Toxicity and Networks of COVID-19 Misinformation Discourse: A Tale of Two Social Media Platforms

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Why?

72% of US adults say that they use at least one social media site.

A little under 48% of US adults say that they get news from social media "often" or 'sometimes".

Toxic information on social media like Twitter, and Parler has become a growing concern.

Even though these social media have policy and regulation to make toxicity free social media, toxicity still present there.

Agenda
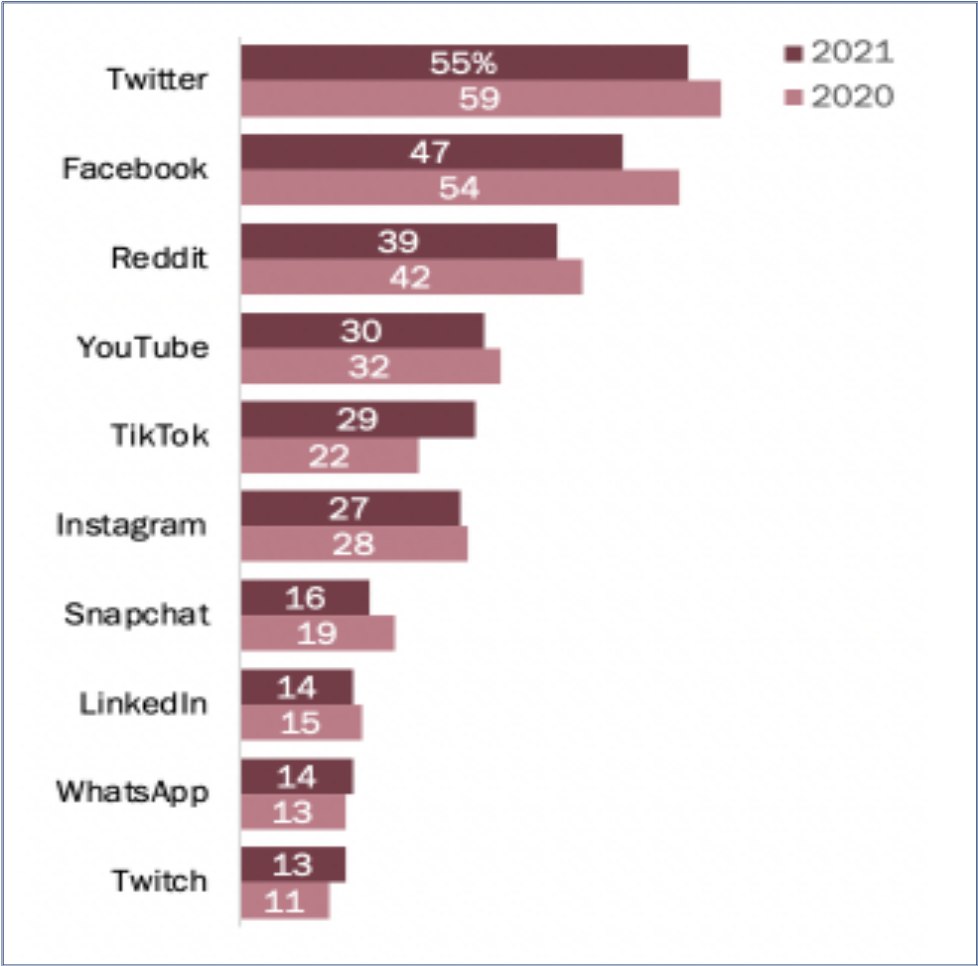
Data collection

Methodology

Results

Conclusion

Future directions

Data Collection

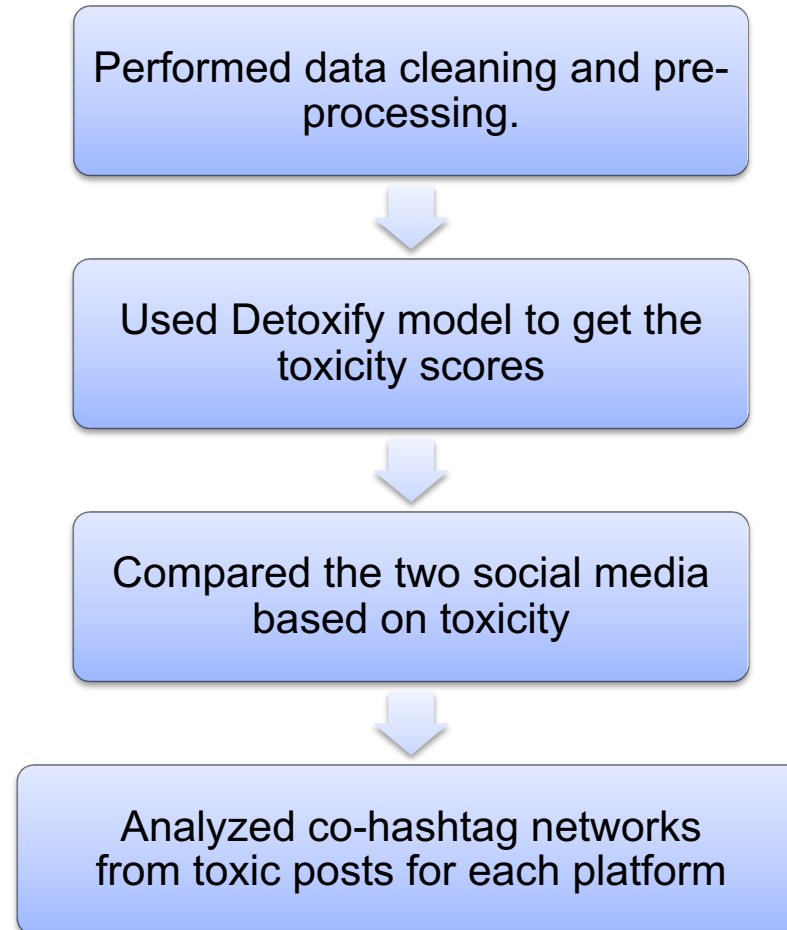4 Covid related keywords/Hashtags. (f*ckcovid, f*cklockdown, f*ckmask, f*ckvaccine)
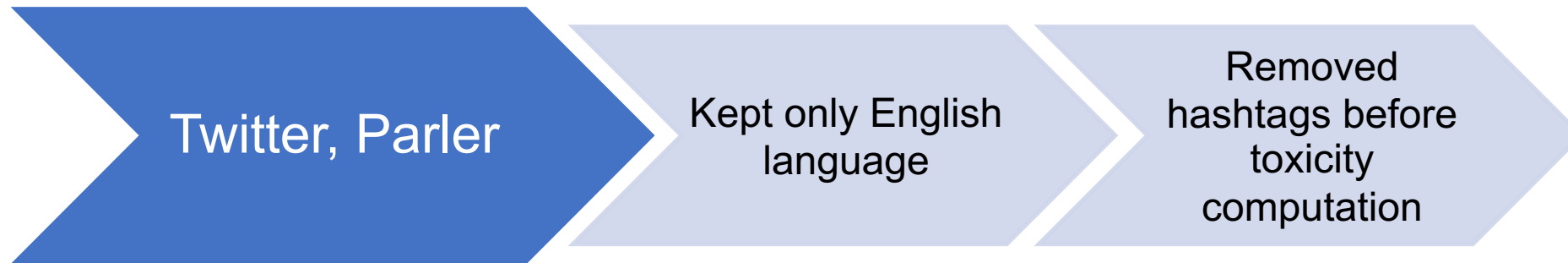
Time Period: January 1, 2020, through December 31, 2020.
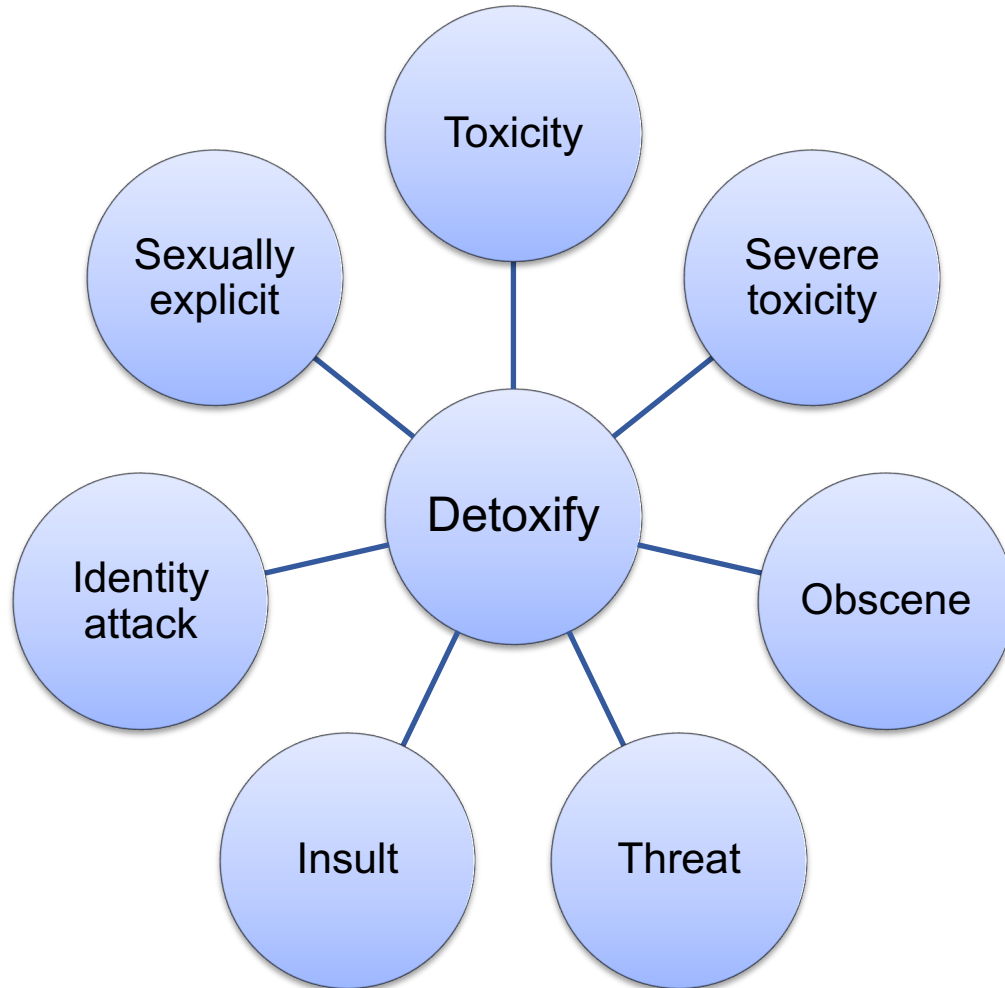
Posts from Twitter: 32,636

2 Social Media Platforms (Twitter, Parler)

From Parler: 54,419

Categories	Social Media	Records
Covid	Twitter	28,131
	Parler	16,361
Lockdown	Twitter	1,472
	Parler	5,965
Mask	Twitter	2,423
	Parler	26,165
Vaccine	Twitter	610
	Parler	5,928

Methodology

Performed data cleaning and pre-processing.

↓

Used Detoxify model to get the toxicity scores

↓

Compared the two social media based on toxicity

↓

Analyzed co-hashtag networks from toxic posts for each platform

Data Cleaning

Twitter, Parler → Kept only English language → Removed hashtags before toxicity computation

Detoxify Model

https://github.com/unitaryai

Network Analysis

NetworkX

Python library for creating and analyzing networks

Generate co-hashtag networks for Twitter and Parler toxic posts.

https://networkx.org/
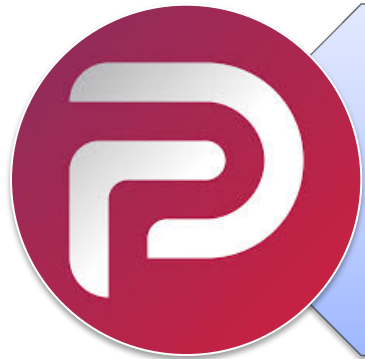
Results – Posting Volume
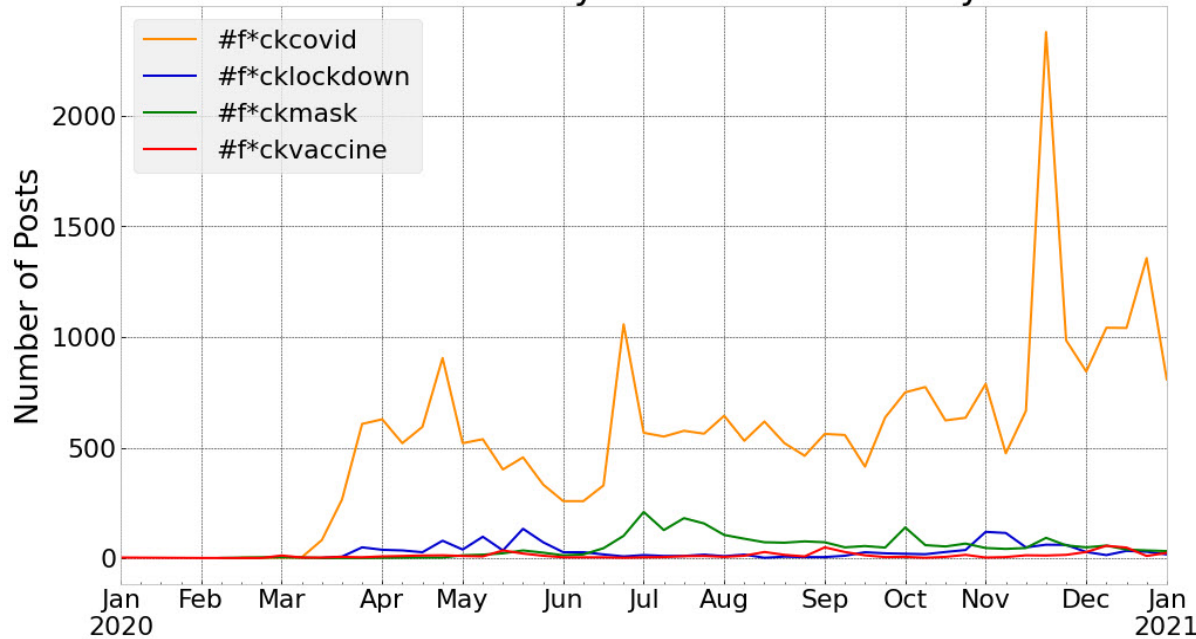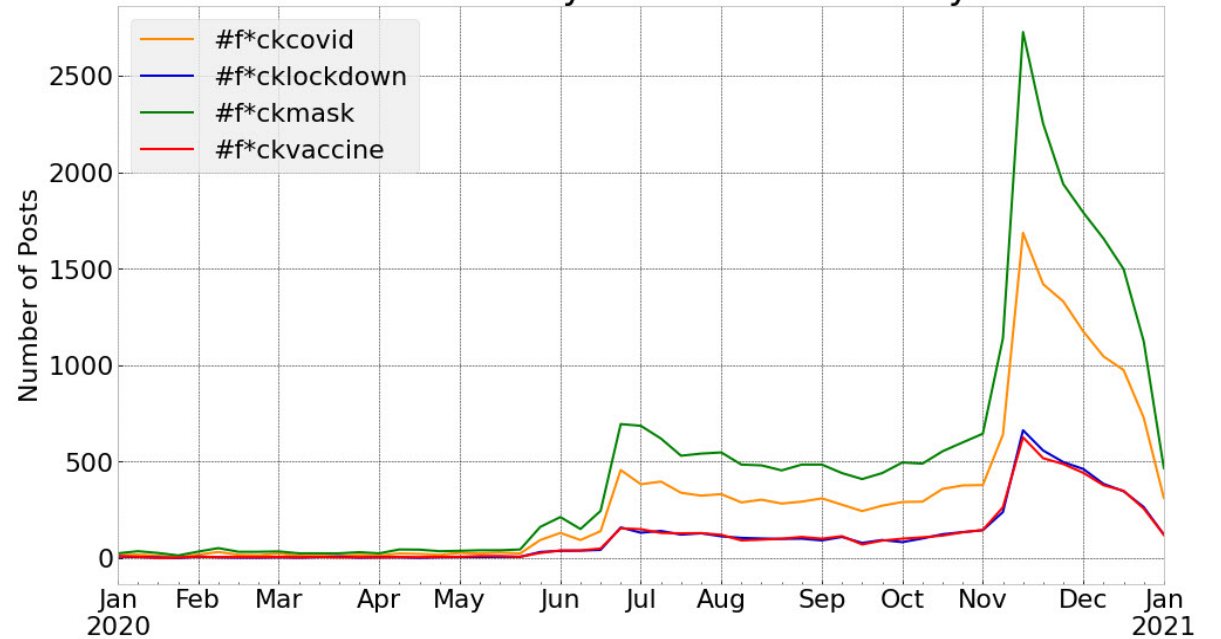
Twitter (left) and Parler (right) posts by weekly publication showing posting frequency

For Anti-Covid, Parler is more toxic.

For Anti-Lockdown, Anti-mask and Anti-vaccine, Twitter is more toxic.

Categories	Social Media	Mean Toxicity	SD
Covid	Twitter	0.234	0.388
	Parler	0.294	0.402
Lockdown	Twitter	0.326	0.406
	Parler	0.176	0.361
Mask	Twitter	0.313	0.416
	Parler	0.264	0.388
Vaccine	Twitter	0.302	0.411
	Parler	0.119	0.304

Results – Comparison

| Dataset	Platform	Total Tweets/ Posts	Percentage of Post with Toxicity Score > 0.5			Percentage of Posts with Toxicity score > 0.7			Percentage of Posts with Toxicity Score > 0.9		
			Toxicity	Obscene	Insult	Toxicity	Obscene	Insult	Toxicity	Obscene	Insult
#f*ckcovid	Twitter	28131	24.08%	22.05%	10.93%	21.65%	19.89%	8.60%	17.00%	10.06%	6.93%
#f*cklockdown		1472	34.31%	28.60%	16.37%	27.45%	22.96%	11.35%	20.11%	14.54%	6.05%
#f*ckmask		2423	31.24%	23.15%	19.81%	27.90%	20.59%	16.05%	22.86%	15.44%	5.94%
#f*ckvaccine		610	30.98%	23.28%	19.51%	27.21%	19.84%	14.75%	20.98%	14.26%	7.21%
#f*ckcovid	Parler	16361	30.51%	20.61%	18.01%	29.08%	19.16%	15.82%	15.48%	10.43%	7.03%
#f*cklockdown		5956	18.11%	13.06%	12.14%	17.45%	12.98%	11.90%	13.73%	8.14%	8.04%
#f*ckmask		26165	26.80%	15.71%	17.12%	23.38%	13.28%	13.48%	14.64%	9.96%	7.18%
#f*ckvaccine		5928	11.93%	9.06%	5.36%	10.90%	8.92%	4.82%	10.37%	8.52%	4.28%
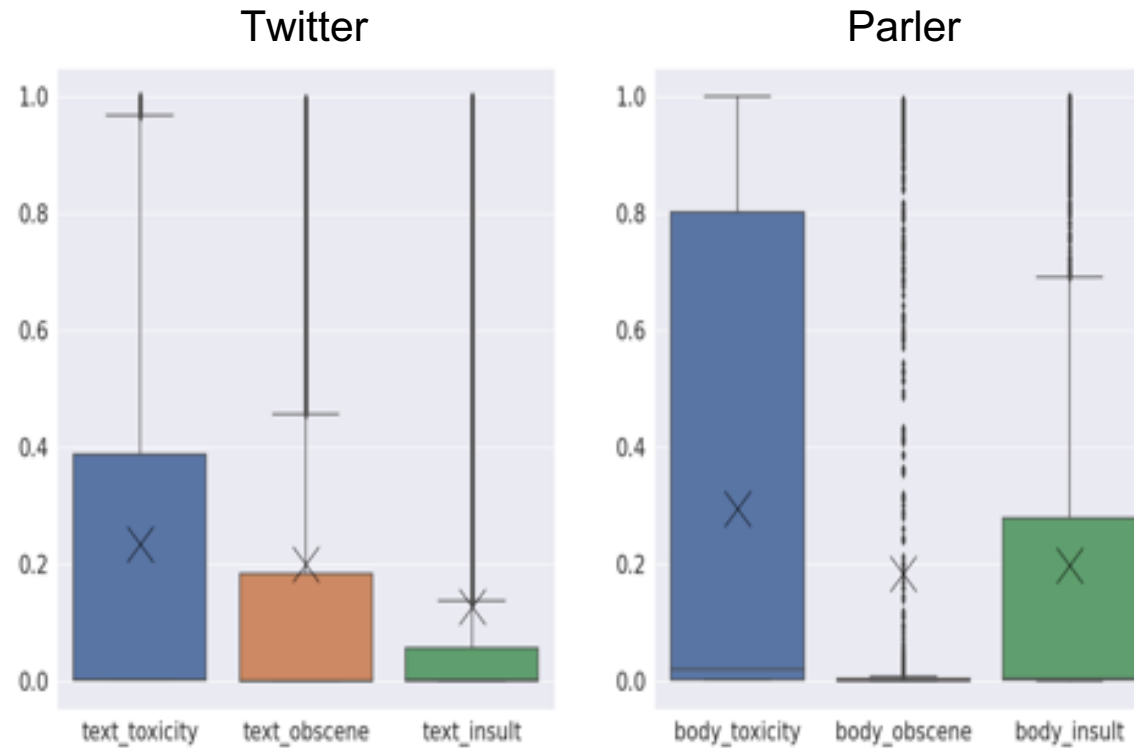
Twitter

Parler

F*Covid Hashtag for three classes (Toxicity, Obscene, Insult) for Twitter vs Parler
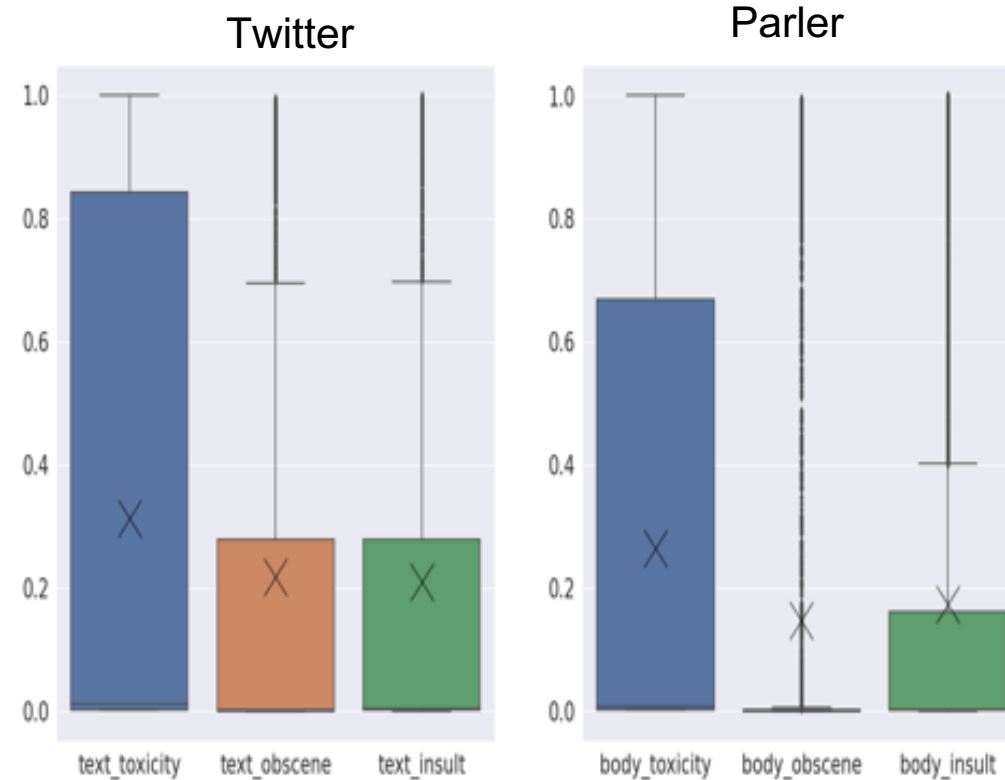
F*lockdown Hashtag for three classes (Toxicity, Obscene, Insult) for Twitter vs Parler
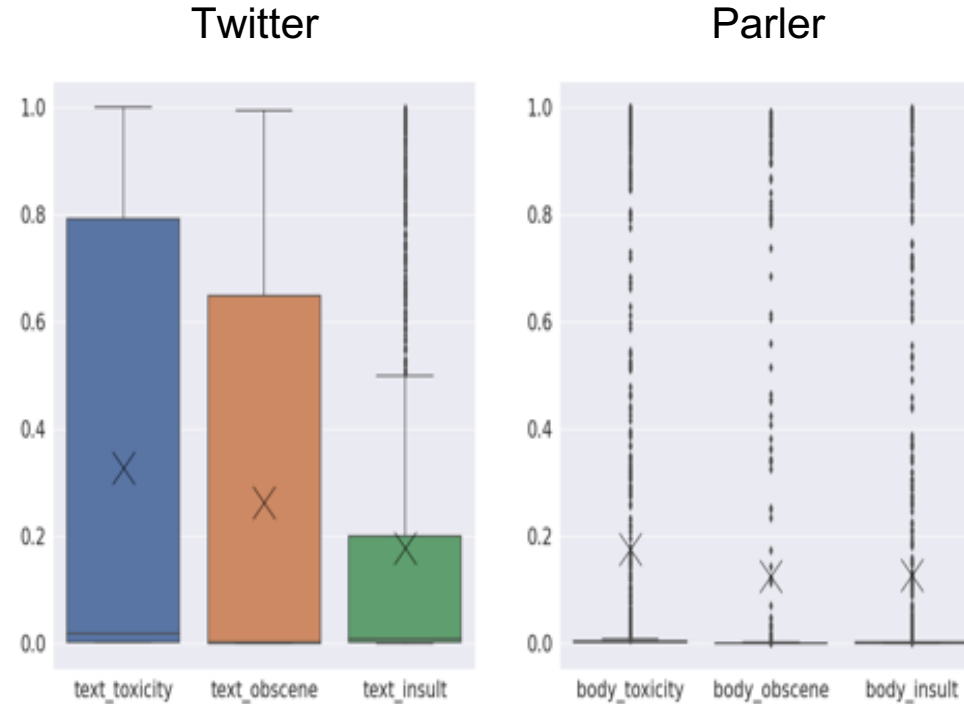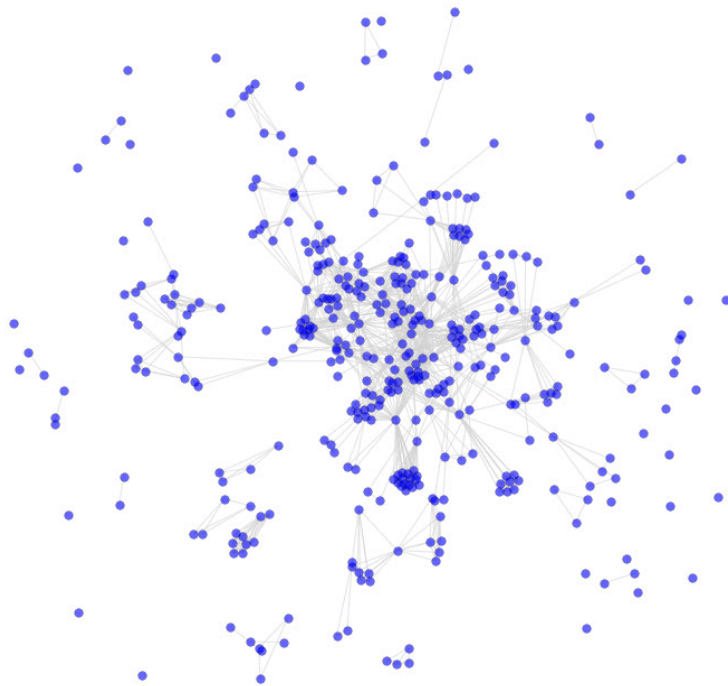
F*mask Hashtag for three types of classes (Toxicity, Obscene, Insult) for Twitter vs Parler
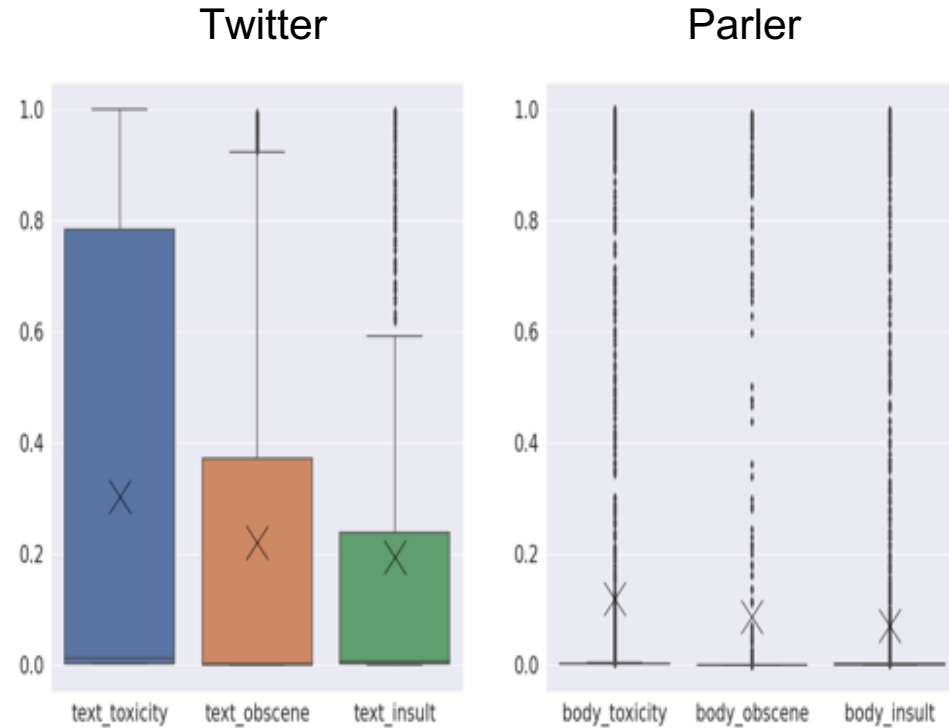
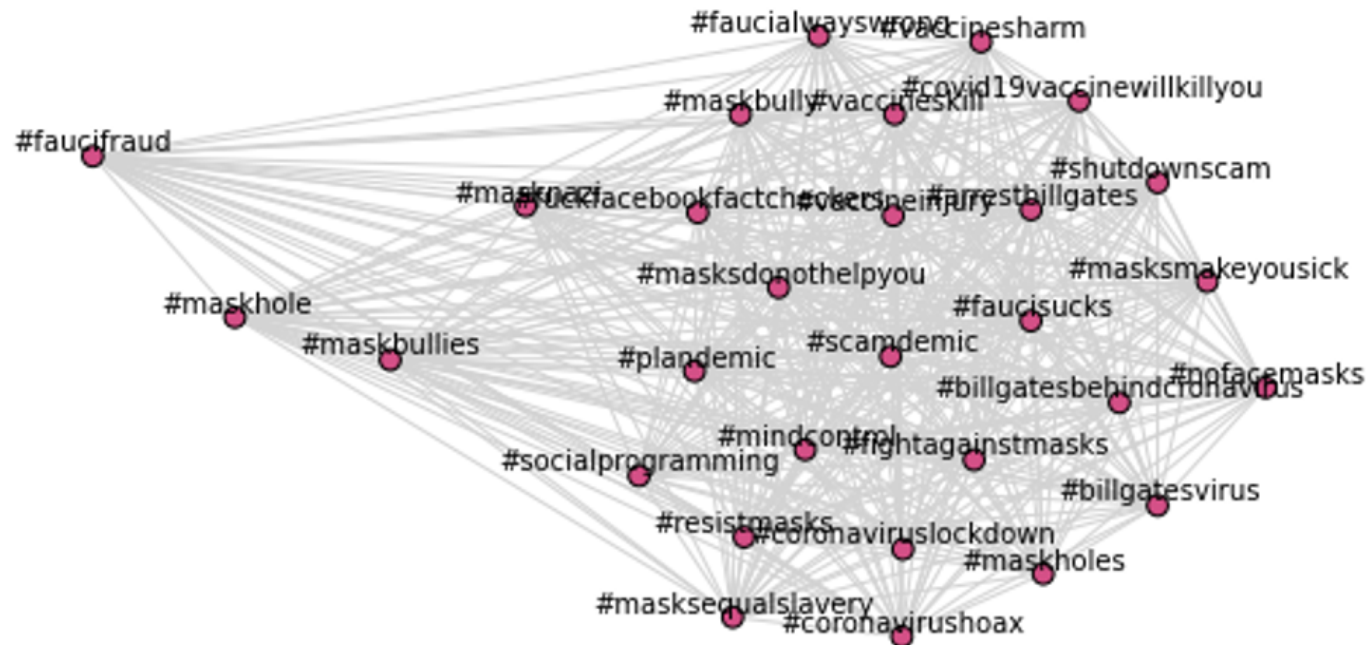F*vaccine Hashtag for three types of toxicity (Toxicity, Obscene, Insult) for Twitter vs Parler
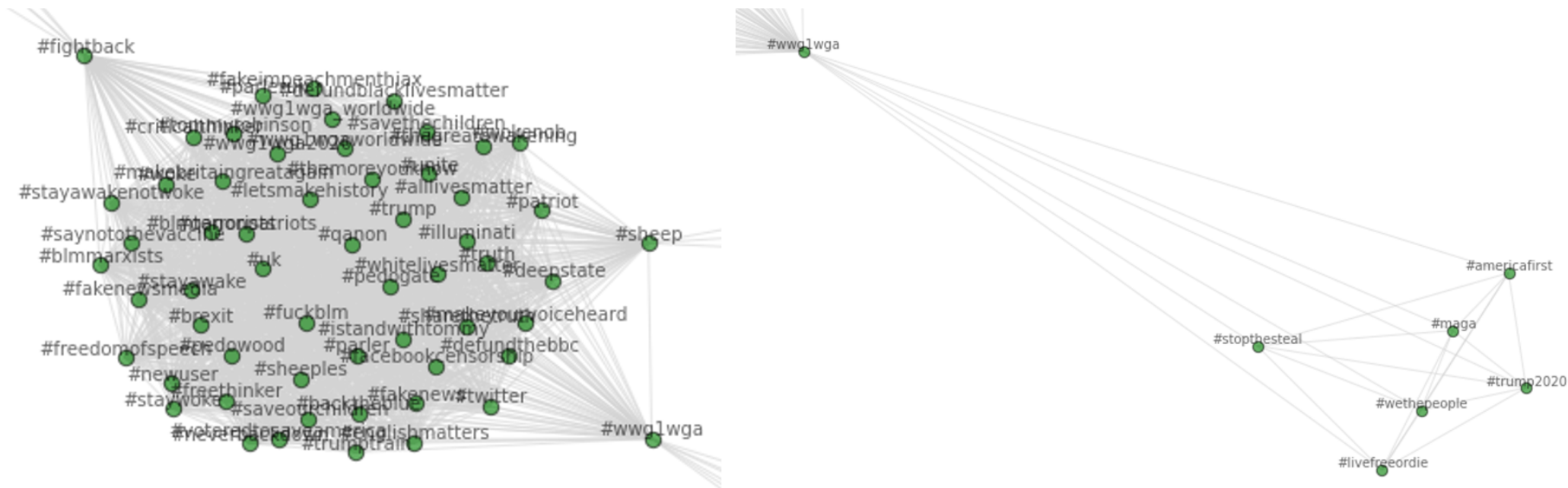
Toxic Twitter Co-Hashtag Network Graph (left) and Parler Co-Hashtag Network Graph (right)

Twitter co-hashtag network graph identifying a mass of users sharing hashtags indicative of various Bill Gates **conspiracies**, anti-vaccination ideas, and the far-right conspiracy group QAnon.

Parler co-hashtag network graph component identifying a misinformation **echo chamber**.

Parler co-hashtag network graph component identifying **important bridge nodes** connecting COVID-19 misinformation to fringe narratives.

Conclusion

Twitter contained a higher level of toxicity for COVID-19 misinformation discourse than Parler

Parler has higher level of toxicity for anti-COVID-19 category
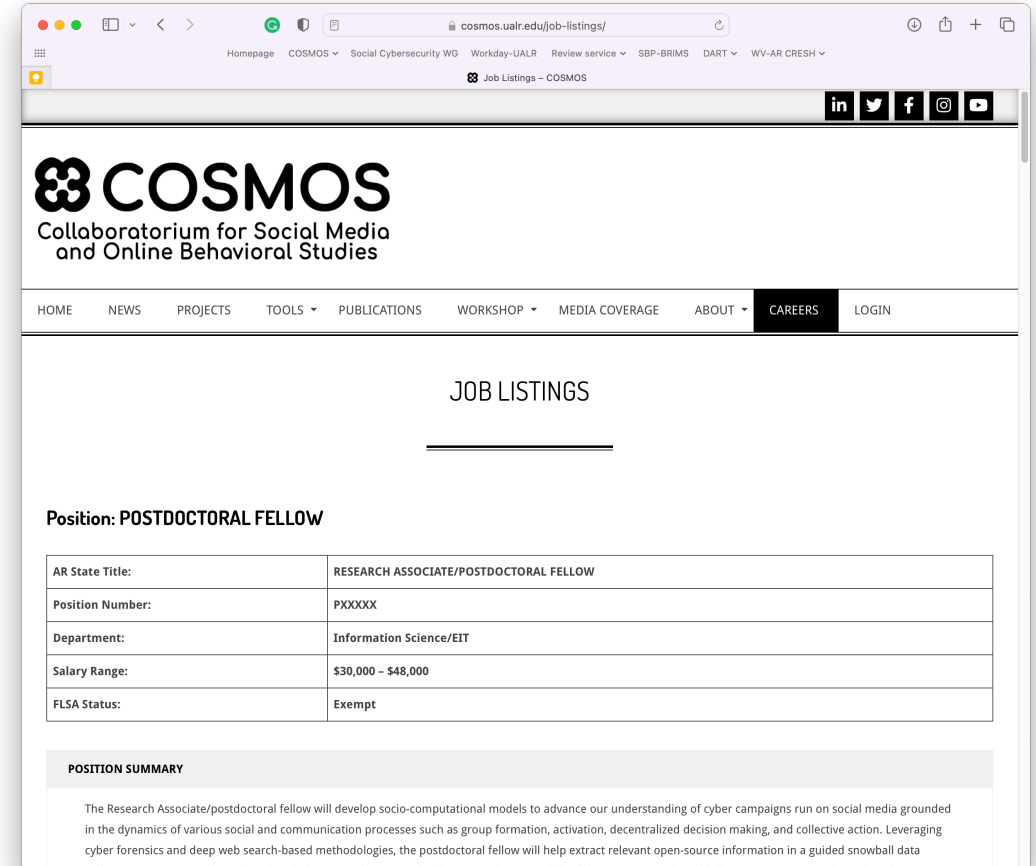
Twitter network showed prominent conspiracy themes such as those regarding Bill Gates and QAnon

Parler network showed well-defined clusters, the most concerning consisting of a misinformation echo chamber

In Parler, important bridge nodes were identified that connected COVID-19 misinformation with other fringe narratives

Future directions

- Extending platform comparison to misinformation narratives other than COVID-19

- Include more platforms such as Reddit, Instagram, and TikTok

- Compare Twitter and Parler mentions, shared URL, and retweet/echo networks

- Detect users suspicious of being a bot and analyze toxicity

COSMOS is Hiring!

- Graduate research assistants (Masters, PhD program)

- Postdoctoral fellows

- Data engineer

- Dev ops

- Contact nxagarwal@ualr.edu

- https://cosmos.ualr.edu

Thank you!

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- **YouTubeTracker** - https://vtracker.host.ualr.edu
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