

Emotional Dynamics, Algorithmic Amplification Mechanisms, and Opinion Polarization in Celebrity Fan Culture on Social Media Platforms

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Abstract. On social media, celebrity fan culture, often known as fandom culture, has grown into a prominent collective phenomenon, reshaping digital public discourse through intense user engagement and the development of online communities. This paper investigates the interplay among emotional mobilization, opinion rigidity, and opinion polarization within fan communities, and their influence on the online public opinion ecosystem. By integrating theories and prior studies on public opinion, emotional contagion, and algorithmic effects, it examines how fan communities' structures, emotional ties, and identity politics encourage opinion stability and conformity. In addition, it further explores how emotional framing by fan leaders shifts factual debates into emotional conflicts and accelerates opinion diffusion, while data-driven recommendation systems on social media amplify these effects through echo chambers, filter bubbles, and a bias toward high-arousal content. Key findings reveal that emotional mobilization and algorithmic amplification synergistically intensify group antagonism and opinion polarization. The study further discusses implications for platform governance, such as algorithmic optimization and institutional regulation, and highlights the need for media literacy and emotional regulation to reduce polarization.

Keywords: Celebrity Fan Culture, Social Media Public Opinion, Emotional Mobilization, Algorithmic Recommendation, Opinion Polarization

1. Introduction

On social media, public opinion has evolved into a dispersed ecosystem where celebrity fan groups, defined by intense emotions, organized leadership, and platform-driven engagement, play a major role in shaping discourse and provoking conflicts. Despite previous studies on emotional contagion, algorithmic echo chambers, and fandom identity politics, they often treat emotional mobilization and algorithmic effects in isolation, overlook the role of fandom structures, and fail to analyze how fan leaders' emotional framing, amplified by algorithms, intensifies polarization. This study fills the existing gap by exploring the interactions among emotional dynamics, algorithmic amplification, and opinion polarization in fan culture. Specifically, it aims to clarify how emotional mobilization contributes to the stasis of opinions, and how algorithms exacerbate this process. It also examines how they jointly contribute to the intensification of group opposition. In addition, it explores how

emotional frameworks strengthen fan identities and stifle dissent, and how algorithms intensify emotional conflicts. Accordingly, this study adopts a mixed research approach, including literature integration to construct a theoretical framework, analysis of fan conflict cases, network and content analysis to depict the structure and measure emotional narratives, and also through participation data for algorithm simulation. In doing so, it explores how emotions and algorithms contribute to fan polarization, providing insights for platform governance and media literacy.

2. Overview of celebrity fan culture in the social media context

In the age of social media, celebrity fan culture represents a collective, identity-driven phenomenon where individuals form communities around admiration for public figures, and membership often becomes integral to their sense of self [1]. Unlike casual audiences, fans allocate considerable time, emotional energy, and sometimes financial resources, rendering fandom primarily a digital culture dependent on social media platforms for communication, coordination, and visibility [2,3]. Platform features like Weibo Super Topics, X hashtags, or TikTok challenges amplify collective engagement, enabling rapid information diffusion and large-scale mobilization [4,5]. These digital spaces are not merely communication channels but formative environments where fan identities are constructed, reinforced through shared symbols, labels, and values [1]. At a structural level, fandoms have semi-hierarchical networks, with power concentrated among central figures like fan club leaders, key content creators, and big fans, who organize activities like data coordination, fan events, and crisis management [3,4]. This hierarchical structure follows a power-law distribution, with influential nodes gaining increasing visibility over time via the "priority connection mechanism" in network theory [6]. Core members shape dominant narratives, marginalizing dissent and fostering collective purpose [4]. And social media platforms reinforce this structure by prioritizing content from high-engagement users, further entrenching the influence of core fan leaders [5,7].

Fandoms endure through emotional attachment, which fosters continued involvement and loyalty [4,6]. And this emotional bond is further driven by psychological needs for belonging and self-expression, motivating fans to defend their idols unconditionally. Anger toward criticism or fear of reputational harm only serves to reinforce their loyalty [1]. Consequently, contradictory evidence is frequently dismissed, and accusations are framed as attacks by "haters", a pattern that emerges from the fusion of personal identity with both the fandom and its idol [1,4]. In response to controversies, fan communities use coordinated strategies, such as flooding comment sections with positive content, redirecting focus to the celebrity's achievements, or organizing mass reporting of critical accounts, often orchestrated by fan leaders who frame criticism as an attack on community identity [3,8]. Moreover, the persistence of opinions within fandoms is shaped by both social and technological influences. Social pressure to conform, along with shared emotional experiences like celebrating an idol's achievements or expressing collective outrage, strengthens group unity and reduces tolerance for opposing views. Technological factors, such as algorithmic recommendations, further restrict differing viewpoints, reinforcing existing beliefs and deepening polarization [4,6]. Technologically, algorithmic recommendations restrict access to differing viewpoints, fostering an "information bubble" effect that strengthens pre-existing beliefs [5,7]. These structural, emotional, and technological dynamics make fandoms prone to opinion rigidity and intergroup conflict [2].

3. Emotion-driven mechanisms of opinion dissemination in fandom culture

3.1. Emotional dynamics in opinion formation in fandom communities

Emotion plays a central role in opinion formation within fandoms, especially through the emotional framing used by fan leaders [4,8]. Rather than guiding fans toward evaluative judgment, such framing steers interpretation by activating shared affective responses: criticism of the idol is framed as hostility toward the fandom itself, while the idol is positioned as a victim of injustice, shifting attention away from factual assessment [4,6]. This process reflects social appraisal theory, whereby emotions are shaped through collectively constructed interpretations of events [6]. For example, promotional narratives highlighting an idol's "unrecognized hard work" evoke pride, while framing criticism as an "unfair smear campaign" stirs anger and defensive solidarity [1,4].

Once emotional frames dominate interpretation, factual disagreement is readily transformed into emotional confrontation [6]). Strong emotional attachment reduces tolerance for critical evaluation, as criticism of the idol is interpreted as a symbolic threat to the fan's self-identity [1]. Defensive emotions like anger are then spread through emotional contagion mechanisms, including mimicry, category activation, and social learning, whereby individuals adopt prevailing emotional responses and associate criticism with antagonistic out-groups [2,6]. As a result, discussions over performance or artistic quality often turn into personal attacks, with emotions overriding rational debate [4,5]. In addition to immediate reactions, emotional dynamics reinforce the collective identity within fandom communities [1,4]. Repeated shared emotional experiences, like collective celebration of an idol's milestone or indignation at a perceived injustice, reinforce group boundaries and internal cohesion. These emotions are reinforced through ritualized practices such as fan meetings, online countdowns, and emotionally charged fan content, which serve to normalize aligned attitudes [2,3]. As a result, emotional contagion spreads affect and strengthens group cohesion, driving greater conformity to dominant opinions for continued membership [4,8]. Fans who express dissenting views risk social exclusion, further reinforcing opinion uniformity within the community.

3.2. Attacks and harassment toward dissenters in fandom communities

In fandom communities, attacks on dissenters are not arbitrary but stem from emotional contagion dynamics that prioritize swift mobilization over thoughtful consideration [2,6]. And the dominance of high-arousal emotions, particularly anger, outrage, and fear, affects how criticism is interpreted, spread, and transformed into collective action against perceived out-group actors [6,9]. Existing studies on emotional diffusion show that high-arousal emotions lead to faster, broader information spread by triggering urgent motivations, driving actions like sharing, commenting, and reposting. Within fandom contexts, anger toward critics or excitement over an idol's success spreads rapidly, as these emotions motivate fans to engage instantly in defensive or celebratory actions [2,4]. Fear-related emotions, such as fear of an idol's reputation being damaged, diffuse more gradually but contribute to sustained attention and participation once a critical mass of users is engaged [6]. By prioritizing highly engaged content, social media algorithms amplify emotional intensity [5,7].

In addition, victimhood narratives play a pivotal role in intensifying emotional mobilization and justifying aggressive responses toward dissenters [4,8]. By framing idols or fandoms as victims of bias, conspiracy, or malicious targeting, fan leaders activate sympathy and moral outrage, which accelerates emotional diffusion and collective alignment [4]. For example, a negative review of a celebrity's film may be recast as a "malicious attack" or an attempt to "suppress talent," turning a critique into an injustice [3,6]. This process reflects social appraisal mechanisms, whereby shared

interpretations of unfairness amplify emotional contagion and legitimize hostile reactions toward critics [1,6]. Besides, emotional dynamics help fandoms manage negative events by shifting focus away from criticism [4,5]. For example, fans often amplify positive content, like idol achievements or charitable acts, to overshadow unfavorable information [3]. During scandals, for instance, fan communities may flood platforms with nostalgic content of the idol's "humble beginnings" or testimonials of their kindness to reinforce shared emotional values [1]. These strategies are effective because emotionally charged content drives higher engagement, aligning with platform algorithms that favor high-arousal material [5,7]. As a result, dissenting voices are overwhelmed by the volume of positive content, amplifying harassment and limiting critical discourse [2,8].

4. The impact of algorithmic recommendation on fandom amplification

4.1. Recommendation systems and public opinion formation

Fandom public opinion is heavily influenced by social media recommendation systems, which use behavioral data such as likes, shares, comments, search history, and viewing duration to personalize content [5,7]. These systems are designed to maximize user engagement by prioritizing content that aligns with individual preferences, creating a "filter bubble" effect. As a result, fans are exposed to more idol-related content, while criticism remains less visible, leading to a more uniform flow of information within fandom networks [2,5]. For example, a K-pop fan on Instagram sees mainly positive content, with critical posts suppressed by the algorithm [3,7].

Moreover, algorithmic recommendations reinforce echo chambers, where fans are exposed only to views that align with their existing beliefs [5,10]. This pattern highlights differences in network structures. While Watts-Strogatz (WS) small-world and fully connected networks maintain opinion diversity, Barabási-Albert (BA) and Erdős-Rényi (ER) networks, common in social media, generate one-sided public opinion due to their scale-free and random connectivity [6]. In BA networks, fans with higher engagement like core fan leaders gain more visibility as their content reaches a wider audience, while dissenting views are pushed aside [6,7]. This is because algorithms prioritize high-engagement (positive/emotional) content, which reinforces opinion rigidity and limits exposure to alternative perspectives [4,5]. Besides, algorithms exhibit an inherent bias toward content with high emotional intensity, as such content generates higher engagement rates [5,7]. Platforms like Weibo, X, and TikTok prioritize content based on engagement metrics such as shares, comments, likes, and retweets, thus ensuring that emotionally intense posts, including fan conflicts, victim narratives, or celebratory messages, gain more visibility [3,5]. This creates a "digital emotional contagion" effect, where content that elicits strong affective responses (anger, joy, outrage) is more likely to go viral, further polarizing discourse [6,9]. For example, a post by a fan leader accusing a rival celebrity of "stealing opportunities" is likely to generate more engagement than a nuanced critique of an idol's performance, leading algorithms to prioritize the former and amplify inter-fandom tensions [7,8].

4.2. Polarization effects and intervention strategies

Algorithmic amplification fuels inter-fandom tensions by prioritizing emotionally charged content rooted in conflict [5,7]. As a result, "fan wars" between rival fandoms escalate as provocative posts, such as criticisms of opposing celebrities, popularity comparisons, or misconduct allegations, are promoted to rival fan groups, triggering defensive and retaliatory reactions [2,3]. This cycle of provocation and retaliation is magnified in BA networks, where a single controversial post can spread to millions of users in hours. Algorithms reward the engagement generated by these conflicts,

further entrenching the cycle and deepening polarization [5,7]. For instance, a dispute between fans of two actors over a casting decision can escalate into mass harassment, with algorithms amplifying the most incendiary posts to maximize user interaction [2,8].

To address polarization, platforms must refine algorithms to limit the amplification of extreme content and encourage greater diversity of viewpoints [5,7]. Proposed strategies include adjusting algorithms to prioritize accuracy, civility, and diversity over engagement, adding "diversity filters" to expose users to varied perspectives, and implementing stricter measures to curb viral hate speech and harassment [6,10]. For example, Weibo could modify its Super Topic algorithm to incorporate more balanced content, resembling WS small-world networks, which foster rational and nuanced discourse through shorter paths and higher clustering [5,6]. Platforms could also limit the visibility of content that incites violence or targeted harassment, even if it generates high engagement [7,8].

Besides, institutional regulation and user education are essential components of a comprehensive solution [5,8]. Regulatory frameworks should mandate platforms to disclose algorithmic practices, swiftly remove harmful content, and hold fan leaders accountable for organizing harassment or manipulation campaigns [3,10]. For example, regulators require transparency reports on algorithmic amplification of emotional content and impose fines for failing to comply with anti-harassment policies [5,7]. At the same time, media literacy and emotional regulation education can empower fans to recognize algorithmic bias, critically evaluate information, and manage intense emotions like anger or hostility [1,8]. Educational programs could teach users to recognize emotional framing, distinguish facts from opinions, and engage constructively, thus reducing conflict while preserving fandom benefits like social bonding and collective action [2,3].

5. Emotional and algorithmic synergy and the moderating role of fandom hierarchy

5.1. The synergistic intensification of polarization by emotions and algorithms

Emotional mobilization and algorithmic amplification work together to drive opinion polarization in fandom culture [4,7]. This synergy begins with fan leaders' emotional framing, which taps into fans' emotional attachments and identity needs. For example, framing an idol's underperformance as "industry sabotage" triggers anger and solidarity, motivating fans to engage [1,8,6]. As a result, this engagement signals to algorithms, boosting visibility and exposure. Subsequently, as more fans interact, emotional contagion spreads, intensifying polarization through a feedback loop [5-9].

Moreover, algorithms shape the direction of emotional mobilization by favoring certain types of emotional content over others [5,7]. High-arousal emotions (anger, outrage, joy) generate more engagement than low-arousal emotions (calmness, sadness), so fan leaders learn to frame narratives using these high-arousal emotions to maximize visibility [4,6]. For instance, a fan leader is more likely to frame a rival's success as "unfair" (evoking anger) rather than "disappointing" (evoking sadness), as the former is more likely to go viral [2,6]. This algorithmic bias toward high-arousal emotions normalizes confrontational and polarizing discourse within fandom communities, as fans and leaders adapt their communication strategies to align with platform incentives [7,10]. In 2024, a fan war between two Chinese celebrity fandoms illustrates how emotional framing and algorithmic amplification work together. A fan leader accused a rival celebrity of plagiarism, stirring anger and outrage. The post quickly spread, triggering algorithmic amplification and escalating the conflict. This shows how emotional framing and algorithmic amplification can turn minor disagreements into large-scale conflicts.

5.2. The moderating role of fandom hierarchy

Fandoms' hierarchy mediates the link between emotional dynamics and algorithmic amplification, driving polarization [3,4]. At the top are core leaders such as fan club administrators, big fans, and influential content creators who shape dominant narratives and coordinate collective action [4,6]. Their content is prioritized by platform algorithms due to past engagement, increasing its visibility and amplification [5,7]. When these leaders use emotional framing, their content spreads quickly, influencing ordinary fans' emotional responses [1,2]. In contrast, ordinary fans in the middle and lower tiers conform to dominant narratives due to social pressure and emotional attachment to the idol [1,4]. They engage with content from core leaders because it aligns with their identity and provides a sense of belonging [8]. This engagement amplifies the leaders' content, reinforcing the hierarchy and dominant narrative [3,5]. Dissent is rare, as it risks exclusion from the community [2,4]. For example, fans questioning core leaders' emotional framing may be labeled as "traitors" or "anti-fans" and banned from fan groups [1,8].

Furthermore, the hierarchy also influences how algorithms interact with fandoms: core leaders' content is more likely to be featured in platform recommendations, while ordinary fans' content is amplified only if it aligns with the dominant narrative [5,7]. Thus, a "hierarchical amplification" effect occurs, where the views of core leaders are disproportionately amplified by algorithms, while alternative perspectives are suppressed [4,6]. For instance, a core leader's post accusing a rival idol of misconduct may be promoted to millions of users, while an ordinary fan's nuanced critique of the leader's framing is ignored by algorithms [8,10]. This dynamic strengthens opinion rigidity within the fandom and intensifies intergroup antagonism, as the dominant narrative, shaped by core leaders and amplified by algorithms, becomes the only visible perspective [2,3].

6. Conclusion

This study investigates the interplay between emotional dynamics, algorithmic amplification, and opinion polarization in social media celebrity fan culture, addressing the gap of treating emotional and algorithmic factors separately. By utilizing a mixed-methods approach with literature synthesis, and case studies, it unpacks the "emotion-algorithm-polarization" chain within fan communities. The findings reveal that emotional mobilization and algorithmic amplification synergistically drive polarization: fan leaders use emotional framing (e.g., victimhood narratives) to consolidate identity and suppress dissent, while social media algorithms amplify these dynamics via echo chambers and high-arousal content prioritization. Fandoms' hierarchical structure mediates these effects, with core leaders shaping dominant narratives amplified by algorithms, and ordinary fans conforming due to social pressure and emotional attachment. However, limitations include limited case study contexts, reliance on behavioral data for algorithmic simulation, and lack of focus on individual differences. Future research can compare cross-cultural and cross-platform studies, use quantitative methods to clarify causal relationships, develop targeted interventions, and explore the influence of emerging technologies on fan culture.

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