

### Introduction

Content recommendation permeates almost every aspect of technology-users' daily lives.

Entertainment, advertisements, news, and media that is viewed on a daily basis can all be attributed to the content dissemination systems of online platforms. Personalized recommendations can have various goals: they might seek to provide users with content they'll enjoy the most or increase the amount of time/money an individual will spend on the platform.



### Abstract

Content distribution algorithms are designed to determine what content should be displayed to which users. These algorithms introduce user choice and, subsequently, user involuntary self disclosure and echo chamber effects via platform usage.

This study delves into the intricate dynamics between these algorithms and user media consumption, shedding light on the unintended consequences of online interactions through the modeling of user and platform interactions. As individuals engage with various platforms, their digital footprint becomes subject to algorithmic curation.

### Literature Review

What are Content Distribution Algorithms? (AIContentfy)

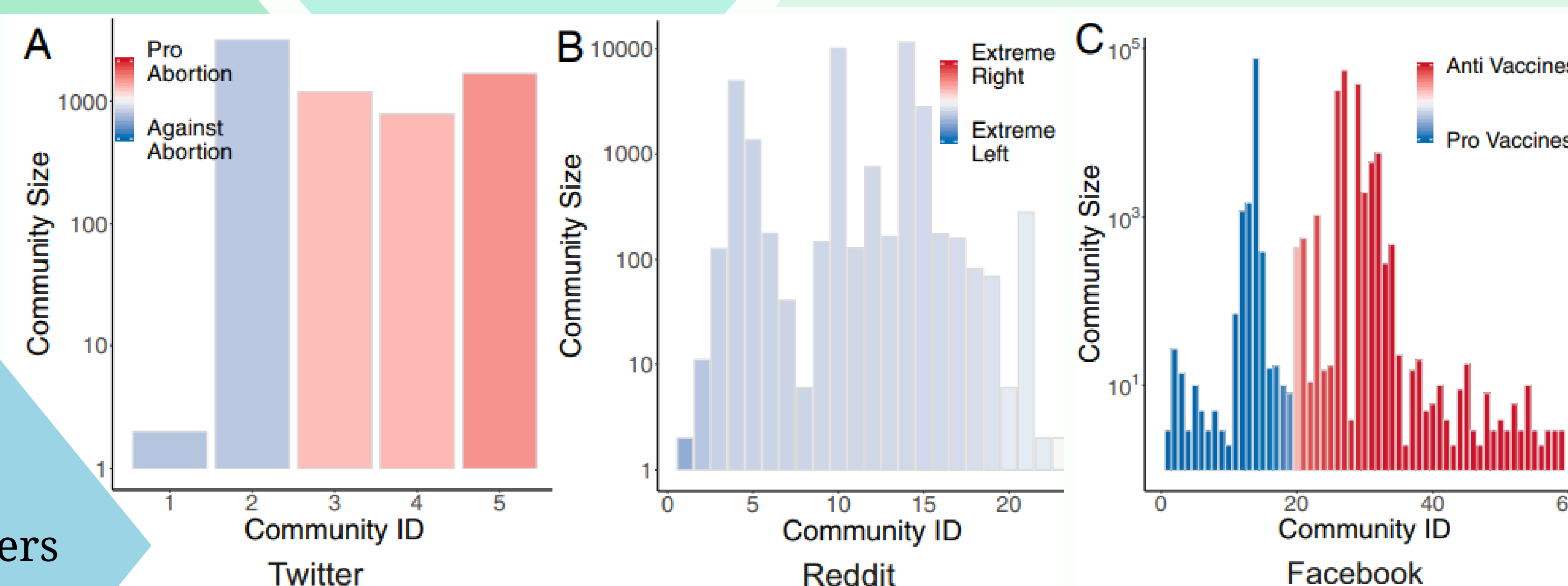
"complex computer programs that determine how content is displayed to users on various platforms, such as social media, news websites, and search engines"

"designed to analyze a multitude of factors such as user behavior, content relevance, and engagement metrics"

"use machine learning models to identify patterns and make predictions about what content will be most engaging and relevant to each user"

Implications on User Consumption: (Cinelli, et al.)

"may limit the exposure to diverse perspectives and favor the formation of groups of like-minded users framing and reinforcing a shared narrative" (echo chamber effect)



(Pictured above) Size and average leaning of communities detected in different dates. A and C show the full spectrum of leanings related to the topics of abortions and vaccines with regard to communities in B and D, where the political leaning is less sparse. (Cinelli, et al.)

### Methods

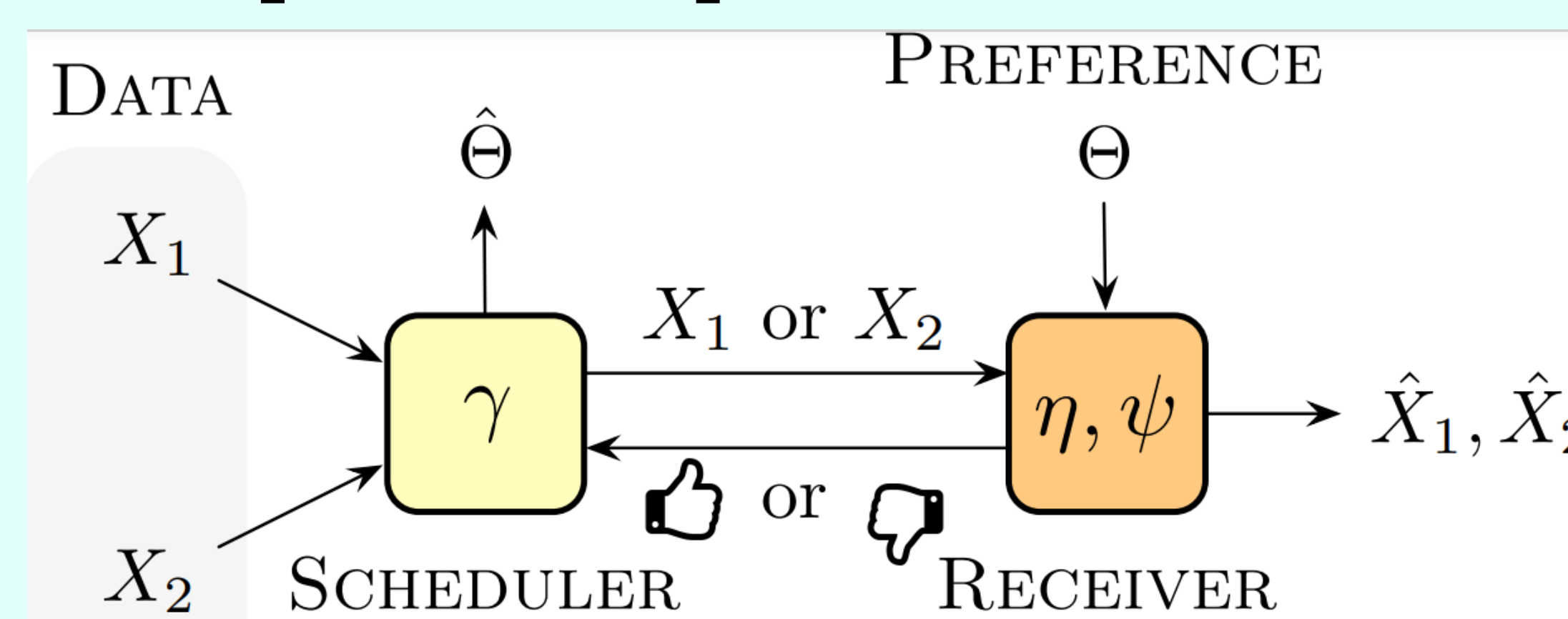
- The research consisted of literature reviews with sources that provided insights into existing content distribution algorithms.
We use Game Theory to analyze the formation of echo chambers and to quantify their sizes depending on the distribution of content available on the platform.
Future work will address how to mitigate echo chamber formation by carefully designing the algorithm.
We would like to collect real data and compare it to our theoretical results.

### Hypothesis

The presence of private preferences forces the platforms to aggressively send content that may upset users to force them to reveal their preference, leading to the formation of echo chambers.

### Results

- Using the information found, a model of content distribution algorithms was produced that can be used by future researchers so they may test the output of said algorithms in a non platform-specific manner.



- The findings underscore the need for a nuanced understanding of algorithmic mechanisms and their implications for users' continued usage.

### References

AIContentfy. (2023). Understanding the algorithms behind content distribution. [online] Available at: https://aicontentfy.com/en/blog/understanding-algorithms-behind-content-distribution.
Bazarova, N. N. & Choi, Y. H. (2014) Self-Disclosure in Social Media: Extending the Functional Approach to Disclosure Motivations and Characteristics on Social Network Sites. Journal of communication. [Online] 64 (4), 635-657.
Berman, R. and Katona, Z. (2020). Curation Algorithms and Filter Bubbles in Social Networks. Marketing Science, 39(2), pp.296-316. doi:https://doi.org/10.1287/mksc.2019.1208.
Cinelli, M. et al. (2021) The echo chamber effect on social media. Proceedings of the National Academy of Sciences - PNAS. 118 (9), .
Dean, S., Dong, E., Jagadeesan, M. and Leqi, L., 2024, January. Recommender Systems as Dynamical Systems: Interactions with Viewers and Creators. In Workshop on Recommendation Ecosystems: Modeling, Optimization and Incentive Design.
Dean, S. and Morgenstern, J., 2022. Preference Dynamics Under Personalized Recommendations. Proceedings of the 23rd ACM Conference on Economics and Computation. doi:https://doi.org/10.1145/3490486.3538346.
Hazrati, N. & Ricci, F. (2023) Choice models and recommender systems effects on users' choices. User modeling and user-adapted interaction. [Online]
Prawesh, S. and Padmanabhan, B. (2021) A complex systems perspective of news recommender systems: Guiding emergent outcomes with feedback models. PloS one. [Online] 16 (1), e0245096-e0245096.