



**eticas**

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# Auditing Social Media: (In)visibility of Political Content on Migration

## Executive Summary

Social media is an increasingly influential part of our lives, and TikTok has emerged as one of the most popular and compelling platforms for entertainment as well as youth politics. TikTok content curated by opaque recommendation algorithms is increasingly informing and shaping our opinions on global issues such as migration. We conducted an adversarial audit of TikTok's recommender system using nine sock puppet accounts to examine how it affects the political discourse on migration across profiles, locations and over time. We found little variation in recommended content on TikTok regardless of users' attitude towards migration and their location's political leaning. While there was considerable variation over time, political discourse on migration was virtually absent from the platform. Based on our findings, we conclude that (1) TikTok wants to entertain, not talk about politics, and (2) there is weak personalization for political content in TikTok's recommender system.

This report is divided into 6 main sections. Section 1 introduces the goal of this audit and our research questions. Section 2 provides an overview of the portrayal of migrants on social media, discussing past studies and the issues they uncovered. In addition, this section covers the recommendation system of TikTok and its previous audits. Section 3 outlines the methodological framework of this adversarial audit, including data collection and content analysis. Section 4 focuses on the findings of our audit. Section 5 outlines the implications of migrant representation on TikTok and provides a set of recommendations on how to strengthen it. Section 6 discusses the limitations of the study's methodology and analysis. Section 7 closes the report with concluding remarks.

"Auditing Social Media: (In)visibility of Political Content on Migration" is the second work in Eticas' series of adversarial audits of social media recommender systems. The first work audited the representation of migrants and refugees on YouTube (Eticas, 2023).

This audit has been produced in the context of the Re:framing Migrants in the European Media, a pilot project co-funded by the European Union. Re: framing Migrants aims to change current media narratives by assuring appropriate media representation of migrant and refugee communities across Europe.

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# Introduction

Social media shapes the way we connect, how we see the world and what we think. While it has enabled greater connectivity, access to information and citizen activism, social media has facilitated the spread of misinformation and disinformation, disruption of democratic processes, and proliferation of echo chambers, filter bubbles and rabbit holes of increasingly extreme content. Despite these negative effects, social media remains a major source of news about current events and it is a powerful force in forming public opinion on global issues.

Given its growing influence in virtually every aspect of life, how does social media shape the political discourse on topics such as migration? What are the technological processes behind it which favor certain discourses over others?

With these questions in mind, we set out to investigate **political expression on the topic of migration on social media through an adversarial algorithmic audit of TikTok**, one of the most popular and influential social media platforms today. The main objectives of our audit are (1) to examine **the impact of TikTok's recommender system on political discourse on migration**, (2) to uncover to the extent possible **how TikTok's recommendation algorithm promotes content** across different political profiles, locations and over time.

Over the course of five months, we created nine TikTok accounts in three locations in the United States with different political leaning, and we trained the accounts by watching, liking and sharing videos, and following content creators with different attitudes towards migration. Following this, we scraped data about the recommended content on each of the accounts' "For You" feed at three separate points before, during, and after the U.S. midterm election.

This approach allowed us to examine the TikTok recommendation algorithm across political profiles, locations and over time. Importantly, it also enabled us to track whether and how the platform recommended political content related to migration across different settings, and how this influences the representation of migrants on social media.

# Motivation and State of the Art

## Migrant representation on social media

Migration has long been a contentious social question, and the mass media plays a key role in shaping public perception and informing discussions on the topic. The extent and type of media coverage on migration can impact the rise of anti-immigrant political actors ([Boomgaarden & Vliegenthart, 2007](#)), public perception of immigration as a major problem ([Dunaway et al., 2010](#)), and perceptions of migration policy ([Merolla et al., 2013](#)). Past research has shown that how migrants are portrayed in the media can significantly influence individual and public attitudes towards migration ([Boomgaarden & Vliegenthart, 2007](#); [Esses et al., 2013](#); [Valentino et al., 2013](#), [van Klingeren et al., 2015](#)). Negative portrayals of migrants in the media can lead to their dehumanization in the eyes of the audience ([Esses et al., 2013](#)) and can reinforce the politics of fear by linking refugees to “threats” to sovereignty and security ([Bleiker et al., 2013](#)). These unfavorable portrayals may also contribute to the promotion of anti-immigration sentiment and restrictive anti-migration policies ([Schemer, 2012](#); [Valentino et al., 2013](#)).

While traditional media has been extensively studied for coverage of migration, social media representation of migrants is a relatively new area of study. In recent years, social media has emerged as an increasingly important platform for communication and self-expression, and has significantly impacted human interaction. The widespread adoption of the internet, smartphones, and social networking platforms has resulted in a rapid increase in the number of social media users worldwide. As of April 2022 there were 4.65 billion social media users, comprising 58.7% of the global population and more than 75% of people aged 13 and above ([DataReportal report, 2022](#)), with projections indicating that this number will rise to nearly 6 billion by 2027 ([Statista, 2023](#)).

Social media platforms are important tools for communication and interaction between people, and they have a significant impact on the lives of migrant people ([Dekker et al., 2016](#); [Thulin & Vilhelmson, 2014](#)) by offering relatively cheap, easily accessible and multimedia means of communication. Social networks afford migrant people the ability to actively participate in the creation of their **own narrative** and to engage in discussions, enabling **two-way communication** as opposed to the unilateral transmission of traditional media. The social networking platforms facilitate international migration by allowing migrants to share up-to-date location information ([Dekker & Engbersen, 2014](#); [Vilhelmson & Thulin, 2013](#)) and facilitate asylum-related mobility ([Merisalo & Jauhiainen, 2021](#)). However, there can be risks and challenges associated with the use of social media, such as issues with **the credibility** and **accessibility of information** ([Dekker et al., 2018](#)). Limited access to the internet and basic phone chargers can prevent migrants from staying connected, and the use of smartphones and social networks can also put them at risk of surveillance by third parties, which can make them more exposed ([Leung, 2010](#)). To avoid these menaces, migrants seeking asylum often use strategies such as using avatars or digital pseudonyms to hide their identities ([Gillespie et al., 2016](#)).

Social media can serve as an important link in shaping understanding of migration for those who may not have direct contact with migrants. The growth of the internet and social networks as sources of political information has led to new forms of news consumption ([van Aelst et al., 2017](#); [Matsa & Shearer, 2018](#)). Today, people are more likely to consume news from social media platforms like Facebook and Twitter rather than traditional sources like newspapers, television, or radio ([Bollenbacher et al., 2022](#); [Heuer et al., 2021](#)).

A number studies on the topic of social media as it relates to migration report miscellaneous findings. **Twitter** has shown mixed results on the portrayal of migration. Some researchers have found tweets on migration-related topics to be sympathetic and calling for further action ([Nerghes & Lee, 2019](#)), while others have seen more dehumanization and politicization ([Siapera et al., 2018](#)).

Heidenreich et al. ([2020](#)) analyzed political **Facebook** accounts in six European countries for migration topics. The migration theme was more visible in the posts of more ideologically radical parties. Moreover, extreme parties with stronger ideologies had more negative tone of their migration-related posts on Facebook. A research conducted by Capozzi et al. ([2020](#)) looked at political and targeted immigration ads on Facebook in Italy. They discovered that the quantity of these ads increased during the pre-election period, and the parties that spent the most on advertising were more likely to promote anti-immigration views.

The results on **Instagram** also revealed different perspectives on how migration is portrayed on the platform, with some descriptions portraying them as vulnerable and others as negative or dangerous. De Rosa et al. ([2020](#)) focused on individuals' social perceptions about immigrants through the photo posts on the platform. The results showed a clear division in the social perception of immigration on Instagram: positive views and inclusive policies towards migrants on the one hand, and negative views and support for exclusion migration policies on the other. In contrast, Jaramillo-Dent et al. ([2022b](#)) analyzed Instagram stories by the Spanish right-wing party Vox related to migration and found that migrants were typically depicted in a negative light, with a common portrayal as unidentified, black male groups involved in violence or fraud.

Our previous audit of the portrayal of migrants on **YouTube** ([2023](#)) found that in general, migrant people on YouTube video thumbnails were depicted as victims in the form of large or medium-sized groups of non-white people crossing a border without clear visibility of their faces, perpetuating dehumanization and stereotyping of migration. Moreover, we observed that YouTube's algorithm system does not consider a user's national or migrant status, rather prioritizes content that portrays migrants negatively. The study also found bias in the depiction of migrant identities and refugees in popular YouTube videos, with migrants being predominantly portrayed as non-white individuals crossing borders, and refugees being depicted as small groups of white individuals with clear face visibility.

Research on the topic of migration on the **TikTok** platform is rather limited at the moment. A study by Jaramillo-Dent et al. ([2022a](#)) explored the creative practices of migrant TikTokers and how they use the platform to reclaim agency and construct multi-

dimensional identities. The findings showed that Hispanic immigrants use TikTok to reach people with human rights and political issues, shape their micro-celebrity characters and use their migrant experiences as identity-forming narratives, while battling injustice as outsiders on the platform. Some articles suggest that TikTok has become a platform for migrants, particularly from Latin American countries, to share videos of their journeys to the US border to warn people of the obstacles they encountered and provide information about the routes they took ([Documented, 2022](#)). In turn, the platform is also being abused by "coyotes" and scammers to exploit migrant people by selling them false promises of a better life in America, and prey on vulnerable migrants by sharing misinformation ([The Guardian, 2022](#); [Rest of World, 2022](#)).

In sum, social media platforms like TikTok, Twitter, Facebook, Instagram and YouTube play a significant role in shaping the narrative of migration and the understanding of migrants for those who may not have direct contact with them. The illustration of migrant people on social networks can form a discriminatory and stereotypical attitude and significantly affect the public perception of this problem. Considering the insufficient oversight, transparency and regulatory frameworks that render social media platforms scarcely accountable, adversarial audits of social platforms and their algorithms are necessary. Audit studies are one of the tools that can help to effectuate the oversight of social media algorithms and address the issue of biased representation of migrants on social media.

## Why audit TikTok?

TikTok is a social media platform designed for creating, sharing and discovering short videos. It was created by the Chinese company [ByteDance](#) and initially launched as Douyin in 2016. In 2018, it merged with Musical.ly and became available worldwide. TikTok is designed for mobile usage and allows users to create videos up to 3 minutes long with the option to add music and edit with effects and filters ([ISD, 2021](#); [Wired, 2019](#)). We chose TikTok as the case study for this adversarial audit because it provides unique insight into migrant representation on social media for the following reasons:

### Popular

TikTok is highly successful, ranking as both the most downloaded and most profitable app in recent years. In the second quarter of 2021, it reached 1 billion users, a milestone it achieved faster than any other non-pre-installed app. As of 2021, TikTok has been downloaded a total of 3 billion times, with 850 million of those downloads occurring in 2020, becoming the top app by worldwide downloads ([Business of Apps, 2022](#); [TensorTower, 2022](#)).

### Youth-oriented and influential

TikTok is a relatively new platform that has gained immense popularity among younger users, especially in the Gen Z and millennial age groups. For example, 48% of users in the U.S. aged 18 to 29 ([Pew Research Center, 2021](#)). Although TikTok is primarily geared towards a younger audience, the app has attracted a range of users from different ages,

locations, and backgrounds. Thus, the app's wide reach, diverse user base and potential for viral content make it a highly influential platform for businesses to market their products or services and reach a large audience with the potential to drive significant growth ([Power Digital, 2021](#)).

### **High impact on political and social realm**

Named "*an engine for progressive young politics*," TikTok has emerged as an influential platform for the political and social engagement and expression of young people, even though it does not permit political advertisements. The app has become a breeding ground for political commentary, where individuals can share their ideas and mobilize others to take action ([The New York Times, 2020](#)). For example, TikTok has provided a platform to raise awareness about climate change and for underrepresented communities to share their stories and experiences ([BBC News, 2019](#); [TikTok, 2021b](#); [Jaramillo-Dent et al., 2022](#)).

### **Non-U.S. company**

Unlike most of the largest social media platforms, TikTok is not a U.S.-based company. This has raised questions over data privacy, national security or external influence. For example, the U.S. government has expressed concerns about exposure to Communist Party indoctrination and potential data smuggling to Beijing servers ([The New York Times, 2019](#)). In addition, in 2019 TikTok faced allegations of suppressing videos related to the protests in Hong Kong to comply with the Chinese government ([Bloomberg, 2019](#)). These issues have led to heightened scrutiny and political appetite for regulation of the platform, and make an independent adversarial audit of the platform imperative.

### **Compelling recommendation algorithm**

The TikTok platform has one of the industry's leading recommendation engines, providing users with a personalized feed without the need for manual searches or prior knowledge of specific creators. This rapid access to a seemingly endless stream of entertainment has garnered the reputation of being a highly addictive and "time-killing" platform ([Towards Data Science, 2020b](#)). According to App Annie, a mobile app analytics firm, TikTok users spend more time per month watching content on the app than YouTube users. For example, as of June 2021, TikTok users in the U.S. watched over 24 hours of content per month compared to 22 hours and 40 minutes on YouTube ([The Verge, 2021](#)). The reason is that TikTok possesses distinct features such as hashtags, collaborative functionalities, and challenges that drive the proliferation of viral tendencies and enhance user loyalty. Sound elements form a critical aspect of the app's user experience, with audio-infused videos demonstrating improved performance. The app's short-form video format is favored by users and enables them to download videos and share on alternative platforms. Additionally, the original creator's information is incorporated into the videos to mitigate instances of plagiarism ([SproutSocial, 2022](#)).

## **Recommender systems**



"A **recommender system**, or a **recommendation system**, is a subclass of information filtering system that seeks to predict the "rating" or "preference" a user would give to an item" ([Towards Data Science, 2020a](#)). In simple terms, recommender systems are a type of technology that help users make decisions about what products to buy, news to read, and movies to watch. For instance, Amazon uses a recommender system to recommend products to its users based on their browsing and purchase history, Netflix to suggest movies & web-series, Facebook to recommend posts, pages, and groups, Spotify to recommend songs and playlists. These systems use various techniques to suggest the most relevant recommendations to users ([Nayebzadeh et al., 2017](#); [Towards Data Science, 2020a](#)):

- **content-based filtering** - recommends items to users based on their past preferences and the features of the items themselves, rather than the preferences of other users. For example, [TripAdvisor](#) recommends hotels, restaurants, and tourist attractions to users based on their previous searches and likes.
- **collaborative filtering** - is a method of recommending items to users based on the preferences and actions of similar users, rather than on the features of the items themselves. For instance, [Spotify](#) can recommend songs and playlists to its users based on their and other users' listening history with similar music taste.
- **hybrid method** - combined method of collaborative and content-based filtering. However, most of the modern popular platforms use hybrid methods of filtering. For example, [Netflix](#) uses collaborative filtering to identify similar users and content-based filtering to recommend movies and TV shows based on their features and the viewing history of similar users.

### TikTok's recommender system

TikTok uses a combination of collaborative and content-based filtering methods to recommend videos to its users. The platform employs data from the user's interactions on the app, the captions, hashtags, and keywords associated with the videos to recommend personalized and relevant videos to each user. The TikTok recommender system is complex and sophisticated, taking into account over 200 different factors to make personalized recommendations for each user ([Flixier, 2022](#)).

### #ForYou page

When you open TikTok, the first thing you will see is the never-ending "For You" page. The For You feed on TikTok is a central feature of the platform, which makes the platform's recommendation algorithms so compelling. The algorithms that power this feature are designed to show users videos that align with their interests, creating a unique and personalized experience. The For You feed's recommendations are based on a combination of multiple factors ([TikTok, 2020](#); [LaterBlog, 2022](#)):

- **user interactions**: user's likes, shares, followed accounts, comments posted, content created, videos completed and re-watches, favorite videos;
- **video information**: sounds, captions, effects and hashtags;
- **device and account characteristics**: language, location and device type.

TikTok processes and weighs all these factors to determine the likely match of a user's interest in a video content and deliver personalized recommendations to each user's For You feed. However, not all of them are given equal weight in TikTok's recommendation algorithm. The system assigns more weight to the factors that are believed to have a greater impact on the user's engagement and satisfaction with the platform. Particularly, the system gives **more importance to indicators of users' engagement**, such as watching a longer video till the end. At the same time, TikTok's algorithm does not completely ignore other factors, such as the characteristics of the device, the location of the viewer, and other static factors. Such factors can also influence the recommendations, but the weight given to them is lower than the user engagement indicators ([TikTok, 2020](#)).

In addition to user engagement, TikTok's algorithm also considers feedback from users, such as when a user marks a video as **"Not Interested"**, **hides a user**, or **skips a video**. This feedback helps the algorithm to understand the user's preferences and provide better recommendations. Although an account with a larger following is more likely to have a video with higher views, the recommendation system **does not directly consider the number of followers** or an account's **history of high-performing videos** ([TikTok, 2020](#)).

### Previous audits of recommender systems

Researchers have conducted audits to analyze the logic of the recommendation algorithms on various platforms and found evidence of harmful effects. For instance, the YouTube platform has been under scrutiny by academics and media for allegedly exposing users to divisive, unverified, and problematic content. Studies have shown that the platform's recommendation system can lead users to **extreme content** and **spread misinformation** and **conspiracy theories** ([Albright, 2018](#); [Conway & McInerney, 2008](#); [Hussein et al., 2020](#); [Murthy, 2021](#); [Nicas, 2020](#); [O'Callaghan et al., 2015](#); [Ribeiro et al., 2020](#); [Warzel, 2017](#)). Another study on YouTube's recommendation system for political topics in Germany used audits as a way to detect biases. The study identified a popularity bias in the YouTube video recommendations, which means that it **tends to focus on popular content** that has more views and likes, and not related to political topics. In other words, these findings indicated that YouTube's recommendation system may prioritize popularity, while recommending videos that increase happiness and decrease sadness, instead of facilitating understanding of complex political issues ([Heuer et al., 2021](#)). An audit of Twitter's recommendation algorithm discovered that it **amplifies political content from the right wing** more than from the left, reducing visibility for the latter ([Huszár et al., 2021](#)). Some studies audited job recommender systems and uncovered potential biases and ethical concerns. A study by Global Witness ([2021](#)) discovered Facebook's gender-biased ad delivery, and a similar examination by Algorithm Watch ([2020](#)) found Facebook and Google ads to have **"gender-segregated" job offers**. The results showed that Facebook's algorithm heavily relies on users' gender and stereotypes in displaying job ads.

### Previous audits of TikTok's recommender system

A number of studies have explored the impact of TikTok's recommendation algorithms on its users, revealing different results. Lee et al., (2022) examined how TikTok users understand and interact with personalized algorithms on the platform. The authors proposed a new conceptual model, the **"algorithmic crystal framework"** which suggests that algorithms reflect multifaceted and dynamic self-concepts and can create temporary connections with groups of similar others. A study by Klug et al. (2021) investigated how TikTok users understand and interact with the platform's recommendation algorithm, which curates individualized video feeds. Through interviews and data analysis, the authors found that **higher engagement** and **posting at certain times** are key factors in a video trending, while hashtags do not have a significant impact. In turn, Boeker and Urman (2022) used a custom algorithm and a "sock puppet" audit methodology to analyze the effects of language, location, follow and like features, and video view rate on recommended content. Their results show that all these factors influence content popularity, but the **"follow" feature has the strongest influence**.

Another set of audit studies looked at the negative impacts of TikTok's algorithms on its users. The Wall Street Journal (WSJ, 2021) found that automated TikTok accounts were lost in **"rabbit holes"** of content on topics including videos about depression, promoting eating disorder, sexualizing minors or discussing suicide within two hours after account creation. To track the interests of a user, TikTok's algorithms need only one piece of information: the **amount of time a user lingers** or **revisits on a piece of content**. In another investigation, a team of NewsGuard analysts created TikTok accounts mimicking normal usage of the app (Cadier et al., 2022). After scrolling through the app's "For You" page and watching videos related to the Russia-Ukraine conflict for 45 minutes, they found that TikTok's feed was "almost exclusively populated" with both misleading and accurate content related to the war.

Aarne (2022) focused on TikTok's recommender system in a Finnish context, using a sock puppet method to replicate the findings of the WSJ investigation. The results have implications for user actions and well-being, as the content a user sees is largely determined by split-second decisions that may not reflect the user's idealized preferences. Moreover, the author found that TikTok appears to have adjusted its recommender system to personalize the content users see to a much lesser degree, likely in response to a WSJ investigation. Zhao (2021) analyzed how TikTok's (in China - Douyin) algorithm principles contribute to **the cycle of addiction** among its users. The algorithm uses personalized content and tricks to keep users engaged and the more they use the platform, the more accurate the algorithm becomes. A case-study by Bandy and Diakopoulos (2020) examined the role of TikTok's algorithm in **amplifying call-to-action videos** that promoted collective action against a U.S. presidential rally in Tulsa, Oklahoma. The study discussed the implications of recommender algorithms amplifying socio-political messages, and found that videos related to the rally were played more frequently, and that this increase in the number of plays was likely due to increased engagement. The framework captures user understandings of how personalized algorithms interact with user identity and shape perspectives on others. Karizat et al. (2021) found that users believe that algorithms suppress certain marginalized identities and that users change their behavior to align with

their understanding of themselves and resist suppression of certain identities. They propose a new theory called the **Identity Strainer Theory** to describe this phenomenon.

While, a recent Forbes (2023) study yielded contrasting conclusions, which may call the effectiveness of TikTok's recommendation systems into question. It was found that TikTok employees regularly engage in "**heating**," a manual push that ensures specific videos achieve a certain number of views. This suggests that the For You page, which is supposed to be a personalized feed ranked by an algorithm, may not entirely be based on user behavior and interests. Additionally, the practice of heating may benefit certain influencers and brands at the expense of others, casting doubt on the reliability of the recommendation system.

Despite the growing number of studies of TikTok's recommendation algorithm, few of them have explored the platform from a socio-technical perspective with a focus on the portrayal of migrants. In line with this and following our adversarial audit of YouTube (2023), Eticas set out to further explore migrant portrayal on social media through an adversarial audit of TikTok's recommendation algorithm. Our goal with this adversarial audit is two-fold: on the one hand, we aim to understand how TikTok's recommendation works across different settings, and on the other hand, we investigate how this impacts political discourse on migration on the platform.

More specifically, we probe whether and to what extent TikTok's algorithm recommends different content across user profiles, locations, and time with an emphasis on political discourse on migration, and we pose the following questions:

- Does the recommended content vary depending on the users' attitude towards migration?
- Does the recommended content vary depending on the location's political leaning?
- Does the recommended content vary over time in the course of the U.S. midterm election?

This adversarial audit therefore contributes to a growing body of research of the current modalities of the media ecosystem around representation. More importantly, however, the overarching aim of our work in algorithmic auditing is to uncover the structural inequalities that are both present and reproduced in the current social media landscape and to identify ways to redress these inequalities by better protecting and empowering migrant communities online.

## Methodology

For this adversarial audit, we use **a mixed-method socio-technical research approach**. Our prior experience in conducting algorithmic audits shows that combining quantitative and qualitative methods yields a deeper understanding of algorithmic functions and their impact on society and marginalized groups. Our adversarial audit of YouTube's search and recommendation algorithms demonstrated that this approach is highly applicable and especially fruitful in the investigation of social media.

The data collection took place from October 8, 2022 until December 1, 2022 during the mid-term elections in the United States. We selected this time period and location as the backdrop of our investigation for two main reasons. First, the ongoing mid-term election afforded us the opportunity to track differences in (political) content recommendations on TikTok before, during and after the election. Second and more important, immigration represented one of the most important voting issues in the 2022 midterm elections ([Pew Research Center](#), 2022a) as well as one of the most divisive ones among Republican and Democrat voters ([Schaeffer and Van Green](#), 2022). The political sensitivity of this setting magnifies the impact of social media on public perceptions and political outcomes regarding migration. Our work in algorithmic auditing provides the means to uncover such dynamics and identify ways to better protect affected communities.

Similar to our audit of YouTube, we used a sockpuppet method and then scraped the data from TikTok (Sandvig et al., 2014). Using 'sock puppet' accounts allows us to impersonate profiles with specific characteristics (such as interaction history and location) and understand how different users experience content recommendation on the platform ([Ada Lovelace Institute](#), 2021).

We created sock puppet accounts on TikTok with different attitudes towards migration, based in locations with different political leaning. First, we set up the accounts in three U.S. cities with different political standing (Democrat, Republican, and 'ambivalent' leaning) to capture differences in content recommendations across locations. We then trained each of the sock puppet accounts to simulate users with different attitudes towards migration. In order to examine the differences across these conditions, we created a total of nine sock puppet accounts to represent all combinations between different location and attitude settings (Table 1).

Democrat locationPro-migrant attitude	Republican locationPro-migrant attitude	Ambivalent locationPro-migrant attitude
Democrat locationAnti-migrant attitude	Republican locationAnti-migrant attitude	Ambivalent locationAnti-migrant attitude
Democrat locationNeutral attitude towards migration	Republican locationNeutral attitude towards migration	Ambivalent locationNeutral attitude towards migration

Table 1. Sock puppet account characteristics

## Account training

We trained the TikTok accounts to stimulate interaction history and preference for either pro-migrant, anti-migrant or 'neutral' content. The training was performed by a custom virtual agent (bot) that simulates human interaction within the browser (login, scroll down, clicks, waiting for web elements to fully load, handling lazy loading, etc.). The bot source code was written in [Python](#) and it was based mainly on the [Selenium](#) library to simulate user interactions.

The training consisted of watching, liking and sharing five videos and following three new accounts each day for five days between October 8, 2022 and October 15, 2022. The videos and content creators selected for training used English as a primary language, and they were chosen to represent different attitudes towards migration:

- For pro-migrant attitude training, we selected TikTok videos with explicitly political content and using hashtags expressing positive sentiment towards migration, such as #proimmigration, #weareallimmigrants, #defendDACA, #immigrantsarepeople, #immigrantrights, #proudimmigrant, #immigrantsmakeamericagreat, #immigrantslivesmatter, #immigrantsareessential, and #immigrantsarewelcomehere. The chosen content creators included a pro-immigration activist lawyer, civil society organization with a track record in support of migration such as the [American Civil Liberties Union](#) (ACLU), and citizen activists, all of whom regularly publish pro-migrant political content on TikTok.
- For anti-migrant attitude training, we selected political videos using the hashtags #americafirst, #illegalimmigrants, #godsaveamerica, #stopillegalimmigration, #buildthewall, #saveourstate, #bidenbordercrisis, and #securetheborder. Content creators included citizen activists in opposition to migration and organizations advocating for stricter border controls such as the [Federation for American Immigration Reform](#) (FAIR), which "seeks to reduce overall immigration to a more normal level".
- For the 'neutral' profile training with no express attitude towards migration, we chose strictly non-political content consisting of pet videos using the hashtags #catsoftiktok, #catlover, #petoftiktok, #dogsoftiktok, #doglover, #puppy, and we selected content creators who exclusively or primarily upload videos of their pets.

Since the TikTok recommendation algorithm takes into account engagement levels, such as the number of times a user has rewatched a video (thereby indicating strong interest) ([WSJ, 2021](#)), we conducted an additional day of training on November 3, 2022. Consistent with the previous training conducted, the accounts watched, liked and shared five videos, and followed three new accounts. Five videos were randomly selected from the previous training, and three new content creators to follow were chosen based on the same criteria described above.

## Location selection

We used **three locations** with different political leanings to set up our accounts via virtual private networks (VPN):

- **San Francisco** as an example of a **Democrat-leaning city**: At the local level, the city mayor, London Breed, and all members of the Board of Supervisors, San Francisco's governing body, are Democrats. At the federal level, the city's congressional districts are served by two Democrats in the House of Representatives (Nancy Pelosi and Kevin Mullin), and San Francisco overwhelmingly supported Democratic candidate Joe Biden in the latest presidential election in 2020.
- **Oklahoma City** as an example of a **Republican-leaning city**: The city mayor, David Holt, is a Republican, and the Republican party holds a 6-3 majority in the Oklahoma City Council. The city's congressional districts are represented by two Republicans (Stephanie Bice and Tom Cole), and Oklahoma City narrowly supported Republican candidate Donald Trump in the 2020 elections.
- **Virginia Beach** as an example of a city with an **ambivalent standing**: the city mayor, Bobby Dyer, is a Republican, but the Democrats hold a small 6-5 majority in the Virginia Beach City Council. Virginia Beach's congressional district is served by Republican Jen Kiggans, but the city supported Joe Biden (D) in the 2020 elections.



## Data scraping

After setting up and training the sock puppet profiles to account for user location and attitudes to migration respectively, we scraped the recommended videos in the “For You” feed for three days before, during and after the election. We scraped the first 20 recommended videos for each account on each day, resulting in a total of 1620 videos (Table 2).

		Pre-Election			Election			Post-Election			Total Videos
		Day 1: Oct 17	Day 2: Oct 18	Day 3: Oct 19	Day 1: Nov 7	Day 2: Nov 8	Day 3: Nov 9	Day 1: Nov 29	Day 2: Nov 30	Day 3: Dec 1	
Democrat location San Francisco	Pro-migrant attitude	20	20	20	20	20	20	20	20	20	180
	Anti-migrant attitude	20	20	20	20	20	20	20	20	20	180
	Neutral attitude towards migration	20	20	20	20	20	20	20	20	20	180
Republican location Oklahoma City	Pro-migrant attitude	20	20	20	20	20	20	20	20	20	180
	Anti-migrant attitude	20	20	20	20	20	20	20	20	20	180
	Neural attitude	20	20	20	20	20	20	20	20	20	180
Ambivalent location Virginia Beach	Pro-migrant attitude	20	20	20	20	20	20	20	20	20	180
	Anti-migrant attitude	20	20	20	20	20	20	20	20	20	180
	Neural attitude	20	20	20	20	20	20	20	20	20	180
TOTAL											1620

Table 2. Scraped data from TikTok’s “For You” recommendation page

The scraping activity was performed by a custom virtual agent (bot) that simulates human interaction within the browser.. The bot source code was written in [Python](#) and it is based mainly on the open-source library [Beautiful Soup](#) to extract the required information from TikTok web elements.<sup>1</sup> For each scraping iteration a clean stand-alone version of Google Chrome was used, without cookies or any embedded client-side information except for the IP address which was dynamically set by using a virtual private network (VPN). Every call to the TikTok server was made with an active VPN client based on the user’s location (San Francisco, Oklahoma City or Virginia Beach).

<sup>1</sup> For each video, we scraped the following data: author ID, author nickname, author profile URL, author profile image URL, video URL, video thumbnail image URL, video description (if present), list of hashtags (if present), number of likes, number of comments, number of shares.



## Content analysis

The next step of this audit was the analysis of TikTok's recommended videos across profiles, location and time. To do this, we used content analysis, a research method to analyze textual and visual data for the presence of themes and meanings in a systematic and objective way. To better understand what kind of content the TikTok algorithm recommended across different settings, we analyzed the content and the actors of each video according to the following categories informed by previous literature on the portrayal of migrants in media:

Type of content	Political			Non-political			Cannot determine
Political content							
Subject (political)	Economy	Energy & climate change	Race & ethnicity	COVID-19	Migration & migrants	Foreign policy	
	Gun policy, violent crime & public safety	Healthcare	Voting policies & appointments	Education policy	Gender & abortion	Others	N/A
Function	Information and promotion		Deliberation and discussion		Participation and mobilization		N/A
Political content about migration & migrants							
Frame	Economy	Security	Validity	Policy	Others		N/A
Sentiment	Positive		Negative		Neutral		N/A
Non-political content							
Subject (non-political)	Entertainment & comedy	Beauty & fashion	DIY, tutorials & life hacks	Challenges	Skills and crafts	Nature & animals	
	Relationships & family	Sports	Art & architecture	Events	Food & cooking	Others	Cannot determine
All content							
Language	English		Other		Cannot determine		N/A
Number of actors	One person		Small group		Large group		N/A
Action	Speak		Dance or sing		Perform an activity	Other	N/A
Gender	Female		Male		Other	Cannot determine	N/A
Race	White		Non-white		Cannot determine		N/A
Presence of minors	Yes		No		Cannot determine		N/A

Table 3. Content analysis categories

We first distinguished between political and non-political content. For the purposes of this audit, we employed a broad definition of "political content" (Guinaudeau et al., 2021) including both comments on daily politics (with topics such as "2022 election", "Black lives

matter” and concrete policy initiatives such as the Deferred Action for Childhood Arrivals – DACA) and normative stances on society (“wealth redistribution reduces inequality”, “abortion is a crime” or “trans rights are human rights”). We coded the subject separately for political and non-political content. For political content, the central subjects correspond to the most important voting issues of the 2022 mid-term election ([Pew Research Center, 2022a](#)). We also considered the function of political content on TikTok, or the type of interaction it encourages or favors (Cervi et al., 2021), where:

- Information and promotion refer to instances of unilateral communication about an issue
- Deliberation and discussion describe content which invites or asks for people's opinions, poses questions or otherwise stimulates discussion
- Participation and mobilization include videos with explicit requests for action to be taken by users, including mobilization to vote, opportunities to attend an event, create their own content, etc.

Since this adversarial audit focuses on political discourse on migration on social media, we were particularly interested in videos where “migration & migrants” were the primary subject. For videos containing political expression on the topic of migration, we sought to identify the frame or the central organizing idea or storyline about the subject. The four main frames which we considered are the following (Lawlor and Tolley, 2017):

- Information and promotion refer to instances of unilateral communication
- Deliberation and discussion describe content which invites or asks for people's opinions, poses questions or otherwise stimulates discussion on an issue
- Participation and mobilization include videos with explicit requests for action to be taken by users, including mobilization to vote, opportunities to attend an event, create their own content, etc.

For migration-related content, we also sought to identify the frame or the central organizing idea or storyline about the subject i.e. migrants. The four main frames which we considered are the following (Lawlor and Tolley, 2017):

- Economy: Issues concerning the economic impact of migrants e.g. taxation, welfare, benefits, contributions to the economy, strain on the economy, use of state services, education etc.
- Security: Issues related to the possible threats to security on account of the presence of migrants e.g. drugs, illegal border crossing, sexual assault and rape etc.
- Validity: Discussion around the legitimacy, or deservedness of migrants e.g. the value of diversity, the contributions of migrants to society
- Policy: Issues related to government and policy initiatives e.g. policies and policy proposals such as DACA, border policy, etc.
- Other frames which fall into none of the categories above

While the frames denote the central organizing idea around the subject of migration, they can have either positive, negative or neutral sentiment. For example, a validity frame can

express a positive sentiment (e.g. “we are all immigrants” historical interpretation in favor of present-day migration) or a negative overtone (e.g. “American people first” implying that migrants deserve less support because they are ‘foreign’). Both the frame and the sentiment categories in the table above refer only to videos coded as political content on the subject of migration and migrants. All other categories, including language and actors, were coded for all videos.

The coding of the videos according to the categories above was performed by two student coders trained in political science with experience in content analysis. We provided a codebook with instructions for the task and organized two training sessions to ensure agreement and consistency among them.

## Results: Inside TikTok's recommendation algorithm

### Does the recommended content vary depending on the users' attitude?

Our findings revealed **little variation in political content related to migration across TikTok accounts with different attitudes**. The proportion of political videos (including migration and other political topics) among recommended content was consistently small across different profiles.

Only 0.6% of TikTok's recommendations contained a political message in the anti-migrant profile, and 0.4% in the pro-migrant account, and in both profiles they concerned race and ethnicity. The predominant function of the few recommended political videos was to either provide information, or encourage discussion.

Contrary to our initial expectations, the 'neutral' profile received the most political videos in its For You feed, albeit still a very small proportion, at 1.1% percent. 0.8% of the videos concerned race and ethnicity as the primary subject and 0.2% gender and abortion. Only 0.2% of the video recommendations in the neutral profile were related to migration, portraying it using a validity frame with a positive sentiment.

Conversely, non-political content consistently amounted to an overwhelming majority of content recommendations across all three profiles. The most popular subjects in these clips were general entertainment & comedy, food & cooking, and skills & crafts. The most common video hashtags included #satisfying, #funny, #asmr, and #food.

TikTok recommendations beyond political content did not differ significantly across users with different attitudes either. The majority of TikTok's recommendations depicted small groups of people performing various activities such as acting out sketches, cooking, working or creating art. While we could not identify a predominant gender among the people appearing in most videos, we observed that slightly less women appeared in the videos in the anti-migrant feed (14.9%) compared to the pro-migrant profile (18.3%). In terms of race, the neutral profile portrayed more white people (24.3%) and more people belonging to other races (35.6%) than both the pro-migrant and anti-migrant accounts. There was little disparity in the appearance of minors in recommendations across profiles.

However, we find no consistent patterns and no considerable differences in the recommendations across profiles with different attitudes towards migration on TikTok. This suggests that TikTok's recommendation algorithm is not influenced by personalization factors, such as a user's political preferences expressed through interaction with the platform, to the extent we initially expected. The overall absence of political and migration-related content on TikTok further testifies to the comparatively low importance of

personalization factors. Importantly, however, it also points to the lack of visibility of migration on the platform.

Overall, we did not find evidence that TikTok recommends varying (political) content depending on the users' attitudes towards migration. Instead, we observed **a tendency to promote non-political content** on the one hand, and **a lack of substantial differences in the recommendations across profiles** on the other.

The lack of variance between the neutral condition, and the pro- and anti-migrant conditions suggests that **TikTok's recommendation algorithm is not influenced by users' preference for political content over entertainment content** to the extent we expected initially. Similarly, the lack of political content across the board implies that **TikTok's recommendations are not shaped by users' political views or preferences**, such as their attitudes towards migration, either.

		RECOMMENDATIONS ACROSS PROFILES (%)		
		Anti- migrant	Neutral profile	Pro- migrant
Type of content	Political	0.6	1.1	0.4
	Non-political	95.4	93.5	92.4
	Cannot determine	4.1	5.4	7.2
	Total =	100	100	100
Political content				
Subject (political)	Race and ethnicity	0.6	0.7	0.4
	Migration and migrants	-	0.2	-
	Gender and abortion	-	0.2	-
	N/A (non-political content)	99.4	98.9	99.6
	Total =	100	100	100
Function	Information and promotion	0.2	0.9	0.4
	Deliberation and discussion	0.4	0.2	-
	Participation and mobilization	-	-	-
	N/A (non-political content)	99.4	98.9	99.6
	Total =	100	100	100
Political content about migration & migrants				
Frame	Economy	-	-	-

	Security	-	-	-
	Validity	-	0.2	-
	Policy	-	-	-
	N/A (content not about migration)	100.0	99.8	100.0
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Sentiment</b>	Positive	-	0.2	-
	Neutral	-	-	-
	Negative	-	-	-
	N/A (content not about migration)	100.0	99.8	100.0
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Non-political content</b>				
<b>Subject (non-political)</b>	Entertainment and comedy	39.5	35.9	42.4
	Beauty & fashion	2.4	4.1	3.7
	DIY and tutorials & life hacks	4.7	3.1	4.4
	Skills & crafts	10.4	10.2	7.6
	Nature & animals	3.2	3.3	2.2
	Relationships & family	4.1	5.4	3.3
	Sports	0.9	1.3	1.5
	Food & cooking	12.3	12.2	12.6
	Personal story	1.5	1.3	1.9
	Health	1.3	2.6	0.7
	Charity	1.5	0.7	2.2
	Others	9.3	13.0	8.7
	Cannot determine	8.9	6.9	8.7
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>All content</b>				
<b>Language</b>	English	57.4	58.5	60.2

	Other	37.8	35.4	35.6
	Cannot determine	0.9	1.3	0.7
	N/A (no written or spoken language)	3.9	4.8	3.5
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Number of actors</b>	One person	41.5	42.0	38.1
	Small group	54.4	52.0	54.1
	Large group	-	1.5	1.1
	N/A (no people present)	4.1	4.4	6.7
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Action</b>	Speak	5.4	4.4	4.8
	Dance or sing	3.0	2.6	2.4
	Perform an activity	87.2	88.5	86.1
	Other	0.2	-	-
	N/A (no people present)	4.3	4.4	6.7
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Gender</b>	Male	26.4	27.2	25.9
	Female	14.9	17.4	18.3
	Others	-	-	-
	Cannot determine	54.6	50.9	48.9
	N/A (no people present)	4.1	4.4	6.9
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Race</b>	White	21.6	24.3	23.7
	Non-white	33.3	35.6	32.2
	Cannot determine	41.0	35.7	37.4
	N/A (no people present)	4.1	4.4	6.7
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Minors</b>	Yes	14.7	13.1	15.9

	No	62.4	66.7	54.3
	Cannot determine	18.8	15.7	23.0
	N/A (no people present)	4.1	4.4	6.9
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>

Table 4. TikTok recommendations across profiles

## Does the recommended content vary depending on the location's political leaning?

Similar to the previous section, we found **little variation in content recommendations across TikTok accounts based in locations with different political leaning**. The accounts based in the Democrat location, San Francisco, received the most political video recommendations among them, and those based in the Republican location, Oklahoma City, received the least, but the overall share of political content was very low across cities.

Race and ethnicity was the only theme to appear in political video recommendations across all three cities, and the only one to appear in the feeds based in the Republican city. Political discourse on TikTok additionally concerned gender in the Democrat city, and migration in the city with ambivalent leaning.

While we found no consistent trends in the portrayal of different actors, we observed greater language diversity in the Democrat location. TikTok suggested more non-English language videos to the accounts based in the liberal city, and more English language videos in the conservative location. Yet, the greater language diversity did not translate to diversity of content, as all three locations primarily received content recommendations in the category of general entertainment.

All in all, we find no evidence that TikTok recommends varying content according to location. The **tendency towards general entertainment content as opposed to political expression** persists across cities with different political leaning, with little variance in the feeds based on location. This could mean that **user location does not play a substantial role as a factor in TikTok's recommender system**.

		RECOMMENDATIONS ACROSS LOCATION (%)		
		Republican location	Democrat location	Ambivalent location
Type of content	Political	0.4	0.9	0.7
	Non-political	96.1	90.0	95.2



	Cannot determine	3.5	9.1	4.1
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Political content</b>				
<b>Subject (political)</b>	Race and ethnicity	0.4	0.7	0.6
	Migration and migrants	-	-	0.2
	Gender and abortion	0.0	0.2	0.0
	N/A (non-political content)	99.6	99.1	99.3
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Function</b>	Information and promotion	-	0.9	0.6
	Deliberation and discussion	0.4	-	0.2
	Participation and mobilization	-	-	-
	N/A (non-political content)	99.6	99.1	99.3
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Political content about migration &amp; migrants</b>				
<b>Frame</b>	Economy	-	-	-
	Security	-	-	-
	Validity	-	-	0.2
	Policy	-	-	-
	N/A (content not about migration)	100.0	100.0	99.8
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Sentiment</b>	Positive	-	-	0.2
	Neutral	-	-	-
	Negative	-	-	-
	N/A (content not about migration)	100.0	100.0	99.8
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Non-political content</b>				
<b>Subject (non-political)</b>	Entertainment and comedy	49.3	27.8	40.7
	Beauty & fashion	3.0	4.3	3.0

	DIY and tutorials & life hacks	4.8	3.5	3.9
	Skills & crafts	8.0	10.7	9.5
	Nature & animals	2.2	3.5	3.0
	Relationships & family	3.3	5.6	3.9
	Sports	1.3	0.7	1.7
	Food & cooking	11.0	13.3	12.8
	Personal story	2.0	1.1	1.5
	Health	1.5	1.3	1.9
	Charity	1.3	1.9	1.3
	Others	5.2	16.3	9.5
	Cannot determine	7.1	10.0	7.4
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>All content</b>				
<b>Language</b>	English	62.7	54.6	58.7
	Other	32.1	39.8	36.8
	Cannot determine	0.9	1.1	0.9
	N/A (no written or spoken language)	4.3	4.4	3.5
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Number of actors</b>	One person	38.8	42.8	40.1
	Small group	54.2	51.9	54.5
	Large group	2.0	-	0.6
	N/A (no people present)	5.0	5.4	4.8
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Action</b>	Speak	4.8	5.7	4.1
	Dance or sing	2.0	2.6	3.3
	Perform an activity	87.8	86.3	87.7
	Other	0.2	-	-

	N/A (no people present)	5.2	5.4	4.8
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Gender</b>	Male	23.8	29.4	26.4
	Female	17.3	17.0	16.3
	Others	-	-	-
	Cannot determine	54.0	48.0	52.4
	N/A (no people present)	5.0	5.6	4.8
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Race</b>	White	20.2	27.4	21.9
	Non-white	31.3	34.3	35.5
	Cannot determine	43.4	32.8	37.9
	N/A (no people present)	5.0	5.6	4.6
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Minors</b>	Yes	15.4	15.4	13.0
	No	62.5	61.3	59.5
	Cannot determine	17.1	17.8	22.7
	N/A (no people present)	5.0	5.6	4.8
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>

Table 5. TikTok recommendations across locations

## Does the recommended content vary over time in the course of the U.S. midterm election?

The results of our analysis show **considerable variations in the language and people appearing in recommended content on TikTok over time.**

The platform's recommendations contained 1.5% political videos before the election, and gradually decreased to 0.4% during the election, and 0.2% after the election. Migration emerged as a topic in political videos only after the election. Among non-political videos, comedy remained the most popular subject throughout the period.

The language of the video recommendations changed substantially over time. English language content made up 80.6% of all recommendations before the election, but

declined to 52.4% during the election and 43.1% after. On the other hand, non-English language content increased its feed share from 12.3% to 51.3%.

The gender balance in video recommendations on TikTok also shifted with time. The presence of men decreased from 31.6% to 18.3%. Conversely, the proportion of women appearing in content recommendations rose from 13.4% to 22.6%. There was a similar trend with the appearance of minors which increased from 10.8% to 18.1%. The depiction of race did not follow a consistent pattern over time.

In summary, the increasing representation of women and non-English languages over time suggest that **TikTok's recommendations became more diverse in the course of our audit**. Yet, the lack of political content in general and political discourse on migration in specific persisted over time. As a result, our analysis does not provide conclusive evidence to determine whether and to what extent the midterm elections affected TikTok's content recommendations.

		RECOMMENDATIONS OVER TIME (%)		
		Before election	During election	After election
Type of content	Political	1.5	0.4	0.2
	Non-political	98.3	90.6	92.4
	Cannot determine	0.2	9.1	7.4
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
Political content				
Subject (political)	Race and ethnicity	1.3	0.4	-
	Migration and migrants	-	-	0.2
	Gender and abortion	0.2	-	-
	N/A (non-political content)	98.5	99.6	99.8
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
Function	Information and promotion	0.9	0.4	0.2
	Deliberation and discussion	0.6	-	-
	Participation and mobilization	-	-	-
	N/A (non-political content)	98.5	99.6	99.8
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
Political content about migration & migrants				
Frame	Economy	-	-	-

	Security	-	-	-
	Validity	-	-	0.2
	Policy	-	-	-
	N/A (content not about migration)	100.0	100.0	99.8
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Sentiment</b>	Positive	-	-	0.2
	Neutral	-	-	-
	Negative	-	-	-
	N/A (content not about migration)	100.0	100.0	99.8
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Non-political content</b>				
<b>Subject (non-political)</b>	Entertainment and comedy	39.7	41.1	37.0
	Beauty & fashion	3.2	1.9	5.2
	DIY and tutorials & life hacks	4.1	4.1	4.1
	Skills & crafts	15.3	6.3	6.7
	Nature & animals	7.6	0.9	0.2
	Relationships & family	3.9	4.6	4.3
	Sports	0.9	1.1	1.7
	Food & cooking	11.9	10.7	14.4
	Personal story	0.9	2.6	1.1
	Health	2.6	1.3	0.7
	Charity	0.4	2.4	1.7
	Others	7.6	10.7	12.6
	Cannot determine	1.9	12.2	10.4
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>All content</b>				
<b>Language</b>	English	80.6	52.4	43.1

	Other	12.3	45.0	51.3
	Cannot determine	0.8	1.3	0.9
	N/A (no written or spoken language)	6.3	1.3	4.6
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Number of actors</b>	One person	46.9	35.7	39.1
	Small group	45.8	61.1	53.5
	Large group	0.7	0.6	1.3
	N/A (no people present)	6.5	2.6	6.1
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Action</b>	Speak	3.0	5.4	6.3
	Dance or sing	3.5	2.4	2.0
	Perform an activity	86.6	89.6	85.6
	Other	0.2	-	-
	N/A (no people present)	6.7	2.6	6.1
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Gender</b>	Male	31.6	29.6	18.3
	Female	13.4	14.6	22.6
	Others	-	-	-
	Cannot determine	48.4	53.1	52.8
	N/A (no people present)	6.5	2.6	6.3
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Race</b>	White	20.5	23.3	25.7
	Non-white	24.7	42.4	33.9
	Cannot determine	48.3	31.9	34.1
	N/A (no people present)	6.5	2.4	6.3
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Minors</b>	Yes	10.8	14.8	18.1

	No	58.3	67.2	57.8
	Cannot determine	24.4	15.4	17.8
	N/A (no people present)	6.5	2.6	6.3
	<b>Total =</b>	<b>100</b>	<b>100</b>	<b>100</b>

Table 6. TikTok recommendations over time

## Discussion: Migrant representation on TikTok

One of the questions we posed at the start of our adversarial audit was “How does TikTok shape the political discourse on migration?”. Across the different settings we examined, however, we found that **political discourse on migration is virtually absent from the platform**. With regards to our question then we can make two main conclusions:

### 1. TikTok wants to entertain, not talk about politics

Our findings demonstrate that **TikTok’s algorithm favors general entertainment over political content** on any topic across different profiles, locations and over time.

This result is in line with TikTok’s self-described function as “first and foremost an entertainment platform” ([TikTok](#), 2022). This is exemplified by the company’s ban on political content in any form of advertising ([TikTok](#)). TikTok re-emphasized this policy at the onset of the 2022 midterm election in the U.S. and introduced new measures to limit political fundraising and verify accounts of politicians ([TikTok](#), 2022). In addition, internal policy documents obtained by the Intercept show TikTok instructed moderators to reduce the visibility of “high controversial topics such as separatism, religion sects conflicts, conflicts between ethnic groups, for instance exaggerating the Islamic sects conflicts, inciting the independence of Northern Ireland, Republic of Chechnya, Tibet and Taiwan and exaggerating the ethnic conflict between black and white” (Biddle et al., 2020).

While the social app has already become an established platform for youth politics and diverse political expression in practice ([Herrman](#), 2020), our study confirms the findings of previous research on **TikTok’s reluctance to amplify political content through systematic or algorithmic means** despite the political activism of its user base. For example, Bandy and Diakopoulos examined the collective action known as the #TulsaFlop, a political call-to-action campaign on TikTok to undermine Donald Trump’s rally in Tulsa, Oklahoma (2020). Although the campaign was successful, Bandy and Diakopoulos found that its visibility was not due to systematic amplification, but simply due to increased user engagement on the topic.

With this, **TikTok seeks to promote entertainment content** through its public communications, community guidelines, internal policies and – as illustrated by our findings – through its recommendation algorithm.

### 2. Weak personalization for political content in TikTok’s recommender system

The lack of variance in content recommendations across different profiles and locations and the absence of political content in the feeds of sock puppet accounts with express attitudes towards political issues hint at the **weak influence of personalization factors on TikTok’s recommendation algorithm when it comes to political attitudes around migration**.



This observation could imply that **TikTok does not pick up on user political interests and other factors relevant for personalization as quickly** as we initially expected. This puts the findings of previous studies of TikTok's algorithm into a new light. Investigations by the Wall Street Journal and NewsGuard both found evidence that TikTok's algorithm picks up implicit user interests shortly after account creation and curates highly personalized recommendation feeds quickly. The WSJ discovered that TikTok learnt the interests implicitly assigned to bots and led them down a rabbit hole of extreme content in less than two hours and in some cases less than 40 minutes ([WSJ](#), 2021), and NewsGuard similarly observed that the feeds of the accounts they created were populated with targeted political content within 40 minutes ([Cadier et al.](#), 2022). In contrast, our audit found **no novel evidence for prompt and highly targeted personalization of video recommendations on TikTok**.

Instead, our findings regarding TikTok's weak personalization of recommendations seem to be in line with more recent studies of the platform. For example, Aarne found that personalization on TikTok was not as intense as commonly believed or as observed by the WSJ (2022). With regards to political content, the author found that accounts primed with an interest in politics did not receive more political content recommendations than other experimental conditions. Aarne did not observe the echo chamber and rabbit hole effect reported by the WSJ and NewsGuard either. With this, the results of our audit and other recent studies seem to suggest that **the level of personalization in TikTok's recommender system has been adjusted** in the past year. This therefore highlights the **evolution of algorithms** over time and the need to continuously re-assess their impacts as they change.

On the whole, TikTok's prioritization of entertainment content and the weakening personalization according to user interests lead to the conclusion that **TikTok's algorithm does not actively shape the substance of political discourse on migration, but it appears to regulate its overall visibility** via its recommender system and personalization mechanism. While TikTok is reluctant to engage with political content more openly, the platform remains highly influential in the formation of public opinion and even policy agendas. The app's opaque internal policies and technologies, combined with the obstacles to access to TikTok data for independent research, make it difficult to determine how the (in)visibility of political discourse on certain topics affects perceptions and outcomes in the real world. In order to enable more effective and thorough investigations of the platform and its impacts, and to better understand how different communities and political issues are represented on the platform, we **recommend** that:

- **TikTok enables independent researchers to investigate the platform.** Even though TikTok is one of the most popular and influential social media networks today, it is difficult to investigate the platform and its content independently. The platform's Application Programming Interface (API) provides very limited data to researchers and the public, and there is a lack of tools compliant with the platform's Terms of Service that allow research at scale (O'Connor, 2021). TikTok has announced the development of an API for research ([TikTok](#), 2022), but it is unclear what the scope of available data and accessibility will be. The platform should

establish and maintain wide access to extensive data via the API for research in compliance with privacy protections for users to allow for independent research.

- **TikTok improves recommender system transparency.** Based on internal policy documents and previous research, it appears that TikTok actively shapes and intervenes in human and algorithmic processes related to the moderation and demotion of political and other controversial content. However, TikTok provides little transparency regarding its policies, enforcement measures, and the algorithms behind them. The company has made the first step to address this problem with the establishment of TikTok's [Transparency Center](#), which publishes reports on government removal requests and intellectual property removal requests among others. However, TikTok should grow its transparency initiative in both scope and depth.
- **TikTok works with migrants and other marginalized communities to create inclusive policies.** TikTok's current policies have been criticized for their selective targeting and unfair enforcement to the disadvantage of marginalized communities at the center of political debates (Trevisan et al., 2022). TikTok should assess and revise its community guidelines and the principles for their application with the input of marginalized groups to create an online environment which promotes diverse representation, including in political discourse.

## Limitations

The purpose of conducting any research is to increase our understanding of the world around us and to uncover new insights and knowledge. However, it is important to recognize that all research has limitations, which can affect the accuracy and reliability of the research findings. These limitations can arise from a variety of sources, such as the methods used to collect and analyze data, the sample size and population studied, and the inherent biases and assumptions of the researchers. It is essential to acknowledge and understand these limitations in order to properly interpret and evaluate the results of a study, and to recognize the potential limitations of the research in the context of its broader implications and applications. Our report has several limitations related to its methodology and analysis:

1. We relied on the use of **nine trained sock puppet TikTok accounts**. This may not accurately reflect the experiences of the general population. The limited sample size does not account for differences in location, language, demographics, and other factors. Using sock puppet accounts may also not accurately reflect real user behavior and fail to capture the full range of recommendations that TikTok may provide to diverse users with more complete histories and preferences.
2. We conducted **six days of training for the sock puppet accounts**, including watching, liking, sharing a total of 30 videos and following 18 content creators. The length and the intensity of the training may have been insufficient for TikTok's recommendation algorithm to effectively determine the interests of the accounts. Nevertheless, our findings remain informative about the limited personalization within the parameters of the study.
3. We utilized **a uniform setup of sock puppet accounts** which may have led TikTok to assume that all the accounts were being operated by the same user. For example, we used a clean stand-alone version of Google Chrome for each instance of interaction with TikTok, meaning that the sock puppets had no embedded client-side information such as cookies except for the IP address. The lack of previous history may have skewed the results of the recommendations generated by the TikTok algorithm.
4. The focus of this audit is the **portrayal of migration in political discourse**. While we recognize that there are other means of migrant representation on social media such as migrant-created entertainment content, such modes of representation are beyond the scope of our study. Nonetheless, other modes of representation on social media are important means for migrants and other marginalized communities to create their own narrative, inform public opinion and influence policy debate, and as such, they merit further investigation in their own right.
5. Our data collection was conducted within a specific period (October 8, 2022 - December 1, 2022) during the U.S. mid-term elections, and **may not necessarily**

- reflect migrant representation at other times.** As the political climate and events of the elections may have had an impact on the type of content that was being shared and recommended, the results of this study may not be generalizable to other time periods or to the behavior of actual users outside of this context. Additionally, the study's findings may be limited by the fact that the data was collected over a relatively short period, which may not fully capture the dynamics and variations in the TikTok recommendation algorithm over time.
6. Our **focus on three U.S. cities** may not accurately reflect the preferences and behaviors of users in other regions or countries, and may not fully capture the full breadth of recommendations provided by the TikTok algorithm. Consequently, the findings of this study may not be generalizable to other locations or larger populations, and may not fully capture the dynamics and variations in the TikTok recommendation algorithm over locations.
  7. We focused on **the For You feed on TikTok** as it is a central feature of the platform. However, this audit does not address other ways in which TikTok's recommendation system shapes user perceptions and understanding of migration. This narrow focus may not fully capture the full extent of algorithmic influence on social media depictions of migration.
  8. Our **use of monolingual data** for the account training may have limited the ability to generalize the results to other contexts and may not accurately reflect the diversity of views of the global population.
  9. We used **the web version of TikTok** platform on a desktop browser, which may differ from the mobile in-app version that the majority of users experience. Although it is unlikely that recommendations will significantly differ across web and mobile versions of the platform, we assume that there could be slight variations in tracking user behavior and collecting data.
  10. **TikTok's recommender system is constantly evolving and changing**, which poses a key limitation for audit studies. The engineers at TikTok are constantly making tests and adjustments to the system, meaning that even a set of sock puppet accounts run at the same time may not all be interacting with the same version of the system.
  11. From an ethical perspective, it is important to note that **TikTok prohibits the extraction of "any data or content from the platform using any automated system or software"** (TikTok, 2022). However, TikTok's application programming interface (API) does not provide data and does not offer assistance or tools for researchers to study the platform (O'Connor, 2021). In practice, researchers use scraping infrastructure from automated browsers to conduct TikTok research at scale due to the limited capabilities of the API (see for example [TikTok Observatory](#); Boeker and Urman, 2022).

## Conclusion

TikTok is one of the most popular and increasingly influential social media networks today. Initially known for catchy lip syncs and dances to viral tunes, TikTok has become a platform for self-expression and social engagement for young people labeled as “an engine for progressive young politics”. As with other social media, however, the visibility of content on TikTok is often the result of opaque and unregulated processes. The goal of this adversarial audit was to uncover how such processes shape political discourse on migration.

For this audit, we created nine sock puppet accounts in three different locations in the U.S. and trained them to mimic different attitudes towards migration by watching, liking and sharing videos and following content creators. Our analysis of TikTok's recommendations for each profile revealed the **virtually complete absence of political discourse on migration**, highlighting **TikTok's reluctance to amplify political content through algorithmic means** in favor of general entertainment content. We also found that **TikTok's recommendations are not highly personalized** based on the user's attitude around migration, political leaning of the location and initial interactions with the platform. While our findings contrast with previous studies of TikTok's recommender system, our novel evidence serves to emphasize the **evolution of algorithms over time** and the need for future audits and continuous assessments of recommender systems. Overall, TikTok's recommender system does not appear to affect the substance of political discourse, but it regulates the **(in)visibility of political debate on migration** across the spectrum by promoting general entertainment and weaker personalization.

While the findings of our adversarial audit remain limited to the parameters of our research questions and experimental setup, they nevertheless point to **the lack of transparency regarding TikTok's policies and practices regarding political content** on the platform. With view to better understanding and addressing the potentially adverse impacts of recommender systems, we recommend that TikTok allows independent researchers to investigate the platform, improves the transparency of its recommender systems, policies and practices regarding political content, and works with migrants and other marginalized communities to create more inclusive policies reflective of a wide variety of topics and perspectives.

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