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The Formation and Transformation Mechanisms of Deep Consumer Engagement and Purchase Behavior in E-Commerce Live Streaming

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Abstract: With the intensification of competition, it is of great significance for businesses and platforms to explore the formation and transformation mechanisms of deep consumer engagement and purchase behavior in an e-commerce live streaming environment. With the help of Hovland's persuasion theory and the uses and gratifications theory, this study constructed a model of these formation and transformation mechanisms via the grounded theory coding of interview data from 42 consumers. Our study shows that demand drives consumers to use e-commerce live streaming, and attraction factors, such as the e-commerce anchor (source), the product message (message), and the live streaming medium (channel), can influence consumers' attitudes, thus reinforcing deep engagement and purchase behavior. This behavior creates feedback to consumer demand generates new purchase motivation in the consumer, and eventually, forms new purchase behavior. Finally, the theoretical contribution of this study to understanding consumer behavior in e-commerce live streaming is discussed; it could be of practical use for merchants and platforms and also highlights directions for future research.

Keywords: e-commerce live streaming; deep engagement behavior; grounded theory; Hovland's persuasion theory; uses and gratifications theory

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1. Introduction

E-commerce live streaming is a new online marketing model in which merchants or anchors rely on online live streaming media to enable instant interaction and present services to consumers [1]. Data from the China Internet Information Center show that the rate of e-commerce live streaming users continues to grow, with more than 40% of Internet users being e-commerce live streaming users. More than a third of these users watch e-commerce live streaming every day, and half of them use the features of e-commerce live streaming for live engagement before and after making a purchase. It can be seen that engaging in e-commerce live streaming has become an important way for consumers to discover and purchase products, and consumers' engagement behavior is the key to e-commerce live streaming.

An e-commerce live streaming environment is an online virtual community with both purchase-related and social attributes [2]. In response to the dual attributes of e-commerce live streaming environments, some scholars have explored the impact of live streaming environments' characteristics, such as interactivity, authenticity, visibility, and synchronization, on consumer behaviors, such as purchasing, sharing, and engagement, from the perspective of information system availability [3–5]. However, most of these studies focus on the influence of external stimuli on consumers' purchase intentions and ignore the influence of endogenous factors such as motivations and attitudes on specific consumers' engagement behavior. The technology acceptance model (TAM) suggests that

users' attitudes regarding their willingness to use information systems ultimately influences their usage behavior [6]. Hovland's persuasion theory, on the other hand, suggests that the change in the information receiver's attitude depends not only on external stimuli but also on intrinsic factors such as their own cognitive preoccupation and emotional involvement [7].

We can learn from Ogbanufe and Gerhart, who introduced the concept of deep information system use, emphasizing that deep use should consider not only whether the information system is used, but also how it is used, which functions are used, and the continuity of its use [8]. Inspired by this, in order to more deeply explore the formation process of consumer engagement behavior in e-commerce live streaming environments, we believe it is necessary to introduce the concept of deep consumer engagement behavior in e-commerce live streaming environments. We define this as a series of behaviors that consumers generate in response to objects (such as products, anchors, etc.) in order to satisfy their own demand, form deep cognitive focus or emotional involvement with the live streaming environment, and actively and continuously use the functions of the e-commerce live streaming environment; these behaviors include bullet-screen comments, retweets, likes, followers, etc. In an e-commerce live streaming environment, consumers' engagement behavior can be divided into shallow and deep engagement behavior according to their cognitive focus and emotional involvement. Shallow engagement behavior occurs when consumers only briefly watch live streams and do not use the other social features; deep engagement behavior occurs when consumers invest more focus and emotion in the live streams, not only watching them but also actively using likes, bullet-screen comments, retweets, followers, and other features.

Some scholars focus on consumers' purchase behavior in e-commerce live streaming. Using a structural equation model, Guo et al. found that the characteristics of an anchor can affect consumers' perception of value, and thus, affect their purchase intentions [9]. Based on the self-determination theory and using multiple linear regression, Gong et al. investigated the influence of the visual design of an e-commerce live streaming platform on consumers' tendency to perform impulse purchases [10]. Most of these studies followed the research paradigm of consumer purchasing in traditional e-commerce situations, focusing on an external stimulus that encourages consumers to make purchase decisions. However, these studies did not discuss the important role of endogenous factors, such as consumers' subjective motivation and emotional responses [11]. There is also a lack of attention paid to the social behavior of consumers in e-commerce live streaming. The deep engagement behavior of consumers is the key to the vitality of a live streaming environment, and the purchase behavior of consumers represents the core of e-commerce live streaming. This includes consumers' movement from shallow engagement behavior to engagement with bullet-screen comments, likes, retweets, followers, and other deep engagement behavior. In particular, it is important to transform deep engagement behavior into purchase behavior, which is the research focus of this paper. In this study, with the help of grounded theory, we analyzed the interview data of 42 interviewees and constructed a model of the formation and transformation mechanisms of deep consumer engagement and purchase behavior in e-commerce live streaming. This study developed the theoretical results of e-commerce live streaming consumer behavior in a theoretical dialogue with Hovland's persuasion theory and the uses and gratifications theory; it could be helpful for platforms and merchants to deepen their understanding of the internal and external dynamics of consumer behavior formation in e-commerce live streaming, improve product sales, and perfect their live services.

The rest of this study is organized as follows. Section 2 provides a literature review and describes the theory. Section 3 presents the study design. Section 4 describes how we encoded the data and constructed the model. Section 5 explains and analyzes the model. Section 6 presents the discussion, theoretical contributions, practical implications, limitations, and future research. Finally, Section 7 concludes the paper.

2. Literature Review

2.1. Consumer Engagement and Purchase Behavior in E-Commerce Live Streaming

Some scholars have explored consumer engagement in e-commerce live streaming from different perspectives [12,13], but consumer engagement in these studies actually refers to consumers' use of e-commerce live streaming, without specifying issues such as what the specific engagement behavior is and how consumers engage, and without delving further into the engagement behavior from the perspective of cognitive focus and emotional involvement. In previous studies of consumer engagement behavior, some scholars define consumer engagement as their psychological willingness to interact with an engager [14], and others emphasize the importance of interaction experiences between consumers and other engagers in the marketing medium [15]. While interpersonal interaction is the focus of these studies that explore consumer engagement, this study views the e-commerce live streaming environment as a virtual community in which the functions of the live environment involve both purchase-based and social interactions [2]; discusses how consumers use specific functions of the live streaming environment to engage with activities in the live stream; and explores the process of deep consumer engagement behavior that occurs during human–computer interaction.

Traditional e-commerce research has focused on whether a specific engagement behavior occurs in consumers. Through factor identification, the factors that influence the occurrence of engagement behaviors are explored (for example, the effect of information accuracy on consumer attention [16], the effect of information type on consumer comments [17], and the effect of consumer attitudes on consumer sharing [16]). Since the features of e-commerce live streaming, such as anchoring, real-time interaction, and visualization, are not available in traditional e-commerce, the theory of consumer engagement in the context of traditional e-commerce is not fully applicable in the context of e-commerce live streaming and is insufficient for explaining the deep engagement behavior of consumers in e-commerce live streaming.

The study of consumer behavior in e-commerce live streaming focuses on purchasing behavior. Most of these studies follow the research paradigm of consumer behavior in traditional e-commerce contexts, focusing on the influence of external stimuli on purchase intentions. For example, the influence of weblebrity credibility and attractiveness on consumers' purchase intentions was explored [18]; live streaming features such as visualization, voice, and guide were found to influence users' purchase intentions [3]. However, these studies tend to ignore the role of endogenous factors such as consumers' subjective motivation, pay significantly less attention to consumers' social engagement in e-commerce live streaming, and fail to comprehensively analyze the relationship between consumers' purchase behavior and other types of engagement.

While most studies assume that consumer engagement behavior is in a steady state, Brodie et al. suggest that consumer engagement behavior may be dynamic in nature and that engagement behavior evolves over time with different forms and intensities [19]. Consumers' likes and bullet-screen comments in e-commerce live streaming determine its vitality and value, but the influence of consumers' likes, bullet-screen comments, and other interactive engagement behavior on their purchasing behavior has received little attention in previous studies. Consumer engagement behavior in the traditional e-commerce context is a relatively stable process; Moe's consumer funnel model found that consumers exhibit a long decision-making process, from attention to searching, hedonic browsing, product comparison, and even the final purchase [20]. However, in e-commerce live streaming, consumer decisions occur in real-time and are more dynamic, influenced by anchors, bullet-screen comments, and the live environment's atmosphere. The theoretical results obtained in a traditional e-commerce context do not enable e-commerce live streaming environment merchants and platforms to accurately and quickly capture consumer demand [12] and also make it difficult for consumers to obtain sufficient satisfaction to make purchase decisions. This study explores the transformation path of deep consumer engagement behavior to

purchase behavior in e-commerce live streaming environments using feedback on deep consumer engagement behavior and motivation.

2.2. Hovland's Persuasion Theory

Hovland viewed persuasion as a process of information dissemination and proposed the persuasion theory of attitude change. It contains four basic elements: the persuader, the persuasion message, the persuasion channel, and the receiver, the first three of which are external stimuli influencing the attitude change of the receiver. Not only does the receiver's attitude depend on these external stimuli, but their own cognitive preoccupation and emotional involvement are intrinsic to their eventual attitude change. Cognition contains the knowledge structure constituted by an individual's processing of information, and when an individual's cognitive focus on certain information is higher, their attitude will change accordingly. Moreover, emotion refers to the emotional transfer that occurs during an individual's psychological evaluation of an object, and when an individual's emotional investment in the object deepens, their attitude will change as well [21]. In the relevant literature on consumer behavior in virtual communities, research on the influence of each of the above elements on consumer attitudes is commonly found. For example, Zhang et al. found that the information quality, perceived similarity, and source credibility of a brand's microblogging community can influence consumer engagement and brand loyalty by affecting brand community commitment [22]. Unfortunately, studies exploring the change in consumer attitudes among e-commerce live streaming, and thus, triggering engagement behavior from a persuasion theory perspective do not occur in the literature. With the help of Hovland's persuasion theory, it is useful to focus on external stimuli that may trigger deep consumer engagement behavior and capture consumers' own energetic responses to external stimuli.

2.3. Uses and Gratifications Theory

The uses and gratifications theory emphasizes that users actively use various types of media, due to the existence of specific motivations, so that their demands are satisfied [23]. This theory is used to explain how users employ different types of media to satisfy their demands, to uncover their motivations for using these media types, and to understand the positive or negative consequences of their use [23]. In a study related to consumer behavior in virtual communities, Dodoo and Youn [24], based on the uses and gratifications theory, found that entertainment, aesthetic, curiosity, and social factors motivate consumers to interact with AR ad lenses in Snapchat software, and it is this motivation that contributes to consumers' attitudinal perceptions of these ad lenses; this, in turn, leads to ad-engagement behaviors and purchase motivation [24]. Most of the existing studies on e-commerce live streaming are based on the stimulus–organism response (SOR) model, which explores consumer behavior based on the assumption that consumers are passively stimulated [13]. However, in the context of e-commerce live streaming, consumer engagement behavior is not simply passively stimulated by the outside world but is also influenced by their subjective motivations and active information-receiving processes. Therefore, this study draws on the uses and gratifications theory to help us focus on the possibly important role of consumer motivation.

3. Study Design

3.1. Study Methodology

Grounded theory is particularly suitable for exploring microscopic, action-oriented process-based questions and emphasizes the collection of data from real scenarios in order to explore the mental activity of the research subject and the meaning-making process of events [25]. Using grounded theory, we can explore the "what", "why", and "how" of consumer engagement and purchase behavior in an e-commerce live streaming environment in a more comprehensive and detailed way, which is difficult to achieve by web crawling cross-sectional data.

This study follows the research steps of grounded theory through interviews, gradually guiding consumers to divulge their true feelings when engaging with e-commerce live streaming; in doing so, we obtained valuable first-hand interview data on consumers' own experiences. The interview data were coded according to Corbin and Strauss, i.e., through open coding, spindle coding, and selective coding [25]. Concepts, categories, and relationships were refined through coding, and the interview data were expanded through theoretical sampling until theory saturation was reached. Finally, a formation and transformation mechanism model of deep consumer engagement and purchase behavior in an e-commerce live streaming environment was constructed.

3.2. Data Collection

A report by the China Consumers Association shows that those born in the 1980s, 1990s, and 2000s are the main engagers in e-commerce live streaming [26]. Several research reports on the e-commerce live streaming industry in China also confirm this view. According to data from AliResearch, users of Taobao live streaming were mostly born in the 1980s and 1990s [27]. According to Sina Micro-hotspot data, among Chinese users who pay attention to e-commerce live streaming, those under 40 account for as much as 94%, and people aged 20 to 30 prefer to watch e-commerce live streaming, and they account for over 55% [28]. Young and middle-aged people accept new media faster, have a more comprehensive understanding of new technologies, and are more skilled in their use. As the main user groups of e-commerce live streaming, their experience and experiences are representative to some extent. Compared with children and the elderly, the experiences of these users are richer and more conducive to the development of this study. Therefore, young and middle-aged users were selected as the target interviewees in this study. The main topics of the interview were: (1) interviewees' use of e-commerce live streaming. This included whether they had engaged in e-commerce live streaming; whether they had purchased goods from e-commerce live streaming; and which platforms, anchors, and stores they mainly watched live. (2) Interviewees' specific engagement behaviors in e-commerce live streaming. This included their engagement behaviors in the e-commerce live streaming environment; whether there were other behaviors in addition to purchasing behaviors; and the frequency and duration of these behaviors. (3) The reasons why interviewees enacted these specific behaviors. This included the motivation for their engagement in e-commerce live streaming; the factors that influenced the production of these behaviors; and their feelings before enacting them. (4) The subsequent effects of these behaviors and the interviewees' reasons for enacting them. This included how they felt after the behaviors occurred; their subsequent behaviors; and the reasons for these subsequent behaviors.

Before recruitment, the interviewees were told that the whole interview process may take 30 to 50 min. They needed to ensure that their schedules permitted them to partake in the interviews and that they could agree with the researchers on a suitable time. In the interview, the researchers mainly communicated with the interviewees in relation to the questions in the interview outline. During this process, the researchers also asked further relevant questions according to the experiences of the interviewees and the topics they mentioned. The interview was recorded with the consent of the interviewees, who were assured that their responses would only be used for research and that for their privacy, their other information would be kept strictly confidential. All of the interviewees accepted these terms, and after the interview, they were rewarded with CNY 20. A total of 42 interviewees who had engaged in e-commerce live streaming were interviewed in depth for this study. The interviewees were all from China and included 17 males and 25 females; of these, there were 20 students, 7 teachers, 11 corporate employees, 2 civil servants, and 2 freelancers. For coding convenience, the interviewees were numbered sequentially as T01, T02, . . . , and T42. The interviewees' basic information is shown in Table 1.

Table 1. Interviewees' information form (N = 42).

Characteristics	Category	Frequency	Percentage (%)
Gender	Male	17	40.5
	Female	25	59.5
Age	<20	2	4.8
	20~24	15	35.7
	25~29	16	38.1
	≥30	9	21.4
Education	Specialized and below	8	19.0
	Undergraduate	21	50.0
	Master's degree and above	13	31.0
Profession	Student	20	47.5
	Teacher	7	16.7
	Civil Servant	2	4.8
	Corporate employees	11	26.2
	Freelance	2	4.8
Monthly Income (CNY)	Under 2000	17	40.5
	2000~5000	12	28.6
	5000~10,000	9	21.4
	10,000 and above	4	9.5

4. Coding Analysis and Model Construction

4.1. Open Coding and Spindle Coding

Open coding involves the conceptualization of information, which is given a conceptualization label, and the generalization of the distilled initial concepts into categories [25]. Main axis coding involves the process of discovering and establishing connections between categories based on logical relationships, such as juxtaposition and causality, on the basis of open coding, and then, performing clustering to form the main categories [25]. In this study, the interview data were managed and coded with the help of NVivo11, and initial concepts with less than three repetitions were eliminated, resulting in a total of 87 initial concepts, 29 initial categories, 12 sub-categories, and 4 main categories. Table 2 describes the processes of extracting the initial test concepts and their categorization from the primary sources during open coding, and Table 3 shows the final results of spindle coding.

Table 2. Open coding.

Initial Scope	Original Information (Initial Concept)
A1 awareness demand	T26: "At the beginning to see is out of curiosity, just to see what this is, why so hot recently." (Curiosity)
A2 social demand	T17: "Sometimes it is to go to see the comments, and other people chat." (Chat with others)
A3 hedonic demand	T19: "I watch live and one reason is to pass the time, when bored, open to see." (Pass time)
A4 purchase demand	T03: "Once is almost to a friend's birthday, want to buy her a gift, go to see if Jiaqi live there is no suitable." (To discover the demand for products)
A5 anchor personality	T15: "There is the anchor funny ha ha ha, talk is also quite amusing kind, it is very attractive to me." (Character humor)
A6 anchor status	T34: "They will often invite stars to the live streaming, and star interaction, meet their favorite, always have to give some face it." (Star live)
A7 anchor face	T24: "Good-looking, good-looking, good-looking, the important thing to say three times." (Good-looking)
A8 anchor capacity	T22: "Li Jiaqi as a super anchor is very professional, he is a senior cabinet brother, product introduction on very professional." (Performance professional)
A9 anchor reputation	T05: "I will also look at some friends recommended anchor, after all, friends can recommend then or relatively reliable." (Friend evaluation)
A10 anchor style	T12: "And the way the anchor speaks, right, also quite attractive to me." (Way of speaking)

Table 2. *Cont.*

Initial Scope	Original Information (Initial Concept)
A11 product prices	T10: "Only the price can attract me, I am a person who only looks at the price, I am not for the anchor yes, it is because the price is cheap." (The price is cheap)
A12 product reputation	T06: "Previously encountered in the sale of a hand touch, I discussed with a friend the brand of this hand film what about, found that it is not bad." (Friends evaluation)
A13 product message argument	T28: "The anchor will explain the product information very full, do not need me to check, which is very friendly." (Comprehensive explanation)
A14 product inventory	T21: "He things are limited, I was very anxious, I was afraid to grab not." (Limited number)
A15 live visualization	T01: "The anchor will ask some models to try on the clothes, the effect of how to see it." (The effect of intuitive)
A16 live interactivity	T16: "The good thing about the live streaming is that if you have any questions, you can ask the anchor, and they will reply when they see it, which is very impressive to me." (Can interact with the anchor)
A17 live entertainment	T23: "The anchor they often design some programs, on a bit of variety nature of the kind, and guests will perform together, very interesting." (Performance interesting)
A18 value perception	T12: "Often as soon as he introduces a thing, he can say the feeling that this thing works for me, and then introduce another, hmm! This is also useful." (Feel useful)
A19 quality perception	T32: "The last time an anchor show clothes when she cut a close up, zoomed in to show the details, you can see that the quality is not bad." (Good quality)
A20 trust perception	T20: "There are some big anchors who are still trustworthy, and they care about their reputation." (Trustworthy)
A21 pleasant emotions	T05: "See the live room they a serious funny, it is super want to laugh." (Feel happy)
A22 evoking emotions	T17: "Ready to grab something, the anchor a shout countdown 321 on the thief nervous." (Feel nervous)
A23 behavioral intentions	T36: "Once look at the anchor eating a self-help pot eating quite fragrant, look straight drooling, thinking about preparing to buy a taste." (Want to buy)
A24 likes behavior	T04: "See the interesting, one is happy, will also point to the popularity of support for the anchor." (Likes behavior)
A25 bullet-screen comments behavior	T11: "Listening to them talk is very interesting is very happy well, I usually will send a comment." (Send bullet-screen comments)
A26 retweets behavior	T41: "Sometimes if you come across something nice, you will also send the link to the group and share it with your friends." (Retweets links)
A27 followers' behavior	T19: "Brush to some new anchor if speaks well, will also point attention." (Followers' anchor)
A28 continuous engagement	T08: "I have this situation before, at first may not be very interested, but send a comment and the anchor chat, ask, one to two, I asked her while speaking, slowly interested, and finally bought." (Continuous send bullet-screen comments)
A29 purchase behavior	T11: "Encounter some limited number of things, and there is a discount, you have to grab it as soon as the link is on, thieves nervous." (Grab purchase)

Note: Ai is the initial category number; Ti is the interviewee number.

Table 3. Spindle coding results.

Main Scope (Ci)	Sub-Category (Bi)	Initial Scope (Ai)	Initial Concept (Ai)
C1 consumer engagement motivation (B1 to B4)	B1 awareness demand	A1 awareness demand	a1 curiosity, a2 novelty, a3 get together, a4 get information
	B2 social demand	A2 social demand	a5 recommended by friends, a6 shared with friends, a7 chatted with people
	B3 hedonic demand	A3 hedonic demand	a8 to relieve stress, a9 to spend time, a10 to watch performances, a11 to listen to segments
	B4 purchase demand	A4 purchase demand	a12 have clear purchase goals, a13 discover demanded goods, a14 temporary ideas

Table 3. *Cont.*

Main Scope (Ci)	Sub-Category (Bi)	Initial Scope (Ai)	Initial Concept (Ai)
C2 e-commerce live streaming attraction (B5 to B7)	B5 e-commerce anchor attraction (A5 to A10)	A5 anchor personality	a15 character humor, a16 character lively, a17 character down-to-earth
		A6 anchor status	a18 star live streaming, a19 celebrity identity, a20 star as guest, a21 professional anchor
		A7 anchor face	a22 looks handsome, a23 looks beautiful
		A8 anchor capacity	a24 verbal skills, a25 performance professional
		A9 anchor reputation	a26 network evaluation, a27 friends' evaluation
		A10 anchor style	a28 way of speaking, a29 anchor speed of speech, a30 anchor mantra
	B6 product message attractiveness (A11 to A14)	A11 product prices	a31 cheap price, a32 with preferential activities, a33 promotional efforts
		A12 product reputation	a34 network evaluation, a35 friends' evaluation
		A13 product message argument	a36 explain comprehensively, a37 show the effect, a38 compliment the degree
		A14 product inventory	a39 total number of goods, a40 remaining quantity, a41 limited quantity
	B7 live streaming media attraction (A15 to A17)	A15 live visualization	a42 strong sense of picture, a43 effect intuitive, a44 image specific
		A16 live interactivity	a45 can interact with anchors, a46 can chat with netizens, a47 interactive instant
		A17 live entertainment	a48 interesting performance, a49 interesting language, a50 active atmosphere
C3 consumer attitudes (B8 to B10)	B8 cognitive response (A18 to A20)	A18 value perception	a51 feel useful, a52 good value for money, a53 worth buying
		A19 quality perception	a54 good quality, a55 good performance, a56 feel good, a57 feel good results
		A20 trust perception	a58 is trustworthy, a59 feels reliable, a60 is real, a61 is credible
	B9 emotional response (A21 to A22)	A21 pleasant emotions	a62 happy, a63 relaxed, a64 satisfied, a65 pleased
		A22 evoking emotions	A66 excitement, a67 anticipation, a68 impulsiveness, a69 nervousness
	B10 intentional response	A23 behavioral intentions	a70 want likes, a71 want followers, a72 want to send bullet-screen comments, a73 want to send to friends, a74 want to buy
C4 consumer behavior (B11 to B12)	B11 deep engagement behavior (A24~A28)	A24 likes behavior	a75 likes
		A25 bullet-screen comments behavior	a76 send bullet-screen comments, a77 chat, a78 question consultation
		A26 retweets behavior	a79 share links
		A27 followers' behavior	a80 follow anchor, a81 follow store
		A28 continuous engagement	a82 continuous likes, a83 multiple purchases, a84 continuous send bullet-screen comments
	B12 purchase behavior	A29 purchase behavior	a85 place an order, a86 snapping up, a87 buy

Note: Ci, Bi, Ai, and ai are the main category, subcategory, initial category, and initial concept number, respectively.

4.2. Selective Coding

Selective coding is based on excavating core categories from the main axis coding, establishing systematic connections between the categories, and depicting the chakra conditions and behavioral phenomena through the developed process; this eventually forms the theoretical framework [25]. After selective coding, the typical relationship structure of the main categories is determined, as shown in Table 4 [29].

In this study, we propose "the formation and transformation mechanisms of deep consumer engagement and purchase behaviors in e-commerce live streaming" as a core topic to guide the relationship between the categories and form four logical processes: motivation drives consumers to use e-commerce live streaming, e-commerce live streaming attracts consumers to form attitudes, consumer attitudes lead to behaviors, and behaviors provide feedback and transformation to consumers' motivations.

Table 4. The typical relationship structure of the main scope.

Typical Relationship Structure	Connotation of Relationship Structure	Representative Statements of Interviewees (Analyzed Relationship Structure)
Consumer engagement motivations → use e-commerce live streaming	Demands of awareness, social, hedonic, and purchase can prompt consumers to use e-commerce live streaming	T26: Just out of curiosity, just to see what this is. (Use e-commerce live streaming because of cognitive needs)
e-commerce live streaming attractions → consumer attitudes	Attractions of e-commerce anchor product message; live streaming media can affect consumer attitudes	T33: When he recommends a product, he emphasizes his own experience, which is useful for me to understand the product and make a judgment about the quality of the product to decide whether to buy it. (Strong argumentative information helps consumers form a perception of the usefulness of the online content and make a decision)
Consumer attitudes → consumer behavior	Consumer attitudes such as cognitive response, emotional response, and intentional response can affect consumer behavior	T29: When I saw her try it on, I thought it should be good, and I kind of wanted to buy it at that time, so I ordered it first when she was on the link. (Consumers' quality perception attitudes have an impact on their purchases)
Consumer behavior → consumer engagement motivation	Consumer behaviors such as likes, bullet-screen comments, retweets, followers, and purchase can have an impact on the original motivation and generate purchase motivation	T29: I asked the anchor some questions through sending bullet-screen comments, learned a lot of information, and then felt that I needed this product. (By sending bullet-screen comments, the cognitive demand is satisfied and the purchase demand is generated)

Note: Ti is the interviewee number.

This study ultimately summarizes the process as follows: consumers' engagement motivations, such as cognitive, social, hedonic, and purchase demand, drive them to enter the e-commerce live streaming environment; subsequently, in the process of watching the live stream, they are influenced by the e-commerce anchor and the product message. As consumers' cognitive focus and emotional investment in the objects deepen, consumers form attitudes driven mostly by cognition, emotion, and intention, which, in turn, leads to deep engagement behavior (likes, bullet-screen comments, retweets, following, etc.) and purchase behavior. The deep engagement behavior of consumers manifests not only in a variety of behavioral content in the form dimension but also in the continuity of the above behavior in the time dimension. Ultimately, consumers' deep engagement behavior and purchase behavior will feed back to their original motivation and may cause a transformation from consumers' original motivation to the generation of new purchase demand; this will start a new process of influence around the satisfaction of purchase demand, and finally, lead to purchase behavior. The formation and transformation mechanisms model constructed in this study of deep consumer engagement and purchase behavior in e-commerce live streaming is shown in Figure 1.

4.3. Theoretical Sampling and Saturation Testing

Theoretical sampling is the process of forming concepts and revealing the relationships between them through the extraction of different samples, and the alternation of data analysis with sample extraction forms its basis [25]. In this study, three rounds of interviews were conducted. Eight current university students were interviewed in round 1, and the data were analyzed once the interviews were completed in order to further refine the interview outline based on the results. The sample size was then increased [30], and 12 more college students were interviewed in the second round. In order to expand the representation of the sample subjects and extract as many concepts as possible (including those not raised by the student population), during the third round of interviews, the researchers conducted interviews with 22 interviewees, including teachers, corporate employees, civil servants, and freelancers. Throughout the study, the researchers alternated

between interviews and data analysis, expanding the interview data with theoretical sampling and conducting coding when the interviews were completed. Until the end of the 3rd round of interviews, the researchers found that the extracted concepts and categories were richly developed, and no new important categories or relationships were found; thus, the theory was considered saturated.

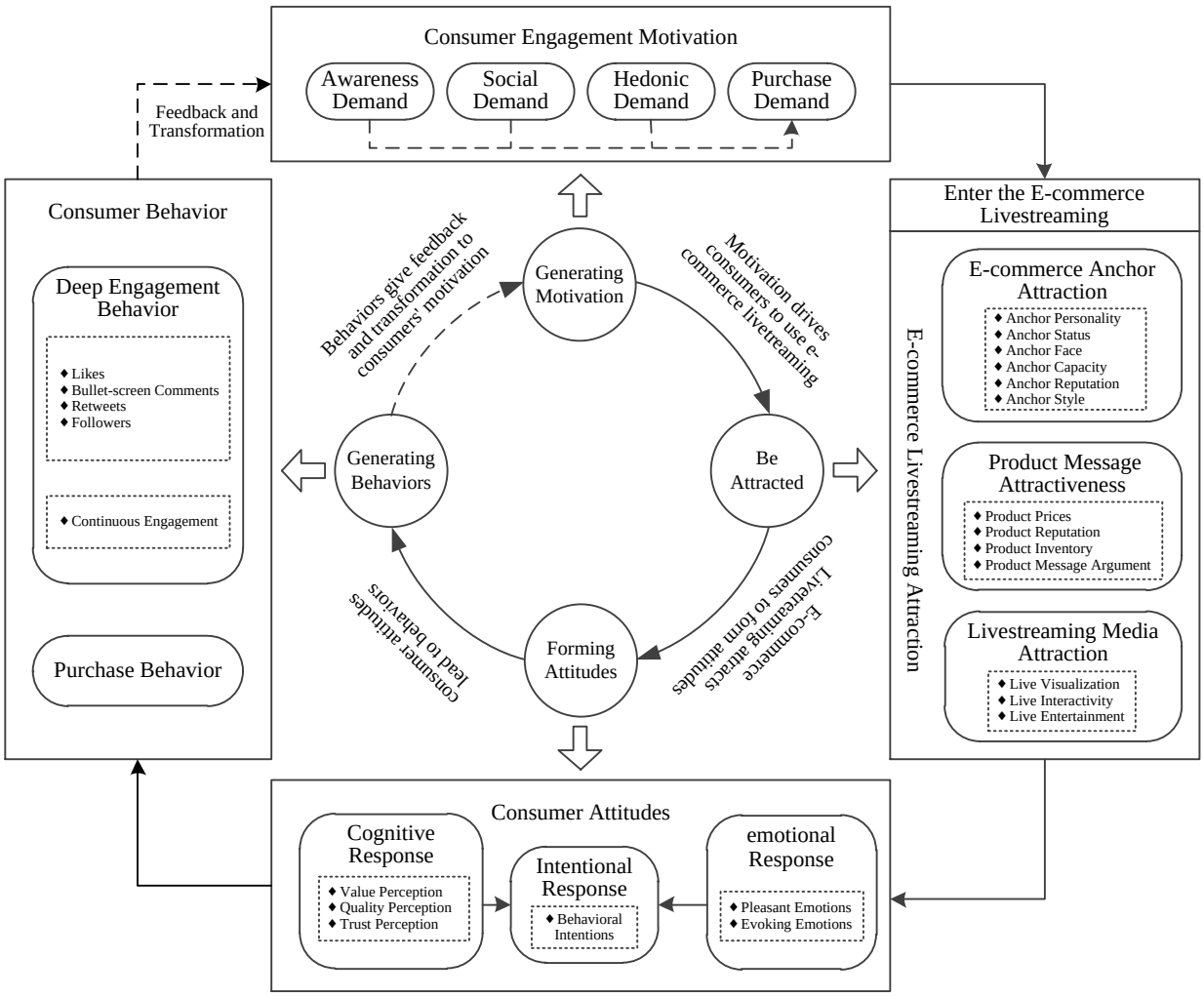

Figure 1. The formation and transformation mechanisms model of deep consumer engagement and purchase behavior in e-commerce live streaming.

5. Model Interpretation and Analysis

5.1. Motivation Drives Consumers to Use E-Commerce Live Streaming

Consumers' motivation to use e-commerce live streaming represents the starting point for their deep engagement and purchase behavior. This study finds that consumer motivations in e-commerce live streaming mainly include cognitive demand, social demand, hedonic demand, and purchase demand. Cognitive demand represents the intrinsic motivation of consumers to understand the e-commerce live streaming environment; social demand represents the intrinsic motivation of consumers to establish and develop relationships with others through e-commerce live streaming; enjoyment demand represents the intrinsic motivation of consumers to enjoy themselves and relax through e-commerce; and purchase demand represents the intrinsic motivation of consumers to purchase the goods or services they need through e-commerce live streaming. Consumers' perceived need is often what contributes to first-time e-commerce live streaming (e.g., T26: "Just out of curiosity, just to see what this is"). Additionally, in everyday life, whether it is a recommendation from a friend or a desire to share something with a friend, the need to be social is a motiva-

tion that keeps consumers focused and engaged in e-commerce live streaming. Of course, in addition to the desire to communicate with friends about e-commerce live streaming in real life, some consumers are also fascinated by interacting with other consumers in the e-commerce live streaming environment (e.g., T17: "Want to go watch bullet-screen comments and chat with others"). The purchase function of e-commerce live streaming is what most researchers are currently focusing on [3]. Unfortunately, few studies have been conducted that aim to uncover the differences in consumers' own purchasing demands and the relationship between consumers' deep engagement behavior and purchasing behavior from the consumers' perspective. For consumers with clear purchase goals, they enter e-commerce live streaming through live previews or active searching; however, there are also a large number of consumers who do not have clear purchase goals in advance and for whom e-commerce live streaming triggers their purchase demand. Experiential consumption brings happiness to consumers, and e-commerce live streaming environments often bring entertainment to consumers (e.g., T18: "I love going to see them perform, their poor acting skills are hilarious"). From the interview data, for individuals, hedonic demand was also confirmed by interviewees as one of the most important drivers of their engagement in e-commerce live streaming (e.g., T23: "I don't have something I want to buy every day, but I want to visit every day, just to watch and play").

5.2. E-commerce Live Streaming Attracts Consumers to Form Attitudes

During the consumer's time in the e-commerce live streaming environment, their self-perception is automatically linked to the live context [3]. When the e-commerce live stream's persuasive message, anchor, and channel are attractive to consumers, it deepens their cognitive focus and emotional involvement with the object of their attention; this triggers a cognitive or emotional response, which determines whether they experience deep engagement and a willingness to buy [21]. Consumers' cognitive, emotional, and intentional responses constitute their attitudes. In this study, consumer attitude refers to the set of conscious and psychological activities that individuals experience after being attracted to live content. A consumer's cognitive response mainly includes value perception, quality perception, and trust perception, their emotional response mainly refers to the pleasant and arousing emotions generated by e-commerce live streaming, and their intentional response mainly refers to their deep engagement and purchase intention.

Some studies have pointed out that the attractiveness of online platforms is an important factor in attracting users [31]. The attraction of e-commerce live streaming to consumers is mainly based on three major factors: the e-commerce anchor, the product message, and the live context; these are composed of the persuasive message, the persuader, and the persuasive context. The degree of attraction of these factors to the consumer often determines the consumer's decision to stay or leave (such as T09: "If you see nothing interesting live naturally crossed away"). The e-commerce anchor's attractiveness refers to the characteristics of the anchor themselves, including their character, identity, face, ability, reputation, style, and other factors that consumers care about. When an online community moderator begins to persuade users, it often facilitates the generation of the users' cognitive and affective focus, and thus, their engagement intentions [32]. The same is true of live streaming. The reason consumers are willing to accept an anchor and are persuaded by them is often related to their attraction to their preferred anchor (such as T22: "He is a professional, each live streaming of the selection is their own personal experience before determining, on this point I think he is trustworthy, so the desire to watch on"). In addition, the characteristics of the anchors and the consumers' emotional investment in them also have an evocative effect, and thus, trigger consumers' willingness to engage. For example, one interviewee (T31) cared a lot about the style of the anchor and mentioned that the anchor had an interesting way of speaking saying, "Every time I hear his phrase 'oh my god, buy it' I get so excited that I always want to send something to the screen".

Product message attractiveness refers to the price of a product, word of mouth, arguments, stock quantity, and other factors that consumers care about pertaining to products

recommended by anchors in e-commerce live streaming. Since the characteristic elements attached to the product itself have a greater influence on the formation of consumer attitudes [33], the delivery of the product message to consumers in e-commerce live streaming is a priority for anchors and merchants. Strong informative communication helps consumers perceive the usefulness of the online content and make a decision [34] (e.g., T33: "When he recommends a product, he emphasizes his own experience, which is useful for me to understand the product and make a judgment about the quality of the product to decide whether to buy it"). It is evident that information content has an influential role on consumers' cognitive reactions and behavioral intentions [35]. Due to the importance in e-commerce live streaming of information delivery [3], there is also an influential role of information content on consumers' emotional reactions and behavioral intentions (e.g., T12: "When hearing the price is very exciting, it is ready to be grabbed").

Live streaming media attractiveness refers to the environmental characteristics of the e-commerce live streaming media, such as live interactivity, live visualization, and other factors that consumers care about. The availability of technology can significantly increase individuals' psychological perceptions, such as that of their sense of autonomy, leading to engagement behavior [36]. Meanwhile, the entertainment aspect of webcasting can also significantly influence individuals' emotional experiences and willingness to use it [37]. Interactive media allow individuals to adjust their attitudes according to their perceptions of the external environment. In e-commerce live streaming, consumers can effectively receive different kinds of information through audio-visual means, so that they can react with their own senses to different kinds of content, including cognitive (e.g., T23: "Let the anchor try on or show details, basically you can see the effect of the product, and if it is good, you will consider getting it") and emotional (e.g., T17: "In my eyes it is an entertainment program, sometimes it is super funny, it can't be more joyful, so I want people who know people to watch it").

5.3. Consumer Attitudes Lead to Behaviors

Consumers' cognitive and affective responses drive their deep engagement and purchase intentions [21], which, in turn, leads to deep engagement and purchase behavior. Burton-Jones and Straub suggest a more refined conceptualization (based on level and duration of use) to define information system use [38]. Ogbanufe and Gerhart proposed the concept of deep usage, emphasizing that deep usage should consider not only whether the information system is used, but also how it is used, and which functions are used [8]. Based on the perspective of functional system use, this study differentiates engagement behavior from the perspectives of the cognitive focus and emotional involvement of consumers; moreover, it formally and temporally categorizes the specific deep engagement behavior of consumers in e-commerce live streaming environments into various social behaviors and the continuity of these behaviors. It was found that the diverse social behaviors in deep engagement mainly include likes, bullet-screen comments, retweets, following, etc. Persistent behavior mainly manifests as the continuous occurrence of the above engagement behaviors, meaning the continuous occurrence of a single or multiple of the above behaviors in terms of time. Consumers' cognitive attitudes have an impact on their purchases [18,39] (e.g., T29: "When I saw her try it on, I thought it should be good, and I kind of wanted to buy it at that time, so I ordered it first when she was on the link"), and consumers' emotional responses also play an important role in influencing consumer behavior. At the same time, we also identified deep consumer engagement behavior, in addition to purchase behavior (e.g., T11: "I'm happy to hear them talk interestingly, I'll send out bullet-screen comments, that is, simply chatting, but also point likes, occasionally retweets a bit").

5.4. Behaviors Provide Feedback and Transformation to Consumers' Motivation

Consumers develop engagement behaviors and new motivations after motivation drives them to interact with information systems [24]. In e-commerce live streaming, the result of consumer behavior determines the degree of consumer demand satisfaction;

therefore, the depth of a consumer's engagement or purchase behavior will feed back to their previous motivation, so that their previous degree of demand changes or shifts to generate new purchase motivation; this has an impact on their subsequent purchase behavior, such that the consumer begins a new process of demand satisfaction. One interviewee (T05) claimed to have quit e-commerce live streaming when their purchase demand was satisfied after completing a purchase. However, another interviewee (T35) said that they started to engage in e-commerce live streaming as a pastime, and after being attracted by the humorous dialogue between a celebrity and the anchor and their interesting performances, their happy emotions prompted deep engagement behavior, such as likes and bullet-screen comments; the continuous bullet-screen interactions motivated them to buy the goods advertised in the live stream with other consumers and led to purchase behavior. In fact, the consumer generated multiple rounds of engagement in the e-commerce live stream until their demands had all been met. Interactive behavior has a positive effect on e-commerce sales [40], and communication through consumer engagement in the comments area often leads to greater motivation to buy [41]. One interviewee (T06), who started to engage with e-commerce live streaming out of curiosity after being attracted by the anchors and the medium, achieved satisfaction of their curiosity and knowledge of e-commerce live streaming by using likes and sending bullet-screen comments. With the anchor's recommendation, the interviewee not only developed a social need to share goods with friends and post retweets about the live stream, but also developed a need to buy the product, and eventually made a purchase. Another interviewee (T29) said that she started watching an e-commerce live stream through a live preview and entered with no prior knowledge of the product message. As the consumer received the information explained by the anchor and asked questions through the bullet-screen comments, they became aware of the product message, and then, made a purchase after learning more about the price. A further interviewee (T36) said that she entered a celebrity's live streaming environment after a friend shared it with her, and the humorous dialogue and interesting performance led her to happily immerse herself in the stream; she excitedly expressed her love for the celebrity anchor through likes and comments, and subsequently decided to make a purchase to further show her support for the anchor. Deep engagement in e-commerce live streaming can help consumers (T30), so more time and effort will be invested in engaging with e-commerce live streaming in the future. Thus, the potential role of deep consumer engagement behavior in influencing purchase behavior can be seen.

6. Discussion

In this study, the scientific issues pertaining to consumer behavior in the phenomenon of e-commerce live streaming are condensed. Through a literature review, in-depth interviews and an exploratory analysis based on grounded theory, we constructed a model of the formation and transformation mechanisms of the deep engagement and purchase behavior of consumers in e-commerce live streaming. According to the research results, consumers enter the e-commerce live streaming environment not only because of purchase demand, but also due to cognitive, social, and hedonic demand. Consumers are attracted by the e-commerce anchor, the product message, and the live streaming medium while watching live content. As consumers deepen their cognitive focus and emotional involvement with their objects of interest, they develop attitudes that are dominated by cognitive, emotional, and intentional content, which, in turn, leads to deep engagement and purchase behavior. Ultimately, consumers' deep engagement and purchase behaviors result in feedback to their engagement motivation, so that their original motivation is transformed into new purchase demand; then, a new process of influence begins around the new demand to be met; and finally, new purchase behavior is formed. Deep consumer engagement behavior manifests not only as diverse and subdivided social behaviors, such as likes, bullet-screen comments, retweets, and follows in the formal dimension, but also as persistent behaviors in the time dimension.

6.1. Theoretical Contribution

This study makes the following three contributions to the study of consumer behavior in e-commerce live streaming: first, previous studies have mostly defined consumer engagement from an interpersonal interaction perspective [5,9,10,12–15], failing to subdivide consumer engagement behavior and expand its connotations. This study follows consumer engagement behavior in an e-commerce live streaming context based on the perspective of the functional system use, distinguishes shallow engagement behavior from deep engagement in terms of the degree of the consumer's cognitive focus and emotional involvement, and extends the theory of consumer behavior in e-commerce live streaming environments from formal and temporal dimensions to diverse social behaviors and the persistence of these behaviors. This study also extends the theory of consumer behavior by differentiating deep engagement behavior in the e-commerce live streaming environment in the formal and temporal dimensions from diverse social behaviors and the continuity of these behaviors.

Second, previous studies have mainly adopted a factor identification approach to explore which factors influence the occurrence of a certain engagement behavior [3,16–18]; however, they lack analyses of the formation process and transformation paths of deep consumer engagement and purchase behavior, as well as theoretical guidance for understanding how to facilitate consumers' transitions from deep engagement behavior to making a final purchase. This study overcomes the limitations of previous factor identification studies conducted from a static perspective (e.g., cross-sectional data) and constructs a model of the formation and transformation mechanisms of the deep engagement and purchase behavior of consumers in e-commerce live streaming. Following the motivation that drives consumers to use e-commerce live streaming, these live streams lead consumers to form attitudes; these attitudes motivate consumers to generate behaviors; and the behaviors feedback and transform consumers' motivations. Using this pattern, we systematically developed a complete transformation model of the relationship between deep consumer engagement, purchase, and attitude, which enriches the theoretical results of e-commerce live streaming consumer behavior.

Third, in previous studies, few scholars have looked at the formation mechanism of consumer behavior in an e-commerce live streaming environment using the theories of persuasion and use satisfaction. This study enriches and refines Hovland's persuasion theory and innovatively applies it to an e-commerce live streaming environment (a virtual community) to discover the interaction between external stimuli (such as anchors, messages, and media) and consumers' own cognitive foci. Moreover, it aims to determine the interplay of external stimuli (such as anchors, messages, media, and consumers' own cognitive preoccupations and emotional involvement), which influence the attitudes of e-commerce live streaming consumers and trigger the formation mechanisms of their behaviors, from browsing to deep engagement and purchasing. the uses and gratifications theory is extended to explain consumers' e-commerce live streaming use motivation and their deep engagement and purchase behaviors. Compared to studies that aim to understand consumer behavior in e-commerce live streaming through passive stimulus-related theories [3,13], this study emphasizes the important role in this process of subjective consumer motivation and the active receiving and seeking of information.

6.2. Practical Implications

The practical insights gained from this study are as follows: first, in e-commerce live streaming environments, the anchors, the messages, and the media are the main factors that attract consumers. Merchants and platforms should consider personality, face, style, and other qualities in the selection and appointment of anchors. Anchors, merchants, and platforms should make full use of the media advantages of e-commerce live streaming while ensuring the quality of goods and effective delivery of information; moreover, they should take full advantage of the interactive and intuitive features of live streaming and

add appropriate entertaining content to create a relaxed and pleasant atmosphere in the live streaming environment.

Second, consumer behavior depends not only on the degree of attractiveness of each external factor in e-commerce live streaming, but also on consumers' demand motivation and internal changes, such as cognitive and emotional changes triggered by their attraction to the live content. Anchors, merchants, and platforms should fully explore the motivations of consumer engagement in e-commerce live streaming; distinguish the demands of new users, intermittent users, and core users; and meet the demands of all types of consumers. In the process of live streaming, it is important to consider changes in cognition, emotion, and other attitudes in the process of consumer engagement with e-commerce live streaming, and thus, achieve continuous empowerment for users.

Third, anchors, merchants, and platforms should not only care about consumers' use of e-commerce live streaming environments, but also focus on how consumers use the live streaming environment and which features they use. Moreover, they should be aware of how consumers' deep engagement behaviors will impact their engagement motivation in order to improve their experiences and correctly guide their behaviors; in doing so, they can meet consumer demand, improve the happiness index of consumer engagement in e-commerce live streaming, and establish an important role for e-commerce live streaming in the connection between consumers and merchants.

6.3. Limitations and Future Research

This study provides inspiration for future research; however, future research must also consider the limitations of this study. First, the interviewees of this study were all from China, so the applicability of our research results to consumers in different countries remains to be discussed. In the future, we could expand the sample size, and consider the background of e-commerce live streaming in different countries and the possible impacts of different consumer cultures. Second, this study is an exploratory study based on a small sample of in-depth interviews, and the generalizability and generalized applicability of the findings need to be further verified. In the future, the sample size could be further expanded to improve the reasonableness and applicability of the model, and we could also obtain data from different applications and verify the relationships between variables in the model via quantitative research. Third, this study did not differentiate between different platforms, nor did it further differentiate between different deep engagement behaviors. In the future, we will focus on various types of proprietary live streaming platforms, while trying to explore the differences between different deep engagement behaviors, grading these behaviors, and performing more detailed and in-depth research on them.

7. Conclusions

Although many scholars have conducted relevant research on e-commerce live streaming, the existing research is scattered and unsystematic. Studying consumer behavior in e-commerce live streaming can help businesses and platforms to understand the influencing factors and psychological processes of consumer behavior, so as to formulate marketing strategies. This study shows that demand motivation, the anchor, the product message, the live medium, and consumer attitudes are the main factors that affect the depth of consumers' engagement and purchase behaviors. The generation of consumer purchase behavior is a dynamic process and does not occur overnight. The theoretical model constructed in this study effectively explains the process and enriches the theoretical results of consumer behavior in e-commerce live streaming. Our research results also provide ideas for businesses and platforms to reasonably carry out live streaming. Although there are some limitations in our research results, this is a phased study and can be further studied in the future.

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