A CRITIQUE OF TWITTER'S RESPONSE TO COVID-19 VACCINE MISINFORMATION

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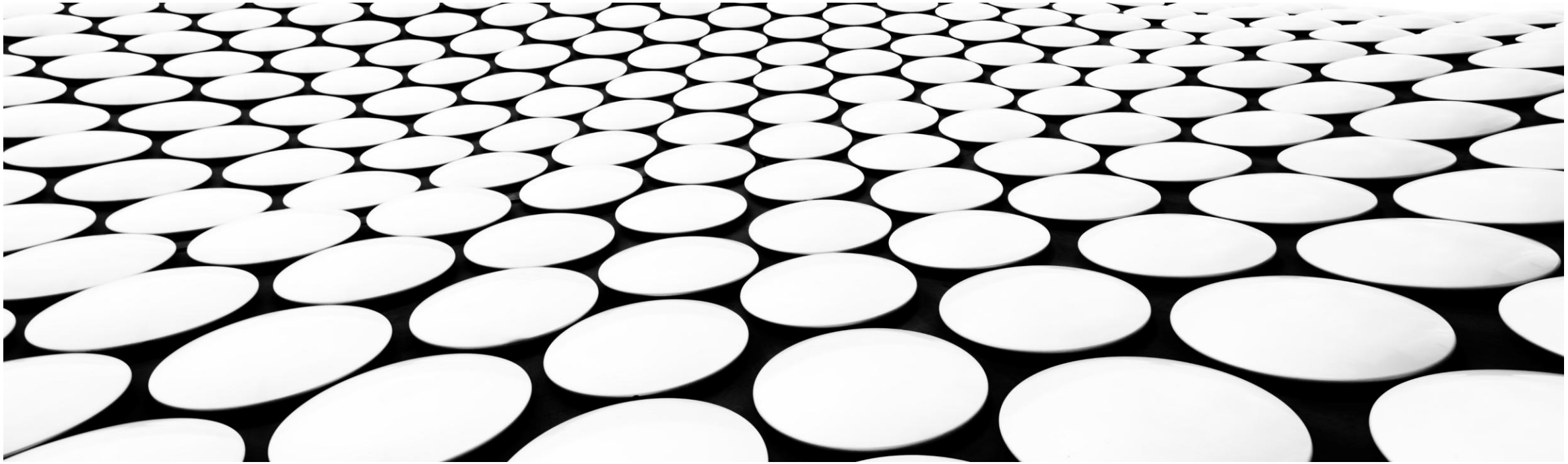
DTSC 690 – 2025 SUMMER 2



INTRODUCTION

- After outbreak of the COVID-19 pandemic, massive health-related misinformation—“infodemic” on multiple social media platform, undermining public health policies to contain the disease
- Research prevalence of COVID-19 vaccine misinformation originating from low-credibility websites, compared to information published on mainstream news websites
- Uncovered role and the contribution of important groups of vaccine misinformation spreaders, namely verified and automated accounts

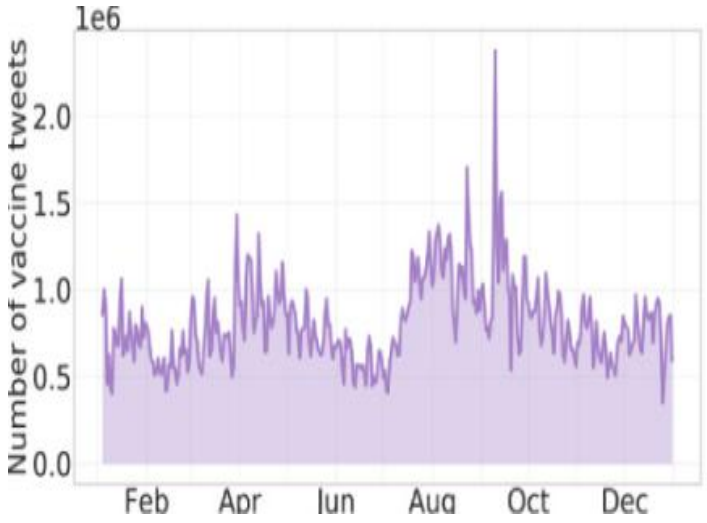
RESEARCH QUESTIONS

- What were the patterns of prevalence and contagion of COVID-19 vaccine misinformation on Twitter ?
- Who were the main spreaders of vaccine misinformation ?

RESEARCH METHODS

TWITTER DATA COLLECTION

VISUALIZING THE RELATIONSHIP BETWEEN ONLINE (MIS)INFORMATION AND COVID-19 VACCINE ADOPTION IN THE UNITED STATES WHERE 90% OF THE TWEETS WITH COMMON KEYWORDS



TIME SERIES OF THE DAILY NUMBER OF VACCINE-RELATED TWEETS SHARED BETWEEN JANUARY 4 AND DECEMBER 31, 2021. THE MEDIAN DAILY NUMBER OF TWEETS IS 720,575

IDENTIFYING ONLINE MISINFORMATION

1. IDENTIFIED TWEETS SHARING LINKS TO LOW-CREDIBILITY WEBSITES THAT WERE LABELED BY JOURNALISTS, FACT-CHECKERS, AND MEDIA EXPERTS FOR REPEATEDLY SHARING FALSE NEWS, HOAXES, CONSPIRACY THEORIES, UNSUBSTANTIATED CLAIMS, HYPERPARTISAN PROPAGANDA, CLICK-BAIT, AND SO ON
2. ANALYZED LINKS TO YOUTUBE VIDEOS SHARED ON TWITTER THAT MIGHT CONTAIN MISINFORMATION

SOURCES OF RELIABLE INFORMATION

CURATED A LIST OF RELIABLE, MAINSTREAM SOURCES OF VACCINE-RELATED NEWS AS OUR BASELINE TO INTERPRET THE PREVALENCE OF MISINFORMATION AND CHARACTERIZED ITS SPREADING PATTERNS

LINK EXTRACTION

IDENTIFYING LOW- AND HIGH-CREDIBILITY LINKS AND YOUTUBE LINKS REQUIRED EXTRACTING THE TOP-LEVEL DOMAINS FROM THE URLS EMBEDDED IN TWEETS AND MATCHING THEM AGAINST LISTS OF WEB DOMAINS

BOT DETECTION

MEASURE THE LEVEL OF BOT ACTIVITY FOR DIFFERENT TYPES OF INFORMATION, EMPLOYING BOTOMETERLITE, CAN EFFICIENTLY IDENTIFY LIKELY AUTOMATED ACCOUNTS ON TWITTER FOR EACH TWITTER ACCOUNT GENERATING A BOT SCORE IN THE RANGE OF 0-1, A HIGHER SCORE INDICATES THAT THE ACCOUNT IS MORE LIKELY TO BE AUTOMATED

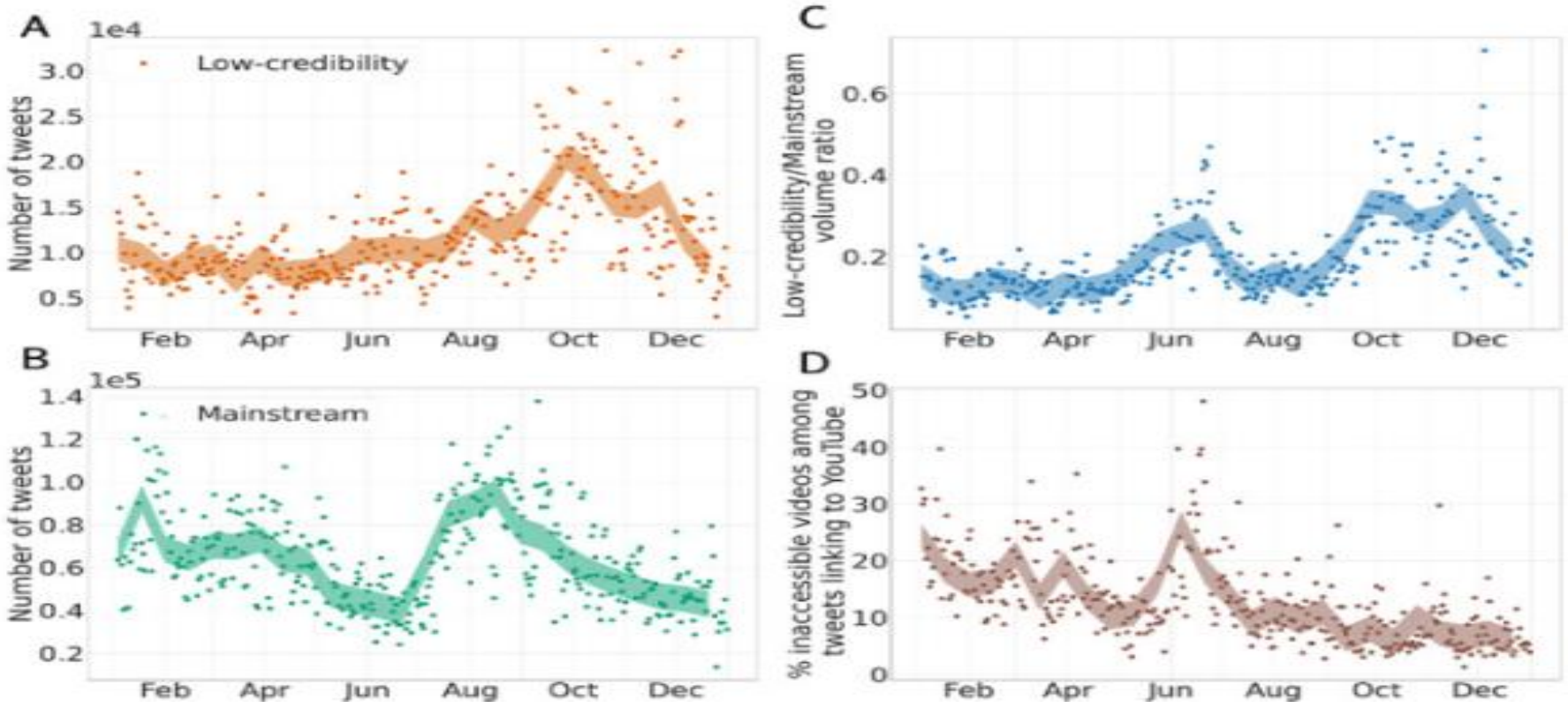
ETHICAL CONSIDERATIONS

RESEARCH IS BASED ON OBSERVATIONS OF PUBLIC DATA WITH MINIMAL RISKS TO HUMAN SUBJECTS. THE STUDY WAS THUS DEEMED EXEMPT FROM REVIEW BY THE INDIANA UNIVERSITY INSTITUTIONAL REVIEW BOARD

RESEARCH ANALYSIS & RESULTS

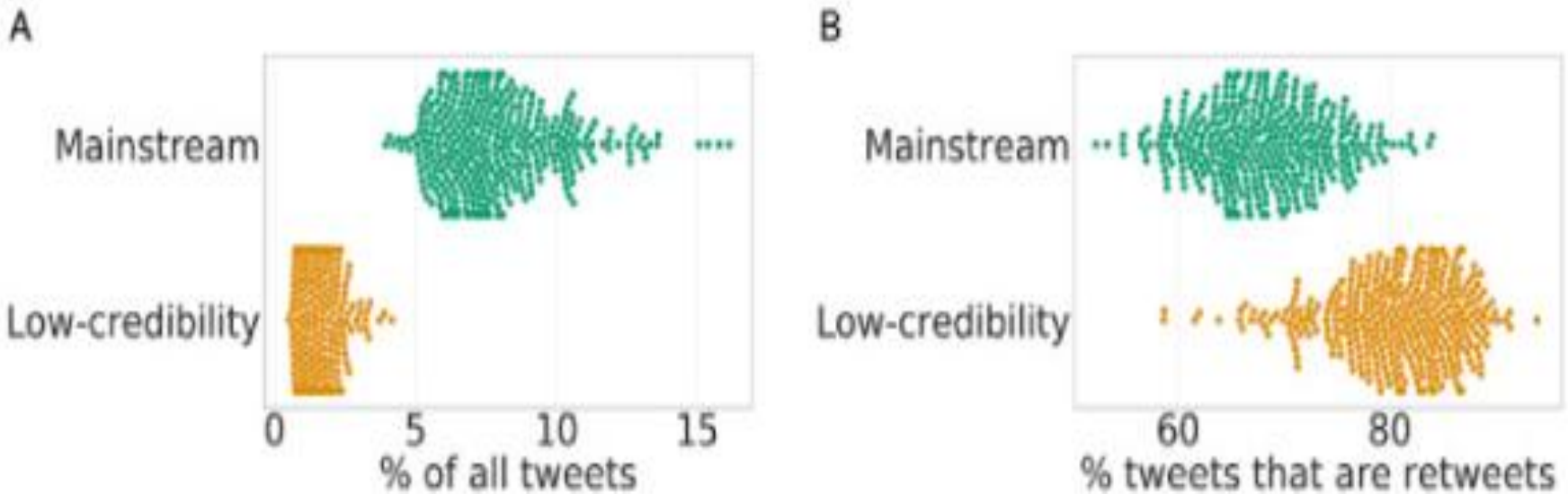
PREVALENCE AND CONTAGION OF ONLINE MISINFORMATION

- Prevalence of tweets that linked to domains in low-credibility and mainstream sources over time for suspicious YouTube videos



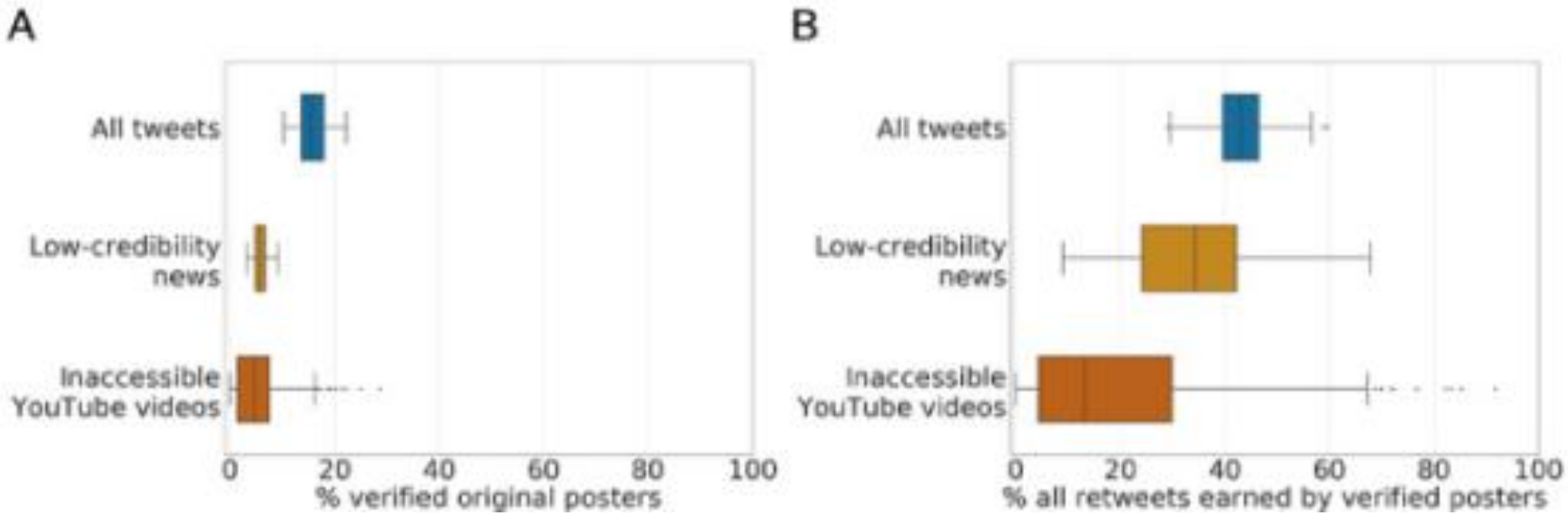
CONTINUE ANALYSIS & RESEARCH

- misinformation generally less prevalent than mainstream news (Figure A)
- low-credibility content tended to spread more through retweets compared to mainstream content (Figure B)



CONTINUE ANALYSIS & RESEARCH

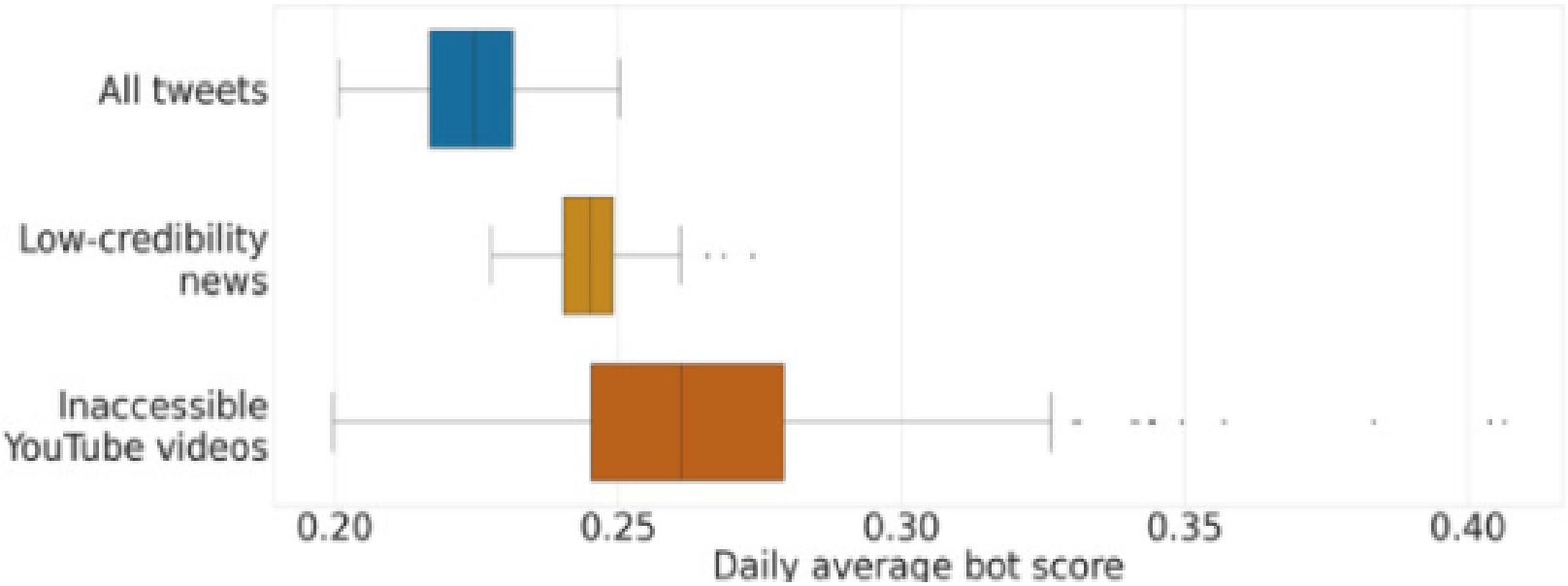
- Superspreaders of Misinformation



median daily proportions of verified accounts among posters of vaccine content, low-credibility news, and inaccessible YouTube videos are 15.4%, 5.6%, and 4.5%, respectively. The median daily proportions of retweets earned by verified posters of vaccine content, low-credibility news, and inaccessible YouTube videos are 43.1%, 34.2%, and 13.2%, respectively. All distributions are significantly different from each other according to two-sided Mann-Whitney tests (P<.001)

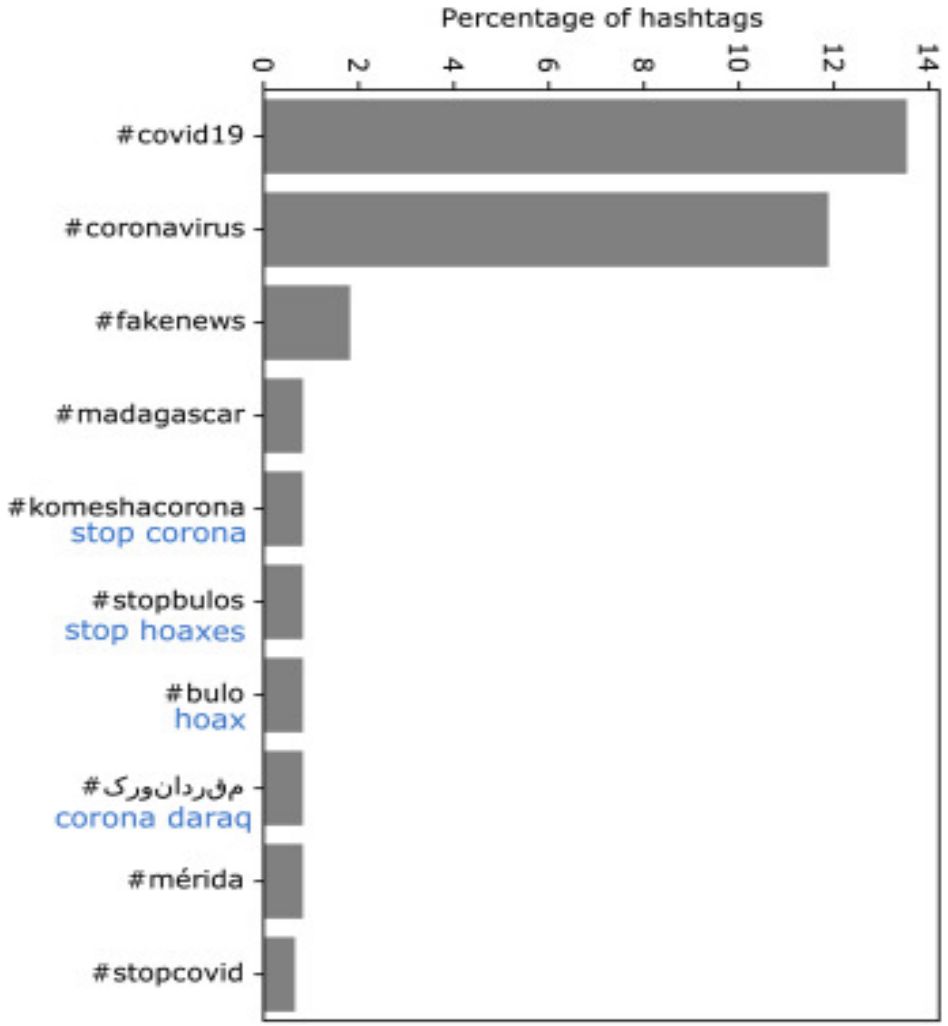
CONTINUE ANALYSIS & RESEARCH

- **Role of Social Bots** - Employing BottometerLite distributions of daily average bot scores for tweets sharing vaccine content, links to low-credibility sources, and inaccessible YouTube videos

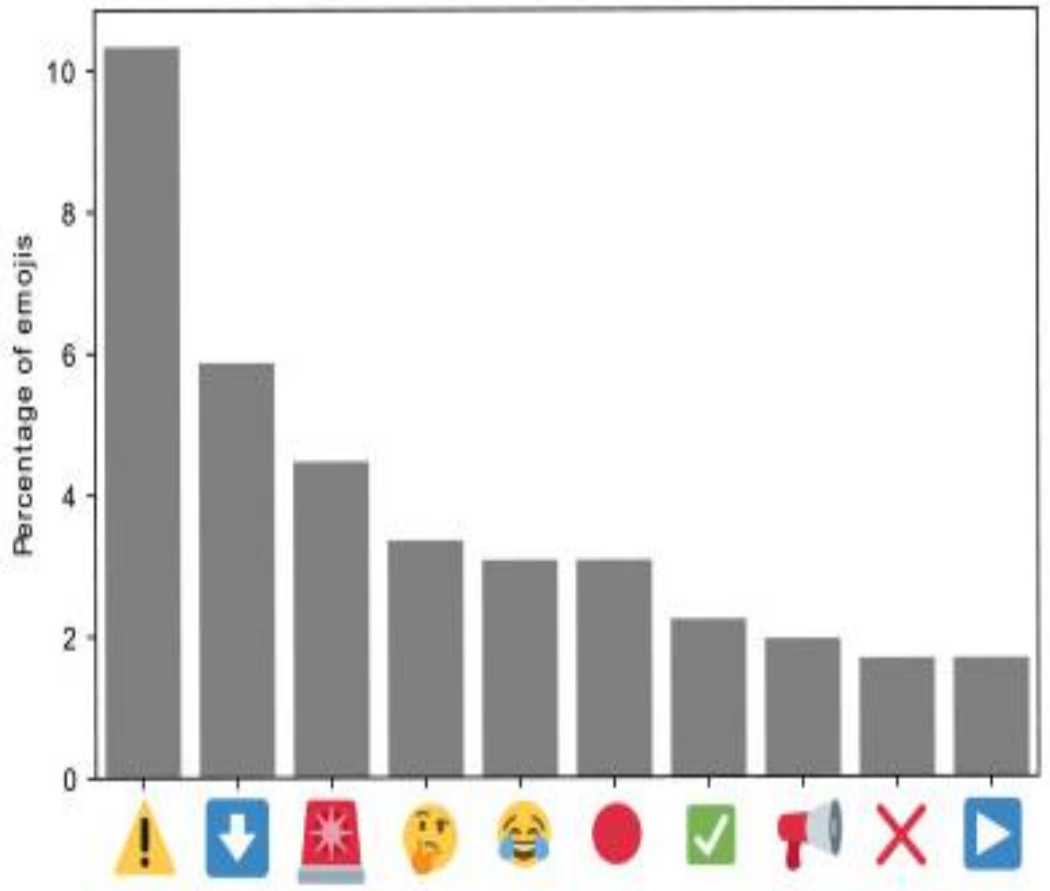


Comparison between the daily average bot score of tweets sharing different categories of vaccine content. The median daily average bot scores of accounts sharing vaccine content, low-credibility news, and inaccessible YouTube videos are 0.22, 0.25 and 0.26, respectively. All distributions are significantly different from each other according to two-sided Mann-Whitney tests (P<.001)

PERCENTAGE OF HASHTAGS



PERCENTAGE OF EMOJIS



TWITTER'S RESPONSE LATER

- Effective November 23, 2022, Twitter is no longer enforcing the COVID-19 misleading information policy
- Few from the top social media researcher, have pointed that 100% the responsibility of the platform is to protect its users from harmful content while defaming Twitter's decision as unacceptable
- policy enacted in January 2020, Twitter prohibited false claims about COVID-19 that the platform determined could lead to real-world harms. More than 11,000 accounts were suspended for violating the rules, and nearly 100,000 pieces of content were removed from the platform

DISCUSSION

- Investigated COVID-19 vaccine misinformation spreading on Twitter during 2021 following the rollout of vaccination programs around the world.
- Leveraging a source-based labeling approach, we identified millions of tweets sharing links to low-credibility and mainstream news websites
- While low-credibility information was generally less prevalent than mainstream content over the year, observed an increasing trend in the reshares of unreliable news during the year and an opposite, decreasing trend for reliable information
- Data mostly capture English-language conversations, which could originate from different countries. However, aggregate analysis could not disentangle the infodemic trends and peaks associated with different countries as observed in prior work

CONCLUSION

- Presence of misinformation around COVID-19 vaccines on Twitter shows that there was an audience for this type of content, which might reflect a deeper distrust of medicine, health professionals, and science
- While social media platforms have legal rights to regulate online conversations, the decisions to deplatform public figures should be made with caution
- Also unclear whether reducing the supply of false information and increasing the supply of accurate information can “cure” the problem of vaccine hesitancy

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