VU VRIJE UNIVERSITEIT AMSTERDAM

INSTITUTE FOR ENVIRONMENTAL STUDIES (IVM)

# Framing Retractions in Scientific Media

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# Agenda

1. Understanding Retractions in Science and the Importance of Framing
2. Formulating the Research Questions
3. Data Collection and Filtering Methodology
4. Media Coverage Peaks: High-Profile Cases of Scientific Misconduct
5. Evolving Trends in the Framing of Retractions
6. Influence of Country, Discipline, and Authorship on Retraction Reporting
7. Study Limitations and Considerations
8. Key Findings and Conclusion

# What are retractions? Why is the framing important?

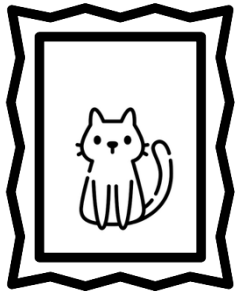
- Scientists make mistakes and sometimes errors in publications must be corrected

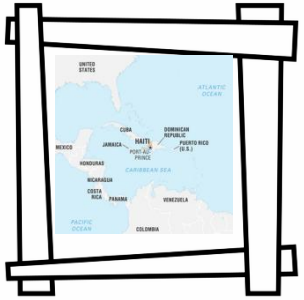
  Articles may be retracted when their findings are no longer considered trustworthy due to scientific misconduct or error, they plagiarize previously published work, or they are found to violate ethical guidelines." (Morrison 2011)

- **Despite being crucial for self-correcting science, retractions are stigmatized.**
  - The Framing of retractions has implications for **trust in science** ("scientists are cheaters!") and **open data attitude** ("I am not uploading my data. I don't want to risk my career when others find mistakes in my analysis!").
  - Others consider retractions as honest mistakes in a self-correcting endeavor, fostering trust in science: "[Retraction] is a litmus test of scientific integrity." (332)

# What is framing? Why discourse?

"To frame is to **select some aspects of a perceived reality** and make them **more salient** in a communicating text, in such a way as to promote a particular **problem definition, causal interpretation, moral evaluation, and/or treatment recommendation** for the item described." (Entman 1993, p. 52).





[acknowledging] honest errors … send[s] a signal … that their future studies are worthy of trust

Frames build up over time via repetition and provide orientation and normalcy expectations in everyday situations:

- What should you do or consider when ...a paper is retracted?
- What should you respond if someone says …their paper was retracted?

Efforts for a positive framing

SCIENCE

# Want to Win a Nobel Prize? Retract a Paper.

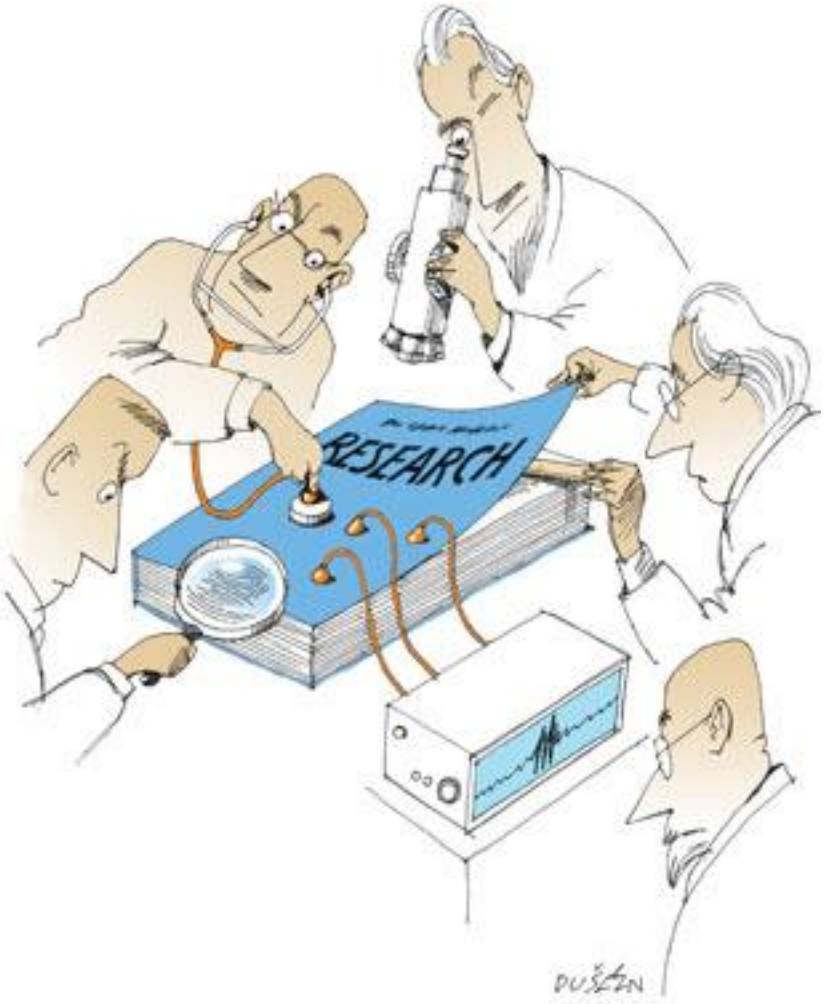
## This advice is both hyperbolic and not nearly as crazy as it sounds.

BY ADAM MARCUS AND IVAN ORANSKY DEC 21, 2017 • 11:07 AM

*"… Scientists who acknowledge honest errors and retract their flawed findings send a signal to their colleagues and peers that their future **studies are worthy of trust**. In turn, those researchers are no less likely to cite those studies—an essential form of endorsement in science. (We should also note that when it's clear a retraction is for misconduct, researchers see a significant dip in citations, which is a reminder that scientists still look down on such behavior.)"*

# Research Questions:

1. Do Nature & Science frame retractions in their articles more often as “**honest mistake**” or “**scientific misconduct**”?
2. Does the framing as misconduct increase over time?
3. Does the framing of retraction depend on:
    1. Mentioned countries
    2. Mentioned disciplines
    3. Article Types
    4. Sentiment



# Science & Nature: Elite Agenda-Setters in Scientific Discourse

- **Prestigious Standing**: Science and Nature are among the highest-ranking journals.
- **Agenda-Setting Power**: Their articles are widely disseminated, influencing global researchers, policymakers, and the media, thus amplifying and shaping the discourse on scientific topics.
- **Influence on Research Integrity**: Their coverage of retractions impacts global research practices, setting standards for scientific communication and accountability.

# Data Collection

**Corpus Creation:** advanced search function on Science & Nature **"retract*"** with no predetermined time frame.

Docling

spaCy

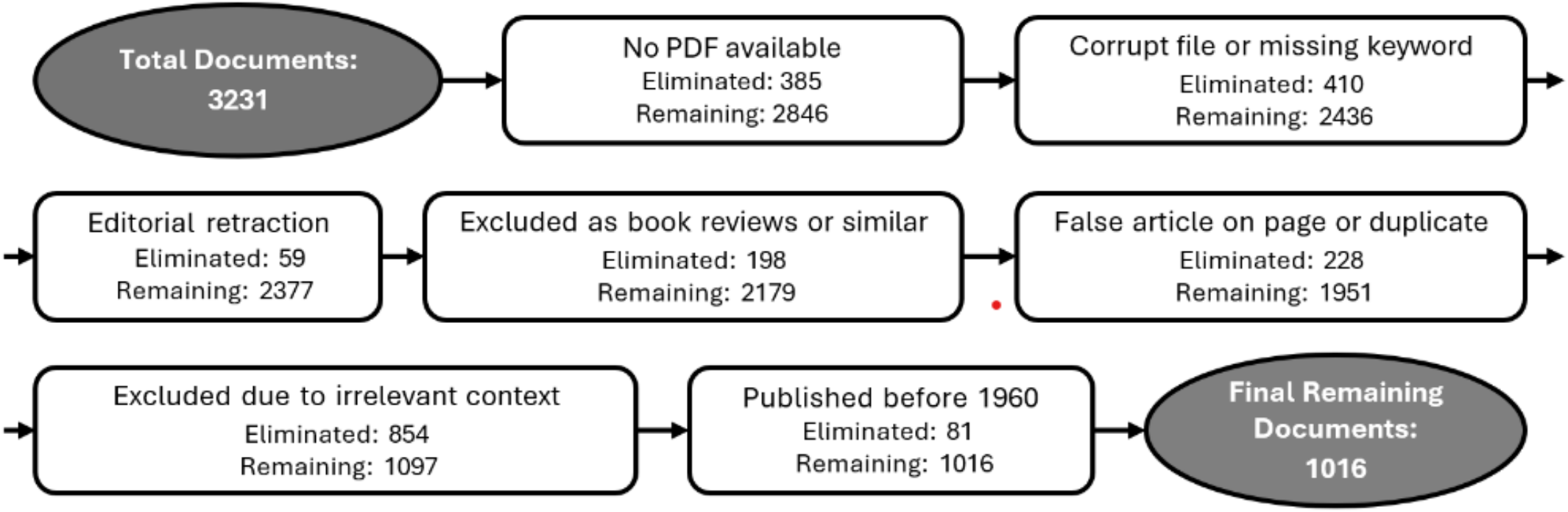


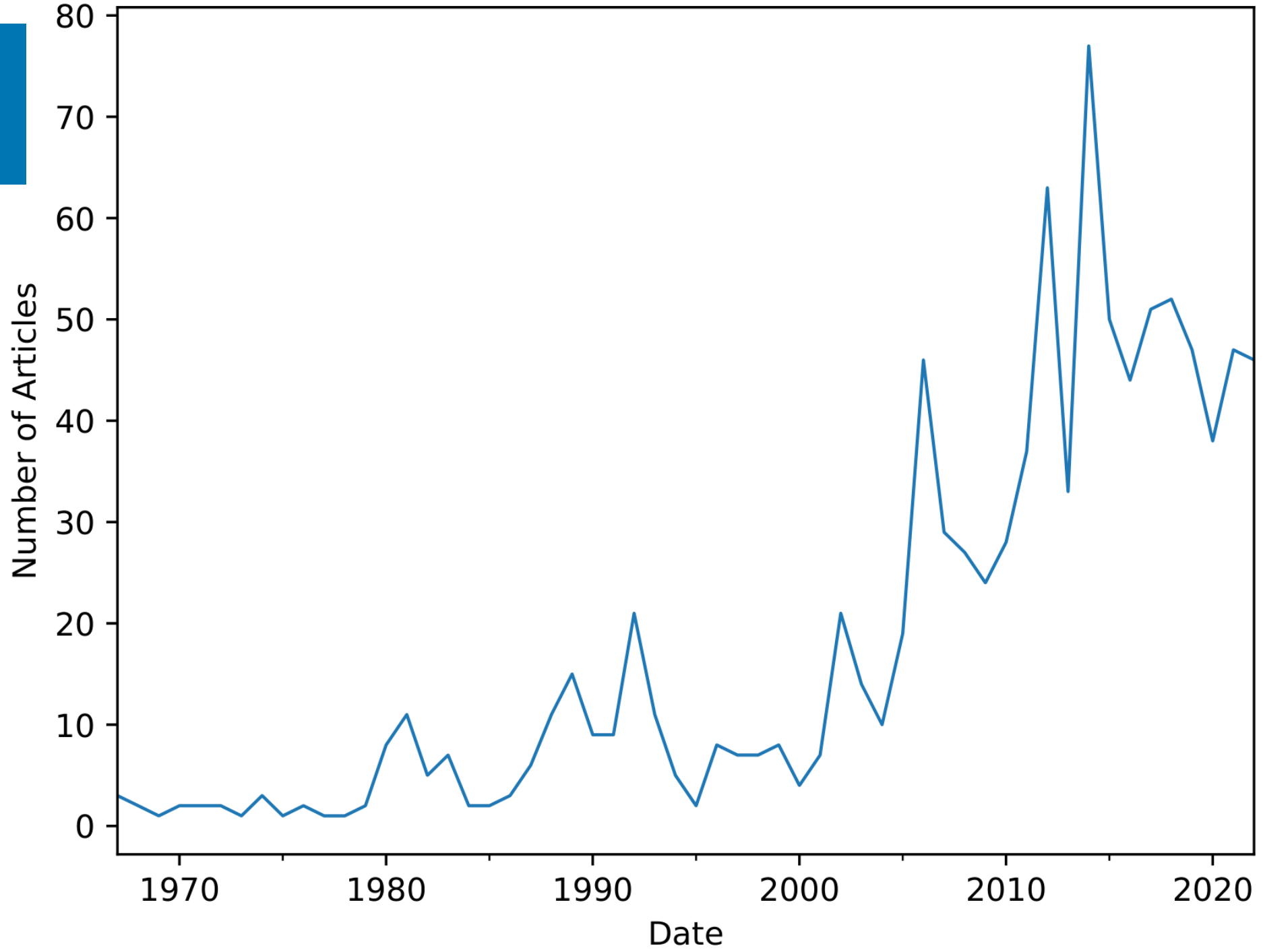

*Figure 1: Data selection flowchart*

...including lot of manual annotation

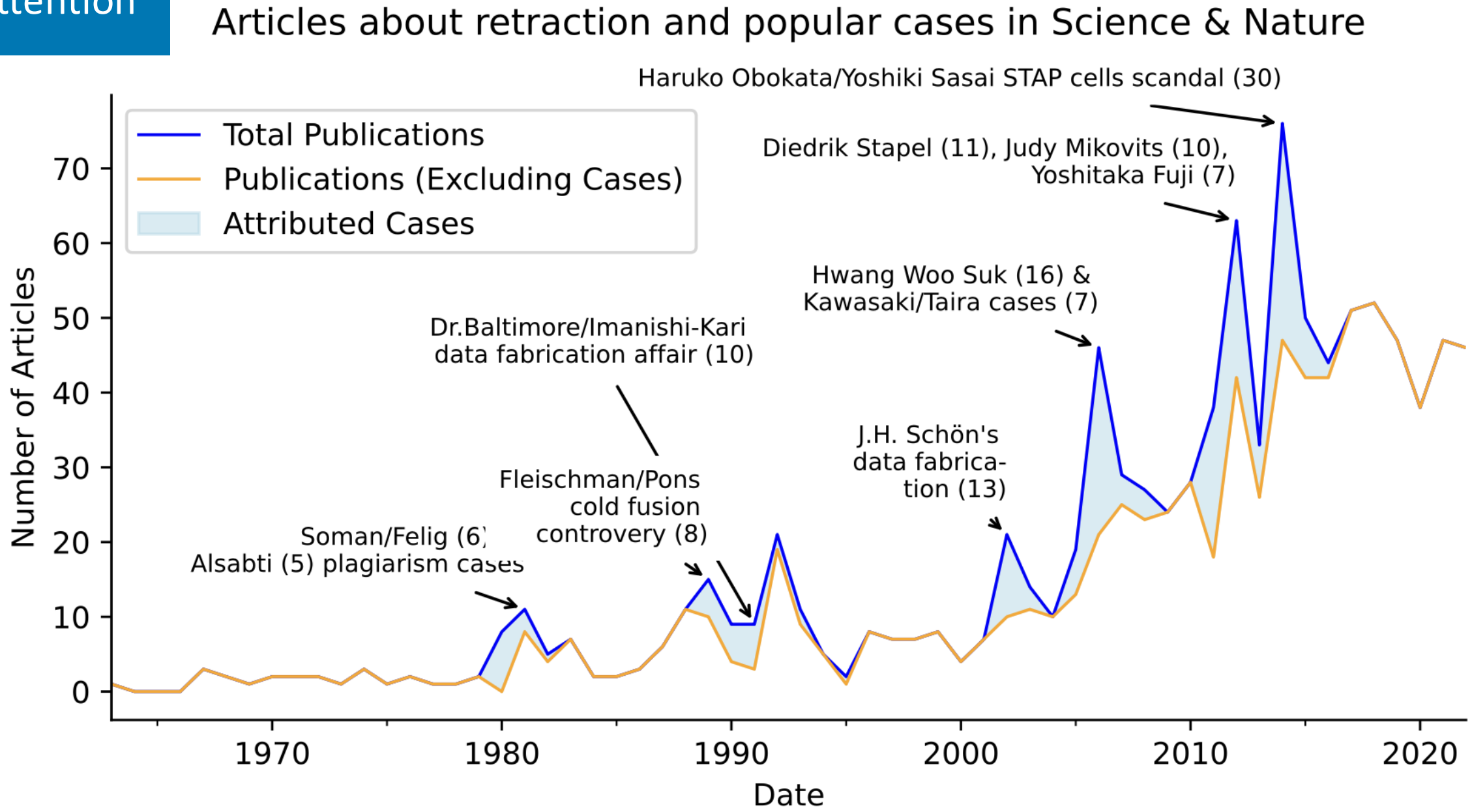
# Media attention: $n_{articles}$ per year

Methods to discuss media attention peaks:

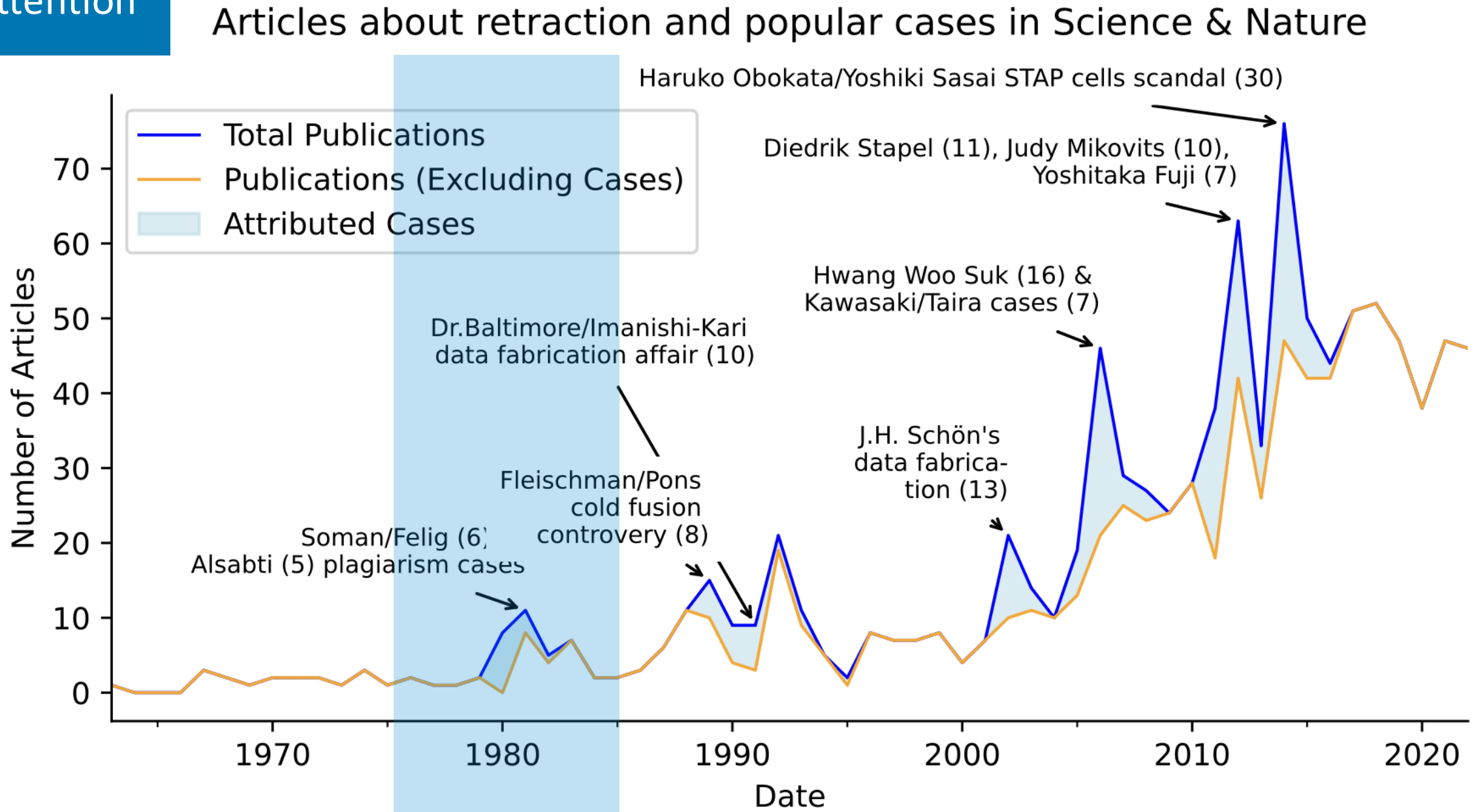
- **Spacy NER: PERSON**;
- Joint mentions in a 5-year timespan
- **Manual validation**: Who are these people and cases?



# Media attention



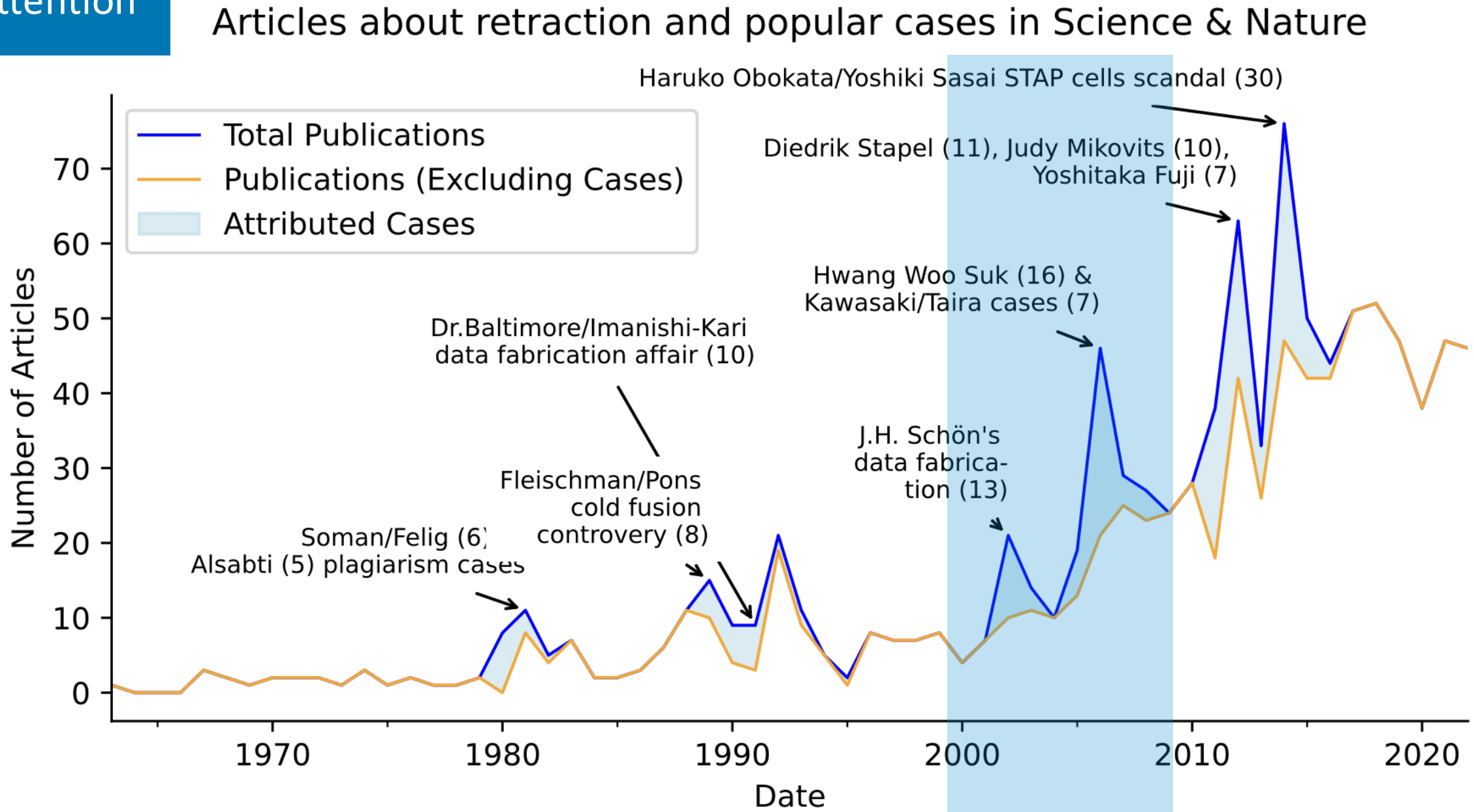
# Media attention



# Early Wake-Up Call: First Major Retraction Scandals Expose Cracks in Scientific Integrity

- **Alsabti Case (1970s):** Plagiarism across multiple journals; exposed weaknesses in editorial oversight and reluctance to retract fraudulent work.
- **Soman Case (1980):** Data fabrication and plagiarism at Yale; led to 11 retractions and resignations of both junior and senior researchers.
- Both scandals triggered **institutional reforms**, raised **public awareness**, and prompted **early discussions on research ethics**.
- Highlighted systemic issues: lack of raw data checks, slow institutional response, and inadequate accountability.
- These cases set the stage for **NIH policy changes** and ongoing efforts to strengthen research oversight.

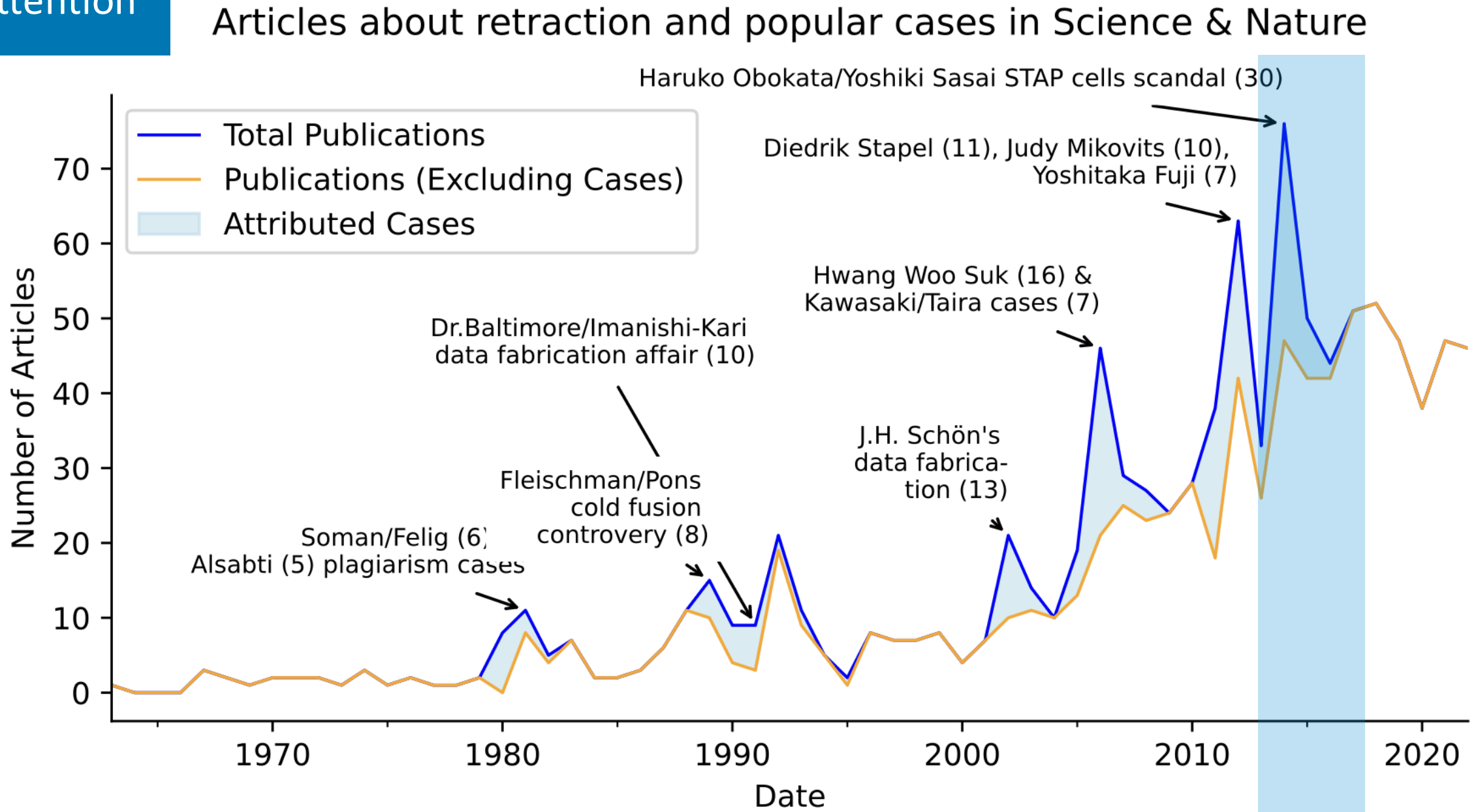
# Media attention



# Media attention examples: Soman/Felig (1980-82) & Alsabti (1980/81)

- **Schön Scandal (Physics, 1998–2001):** Fabricated data in 16 papers; triggered major retractions and exposed peer review weaknesses, sparking heightened media coverage and policy changes.
- **Hwang Case (South Korea, 2004–2005):** Stem cell cloning fraud led to retractions, legal penalties, and a global trust crisis in biomedical research.
- **Taira & Kawasaki Case (Japan, 1998–2004):** Irreproducible RNA studies and missing data caused retractions and Japan's first university dismissals for misconduct.
- These cases revealed systemic failures in peer review, oversight, and accountability
- Highlighted severe personal and institutional consequences, including damaged careers, public fallout, fueling ongoing ethics debates.

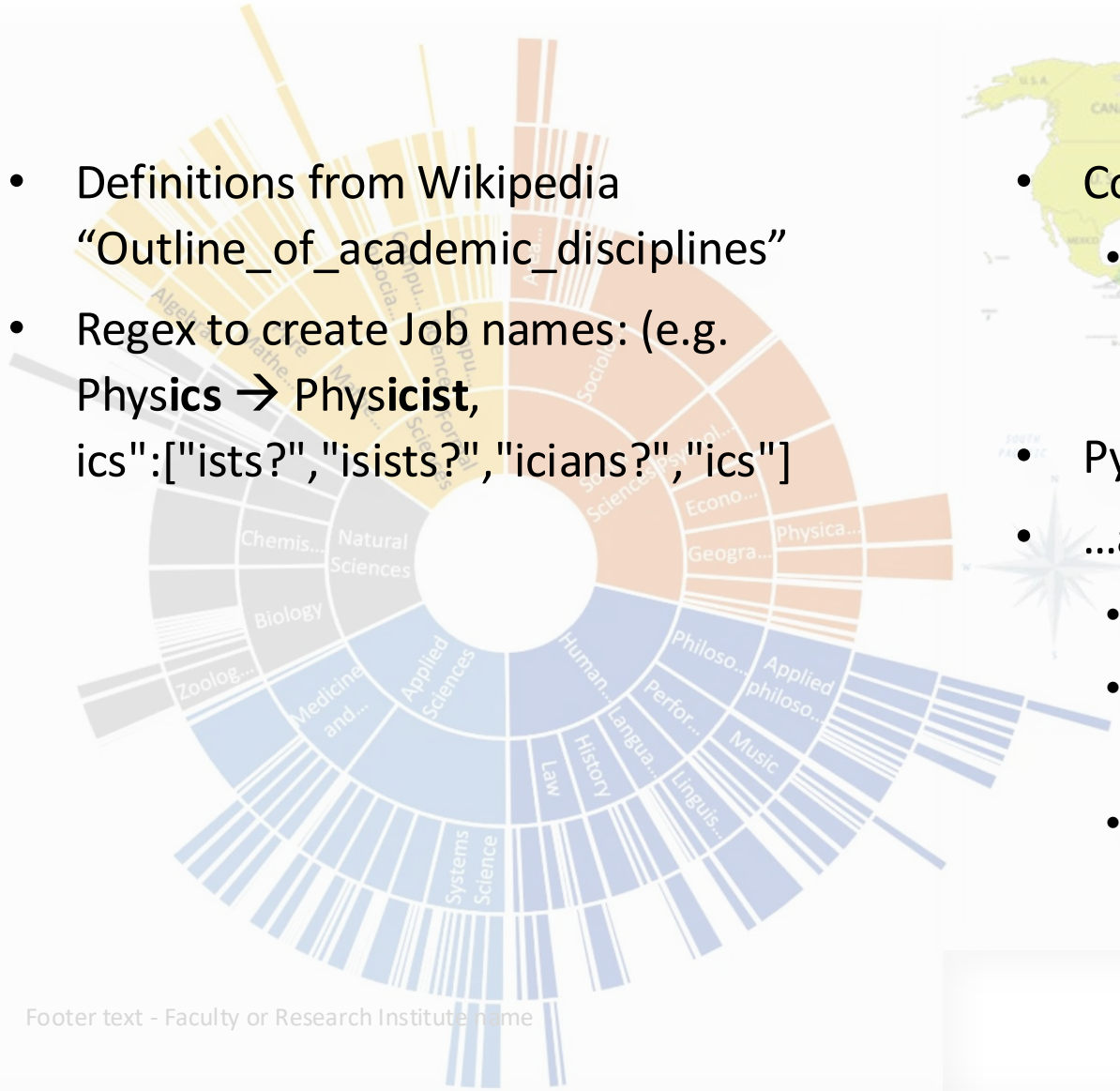
# Media attention



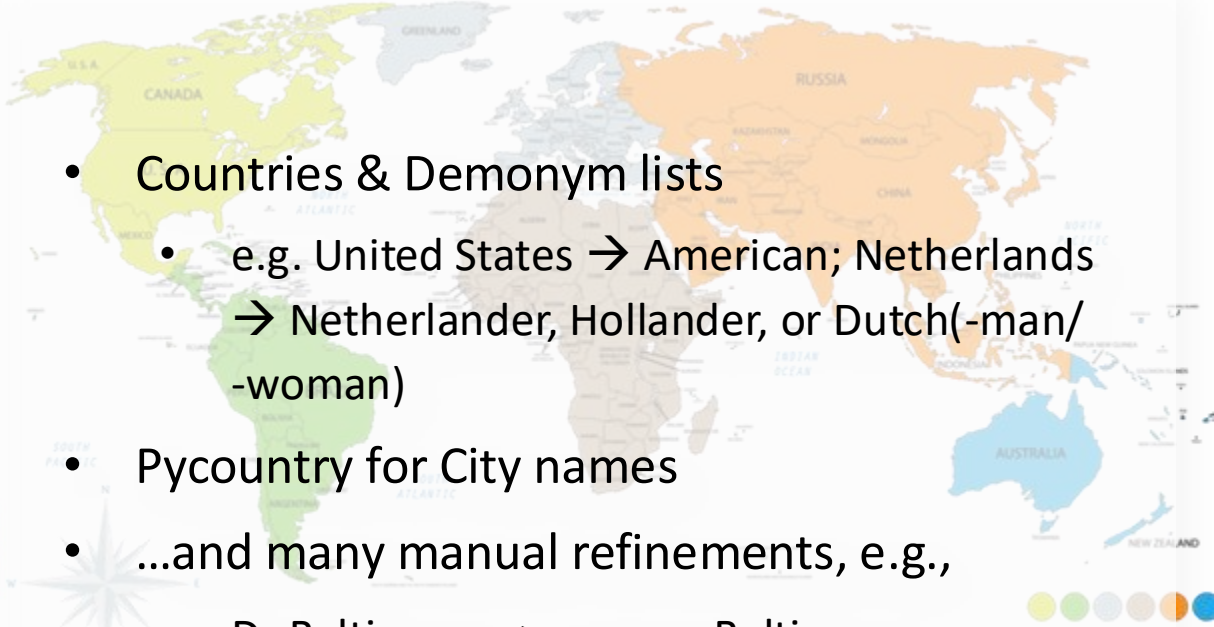
# Most Recent Big Media Surge: Obokata STAP Scandal

- Haruko Obokata's 2014 Nature papers claimed a breakthrough in stem cell creation (STAP) but quickly faced allegations of misconduct.
- Investigations confirmed **image manipulation** and **plagiarism**, leading to retractions, Obokata's resignation, and **revocation of her PhD**.
- The scandal sparked major reforms at RIKEN Institute of Physical and Chemical Research and stricter peer review and editorial policies at Nature and beyond.
- Tragic fallout included **the suicide of co-author Yoshiki Sasai**, highlighting the human toll of scientific misconduct.
- The case underscored the critical importance of verification, co-author accountability, and ethical vigilance in high-stakes research.

# Dictionary Approach: Scientific Fields & Countries




- Definitions from Wikipedia “Outline_of_academic_disciplines”
- Regex to create Job names: (e.g. Phys**ics** → Phys**icist**, ics":["ists?","isists?","icians?","ics"]




- Countries & Demonym lists
  - e.g. United States → American; Netherlands → Netherlander, Hollander, or Dutch(-man/ -woman)
- Pycountry for City names
- …and many manual refinements, e.g.,
  - Dr Baltimore --> remove Baltimore
  - Human & Genes are not cities in this context.
  - “Van” is most likely part of a Dutch Name (Van Andel & Van Parijs) and not the Turkish City

# Frame Classification: Dictionary Approach vs. OpenAI API requests

## Dictionary Approach

*Table 2: Keywords and rules for sentence classification with the dictionary approach*

| Name | Keywords | Rule |
|---|---|---|
| “mistake” | "honest","mistake","accident","computational", "withdraw","withdrew", "correct"," error" | If n_mistake > n_misconduct |
| “misconduct” | "fraud", "misconduc", "plagia", "scandal", "guilt", "fabricat", "tortured phrases", "p-hacking", "cherry picking", "hacking", "fake", "questionable", "fabricat", "manipula", "fudge", "scam" | If n_mistake < n_misconduct |
| “equal / unclassified” | “retract” | If n_mistake == n_misconduct OR If n_mistake ==0 OR If n_misconduct == 0 |

## Codebook for LLM requests

*“You are a helpful assistant that categorizes the sentences into the retraction frames, “mistake”, “misconduct”, or “none”. Use the following definitions and examples. …*

*Code a text with the "Mistake" frame when it emphasizes the correction of a mistake or error without suggesting bad intentions of authors or reviewers.* ***Also consider*** *sentences that evoke or exemplify honesty, responsibility, and the self-correcting nature of science where mistakes can happen, be explained, excused, and corrected.*

***Examples: …***

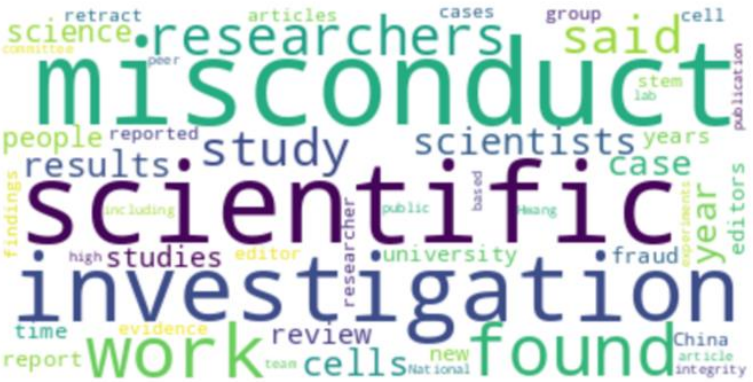
# Classification with GPT4.1: examples & explanations

| | text | category | explanation |
|---|---|---|---|
| **92** | TheUSattorney inBaltimore,Maryland, may seek an indictment on criminal charges asearly aslateJanuary.Butnow that SuzanneHadley,the principal investigator in the case,has been forced to ANY newyear resolution to say no more about misconduct and Robert Gallo, TherezaImanishi-KariorDavidBaltimore will almost certainly be broken.This may, however,be the last year in which that is thecase.Afteryearsofheatedrhetoricand conflictingclaims,severallandmark cases intheevolution ofscientificmisconduct p... | misconduct | The text discusses possible criminal charges and misconduct in the context of a retracted paper, indicating serious ethical lapses and bad intentions in the scientific process. It references prolonged conflict over claims of misconduct and mentions the involvement of legal authorities, which further suggests a framing of misconduct. |
| **106** | ASTRONoMERs who last year reported a pulsarthatwasapparentlyrotating atan unheardofrate of nearly2,0o0times a second have discovered an experimental error in their data that could negate the results.Speaking at the annual meeting of the American Association for the Advancement of Science thisweek, John Middleditch,an astronomer at the Los Alamos National Laboratory,said that interference fromavideocameramayhave causedthe spurious data.The pulsar's perceived rotationalfrequencyof1968.63Hzcorr... | mistake | The text discusses the discovery of an "experimental error" in data related to pulsar claims, indicating a recognition of a mistake that can negate results. It emphasizes the self-correcting nature of science and acknowledges that errors can occur during research without suggesting bad intentions. |
| **583** | Mexico's ban on genetically modified maize has not stopped transgenes getting into traditional crops. A second round of criticism was sparked in 2005, after the Snow paper reported no evidence for transgenes in Mexican maize. Some criticized this article as being statistically inconclusive and lacking representative samples?,which the authors disputed. and erroneously, called this a retraction. Sarukhan responds: "I saw no reason why it should not be published." The original paper caused a s... | none | The text discusses a controversy surrounding a scientific paper, highlighting criticisms and disputes without clearly categorizing the retraction as a mistake or misconduct. It presents a balanced view of the criticisms and the authors' defense, making it neutral in framing. |

# Wordclouds of the different categories: Blame vs understanding

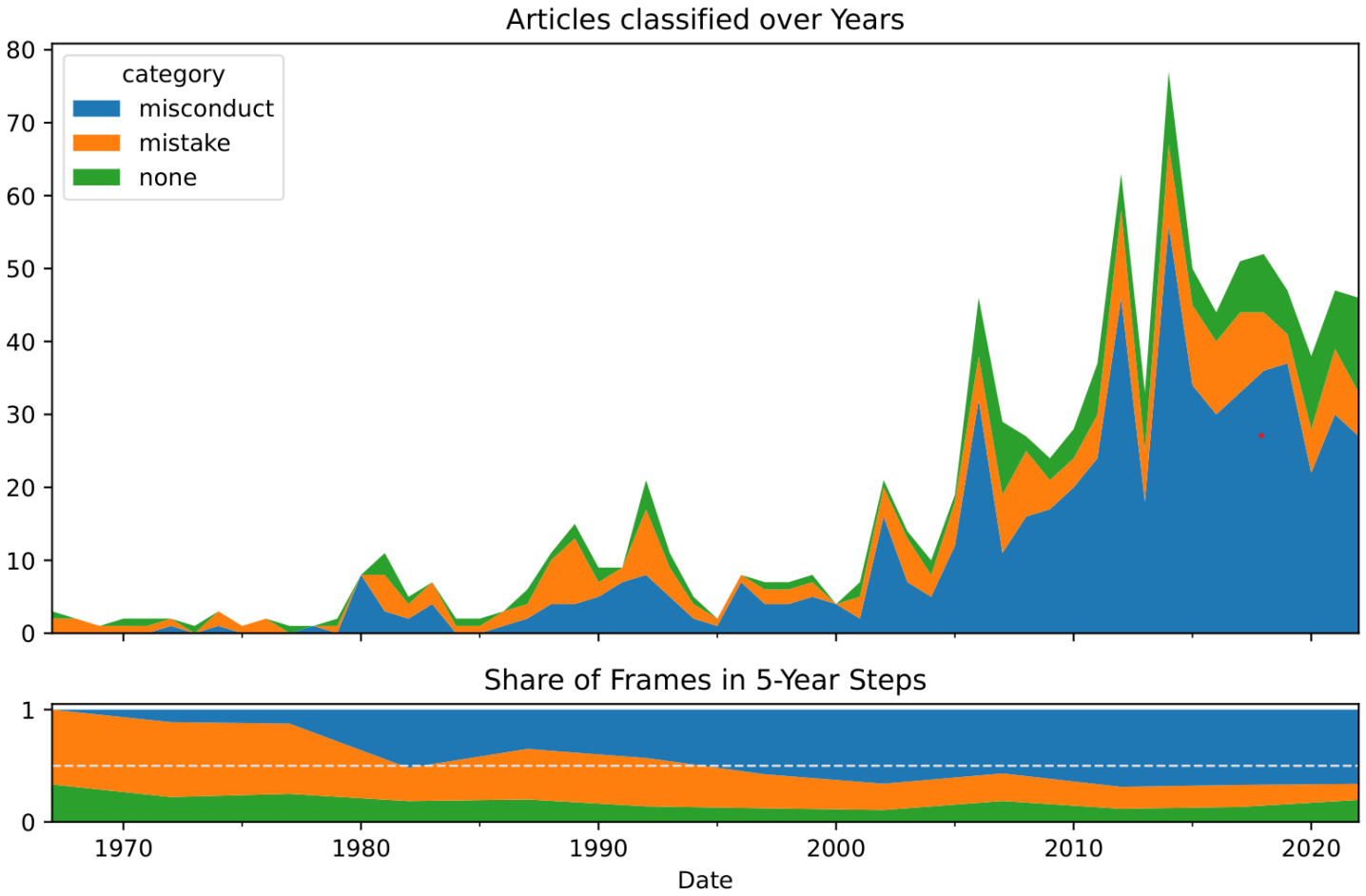
- Neutral words like “paper,” “all,” and “say” were removed to spotlight framing-specific terms.
- ***Misconduct*** frames highlight words like “investigation” and “found,” emphasizing blame and formal inquiry.
- ***Mistake*** focus on “study” and “errors,” normalizing scientific challenges as part of the research process.
- Word counts reflect deeper narrative strategies: criminalizing vs. normalizing scientific flaws.
- Despite some positive trends toward normalizing errors, the misconduct frame still dominates, maintaining the stigma around retractions.

misconduct




mistake

# Scientific Retractions Increasingly Framed as Misconduct




- 61% of articles link retractions to misconduct (n=628)
- 23% link retractions to mistakes or errors (n=230)
- Misconduct framing has increased over time (Person's r = 0.69, p = 0.041
- Mistake framing has decreased (Pearson's r = -0.81, p = 0.008)
- Pre-1980: low article volume; mistake framing dominant

# Scientific Retraction Coverage Skews Heavily Toward US-China Narrative

- 60% of articles mention at least one country (n=608).
- China and U.S. dominate coverage, China mentions rising since 2008.
- Media focus reflects absolute volume, not relative rates.
- Japan, Germany, Canada overrepresented - tied to 2015 individual cases.
- High-rate countries (e.g., Malta, Ethiopia, Iran) rarely mentioned.

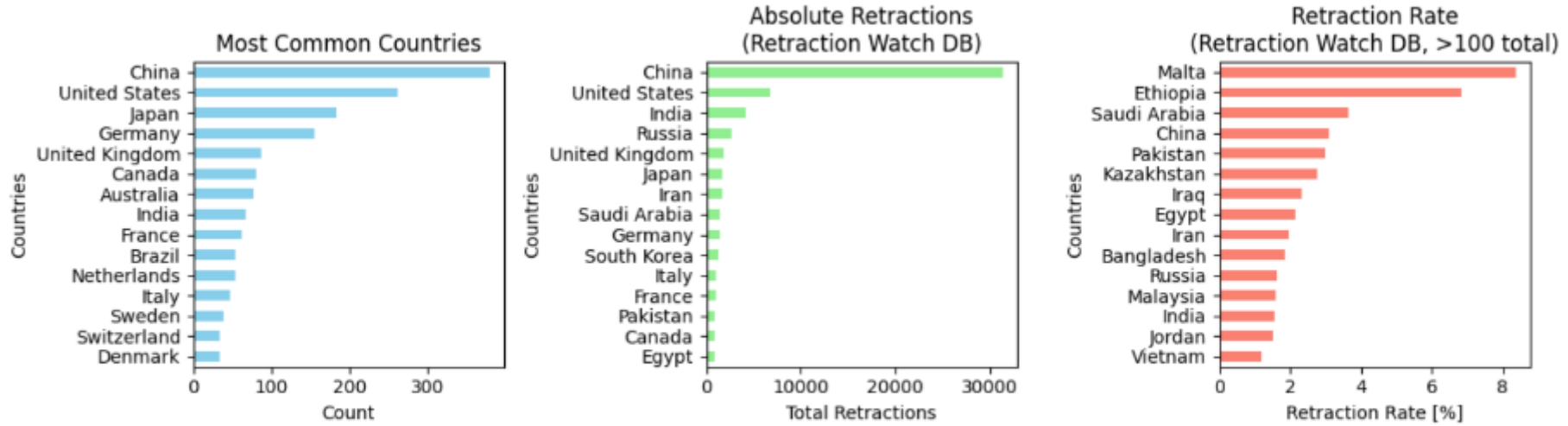
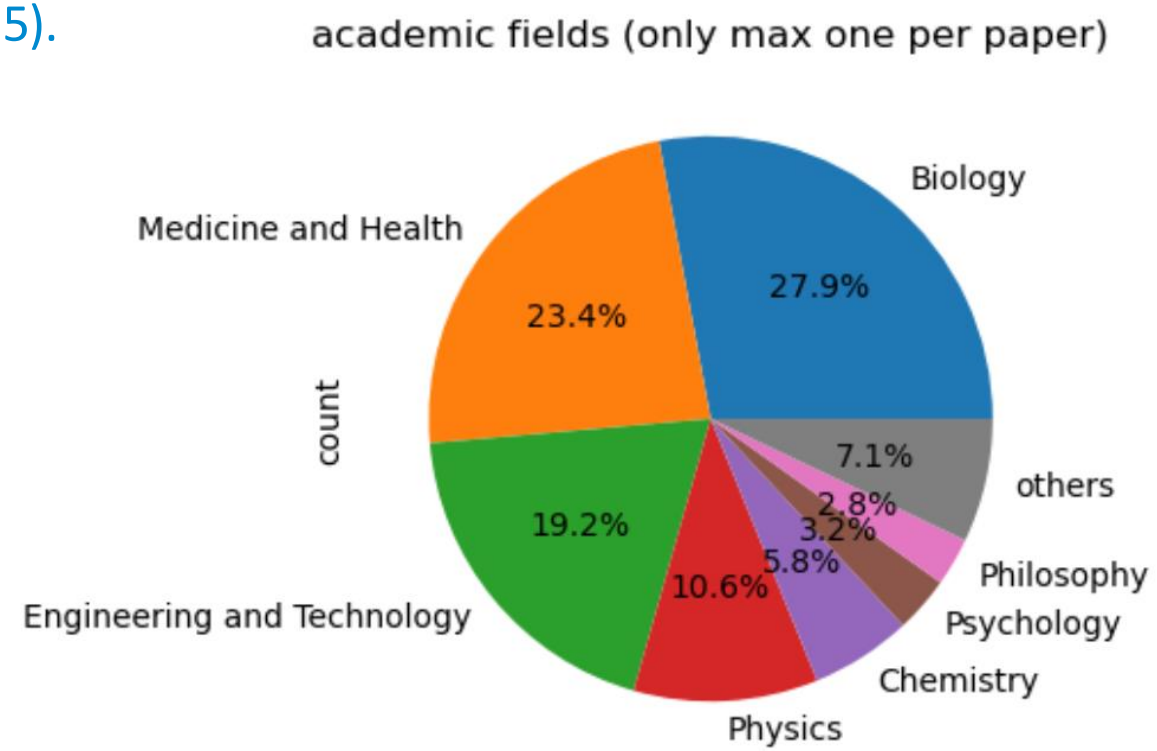



***Figure 4: Geographical references in articles mentioning retractions and geographical distribution of retractions in absolute and relative terms according to the Retraction Watch Database.***

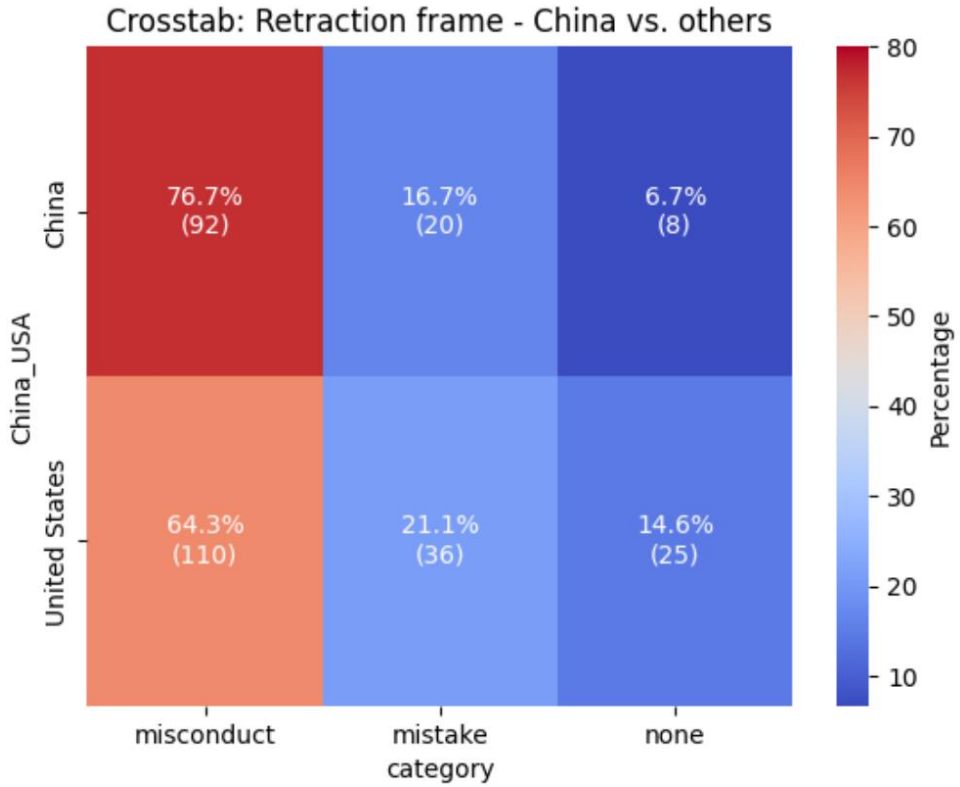
# Retractions Rarely Spotlight Social Sciences: Is Misconduct Seen as a 'Hard Science' Problem?

- No link found between framing (misconduct vs. mistake) and discipline ($\chi^2(8) = 5.57$, $p = 0.695$).
- **Biology and Medicine dominate** retraction coverage, aligning with their high retraction rates and societal relevance (e.g., health, environment).
- **Social Sciences and Humanities** are rarely mentioned, possibly due to lower retraction rates and differing publication norms.
- This imbalance may **limit awareness** of integrity issues across fields and reinforce **misconceptions** of misconduct being unique to STEM disciplines.



# China-Linked Retractions More Often Tied to Misconduct Than U.S. Ones

- **Retractions referencing China** are significantly more likely to be framed as **misconduct** than those referencing the **USA** ($\chi^2(1) = 4.49$, $p = 0.034$).
- These patterns may reflect or reinforce **global power dynamics** in academia, risking the **stereotyping** of certain countries as less credible or more prone to misconduct.

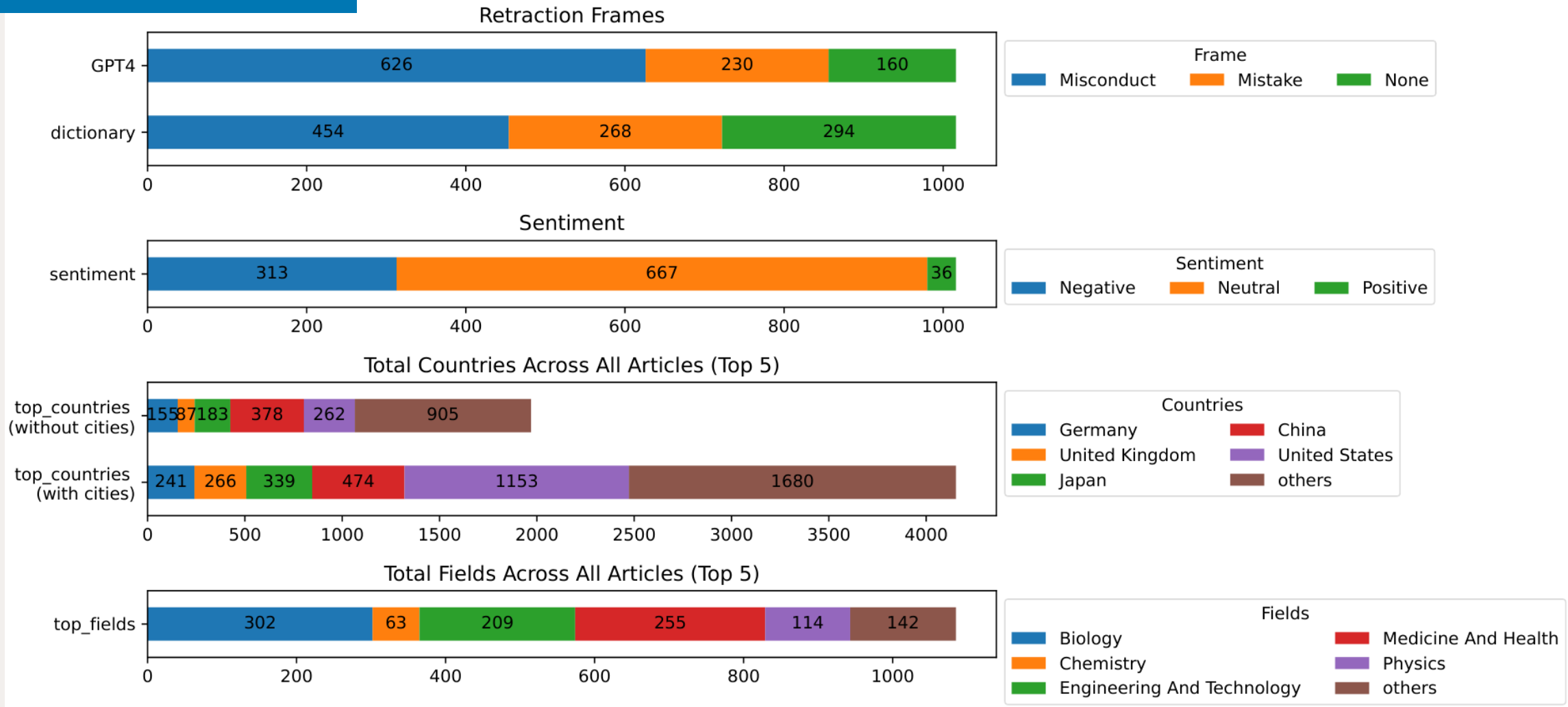



p-value = 0.045
chi-value = 6.184

# Authorship and Sentiment Shape How Retractions Are Framed in the Media

- **Authorship type significantly affects framing** ($\chi^2(2) = 31.10$, $p < 0.001$): journalists tend to emphasize **misconduct**, while external contributors more often frame retractions as honest **mistakes**.
- The focus on misconduct in journalism aligns with its **higher newsworthiness** due to deviance and social impact.
- **Sentiment also shows a strong association with framing** ($\chi^2(4) = 19.00$, $p < 0.0008$), with most articles displaying **neutral or negative tones**, and few expressing positive views of retractions.
- **No link** was found between framing and **journal of publication** ($\chi^2(2) = 0.25$, $p = 0.88$), suggesting editorial venues of Science and Nature does not drive how retractions are framed.

# Descriptive Overview



# Limitations of the Study

**Scope & Coverage**

- Focus on absolute (not relative) article with “retract* counts may distort the prominence of retractions.
- Excludes other media types (e.g., blogs, science news sites).

**LLM-Based Classification**

- Used a simple codebook; context-heavy tasks may reduce accuracy.
- Did not test fine-tuned or intermediate ML models.

**Geographical References**

- Results vary depending on inclusion of city names vs. country names.
- Possible bias due to U.S.-centric reporting and residual metadata.

**Framing & Sentiment**

- High number of “None” frames suggests limits of binary classification.
- Study is descriptive; further qualitative research needed on narrative dynamics.

# Conclusion:
# Stereotypes and Misconduct Make Headlines - But Science Deserves Better Stories

- LLM + codebook classification outperforms dictionary methods in capturing framing nuance.
- Retractions are predominantly framed as **misconduct**, and this trend is increasing despite community efforts (external authorship)
- Media coverage skews toward **sensational cases**, not actual retraction rates by country. Retractions Rarely Spotlight Social Sciences & Humanities.
- **China is ~~disproportionately~~ framed** through a misconduct lens compared to the USA.

➢ **To reduce stigma, the scientific community should avoid sensationalism and promote narratives of honest error, especially in underrepresented regions.**

OSF PREPRINTS

# Representation of retractions in scientific media

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Valinciute, A., & Roßmann, M. (2025, July 16). Representation of retractions in scientific media

https://doi.org/10.31219/osf.io/jkd3p_v1

Python code for the analysis:
https://github.com/Klapperhorn/retraction_portrayal

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