Domestication and Reverse Domestication: An Empirical Study of Algorithmic Recommendation Phenomena in Douyin Live Streaming (Postprint)

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Abstract

Objective

As digital technology advances, algorithms have become pivotal in reshaping information dissemination and social structures. This study examines aspects of the algorithmic recommendation phenomenon in Douyin live streaming, aiming to provide supplementary empirical materials for research in this domain.

Methods

This study employs an empirical research methodology, utilizing three-level coding from grounded theory to identify two core explanatory categories— "domestication" and "reverse domestication" —thereby advancing the dialogue with domestication theory.

Results

At the domestication level, algorithmic recommendation constitutes an object characterized by domestication difficulty and concealment. Users possess two fundamental pathways for domesticating algorithmic recommendations and their associated content, while algorithmic recommendations within the platform exhibit interconnections and mutual influences across different functional zones. At the reverse domestication level, the domestication of live streaming participants by algorithmic recommendations proceeds imperceptibly from behavior to cognition and from individual to collective dimensions. Moreover, a strong correlation exists between the logic of reverse domestication and the inherent design of algorithmic recommendations.

Conclusion

While algorithmic recommendations offer benefits to live streaming participants, they also embody a latent control logic inherent to the digital capitalism era.

Full Text

Preamble

Domestication and Reverse Domestication: An Empirical Study of Algorithmic Recommendation Phenomena in Douyin Live Streaming

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Abstract

With the deepening development of digital technology, algorithms have become a key element in the transformation of information dissemination and social construction. This study examines the phenomenon of algorithmic recommendation in Douyin live streaming through empirical research, attempting to supplement existing studies with empirical materials. Using grounded theory and three-level coding, the study identifies two core explanatory categories: "domestication" and "reverse domestication," which further dialogue with domestication theory. At the domestication level, algorithmic recommendation proves to be an object with certain domestication difficulties and concealed characteristics. Users domesticate algorithmic recommendation and its related content through two basic paths, while algorithmic recommendations across different functional areas of the platform interconnect and influence one another. At the reverse domestication level, the domestication of live streaming participants by algorithmic recommendation is subtle and imperceptible, extending from behavior to concepts and from individuals to groups. Moreover, a strong correlation exists between the logic of reverse domestication and the design of algorithmic recommendation itself. The conclusion suggests that while algorithmic recommendation does not necessarily disadvantage live streaming participants, it embodies a hidden control logic within the digital capitalism era.

Keywords: algorithmic recommendation; grounded theory; domestication; reverse domestication; Douyin live streaming

1. Problem Statement: Algorithmic Recommendation and Douyin User Interaction

With the profound development of digital technology, algorithms have become a crucial element in transforming information dissemination and social construction, giving rise to numerous phenomenon-related keywords closely associated

with algorithms, such as "algorithmic black box," "filter bubble," and "information cocoon." Algorithmic recommendation is no exception. From early practices of automated news production and personalized recommendation in the journalism industry to recent short videos, live streaming, and information push on various social platforms, algorithmic recommendation—as one of the common applications of algorithmic technology—has been deeply integrated into people's daily lives. Specifically, algorithmic technology is "a series of operational steps to solve specific problems or achieve definite results" [1], while algorithmic recommendation addresses the problem of recommending preferred content by tracking users' online behaviors, namely through processing user profiles, platform information, environmental characteristics, and other data to generate recommendations and ultimately form a feedback operational process [2]. As one of China's live streaming platforms with the largest user base, Douyin also establishes connections with live streaming participants through algorithmic recommendation [3], reflecting the interaction between user agency as live streaming participants and technological agency of the platform.

In recent years, research focusing on algorithms with Douyin as a typical case has become a new academic concern. For instance, Jiang Xiaoli et al. examined Douyin users' self-practices within algorithmic anxiety, emphasizing the transformation of user agency and subjectivity from "enslaved by objects" to "empowered by objects" during the "re-domestication" of the platform [4]. Liang Lili et al., starting from intangible cultural heritage video live streaming on Douyin, proposed optimizing algorithms as a specific measure to "promote new inheritance mechanisms cultivated by network intangible cultural heritage shaping new orders" [5]. Yan Qihong, based on social cognitive theory, studied the influence mechanism of users' algorithmic perception on feedback behavior, finding that in media practice, users can perceive that information is recommended by algorithms, forming different perception patterns that feed back into behavior [6]. Additionally, numerous studies have broadly examined advertising effectiveness in platform live streaming, human-platform interaction relationships, etc. However, some studies have only examined algorithmic definition from the "pre-domestication—domestication" perspective, and no scholars have yet conducted research on Douyin's algorithmic recommendation phenomena from the "domestication and reverse domestication" angle [7]. Therefore, this article empirically examines the algorithmic recommendation phenomenon in Douyin live streaming, identifies "domestication" and "reverse domestication" as two core explanatory categories through grounded theory's three-level coding, and further dialogues with domestication theory while supplementing existing research with empirical materials.

2. Literature Review and Research Design: Domestication Theory and Grounded Theory

Domestication was originally used as a metaphor for "taming wild animals" and derives from empirical research on communication technologies to refer to the

process of "taming information and communication technologies." It comprises four steps: commodification, objectification, incorporation, and conversion [8]. Commodification refers to bringing technology into domestic spaces; objectification refers to the physical and symbolic placement of technology in that space; incorporation refers to the ways technology is used in daily life; and conversion refers to technology as part of people' s identity and self-presentation [9]. Reverse domestication extends Silverstone' s above thinking, further reflecting on "technology" and emphasizing concerns about "the alienation of the relationship between humans and media technology in the digital age" [10]. To some extent, this represents a shift from "humans domesticating technology" to "technology domesticating humans," forming a consensus that while humans domesticate media technology, they are also reverse-domesticated by it. In fact, numerous recent studies have addressed reverse domestication, covering children' s online consumption behavior [11], farmers' Douyin practices [12], smart home usage [13], and other aspects. However, no research has yet analyzed algorithmic recommendation phenomena in live streaming, making this study an attempt to supplement reverse domestication research with case studies.

In this article, users as live streaming participants represent "humans," while algorithmic recommendation and related content in live streaming platforms represent "technology,"corresponding to human agency and technological agency respectively.

This study primarily employs in-depth interviews, with all research samples determined through purposive sampling. To more accurately address research questions concerning algorithmic recommendation phenomena in Douyin live streaming, the sampling criterion was set as "watching Douyin live streaming for more than 90 minutes daily" to ensure participants were heavy users with adequate understanding of Douyin live streaming. Ultimately, 20 interviewees were identified. Basic information about the research sample is shown in Table 1 .

The study utilized a combination of audio recording and note-taking during interviews, with participants' consent. After interviews, materials were organized, verified, and cleaned through recordings and transcripts, with some participants revisited. The analysis phase then commenced. To protect interviewee privacy, all personal information was coded. Additionally, considering limitations in representativeness and comprehensiveness of the surveyed group, the researcher also obtained supplementary materials related to algorithmic recommendation from Douyin' s official internal sources through personal connections.

Grounded theory, as a methodology, emphasizes the combination of induction and deduction, focusing on research data collection and analysis through clear procedures and the gradual emergence of theoretical concepts. Therefore, the collected research materials underwent three-level coding: open coding, axial coding, and selective coding, as shown in Table 2 .

The coding framework reveals two domestication pathways: first, domesticating

algorithmic recommendation technology itself in Douyin live streaming, manifested primarily in platform improvements to algorithmic technology; second, domesticating live streaming content selection through algorithmic recommendation technology. Two reverse domestication pathways also emerge: first, live streaming recommendation algorithms' disciplining of user behavior; and second, their disciplining of user concepts. These pathways illustrate the dynamic interplay between human agency ("humans → technology") and technological agency ("technology → humans").

3. Research Analysis: Domestication and Reverse Domestication

When algorithmic recommendation intervenes in Douyin live streaming, this media technology, as a tool created and domesticated by "humans," simultaneously domesticates live streaming participants through its own "technological intentional structure," forming a process of reverse domestication [14]. This is not a two-stage process of user participation in Douyin live streaming but a symbiotic, simultaneous process.

Before formal analysis, as an analytical premise, it must be noted that interview data revealed 55% of respondents remained at the stage of being relatively unfamiliar (having heard of it) or completely unfamiliar with algorithmic recommendation. Moreover, this familiarity level did not show significant positive correlation with education level. Higher familiarity concentrated among high school and undergraduate respondents. Intrigued by this phenomenon, the researcher discovered through snowball sampling that familiarity with algorithmic recommendation closely relates to the degree of live streaming participation.

In this natural process of "domestication and reverse domestication," several specific situations can be discussed: two types of "domestication" and two types of "reverse domestication."

The first domestication involves algorithmic recommendation technology itself in Douyin live streaming, primarily manifested in platform improvements to algorithmic technology. These improvements originate partly from technological advancement and partly from real-time user feedback. Simultaneously, domestication of this technology demonstrates a shift from text to dynamic visuals. As one interviewee noted: "The platform itself also improves this recommendation algorithm and the algorithmic recommendation settings for users. Like earlier, there was a straightforward 'not interested' button (that broken heart button), then later there were those randomly distributed video-form questionnaires asking how the live streaming was, whether the type matched your needs, etc., and now there' s a direct jump from text selection to live streaming visuals. The platform itself makes many adjustments under user influence and iterates quickly."

The second domestication involves using algorithmic recommendation technology in Douyin live streaming to domesticate content selection. In this process,

Douyin live streaming influences users' content selection through algorithmic recommendation primarily via two major aspects: first, direct "audio-visual feedback," "not interested," and "optimize live streaming recommendation" functions; second, user profiling, including users' live streaming viewing habits and consumption habits. The study also found that short video viewing habits affect live streaming algorithmic recommendations, and user profiles across different functional areas of the platform are not isolated but interconnected. One interviewee explained: "I myself watched quite a lot of live streaming at first, but I only knew there was a 'not interested' button; I didn' t know anything else, let alone terms like algorithmic recommendation you mentioned. I accidentally discovered the 'optimize live streaming recommendation' option by long-pressing (probably pressed it by mistake) while watching a live stream, then I searched on Zhihu and understood it was recommendation. Later, I started using it."

In both domestication processes, the study identified a distinctive "concealment" characteristic in platform live streaming algorithmic recommendations. Platforms prefer using user profiles influenced by users' own viewing behaviors as the basis for algorithmic recommendation, thereby subtly completing live streaming algorithmic recommendation. This confirms the earlier-mentioned reality of alienation from algorithmic recommendation even among users with higher education levels and live streaming participation. As one respondent remarked after being shown the "optimize live streaming recommendation" function: "This is too hard to find. Who bothers to dig around for these buttons (function keys) at the bottom? But you know what, this is actually pretty good for selecting new live streams. I also remember there were those survey videos (video preference questionnaires) before, but I basically ignored them. If this optimization (optimize live streaming recommendation) were made more prominent, I would actually use it. (laughs)" Another noted: "I experimented myself. For a while, I was really into short videos of dancing, just crazily liking and commenting. Before this, the platform never recommended any dance-related live streams to me, but since (the liking and commenting), it synchronized to my live streaming recommendations within a day or two."

The first reverse domestication involves live streaming recommendation algorithms' disciplining of user behavior, most notably manifested in changed search habits influenced by the "optimize live streaming recommendation" function and fixed viewing habits shaped by algorithmic recommendation, thereby increasing viewing stickiness. Similar reverse domestication phenomena exist in live streaming consumption habits. As one interviewee stated: "This algorithmic recommendation is itself set by the platform. When we watch, we actually participate in this relationship of using and being used. For example, you might think you' re taking the initiative by using 'not interested' to eliminate live streams you don' t like, but you' re actually falling into its trap because you' re also changing your viewing behavior through methods the platform has set up." Another mentioned: "Sometimes I don' t know what to watch or search for. I' m very willing to use that 'optimize live streaming recommendation' for 'fuzzy searching' because it' s straightforward—hope to recommend or not recommend

—and after doing it, it really hits the spot, all content I like to watch."

The second reverse domestication involves live streaming recommendation algorithms' disciplining of user concepts. Numerous studies have shown that any content from algorithmic recommendation always reflects, consciously or unconsciously, certain social concepts, representing a degree of acceptance of algorithmic-recommended concepts [15]. In Douyin live streaming' s algorithmic recommendation, the disciplining of user concepts follows a process from "increasing contact rate" to "enhancing stickiness" to "repeated reinforcement," representing a continuation of influence on user behavior. In Douyin live streaming' s algorithmic recommendation, this includes content-oriented algorithmic recommendation, user-collaboration-oriented algorithmic recommendation, association-principle-oriented algorithmic recommendation, and random algorithmic recommendation. In this process, algorithmic recommendation also influences group concepts through disciplining user concepts. Specifically, high-frequency exposure to content about a certain concept affects users' cognition to some extent, and this cognition, while influencing individual users, also spreads through algorithmic recommendation to similar users. With an expanding user base, certain group concepts are implicitly embedded.

This study empirically examined algorithmic recommendation phenomena in Douyin live streaming, identifying "domestication" and "reverse domestication" as two core explanatory categories through grounded theory' s three-level coding, which also serve as the theoretical foundation of this article. The analysis then described and examined two domestication phenomena and two reverse domestication phenomena, revealing that at the domestication level: (1) algorithmic recommendation is a domestication object with certain difficulties; (2) algorithmic recommendation itself possesses concealed characteristics; (3) users domesticate algorithmic recommendation and related content through two basic paths; and (4) algorithmic recommendations across different functional areas of the platform interconnect and influence each other. At the reverse domestication level: (1) algorithmic recommendation' s domestication of live streaming participants is subtle and imperceptible; (2) this domestication extends from behavior to concepts and from individuals to groups; and (3) a strong correlation exists between reverse domestication logic and algorithmic recommendation' s own design.

On the surface, algorithmic recommendation in Douyin live streaming appears not to disadvantage participants, but it actually embodies a hidden control logic within the digital capitalism era. As media-influenced technological exploitation "brings about a new form of coercion, a new slavery···its exploitation is even more efficient" [16]. This coercion widely exists in its influence on behavior and concepts, as well as in its concealed nature [17]. Therefore, a critical perspective should be maintained toward this algorithmic recommendation phenomenon in Douyin live streaming.

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Note: Figure translations are in progress. See original paper for figures.