Thesis Seminar
The publication process, problems, and possible solutions

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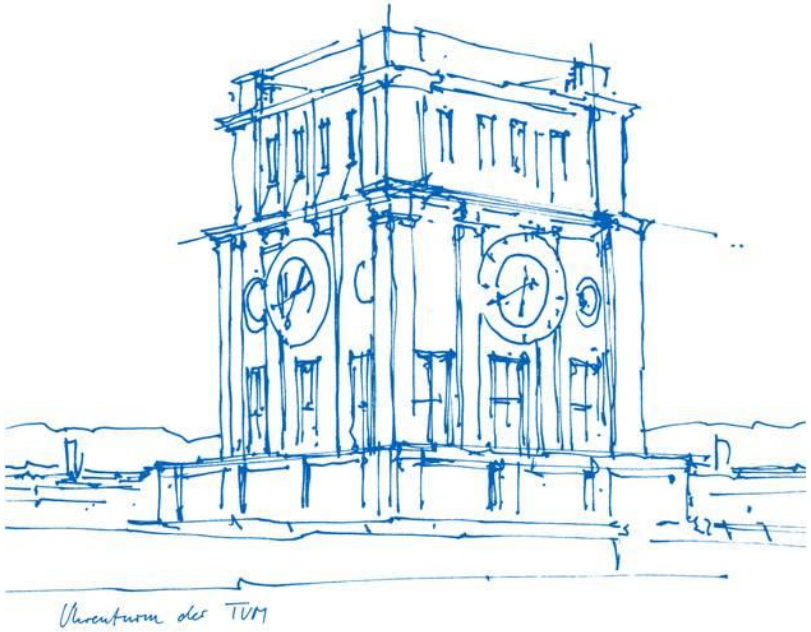
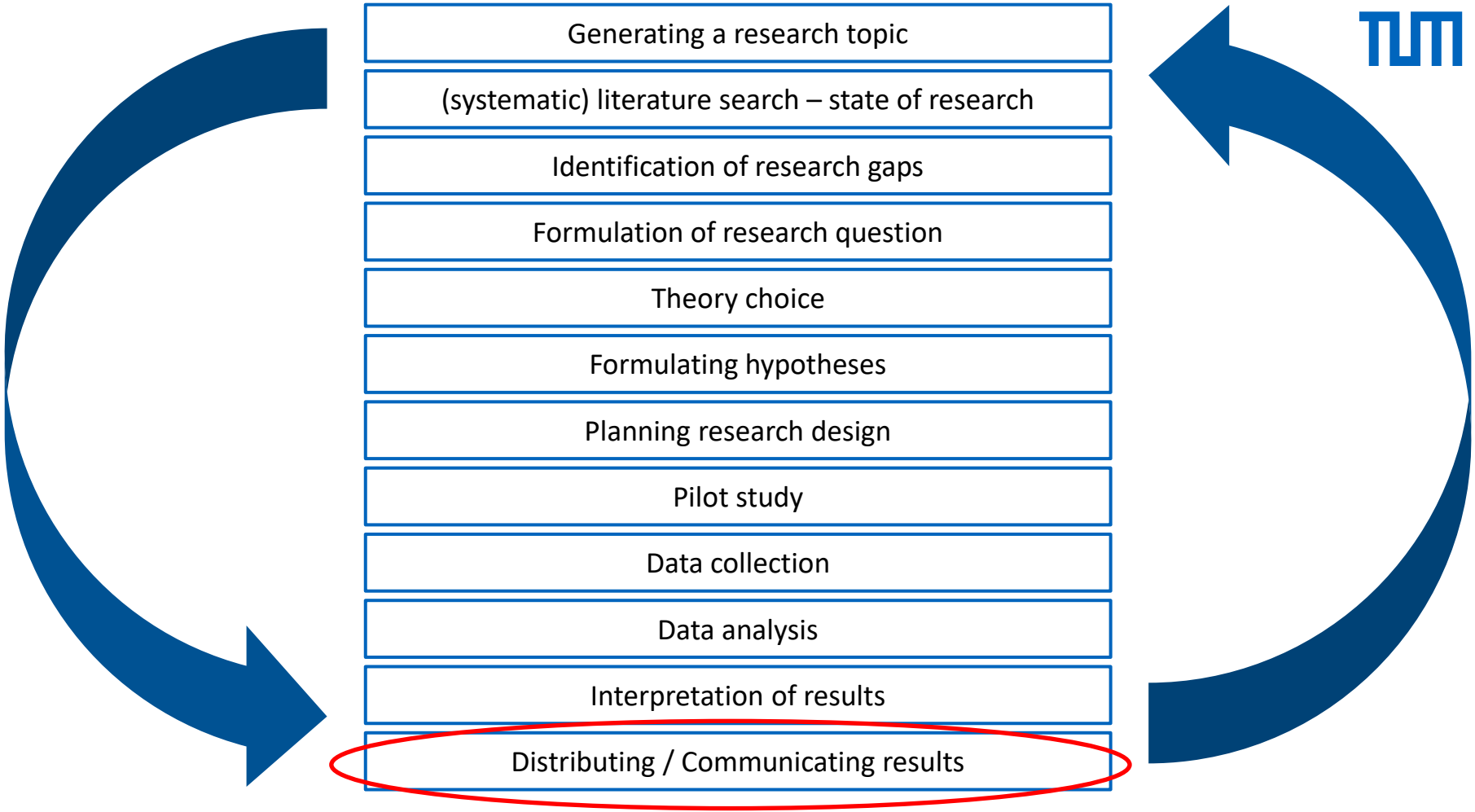
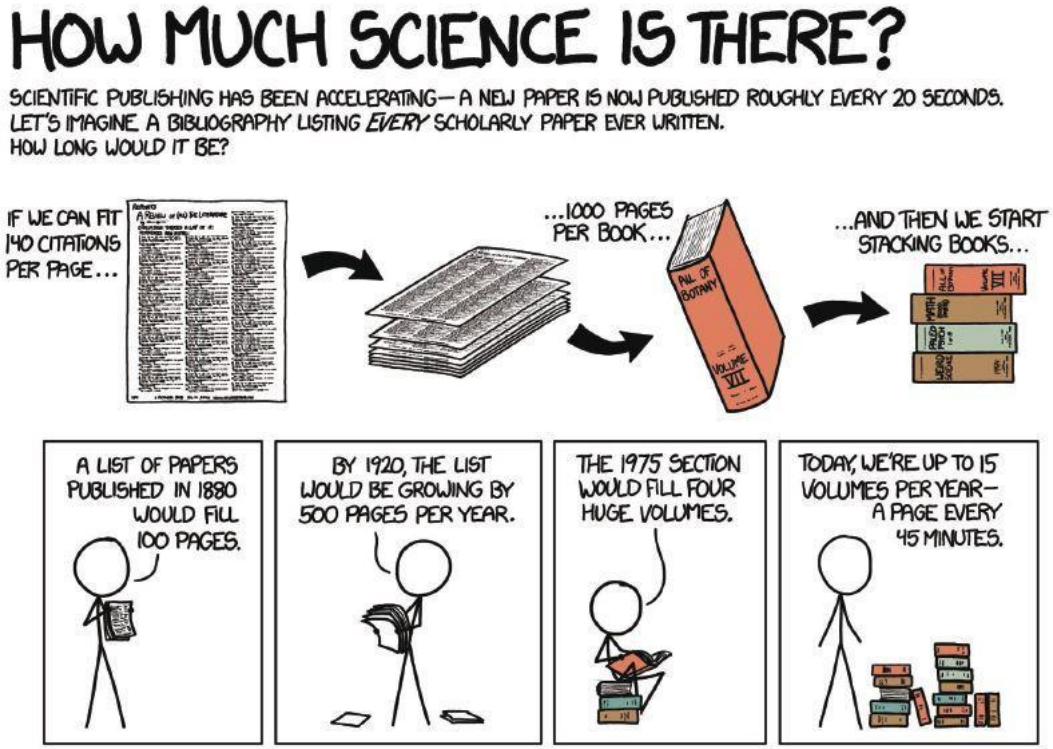



Generating a research topic
(systematic) literature search – state of research
Identification of research gaps
Formulation of research question
Theory choice
Formulating hypotheses
Planning research design
Pilot study
Data collection
Data analysis
Interpretation of results
Distributing / Communicating results

(double-blind) peer-review publication process

Writing for publications…



What is the (double blind) peer-review process?

The Peer-Review Process

1. Authors submit paper through journal system
2. Editor scans paper; either desk-reject or assign to action editor (AE)
3. Either editor or AE assign paper to 2-3 reviewers
4. Reviewers return reviews and recommendations (reviews usually include narrative (which authors and AE see), and private comments to AE plus numerical ratings (which AE, but not authors, see)
5. AE writes decision letter (reject, revise&resubmit, conditional accept, accept)
6. Decision letter sent to author and reviewers
7. In case of revision, revised paper sent through the same process above

Why do papers get rejected?

- **Unclear contribution**
- **Insufficient theory development**
- **Methdological issues**

Why do papers get rejected?

Unclear contribution:

- no contribution (currently or potentially) **to the literature**
- no important **theoretical** (new ideas), **empirical** (new findings), and/or **practical** (new guidance) **contributions**
- authors don't discuss contributions **clearly and explicitly**
- authors don’t provide **solid rationale** for their stated contributions
- authors can’t improve their discussion of, and **justification** for, the stated contributions

Contribution:

→ **State the literature you contribute to**
→ **Cite the scholars on your table**
→ **State exactly what is it you contribute to this table**
→ **Clarify the relevance of your contributions**

Why do papers get rejected?

Insufficient theory development:

- **research question** is **not meaningful**, important, and novel
- no meaningful, clear, and well-supported **theoretical framework or theory(ies)** guiding the study
- study doesn't **advance new knowledge** in area
- **constructs** aren't well-developed (defined, justified, explained)
- **other constructs should be included** (alternative explanations)
- **hypotheses aren't clear** and well-justified (based on theory, logic, and prior research)

Theory development:

→ **State the theoretical lens that you apply**
→ **Define constructs and develop hypotheses**
→ **Acknowledge literature (what was done)**
→ **Acknowledge limitations (what should be done)**

Why do papers get rejected?

Methodological issues:

- Methods are not often the sole reason for rejection, but they certainly could be a major reason for rejection
- **Sampling and study design** (does elicitation of phenomena allow for proper test of research questions and hypotheses?)
- **Measurement issues** (reliability, validity, levels, adequacy of sources)
- **Analytical issues** (do the analyses yield valid inferences vis-à-vis hypotheses? can alternative analyses be better?)

Method development:

→ **provide more evidence in support of validity**
→ **test alternatives (new or additional data and/or analyses)**
→ **acknowledge limitations**

Practices that harm science (1/4)

#	Management problem	Source / Paper	Especially relevant paper section
1	**HARKing: Overview**	Murphy, K. R., & Aguinis, H. (2019). HARKing: how badly can cherry-picking and question trolling produce bias in published results?. *Journal of business and psychology*, *34*(1), 1-17.	Abstract + Introduction (not entitled, but directly following the abstract)
2	**Types of HARKing: Cherry picking**	Murphy, K. R., & Aguinis, H. (2019). HARKing: how badly can cherry-picking and question trolling produce bias in published results?. *Journal of business and psychology*, *34*(1), 1-17.	Different forms of harking, Prevalence of Cherry-Picking and Question Trolling
3	**Types of HARKing: Question trolling**	Murphy, K. R., & Aguinis, H. (2019). HARKing: how badly can cherry-picking and question trolling produce bias in published results?. *Journal of business and psychology*, *34*(1), 1-17.	Different forms of harking, Prevalence of Cherry-Picking and Question Trolling
4	**P-Hacking**	Aguinis, H., Cascio, W. F., & Ramani, R. S. (2017). Science's reproducibility and replicability crisis: International business is not immune. *Journal of International Business Studies*, 48, 653–663.	Reporting of p values

Practices that harm science (2/4)

#	Management problem	Source / Paper	Especially relevant paper section
5	**The Chrysalis Effect**	O'Boyle Jr, E. H., Banks, G. C., & Gonzalez-Mulé, E. (2017). The chrysalis effect: How ugly initial results metamorphosize into beautiful articles. *Journal of Management*, *43*(2), 376-399.	pp. 376-378
6	**Publication bias / File drawer problem**	Dalton, D. R., Aguinis, H., Dalton, C. A., Bosco, F. A., & Pierce, C. A. 2012. Revisiting the file drawer problem in meta-analysis: An empirical assessment of published and non-published correlation matrices. *Personnel Psychology*, 65: 221-249.	File Drawer Problem
7	**Reproducibility vs. replicability and the replication crisis**	Aguinis, H., Cascio, W. F., & Ramani, R. S. (2017). Science's reproducibility and replicability crisis: International business is not immune. *Journal of International Business Studies*, 48, 653–663.	Introduction
8	**Lack of transparency**	Aguinis, H., & Solarino, A. M. (2019). Transparency and replicability in qualitative research: The case of interviews with elite informants. *Strategic Management Journal*, *40*(8), 1291-1315.	3.1 Transparency criteria in qualitative research

Practices that harm science (3/4)

#	Management problem	Source / Paper	Especially relevant paper section
9	**Quantity over quality = Publish or perish**	Wright, P. M. (2016). Ensuring research integrity: An editor's perspective. Journal of Management, 42(5), 1037 –1043.	The Publishing Pressure Cooker (Introduction + Publish or perish)
10	**Plagiarism**	Clarke, R. (2006). Plagiarism by academics: More complex than it seems. *Journal of the Association for Information Systems*, *7*(2), 91-121.	Definition, Plagiarism by Academics
11	**‚Coercive citation'**	Wilhite, A. W., & Fong, E. A. (2012). Coercive citation in academic publishing. *Science*, *335*(6068), 542-543.	complete
12	**Crisis of confidence**	Harley, B. (2019). Confronting the crisis of confidence in management studies: Why senior scholars need to stop setting a bad example. *Academy of Management Learning & Education*, *18*(2), 286-297.	p. 286-291

Practices that harm science (4/4)

#	Management problem	Source / Paper	Especially relevant paper section
13	**Arigorium**	Antonakis, J. (2017). On doing better science: From thrill of discovery to policy implications. The Leadership Quarterly, 28(1), 5-21.	Introduction (p. 1-7) + Disease 4: Arigorium
14	**WEIRD sample**	Henrich, J., Heine, S. J., & Norenzayan, A. (2010). Most people are not WEIRD. Nature, 466(7302), 29-29.	complete
15	**Endogeneity & Causality**	Antonakis, J., Bendahan, S., Jacquart, P., & Lalive, R. (2010). On making causal claims: A review and recommendations. *The Leadership Quarterly*, *21*(6), 1086-1120.	Introduction (p. 1-8)
16	**Common-method variance**	Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *885*(879), 10-1037.	p.879-886
17	**Data fabrication or falsification**	Fanelli, D. (2009). How many scientists fabricate and falsify research? A systematic review and meta-analysis of survey data. *PloS one*, *4*(5), e5738.	Introduction + Discussion

Proscribed practices (not directly harming science) (1/3)

#	Management problem	Source / Paper	Especially relevant paper section
18	**Theorrhea**	Antonakis, J. (2017). On doing better science: From thrill of discovery to policy implications. The Leadership Quarterly, 28(1), 5-21.	Introduction (p- 1-7) + Disease 3: Significosis
19	**Neophilia**	Antonakis, J. (2017). On doing better science: From thrill of discovery to policy implications. The Leadership Quarterly, 28(1), 5-21.	Introduction (p- 1-7) + Disease 2: Theorrhea
20	**Significosis**	Antonakis, J. (2017). On doing better science: From thrill of discovery to policy implications. The Leadership Quarterly, 28(1), 5-21.	Introduction (p- 1-7) + Disease 1: Significosis
21	**Disjunctivitis**	Antonakis, J. (2017). On doing better science: From thrill of discovery to policy implications. The Leadership Quarterly, 28(1), 5-21.	Introduction (p- 1-7) + Disease 5: Disjunctivitis
22	**Construct Proliferation**	Shaffer, J. A., DeGeest, D., & Li, A. (2016). Tackling the problem of construct proliferation: A guide to assessing the discriminant validity of conceptually related constructs. *Organizational Research Methods*, *19*(1), 80-110.	p. 80-83

Proscribed practices (not directly harming science) (2/3)

#	Management problem	Source / Paper	Especially relevant paper section
23	**Interpretation**	Bliese, P. D., & Wang, M. (2019). Results Provide Information About Cumulative Probabilities of Finding Significance: Let's Report This Information. *Journal of Management* (forthcoming).	Abstract + Introduction (not entitled, but directly following the abstract)
24	**Evaluitis**	Leeuw, Frans L. "Evaluation: a booming business but is it adding value?." *Evaluation Journal of Australasia*, 9(1), 3-9.	The problem
25	**How the review process damages our writing**	Tourish, D. (2019). The triumph of nonsense in management studies. *Academy of Management Learning & Education*.	Paragraph on "How the review process damages our writing" (p. 13-19)
26	**Fisher t-tests and it's problems**	Fay, M. P. (2010). Confidence intervals that match Fisher's exact or Blaker's exact tests. *Biostatistics*, *11*(2), 373-374. Rice, K. (2010) A decision-theoretic formulation of Fisher's approach to testing. Am. Statistn, 64, 345–349.	**Further readings for self-study**

Proscribed practices (not directly harming science) (3/3)

#	Management problem	Source / Paper	Especially relevant paper section
27	**Self-plagiarism**	Clarke, R. (2009). Journal self-citation XIX: Self-plagiarism and self-citation-A practical guide based on underlying principles. *Communications of the Association for Information Systems*, *25*(1), 19.	III. SELF-PLAGIARISM
28	**Covert Research Practices**	Roulet, T. J., Gill, M. J., Stenger, S., & Gill, D. J. (2017). Reconsidering the value of covert research: The role of ambiguous consent in participant observation. *Organizational Research Methods*, *20*(3), 487-517.	Abstract + Introduction (not entitled, but directly following the abstract)
29	**Data Slicing**	Pfleegor, A. G., Katz, M., & Bowers, M. T. (2019). Publish, perish, or salami slice? Authorship ethics in an emerging field. *Journal of Business Ethics*, *156*(1), 189-208.	Responsible and Ethical Authorship + Ethically Questionable Authorship Practices in Sport Scholarship
30	**Multiple use of the same data set**	Colquitt, J. A. (2013). Data overlap policies at AMJ. *Academy of Management Journal, 56*(2), 331-333.	complete

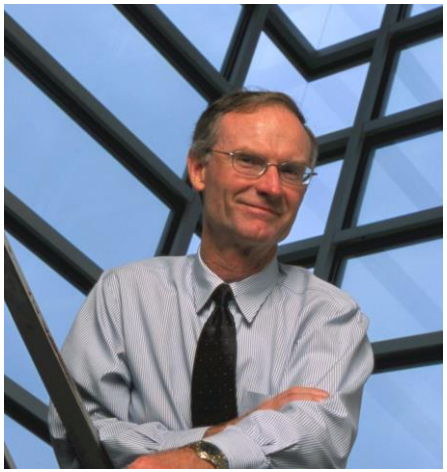
Unfortunately, the problem is much bigger…

Current challenges in management research

1993 Presidential Address:

WHAT IF THE ACADEMY ACTUALLY MATTERED?

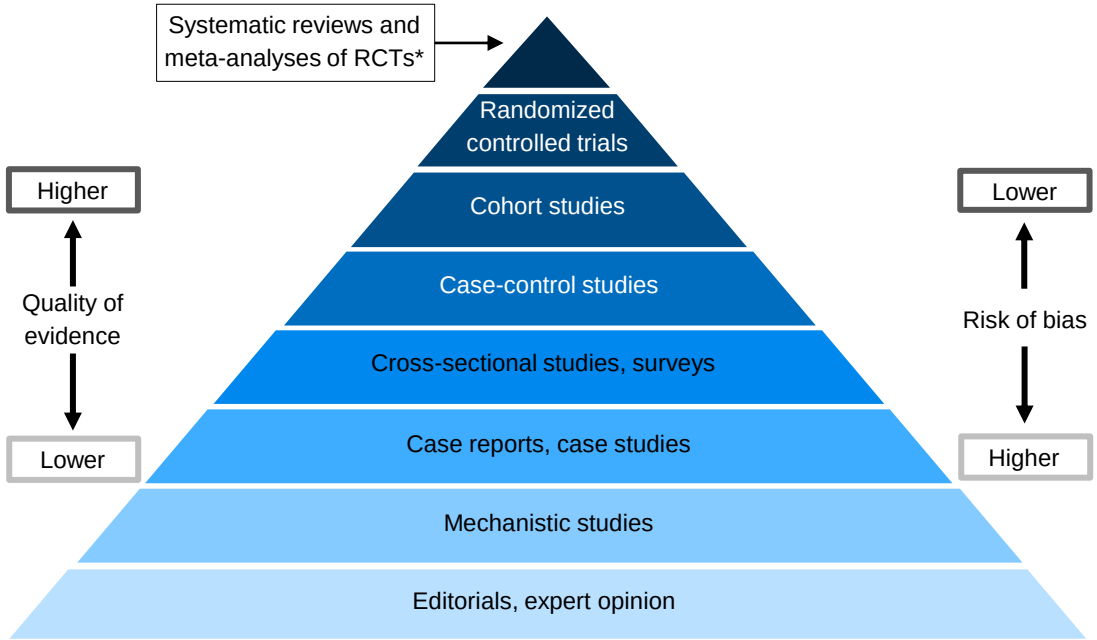
DONALD C. HAMBRICK
Columbia University



mal innovation, minimal visibility, minimal impact.[1] Each August, we come to talk with each other; during the rest of the year we read each others' papers in our journals and write our own papers so that we may, in turn, have an audience the following August: an incestuous, closed loop.

Colleagues, if we believe highly in what we do, if we believe in the significance of advanced thinking and research on management, then it is time we showed it. We must recognize that our responsibility is not to ourselves, but rather to the institutions around the world that are in dire need of improved management, as well as to those individuals who seek to be the most effective managers they possibly can be. It is time for us to break out of our closed loop. It is time for us to matter.

The hierarchy of evidence pyramid



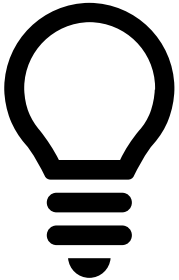
RCT: randomized controlled trial

- At each ascending level, the quality of evidence is likely to improve (i.e., the risk of bias decreases) and the quantity of available studies usually declines
- Confidence in causal relationships generally increases toward the top of the pyramid
- However, within each level, the quality varies based on study design and implementation

Yetley, E. A., MacFarlane, A. J., Greene-Finestone, L. S., Garza, C., Ard, J. D., Atkinson, S. A., ... & King, J. C. (2017). Options for basing Dietary Reference Intakes (DRIs) on chronic disease endpoints: report from a joint US-/Canadian-sponsored working group. The American journal of clinical nutrition, 105(1), 249S-285S.

How to get published in management journals

Theory Development



Actual theory development is hard and therefore rare

Top management journals require theory development

Authors create an *illusion* of theory development

Tourish, 2019, AMLE

The problem of peer review

I must find something wrong in order for my review to count

Reviewer

$p < .05$

tautologous hypothesis and nonsense results

Convoluted language

author may feel that work is not his own anymore

Continuous revision

Spending much time for very little added value

I do whatever I can to please the reviewer in order to get published

Author

Moosa, 2018; Tourish, 2019

The game of publishing

Arbitraryness

Peters & Ceci, 1982: resubmitted 12 psychology papers to journals who already published them, 16/18 reviewers recommended rejection

Big words

Lonely employees dislike workplaces where they feel lonely

„Employees who experience higher levels of workplace loneliness will be less affectively commited to their organization“ (Ozcelik & Barsade, 2018)

Researchers become genuine imposters

Billig, 2013; Ozcelik & Barsade, 2018; Peters & Ceci, 1982; Tourish, 2019

What is to be done

Publishing should not be seen as a game

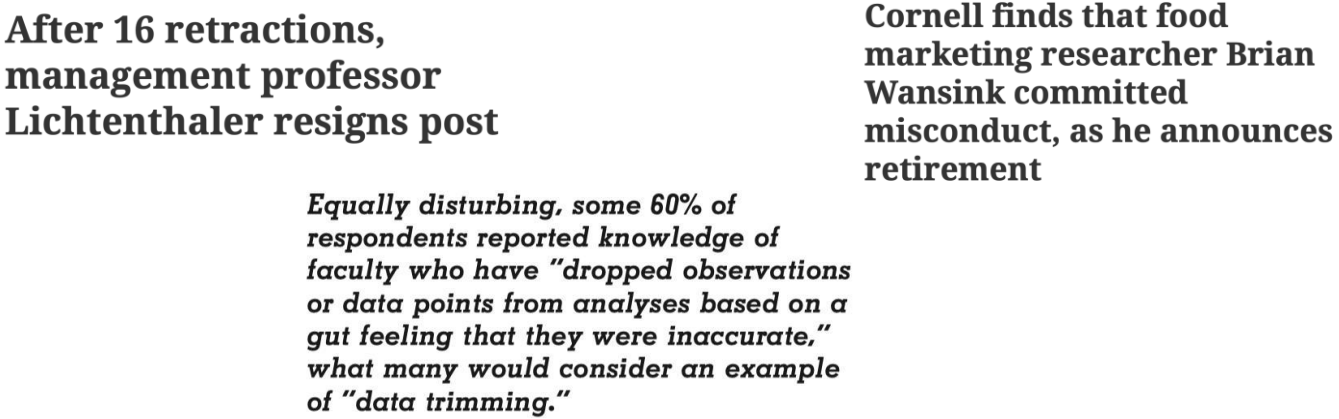
Management journals should rethink their position
towards the need for theory development

Strict sturctural form should be abandoned –
authors should be allowed to show they are human

Regain a sense of proportionate effort –
Firm decision whether to publish a paper after two revision rounds

Tourish, 2019, AMLE

Scientific Misconduct in Empirical Research



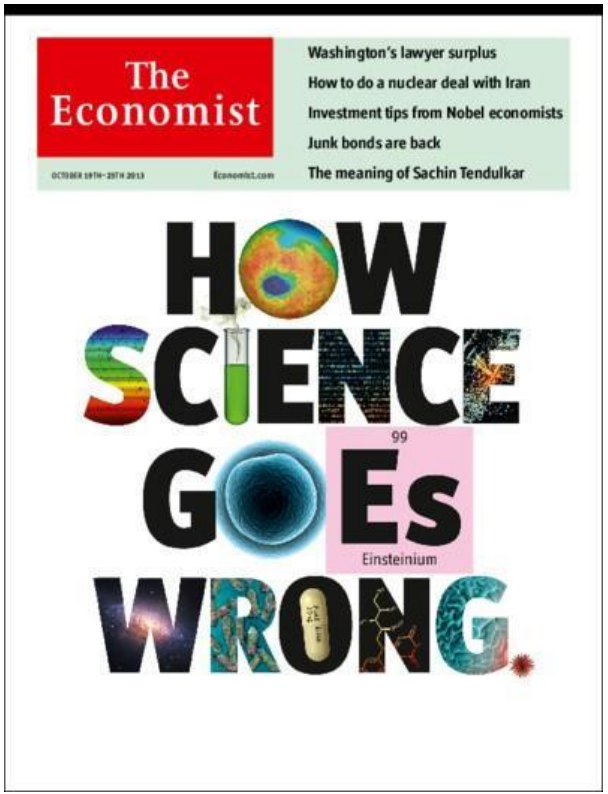
- **Scientific misconduct**, data falsification and honest mistakes are **quite common in empirical management research**
- **No objective and independent tests** broadly used to verify empirical findings
- **Authors identify** and demonstrate **three such objective tests** from peer-reviewed literature

Source: Bedeian, Taylor and Miller (2010); www.retractionwatch.org; Bergh et. al. (2017).

Recent headlines to science, research and universities

„Scientific research has changed the world.

Now it needs to change itself.“



Recent headlines to science, research and universities

theguardian

Google™ Custom Search

Nobel winner declares boycott of top science journals

Randy Schekman says his lab will no longer send papers to Nature, Cell and Science as they distort scientific process

Ian Sample, science correspondent
The Guardian, Monday 9 December 2013 19.42 GMT

Randy Schekman, centre, at a Nobel prize ceremony in Stockholm. Photograph: Rob Schoenbaum/Zuma

Current worries of nobel prize winners

*„Today, he said, **he would not get an academic job**. It‘s as simple as that. I don‘t think I would be regarded as productive enough.“*

Peter Higgs
Physics nobel prize winner 2013

*Just as Wall Street needs to break the hold of bonus culture, so **science must break the tyranny of the luxury journals**."*

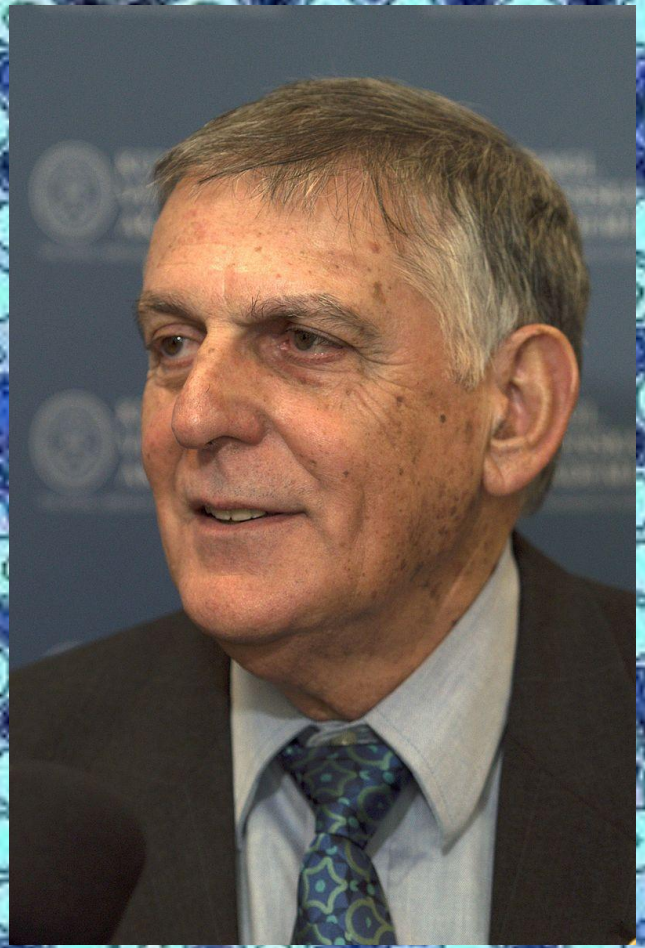
Randy Schekman
Medicine nobel prize winner 2013

*"Daniel Kahneman Sees ‘Train-Wreck Looming’ for Social Psychology”: “I **believe that you should collectively do something about this mess**.”*

Daniel Kahneman
Economy nobel prize winner 2002

Dan Shechtman

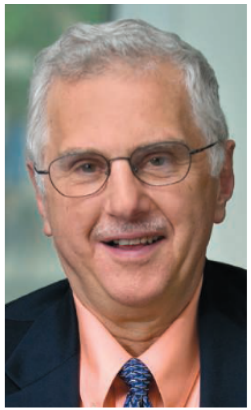
Nobel prize winner chemistry 2011 for the finding of quasichrystals



„There are no quasicrystals, only quasi-scientists“ …

… said the chemistry Nobel prize winner Linus Carl Pauling (passed in 1994).

Current headlines to science, research and universities



Bruce Alberts is Editor-in-Chief of *Science*.

Science
AAAS

EDITORIAL

Impact Factor Distortions

THIS EDITORIAL COINCIDES WITH THE RELEASE OF THE *SAN FRANCISCO DECLARATION ON RESEARCH Assessment* (DORA), the outcome of a gathering of concerned scientists at the December 2012 meeting of the American Society for Cell Biology.* To correct distortions in the evaluation of scientific research, DORA aims to stop the use of the "journal impact factor" in judging an individual scientist's work. The *Declaration* states that the impact factor must not be used as "a surrogate measure of the quality of individual research articles, to assess an individual scientist's contributions, or in hiring, promotion, or funding decisions." DORA also provides a list of specific actions, targeted at improving the way scientific publications are assessed, to be taken by funding agencies, institutions, publishers, researchers, and the organizations that supply

Current headlines to science, research and universities

San Francisco Declaration on Research Assessment

Putting science into the assessment of research

There is a pressing need to improve the ways in which the output of scientific research is evaluated by funding agencies, academic institutions, and other parties.

To address this issue, a group of editors and publishers of scholarly journals met during the Annual Meeting of The American Society for Cell Biology (ASCB) in San Francisco, CA, on December 16, 2012. The group developed a set of recommendations, referred to as the *San Francisco Declaration on Research Assessment*. We invite interested parties across all scientific disciplines to indicate their support by adding their names to this Declaration.

Current headlines to science, research and universities

How should medical science change?

In December, 2013, Randy Schekman received a Nobel Prize in Physiology or Medicine for his codiscovery (with James Rothman and Thomas Südhof) of the cellular machinery regulating vesicle traffic. He used the occasion to launch a ferocious attack against what he called "luxury journals"—*Nature*, *Science*, and *Cell*. Although he didn't mention *The Lancet*, *JAMA*, or *The New England Journal of Medicine*, it probably isn't unreasonable to think he would include us in his definition of "luxury journal". This is what he wrote in *The Guardian*: "These luxury journals are supposed

production and reporting of research evidence", which made the extraordinary claim that as much as 85% of research investment was wasted.[3] It seemed an unbelievable figure. But the useful discussion their paper triggered led to a spate of seminars and meetings to explore what could be done about what all agreed was a wholly unsatisfactory situation—wrong questions being asked by scientists, poor study designs being applied, research that was inaccessible, and findings that were distorted by selective reporting and other types of bias. The Series we now publish addresses these issues in far

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http://dx.doi.org/10.1016/S0140-6736(13)62678-1

See Online/Series
http://dx.doi.org/10.1016/S0140-6736(13)62229-1,
http://dx.doi.org/10.1016/S0140-6736(13)62227-8,
http://dx.doi.org/10.1016/S0140-6736(13)62297-7,
http://dx.doi.org/10.1016/S0140-6736(13)62296-5, and
http://dx.doi.org/10.1016/S0140-6736(13)62228-X

THE LANCET

„How should the entire scientific enterprise change to produce reliable and accessible evidence that addresses the challenges faced by society and the individuals who make up their societies"
(The Lancet, 2014, January 8).

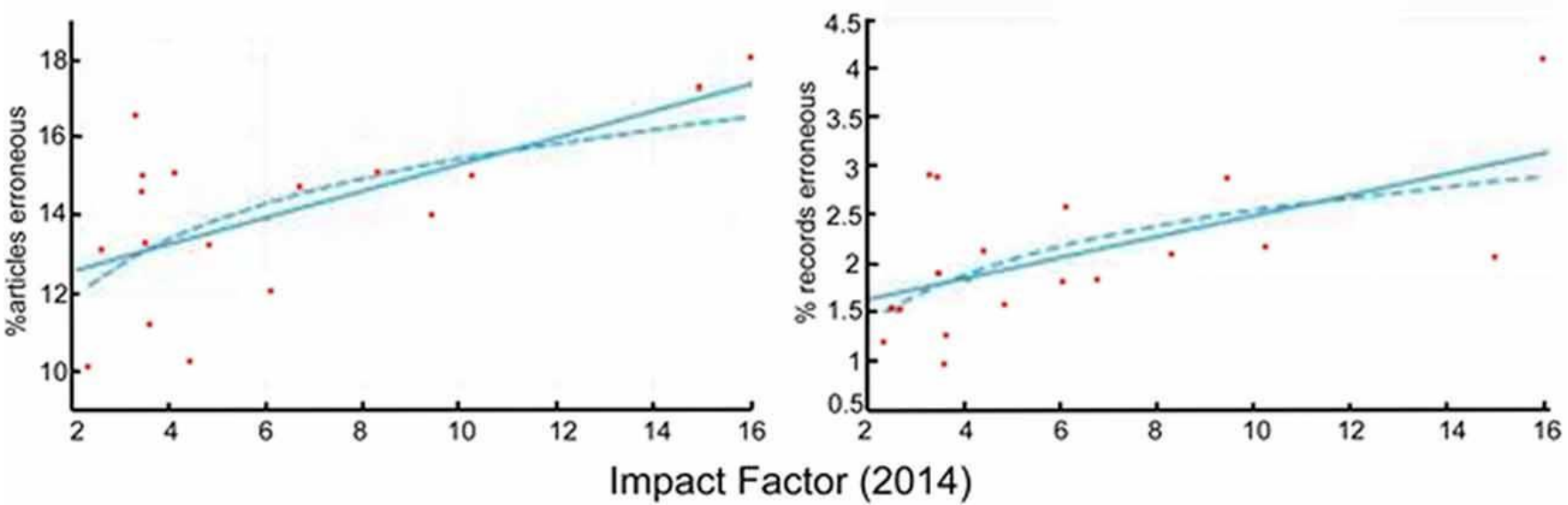
REVIEW ARTICLE
Front. Hum. Neurosci., 20 February 2018 | https://doi.org/10.3389/fnhum.2018.00037

Prestigious Science Journals Struggle to Reach Even Average Reliability

In which journal a scientist publishes is considered one of the most crucial factors determining their career. The underlying common assumption is that only the best scientists manage to publish in a highly selective tier of the most prestigious journals. However, data from several lines of evidence suggest that the methodological quality of scientific experiments does not increase with increasing rank of the journal. On the contrary, an accumulating body of evidence suggests the inverse: methodological quality and, consequently, reliability of published research works in several fields may be *decreasing* with increasing journal rank. The data supporting these conclusions circumvent confounding factors such as increased readership and scrutiny for these journals, focusing instead on quantifiable indicators of methodological soundness in the published literature, relying on, in part, semi-automated data extraction from often thousands of publications at a time. With the accumulating evidence over the last decade grew the realization that the very existence of scholarly journals, due to their inherent hierarchy, constitutes one of the major threats to publicly funded science: hiring, promoting and funding scientists who publish unreliable science eventually erodes public trust in science.

In the literature covering unretracted, peer-reviewed articles, one can identify at least eight lines of evidence suggesting that articles published in higher ranking journals are methodologically either not stronger or, indeed, weaker than those in lower ranking journals. In contrast, there is no evidence that articles published in higher ranking journals are methodologically stronger. Methodology here refers to several measures of experimental and statistical rigor with a potential bearing on subsequent replication or re-use. There is currently one article with evidence that higher ranking journals are better at detecting duplicated images (Bik et al., 2016).

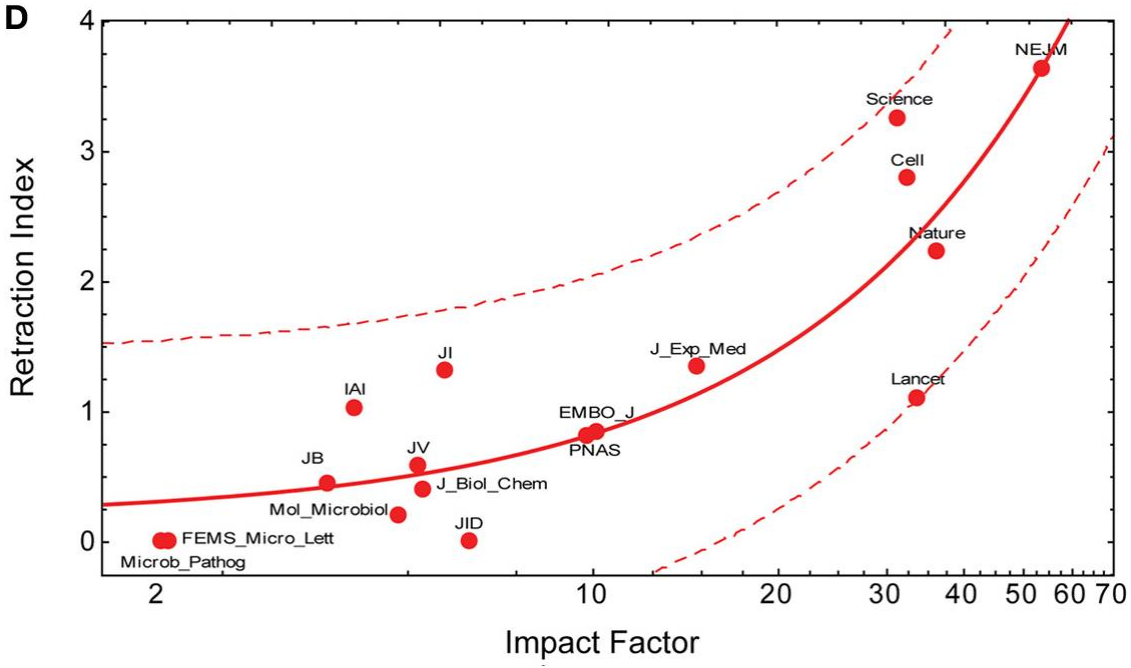
The higher the impact factor of the journal the less reliable the data, the less methodologically good the experiments, the more fraud



https://www.frontiersin.org/files/Articles/327726/fnhum-12-00037-HTML/image_m/fnhum-12-00037-g006.jpg

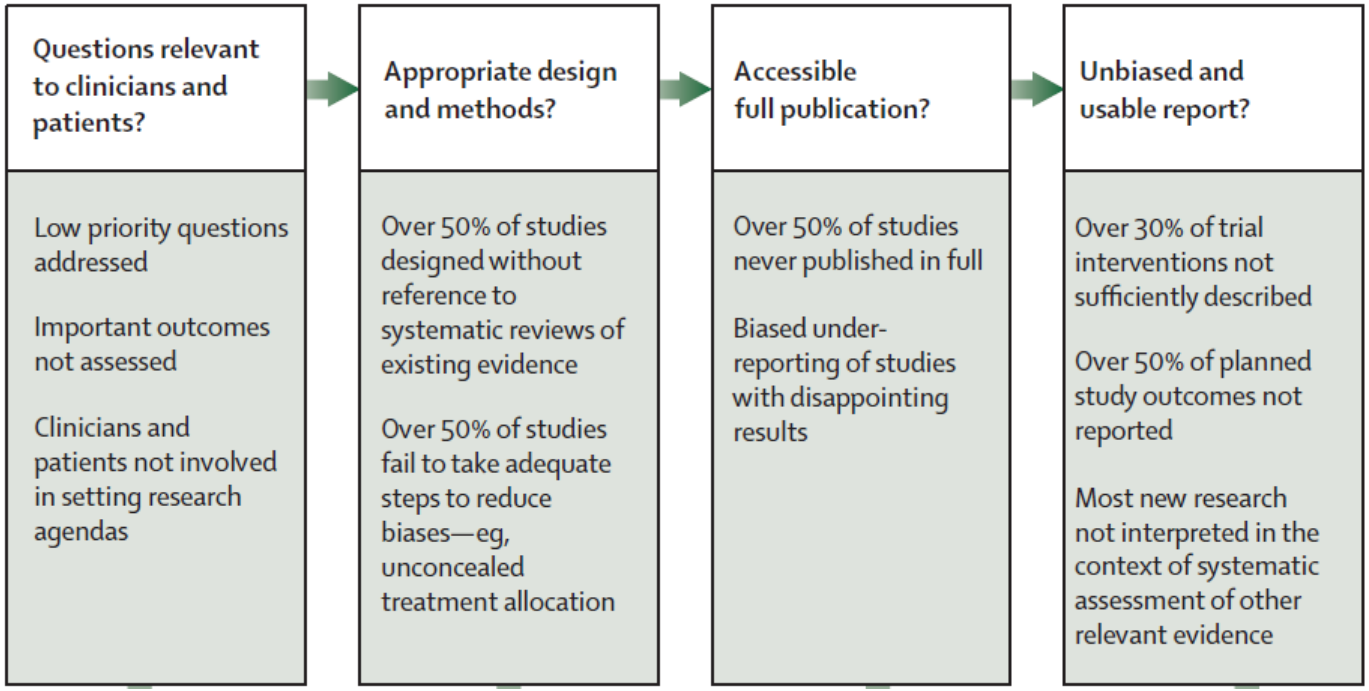
Impact factors and rankings: the problem of their objectivity and resulting consequences

Is the impact factor reliable enough as a quality indicator for research?



Positive correlation between retraction rate and impact factor (Brembs et al., 2013).

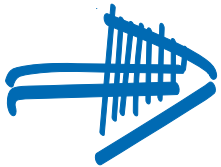
Criticism on all stages of the research value chain



Chalmers & Glasziou, 2009, S. 86

Data basis: Pros and cons of obligatory specifications of objective measurement results and quality criteria of measurement instruments

„Publish or perish“



„Significance chasing“

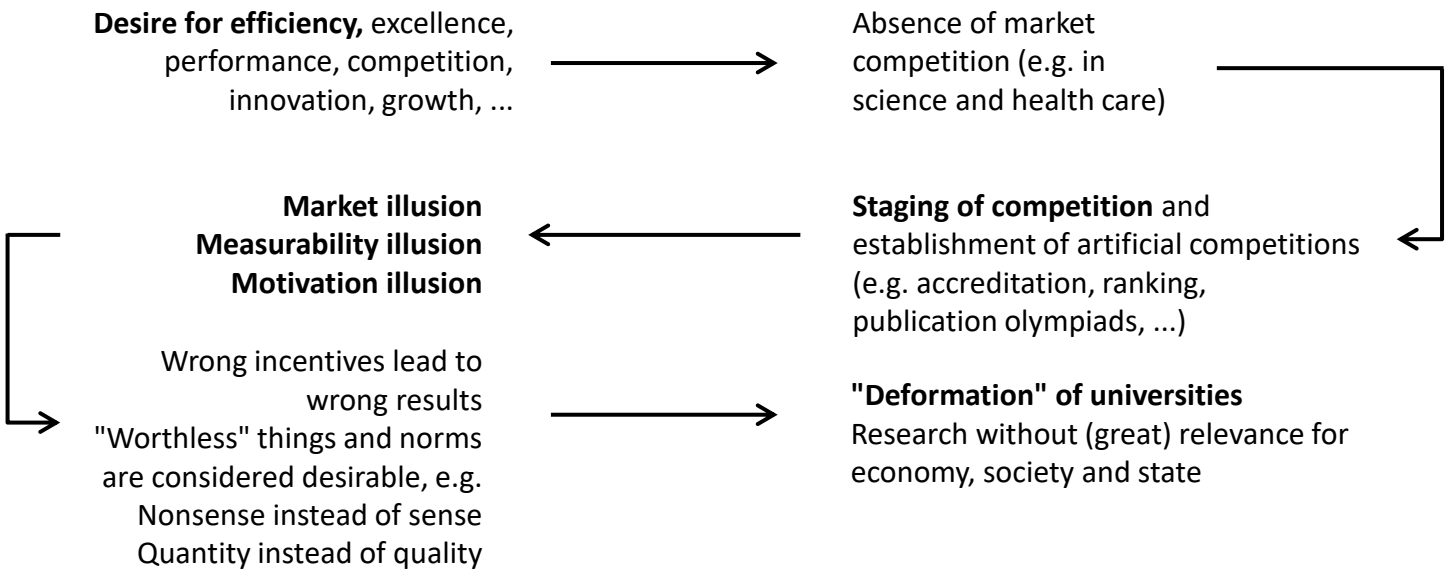
„HARKing“

Improper methodology and evaluation

“publish or perish”-principle results in the publication of more and more nonsense.” (Binswanger, 2015, p.19)

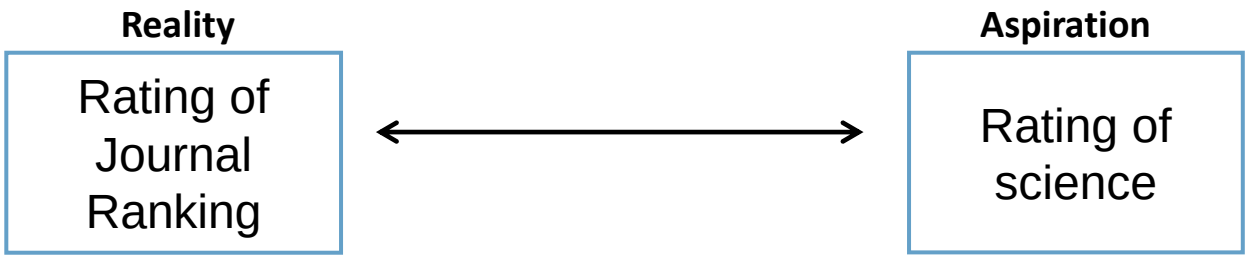
“It can be proven that most claimed research findings are false.“
(Ioannidis, 2005, S. 0696)

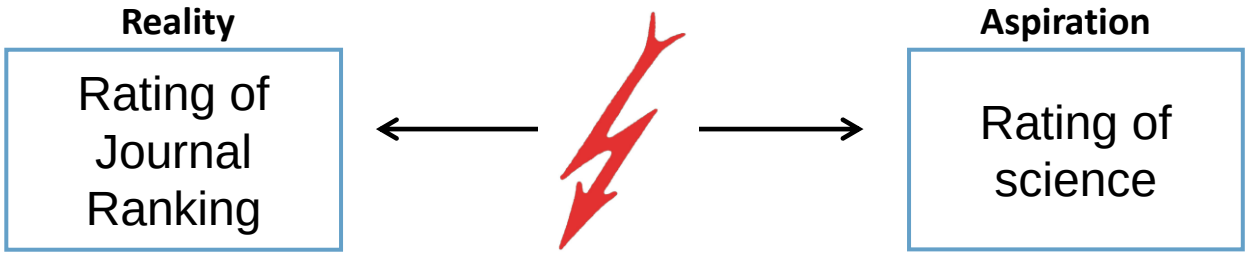
How artificial competitions harm science

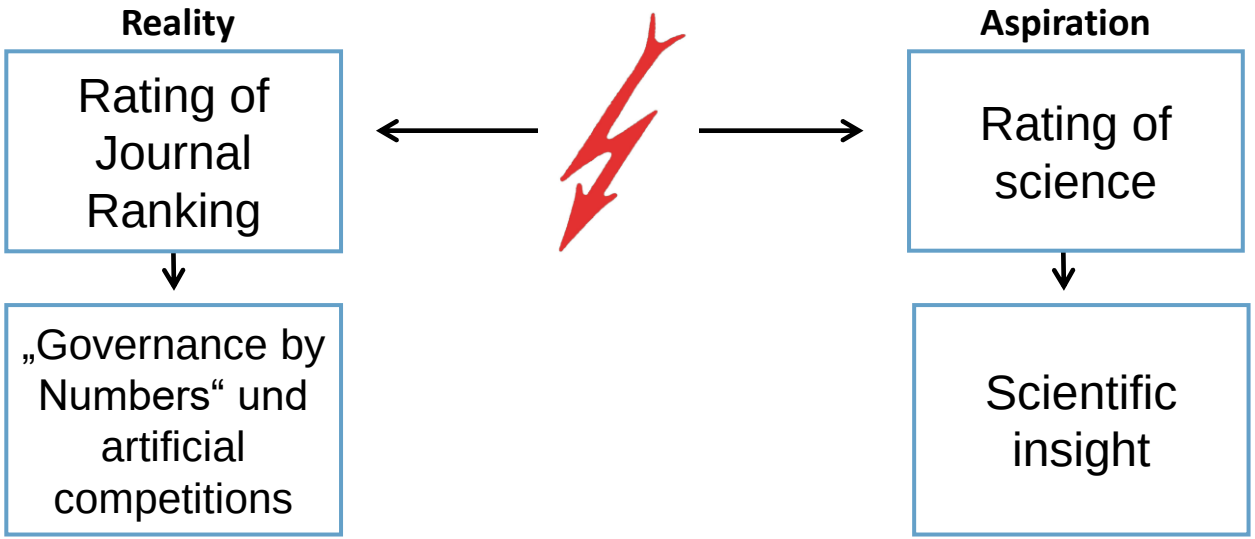


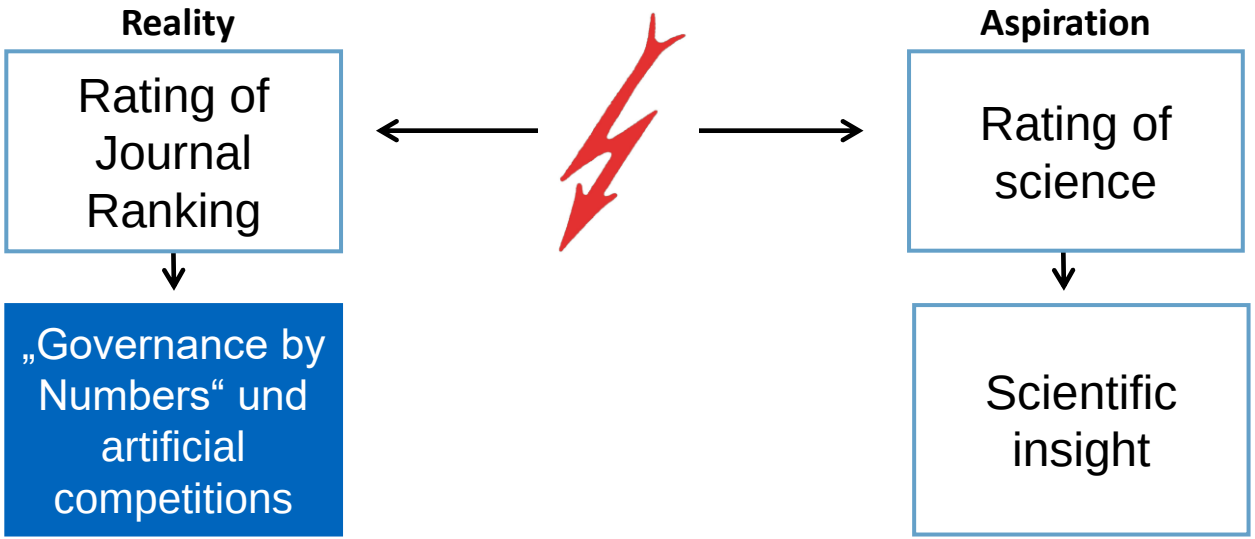
“publish or perish”-principle results in the publication of more and more nonsense.” (Binswanger, 2015, p.19)

Mathias Binswanger (2011) Mathias Bisnwanger (2010)


Reality
Rating of Journal Ranking
Aspiration
Rating of science


Reality
Rating of Journal Ranking
Aspiration
Rating of science

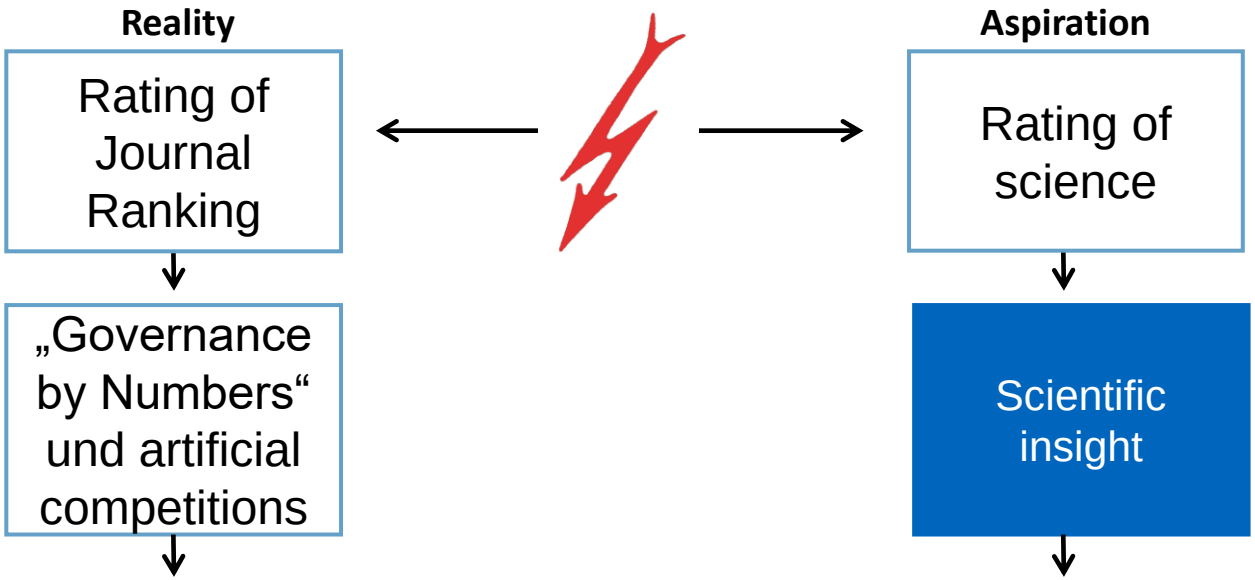

Reality
Rating of Journal Ranking
„Governance by Numbers“ und artificial competitions
Aspiration
Rating of science
Scientific insight


Reality
Rating of Journal Ranking
„Governance by Numbers“ und artificial competitions
Aspiration
Rating of science
Scientific insight

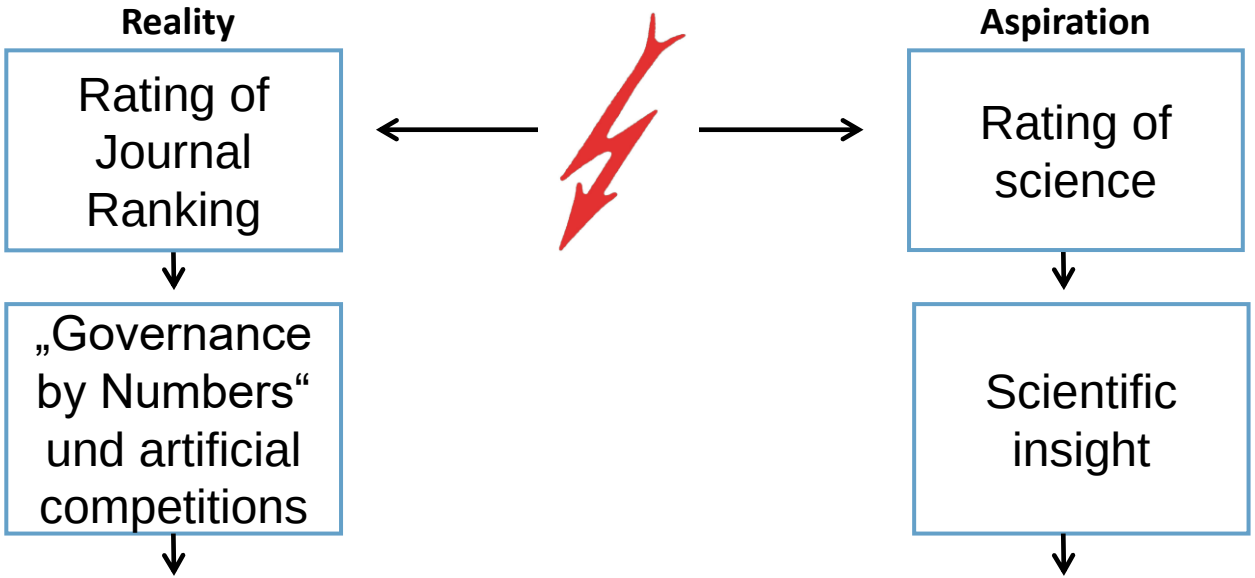
$$Performance = \frac{Third\ party\ funds}{Researchers\ involved}$$

$$Performance = \frac{Number\ of\ publications}{Resources\ deployed}$$

$$Performance = \frac{Number\ of\ citations}{Resources\ deployed}$$


Reality
Rating of Journal Ranking
„Governance by Numbers“ und artificial competitions
Aspiration
Rating of science
Scientific insight

$$Performance = \frac{Scientific\ Insight}{Resources\ deployed}$$



Problems of science

- Research without relevance and risk
- Errors and lack of replicability
- Slowness
- Lack of transparency and access to data
- Black box of peer review
- Non-intended effects/manipulability
- One-dimensionality of measurement

Welpe (2020)

"What you are suggesting would mean that we would have to start (sic!) reading the applicants' publications again!"

Member of an appointment committee

SHANGHAI RANKING CONSULTANCY

20 Jahre CHE Ranking

THE WORLD UNIVERSITY RANKINGS

"As a scientist, I agree with all of your criticisms of counting, measuring, and weighing science - but: **politically, success in rankings, artificial competitions, and publication rankings that we win are of use to us, even if they measure the wrong thing and lead us to do irrelevant things."**

President of a university of excellence

TOP 100

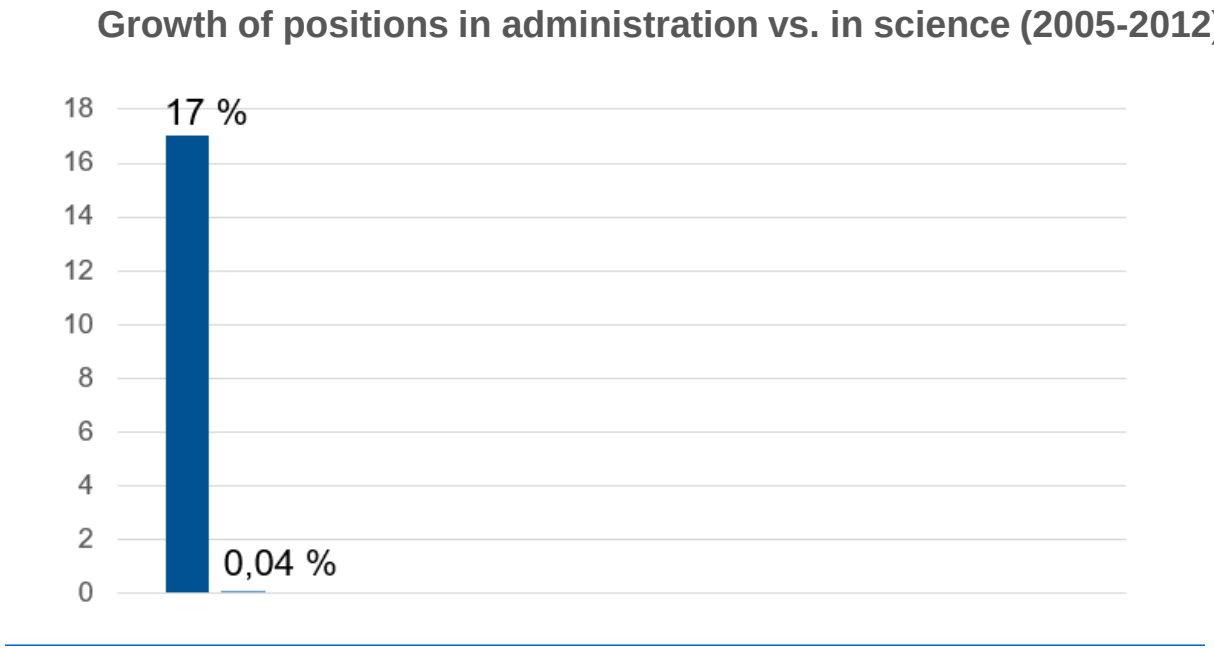
Handelsblatt VWL-Ranking 2015 - Beste Forschungsleistung

Die Handelsblatt-Studie orientiert sich an international gängigen Standards zur Evaluierung wirtschaftswissenschaftlicher Forschung. Betrachtet werden Publikationen in Fachzeitschrift Konjunkturforschungsstelle der ETH Zürich erstellt die Rangliste im Auftrag des Handelsblatts

Rang 2015	Rang 2013	Vorname	Nachname	Universität	Alter	Fach
1	3	Peter	Egger	Zürich ETH	45	Internationale Ökonomie
2	12	Holger	Strulik	Göttingen Uni	50	theoretische Makroökonomie
3	5	Hans	Gersbach	Zürich ETH	55	theoretische Makroökonomie; Politische Ökonomie
4	8	Patrick W.	Schmitz	Köln Uni	46	theoretische Mikroökonomie; angewandte Mikroökonomie
5	1	Roman	Inderst	Frankfurt / Main Uni	45	Industrieökonomie; Bankbetriebslehre & Finanzierung
6	2	Matthias	Sutter	Köln Uni	46	Experimentelle Wirtschaftsforschung
7	10	Ernst	Fehr	Zürich Uni	58	Experimentelle Wirtschaftsforschung
8	11	Ulrich	Müller	Princeton University	40	konometrie
9	4	Lutz	Kilian	University of Michigan	51	Oekonometrie; angewandte Makrooekonomie
10	36	Joachim	Wagner	Lüneburg Leuphana Uni	60	angewandte Mikroökonomie
11	49	Ansgar	Belke	Duisburg-Essen Uni	50	Internationale Ökonomie; Geldtheorie und -politik
12	32	Jan-Christoph	Rülke	EBS Uni	37	Internationale Ökonomie; Geldtheorie und -politik; Aussenwirtschaftstheorie und -politik
13		Martin	Huber	Fribourg Uni	35	Ökonometrie; angewandte Mikroökonomie
14	13	Armin	Falk	Bonn Uni	47	Experimentelle Wirtschaftsforschung
15	6	Marcel	Fratzscher	Berlin HU	44	Internationale Ökonomie; angewandte Makroökonomie
16	7	Axel	Dreher	Heidelberg Uni	42	Internationale Ökonomie
17	17	Niklas	Potrafke	München LMU	35	Politische Ökonomie
18	83	Yves	Breitmoser	Berlin HU	38	Verhaltensökonomie; theoretische Mikroökonomie
19	14	Johannes	Hörner	Yale University	42	theoretische Mikroökonomie; Spieltheorie
20	21	Thomas	Eichner	Hagen FernUni	45	Finanzwissenschaft
21	65	Mario	Larch	Bayreuth Uni	39	Ökonometrie; Internationale Ökonomie
22	18	Kai A.	Konrad	München LMU	54	Finanzwissenschaft
22	74	Björn	Bartling	Zürich Uni	41	Verhaltensökonomie; Experimentelle Wirtschaftsforschung; angewandte Mikroökonomie
24		Peter	Nunnenkamp	ifw Institut für Weltwirtschaft Kiel		-
25	33	Tim	Friehe	Marburg Uni	37	Rechtsökonomie; angewandte Mikroökonomie

Stand 3. September 2015

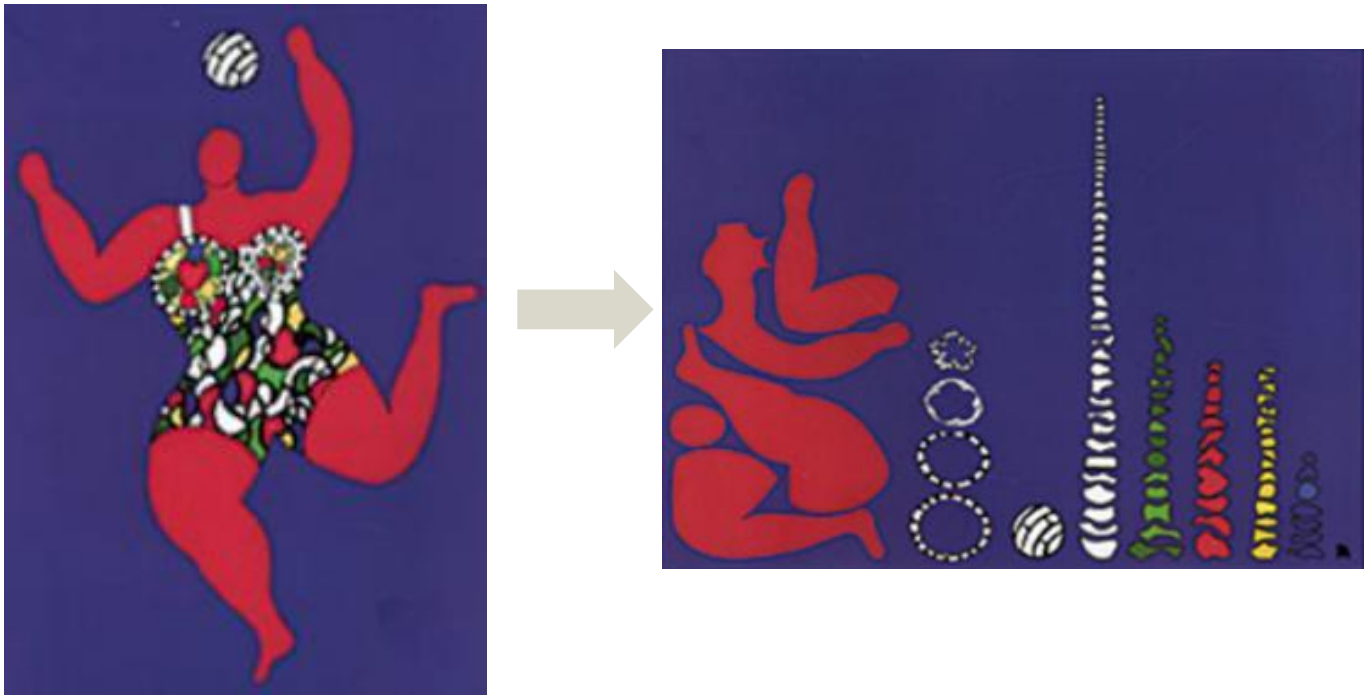
Who has benefited from the Excellence Initiative?



"These numbers show the real winners and losers of the increased cash flow in this past decade: the students and scientists lose out, while university administrations benefit the most from the billions."

Quelle: Brems & Brennicke (2015): http://bjoern.brembs.net/2015/01/booming-university-administrations/ Rohdaten liegen vor Destatis 2005-2012

New KPIs? How to evaluate originality?



U. Wehrli: „Kunst aufräumen“

1

Input control

“The primary means for controlling the quality of scholarly activities is through selecting its members“

2

Content discussion

Who has recognized something that is true that others have not yet recognized?
(Hint: Not those who celebrate "success" in the mainstream).

3

Digitization and social media

Openness
Access
Transparency
Multidimensionality
Democratization
Complementarity ("Alt-, & Compmetrics")

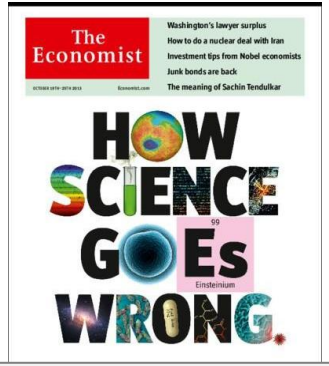
San Francisco Declaration on Research Assessment

The San Francisco Declaration on Research Assessment, which has been endorsed by many leading institutions, clearly states: "***Do not use journal-based metrics, such as Journal Impact Factors, as a surrogate measure of the quality of individual research articles, to assess an individual scientist's contributions, or in hiring, promotion, or funding decisions***."

The recently released "Statement by three national academies (Académie des Sciences, Leopoldina and Royal Society) on good practice in the evaluation of researchers and research programmes" also asserts that ***"[i]mpact factors of journals should not be considered in evaluating research outputs***"

Summary of the challenges of management science

1) Irrelevance of research
2) Focus on mainstream research and thus neglect of riskier projects
3) Low reliability and reproducibility of research results
4) Lack of transparency and access to data
5) Black box of the peer review system
6) Non-intended effects and manipulability
7) ...



„Scientific research has changed the world.
Now it needs to change itself.“

How to treat these diseases?

What journals can do

Publish:

- Registered reports
- Results-masked articles
- Replication studies
- Null results studies
- Exploratory studies
- Other types of articles (e.g. commentaries, critiques, adversarial collaborations)

What authors can do

- Theorize clearly
- Design realistic experiments
- Do high-quality qualitative research
- Do not ignore endogeneity
- Be transparent with data, methods, and reporting
- Declare conflicts of interest

Source: Antonakis, J. (2017). On doing better science: From thrill of discovery to policy implications. The Leadership Quarterly, 28(1), 5-21

Solutions for better science in general

- → Ten Principles of the Leiden Manifesto or DORA
- → Coincidence
- → Article Based Metrics
- → Post Publication Reviews (open)
- → Independent Thinking
- → Look for Impact
- → Replication studies
- → Open Science
- → Pre-Registration

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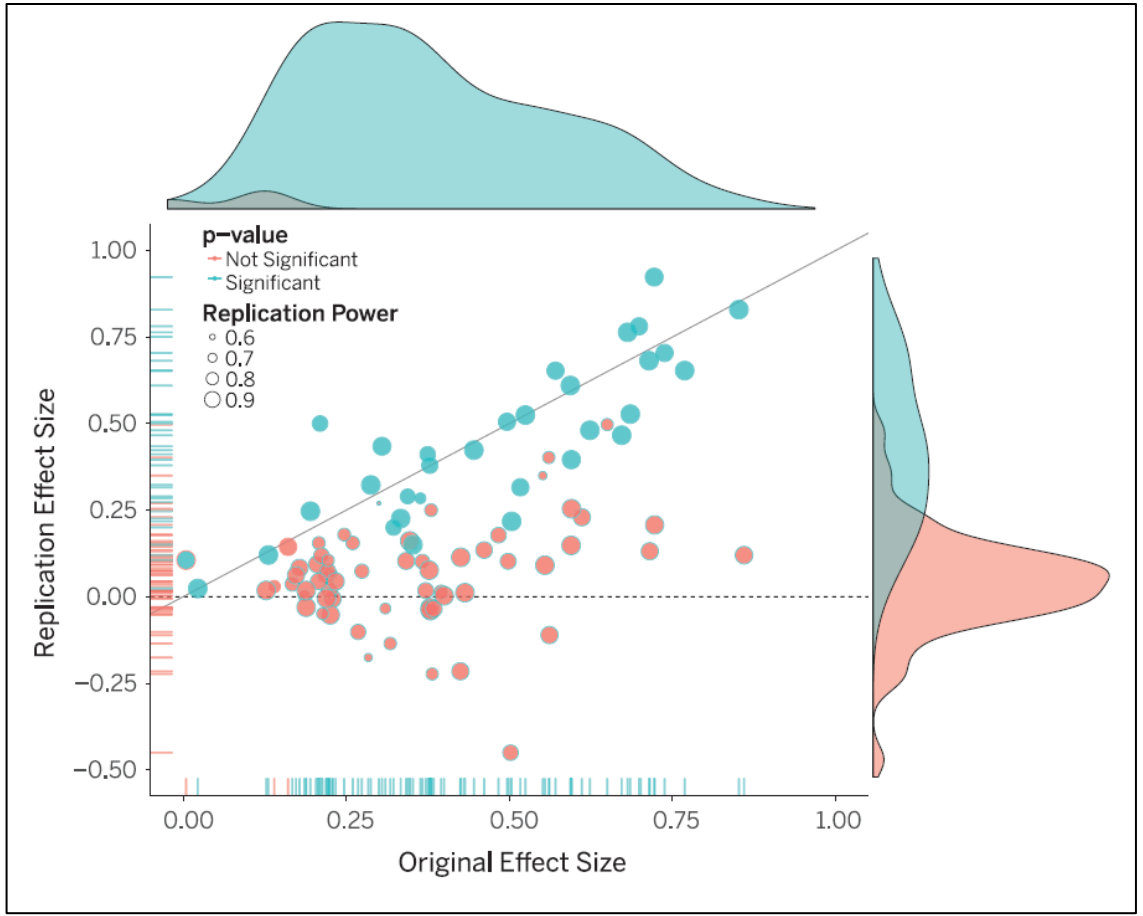
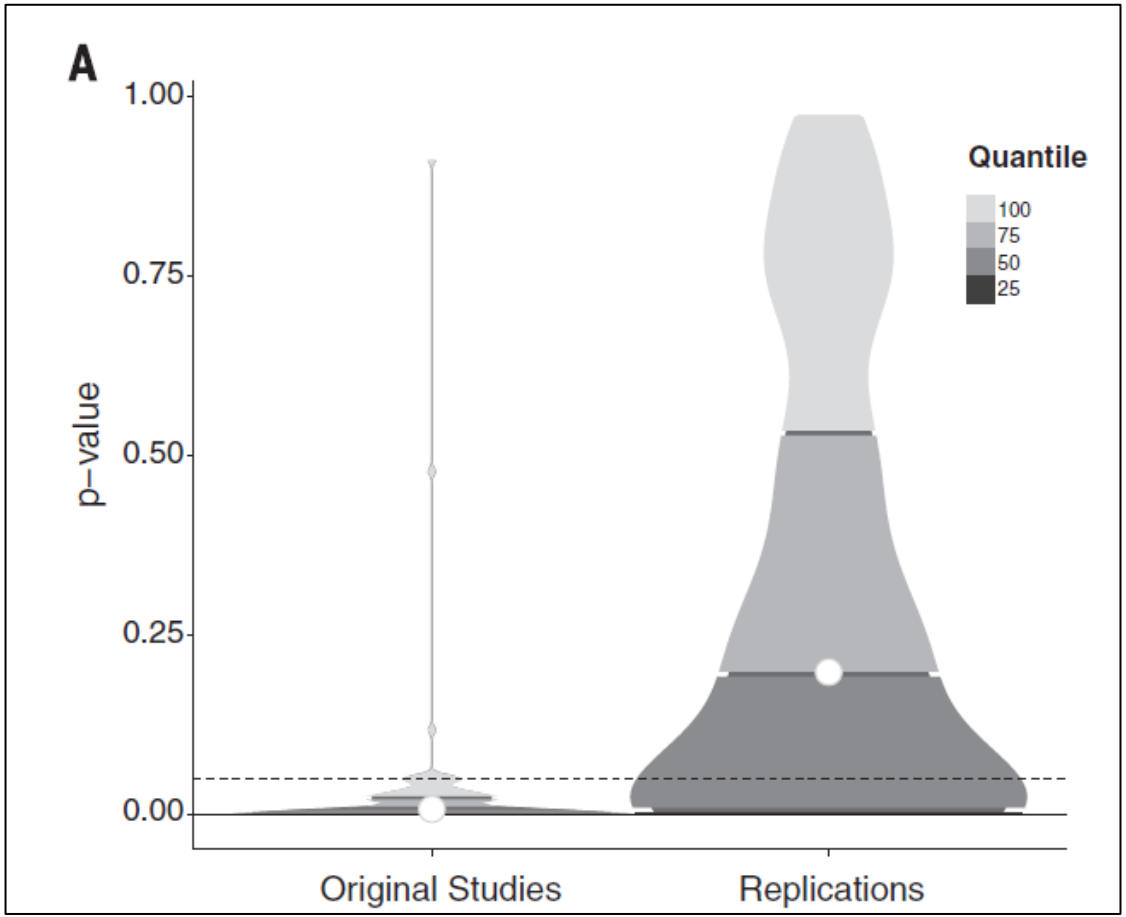
Reproducibility project in psychology (1/3)



Source: Open Science Collaboration (2015).

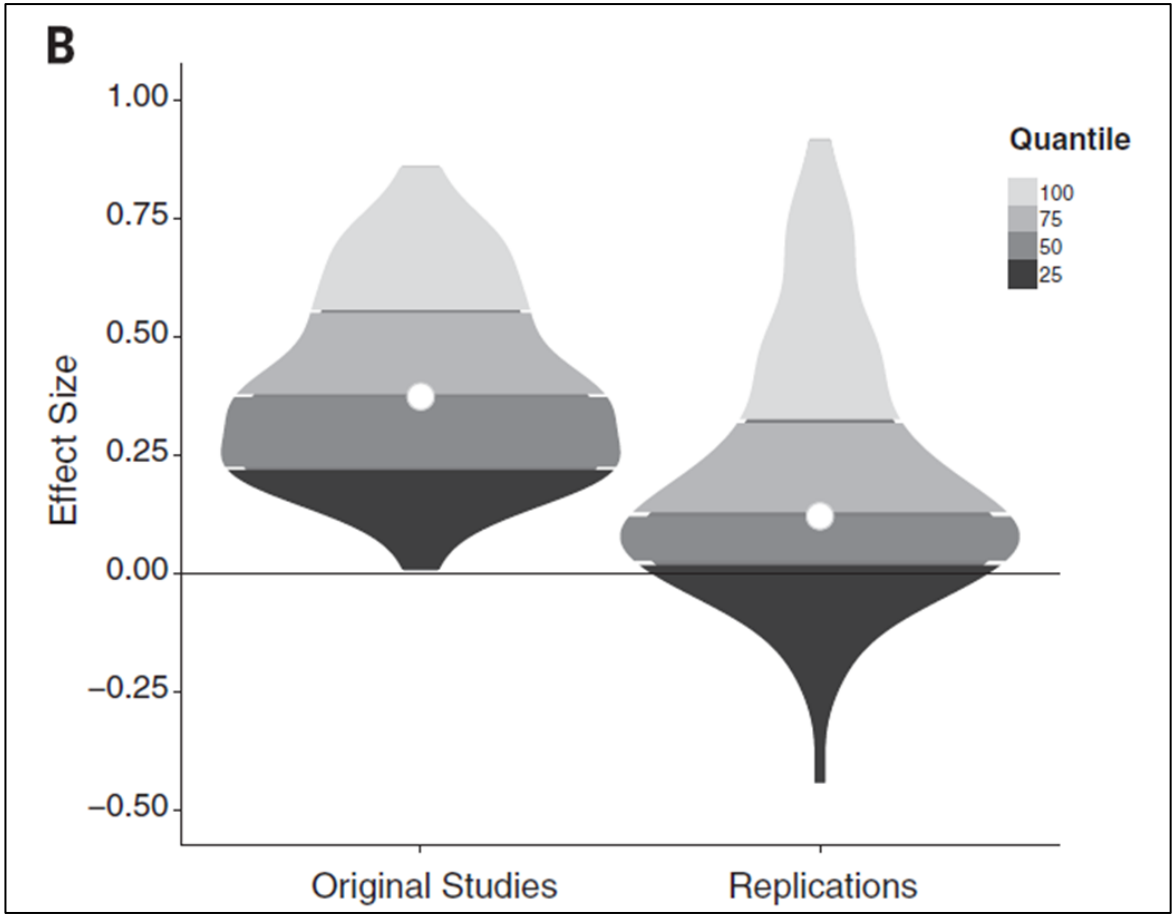
Reproducibility project in psychology (2/3)



Evidence for **p-hacking**?

Source: Open Science Collaboration (2015).

Reproducibility project in psychology (3/3)



Source: Open Science Collaboration (2015).

Classification of replications

Types of Replication

	Same Measurement and Analysis	Different Measurement and/or Analysis
Same Data Set	Checking of analysis	Reanalysis of data
Same Population	Exact replication	Conceptual extension
Different Population	Empirical generalization	Generalization and extension

Source: Tsang and Kwan (1999).

	Same Research Design	*Different Research Design*
Same Data and Sample	Checking for errors and/ or falsification of results	
Same Population (Same Context) with Different Sample	Reliability and representativeness of data	
Different Population (Different Context)		

Figure 2. Narrow replication

	Same Research Design	*Different Research Design*
Same Data and Sample		Robustness to different measures, methods, and models
Same Population (Same Context) with Different Sample		Robustness to different measures, methods, and models
Different Population (Different Context)	Generalize to new population (subjects, industry, time period, etc.)	Generalize to new population and assess robustness

Figure 3. Quasi-replication

Source: Bettis et al. (2016).

Replication versus robustness

Table 1. A Proposed Standard for Classifying Any Study as a Replication.

	Sampling distribution for parameter estimates	Sufficient conditions for discrepancy	Types	Methods in follow-up study versus methods *reported* in original: Same specification	Same population	Same sample	Examples
Replication	*Same*	*Random chance, error, or fraud*	Verification	**Yes**	**Yes**	**Yes**	*Fix faulty measurement, code, data set*
			Reproduction	**Yes**	**Yes**	*No*	*Remedy sampling error, low power*
Robustness	*Different*	*Sampling distribution has changed*	Reanalysis	*No*	**Yes**	**Yes**/*No*	*Alter specification, recode variables*
			Extension	**Yes**	*No*	*No*	*Alter place or time; drop outliers*

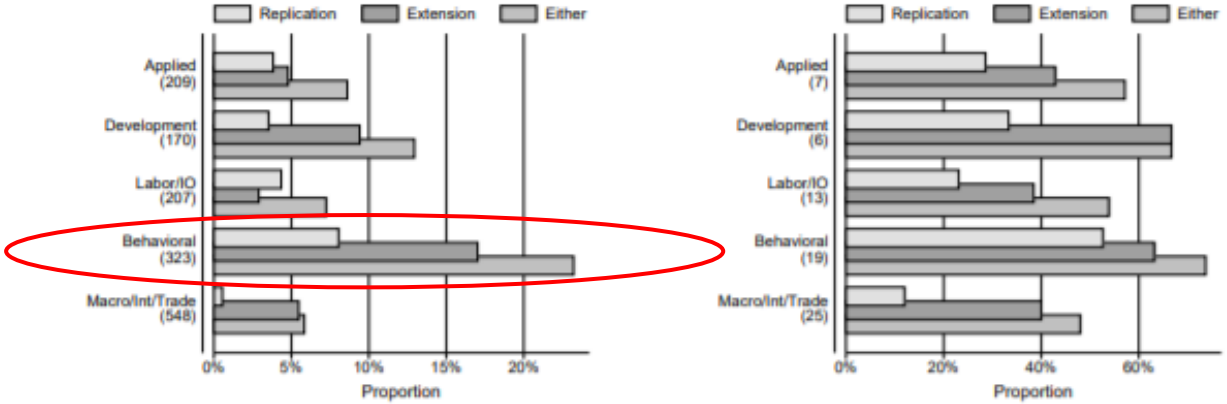
Notes: The "same" specification, population, or sample means the same as *reported* in the original paper, not necessarily what was contained in the code and data used by the original paper. Thus for example if code used in the original paper contains an error such that it does not run exactly the regressions that the original paper said it does, new code that fixes the error is nevertheless using the "same" specifications (as described in the paper).

Source: Clemens (2017).

Some evidence from the field of economics

Table 2—: Coding Rates

	Replications	Extension	Robustness	Any	*N*
Volume Sample	28.6% (20)	48.6% (34)	40.0% (28)	60.0% (42)	70
Citing Sample	3.4% (52)	7.8% (121)	4.7% (73)	11.0% (170)	1,546



(a) Citing Sample (b) Volume Sample

Figure 1. : Replications/Extensions by Field

Source: Berry et al. (2017).

Contents lists available at ScienceDirect

Research Policy

journal homepage: www.elsevier.com/locate/respol

Replication studies in economics—How many and which papers are chosen for replication, and why?☆

Frank Mueller-Langer[a,b,*], Benedikt Fecher[c,d], Dietmar Harhoff[b], Gert G. Wagner[c,d,e]

ABSTRACT

We investigate how often replication studies are published in empirical economics and what types of journal articles are replicated. We find that between 1974 and 2014 0.1% of publications in the top 50 economics journals were replication studies. We consider the results of published formal replication studies (whether they are negating or reinforcing) and their extent: Narrow replication studies are typically devoted to mere replication of prior work, while scientific replication studies provide a broader analysis. We find evidence that higher-impact articles and articles by authors from leading institutions are more likely to be replicated, whereas the replication probability is lower for articles that appeared in top 5 economics journals. Our analysis also suggests that mandatory data disclosure policies may have a positive effect on the incidence of replication.

The study sample

Table 1
Descriptive statistics.

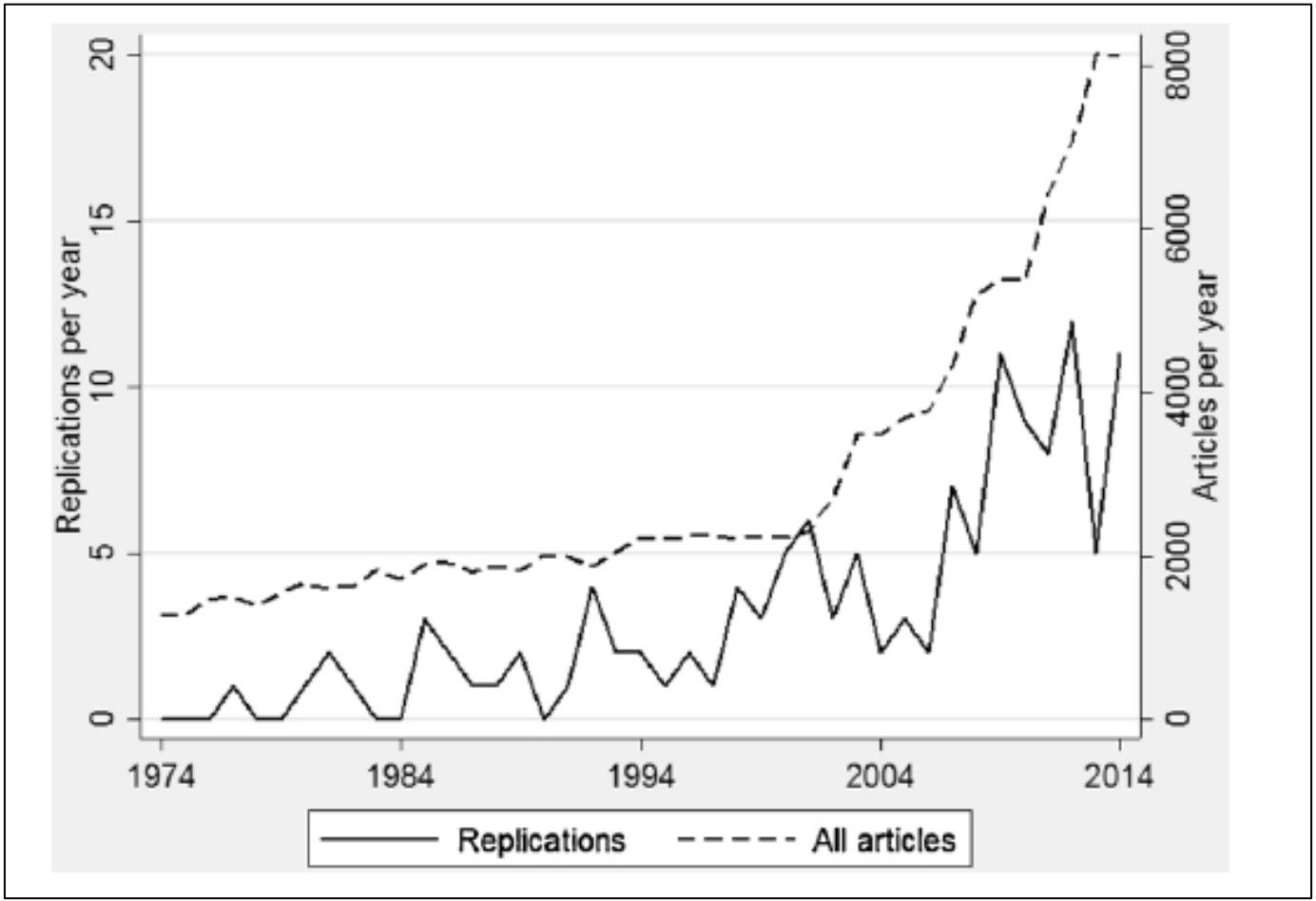
	mean	sd	min	max	N
Dependent variable					
Replicated article	0.105		0	1	1243
Negated replicated article	0.049		0	1	1243
(Partially) reinforced replicated article	0.056		0	1	1243
Main variables of interest					
Total citations before publication of replication	20.89	64.18	0	1508	1243
Lag between publication of replicated article and replication	4.851	3.601	0	23	1243
Journal impact factor	3.516	1.153	2.137	6.033	1243
Top five economics journal	0.512		0	1	1243
Top 50 university	0.606		0	1	1243
Mandatory data disclosure policy	0.230		0	1	1243
Data or program code available	0.169		0	1	1243
Control variables					
Self-created data	0.124		0	1	1243
Confidential or proprietary data	0.012		0	1	1243
Article published in conference proceedings	0.118		0	1	1243
Number of references	29.28	17.83	0	130	1243
Number of pages	19.51	10.94	1	65	1243
Number of authors	2.057	1.097	1	16	1243
h-index of best author	17.42	12.90	0	106	1225
Third-party funding	0.185		0	1	1243
Funder's support for data availability	0.598	1.366	0	5	1243

10.5 % of the study sample is a replication.

About half of the replications negated the result of the replicated article.

Source: Mueller-Langer et al. (2021).

Amount and share of replications over time



Source: Mueller-Langer et al. (2021).

Replicated versus nonreplicated articles

Table 2
Extended descriptive statistics.

	Replicated articles		Nonreplicated articles	
	CitesPreReplication mean	*LagReplication* mean	*CitesPreReplication* Mean	*LagReplication* mean
Main variables of interest				
Top5Journal = 1	100.57	6.71	24.51	6.10
Top5Journal = 0	25.23	3.64	7.40	3.45
Top50University = 1	73.07	5.04	19.67	5.07
Top50University = 0	26.69	5.17	11.32	4.47
MandatoryDisclosure = 1	35.22	3.89	12.06	4.04
MandatoryDisclosure = 0	64.66	5.26	17.58	5.07
DataOrCode = 1	29.00	4.26	20.15	3.87
DataOrCode = 0	65.99	5.22	15.45	5.02

The replicated articles have far more prereplication citations than similar articles in the same issue of the journal!

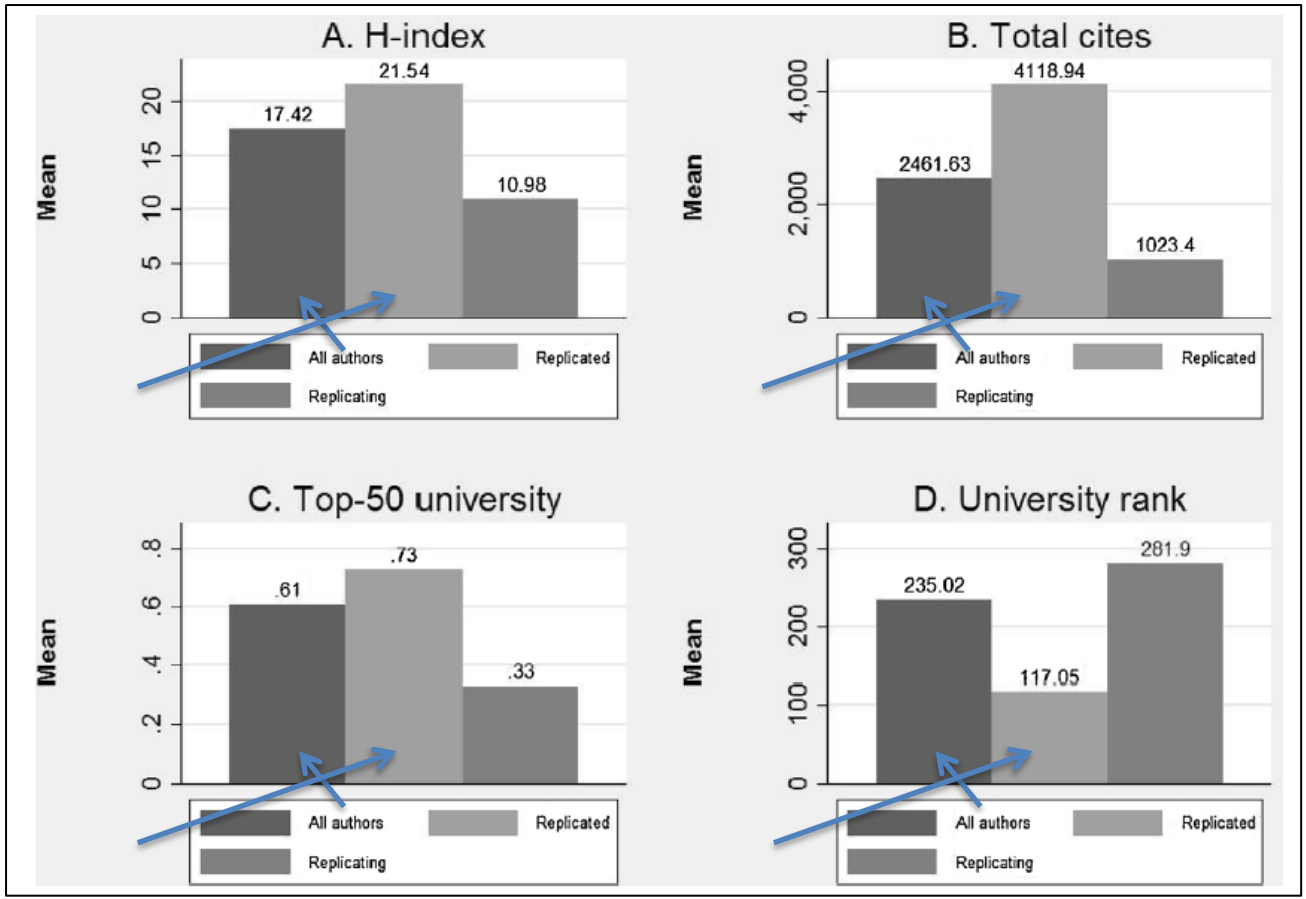
Source: Mueller-Langer et al. (2021).

Determinants of being replicated

Issues/Sample:	[1] All	[2] All	[3] All	[4] All	[5] All	[6] All	[7] With sci. repl. art.	[8] With neg. repl. art.	[9] With reinf. repl. art.
Dependent variable:	Repl. article	Repl. article	Repl. article	Repl. article	Repl. article	Repl. article	Scient. repl. art.	Negated repl. art.	Reinf. repl art.
Log total citations before publication of replication		0.055***	0.056***	0.053***	0.053***	0.053***	0.053***	0.067***	0.040***
		(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.010)	(0.007)
Log lag between publication of replicated article and replication		−0.106***	−0.106***	−0.100***	−0.101***	−0.101***	−0.105***	−0.142***	−0.073***
		(0.014)	(0.014)	(0.014)	(0.014)	(0.015)	(0.013)	(0.022)	(0.016)
Top 5 economics journal = 1			−0.096***	−0.092***	−0.081**	−0.090***	−0.072***	−0.037	−0.062**
			(0.024)	(0.025)	(0.030)	(0.025)	(0.018)	(0.043)	(0.021)
Log impact factor			−0.040	−0.036	−0.042	−0.038	−0.072**	−0.008	−0.071
			(0.022)	(0.023)	(0.027)	(0.026)	(0.025)	(0.040)	(0.037)
Top 50 university = 1				0.038	0.038	0.038	0.044*	0.019	0.045*
				(0.020)	(0.020)	(0.020)	(0.019)	(0.027)	(0.021)
Mandatory data-disclosure policy = 1					−0.011				
					(0.016)				
Data or program code available = 1						−0.002	−0.016	−0.014	0.003
						(0.012)	(0.017)	(0.025)	(0.008)
Observations	1225	1225	1225	1225	1225	1225	973	563	714
Pseudo R-squared	0.0723	0.111	0.113	0.120	0.120	0.120	0.139	0.129	0.145
Log Pseudo Likelihood	−384.5	−368.4	−367.4	−364.9	−364.8	−364.9	−290.1	−168.2	−193.8
Journal Dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES

Source: Mueller-Langer et al. (2021).

Who replicates vs. who gets replicated



Source: Mueller-Langer et al. (2021).

Creating Repeatable Cumulative Knowledge in Strategic Management: A Call For a Broad and Deep Conversation among Authors, Referees, and Editors

Richard A. Bettis, Sendil Ethiraj, Alfonso Gambardella, Constance Helfat, and Will Mitchell

2016
Strategic Management Journal

Repeatability problems of statistical studies

- “A third of the most-cited clinical research seems to have replication problems, and this seems to be as large, if not larger than the vast majority of less-cited clinical research” (Ioannidis 2005: 224).
- “Much of the scientific literature, perhaps half may simply be untrue” (Horton, 2015) Editor-in-Chief of the top medical journal *The Lancet.*
- Most relevant study reported on 100 replications from three important psychology journals in 2008: 97 percent of the original studies had statistically significant results, while only 36 percent of the replications did (Open Science Collaboration, 2015).
- Problem: only evidence from a study with a significant coefficient is publishable in top journals, also if other studies using a different sample of similar data find that the appropriate model coefficient is not statistically significant.

Horton R. 2015. Offline: what is medicine’s 5 sigma. **385**. Available at: http://www.thelancet.com.
Ioannidis PAJ. 2005. Contradicted and initially stronger effects in highly cited clinical research. *Journal of the American Medical Association* **294**(4): 218–228.
Open Science Collaboration. 2015. Estimating the reproducibility of psychological science. *Science* **349**: 943.

Does a significant *p*-value have value?

- P-values arising from Null Hypothesis Significance Tests provide no information “regarding the reliability of the research” (Branch, 2014: 257).
- It is incorrect to interpret p as the probability that the null hypothesis is false. Instead, p is the probability that the sample value would be at least as large as the value actually observed if the null hypothesis is true (Wonnacott and Wonnacott, 1990: 294).
- The true definition of p-value permits a conclusion only about the probability of finding a result in a particular sample.
- “Searching for asterisks” (Bettis, 2012) is inconsistent with Popper’s falsifiability criterion.

Bettis RA. 2012. The search for asterisks: compromised statistical tests and flawed theory. *Strategic Management Journal* **33**(1): 108–113.
Branch M. 2014. Malignant side-effects of null-hypothesis testing. *Theory and Psychology* **24**(2): 256–277.
Wonnacott TH, Wonnacott RJ. 1990. *Introductory Statistics for Business and Economics*. Wiley & Sons: New York, NY.

Does p-size matter?

- The size of p-values (0.05, 0.01, 0.001) is often taken as a measure of the “strength” of the result, where smaller p-values are considered stronger evidence.
- A rigid p-value breakpoint between truth and irrelevancy is inconsistent with good science.
- The strength of a result in terms of economic, behavioral, or practical importance, as indicated by the size of the estimated coefficient, is sometimes ignored if the coefficient is significant.

Replication is the measure of repeatability

- Publishing only statistically significant results, while not publishing replications or non-results is inconsistent with the establishment of repeatable cumulative knowledge
- One significant coefficient in one study proves little or nothing.
- A single replication without statistical significance on the coefficient of interest does not disprove anything. Instead, it adds disconfirming evidence.
- Because the nature of statistical testing is probabilistic, we can only make statements about the balance of evidence.

What to do:
New policies at *strategic management journal*

- *SMJ* will publish and welcomes submissions of replication studies

- *SMJ* will publish and welcomes submissions of studies with non-results. These types of studies demonstrate a lack of statistical support in a particular sample for specific hypotheses or research propositions

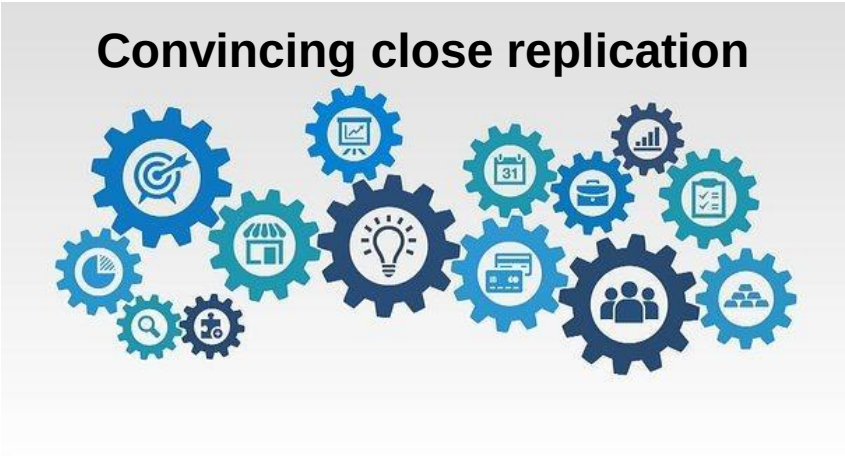
- *SMJ* will no longer accept papers for publication that report or refer to cut-off levels of statistical significance (*p*-values). In statistical studies, authors should report either standard errors or exact *p*-values (without asterisks) or both and should interpret these values appropriately in the text.

- *SMJ* will require in papers accepted for publication that authors explicitly discuss and interpret effect sizes of relevant estimated coefficients.

The Replication Recipe: What makes for a convincing replication?

Brandt, M. J., et al.
2014
Journal of Experimental Social Psychology

Replicate to build a cumulative knowledge base



- Test assumed underlying theoretical process
- Test the robustness of an effect
- Assess average effect size of an effect
- Refinement of old, psychological theories

Brandt, M. J., IJzerman, H., Dijksterhuis, A., Farach, F. J., Geller, J., Giner-Sorolla, R., ... & Van't Veer, A. (2014). The replication recipe: What makes for a convincing replication?. *Journal of Experimental Social Psychology*, *50*, 217-224.

The Replication Recipe

-

Standard criteria for a convincing close replication

Brandt, M. J., IJzerman, H., Dijksterhuis, A., Farach, F. J., Geller, J., Giner-Sorolla, R., ... & Van't Veer, A. (2014). The replication recipe: What makes for a convincing replication?. *Journal of Experimental Social Psychology*, *50*, 217-224.

Ingredient #1: Carefully defining the effects and methods that the researcher intends to replicate

How does the precise <u>effect</u> you intend to replicate look like?

- → Verbal description of the effect
- → Effect size, size's confidence intervals

Is it <u>important</u> and <u>necessary</u> to replicate this particular effect?

- → Theoretical importance to a particular field or direct or indirect value to society
- → Existing confidence in the reliability of the effect

What <u>methods</u> were used to detect the effect in the original study?

- → Sample size & sampling procedure
- → Demographics of the participants
- → Study design

Brandt, M. J., IJzerman, H., Dijksterhuis, A., Farach, F. J., Geller, J., Giner-Sorolla, R., ... & Van't Veer, A. (2014). The replication recipe: What makes for a convincing replication?. *Journal of Experimental Social Psychology*, *50*, 217-224.

Ingredient #2: Following exactly the methods of the original study

Designing the replication study

- Use of original study materials (contact the authors)

OR

- Recreate the necessary methods (ask experts to provide feedback & conduct pilot studies)

Documentation

- Identify & justify differences
- Categorize which parts of the study are

… exactly the same as,

… close to

… conceptually different to

the original study

Brandt, M. J., IJzerman, H., Dijksterhuis, A., Farach, F. J., Geller, J., Giner-Sorolla, R., ... & Van't Veer, A. (2014). The replication recipe: What makes for a convincing replication?. *Journal of Experimental Social Psychology*, *50*, 217-224.

Ingredient #3: Having high statistical power

Why is a high statistical power important?

- Allowing a strong chance to confirm the effect size from the original study as significant
- Avoiding incorrect conclusions that original effects are false positives

How to derive a sufficient sample size?

- Power calculations
  (Aberson, 2010; Cohen, 1992; Faul, Erdfelder, Lang, & Buchner, 2007; Maxwell, Kelley, & Rausch, 2008; Scherbaum & Ferreter, 2009; Shieh, 2009; Zhang & Wang, 2009)
- Take 2.5 times the original sample size
  (Simonsohn, 2013)

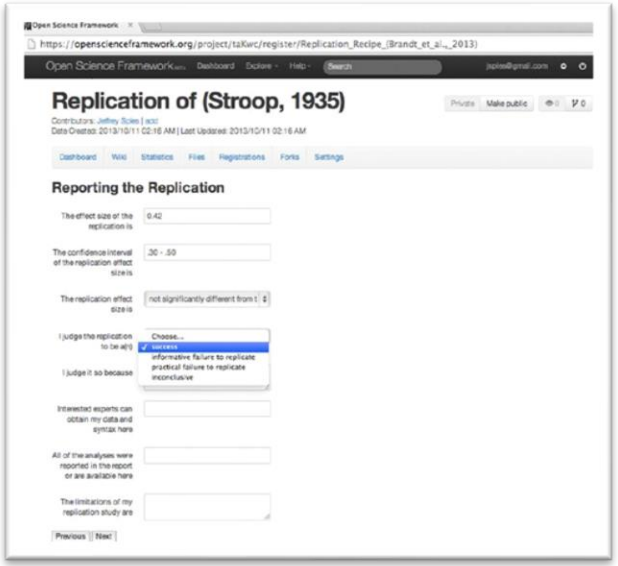
Brandt, M. J., IJzerman, H., Dijksterhuis, A., Farach, F. J., Geller, J., Giner-Sorolla, R., ... & Van't Veer, A. (2014). The replication recipe: What makes for a convincing replication?. *Journal of Experimental Social Psychology*, *50*, 217-224.

Ingredient #4: Making complete details about the replication available

As much openness as ethically possible

- Pre-registration of replication attempts
- Openness in methods, sample, and procedure
- Make data, syntax, analyses and all results available
- Accessible to readers, editors and reviewers

Reporting a replication on the Open Science Framework



Brandt, M. J., IJzerman, H., Dijksterhuis, A., Farach, F. J., Geller, J., Giner-Sorolla, R., ... & Van't Veer, A. (2014). The replication recipe: What makes for a convincing replication?. *Journal of Experimental Social Psychology*, *50*, 217-224.

Ingredient #5: Evaluating replication results and comparing them critically to the results of the original study

Evaluation & Comparison

1) Test the size, direction and confidence interval of the effect (replication effect is significantly different from the null).
2) Test whether it is significantly different from the original effect.
3) Meta-analytic aggregation of the replication study's effect with the original and other close replications.

Brandt, M. J., IJzerman, H., Dijksterhuis, A., Farach, F. J., Geller, J., Giner-Sorolla, R., ... & Van't Veer, A. (2014). The replication recipe: What makes for a convincing replication?. *Journal of Experimental Social Psychology*, *50*, 217-224.

Solutions for better science in general

- → Ten Principles of the Leiden Manifesto or DORA
- → Coincidence
- → Article Based Metrics
- → Post Publication Reviews (open)
- → Independent Thinking
- → Look for Impact
- → Replication studies
- **→Open Science**
- → Pre-Registration

What is Open Science?

https://quizizz.com/admin/quiz/58341dff6677f8dc4963caa9/w-fragen

Good Research Practice

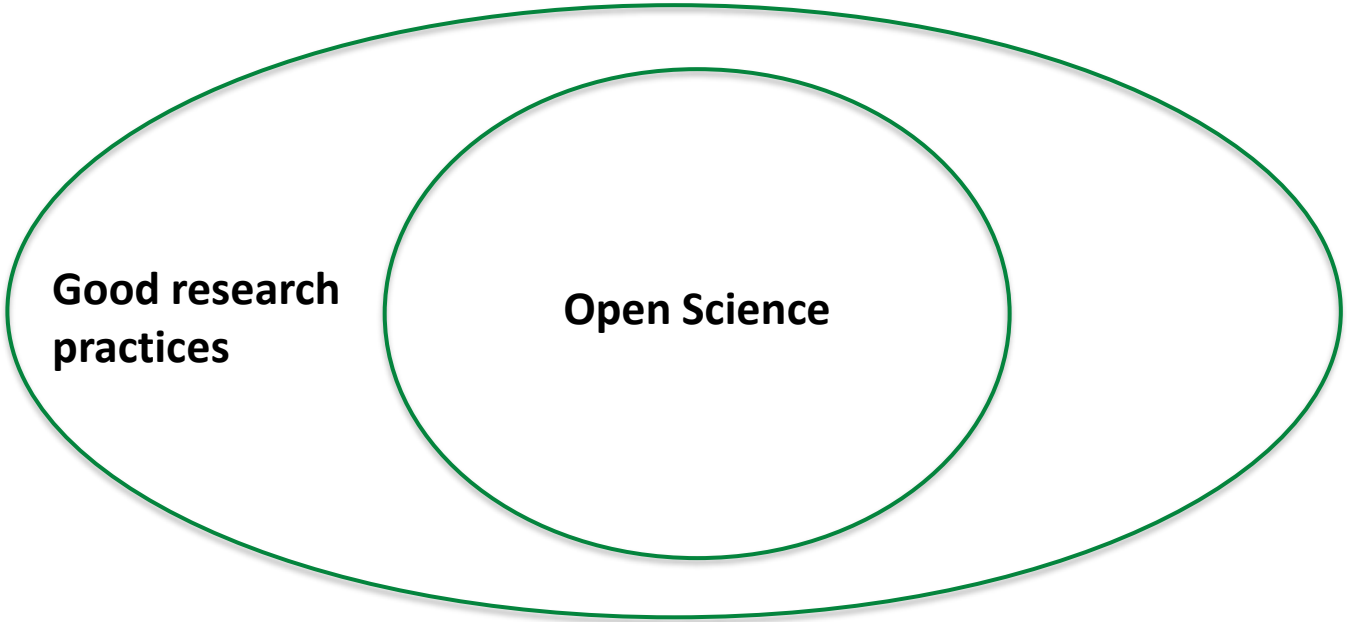
Good researchers

- Strive for excellence and take responsibility
- Respect the law, research ethics, and professional standards
- **Support a culture of transparency, openness, and honesty towards other researchers and the public**
- **Maximize public benefit and avoid resource waste**
- Continue learning and mentor others

Open Science

https://osf.io/2wvmd/, LMU Open Science Centre (2018) Open Science Intro in Open Science Workshop Materials. Retrievable via: https://osf.io/2wvmd/

Open Science ϵ Good Science



https://osf.io/2wvmd/; LMU Open Science Centre (2018) Open Science Intro in Open Science Workshop Materials. Retrievable via: https://osf.io/2wvmd/

Basic principles of Open Science

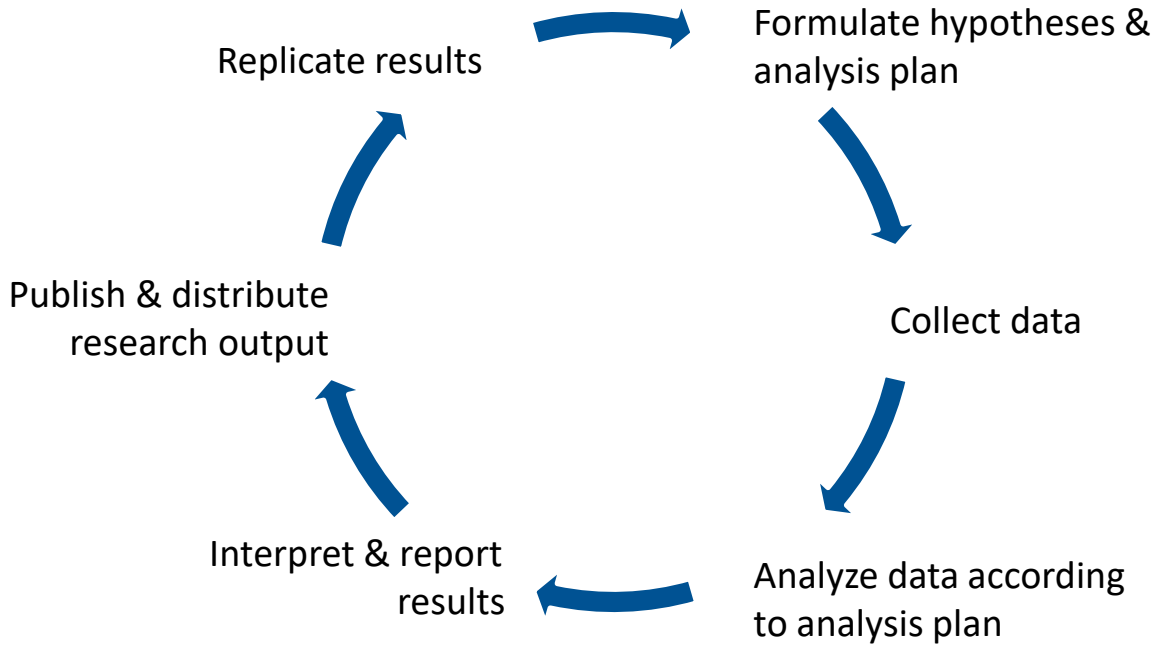
“free to use, re-use and re-distribute for all”

- Transparency
- Reproducibility
- Reusability
- Open Communication

“Open science is the idea that scientific knowledge of all kinds should be openly shared as early as is practical in the discovery process.” Michael Nielsen

https://ag-openscience.de/open-science/; http://opendefinition.org, https://figshare.com/articles/Sharing_is_Caring_Open_Science_Icon/97595

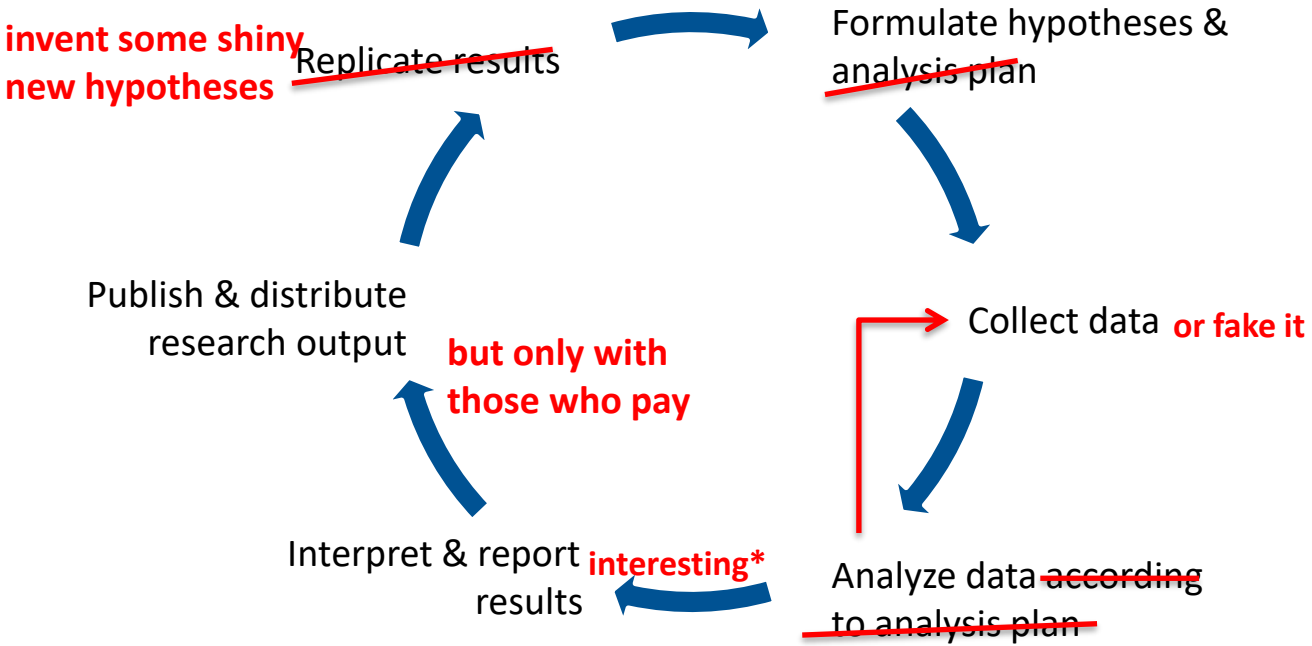
The confirmatory research cycle



LMU Open Science Centre (2018) Open Science Intro in Open Science Workshop Materials. Retrievable via: https://osf.io/2wvmd/, Wagenmakers, E. J., Wetzels, R., Borsboom, D., van der Maas, H. L., & Kievit, R. A. (2012). An agenda for purely confirmatory research. Perspectives on Psychological Science, 7(6), 632-638.

The confirmatory research cycle

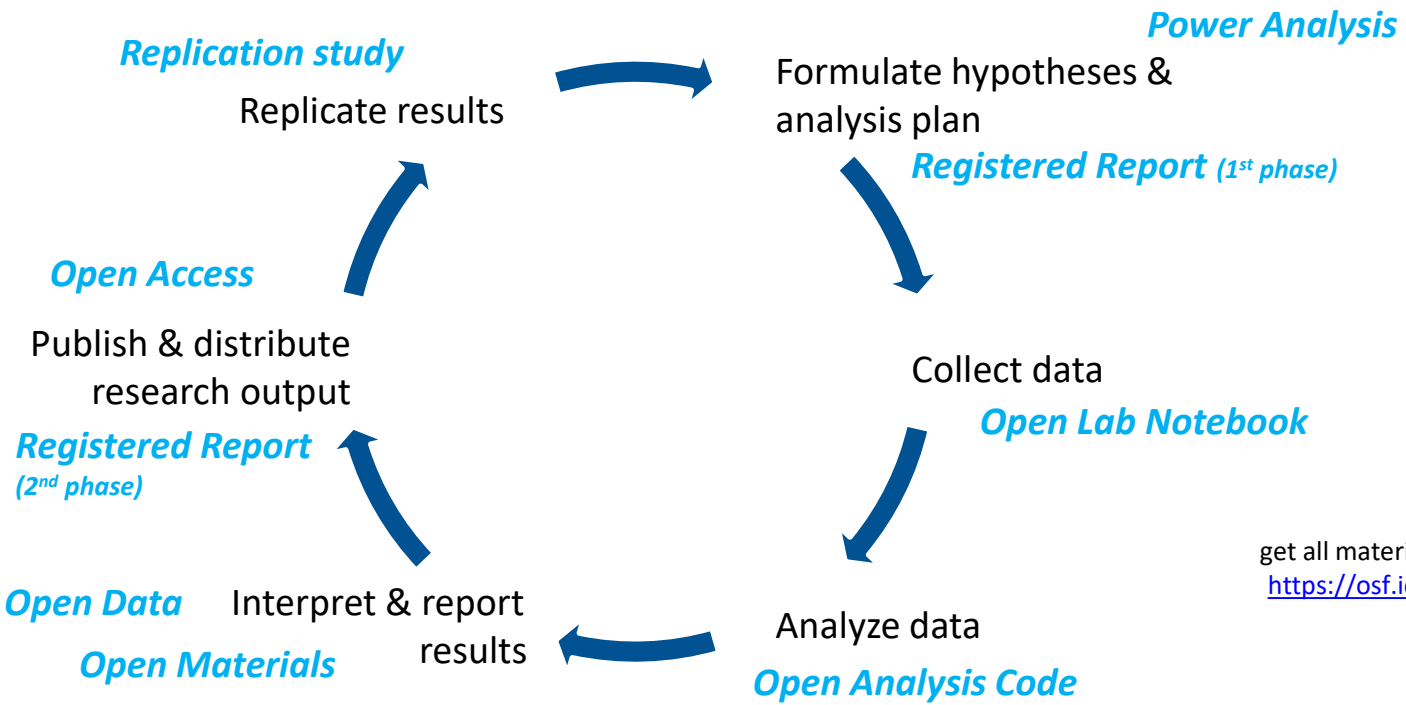
How can you know that it does not look like this?



*** p < .05; that fit a theory; that are surprising / publishable…**

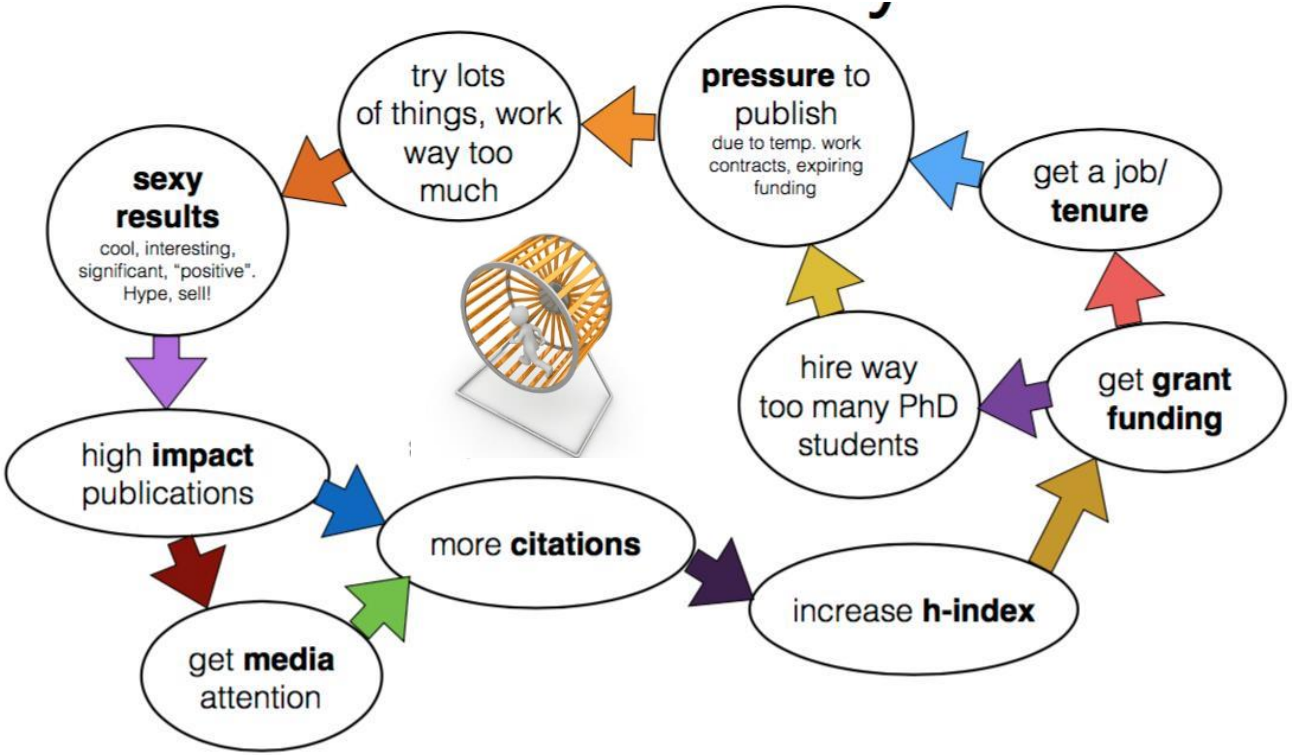
LMU Open Science Centre (2018) Open Science Intro in Open Science Workshop Materials. Retrievable via: https://osf.io/2wvmd/, Wagenmakers, E. J., Wetzels, R., Borsboom, D., van der Maas, H. L., & Kievit, R. A. (2012). An agenda for purely confirmatory research. Perspectives on Psychological Science, 7(6), 632-638.

Open Science in the research proce

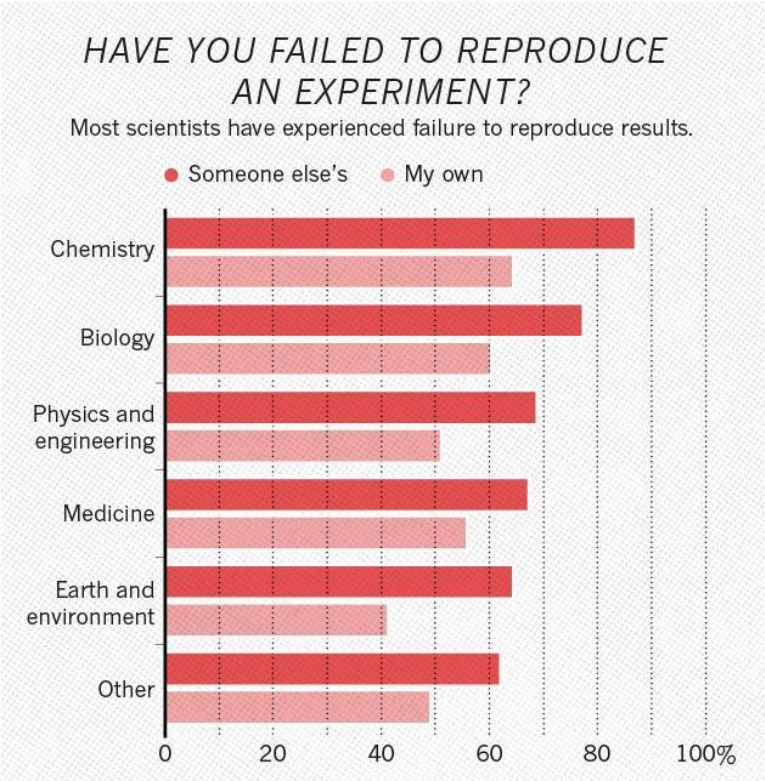


get all material here:
https://osf.io/zjrhu/

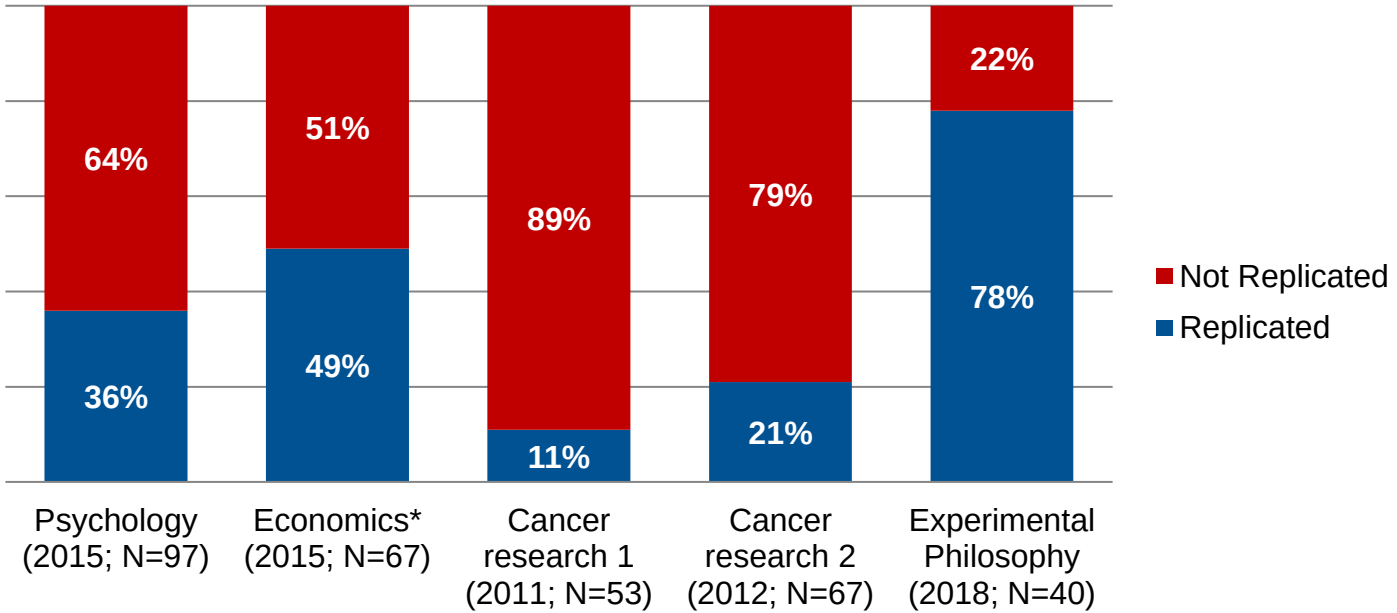
The science hamster wheel



Is there a Replication Crisis?

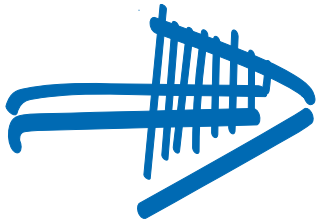


Is there a Replication Crisis?



* The data on economics is about *reproducibility*; i.e. the attempt to get the same results if you apply the original data analysis on the original data set.

Current problems in science overall



- Scientific progress is slowed down
- Published results cannot be trusted
- Resources are wasted

What can you do?

Publication bias

QRPs / p-hacking

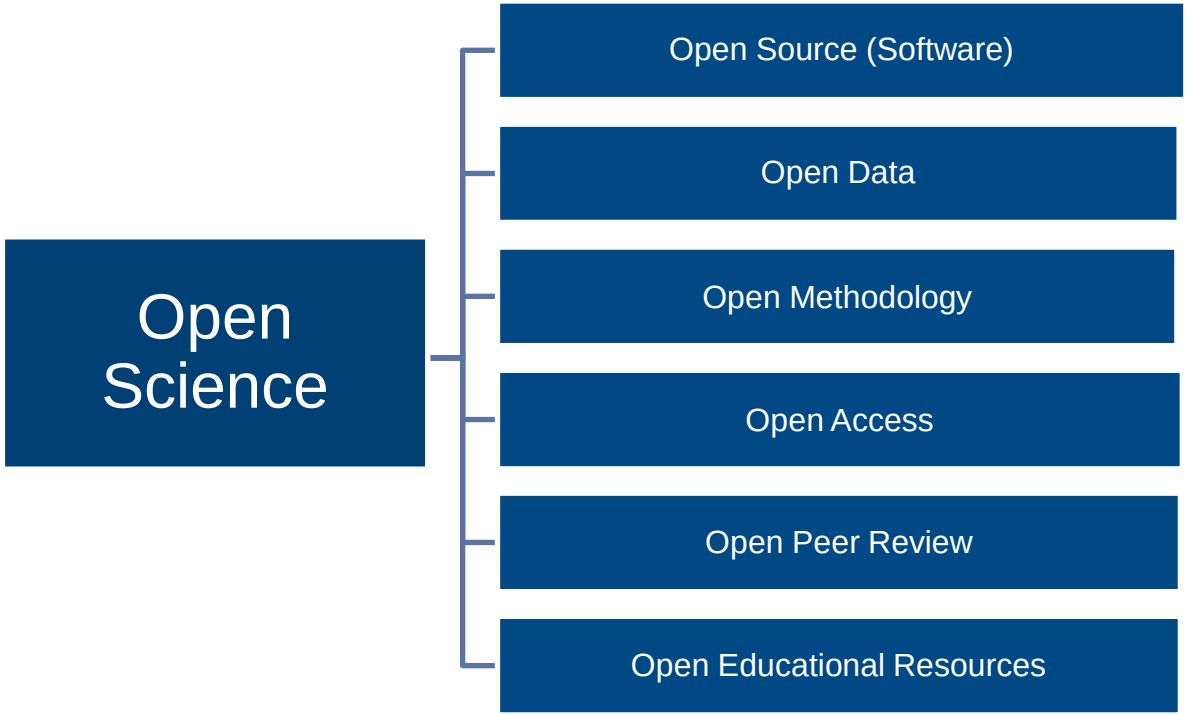
- Scientific progress is slowed down
- Published results cannot be trusted
- Resources are wasted

(1) Identify Questionable Research Practices

(2) Practice Open Science: Make your own research trustworthy

(3) Help to change incentive structures

Overview: Open Science

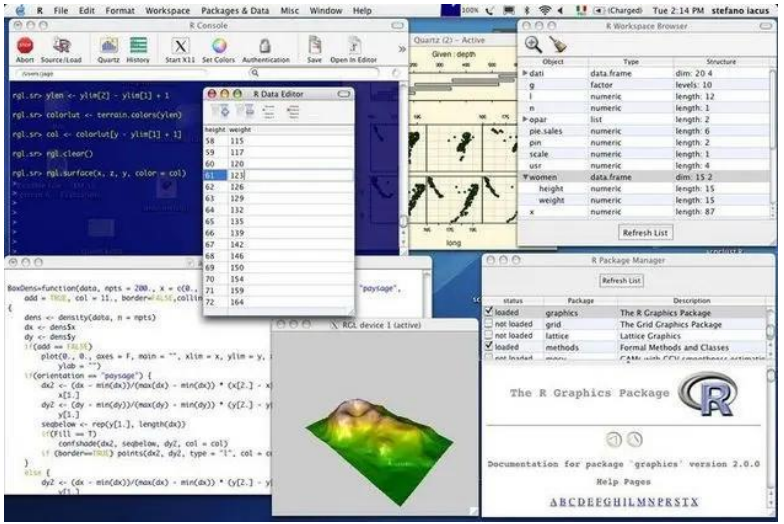


Neuschaefer (2020). Handbuch Open Science. Retrievable via Wikibooks: https://de.wikibooks.org/wiki/Handbuch_Open_Science

Open Source

= decentralized software development model that encourages open collaboration

- **Example**: The R Project for Statistical Computing

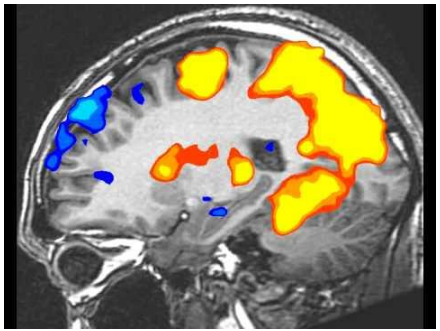


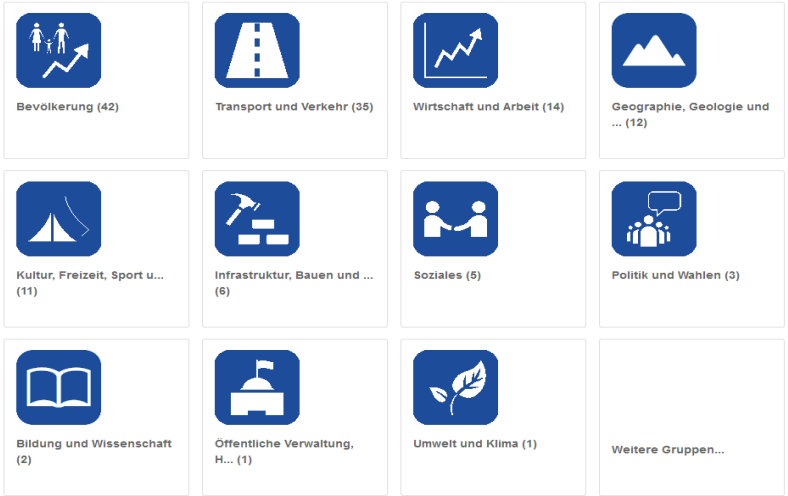
https://www.r-project.org/

Open Data

= data is freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control

- **Examples** from other fields:
  - fMRI Data Center
  - Open-Data-Portal München



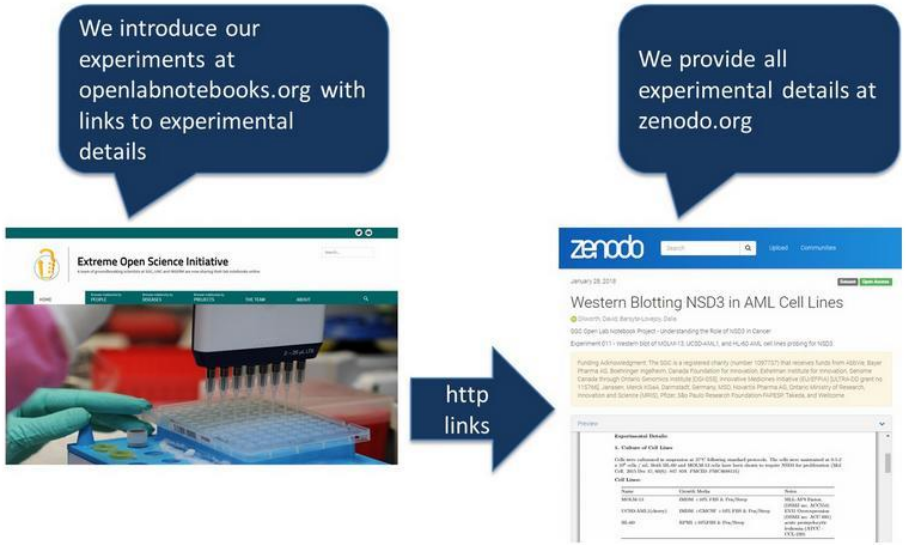


http://www.fmridc.org/f/fmridc;https://www.opengov-muenchen.de/dataset

Open Methodology

= using methods and documenting the entire process in a practicable and relevant manner

- Example:
https://openlabnotebooks.org/

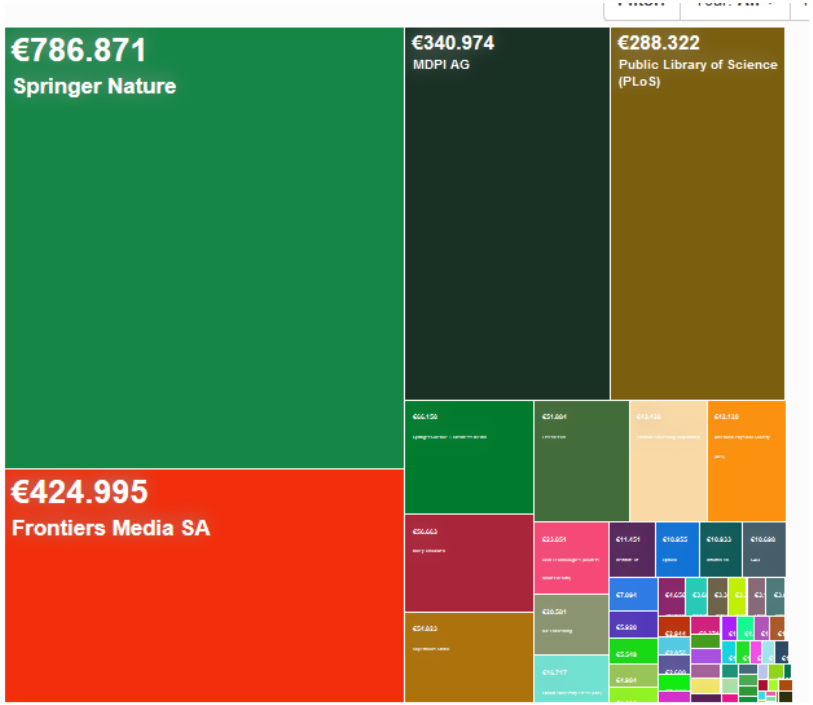


Open Access

= research outputs are distributed online, free of cost or other access barriers

- **Example**:
  - The **TUM Open Access Publishing Fund** covers article processing charges (APC) for papers published by TUM members in open access journals when certain eligibility conditions are fulfilled.

  - Have a look a the **TUM Open Access Policy**: https://www.ub.tum.de/en/open-access-policy



https://www.ub.tum.de/publikationsfonds

Open Access

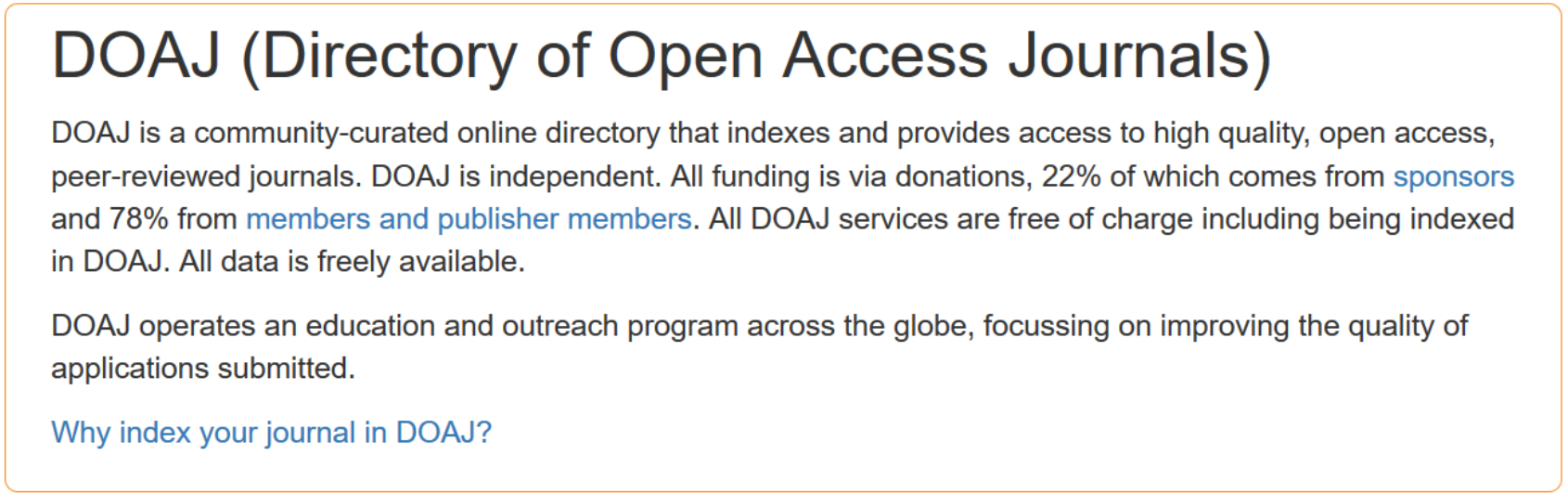
= research outputs are distributed online, free of cost or other access barriers

https://www.youtube.com/watch?v=L5rVH1KGBCY

Open Access

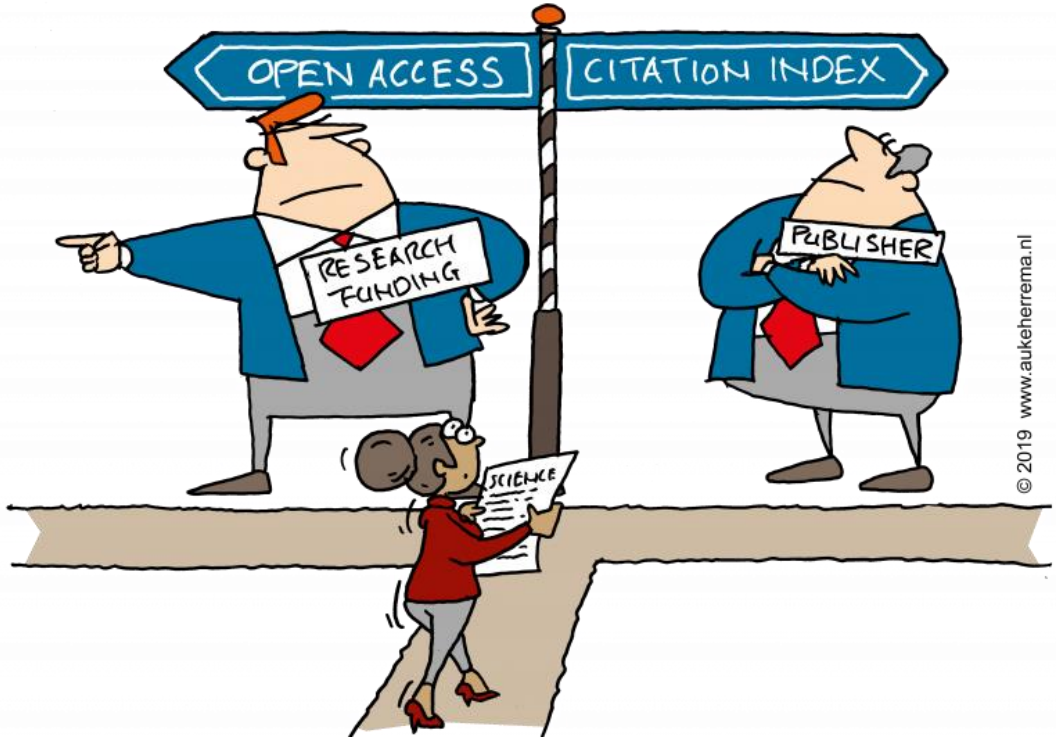
= research outputs are distributed online, free of cost or other access barriers

- **Example**: https://doaj.org/



https://doaj.org/

A conflict of interests…



https://www.delta.tudelft.nl/article/doctoral-candidates-obstructed-open-access

Open Peer-review

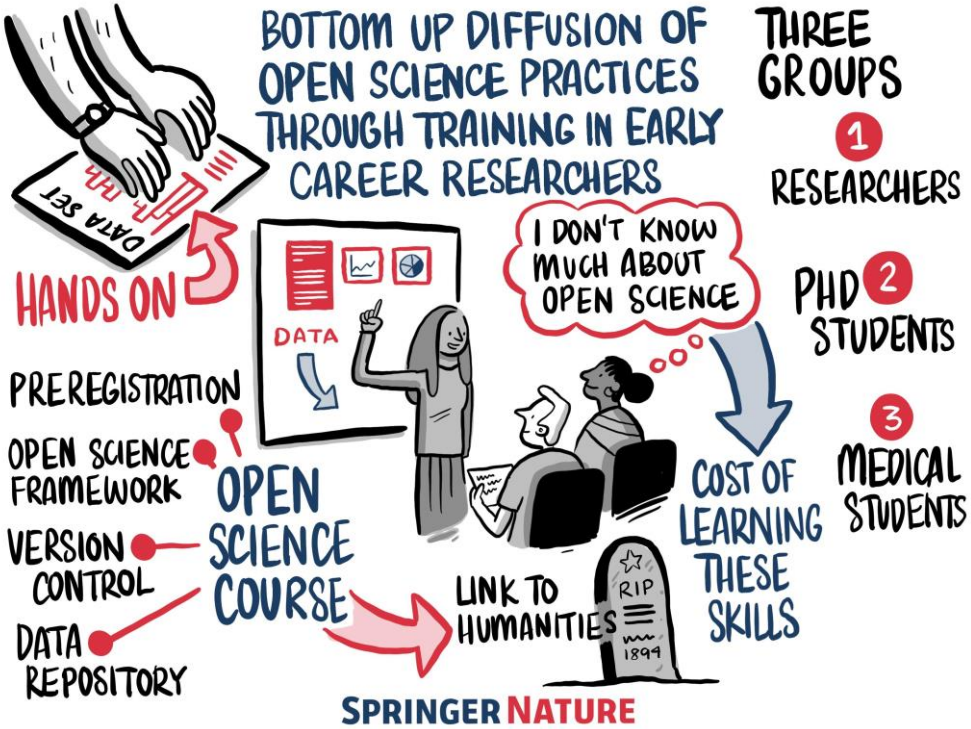
= modifications of the traditional scholarly peer review process, including

- **Open identities**
- **Open reports**
- **Open participation**

→ **Example**:
Public post-publication peer review

https://www.youtube.com/watch?v=5d6jzIT0Fzk

How can we make Open Science work?



https://www.bihealth.org/de/aktuell/digital-open-science-teaching-digital-tools-for-reproducible-and-transparent-research-auf-englisch/

Summary - The Open Research Process

LMU Open Science Centre (2018) Open Science Intro in Open Science Workshop Materials. Retrievable via: https://osf.io/2wvmd/

The Open Research Process

Study Design	Data Collection	Publication & Distribution	Replication

Preregistration

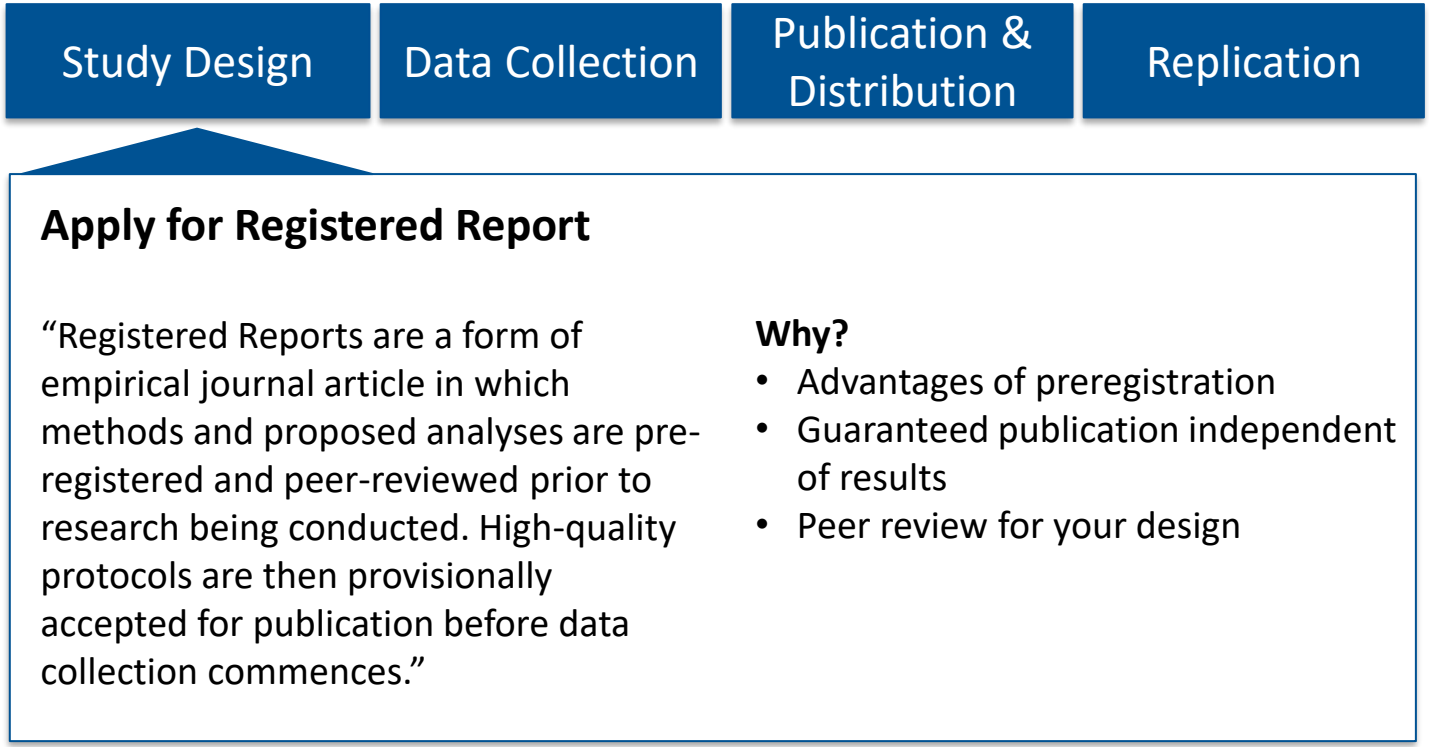
"The specification of a research design, hypotheses, and analysis plan prior to observing the outcomes of a s

Nosek & Lindsay (2018)

Why?

- Prevent HARKing
- Reduce analytical flexibility
- Make selective reporting visible
- Get early feedback
- Take credit for your ideas
- Regulatory agencies require it

The Open Research Process



The Open Research Process

Study Design | Data Collection | Publication & Distribution | Replication

Open Lab Notebook

"Researchers use a lab notebook to document their hypotheses, experiments, and initial analysis or interpretation of these experiments. The lab notebook serves as an organizational tool, a memory aid, and can have a role in protecting intellectual property that comes from the research."

Why?

- Gain & share procedural knowledge
- Increase authenticity
- Protect your intellectual property

LMU Open Science Centre (2018) Open Science Intro in Open Science Workshop Materials. Retrievable via: https://osf.io/2wvmd/, Goyal, Malviya, & Kapoor (2012)

The Open Research Process

Study Design	Data Collection	Publication & Distribution	Replication

Open Data

"Open data should be available to everyone to access, use, and share."

Why?

- Make your analyses reproducible
- Enable re-use of data for answering other research questions
- Never lose valuable data in a file drawer
- Funding agencies require it

LMU Open Science Centre (2018) Open Science Intro in Open Science Workshop Materials. Retrievable via: https://osf.io/2wvmd/, GO FAIR (2018)

The Open Research Process

Study Design	Data Collection	Publication & Distribution	Replication

Open Materials

"Making components of the research methodology needed to reproduce the reported procedure and analysis publicly available."

Why?

- Make your study reproducible
- Enable re-use of materials for other experiments

LMU Open Science Centre (2018) Open Science Intro in Open Science Workshop Materials. Retrievable via: https://osf.io/2wvmd/, OSF (2016)

The Open Research Process

Study Design	Data Collection	Publication & Distribution	Replication

Open Access

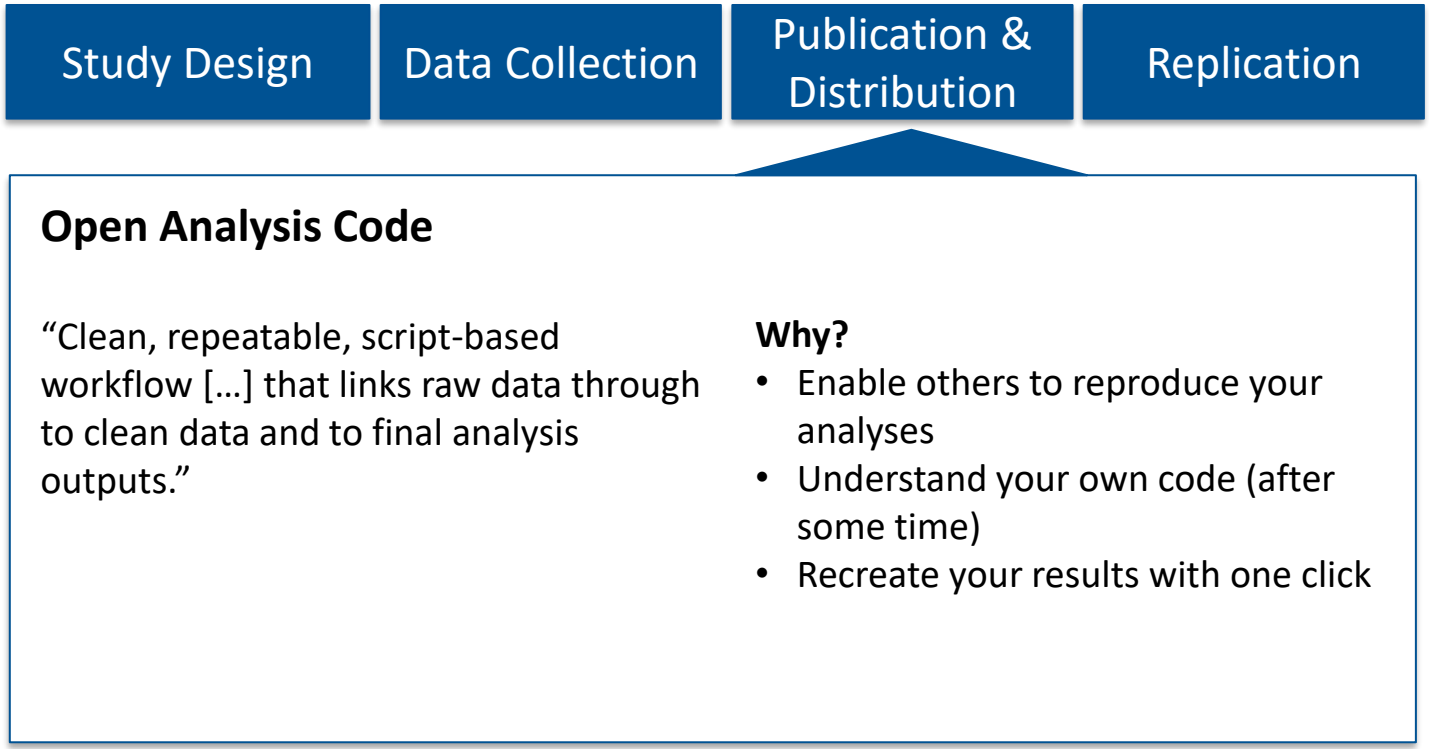
Literature which is “digital, online, free of charge, and free of most copyright and licensing restrictions”.

Why?

- Enable faster progress in research by opening the access to knowledge
- Give back value to the community that funded you and not only to publishers

LMU Open Science Centre (2018) Open Science Intro in Open Science Workshop Materials. Retrievable via: https://osf.io/2wvmd/, Suber (2015)

The Open Research Process



LMU Open Science Centre (2018) Open Science Intro in Open Science Workshop Materials. Retrievable via: https://osf.io/2wvmd/, British Ecological Society (2017)

The Open Research Process

Replication

"replication is a scientific method to verify research findings and […] refers to a repetition of a research procedure to check the accuracy or truth of the findings reported."

Why?

- Enhance credibility of your research
- Gain confidence in your findings & solidify the basis of your research

LMU Open Science Centre (2018) Open Science Intro in Open Science Workshop Materials. Retrievable via: https://osf.io/2wvmd/, Schmidt (2009)

Food for thoughts:
Open Science can save the planet (Kamila Markram)

https://www.youtube.com/watch?v=uPtP6-nAjJ0

Open science: Michael Nielsen at TEDxWaterloo

https://www.youtube.com/watch?time_continue=5&v=DnWocYKqvhw&feature=emb_logo

Solutions for better science in general

- → Ten Principles of the Leiden Manifesto or DORA
- → Coincidence
- → Article Based Metrics
- → Post Publication Reviews (open)
- → Independent Thinking
- → Look for Impact
- → Replication studies
- → Open Science

→Pre-Registration

What is Preregistration?

https://quizizz.com/admin/quiz/58341dff6677f8dc4963caa9/w-fragen

Preregistration

Preregistration is the process of **specifying key study** and **analysis details and decisions** before conducting the experiment

The main goal of preregistering one's research is to make it easier to distinguish

a) between what you set out to do (confirmation) and
b) what was discovered along the way (exploration).

https://cos.io/blog/preregistration-plan-not-prison/

Preregistration

Confirmatory Research

Hypothesis testing

- Results are held to the highest standards
- Data-independent
- Minimizes false positives
- P-values retain diagnostic value
- Inferences may be drawn to wider population

Exploratory Research

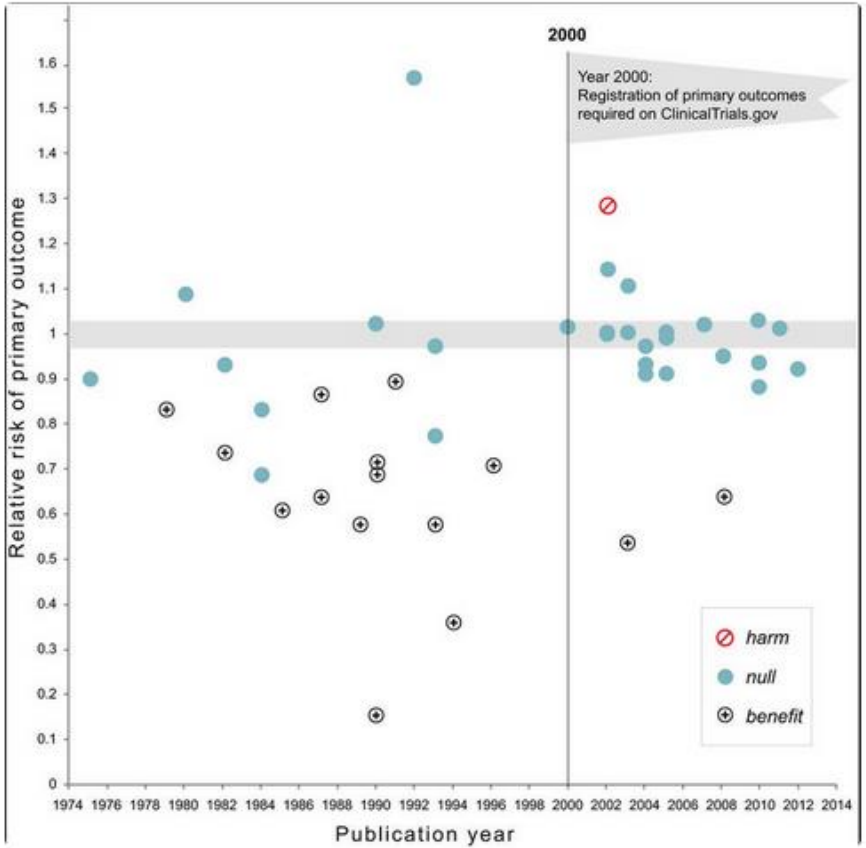
Hypothesis generating

- Results deserve to be replicated and confirmed
- Data-dependent
- Minimizes false negatives in order to find unexpected discoveries
- P-values lose diagnostic value
- Not useful for making inferences to any wider population

Preregistration allows the researcher to make a clear distinction between both modes of research.

https://cos.io/prereg/

Pre-registration causes drugs to stop working



Kaplan, R. M., & Irvin, V. L. (2015). Likelihood of null effects of large NHLBI clinical trials has increased over time. PloS one, 10(8).

Arguments against preregistration

1. **Preregistration limits experimentation**

   However:

   Preregistration does not forbid exploration!
   It only makes transparent, what is planned.

2. **Preregistration is very time-consuming**

   However:

   It is.

   But you gain a peace of mind through it and at some point you would need to do the work anyways.

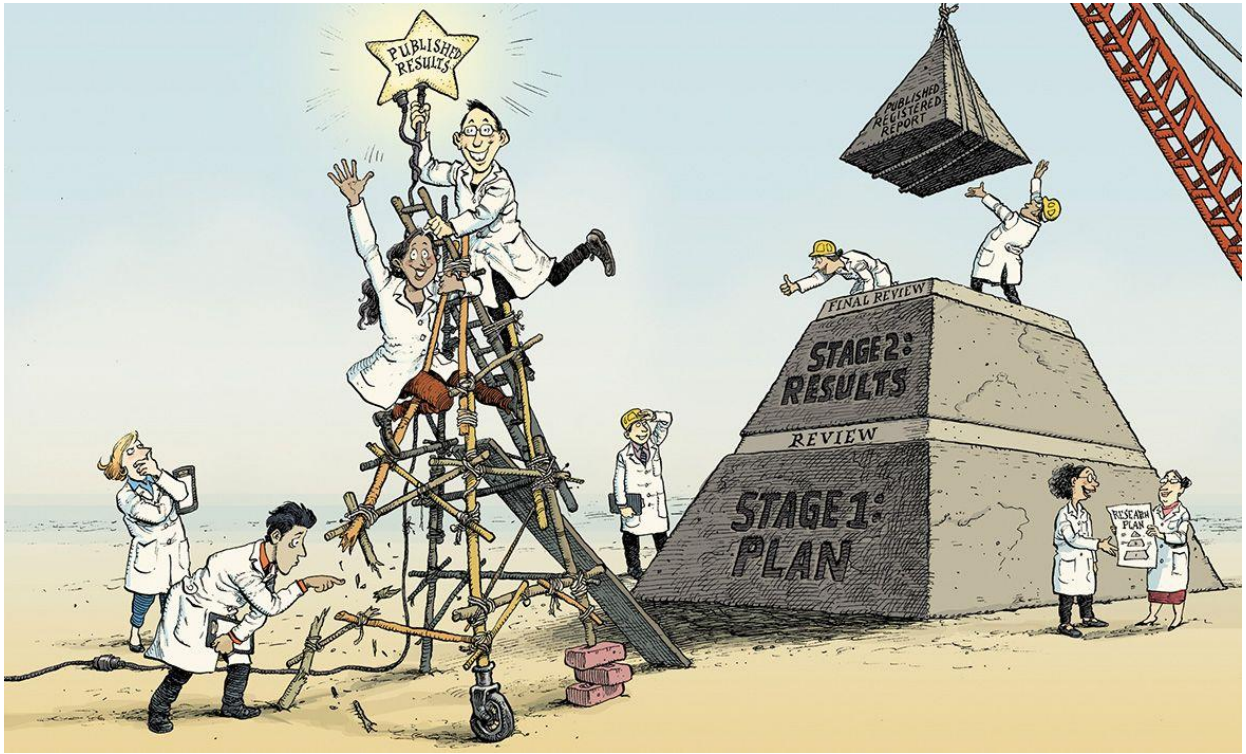
Registered Report

= a form of empirical article in which the introduction, methods, and proposed analyses are pre-registered and reviewed prior to research being conducted.

- High quality protocols are then provisionally accepted for publication, if the authors follow through with the registered methodology.

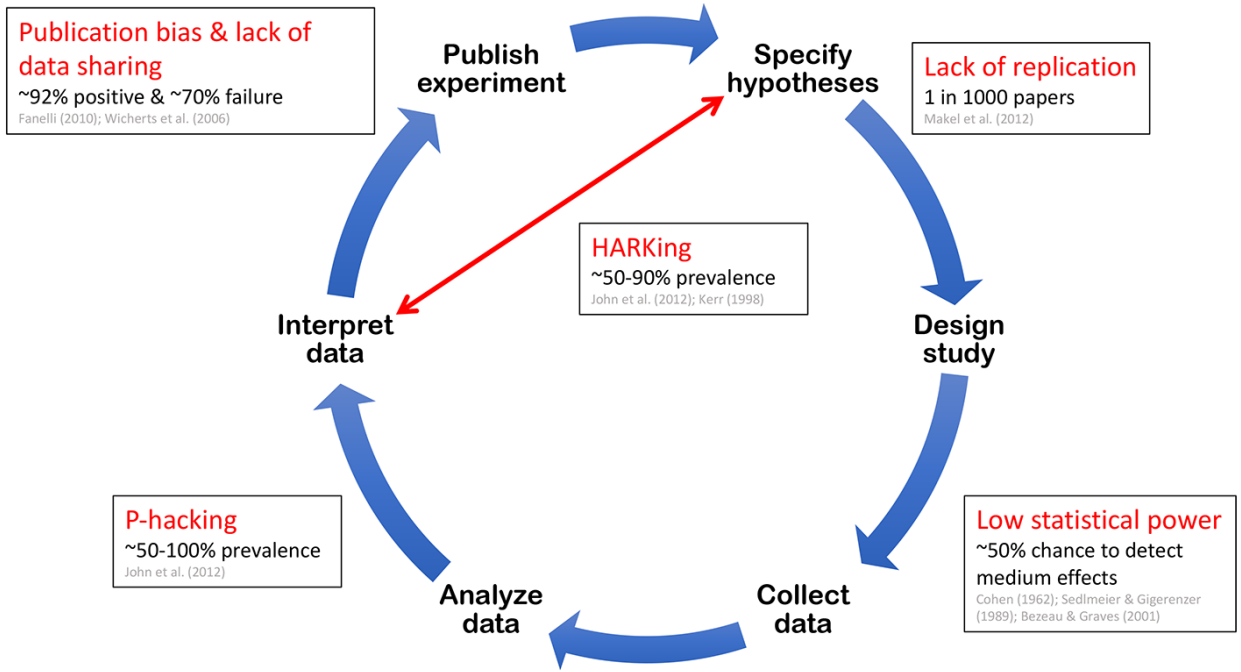
https://cos.io/rr/

Registered Report – what it can prevent



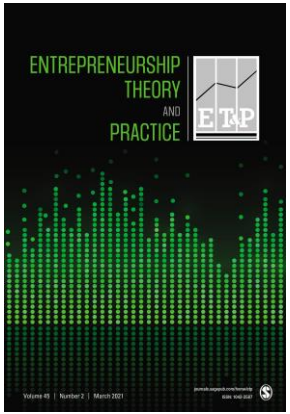
https://www.nature.com/articles/d41586-019-02674-6

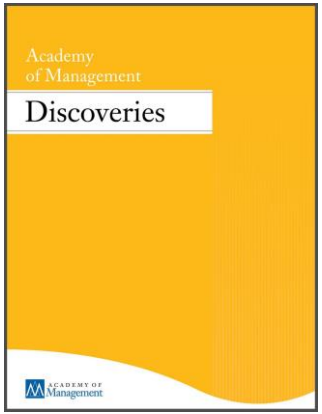
Registered Report – what it can prevent



https://cos.io/rr/

Some leading journal examples





Replications	Replications	Replications	Replications
	Preregistered reports		Preregistered reports
		Abductive research	Abductive research

TABLE 1
Differences between Deduction, Induction, and Abduction

	Deductive Reasoning	Inductive Reasoning	Abductive Reasoning
Objective	- To demonstrate that if premises are true, it is impossible for the conclusion to be false - To demonstrate the situational validity of a generalizable rule or claim	- To generate a knowledge claim where "it is improbable that the conclusion is false if the premises are true" (Hurley, 2000) - To demonstrate the probable generalizability of a situational reality	- To generate plausible, conjecturable explanations - Discovery
Strength of knowledge claim	Strongest (certain)	Strong (probable)	Weak (plausible)
Role of theory	Provides *a priori* explanations (hypotheses) to be challenged empirically	Provides a guiding framework and systematic approach to generate a generalizable explanation from the data	Provides assumptions to be challenged and frames anomalies to be explored and suggests the variables on which to sample
How data are used	- To disconfirm the null - To disconfirm alternatives	To confirm a generalizable outcome when premises are met	- To describe phenomena - To elicit tentative claims - To narrow range of possible explanations
Type of reasoning and how used	Necessary reasoning Used to test falsifiability of presumed means-ends linkages	Probabilistic reasoning Used to demonstrate generalizable means-ends linkages or processes	Contrastive reasoning Used to identify patterns indicative of alternative dynamics, processes, mechanisms, or means-ends linkages

Primary sources: Campos (2011), Folger and Stein (2017), Okhuysen and Behfar (2017).

Bamberger (2018), AMD from the editors