Algorithmic Extremism on YouTube: A Case Study of Polarization in the Indian Context

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This final project for Social Network Analysis (DACSS 697E) analyzes two YouTube video networks generated from select keywords from the Indian right-wing vocabulary to examine whether the platform's algorithm has a role in constructing echo chambers, leading to user radicalization.

INTRODUCTION

YouTube's algorithm recommends videos based on a user's past behavior, and its official recommendation criteria includes: "1) engagement objectives, such as user clicks, and degree of engagement with recommended videos; 2) satisfaction objectives, such as user liking a video on YouTube, and leaving a rating on the recommendation" (Ledwich & Zaitsev, 2019). While some studies have indicated that it tends to suggest radical content to its users and construct echo chambers (Chen et al., 2022; Ribeiro et al., 2021), others found otherwise (Bessi et al., 2016; Ledwich & Zaitsev, 2019).

 The country with highest YouTube viewership is India, whose history of religious intolerance has only been intensified through social media usage. Hindu nationalism and the Hindutva ideology (which designates Hindus as the in-group and Dalits, Muslims, and secular liberals as the out-group) has become more prevalent. These extremist views are manifesting in real life too, with popular YouTubers being accused of religiously-motivated murder and government crackdowns on those who criticize them online.

OBJECTIVE

To understand whether YouTube's recommendation algorithm facilitates polarization and the creation of echo chambers by recommending more extremist content to its users.
The keywords in focus are:
1) '**Love Jihad**': "a conspiracy theory accusing Muslim men of wooing Hindu women to force them to convert to Islam" (Frayer, 2021)
2) '**Gau Raksha**': literally translates from Hindi to "cow protection"; "The modern militant gau-rakshak (cow protector) views himself as an inheritor of the martial tradition where the cow, as well as women and nation, become sacred objects to be protected" (Kothiyal, 2017)
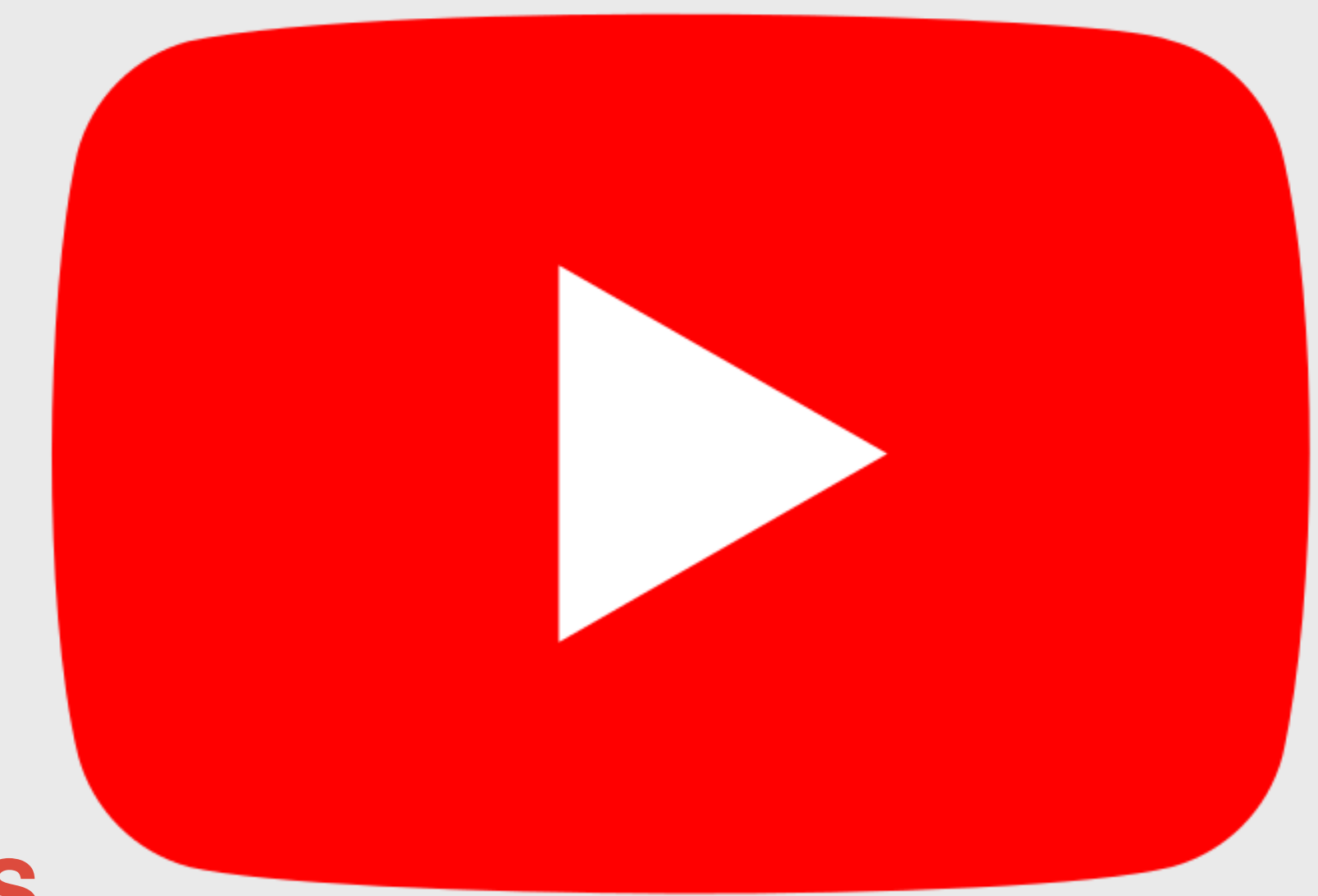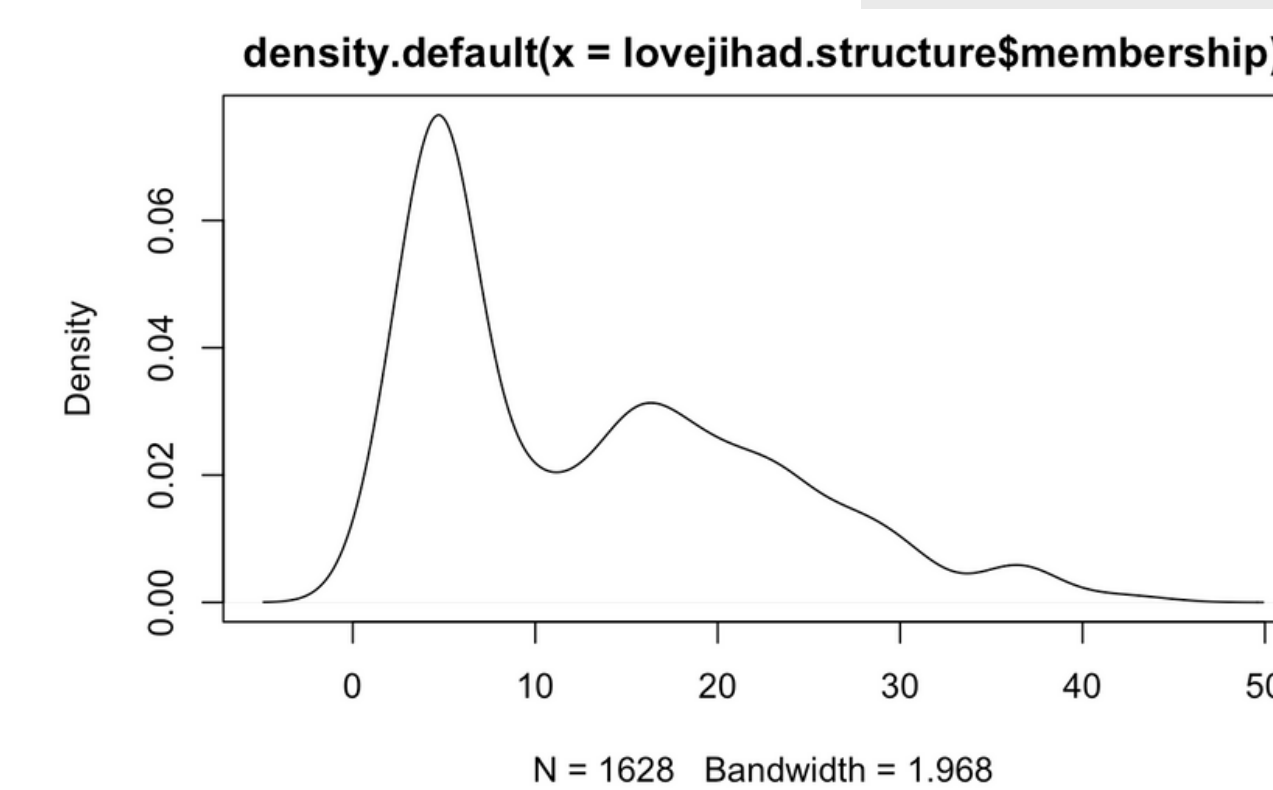
METHODOLOGY

Data for this project were collected from the 'YouTube Data Tools' website on May 11th and 18th. Video networks (a network of relations between videos, starting from a search or a list of video ids) were generated from the two keywords. A node is a YouTube video, and a directed, unweighted edge exists between two videos if one recommends the other. One iteration was run to return 50 items, results were sorted by relevance to the query, and crawl depth ("how far from the seeds the script should go" (Rieder, 2015) was set to 1. Network analysis methods from statnet and igraph were used to draw inferences in RStudio.
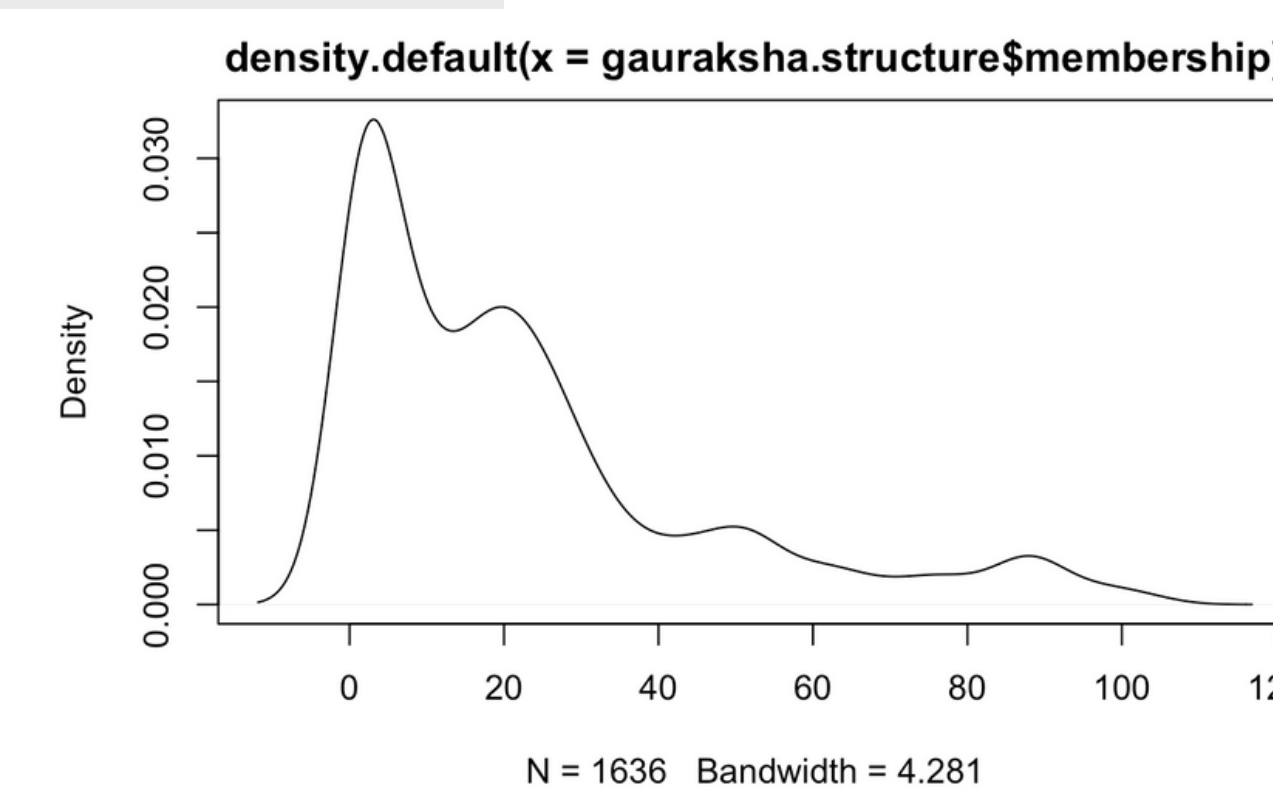
FINDINGS

Search Term: 'Love Jihad' | *Search Term: 'Gau Raksha'*

Density plot of node membership

density.default(x = lovejihad.structure$membership)

density.default(x = gauraksha.structure$membership)
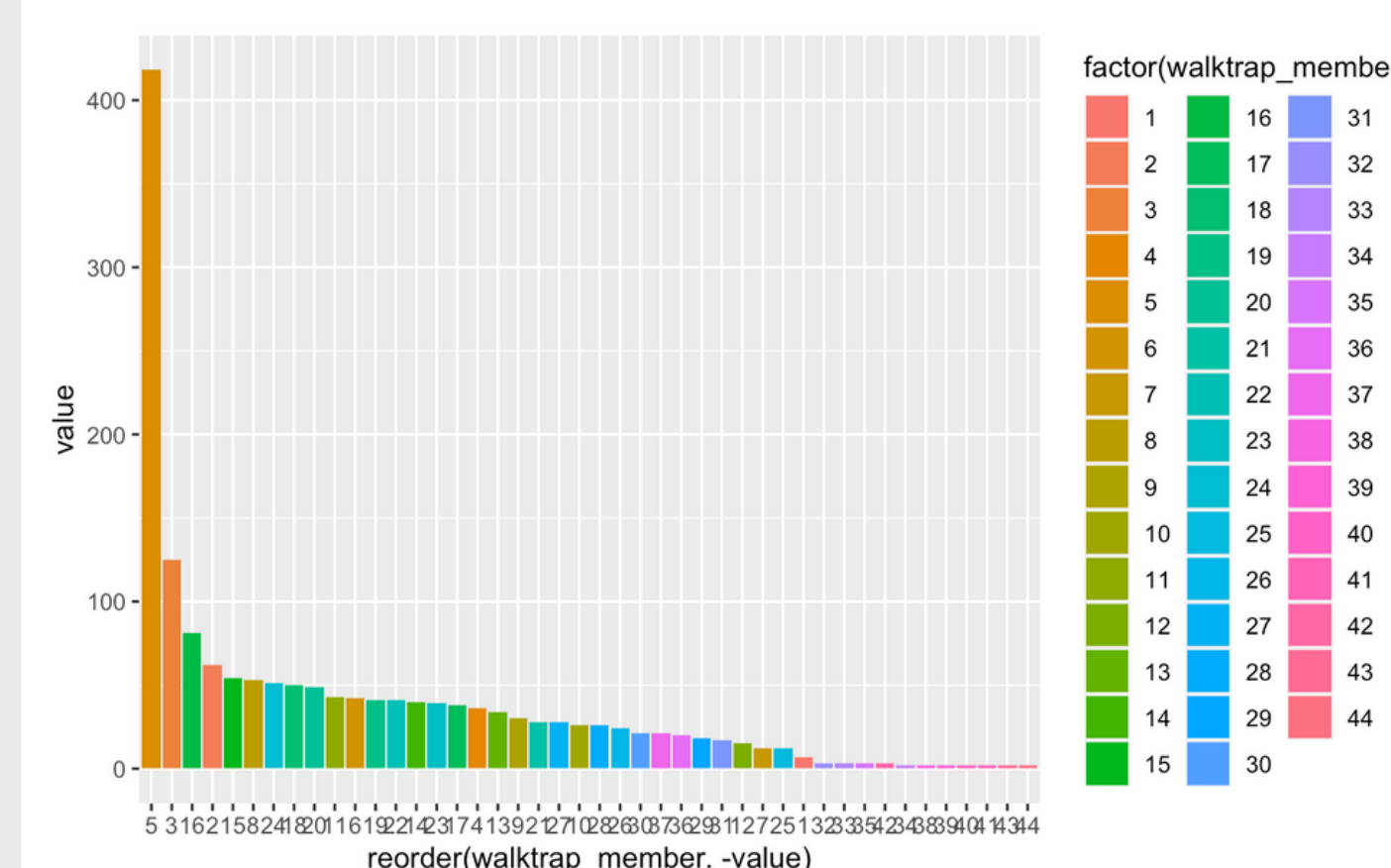
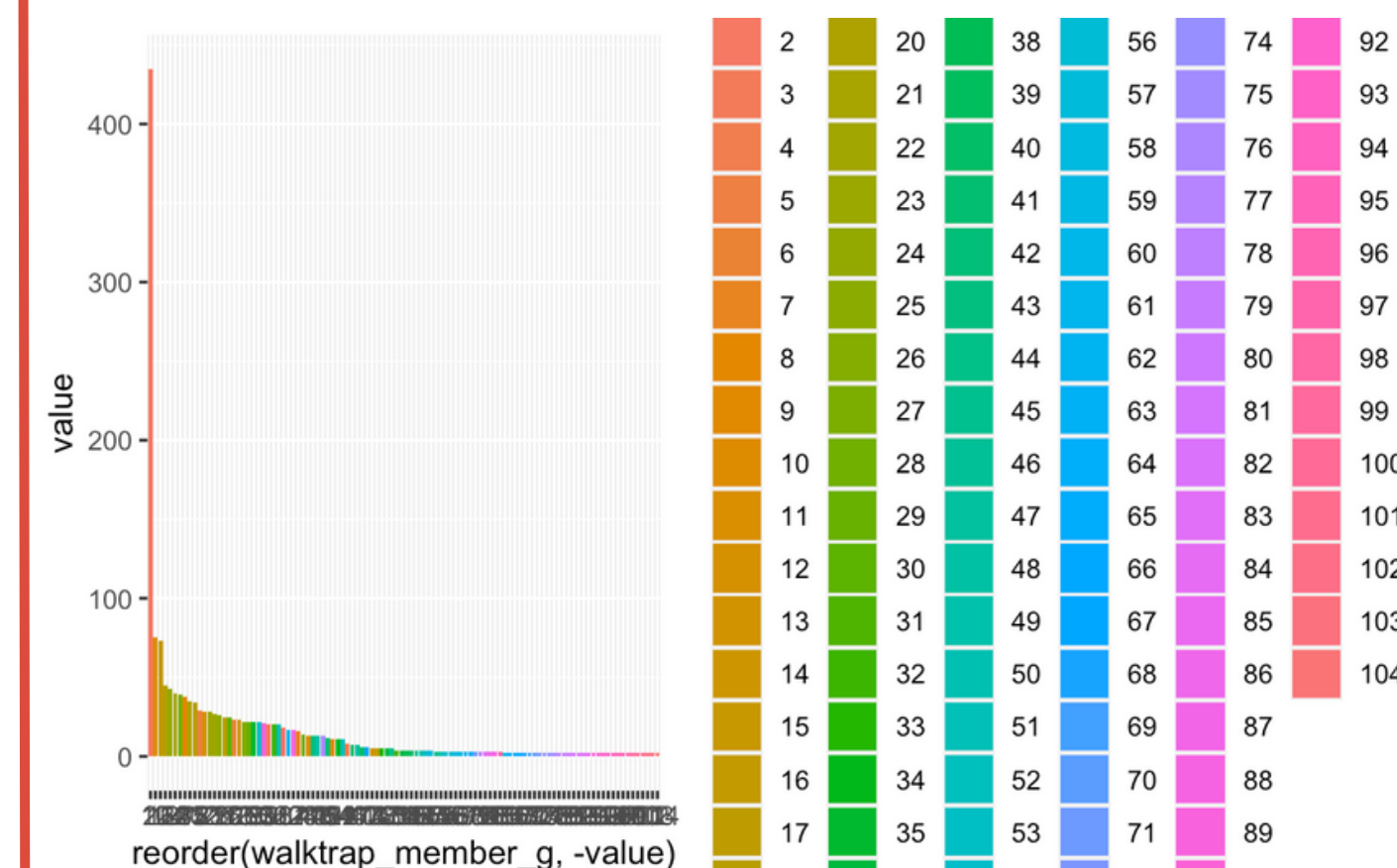Two major membership communities, with one containing more nodes.

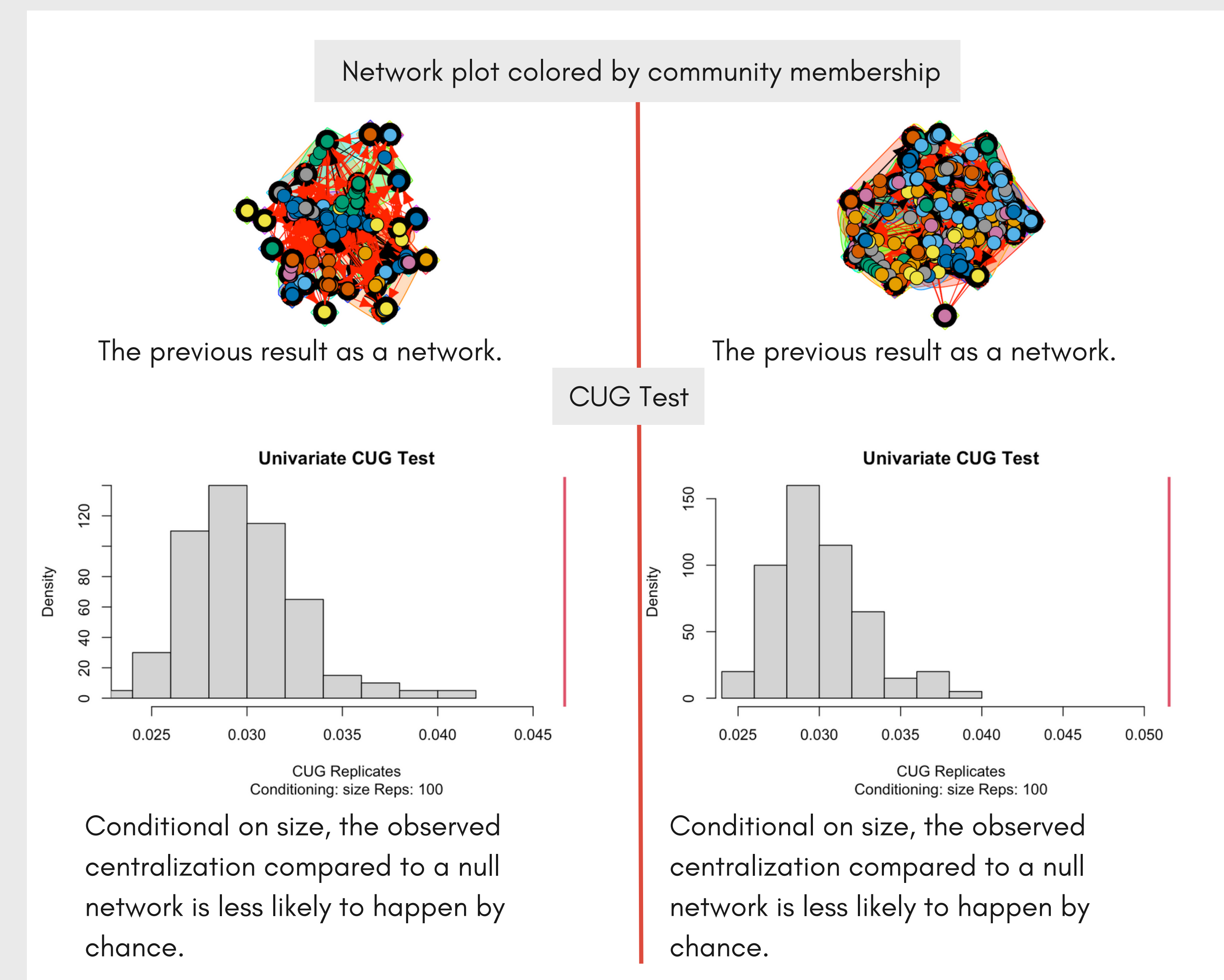One major community; more distributed membership.

Walktrap community detection algorithm

44 distinct communities were identified, with one containing most of the nodes.

104 distinct communities were identified, with one containing most of the nodes.

Network plot colored by community membership

The previous result as a network. | The previous result as a network.

CUG Test

Univariate CUG Test | Univariate CUG Test

CUG Replicates
Conditioning: size Reps: 100

Conditional on size, the observed centralization compared to a null network is less likely to happen by chance. | Conditional on size, the observed centralization compared to a null network is less likely to happen by chance.

CONCLUSION

- Both networks are largely sparse: videos don't always point to similarly themed ones in the same network
- Views and likes are not correlated with degree and centrality scores of the videos: the most popular videos aren't usually recommended by the algorithm
- Blockmodeling and walktrap community detection methods detected two major communities in both networks: these communities may hold differing opinions on the search terms, however not strong enough to be echo chambers
- The formation of these networks were not by chance, the algorithm has some influence over viewership
- Networks not completely representative: future studies could compare more generic keywords to see whether they lead to extremist content
- Other centrality scores for both networks could be analyzed further
- A channel-level analysis could be conducted to assess the most frequently occurring channels for each keyword