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Making Sense of Algorithm: Exploring TikTok Users' Awareness of Content Recommendation and Moderation Algorithms

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This article examines algorithm awareness among young TikTok users, focusing on their understanding and experiences with the platform's recommendation and moderation systems, and how these perceptions influence their engagement. Adopting a user-centric perspective, the study uses the vignette method with 50 young users across Italy to simulate scenarios involving TikTok's algorithmic systems, aiming to uncover users' algorithm awareness. The findings reveal that users interpret recommendation and moderation systems differently and engage with them critically based on these interpretations. Previous encounters with algorithmic systems, especially unexpected outcomes, enhance awareness of recommendation and moderation algorithms, fostering a more critical stance toward them.

Keywords: algorithm awareness, algorithmic imaginary, algorithmic literacy, vignette method, TikTok

Awareness of algorithms is central to navigating digital landscapes. Understanding how algorithms work empowers users to calibrate their reception of information, strengthen their privacy, and engage critically (Gruber, Hargittai, Karaoglu, & Brombach, 2021). This understanding thwarts the passive absorption of normative discourses inherent in algorithmic outputs and prevents reliance on algorithmic configurations (Cotter & Reisdorf, 2020; Gillespie, 2014).

Algorithm awareness broadly encompasses individuals' understanding of the use of algorithms within online platforms, their intended purposes, and the specific online environments in which they operate (Eslami et al., 2015; Hamilton, Karahalios, Sandvig, & Eslami, 2014). Consistent with the literature, this study conceives algorithm awareness as a multidimensional concept (Siles, Valerio-Alfaro, & Meléndez-Moran, 2022; Zarouali, Boerman, & de Vreese, 2021) comprising four main dimensions: cognitive, behavioral, reflective, and affective (Felaco, 2022, 2024). The cognitive dimension includes perception (awareness *tout court*) and understanding of how algorithms operate (knowledge). The affective aspect is connected to users' emotions stemming from their experiences with algorithms. The behavioral aspect pertains to users' interactions with algorithmic systems, while the reflective dimension relates to the ability to critically evaluate algorithmic outcomes, advantages, and potential drawbacks.

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Previous research on algorithm awareness covers how users' experiences and assumptions influence engagement with recommendation algorithms, from Facebook news feed curation (Eslami et al., 2016; Rader & Gray, 2015) to Spotify music suggestions (Siles, Segura-Castillo, Solís, & Sancho, 2020). Studies of TikTok's algorithm awareness remain limited. Nevertheless, TikTok provides a compelling case for investigating algorithm awareness because its algorithm plays a pivotal role in shaping users' content consumption (Schellewald, 2023) and makes content moderation controversial (Bacchi, 2020).

This article aims to explore algorithm awareness among young TikTok users. Specifically, it examines how young users understand and experience TikTok's content recommendation and moderation algorithms and how their assumptions influence their engagement with the app and foster a critical attitude toward its outcomes. To this end, the article employs a user-centric perspective (see Hargittai, Gruber, Djukaric, Fuchs, & Brombach, 2020; Swart, 2021) using the vignette method. The idea advanced here is that staging scenarios inspired by actual events or related to everyday encounters with algorithms at work makes respondents more inclined to provide insights into their TikTok assumptions, experiences, and usage.

As such, this article contributes conceptually to the emerging but limited research on algorithm awareness within the TikTok environment and methodologically provides an alternative posture for examining its multidimensional nature.

Research on Algorithm Awareness

The research examined multiple dimensions of algorithm awareness. Several studies emphasized the cognitive aspects of this awareness, exploring to what extent users are aware of the presence of algorithms while navigating platforms (Cotter & Reisdorf, 2020) and their understanding of how they work in practice (Hargittai et al., 2020). They have unveiled a widespread lack of awareness about how algorithms function on diverse online platforms. For example, despite Norway's reputation for high digital literacy, many individuals report minimal to no awareness of algorithms and their operational mechanisms (Gran, Booth, & Bucher, 2021). Similarly, users often remain oblivious to Facebook's utilization of algorithms to curate their news feeds (Eslami et al., 2015). The cognitive facets of algorithm awareness display varied distribution patterns across different population groups. Research indicates that only a minority of users are cognizant of algorithmic operations, with awareness influenced by age, education, and gender. Notably, younger individuals, males, and those with higher levels of education tend to demonstrate a better understanding of algorithms (Cotter & Reisdorf, 2020).

Further research on cognitive aspects identified various sources through which users acquire knowledge about algorithms, including the media (DeVito, Birnholtz, Hancock, French, & Liu, 2018) and peer discussions (Bishop, 2019). Individuals also exhibit heightened interest in understanding algorithms when personal interests are at stake, such as influencers seeking to augment their online visibility for financial purposes (Klawitter & Hargittai, 2018). The research emphasizes users' comprehension of opaque algorithmic systems by developing "algorithmic imaginaries" (Bucher, 2019), representing their conceptualizations of algorithmic functionalities and decision-making processes. These imaginaries are not misconceptions but represent the most comprehensive understanding that users can formulate based on their interactions with algorithmic systems. The perception of the algorithm's existence and its possible

effects on the functioning of online platforms are sufficient conditions for developing an algorithmic imaginary. Additionally, users develop "folk theories" based on recurrent experiences, which they use to explicate the outcomes of technological systems, thereby shaping their responses and behaviors toward these systems (DeVito, Gergle, & Birnholtz, 2017; Ytre-Arne & Moe, 2021). Although these imaginaries and theories may be inherently subjective, potentially incomplete, and prone to distorting perceptions of algorithmic operations, they remain relevant to ordinary users' experiences. These algorithmic representations bridge the gap between users' limited knowledge of algorithms and their functioning, helping them make sense of algorithmic opacity and facilitating a collective sharing of lived experiences (Schellewald, 2023).

Another strand of research examined the practical aspects of algorithm awareness by focusing on users' direct actions. Users may recognize the presence of algorithms governing online platforms through direct interaction, observation, and technology usage (DeVito et al., 2018). Users' understanding of algorithms largely stems from firsthand experiences, providing insights into algorithmic logic and influencing behaviors (Cotter, 2022; Cotter & Reisdorf, 2020). Moreover, people can influence the algorithm's design through their daily interactions (Bucher, 2018). In this regard, Rader and Gray (2015) introduce the concept of feedback loops, illustrating how individuals' engagements with algorithmic systems shape their user experience and, conversely, how this experience influences their interactions. For example, through deliberate actions such as consciously liking certain posts or posting intentionally, users can strategically shape algorithms to their advantage according to their interpretations of the system. Here, algorithm awareness is evident through users' various actions, practices, and strategies to resist, adapt, and manipulate algorithms to achieve their objectives. These actions range from customizing activities to "trick" algorithms (Velkova & Kaun, 2021) to "gaming the system" (see Cotter, 2019; Gillespie, 2014) by exploiting the same rules governing a system to manipulate it for personal advantage. For example, Bonini and Trerè (2024) illustrate the collective actions and tactics employed by couriers for online food delivery across different countries to save time, consume undelivered orders to expedite delivery, book work shifts, and improve their chances of receiving orders. Moreover, users' online engagement positively correlates with their understanding of algorithms' roles in social media platforms (Rader & Gray, 2015). Siles and Meléndez-Moran (2021) demonstrate that awareness influences users' affinity toward TikTok's personalized content and impacts their behaviors, leading to various pathways, including active engagement with TikTok and external sources.

Research has also investigated the reflective dimensions of algorithm awareness, highlighting that understanding how digital platforms collect and employ data affects individuals' ability to assess algorithmic processes critically (Gruber & Hargittai, 2023). In addition, awareness and understanding of algorithmic platforms tend to improve when individuals reflect on their algorithmic interactions (Koenig, 2020). This reflective dimension is closely intertwined with the cognitive aspect, encompassing cognitive processes necessary for evaluating algorithmic operations. The extensive use of online platforms can enhance users' understanding of algorithms and foster critical reflection on their impact on daily life (Blank & Dutton, 2012). Similarly, the encounter with unexpected and, in some cases, uncanny, algorithmic outcomes—such as when the algorithm generates incorrect classifications or perpetuates discriminations against individuals or social groups—often makes the assumptions of an algorithm more transparent and triggers reflections on its workings (Neyland & Möllers, 2019). However, the reflective dimension is not necessarily linked to the

behavioral dimension; individuals may interact with algorithmic systems without critically observing how these systems work or affect both individuals and society (Felaco, 2024).

Further research has examined the affective dimension of algorithm awareness. Confusing or unexpected algorithmic outcomes can also elicit strong emotional responses, prompting individuals to scrutinize the mechanisms behind these results (Kennedy & Hill, 2018). Emotions triggered by algorithmic processes can thus drive users to reflect on their underlying functions, potentially deepening their understanding (Bucher, 2018; Ruckenstein & Granroth, 2020; Swart, 2021). Emotional responses to algorithms vary. Individuals may exhibit "aversion" when reluctant to trust algorithmic decisions, even if they outperform human judgments. As Dietvorst, Simmons, and Massey (2015) note, humans are generally more tolerant of human errors than machine errors, making algorithmic mistakes particularly aversive. Such aversion arises from unmet expectations, limited autonomy due to a lack of expertise, and insufficient incentives to adopt algorithmic tools. Conversely, "appreciation" for algorithms often emerges when they are perceived as efficient and accurate. Logg, Minson, and Moore (2019) highlight that while appreciation is frequently underestimated, it remains a prevalent response to algorithmic systems in daily life.

TikTok's Recommendation and Moderation Algorithms and Users' Awareness

TikTok is an application designed for creating and sharing short videos with a mission to encourage creativity and spread joy (TikTok, 2020). Among the various social networks, TikTok is considered the premier platform for escapism (Rach & Peter, 2021).

Algorithms mediate user experiences on TikTok. They analyze user behavior, preferences, and engagement patterns to curate personalized content feeds. The algorithm's influence is prominently manifested in the personalized compilation of videos known as the For You Page (FYP). The TikTok recommendation algorithm learns from user behaviors, such as likes, views, and replies, to further tailor the content delivered based on viewing history, followed accounts, specific hashtags, content preferences, and device/account settings like language preference and location (Chen & Shi, 2022). Kang and Lou (2022) underscored the intrusive nature of the TikTok algorithm, capable of quickly and effectively capturing users' interests. Through the application of natural language processing and computer vision techniques, TikTok's content frequently aligns with user preferences without prior indication, despite users having limited control over the content displayed on their FYP (Hermann, 2022). Therefore, some scholars have characterized the "For You" algorithm as particularly assertive and influential compared with other social media platforms' algorithms (Schellewald, 2023; Siles & Meléndez-Moran, 2021). For instance, Taylor and Choi (2022) employed the concept of "algorithm responsiveness" to indicate the degree to which users perceive algorithms of various social network platforms as responsive to their actions and preferences; they show that, compared with other platforms, TikTok users often perceive its algorithm as highly responsive because of the platform's rapid and personalized content adjustments based on user interactions.

TikTok's responsiveness fosters stronger user interaction with algorithmic mechanisms than other platforms, creating opportunities to enhance algorithm awareness. Klug, Qin, Evans, and Kaufman (2021) highlight that users form assumptions about TikTok's algorithm, which guides strategies to manipulate or align with it, aiming to improve their experience or increase content visibility. These assumptions and

strategies significantly shape user satisfaction and engagement, with those who feel successful in influencing the algorithm reporting higher satisfaction. Furthermore, such assumptions are dynamic, evolving as users interact with the platform (Siles et al., 2022).

Yet the virality-centric nature of TikTok introduces complexities in content governance (Chen & Shi, 2022). Scholars have critically examined the risks associated with platforms wielding increased power to determine what is "irrelevant," "false," or "harmful" (Gillespie, 2020). Despite TikTok's community guidelines aiming to balance expression and harm prevention, ensuring human dignity and fairness (TikTok, 2020), a significant body of research highlights the introduction of human bias in algorithmic governance. This bias is evident in the platform's moderation practices, particularly in managing the visibility of perceived vulnerable users. For example, Zarsky (2016) showed that TikTok has deliberately restricted the visibility of vulnerable users in efforts to curb online bullying. These kinds of censorship have also applied to videos featuring individuals with traits considered "unattractive" (e.g., body shape, appearance, and age) and developmental disorders (e.g., autism, Down syndrome; Köver & Reuter, 2019). Likewise, Bacchi (2020) and Simpson and Semaan (2021) examined the contentious nature of TikTok's LGBTQ+ content moderation, revealing their frequent censorship and the implications for freedom of expression on the platform.

Several studies have linked TikTok's moderation systems to algorithm awareness, highlighting users' tactics for navigating, resisting, and adapting to content moderation. Karizat, Delmonaco, Eslami, and Andalibi (2021) examine user resistance in affirming their identities on TikTok, showing how users develop folk theories that shape their platform identities and influence algorithmic behavior, a phenomenon termed "algorithmic resistance." Other research focuses on practical tactics, such as Algospeak—strategic language involving euphemisms, misspellings, or cultural references (e.g., "Unlive" for "Death" or "DV" for "Domestic Violence")—deliberately employed to bypass automated filters (Felaco & Pelliccia, 2024; Klug et al., 2021; Steen, Yurechko, & Klug, 2023). Algospeak exemplifies users' agency and resistance to algorithmic control, reflecting their awareness of algorithms. Through creative adaptations of language and behavior, users strive to preserve expression and autonomy despite platform regulations.

Research Questions

Given this background, TikTok offers an ideal context for studying algorithm awareness because of its central reliance on algorithms for content recommendation and moderation. Unlike platforms where social networks or hashtags shape visibility, TikTok prioritizes personalized recommendations based on user engagement. This design fosters intuitive interactions, prompting users to engage with and attempt to influence the algorithm. TikTok's algorithm-driven curation requires unique cognitive efforts, encouraging the formation of assumptions and novel engagement strategies around algorithmic processes. These dynamics provide a foundation for examining how such assumptions shape attitudes toward recommendation and moderation systems, framing the three research questions of this study:

RQ1: How do young users perceive and interpret TikTok's content recommendation and moderation algorithms?

RQ2: How do young users' experiences and assumptions about these algorithms influence their engagement with the app and foster critical attitudes toward its outcomes?

RQ3: What differences emerge in algorithm awareness between recommender and moderation systems?

Research Design

Data Collection

This study uses vignettes from a sample of 50 young Italian TikTok users, aged 18–26. These digital natives live in a digitized environment, with approximately 60% participating in social networks (Eurostat, 2023). Specifically, TikTok has experienced significant growth in Italy, with a reported 22% increase compared with other social networks (We Are Social, 2024). Participants were recruited through a voluntary participation call posted on a research assistant's personal TikTok between August and December 2023. The sample comprises ordinary users (not content creators) and is evenly split by gender, with an average age of 23. Two-thirds of the participants are students with medium to high educational qualifications (diploma or degree) residing across Italy. On average, respondents spend two hours per day on the app, and all reported regular use of Facebook and Instagram. Most participants use TikTok primarily to watch content posted by others and stay informed about current issues, identifying themselves mainly as "view-only" users. Their primary motivation for using TikTok is playfulness, escapism, and fun, followed by seeking information and news.

Vignettes

Participants responded to five vignettes illustrating real events of daily engagement with TikTok's algorithmic content recommendation and moderation system. The assumption is that realistic scenarios will more likely elicit reactions corresponding to actual behavior (Marradi, 2005). Vignettes can concretize the abstractness of algorithms (Das, Wong, Jones, & Jackson, 2024), ensuring users' beliefs, assumptions, and experiences with TikTok's recommender and moderating system are more reliable. Responding from vignette characters' perspectives fosters more candid responses to hypothetical situations than direct inquiries about beliefs or behaviors, potentially mitigating social desirability bias. Employing narratives offers consistency and control over stimuli, similar to experiments (Hughes & Huby, 2004), ensuring that all participants are exposed to the same information and aiding comparability across responses.

An initial version of the vignettes was rigorously tested for internal validity (Gould, 1996) through three focus groups of young Italian TikTok users selected to mirror the final participants' demographic and behavioral traits. Each group of five participants from diverse backgrounds provided feedback on the vignettes' clarity, relevance, and comprehensiveness, refining them for the study. The discussions led to the selection of five final vignettes. In line with prior research (Gruber & Hargittai, 2023; Karizat et al., 2021; Swart, 2021), the term "algorithm" was deliberately excluded from the scenarios to minimize bias in users' assumptions about algorithm awareness. The first three vignettes illustrate scenarios where characters interact with TikTok's recommendation system and personalized content:

Scenario 1: *Luca, a veterinary surgeon, observes that TikTok suggests content different from what he is accustomed to watching while browsing content primarily related to animal care.*

Scenario 2: *Enrica initially finds the "For You" page content uninteresting, but over time, as she uses the app daily, the recommended content aligns more with her interests, making TikTok her favorite app.*

Scenario 3: *Chiara recently registered on TikTok. Many of her friends have recommended the app, but she comes across content she is not particularly interested in and does not know how to get to different content.*

The last two vignettes describe episodes of shadow banning or censorship, addressing the app's automated content moderation system at work:

Scenario 4: *Antonio discovers that TikTok does not permit searching for eating disorder-related content.*

Scenario 5: *Andrea, a creator of LGBTQ+ content, finds that his videos fail to garner the desired views despite adhering to TikTok's community guidelines and producing high-quality content.*

Participants responded to open-ended questions to determine whether they had personally experienced or heard of the scenarios depicted, and to suggest strategies to help the protagonist address the challenges. Additionally, they completed a brief survey collecting demographic data (age, gender, education, employment status, and location) and information about social media usage patterns, including average time spent, motivations for using TikTok, and overall social media engagement.

Analysis Procedure

Data were collected in Italian and translated into English for analysis. The analysis began with open coding, where two independent coders reviewed vignette transcriptions to identify key data features. In the second stage, codes were refined, grouped into themes, and examined through axial coding (Corbin & Strauss, 2014). Each coder initially performed an independent analysis to identify potential themes. When discrepancies in theme interpretations or labels arose, the coding decisions were reviewed and discussed ensuring consistency. This iterative process involved reevaluating the data to refine, merge, or redefine themes, ensuring they accurately reflected the responses. Both inductive and deductive coding approaches were employed. Initial codes and themes were drawn from existing literature on algorithm awareness and then adapted based on the data.

Results

The analytic process identified three main themes related to users' experiences with content recommendation and moderation algorithms: how young users perceive and imagine algorithms (perceiving

algorithms), their emotive and reflective reacted algorithms (reacting algorithms), and their engagement with algorithms in practice (engaging with algorithms).

Perceiving Algorithms

Recommendation Algorithm

The scenarios presented in the recommendation algorithm vignettes reveal various assumptions and user experiences with these systems. Most participants acknowledge the presence of an automated content recommendation mechanism designed to tailor the "For You" page according to their interests and to identify new content that may align with their preferences. Here, respondents perceive the content-tailoring process as dynamic, highlighting two primary aspects.

The first is that the algorithm suggests content based on users' data to the app at signup. Over time, the algorithm refines these suggestions based on users' daily interactions with the app until the recommendations closely match their interests. For instance, one participant observed that, by frequently engaging with football-related content, their "For You" page became increasingly personalized with similar material:

> When I first installed the app, TikTok asked me to indicate my interests, and I selected "sports." As a result, I initially saw content broadly related to my interests. However, since I am particularly interested in soccer, I noticed that when I quickly scrolled past videos of other sports without watching them, I was subsequently shown fewer such videos. In contrast, when I watched soccer videos, my "For You" page began to display more of this type of content. (Interviewee 2, M, 26)

The second theme presents an expanded conception of the content-tailoring process. Here, users believe that TikTok's content presentation, as illustrated in the first scenario, is influenced by their prior interactions with the app and other digital platforms. For example, one respondent interprets Luca's scenario as an outcome of algorithmic data curation shaped by digital traces from various online platforms:

> Perhaps Luca has interacted with videos or different content on other applications. I often search for content on Google or other platforms such as Instagram, and shortly after that, the material I searched for reappears on TikTok. [. . .] It is as if the algorithm "captures" the content I prefer; the more I use it, the more it learns about me and gradually refines its recommendations to align with my interests. (Interviewee 34, F, 22)

> Unlike these imaginaries, some interpretations of recommender systems' scenarios deny the algorithm's presence. Users claim to perceive themselves under observation by a surveillance system involving human actors illicitly recording their conversations. A user summarized the essence of this algorithmic imaginary: They listen to us daily through our smartphone microphones, and the more we talk about something, the more

> personalized content, such as advertisements and TikTok videos, we receive. (Interviewee 45, F, 19)

This "microphone hypothesis" aligns with previous studies (Bucher, 2018; Swart, 2021), indicating how media coverage of privacy scandals and algorithmic opacity shape collective theories. Despite this, young users continue to engage with social media platforms.

Last, a minority state that they do not understand how to assist the protagonists of these stories, revealing little or no awareness of algorithms ("I do not know how it happens . . .," "I have never had that happen to me, so I don't know.").

Moderation Algorithm

Regarding the last two vignettes, most respondents offer limited solutions to the scenarios presented, whether it involves searching for eating disorder-related content or attempting to make LGBTQ+-related content viral. Some users, despite lacking direct experience with these issues, still provide interpretations of the vignettes. Two algorithmic imaginaries emerge based on the roles attributed to human and nonhuman factors in moderating content (Roberts, 2019).

> One imaginary conceives content moderation as the result of human agency. First, the challenges in researching and promoting sensitive topics stem from the limited quality of available content. In this case, the difficulties faced by the vignette protagonists are attributed to their inability to search for or create content on sensitive subjects effectively. One respondent expressed this view, stating: The problem is the kind of content shared; the quality is probably not good either, and it does not work on TikTok. I think Antonio or Andrea should adopt better communication strategies for searching and posting on TikTok (Interviewee 22, M, 18).

Second, such imaginary excludes the possibility that content moderation might censor sensitive or harmful content. Instead, respondents point to a mismatch between the nature of such content and the platform's structural characteristics, which are designed to prioritize playful material, and the audience's expectations, which tend toward lighthearted content. One user observed:

> I think many people might not engage with that type of content. Typically, on TikTok, videos that feature lighthearted or humorous content tend to go viral. People expect to see more entertaining content on TikTok to distract them from their daily lives, while others may not receive as many views, likes, or comments. (Interviewee 26, M, 25)

Despite attempts to interpret these scenarios, the suggested practices remain unspecific, indicating a limited understanding of TikTok's underlying mechanisms. Only a small minority of respondents considered algorithmic agency a significant factor in content moderation, particularly concerning sensitive subjects. One participant articulated this view clearly, emphasizing the algorithm's role in shadow banning or censoring certain content: "I noticed that not all content is equally successful on the app [. . .]

algorithms may silently intervene to hide or restrict content deemed divisive through forms of censorship" (Interviewee 37, F, 23).

As with the recommendation system, some users did not provide responses to the scenarios, reflecting the difficulty users had in making sense of algorithmic moderation. Only two attributed the challenges of finding content related to eating disorders or promoting LGBTQ+ content to chance, stating, "I don't know why some videos go viral, and others don't. I don't think it's just luck, but I can't explain it technically."

Reacting Algorithms

Recommendation Algorithm

The content recommendation system elicits various sensations and emotional responses. Unlike findings in previous studies (Ruckenstein & Granroth, 2020), it prompts limited reflection on its underlying mechanisms. Most users describe a feedback loop in which interactions between users and the algorithm reinforce each other (Siles et al., 2022); within this cycle, the app appears to continuously and dynamically engage users through algorithmic interaction. Despite this awareness, only a few respondents attempt to explain the underlying purposes of the recommendation system. Here, previous platform experience and frequent app usage contribute to heightened awareness and encourage more reflective engagement with content curation outcomes (Cotter, 2022). One user, for example, describes an experience similar to that of the vignette characters, which facilitated her understanding of previously overlooked platform functionalities and enabled her to make an informed assumption about the system's intent to increase user engagement time:

> I also had a similar experience to Enrica's. [. . .] I think Enrica's experience occurs because the more time you spend watching specific content, the more the algorithm recommends similar content, and I believe TikTok does this to keep users entertained and engaged with the app. (Interviewee 2, M, 26)

While respondents expressed various conceptions of the recommendation algorithm, a prevalent sentiment of appreciation emerged (Logg et al., 2019). Respondents who did not indicate an understanding of the scenario or propose any suggestions or solutions for the characters tended to passively wait for content that aligned with their interests rather than actively engaging with the algorithm. ("When I encounter videos that don't interest me, I simply move on and wait for more appealing ones"; Interviewee 12, F, 25.)

For these users, the platform primarily serves as a source of leisure and relaxation, fulfilling expectations of escapism and entertainment rather than encouraging critical reflection on algorithmic processes ("I use the app for leisure and relaxation. I have never found TikTok's content boring; on the contrary, I often find it entertaining"; Interviewee 11, F, 19).

Users rely on the content selection generated by the algorithm, expressing confidence that it will deliver content suited to their preferences. This appreciation results from an adaptive process, as users report evolving sentiments similar to the character in the second vignette. Initially perceived as boring, the app gradually evokes positive feelings, encouraging increased engagement and curiosity about its operations: ("Like Enrica, I first found TikTok boring [. . .], but my perception has changed over time. Now, I find the app enjoyable because it has managed to understand my tastes"; Interviewee 19, F, 18).

From this perspective, users view the recommendation system as effective, as it delivers content that aligns with their preferences, fostering a positive experience and reinforcing the platform's usage.

Moderation Algorithm

Unlike recommendation algorithms, moderation systems may elicit negative emotions and encourage critical reflections on their societal impacts. Actually, only those users who perceive an algorithm operating behind TikTok's moderation system express concerns about its transparency, recognizing potential risks for the characters in the scenarios. Consistent with previous research (DeVito et al., 2018; Neyland & Möllers, 2019; Rader & Gray, 2015), situations involving confusing or unsettling algorithmic outcomes tend to prompt spontaneous reflection. While participants acknowledge the need for visible moderation mechanisms to protect vulnerable individuals and groups, they frequently report dissatisfaction with the moderation system's fairness and transparency:

> I'm not saying there should not be a content moderation system, but I don't think it always works well. Discussing certain issues [eating disorder] is a way to raise awareness or at least give people a chance to inform themselves. (Interviewee 21, F, 19)

Additionally, TikTok's moderation mechanisms risk exacerbating social exclusion and limiting the ability to explore sensitive issues. One respondent articulates these concerns: In Andrea's case, there's a risk of discrimination against the LGBTQ+ community, which I find unfair [. . .] In addition to excluding certain people, the algorithm or moderation system also prevents others from learning about gender issues (Interviewee 9, M, 24).

These criticisms underscore the tension between the protective role of moderation and its unintended consequences, particularly the reinforcement of discriminatory norms or the silencing of marginalized voices. Users' dissatisfaction with moderation systems often stems from unmet expectations (DeVito et al., 2018; Hargittai et al., 2020), which can evoke mixed emotions, prompting users to seek an understanding of these processes and increasing their awareness of the opacity inherent in moderation. One respondent recounts an experience of unexpected censorship, reflecting on its impact:

> I posted a piece of content about my body that I thought was harmless, but it was censored . . . it left me feeling puzzled . . . I honestly did not expect this [. . .] So, I started to think more deeply about how TikTok moderates content, and I began to inform myself to improve my knowledge. (Interviewee 33, F, 20)

Users who perceive threats or injustices within the moderation system are more likely to distrust it and critically evaluate its design and implementation.

Engaging With Algorithms

Recommendation Algorithm

The users' practical engagement with the recommender algorithm often remains limited. Users who struggle to interpret vignette situations tend to swipe through content passively until something engaging appears. Even among users who are more cognizant of the algorithm, engagement may still be limited. For example, one respondent expressed awareness of the potential to "interact" with the platform to influence the content displayed but preferred to rely on the "For You" feed to adjust automatically over time. He stated:

> I'm an expert . . ., but I know that I could somehow 'interact' more with TikTok to get content that is more of my interest [. . .], but I don't. I wait for the ones that interest me to appear . . . maybe out of laziness or maybe because I noticed that the proposal became more uniform. (Interviewee 49, F, 22)

This perspective reflects a passive attitude toward the algorithm, as users perceive that engaging with it requires effort.

Conversely, some users recognize the interplay between their actions and the algorithmic processing that tailors the "For You" page (Rader & Gray, 2015). These users consciously and deliberately engage with the algorithm, advising others, like Chiara, to "stimulate" and "interact" more with the system to better convey their preferences and interests. In such cases, user awareness fosters active engagement, optimizing the platform's capabilities. For example:

> Yes, I had a very similar situation. Chiara probably doesn't "like" posts often and has few social connections, so the algorithm lacks sufficient parameters to suggest potentially interesting content. I recommend that Chiara interact more with the app to provide TikTok with the necessary information for profiling. For example, she could use the "Not Interested" button or rate the content she watches either positively (likes) or negatively (by clicking the "dislike" button). (Interviewee 5, F, 25)

This proactive approach reflects a nuanced understanding of the algorithm's mechanisms, highlighting how user agency can be exercised to optimize the app's functionality. Interestingly, only one respondent described a practice that could be classified as "gaming the system" (Cotter, 2019; Gillespie, 2014). It involves refreshing the "For You" feed on TikTok to prompt new interactions with the algorithm and diversify content recommendations:

> The videos were becoming too repetitive and boring [. . .] I read on a blog about the option to refresh the feed to reset my For You page [. . .] I must say that afterwards, I

> was offered a wider variety of videos [. . .], and I understood how to intervene to get content more in line with my tastes. (Interviewee 47, M, 24)

These practices demonstrate users' empowerment as they leverage system understanding to achieve desired outcomes. Success in this approach reinforces algorithm awareness, enhancing user experience and comprehension of the system's logic.

Moderation Algorithm

Users' varying perceptions of content moderation mechanisms shape their engagement with these systems, influencing how they navigate TikTok's algorithmic structures. Notably, some users view the moderation algorithm as a direct consequence of their app usage, leading to two strategies for optimizing content visibility and impact.

The first strategy focuses on enhancing the quality and performance of content. This approach involves tactics such as "creating visually engaging videos and using specific hashtags to increase virality" (Interviewee 22, M, 18). Respondents often suggest incorporating playful elements to make content more appealing and shareable. For example, one respondent recommends: "To assist Andrea, I suggest integrating lighter content or a joke, potentially boosting its virality" (Interviewee 26, M, 25).

The second strategy seeks to exploit TikTok's infrastructure by aligning with platform trends or engaging with communities outside TikTok. Users adopting this approach aim to "capitalize on current trends to reach a wider audience with more generic content and then retain followers interested in preferred topics once a large following is established" (Interviewee 31, F, 24). Another respondent highlights the importance of external networks, suggesting the value of "following creators" addressing similar topics on other platforms (Interviewee 4, M, 26).

While these attempts reflect a degree of engagement with the algorithm, the suggested practices often lack precision, revealing a user's challenges when interacting with opaque algorithmic processes. Nevertheless, a heightened awareness of algorithmic moderation mechanisms often correlates with a greater propensity to experiment and adapt to achieve desired outcomes. Respondents aware of the moderation algorithm demonstrate deeper and more nuanced interactions with it, often adopting sophisticated techniques to bypass its constraints. One such tactic is Algospeak, as one respondent explains: TikTok often censors sensitive topics; I recommend censoring trigger words with asterisks and looking for similar examples, such as using "$e$$o" instead of "sex" [. . .], which allows bypassing TikTok censorship (Interviewee 37, F, 23).

Algospeak illustrates a deliberate strategy to bypass automated moderation, showcasing users' understanding of algorithms and ability to anticipate outcomes (Felaco & Pelliccia, 2024). This practice reflects a dynamic interplay between resistance and compliance.

Discussions and Conclusion

This study explored how a sample of young Italian users understands and engages with TikTok's content recommendation and moderation algorithms in everyday life, contributing to the existing literature by discerning forms of algorithm awareness and their influence on the app experience. The main findings suggest that TikTok's algorithm awareness is not a static resource that users possess or lack; instead, it manifests in cognitive, affective, practical, and reflective forms. Young users developed various algorithmic imaginaries to make sense of content personalization, recommendation, and moderation processes, reflecting similar findings in the literature (Bucher, 2019; DeVito et al., 2017, 2018; Siles et al., 2022). Extending the literature that highlighted implicit forms of algorithm awareness (Felaco, 2024; Gruber et al., 2021), this study finds that even users who did not explicitly mention the word "algorithm" showed awareness of the automatic decision-making processes regulating TikTok. Algorithmic representations of TikTok become more generic, with respondents using a broader vocabulary that includes terms like "system," "TikTok," "app," and "the platform" to refer to the computational procedures recommending and moderating content. In this perspective, these terms are not isolated but thoroughly intertwined and mutually constitutive with the users' agency, aligning with the concept of TikTok as a socio-technical assemblage (Siles & Meléndez-Moran, 2021).

The current research contributes to defining the dimensions of algorithm awareness, shedding light on their nuances within recommendation and moderation systems. Users' interactions within the app are significantly influenced by their assumptions about how algorithms work, primarily shaped by their TikTok experiences (Blank & Dutton, 2012). However, this study reveals that not all technological experiences are equally relevant for understanding content recommendation and moderation algorithms.

In the context of content recommendation, users demonstrate dynamic awareness of how the algorithm curates their "For You" page based on their interactions, recognizing the iterative refinement of recommendations tailored to their preferences. They engage critically with the algorithm, even if they do not explicitly mention its presence. Instead, they refer to automated or surveillance systems, still acknowledging a process of content tailoring to user preferences. These encounters with algorithms shape their sense-making about algorithmic recommendations. However, only users who perceive the user-algorithm dialectic show an ability to suggest effective tactics for interacting with the recommender algorithm.

In contrast, awareness of moderation algorithms is more fragmented and less widespread than awareness of recommendation algorithms, as are the strategies proposed by respondents to improve content visibility. This disparity is likely due to the greater opacity of content moderation algorithms. As Gillespie (2020) notes, users are generally less aware of moderation algorithms because their operations are often invisible unless a user's content is flagged, removed, or otherwise disrupted. This starkly contrasts recommendation algorithms, whose effects are directly observable in shaping the content users see and engage with regularly. Therefore, even when users recognize that moderation occurs, their understanding of its algorithmic nature or the criteria it employs is often limited (Roberts, 2019). Furthermore, without transparent and authoritative explanations, people attribute outcomes to human intervention rather than automated systems (Myers West, 2018). Respondents frequently attribute perceived failures of content moderation systems to users' inability to create high-quality, platform-appropriate content, shifting

responsibility from the algorithm to the user and obscuring the role of algorithmic intervention. This opacity results in speculative and nonspecific strategies for improving content visibility, limiting users' ability to engage critically or adapt effectively.

This study also provided an alternative lens for interpreting the relationship between affective and reflective aspects of algorithm awareness, enhancing the understanding of the contextual nature of aversion and appreciation (Oomen, Goncalves, & Mols, 2024). It showed that these emotions are closely tied to different algorithms' roles and impacts.

Algorithmic expectations play a crucial role in this relationship, though they differ across algorithmic systems. Echoing previous research (Hargittai et al., 2020; Swart, 2021), unexpected algorithmic outcomes often violate users' expectations, prompting a critical reassessment of algorithmic assumptions. However, this study demonstrates that this stance does not apply equally to recommendation and moderation algorithms. Unexpected algorithmic outcomes primarily lead to violations of expectations and aversion explicitly directed at the mechanisms governing content visibility. Situations that illustrate profound social implications, such as discrimination and exclusion, elicit emotional reactions of rejection toward moderation algorithms, which are perceived as the root cause. This aversion stimulates reflection, fostering a critical stance toward algorithmic decision making that informs future choices and interactions. From this perspective, reflecting on the existence and function of moderation algorithms can be seen as an exercise of agency (Couldry, 2014). However, this aversion is only partially expressed, as there is no evidence to suggest a preference for human moderators over algorithms.

By contrast, unmet expectations concerning the recommendation algorithm do not appear to provoke conflict, likely because such occurrences are perceived as routine aspects of the app's daily use (Logg et al., 2019). The recommendation algorithm aligns with users' desires for escapism and entertainment, fostering a harmonious relationship where it meets their preferences and anticipates their needs (Bucher, 2019). This alignment often generates appreciation for the algorithm, which may dampen critical engagement and reflection, thereby hindering the development of algorithm awareness. Here, a naive awareness of algorithms emerges. Furthermore, this appreciation may result from gradual adaptation, as users' experiences with TikTok evolve from initial boredom to sustained enjoyment in daily interactions.

A further consideration regarding this study's contribution pertains to the nature of the sample. Young users are indicated in the literature to be most equipped regarding digital capital (Ragnedda, Ruiu, & Addeo, 2020) and algorithmic literacy (Cotter & Reisdorf, 2020) to benefit from algorithms. However, it is important to note that this heightened awareness primarily concerns the cognitive aspects of algorithm awareness, as evidenced by the active and critical stance adopted by only a minority of users. The challenges in translating awareness into critical engagement with TikTok's algorithms may be attributed to the type of user involved in the research. Compared with content creators who are more engaged in understanding how algorithms work to optimize their content and increase earnings, generic users are generally less interested.

Additionally, assumptions and engagement with algorithms are connected to the features of the social network platform. By placing the algorithm at the center of its operation and making the "For You" feature more evident, TikTok's infrastructure exposes users more to the automated processes of content

personalization than other social networks, thus creating more favorable conditions for users to become familiar with these processes. Similarly, the significance of affective and reflective aspects of algorithm awareness may be linked to the infrastructural platform's affordances to elicit emotional experiences.

In addition to the empirical contribution, this study provides an alternative methodological posture for investigating algorithm awareness. Vignettes can compensate for the limitations of using a more structured research approach, where the self-reported perception of awareness may be influenced by respondents' personality traits and their understanding of survey awareness scales (Gran et al., 2021). Moreover, scenario-based methods capture tacit and more intuitive algorithmic experience-based forms of knowledge, "stimulating algorithm awareness" by depicting algorithms at work and unexpected events (Felaco, 2024, p. 13). These methods can also raise algorithm awareness by staging hypothetical yet plausible futures, which help people calibrate their future interactions with algorithms, as evidenced by research in design futuring within human-computer interaction (Das et al., 2024).

Limitations and Future Perspectives

The findings of this research are context-specific, reflecting conditions in Italy, a country with high Internet access and social media usage but varying levels of digital and algorithmic literacy. Some respondents struggled with the presented scenarios and character responses, highlighting potential gaps in understanding. The study employed a limited, non-randomized sample, so the results cannot be generalized. Future research in diverse contexts with varying digital literacy levels and broader samples could yield deeper insights.

Moreover, future studies might adopt participatory methods, such as "explanation by example" experiments from explainable artificial intelligence, to advance algorithm awareness, exposing participants to congruent and incongruent TikTok conditions. Recognizing mismatches between assumptions and outcomes could foster critical reflection on algorithmic biases and opacity. Additionally, workshops on TikTok's content recommendation and moderation systems could enhance digital literacy. Expanding this approach across platforms may empower users to understand better and navigate digital ecosystems, improving their awareness of privacy, algorithms, and information consumption.

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