousness at this level may exert pressure on regular consumers, potentially affecting their purchasing behavior.

As a result, streamers with different types and fan bases exhibit varying personality traits during live-streaming. Streamers should explore different product introduction approaches and are encouraged to evoke strong emotional responses to capture consumer attention. For celebrity streamers, it becomes increasingly crucial to care for and express concern to fans, while for brand streaming, the focus is on product introduction and sales. Brands and celebrities with large fan bases need to be mindful of their language to prevent causing dissatisfaction among consumers.

Theoretical Implications

Based on the literature on e-commerce live streaming and personality traits, this study proposes a model framework for the impact of the Big Five personality traits on sales and empirically tests several theoretical hypotheses. Firstly, most of previous studies on streamers use questionnaire methods. The characteristics of streamers are subjectively described by consumers, which may result in bias and prejudice. Therefore, this study collected real data from live broadcasts and mined the live text. We used more objective data to study the personality traits of the streamers. Secondly, the majority of previous studies on the characteristics of streamers have employed attractiveness and interactivity as the initial point of investigation. This study combines psychological theories with live streaming e-commerce research, utilising the five factor personality traits of streamers as the point of departure, thereby enriching the research on streamer characteristics and personality traits. Furthermore, it establishes a foundation for future research. Thirdly, we also verified the moderating effect of streamer's fan base as well as streamer's type, and analysed the differences in the live broadcasting styles of streamers in different situations. This makes the research results more detailed. Finally, the findings of this paper provide some social and psychological insights for live streaming and uncover some conclusions that are different from secular ideas.

Managerial Implications

The findings of the study can inform industry practice and provide guidance for streamers and companies. Firstly, streamers should devote greater attention to the creativity and comprehensiveness of their explanations. The temperament of a rational decision maker can be displayed, but streamers should avoid talking too much about their life. In certain instances, the streamer may choose to utilise more complex mood swings in order to create a sense of heightened tension within the environment. A celebrity streamer is able to express themselves in a manner that facilitates the establishment of a more profound emotional connection with their audience. Those with a large following on streaming platforms must exercise caution in their interactions with fans. Streamers can optimise their live-streaming strategy according to their own circumstances in order to enhance their sales performance. Secondly, the openness of the streamer can be utilised as a selection criterion by companies when choosing streamers. The findings of the study can be used by enterprises to inform the training of streamers, enabling them to make the most of their individual characteristics. Finally, the implications of this study extend beyond the e-commerce industry, potentially influencing socio-cultural aspects as well. The study addresses the influence of streamers as public figures, particularly in terms of image-building and behavioural role modelling. This has implications for young viewers and consumers.

Limitations and Future Research

Several inevitable limitations in this paper need future research attention. Firstly, our study only used textual data from streamers and did not analyze their image data. The streamers' facial expressions and body movements were not considered independent variables in the analysis. Additionally, due to the large number of products, it is difficult to compare the price of products in different live streaming rooms and different platforms. So we did not control for the variable of product pricing. Secondly, our study focused on Chinese e-commerce streamers on the DouYin platform. The influence of streamers' personality traits on consumers may vary across different platforms and in different countries. Thirdly, the research only investigated personality traits exhibited during live-streaming, and there might be variations in the personality traits displayed on social media platforms compared to those during live streaming. These variations in personality traits across different contexts may also have varying effects on sales.

In conclusion, this study used live-streaming text to examine the influence of personality traits on e-commerce live-streaming. It offered suggestions for both streamers and brands in the e-commerce live-streaming industry. This research will pique the interest of relevant researchers.

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