

Exploring the Impact of Virtual Anchor Features and Live Content on Viewers' Willingness to Pay for “Superchat” in Live Entertainment Scenarios

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Abstract. With the Internet, the Virtual anchor industry has flourished, gaining a wide fan base and creating eye-catching economic benefits. The new form of reward “Superchat”, which is born with the development of Virtual anchors, has not been studied yet. Therefore, this study aims to investigate the influence of the features of Virtual anchors and live content on viewers' willingness to pay for Superchat in the live entertainment scene. The results showed that: (1) Virtual anchor features are significant, and viewers' willingness to pay for Superchat is strong, and different features will have different effects on willingness. (2) Viewers' perceived recognition and internalization mechanisms mediate the process from virtual anchor features to the willingness to pay for Superchat. Different features correspond to different mechanisms to influence the willingness to pay for Superchat. (3) The type of live content will have a moderating effect on the mechanism of viewers' perception. (4) In summary, in the hedonistic live broadcast, the attractiveness, technical capability and character property of the virtual anchor influence the willingness to pay for Superchat through the mediating effect of the recognition mechanism; in the utilitarian live broadcast, the professionalism of the virtual anchor influence the willingness to pay for Superchat through the mediating effect of the internalization mechanism.

Keywords: Virtual Anchor; Anchor Features; Recognition and Internalization; Types of Live Broadcasting.

1. Introduction

A Virtual anchor is literally a non-real human anchor. In a nutshell, a Virtual anchor is a virtual or real person who operates in a virtual or realistic environment such as the Internet in the age of artificial intelligence [1]. From the virtual character “Akemi Hayashi” in 1984's *Super Dimension Fortress*, who became the world's first virtual character to be introduced as a virtual idol, to the world's first avatar, Max Headroom, and the first virtual idol created by 3DCG technology, “Ida Apricot”[2], and then developed into the world's most famous virtual idols, such as “Hatsune Miku” and “Luo Tianyi”. At this time, many researchers have often mentioned Virtual anchors when talking about the more mature virtual idols such as Miku and Luo, which are represented by Vocaloid characters [3].

It is generally believed that the world's first Virtual anchor capable of generating live medium real-time contact function and leading cultural significance is Kizuna Ai, who has been active on YouTube since December 2016[2]. Depending on the presence or absence of a real person, they can be roughly categorized into: “leather-jacketed” anchors that use advanced real-time algorithms and motion-capture technology, combined with virtual behind-the-scenes character action performances and simultaneous voice acting, and Virtual anchors created by artificial intelligence technology with machine learning capabilities, such as “Microsoft Xiaobing”, “Hupo Xuyan”, etc[1]. In this paper, we focus on the “skinned” anchors with real people.

At present, Virtual anchors are involved in the fields of live e-commerce, news broadcast, idol debut, entertainment live (singing show, live show, game show) and so on. Take Bilibili as an example, this platform, which is arguably the longest layout of the domestic virtual anchor industry, has a total of over 6,000 virtual anchors broadcasting on Bilibili within the first quarter of 2019, with nearly 6 million viewers. Not only that, Bilibili has also invested in highly popular virtual idols such as Luo Tianyi and NIJISANJI.[4] In general, under the new technical support, virtual idols tend to be more

network-oriented and popular operation mode, and gradually develop in the direction of richer types and more diversified modes[1].

The “reward” behavior in the network live broadcast refers to the behavior of the network live broadcast users to reward the talent performed by their favorite anchor by purchasing and giving virtual props[5]. According to the 45th “China Internet Development Statistics Report” and “2019 Anchor Career Report”, the current scale of China's live webcast users increased to 506 million, accounting for 62.0% of the total size of Internet users. Among them, nearly 80% of webcast users will pay for live streaming, and 24.1% of professional anchors earn more than ¥10,000 monthly. With the continuous popularization of live webcasting, live bounty has become a common consumption mode in live webcasting, as well as one of the main ways of profit for live platforms and anchors. The bounty income of the virtual anchor is not to be underestimated. According to the latest statistics from Playboard, a professional station for YouTube data collection, the 2021 VTuber received bounty ranking publicly, Uruha Rushia topped the list, with a total bounty of nearly 200 million yen. [6]

Compared with the paid purchase of goods in e-commerce live streaming, rewarding does not reap specific material rewards. In the case of virtual anchors, the image of the anchor is not real and there is no physical contact between the viewer and the virtual anchor. So, what are the characteristics of virtual anchors that make viewers willing to give generously for their favorite anchors? Based on the above questions, this study will explore the influence of the features of virtual anchors and live content on viewers' willingness to pay for “Superchat” in the live entertainment scene, which will help to better understand the psychology and behavior of users' mental consumption in the online media environment. It will also have theoretical value and significance for the development and regulation of the rapidly growing but relatively unregulated live virtual broadcasting industry.

2. Literature Review

2.1 Superchat

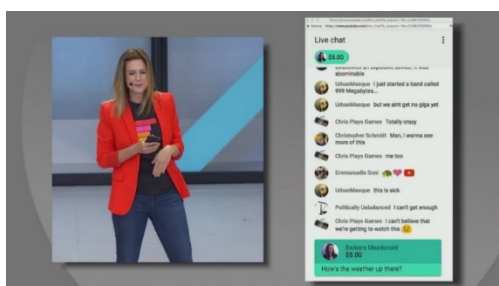


Fig 1. YouTube product manager Barbara Macdonald's demo at Google I/O 2017

Wake-Up Message (official name Super Chat also translates to Super Message, Superchat, etc.), is a feature launched by YouTube in 2017. “It's a way for viewers to reward bloggers. A typical Super Chat will highlight a viewer's chat message and fix it higher in the regular chat feed.”[7] Regularly sent messages will appear in smaller bold text in the online chat box and will be overwritten by later messages. But messages sent for a fee will be highlighted in the chat box, last for a while and then disappear without being overwritten.

Purchase amount (USD)	Color	Color name	Max. message length	Max. time in the ticker
\$ 1.00 - 1.99		Blue	0 characters	0 seconds
\$ 2.00 - 4.99		Light blue	50 characters	0 seconds
\$ 5.00 - 9.99		Green	150 characters	2 minutes
\$ 10.00 - 19.99		Yellow	200 characters	5 minutes
\$ 20.00 - 49.99		Orange	225 characters	10 minutes
\$ 50.00 - 99.99		Magenta	250 characters	30 minutes
\$ 100.00 - 199.99		Red	270 characters	1 hour
\$ 200.00 - 299.99		Red	290 characters	2 hours
\$ 300.00 - 399.99		Red	310 characters	3 hours
\$ 400.00 - 499.99		Red	330 characters	4 hours
\$ 500.00		Red	350 characters	5 hours

Note: There is a sitewide daily limit of \$ 500 USD.
Purchases less than \$ 5.00 USD do not display in the ticker.

Fig 2. YouTube Superchat feature price list

The higher the amount paid, the longer the icons and messages are displayed in the upper part of the chat bar, the more words can be entered, and the color of the background changes. However, it is not possible to enter a message for a smaller amount, and it cannot be fixed in the upper part of the chat bar. [8].



Fig 3. Bilibili's Superchat function schematic

In September 2019, Bilibili opened a “Superchat” function in the virtual anchor area, imitating the “Superchat” in YouTube. Unlike the common “gift reward” on domestic live streaming platforms, users can send messages with a minimum price of 30 yuan, so that the virtual anchors can communicate with their audience based on the content. Within three days of the feature's launch, the virtual anchor audience had sent more than 12,000 “Superchat”[3].

2.2 Emotional Labor

Activities involving interpersonal interactions require emotional work. Hochschild, a famous American sociologist of emotion, introduced the concept of emotional labor through his analysis of Delta Airlines flight attendants. He defined it as “for pay, employees manage their own emotions and perform in accordance with the organization's requirements for facial expressions or body language requirements of the organization”[9]. Subsequent researchers have defined the concept of emotional labor from different perspectives. Despite the differences, all definitions emphasize the exchange value of emotional labor, stating that it is groomed and presented for pay in a business context. [9][10][11]

With the development of the online society, the discussion of emotional labor spreads from offline to online and gradually becomes a form of labor that cannot be ignored by Internet users in the virtual world[12]. This media reality constructed in the Internet era has facilitated more informal, free and fluid, and timely interactions[13], making the communication process seem more direct and intimate[14]. This has also created the possibility for the rise of webcasting. The webcasting process can show the real time, which constructs a sense of reality closer to the daily conversation. This has largely expanded the space for people's emotional expression in the Internet world. As a result, a large number of viewers enter the live broadcast room to interact with webcasters, seeking emotional satisfaction and support. Accordingly, anchors give more or less of their emotional energy in the process of live interaction. Thus, it can be seen that the profession of webcasters is an industry full of emotional communication.

2.3 Product Type

There is a wide variety of definitions of products. Kotler and Armstrong (1990) believe that anything that satisfies the needs, wants and desires of consumers, such as services or ideas, can be

called a product[15]. Previous studies have classified products into utilitarian and hedonic goods based on the characteristics of the product itself[16]. Based on this theory, there are different interpretations of “utilitarian” and “hedonic” products. Hirschman and Holbrook (1982) define hedonic products and utilitarian products as follows[17]:

(1) Hedonic Products: Products that give customers a sense of fun and enjoyment after consumption.

(2) Utilitarian Products: These products have a high technical content and can meet the needs of users and solve their problems.

2.4 Anchor Characteristics

Every anchor wants to build engagement with his or her live users. Because it will enhance the stickiness and loyalty of live users for them.[5] However, there is a wide variety of types of anchors that possess a variety of characteristics, and it is difficult to specify which aspect is playing an exact role. Xiang, L., Zheng, X., Lee, M.K & Zhao, D. (2016) proposed that the three aspects of interpersonal communication that can influence the development of interpersonal relationships and enhance attractiveness are interpersonal similarity, professionalism and affinity[18]. Jun-Ning Huang, Qi-Xun Li, and Jun-Ming Chen (2014) studied the impact of weblebrity endorsement goods on consumer trustworthiness, defined weblebrity trustworthiness as “the degree of trust that the test subjects have in the weblebrity endorser and includes professionalism, attractiveness, reliability and likability”[19]. “Affinity” was also mentioned in the study of virtual anchors. The most important aspect of the virtual anchor driving technology is embodied emotion. If there is no tangible emotional expression, it is difficult to make users feel close and identify with them, and it will make people feel like they are communicating with a “facial palsy”. Affective expression is important in the design of AI virtual anchor.[4]

The virtual anchors have a more virtual quality in their recognition interpretation compared to the real anchors. Zhang Lu (2021) mentions “technical capability” and “anchor characters” in “The Theory of Virtual Anchor: Emotion, Reality and Social Relations”[3]. “Technical capability” refers to the ability of the character to be displayed in Live2D or 3D, such as model fineness and accuracy for motion capture; “Character property” is the character itself has the symbolic posterior characteristics, that is, what we call “persona”. For example, the character of the virtual anchor Akahim Elio is set as the head of the Order, and she calls her fans “Phantasy” in the live broadcast; and then there is the case of Kizuna Ai, who will always mention in the opening of the video: “I am the artificial intelligence Kizuna Ai”. In addition to the extensive use of basic settings such as “cute attributes” that can generate secondary aesthetic appeal and can be categorized, in order to meet the features of “virtual”, a considerable number of virtual anchors have adopted a more fantasy-oriented elements of the body, clothing, occupation. For example, among the 22 people of Nijisanji, Japan's largest virtual anchor project, who entered Bilibili live platform in batches, 14 virtual anchors have descriptions with keywords such as “magic” “otherworldly” “knight” “demon” and other keywords. [3]

2.5 Mechanism of Recognition and Internalization of Audience Perception

According to social influence theory, internalization and recognition are two distinct processes of attitude change caused by social influences[20]. Internalization is the process by which individuals adopt the perceptions or behaviors of other individuals that are beneficial to them and consistent with their own value system under the influence of social influences; recognition occurs when individuals adopt the perceptions or behaviors of other individuals in order to establish or maintain good self-defined relationships with others and thus enhance their personal image[21].

In the context of live e-commerce, it has been shown that the consumption of utilitarian products is mainly driven by expectations of performance[22][23], with more attention to objective technical attributes and knowledge of the product[22], and is mainly dominated by internalization mechanisms. In the case of hedonic products, consumption is more sensory involving fun and pleasure[24][25],

and thus consumption decisions will be more emotional [26] and mainly dominated by recognition mechanisms.

2.6 Hypothesis Derivation

2.6.1 Virtual Anchor Features and “Superchat” Willingness

According to previous studies, the three aspects of interpersonal communication that can influence the development of interpersonal relationships and enhance attractiveness are similarity, professionalism, and affinity[15]. And the four aspects that constitute the reliability of the messenger are reliability, professionalism, attractiveness, and likability[27]. Yi-Cong Guan, Xin Lu (2020) proposed the affinity of virtual anchors[2], Zhang Lu (2021) proposed the “character property” and “technical capability” of virtual anchors [3]. In this study, professionalism, affinity, attractiveness, technical capability, and character property are used as the constituents of “features”, and H1 is proposed.

H1: Anchor features have a positive effect on viewers willingness to pay for “Superchat”

2.6.2 The Mediating Role of the Internalization Mechanism of Viewers' Perceived Recognition

In the field of avatars, recognition mechanisms have been widely available. The frequent participation of avatars in TV programs and variety shows has gained the audience's recognition with the virtual identity[28]. The figurative emotional expression of avatars, and the joint action of the three levels of emotion, has gained the audience's emotional recognition[4][29]. The avatars gain the social recognition of the audience through productive behaviors such as cultural performances and advertising campaigns[32]. In contrast, there are relatively few cases where internalization mechanisms come into play. Admittedly, live broadcasts by avatars carry a natural hedonic attribute, and people rarely explicitly expect to learn any skills to solve any problems in live broadcasts by virtual anchors. Even if the type of live broadcast has strong professionalism, such as game commentary, emotional counseling, etc., most people still watch it with the mentality of “just for fun”. But the role of internalization mechanism cannot be easily denied.

The “Superchat” show the strong desire of viewers to interact with the anchor. From the perspective of recognition mechanism, viewers get pleasure and satisfaction in the process of watching the live broadcast, and more importantly, they will fantasize about forming “illusory intimate relationship” with the anchor on this basis. Guided by this fantasy, viewers will do things like increase the length of watching, increase the interaction, etc. to “maintain friendship”. By watching frequently, interacting instantly and giving gifts, the viewers form a “quasi-social relationship” with the anchors[5]. It has been shown that closer quasi-social interactions lead to stronger consumer impulses[30]. The content of messages in this scenario is simple and typical, such as “I really like you” and “I love you”, which are strong emotional expressions. From the perspective of internalization mechanism, it is relatively simple, based on trust, viewers pay to make requests (such as specifying the game or character they want to watch) or ask questions to the anchor, and the anchor will respond to them. This is similar to paying for a consultation.

On this basis, it is proposed that this study H2.

H2: Viewers' perceived recognition and internalization mechanisms mediate the transition from virtual anchor features to “Superchat” willingness

2.6.3 Moderating Effect of Live Type

The type of work affects the emotional labor mechanism[31]. Explicit requirements or non-explicit expectations within the industry constitute the industry-specific rules of presentation, i.e., the standards for appropriate expression of emotions in specific jobs. [32]For example, for waiters, positive emotions (e.g., smiling, affectionate, etc.) are to be displayed; while specific occupations, such as bill collectors, are to display negative emotions (including irritation, aggression, etc.)[9].

According to Kotler and Armstrong's theory[15], live streaming can be treated as a commodity. In today's live entertainment scene, the live content of virtual anchors is divided into three main categories: game show, chat, and singing show. According to the theory of emotional planning and

the definition of “utilitarian goods” and “hedonic goods”, the types of live broadcast are classified and defined as follows.

(1) Hedonic live broadcast: viewers have emotional needs such as companionship and confession, which will be satisfied when watching live broadcast; anchors need to carry out positive emotional planning, focus on interaction with viewers and respond to the requests made by viewers. Typical types of live broadcasts are: companionship chat, song ordering, emotional radio, etc.

(2) Utilitarian Live Streaming: The audience is satisfied by the ornamental skills shown by the anchor in the process of watching live streaming; the anchor has a certain knowledge base, experience and technology in the field. No need to focus on emotional expression, interaction or audience needs, and can focus on themselves. Typical live broadcast are: e-sports, chess, etc.

Under the influence of different types of live streaming, the feedback of anchor features appears to be different. For example, e-sports anchors can gain a large number of fans through their professional gaming skills even if they are indifferent; anchors who accompany chatting do not show professional skills, but can be very popular through friendly conversation. This indicates that the intermediate process between anchor delivery and audience reception has been affected.

The mediating role of audience perception was also integrated, which led to the proposal of this study H3.

H3: The type of live broadcast has a moderating effect on the mediation of anchor features to “Superchat” willingness

In summary, this study summarizes the reasons why viewers pay for “Superchat” in live entertainment scenes and constructs a research model.

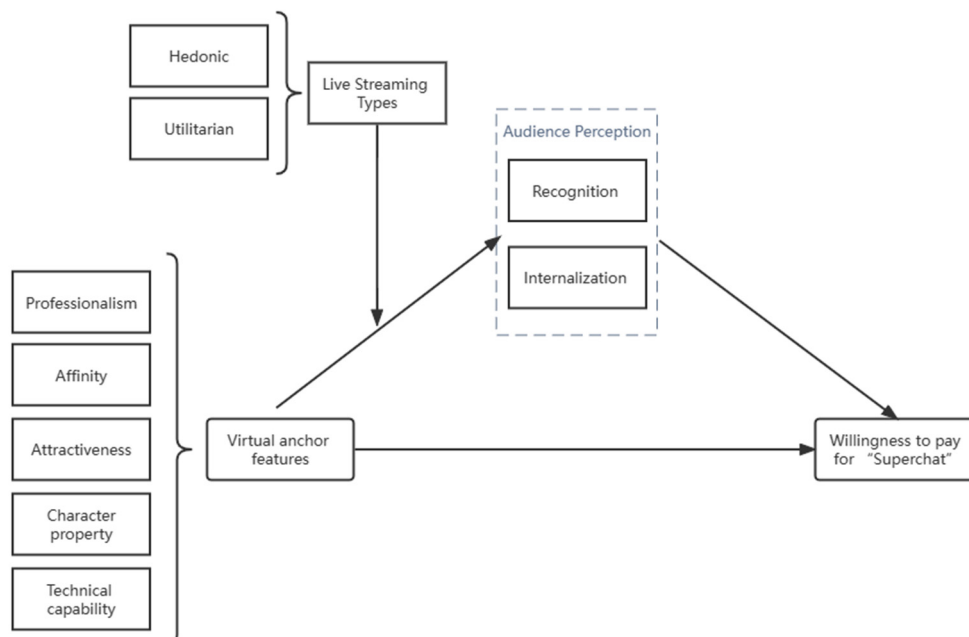


Fig 4. Research framework

3. Research Methodology

3.1 Study Variables

Based on the research structure, the variables related to this study were then defined based on the definition of each variable by previous scholars as a reference. Virtual anchor features are defined as “the features that virtual anchors show during live streaming”. Professionalism is the degree of expertise shown by the virtual anchor in the field of live broadcasting, such as high singing level and excellent game skills; affinity is the tone of voice and wording of the anchor that gives the audience a sense of intimacy; attractiveness is the external image of the anchor; the above questionnaire options

refer to Xiang[18], Wu Yue, Han Yuchen, Sun Yuannan[5], Huang Minxue, Ye Yuchan, Wang Wei[34], and make appropriate changes according to this study. The technical capability is the level of sophistication of virtual image production and motion capture technology; the character property is the persona of the virtual anchor image, such as “otherworldly knight leader”, etc. The above two questionnaire options are based on the results of Zhicong Lu's interview[33]. The total number of questions is 12 (Table 1). The five-point Likert scale was used as the scale, and the respondents were asked to rate their agreement on a five-point scale (strongly disagree to strongly agree).

Table 1. Options for virtual anchor features

Components	Questions	Scholars
Professionalism	1. I think the anchor has a certain theoretical knowledge for his field of live 2. I think the anchor has a power of discourse in the field of their live 3. I think the anchor is an expert in the field of their live	Fang, L., & Jiang, Y.[27] Wu Yue, Han Yuchen, Sun Yuannan[5] Huang Minxue, Ye Yuxian, Wang Wei[34] Lu, Z., Shen, C., Li, J., Shen, H., & Wigdor, D.[33]
Affinity	1. I think the anchor is loved by the public 2. I think the anchor's attitude is going to make people feel close	
Attractiveness	1. I think the image of the anchor is handsome/beautiful 2. I think the anchor's image is attractive to me	
Technical Capability	1. I think the anchor's image modeling is fine enough 2. I think the anchor's expression is smooth enough in the communication 3. I think the anchor's motion capture has a good look and feel	
Character properties	1. I will take the initiative to understand the character settings of the virtual anchor 2. I think the character setting of the anchor is attractive enough for me	

The perception of the type of live streaming was defined using the previous definition of “hedonic” and “utilitarian” characteristics to determine the type of live streaming that respondents preferred and how they felt about it. The questionnaire was based on the interview study of Hirschman & Holbrook[17] and was refined according to this study. A five-point Likert scale was used as the scale, and respondents rated their agreement on a five-point scale (strongly disagree to strongly agree).

Table 2. Options for the type of virtual anchor live broadcast

Components	Questions	Scholars
Virtual Anchor Live Streaming Type	1. I think watching the live broadcast of the anchor will make me feel happy 2. I satisfied the psychological needs of companionship and confiding in the process of watching the live broadcast 3. I can be exposed to professional thinking, theories, methods, and techniques while watching live 4. I learned something new from watching the anchor's live broadcast	Hirschman, E. C., & Holbrook[17]

The questionnaire questions of internalization and recognition mechanism were referenced from Min-Hsueh Huang, Yu-Chin Yeh, and Wei Wang[34]. A five-point Likert scale was used as the scale,

and the respondents used a five-point scale based on the agreement procedure as the scale (strongly disagree to strongly agree).

Table 3. Options for the recognition and internalization of audience

Components	Questions	Scholars
Recognition mechanism	1. I recognize the anchor 2. Interacting with the anchor gives me a sense of recognition	Huang Minxue, Ye Yuxian, Wang Wei[34]
Internalization mechanism	1. The anchor fully reflects the knowledge and skills of the field 2. I don't know much about a certain field, I will get information or request guidance by watching the anchors	

The audience paid for the “Superchat” of the willingness question referenced Xiang[18], Wu Yue, Han Yuchen, Sun Yuannan[5] and modified. The five-point Likert scale was used as the scale, and the respondents were asked to rate their willingness on a five-point scale (strongly disagree to strongly agree) based on the consent procedure.

Table 4. Options for of viewer' willingness to pay for Superchat

Components	Questions	Scholars
Willingness to pay for Superchat	1. I will consider the possibility of paying for the anchor to Superchat is very high 2. I am willing to pay for Superchat to the anchors if the conditions allow	Wu Yue, Han Yuchen, Sun Yuannan[5]

3.2 Study Design

In this study, 202 questionnaires were distributed through Credamo Seeing Number paid sample service, and after deducting 9 invalid questionnaires, the actual number of valid questionnaires was 193, with an overall valid questionnaire return rate of 95.54%. In order to understand the sample structure of this study, descriptive statistical analysis of respondents' demographic variables such as gender, age, education, occupation, and monthly income was first conducted using SPSS22.

Second, considering the number of questionnaire options as well as the number of dimensions, in order to more accurately test the hypotheses proposed in this study, it is necessary to ensure the internal consistency of the options, and the Cronbach alpha coefficient is chosen for reliability analysis. Again, this paper uses linear regression to test the influence relationship between the independent and dependent variables. Finally, the influence of mediating variables as well as moderating variables was verified using Model7 in the moderated mediation analysis.

4. Research Results

4.1 Descriptive Statistical Analysis

The study had a predominantly male sample of 97 (50.25 % of the total sample) and a female sample of 96 (49.47 % of the total sample).

In terms of age distribution, the oldest was 56 years old, the youngest was 18 years old, and the average age was 25.

The distribution of education is mostly undergraduate, with 159 students, accounting for 82.38% of the total sample. This is followed by master's degree and above, with 27 students, accounting for 13.99% of the total sample, followed by secondary school, with 6 students, accounting for 3.11% of the total sample, and finally high school and below, with 1 student, accounting for 0.52% of the total sample

The distribution of occupations was dominated by school students, with 108 students, accounting for 55.96% of the total sample. The next largest group of employees was corporate employees, with 64 employees, accounting for 33.16% of the total sample. Then there were 8 employees in institutions, accounting for 4.15% of the total sample. Then there are civil servants and professionals, with 5 each, accounting for 2.59% of the total sample. Finally, there were self-employed and freelancers, with one each, accounting for 0.52% of the total sample.

In the distribution of monthly income, 82 people earned more than 4,000 yuan, accounting for 42.49% of the total; 51 people earned 1,500-2,000 yuan, accounting for 26.42% ; 21 people earned 2,001-2,500 yuan, accounting for 10.88% ; 15 people earned 1,500 yuan per month below, accounting for 7.77% ; 13 people with monthly income of 3001-3500 yuan, accounting for 6.74% ; six people with monthly income of 3501-4000 yuan, accounting for 3.11%; five people with monthly income of 2501-3000 yuan, accounting for 2.59%.

4.2 Reliability Analysis

Cronbach's is a criterion for determining reliability. An alpha value below 0.35 indicates low reliability; an alpha value between 0.35 and 0.70 indicates medium reliability; and an alpha value above 0.70 indicates high reliability. Therefore, the reliability analysis was conducted based on the above criteria to ensure the internal consistency of all questions in the questionnaire. The table shows that the reliability of all the variables is greater than 0.7, which is high, and there are no deleted items, therefore, the questions in this study are internally consistent.

Table 5. Variables' Cronbach alpha coefficient

Variables	Number of measurement questions	Cronbach alpha coefficient
Willingness to pay	3	0.862
Professionalism	3	0.838
Affinity	2	0.835
Attractiveness	2	0.829
Technical Capability	3	0.833
Character Property	2	0.832
Hedonic	2	0.836
Utilitarian	2	0.849
Recognition	2	0.826
Internalization	2	0.840

4.3 Hypothesis Testing

4.3.1 Linear Regression

Table 6. Results of linear regression analysis for H2 (n=193)

	<i>B</i>	Std.Error	<i>Beta</i>	<i>t</i>	<i>p</i>	VIF	<i>R</i> ²	Adj <i>R</i> ²	<i>F</i>
Constant	-0.191	0.604		-0.316	0.753				
Recognition	0.809	0.119	0.473	6.797	0.000**	1.205	0.237	0.229	<i>F</i> (2,190) =29.565, <i>p</i> =0.000
Internalization	0.041	0.086	0.033	0.469	0.640	1.205			

Dependent variable: willingness to pay (hedonic type)

* $p < 0.05$ ** $p < 0.01$

Two videos of anchors (Kizuna Ai and Klein), are provided in this study, corresponding to the two situations of hedonic and utilitarian in the moderating variable. Regression analyses of viewer perceptions on willingness to pay for "Superchat" are conducted in the two situations, respectively.

With hedonic live type (Kizuna Ai), the regression coefficient value of recognition is 0.809 ($t=6.797$, $p=0.000<0.01$), implying that recognition will have a significant positive influence relationship on willingness to pay for Superchat. The regression coefficient value of internalization is 0.041 ($t=0.469$, $p=0.640>0.05$), implying that internalization does not have an influential relationship on willingness to pay for Superchat.

With utilitarian live type (Klein), the regression coefficient value of recognition is 0.202 ($t=1.555$, $p=0.122>0.05$), implying that recognition does not have an influential relationship on willingness to pay for Superchat. The regression coefficient value of internalization is 0.339 ($t=3.594$, $p=0.000<0.01$), implying that internalization will have a significant positive influence relationship on willingness to pay composite (Klein).

Table 7. Results of linear regression analysis for H2 (n=193)

	<i>B</i>	Std.Error	<i>Beta</i>	<i>t</i>	<i>p</i>	VIF	<i>R</i> ²	Adj <i>R</i> ²	<i>F</i>
Constant	0.919	0.658		1.397	0.164				
Recognition	0.202	0.130	0.117	1.555	0.122	1.205	0.112	0.103	$F(2,190)=12.024$, $p=0.000$
Internalization	0.339	0.094	0.270	3.594	0.000**	1.205			

Dependent variable: willingness to pay (utilitarian type)

* $p<0.05$ ** $p<0.01$

To sum up the analysis, it can be seen that in both types of live content, viewers' perceptions have a significant positive influence on the willingness to pay for messages. In the hedonic live streaming context, the recognition mechanism has a significant positive influence on the willingness to pay, and the internalization mechanism does not have an influence on the willingness to pay for messages; in the utilitarian live streaming context, the recognition mechanism does not have an influence on the willingness to pay for messages, and the internalization mechanism has a significant positive influence on the willingness to pay.

Table 8. Summary of linear regression results for H2

	Hedonic	Utilitarian
Recognition	Significant	Not Significant
Internalization	Not Significant	Significant

Hypothesis H2 is proved.

A linear regression with the recognition mechanism in viewer perception as the dependent variable and each factor in anchor features as the independent variable yielded a regression coefficient value of 0.109 for professionalism ($t=2.173$, $p=0.031<0.05$), implying that professionalism exerts a significant positive influence relationship on recognition. The regression coefficient value of affinity is 0.119 ($t=1.821$, $p=0.070>0.05$), implying that affinity does not have an influential relationship on recognition. The regression coefficient value of attractiveness is 0.174 ($t=2.505$, $p=0.013<0.05$), implying that attractiveness has a significant positive influence relationship on recognition. The regression coefficient value of technical capability is 0.093 ($t=1.339$, $p=0.182>0.05$), implying that technical capability does not have an influential relationship on recognition. The regression coefficient value of character property is 0.277 ($t=4.841$, $p=0.000<0.01$), implying that character property will have a significant positive influence relationship on recognition. To summarize the

analysis, it is clear that professionalism, attractiveness, and role have a significant positive effect on recognition. However, affinity and technical capability do not have an influence on recognition.

Table 9. Results of linear regression analysis for H1 (n=193)

	<i>B</i>	Std. Error	<i>Beta</i>	<i>t</i>	<i>P</i>	VIF	<i>R</i> ²	Adj <i>R</i> ²	<i>F</i>
Constant	1.129	0.300		3.763	0.000**				
Professionalism	0.109	0.050	0.125	2.173	0.031*	1.359			
Affinity	0.119	0.066	0.138	1.821	0.070*	2.347	0.543	0.531	<i>F</i> (5,187) =44.399, <i>p</i> =0.000
Attractiveness	0.174	0.070	0.209	2.505	0.013*	2.838			
Technical Capability	0.093	0.069	0.097	1.339	0.182	2.150			
Character Property	0.277	0.057	0.341	4.841	0.000**	2.030			

Dependent variable: recognition

* $p < 0.05$ ** $p < 0.01$

Table 10. Results of linear regression analysis for H1 (n=193)

	<i>B</i>	Std. Error	<i>Beta</i>	<i>t</i>	<i>P</i>	VIF	<i>R</i> ²	Adj <i>R</i> ²	<i>F</i>
Constant	1.396	0.487		2.865	0.005**				
Professionalism	0.768	0.082	0.640	9.403	0.000**	1.359			
Affinity	-0.100	0.107	-0.084	-0.939	0.349	2.347	0.363	0.346	<i>F</i> (5,187) =21.283, <i>p</i> =0.000
Attractiveness	-0.101	0.113	-0.088	-0.892	0.373	2.838			
Technical Capability	-0.005	0.113	-0.004	-0.042	0.967	2.150			
Character Property	0.119	0.093	0.107	1.285	0.201	2.030			

Dependent variable: internalization

* $p < 0.05$ ** $p < 0.01$

A linear regression with the internalization mechanism in viewers' perception as the dependent variable and each factor in anchor features as the independent variable showed a regression coefficient value of 0.768 for professionalism ($t=9.403$, $p=0.000 < 0.01$), implying that professionalism exerts a significant positive influence relationship on internalization. The regression coefficient value of affinity is -0.100 ($t=-0.939$, $p=0.349 > 0.05$), implying that affinity does not have an influential relationship on internalization. The regression coefficient value of attractiveness is -0.101 ($t=-0.892$, $p=0.373 > 0.05$), implying that attractiveness does not have an influential relationship on

internalization. The regression coefficient value of technical capability is -0.005 ($t=-0.042$, $p=0.967>0.05$), implying that technical capability does not have an influential relationship on internalization. The value of the regression coefficient for character property is 0.119 ($t=1.285$, $p=0.201>0.05$), implying that character property does not have an influential relationship on internalization. Summarizing the analysis, it is clear that professionalism will have a significant positive influence relationship on internalization. But affinity, attractiveness, technicality, and role-ness do not have an influential relationship on internalization.

The above results were organized into tables.

Table 11. Summary of linear regression results for H1

	Recognition	Internalization
Professionalism	Not significant	Significant
Affinity	Not significant	Not significant
Attractiveness	Significant	Not significant
Technical Capability	Significant	Not significant
Character property	Significant	Not significant

Thus, the hypothesis H1 is proved.

4.3.2 Analysis of Moderated Mediation Effects

The moderated mediation effect of viewer perception and live stream type on the relationship between anchor features and willingness to pay for Superchat was analyzed and tested with Model7.

Table 12. Regression model summary table for Model 7

	Willingness to "Superchat"	Recognition	Internalization
Constants	0.429	-0.327	0.023
	(0.694)	(-0.404)	(0.020)
Anchor features	0.107	0.585**	0.054
	(0.679)	(3.281)	(0.222)
Hedonic		0.483**	0.105
		(3.101)	(0.497)
Anchor features* Hedonic		-0.019	0.007
		(-0.616)	(0.158)
Utilitarian	-0.207	0.084*	0.753**
	(-1.804)	(2.448)	(16.100)
Recognition	0.434**		
	(3.025)		
Internalization	0.349**		
	(2.910)		
Sample size	193	193	193
R^2	0.208	0.635	0.643
Adj R^2	0.187	0.625	0.633
F	$F(4,188)=12.327$, $p=0.000$	$F(4,188)=81.818$, $p=0.000$	$F(4,188)=84.519$, $p=0.000$

* $p<0.05$ ** $p<0.01$

The moderated mediation effect analysis was conducted for model7, and for the mediating variable of recognition, the boot 95%CI does not include the number 0 at low levels, implying a mediating effect at this level, and the Effect value is 0.217; its boot 95%CI does not include the number 0 at mean levels, implying a mediating effect at this level, and the Effect value is 0.208; its boot 95%CI does not include the number 0 at high levels, implying a mediating effect at this level, and the Effect value is 0.200. Effect value is 0.208; its boot 95%CI at high level does not include the number 0, implying a mediating effect at this level, and the Effect value is 0.200; in summary, the analysis shows that the mediating effect is consistent at different levels, indicating that there may be no moderated mediation effect.

For the mediating variable of internalization, its boot 95% CI at low levels includes the number 0, implying no mediating effect at this level; its boot 95% CI at mean levels includes the number 0, implying no mediating effect at this level; its boot 95% CI at high levels includes the number 0, implying no mediating effect at this level; in summary, the analysis shows that that the mediating effect was consistent at different levels, suggesting that there may be no moderated mediation effect.

The results are organized as follows.

Table 13. Moderated mediation effect based on Model 7

	Mediating effect	Moderating effect
Recognition	Significant	Not significant
Internalization	Not significant	Not significant

Hypothesis H3 is rejected.

In combination with the H2 hypothesis, Model14 was reelected for the moderated mediation analysis.

Table 14. Regression model summary table for Model 14

	Willingness to "Superchat"	Recognition	Internalization
Constants	-0.199 (-0.132)	0.946** (3.018)	0.143 (0.381)
Anchor features	0.009 (0.055)	0.711** (12.909)	0.190** (2.662)
Hedonic	0.291 (0.974)		
Utilitarian	-0.170 (-1.490)	0.047 (1.226)	0.739** (15.943)
Recognition	1.377** (2.912)		
Recognition*Hedonic	-0.182* (-2.343)		
Internalization	-0.635 (-1.577)		
Internalization*Hedonic	0.169* (2.513)		
Sample size	193	193	193
$193R^2$	0.249	0.517	0.635
Adj R^2	0.217	0.510	0.629
F			

* $p < 0.05$ ** $p < 0.01$

For the moderated mediation effect analysis of model14, for the mediating variable of recognition, its boot 95%CI at low level does not include the number 0, implying a mediating effect at this level, and the Effect value is 0.430; its boot 95%CI at mean level does not include the number 0, implying

a mediating effect at this level, and the Effect value is 0.289; its boot 95%CI at high level includes the number 0, implying no mediating effect at this level. Effect value is 0.289; its boot 95%CI at high level includes the number 0, implying that there is no mediating effect at this level; in summary, the analysis shows that the mediating situation is inconsistent at different levels, indicating a moderated mediation effect.

For the mediating variable of internalization, its boot 95%CI includes the number 0 at low levels, implying no mediating effect at this level; its boot 95%CI does not include the number 0 at the mean level, implying a mediating effect at this level and an Effect value of 0.057; its boot 95%CI does not include the number 0 at high levels, implying a mediating effect at this level. implying a mediating effect at this level and an Effect value of 0.089; in summary, the analysis shows that the mediating situation is inconsistent at different levels, indicating a moderated mediation effect.

The results are organized as follows.

Table 15. Moderated mediation effect based on Model 14

	Mediating effect	Moderating effect
Recognition	Significant	Significant
Internalization	Significant	Significant

The original research framework was improved by adapting.

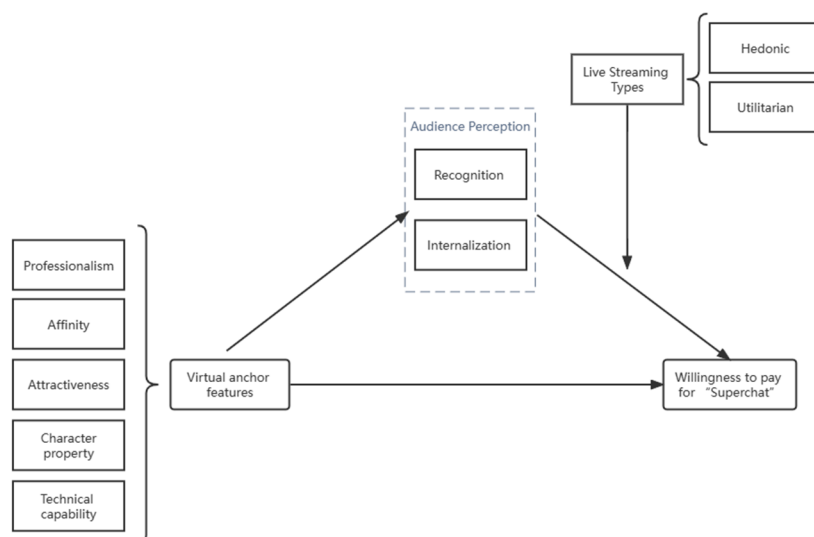


Fig 5. Improved research framework

5. Conclusion and Recommendations

Since its birth in 2016, Kizuna Ai has become the world's first widely known virtual anchor. Since then, virtual anchors have spread to all walks of life with their ever-expanding influence. From a niche culture that has become widely known, from a complex code to an open-source program, from virtual anchors launched by interest groups, from virtual anchors created by capital to virtual anchors that everyone can become, virtual anchors are gaining recognition and becoming part of our lives, and the number of people watching virtual anchors is increasing. People get companionship, recognition, and sense of community from the live broadcast of virtual anchors, and the gradually generous economic conditions also make people willing to generously pay for this psychological satisfaction and reward the anchors. For the virtual anchors, the enterprise launched virtual anchors naturally to take profit as the first purpose, reward is an important part of the performance assessment; individual virtual anchors, reward is a considerable amount of income. With the emergence of "Superchat", a new way of rewarding virtual anchors, it is especially important to keep the audience

interested. Therefore, this study investigates the influence of the features of virtual anchors and live content on viewers' willingness to pay for "Superchat" in the live entertainment scene.

(1) Anchor features and audience perception

The results of this study show that anchor features have a significant positive impact on audience perception, and different features correspond to different perception mechanisms. When planning a new virtual anchor program, companies and groups need to have a detailed plan for their image setting, which can be designed according to the audience perception effect they want to achieve at this time. Audience perception is divided into two mechanisms: recognition is to obtain psychological satisfaction and internalization is to absorb new knowledge. Therefore, when designing virtual anchors according to consumers' psychological needs, if you want to play the recognition mechanism, you should pay attention to the attractiveness, technical capability and role of virtual anchors. For example, Tencent's virtual idol project "Xing Tong" continues to adopt the traditional but popular image of a beautiful silver-haired girl, and uses studio-grade motion capture equipment, which is currently the highest in the industry. She uses the identity of a singer and fashion blogger and is widely loved. If you want to play the internalization mechanism, you should pay attention to the professionalism of the virtual anchors and add elements of identification, like the white coat of a doctor.

(2) Audience perception and willingness to pay for messages

The results of this study show that viewer perception has a significant positive effect on willingness to pay for Superchat, and the type of live broadcast plays a moderating effect here. The recognition effect is significant and the internalization effect is not significant in the hedonic live broadcast. In utilitarian live broadcast, the internalization effect is significant and the recognition effect is insignificant, which is in line with objective reality.

The revenue brought by Superchat should not be underestimated. For Uruha Rushia, the source of bounty was all provided by superchat. The development of domestic Superchat is relatively short in China, but according to statistics, the virtual anchor "Jia Ran" earned 110,000 yuan in January 2022 with Superchat. For companies and enterprises related to virtual anchors, if they want to use Superchat as a way to profit, they should seriously consider the mechanism of audience perception and the adaptation to the type of live broadcast. Virtual anchors who provide psychological recognition and satisfaction should choose hedonistic live content (such as chatting, talent display), which can maximize the willingness to pay for Superchat; virtual anchors who provide knowledge sharing should choose utilitarian live content (such as psychological consultation, product recommendation), which can maximize the willingness to pay for Superchat.

(3) The mediating role of audience perception

The results of this study show that viewers' perceptions have a mediating effect on virtual anchor features and willingness to pay for Superchat. And in the hedonic live broadcast, the mediating role is mainly played by the recognition mechanism; in the utilitarian live broadcast, the integrated role is mainly played by the internalization mechanism.

Synthesizing the above points, this study proposes the final conclusion: In hedonic live streaming, the attractiveness, technical capability, and character property of virtual anchor features influence the willingness to pay for Superchat through the mediating effect of recognition mechanism; in utilitarian live streaming, the professionalism of virtual anchor influence the willingness to pay for Superchat through the mediating effect of internalization mechanism.

In this regard, it is suggested that: first, practitioners need to understand the psychological motivation of live-streaming users as well as enhance the popularity of anchors to further enhance user loyalty and expand revenue; second, For users with low self-control, especially minors, when making large payments, the self-regulation of the live streaming platform and the external supervision of the market need to play an important role; third, parents and educators should, based on the findings of this paper, start from the direction of recognition mechanism to psychologically educate teenagers and prevent them from engaging in blind behaviors to gain psychological recognition or satisfaction.

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