

Why do some retracted articles continue to get cited?

Interventions in the scientific discourse and how citing communities deal with epistemic risk using the example of retractions

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Background: Retractions

- Definition (COPE): „findings are unreliable, either as a result of a major error [...] or fabrication or falsification“, duplication, plagiarism or ethical problems
- Retractions are ambivalent
 - as they affect both misconduct and honest error,
 - as they are primarily intended to correct the body of knowledge, but obviously also have a punitive and stigmatizing effect.
- Retractions are in general well-known and discussed, but visibility on individual level less certain.
- Retractions are often formulated evasively in terms of reasons and extent -> room for epistemic uncertainty.
- Premise is usually: Continuing citations show that erroneous/false information persists in/pollutes scientific discourse for years (e.g. Houghton, 2022, Yarborough et al., 2019, Harris, 2018:185)

Research Questions

How can post-retraction citations be explained and what does that mean in terms of epistemic harm?

- **How are RPs' knowledge claims situated in research strands?** Are RPs located in dense networks? Is there empirical support or opposition for their claims? Are there changes over time? (network approach)
- **Which knowledge claims of the RPs are the focus of the citations and which not?** (propositional approach)
- **How do citing authors describe claims of the RPs?** Do the papers that cite the RPs refer to the retraction or express skepticism (or concern or hesitation)? Are there recurring patterns or narratives through which knowledge claims or associated discourses are presented and interpreted in specific ways? (metadiscourse approach)

Research Design

- **Mixed Methods:** Combination of computational (distant) methods and close reading of citation contexts
- **Case Study** of six RPs with ongoing and six RPs with decreasing citation dynamics (contrastive-purposive sample strategy)
 - **Network approach:** Co-citation analysis, enhanced by a parsing for cue terms of support and contrast in citation contexts, to explore whether retracted publications' claims are rather singular or supported by other publications
 - **Propositional approach:** Extraction and frequency analysis of concept terms in RPs' abstracts and citation contexts, and the MeSH thesaurus and word embeddings for an expansion of this vocabulary
 - **Metadiscourse approach:** Parsing for cue terms for negational and skeptical citations; keyword extraction (linguistic procedure) and filtering of resulting terms with cognitive, emotional, metadiscursive characteristics to explore if there are specific rhetorical patterns in citation contexts.

Contrastive-purposive sampling strategy*

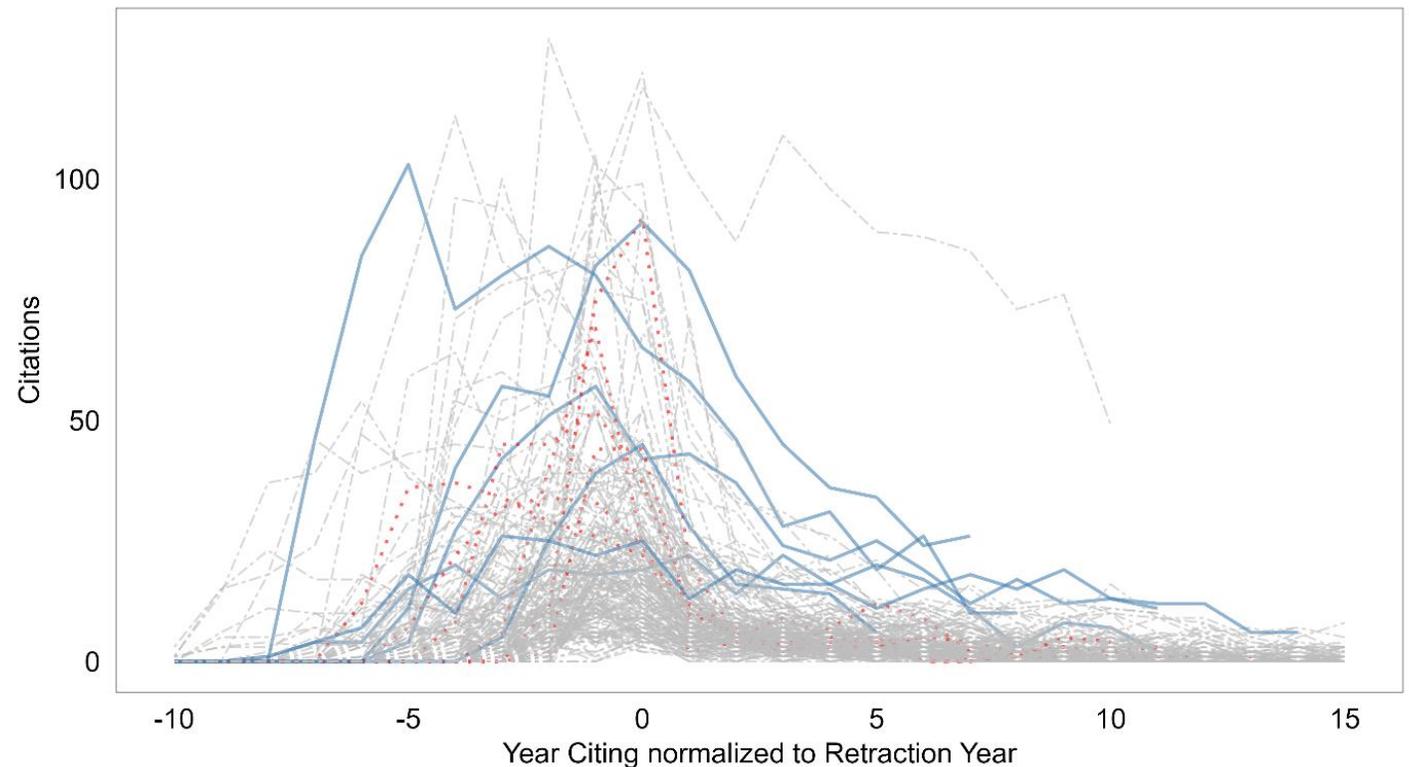
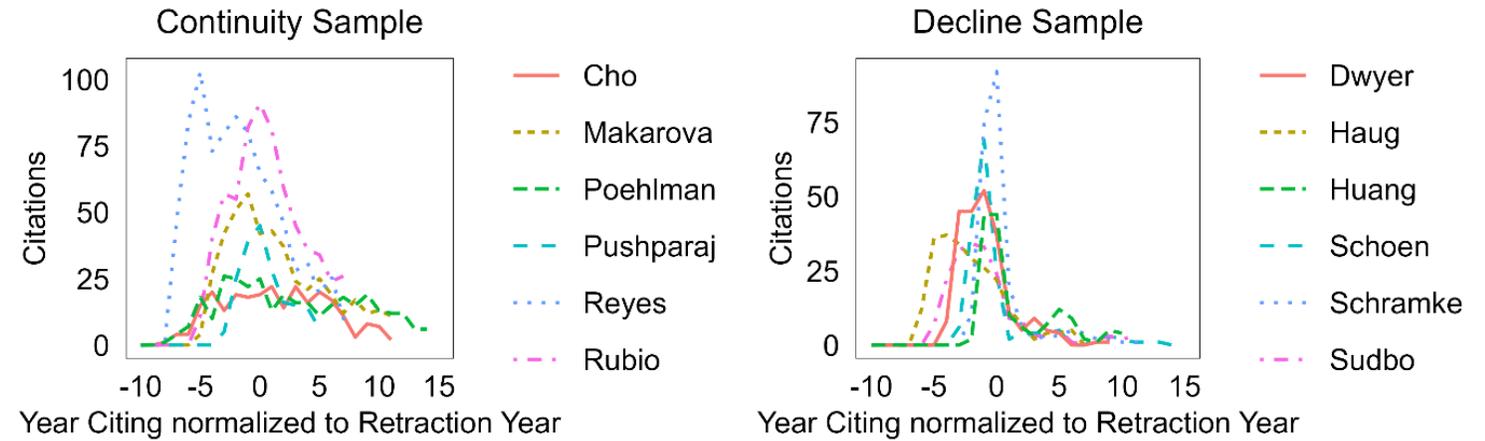
–Only cases with fabrication, falsification or reproducibility/data problems and substantial citation numbers before retraction: ≥ 20), RP up to 2013, database: WoS (PubMed)

–Definition of reference corpora to take into account normal aging of publications

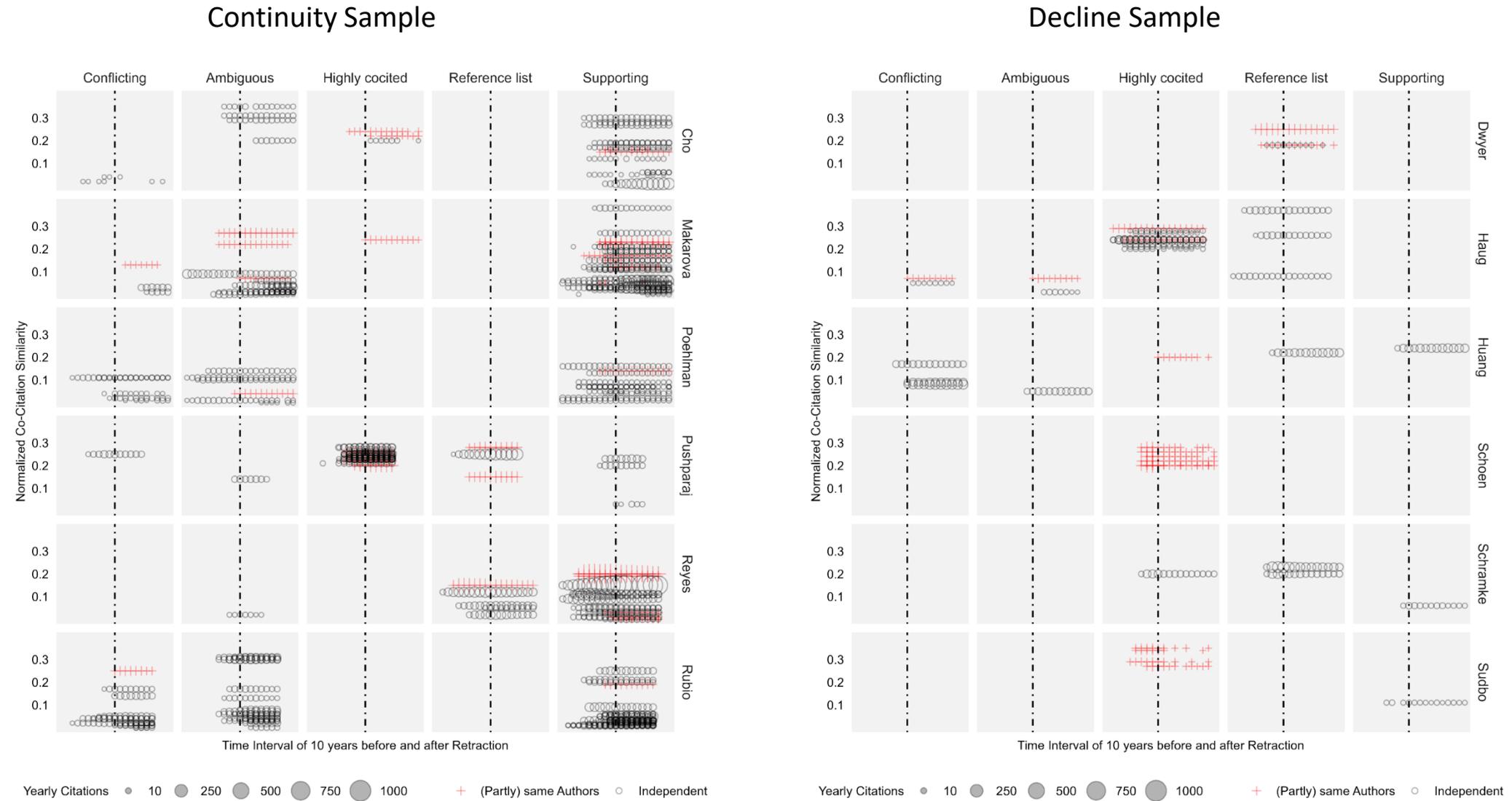
–6 cases in which citation dynamics tend to continue after retraction, 6 cases with a significant decline in citations after retraction,

– a stratified sampling of citation contexts, about 950 contexts in total

*Teddlie & Yu (2008)



Results (I) Network Approach: *How are RPs' knowledge claims situated in research strands?* – Citation Dynamics of co-cited publications; support & conflict

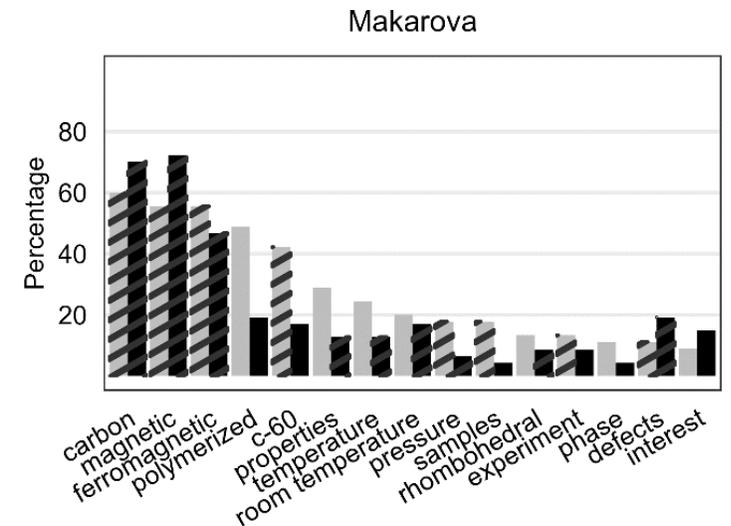
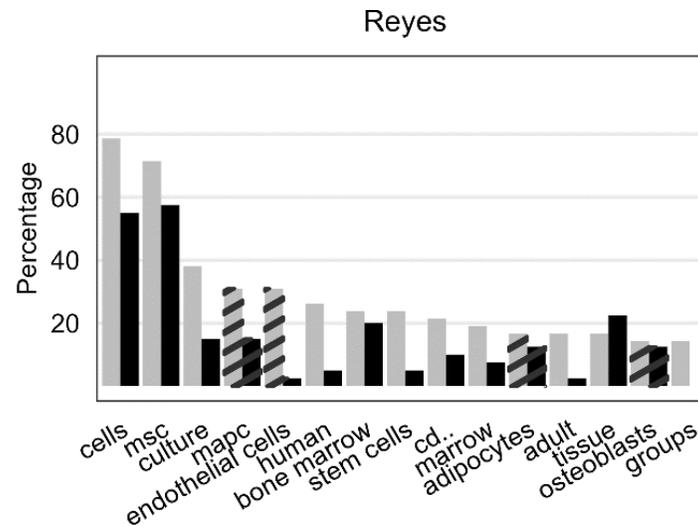
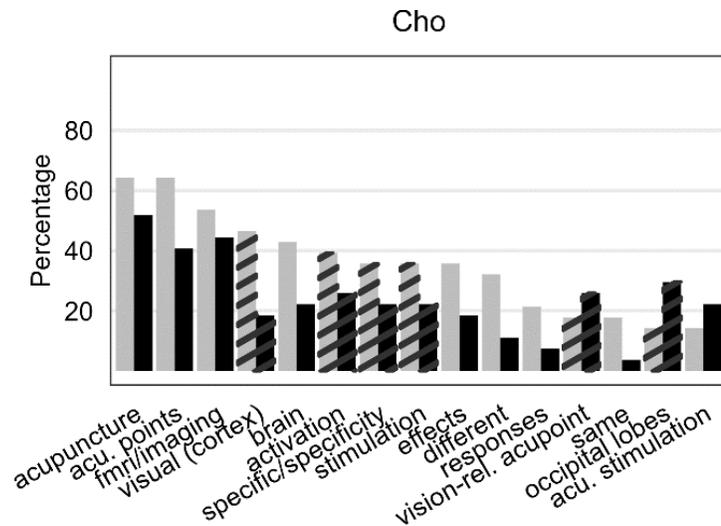


Results (I): Network Approach: *How are RPs' knowledge claims situated in research strands?* – Support & conflict; evidence from close reading

- Evidence of ongoing discourses in four publications of the continuity sample, in particular in two cases there are indications that the publications are part of broader disputes not fully resolved by the retraction
 - supporting evidence from other publications
 - cross-contamination (as reason for the retraction) does not fully account for effects:
 - *„the ferromagnetic signal could not be completely attributed to the magnetic impurity“*

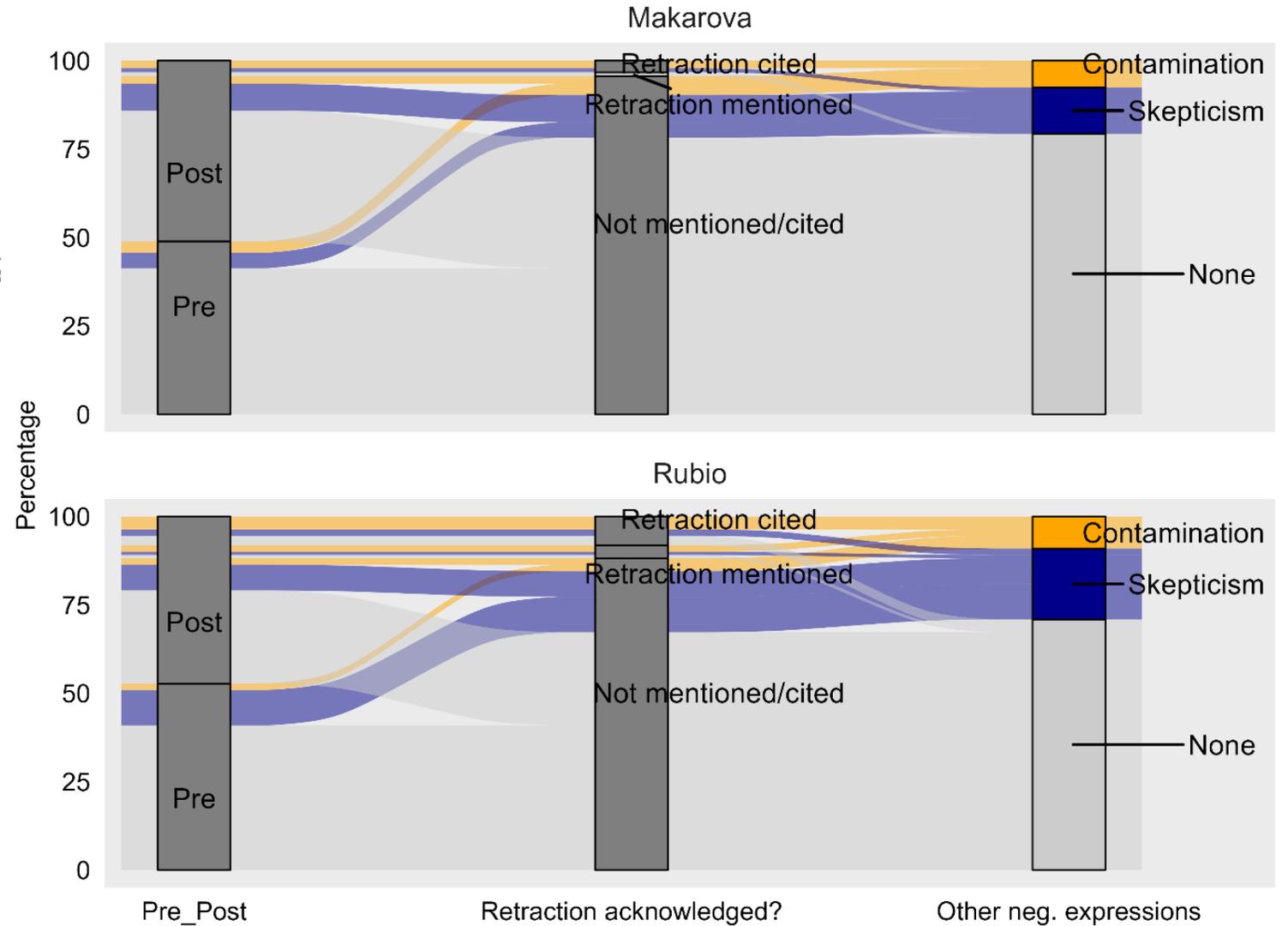
Results (II) Propositional Approach: Which knowledge claims of the RPs are the focus of the citations and which not? – Extracted concept terms

- Empirical core claims marked by stripes
- Graphics left and center: Other than core empirical claims are cited
 - more generic claim levels,
 - methodical claims (such as: fmri, culture[ing]).



Results (III)

Metadiscourse Approach:
Do the papers that cite the RPs refer to the retraction or express skepticism? – The relationship between skeptical expressions, mentions of contamination issues, and whether the retraction is mentioned in the text or at least referenced



Results (III) Metadiscourse Approach: *Are there recurring rhetorical patterns or narratives through which knowledge claims or associated discourses are presented and interpreted in specific ways?* – Identification of relevant word fields in citation contexts based on keyword extraction and filtering

- „*interest*“, „*attraction*“, „*attention*“: ***promises***
- „*debate*“, „*concern*“, „*safety*“: ***warnings on non-epistemic risks***
- both patterns can be understood as speech acts (J.L. Austin)

Examples from close reading:

- „*In recent years, the intrinsic magnetism induced by native defects in sp-electron systems has attracted increasing attention for potential applications in spintronics,¹ (...)*“
- „*There is also concern that MSC themselves might enhance or initiate tumor growth*“

Specific informational values of disputed claims: promise of innovative applications, danger of health risks for humans (if claim happen to be correct)

Overview of results

- Four RP are part of ongoing discourses unresolved by the retraction (supporting evidence from other publications; cross-contamination does not fully account for effects)
- Specific informational values of disputed claims in two cases: promise of innovative applications, danger of health risks for humans
- Other than core empirical claims are cited (more generic claim levels, methodical claims)
- These reasons occur partly solely, partly to a more considerable extent in RPs with ongoing citations

<i>Retracted Publication</i>	<i>Reason</i>	<i>Cit. Dyna mics</i>	<i>Cited claims (Post-retraction) are mainly...</i>	<i>Support yes/no</i>	<i>Meta Discourse</i>
Cho et al. 1998	Reproducibility Problem/ Contamination	+	Core claim, methodological claim, generalized claim level	Yes	--
Makarova et al., 2001	Reproducibility Problem/ Contamination	+	Core claim	Yes	Attracts interest/attention, discovery (methodical)
Reyes et al., 2001	Duplication, Falsification	+	Methodological claim, generalized claim level, core claim with decreasing tendency	Yes, but mostly on methodical/generalized claims, also by same author group	
Rubio et al., 2005	Reproducibility Problem/ Contamination	+	Core claim	Yes	Safety concerns
Poehlman, Toth & Gardner, 1995	Fabrication	+	Core claim	Yes	--
Pushparaj et al, 2009	Duplication	+	Core claim, generalized claim level	Yes, but little	--
Dwyer, Looger & Hellinga, 2003	Reproducibility Problem/ Contamination	-	Core claim	No	Novel, application
Haug et al., 2003	Falsification	-	Core claim	No	--
Huang et al. 2005	Falsification	-	Core claim	Yes, weak support in only one case	--
Schoen et al., 2000	[Fabrication]	-	Core claim	No	Interest, application
Schramke & Allshire, 2003	Reproducibility problems/ [possibly falsification or fabrication]	-	Core claim	Yes, but in only one case	--
Sudbø et al., 2001	Data problems [possibly falsification or fabrication]	-	Core claim	Yes, but in only one case	--

Conclusions

In the analyzed group of high impact RPs with continuing citations, we found evidence of autonomous assessments of epistemic risk and informational value by the citing community.

Explanation based on theorem from social epistemology*:

Citations (as reactions of the peer community) correspond to socialized risk mitigation, which balances risks and informational values differently and more variably than the formal intervention of retraction does.

* *Epistemic risk mitigation*, see e.g. Douglas (2000), Contessa (2021), Harvard & Winsberg (2021), Parascandola (2010)

Literature

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- Houghton, F. (2022). Keep calm and carry on: Moral panic, predatory publishers, peer review, and the emperor's new clothes. *Journal of the Medical Library Association*, 110(2). <https://doi.org/10.5195/jmla.2022.1441>
- Teddlie, C., & Yu, F. (2008). Different sampling techniques for mixed methods studies. In *The mixed methods reader*. Sage.
- Parascandola, M. (2010). Epistemic risk: Empirical science and the fear of being wrong. *Law, Probability and Risk*, 9(3–4), 201–214. <https://doi.org/10.1093/lpr/mgq005>
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Thank you for your attention

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Suppl. Mat.: Characterization of sample publications

Overview of cases; citation dynamics: '+' = citation continue also after retraction; '-' = strong decline in citations

<i>Retracted Publication</i>	<i>Short Summary of Statement in Retraction Notice</i>	<i>Reason</i>	<i>Citation Dynamics*</i>
A Cho et al. 1998 10.1073/pnas.95.5.2670	Main result regarding acupoint specificity (for analgesic effects) could not be confirmed.	Reproducibility Problem/ Contamination	+
B Dwyer, Looger & Hellinga, 2003 10.1126/science.1098432	Allegedly computationally designed activity was actually caused by impurities.	Reproducibility Problem/ Contamination	-
C Haug et al., 2003 10.1038/ng1121	Data had been falsified.	Falsification	-
D Huang et al. 2005 10.1126/science.1117768	Data had been falsified.	Falsification	-
E Makarova et al., 2001 10.1038/35099527	Key claim of high-temperature ferromagnetism in pure polymerized carbon could not be maintained due to the detection of impurities and other evidence.	Reproducibility Problem/ Contamination	+
F Poehlman, Toth & Gardner, 1995 10.7326/0003-4819-123-9-199511010-00005	First author had published 3 articles that contained false and fabricated data.	Fabrication	+
G Pushparaj et al, 2009 10.1073/pnas.0901206106	Duplication of figures from other publications which also have been retracted or issued with Expression of Concern; overall message of paper believed to be correct, but findings are no longer considered as reliable.	Duplication	+
H Reyes et al., 2001 10.1182/blood.V98.9.2615	Duplications and other irregularities in multiple figures.	Duplication, Falsification	+
K Rubio et al., 2005 10.1158/0008-5472.CAN-04-4194	Authors have been unable to reproduce some of the reported spontaneous transformation events and suspect the phenomenon is due to a cross-contamination artifact.	Reproducibility Problem/ Contamination	+
L Schön et al., 2000 10.1038/35021011	Validity of data associated with device measurements has been reviewed due to concerns about validity.	[Fabrication]	-
M Schramke & Allshwere, 2003 10.1126/science.1086870	Observations that are basis for several figures could not be reproduced.	Reproducibility problems/ [possibly falsification or fabrication]	-
N Sudbø et al., 2001 10.1056/NEJM200104263441702	Data have been called into question by the findings of the commission.	Data problems [possibly falsification or fabrication]	-