

Investigating Scientific Misinformation Originating from Retracted Publications and Their Perception

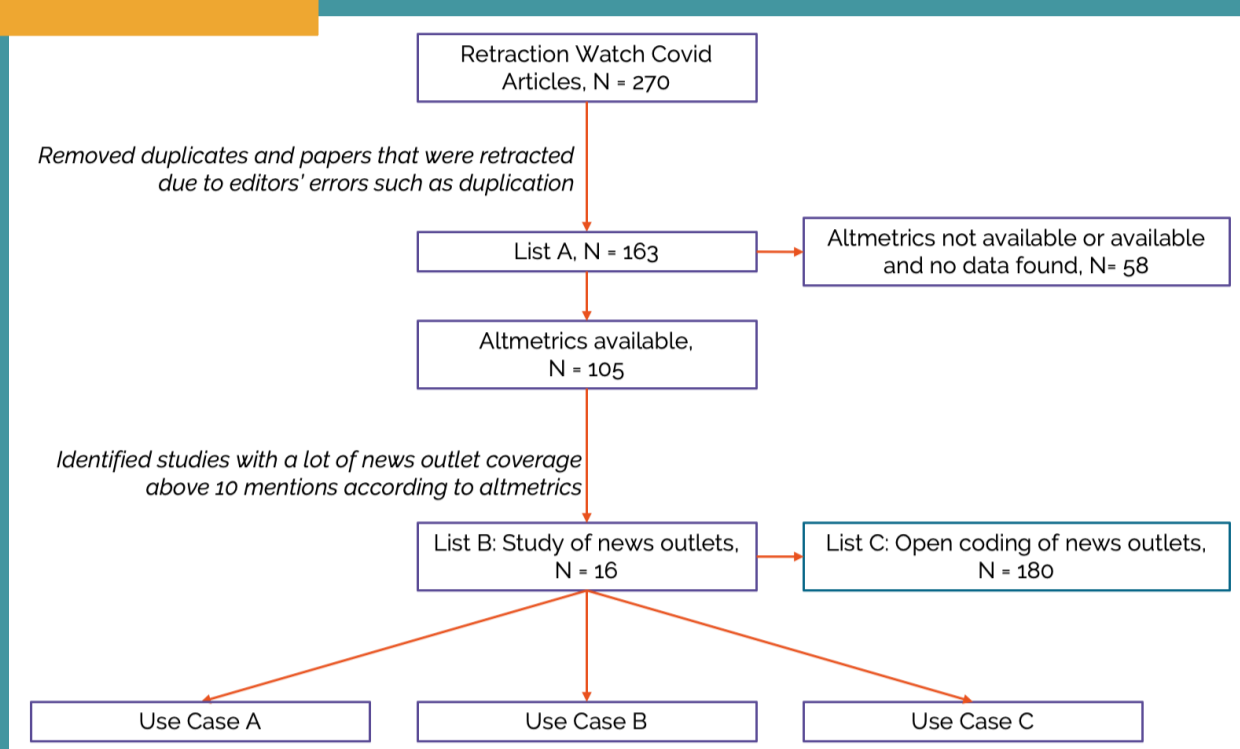
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Introduction

The scientific community is built on the principles of transparency and accountability, where published research is subject to scrutiny and open to re-evaluation. One of the mechanisms by which the scientific record is corrected is through retractions (Wray & Anderson, 2018), which signal to the scientific community that a published article contains significant flaws or errors and results cannot be relied upon (COPE, 2019). As retracted papers are often related to erroneous research, we use these to learn more about the relationship between scientific publication and false information and the spread of false information in the media. We distinguish between four different causes of scientific misinformation: 1) information that originally met scientific criteria but is now considered outdated, 2) information produced by scientists either intentionally or due to unintentional errors, 3) information that appears scientific but lacks a scientific basis (pseudoscience), and 4) information that meets scientific criteria but is distorted or falsified in its reception.

Method

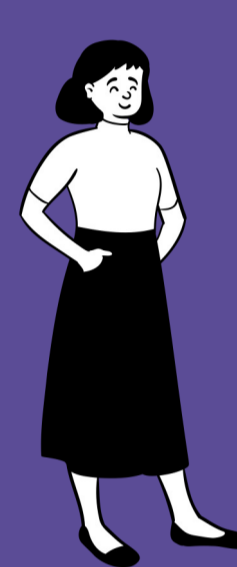


We leveraged an expanding list of retracted scientific publications related to the COVID-19 pandemic curated by the blog Retraction Watch. Altimetrics data from Plumx and Altimetrics for 105 articles of this list gives us insights into spread and inclusion of these articles in public media. 16 articles were further examined as they were mentioned more than ten times in news outlets. We employed an open coding method to conduct an analysis of the 180 news outlet articles pertaining to one of these 16 specific retractions or scientific articles across three distinct dimensions: 1) **“Type of Coverage”**: identify patterns of coverage and different objects of coverage, 2) **“Perceived Accuracy and Reliability of Claims”**: analyse the perceived validity of claims presented in scientific articles as seen by news articles as well as how studies are perceived once they are retracted, 3) **“Distance from Original Research”**: determine how deeply the news article engages with the original scientific paper or retraction. Additionally, we identified three distinct use cases that illustrate the diversity of reception and the underlying relationships between scientific content and misinformation. These use cases span across different aspects of the dimensions and provide insight into the various forms of scientific misinformation and how they are received.

Use Case Analysis

Different Contexts Shape the Message

DOI publication: 10.7326/M20-1342
 Publication date: 06.04.2020
 DOI retraction: 10.7326/L20-0745
 Retraction date: 07.07.2020



“Masks do not help”
 Interpretation of paper

Reason for Retraction*:
 Error in Analyses, Unreliable Data, Unreliable Results

Different Media Perceptions

- 1 Use statement of original paper to strengthen claim that masks do not help.
- 2 Use retraction to strengthen claims that masks do help as paper stating otherwise was retracted.
- 3 Use statement of original paper to say that more measure than masks are needed.

- Original Paper is used to back-up different claims
- Retraction is used as evidence that claims opposing the claim made in retracted paper are true
- Strong conclusion can be a red flag for sensitive topics

Authors' Intention are Questioned

DOI publication: 10.1183/13993003.02144-2020
 Publication date: 07.06.2020
 DOI retraction: 10.1183/13993003.02144-2020
 Retraction date: 04.03.2021



“Smokers are less likely to get Covid”
 Interpretation of paper

Reason for Retraction*:
 Conflict of Interest, Breach of Policy by Author, Objections by Author

Harm of Scientific Misconduct

- 1 Media outlets discussed how the paper undermined the trust in science.
- 2 Due to retraction newspapers covered the problems of scientific conduct, data collection and data analysis.
- 3 It is emphasized that transparent disclosure of connections to industry in research is “essential to promoting public trust in science, which is important now more than ever.”

- Funding by lobbyists is not well perceived and might harm trust in science
- Discussion in media outlets leads to education about the rules of science among population

Communities with Closed World Views

DOI publication: 10.3390/v13102056
 Publication date: 13.10.2021
 DOI retraction: 10.3390/v14051011
 Retraction date: 10.05.2022



“Covid vaccines are dangerous”
 Interpretation of paper

Reason for Retraction*:
 Concerns/Issues about Data, Error in Analyses, Unreliable Results

Feeding Conspiracies

- 1 Original study is referenced to promote conspiracy myths.
- 2 Use the study as evidence that the COVID-19 vaccine is dangerous, connected with the call for not getting vaccinated.
- 3 Retraction is used as a proof that people get silenced if they are critical about vaccinations.

- In this community, retractions are not met with receptivity and often go unnoticed.
- When they are noticed, they serve to reinforce further conspiracy theories.
- Results are commonly misinterpreted.

*Reasons for Retractions from Retraction Watch database: <http://retractiondatabase.org/>

Discussion

The three identified use cases demonstrate the dissemination of scientific misinformation in the public domain. Our investigation specifically focused on scientific misinformation originating from article retractions and how these retractions are perceived and discussed in news outlet articles. We identified four key factors that influence the portrayal of retracted articles and the information presented in these news outlets: 1) the **Object of Reception** determines whether the article itself or its retraction is discussed within the news outlets, 2) the **Characteristics of News Articles** determines the depth and extent to which information about the retraction is integrated into the news articles, 3) the **Community of Reception** pertains to the intended readership or audience of the news article, and 4) the **Characteristics of the Publication** deals with the potential motives or intentions of the authors behind the publication. Our investigation provides a foundation for further analysis and advances our understanding of how dubious scientific publications are perceived and how scientific misinformation spreads.



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