2026 IEEE VR
DAEGU, KOREA
MARCH 21-25, 2026

Emerging Reviewing and Publication Models to Promote Trustworthy Research and Support Scientific Career Advancement

J. Edward Swan II

Mississippi State University, USA

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2026 IEEE VR DAEGU, KOREA

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Are you happy with the way that peer review is currently implemented?

Outline

- A brief history of scholarly publishing and reviewing models
- Consequences of paper-based publishing models
- What is our reviewing model?
- Alternative reviewing models
- Alternative publication models
- A more radical reviewing and publication model
- Potential benefits of new models
- Concluding thoughts

A brief history of scholarly publishing and reviewing models

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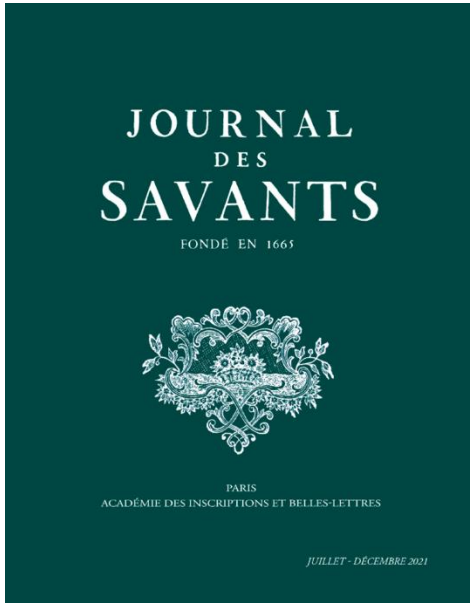
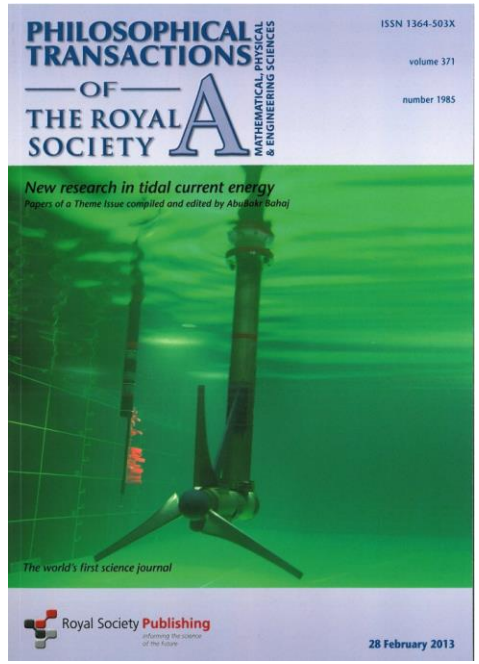
Beginnings of scholarly publishing

- Founding of learned societies
  - Compagnie du Gai Sçavoir, 1323
  - Royal Society of London, 1660
- Movable-type printing press invented
  - Johannes Gutenberg, 1440
- Publishing of scholarly journals
  - Begun in the 1600's; expanded greatly in 1800's
  - Journal des Sçavans (January 1665)
  - Philosophical Transactions of the Royal Society (March 1665)
  - Published Bulletins, Proceedings, Transactions





Decision methods and reviewing

- Beginning (1660): a single editor solicited and selected papers
  - Philosophical Transactions of the Royal Society: Henry Oldenburg
- Team of editors (early-to-mid 1800's)
  - Additional expertise
  - Voting on what to publish
  - Began to seek reports of referees
- Sharing referee suggestions with authors, guiding author response
  - George Gabriel Stokes, secretary of the Royal Society, 1854–85

Peer Review: Not as old as you might think

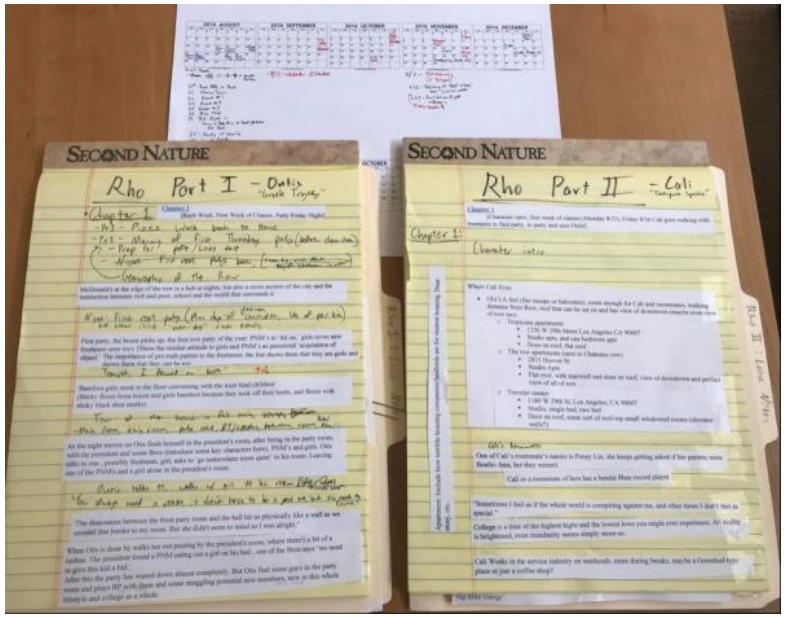
- Oxford English Dictionary
  - "a form of review of competence by others in the same occupation"
  - first used in 1967

- What does it mean?
  - Modern connotation: proof beyond reasonable doubt
- Began to be used by grant-making bodies (1970's)
- Historians of scholarly publishing ask:
  - Is peer review up to the challenges of the online age?
  - Not a sacred cow, but the currently dominant practice in a long and varied history of reviewing practices

[Fyfe 2015, 2017]

Paper-based scholarly publishing (1960's–90's)

- Conduct a research project
  - Write code, evaluate, perhaps empirical experiment with human subjects, etc.
- Write paper
- Mail 4+ copies to conference (journal)
  - Graphics or photos? Glue color photos onto pages
  - Late-night run to FedEx
- Conference mails reviewers, reviewers mail conference, conference mails author
- Revisions, copyediting, proofing by mail
- Journal typesets issue; prints; mails to subscribers and libraries
- Scholar: receive issue in the mail. Otherwise, visit library.



e.g., [Nosek 2024]

Consequences of paper-based publishing models

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Consequences of paper-based publishing

- Publisher played useful role
  - Manage peer review
  - Print and distribute proceedings / journal
- Peer review only happens when research is complete
- Only paper is reviewed
  - Not research plan, motivation, code, data, materials, statistical analysis, etc.
- Only reviewed by a few people, somewhat selected at random
- Review results in binary decision: accept (maybe with edits) or reject
- Review and decision process is opaque and unknowable
- Decision is permanent and unrevisable
- Decision often based on unknowable facts
  - Whether or not the research should have been conducted in the first place
  - Importance or impact of research, as seen 5+ / 10+ years in the future

e.g., [Nosek 2024]

Cannot update archived paper

- **JL Gabbard, DG Mehra, and JE Swan II. Effects of AR Display Context Switching and Focal Distance Switching on Human Performance. *IEEE Transactions on Visualization and Computer Graphics*, 25(6):2228–2241, May 2018. DOI: 10.1109/TVCG.2018.2832633.**

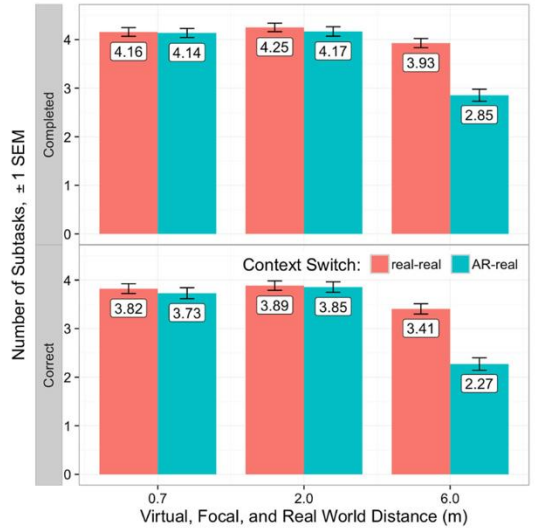


Fig. 4. Context switching between AR and real-world visual information at 6 m resulted in significantly fewer completed subtasks (upper panel) and less accurate performance (lower panel), as compared to the 0.7 m and 2 m viewing conditions. Data from Tables 1 and 2: *real-real* = R_1R_1, R_2R_2, R_3R_3; *AR-real* = $V_1F_1R_1$, $V_2F_2R_2$, $V_3F_3R_3$.

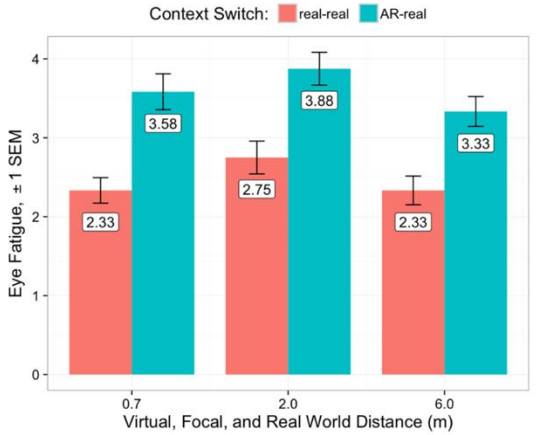
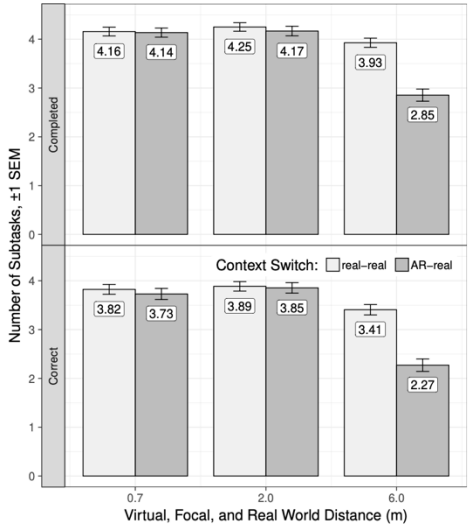


Fig. 5. Context switching between AR and real-world visual information resulted in significantly higher levels of eye fatigue at all distances. Data from Tables 1 and 2: *real-real* = R_1R_1, R_2R_2, R_3R_3; *AR-real* = $V_1F_1R_1$, $V_2F_2R_2$, $V_3F_3R_3$.

observed variation, and an increase of 1.8 for the lower panel, explaining $R^2 = 9.5\%$ of the observed variation.

4.2.2 Discussion



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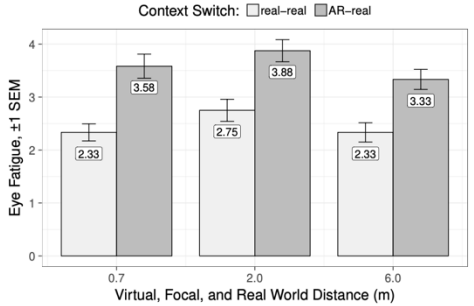

Fig. 5. Context switching between AR and real-world visual information resulted in significantly higher levels of eye fatigue at all distances. Data from Tables 1 and 2: *real-real* = R_1R_1, R_2R_2, R_3R_3; *AR-real* = $V_1F_1R_1$, $V_2F_2R_2$, $V_3F_3R_3$.

rating increase of 1.6 for the upper panel, explaining $R^2 = 5.5\%$ of the observed variation, and an increase of 1.8 for the lower panel, explaining $R^2 = 9.5\%$ of the observed variation.

4.2.2 Discussion

There was no difference between real-real and AR-real task performance when information was displayed at 0.7 and 2 meters. However, results revealed that at 6 meters, participants completed fewer tasks and were also less accurate when context switching (Fig. 4). For both AR and real text, the text size at 6 meters, although smaller than the text size at

Digital Library Version:
https://ieeexplore.ieee.org/document/8353823

Author Version on Website:
https://ed-swan.github.io/index.html

Paper-based publishing	Evaluation of research and scholarship	Resulting author reward system	Impact on research enterprise
• Physical printed papers	• Only the paper • Semi-random reviewers; uncertain knowledge • Binary decision • Decision process opaque and unknowable • Permanent and unrevisable	• Novel results • Positive, tidy results • Statistically significant results • Minimal results (more papers) • Minimal motivation to share data, materials, code, etc.	• Replication crisis; low research credibility • Little motivation to correct mistakes or update results • Reward systems unreliable, invalid • Career advancement based on paper and citation counts • Predatory journals, paper mills, research fraud

e.g., [Nosek 2024]

But, now it is digital! Why does scholarly reviewing and publishing still have these problems?

- Risk and uncertainty
- Inertia; system justification
- Publisher business models
  - Important inputs provided for free: articles, peer reviews
  - Publishers no longer print physical proceedings → run digital libraries
  - Inelastic demand for articles
  - 40% margins → serials crisis
- However, much energy devoted to developing alternative reviewing and publishing models
  - Open Access
  - Shadow Libraries (Pirate Libraries)
  - Open Science

What is our reviewing model?

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Our implementation of decision and peer review (VR 2026)

- **Stage 1**: Paper receives primary and secondary reviewer from IPC
  - **Desk rejections**: not anonymized, not formatted, out of scope, lacking IRB for human subject studies
  - **Early rejections**:
    - Secondary reviewer performs full review
    - If low score, primary performs full review, and if consensus early rejection
- **Stage 2**: Primary and secondary recruit two external reviewers
  - External reviews + secondary review = **3 reviews + scores**
  - Reviewers encouraged to not change their initial numerical score
  - **Primary leads online discussion** → (1) conditional accept as paper [don't decide TVCG / Conference], (2) reject, (3) no consensus
- **Stage 3**: Supercommittee discussion of papers
  - **Live meetings** → (1) recommended for conditional acceptance, (2) reject
  - **Final decision, including TVCG / Conference (TVCG highest review scores)**
- **Stage 4**: Minor revision cycle, overseen by primary

Alternative reviewing models

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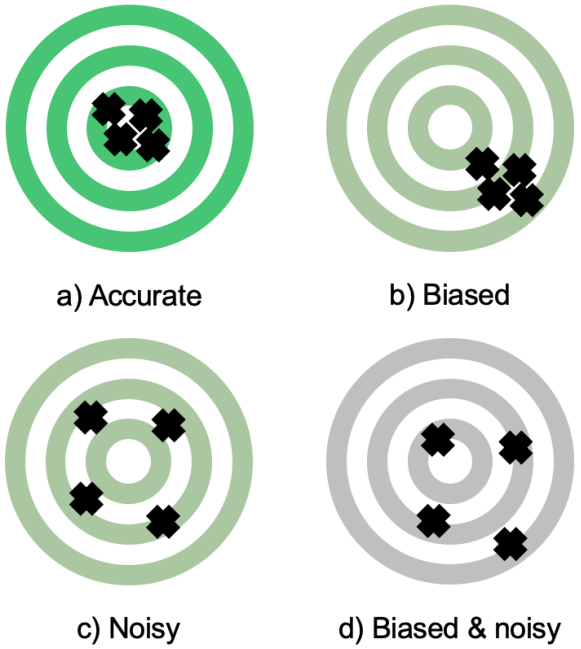
Reviews completed independently

- VR conference reviews influence each other
  - Discussion phase, reviewers can alter their score
  - Reviews are initially written independently, but can be circumvented
- Alternative method: reviews completed and scored independently
  - Hidden Brain interview with Daniel Kahneman (2021) ➔
    if human judgements independent, even if noisy,
    average judgement less biased than any single judgement
- Example journal: Transactions on Visualization and Computer Graphics
  - Solicit 3 external reviews
  - If the 3 reviews agree:
    - If positive, accept (or minor revision)
    - If negative, reject
  - If 2 reviewers agree, and 1 disagrees:
    - If majority positive, accept (or major or minor revision)
    - If majority negative, reject (or possibly major revision)
  - This method implicitly averages the reviews



[Hidden Brain 2021;
Kahneman et al. 2021;
Surowiecki 2005]

Single- vs double-blind reviewing

- VR conference reviews double-blind
  - Advantage: reduction in reviewer bias
  - Disadvantages:
    - Time-consuming and difficult to properly anonymize a paper
    - If not properly anonymized, implied moral failing
    - If non-archival previous publication (poster abstract, thesis, arXiv, etc.), anonymity difficult
    - Motivated reviewers can almost always break anonymity
    - Particularly difficult for series of replicate + extend empirical studies
- Most journals are single-blind
- Hybrid approach: Transactions on Visualization and Computer Graphics
  - Single-blind is default, but double-blind submission is possible

Non-anonymous reviewers

SYSTEMATIC REVIEW article

Front. Robot. AI , 16 April 2018

Sec. Virtual Environments

Volume 5 - 2018 | https://doi.org/10.3389/frobt.2018.00037

A Systematic Review of 10 Years of Augmented Reality Usability Studies: 2005 to 2014

 Arindam Dey[1*]  Mark Billinghurst[1]  Robert W. Lindeman[2]

 J. Edward Swan II[3]

[1] Empathic Computing Laboratory, University of South Australia, Mawson Lakes, SA, Australia
[2] Human Interface Technology Lab New Zealand (HIT Lab NZ), University of Canterbury, Christchurch, New Zealand
[3] Mississippi State University, Starkville, MS, United States

Augmented Reality (AR) interfaces have been studied extensively over the last few decades, with a growing number of user-based experiments. In this paper, we systematically review 10 years of the most influential AR user studies, from 2005 to 2014. A total of 291 papers with 369 individual user studies have been reviewed and classified based on their application areas. The primary contribution of the review is to present the broad landscape of user-based AR research, and to provide a high-level view of how that landscape has changed. We summarize the high-level contributions from each category of papers, and present examples of the most influential user studies. We also identify areas where there have been few user studies, and opportunities for future research. Among other things, we find that there is a growing trend toward handheld AR user studies, and that most

Public reviews

Superstoichiometric reversible and manipulable copper-ion intercalation in niobium selenide

Yuanhe Sun, Rui Qi, Zhipeng Xue, Qi Lei, Yuanxin Zhao, Zhiguo Ren, Wei Zhang, Jingying Si, Haitao Li, Yi Gao, Wen Wen, Xiaolong Li ✉ & Daming Zhu ✉

Nature Communications **16**, Article number: 2099 (2025) | Cite this article

Metrics

Abstract

Few-layer stacked niobium selenide ($NbSe_2$) has evoked great interest owing to its intrinsically exotic properties and accessible manipulation by controlled ion intercalation for superconductivity physics and advanced device applications. However, attempts to extend the range of reversible intercalation stoichiometries are often hindered by overexpanded bond rupture and intrinsic-limit transition metal redox centres in selenides when proceeding towards deep intercalation. Here, we report that reversible unconventional

nature portfolio

Peer Review File

Superstoichiometric reversible and manipulable copper-ion intercalation in niobium selenide

Corresponding Author: Professor Daming Zhu

This file contains all reviewer reports in order by version, followed by all author rebuttals in order by version.

Attachments originally included by the reviewers as part of their assessment can be found at the end of this file.

Version 0:

Reviewer comments:

Reviewer #1

(Remarks to the Author)
In this paper, the authors have achieved unconventional superstoichiometric intercalation of two Cu ions in NbSe2. The mechanism behind this unique phenomenon is attributed to the synergistic redox reactions of cations and anions in NbSe2, which stabilize the chemical bonds and lattice structure, thereby avoiding the occurrence of conversion reactions. Superstoichiometric intercalation enables high-capacity and stable copper-ion batteries and is extendable to other electrochemical energy storage systems. The proposed mechanism has certain innovation and significance. However, the evidence for superstoichiometric intercalation and synergistic cation-anion redox remains insufficient. Some experimental data and results still need to be further provided. My concerns and comments are appended below:
1. An important innovation of this work is that the author proposed the unconventional intercalation of two copper ions in NbSe2 which is very stunning. However, the characterization confirming the intercalation of the two copper ions is semi-quantitative method, such as EDS, and ICP. I do not think the presented methods are sufficient to prove the intercalation of two copper ions. Therefore, the authors need to provide direct characterization methods, such as STEM, to atomically confirm the intercalation of two copper ions.
2. Exfoliating b-$NbSe_2$ to a few-layer f-$NbSe_2$, the amount of copper ion intercalation in $NbSe_2$ has been elevated to a superstoichiometric intercalation. The fundamental changes in f-$NbSe_2$ that lead to this phenomenon should be a key focus. However, the authors have almost ignored the theoretical calculations, electronic structure, and compositional changes of b-$NbSe_2$. Therefore, it is recommended that the authors supplement or add relevant data to compare the fundamental changes occurring in these two materials.

Anonymous reviews and author responses are given as supplemental material

Public, signed reviews

Check for updates

SYSTEMATIC REVIEW

REVISED **What is open peer review? A systematic review [version 2; peer review: 4 approved]**

Tony Ross-Hellauer
Author details

This article is included in the Research on Research, Policy & Culture gateway.

Abstract

Background: "Open peer review" (OPR), despite being a major pillar of Open Science, has neither a standardized definition nor an agreed schema of its features and implementations. The literature reflects this, with numerous overlapping and contradictory definitions. While for some the term refers to peer review where the identities of both author and reviewer are disclosed to each other, for others it signifies systems where reviewer reports are published alongside articles. For others it signifies both of these conditions, and for yet others it describes systems where not only "invited experts" are able to comment. For still others, it includes a variety of combinations of these and other novel methods.

Methods: Recognising the absence of a consensus view on what open peer review is, this article undertakes a systematic review of definitions of "open peer review" or "open review", to create a corpus of 122 definitions. These definitions are systematically analysed to build a coherent typology of the various innovations in peer review signified by the term, and hence provide the precise technical definition currently lacking.

Results: This quantifiable data yields rich information on the range and extent of differing definitions over time and by broad subject area. Quantifying definitions in this way allows us to accurately portray exactly how ambiguously the phrase "open peer review" has been used thus far, for the literature offers 22 distinct configurations of seven traits, effectively meaning that there are 22 different definitions of OPR in the literature reviewed.

Conclusions: I propose a pragmatic definition of open peer review as an umbrella term for a number of overlapping ways that peer review models can be adapted in line with the aims of Open Science, including making reviewer and author identities open, publishing review reports and enabling greater participation in the peer review process.

Back to all reports

Reviewer Report

371 Views

22 May 2017 | for Version 1

Emily Ford, Urban & Public Affairs Librarian, Portland State University, Portland, OR, USA

Cite this report
Responses (1)

APPROVED WITH RESERVATIONS

Introduction

- The definition of open science needs to be clearly stated in the Introduction in order to strengthen the frame of the whole paper. Is the definition you are using of open science fully accepted and not contested? If so, then great, but if not, then it becomes murkier and you might want to spend time unpacking the tension there. Also in the last sentence of the Intro, what is that ethos of open science?

Introduction: Background

- Would it be useful to unpack some counter arguments on the reasons peer review in its current state of

RESEARCH ARTICLE metrics ✕ ?

Machine learning applications in risk management: Trends and research agenda

[version 1; peer review: 1 approved with reservations, 1 not approved]

Alejandro Valencia-Arias, Jesus Alberto Jimenez Garcia, Erica Agudelo-Ceballos, Aarón José Alberto Oré León, Ezequiel Martínez Rojas, Julio Leyrer Henríquez, Diana Marleny Ramírez-Ramírez

PEER REVIEWERS Ajay Vikram Singh; Rakibul Hasan Chowdhury

PUBLISHED 25 Feb 2025

RESEARCH ARTICLE metrics *AWAITING PEER REVIEW*

Syphilis in pregnancy: Prevalence, risk factors and maternal-fetal prognosis in Kisangani

[version 1; peer review: awaiting peer review]

Likilo Osundja Jérémie, Tshodi Bulanda Arsène, Lufuluabu Mpemba Alphonse, Mbohou Kouaming Aminate Nawal, Komanda Likeweke Emmanuel, Katenga Bosunga Gédéon

PEER REVIEWERS Invited

FUNDER none

PUBLISHED 25 Feb 2025

RESEARCH ARTICLE metrics ? ?

REVISED Sense of personal agency towards mitigating the threat of antibiotic resistance: a focus group study with parents of children under 5 years old, conducted mid-pandemic

[version 2; peer review: 2 approved with reservations]

Becky McCall, Andrew Hayward, Michael Wilson, Gill Forbes, Laura Shallcross

Check for updates

RESEARCH ARTICLE

REVISED Through restful waters and deep commotion: A study on burnout and health impairment of Italian seafarers from the JD-R model perspective.

[version 2; peer review: 3 approved]

Francesco Buscema [1], Lorenzo Cena [1], Clarissa Cricenti[2], Margherita Zito[3], Lara Bertola [4], Lara Colombo[1]

Author details

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This article is included in the Social Psychology gateway.

Abstract

Background

The work experience of seafarers differs significantly from other land-based occupations due to several factors, particularly remoteness and the restricted work environment. This study seeks to examine the impact of burnout and health impairment in the maritime industry, using the Job Demand-Resources theory as a framework.

Methods

To investigate these phenomena, an online questionnaire was sent to 629 Italian seafarers and we conducted analysis on a valid sample of 239 respondents (94.6% men, Mage = 39.44, SD = 12.8). We tested a mediated Structural Equation Model (SEM) aimed at predicting negative health outcomes.

Results

The results show that burnout plays a mediating role between job demands (such as workload and cognitive strain) and health impairment (such as sleep quality and physical well-being) (Total Indirect Effect = 0.443, $p < .0001$) as well as between job resources (such as social support and transformational leadership) and health impairment (Total Indirect Effect = -0.249, $p < .0001$). Furthermore, the findings highlight the direct influence of occupational resources on seafarers' health.

Conclusions

The discussion highlights the urgent need for more research in the field of organisational psychology in the maritime industry and the discrepancies between these findings, which are consistent with the existing maritime literature, and other studies that do not include seafarers in their sample groups.

Open Peer Review

Reviewer Status ✓ ✓ ✓

Reviewer Reports

	Invited Reviewers		
	1	2	3
Version 2 (revision) 20 Feb 25	✓ read	✓ read	
Version 1 03 Jan 25	? read	? read	✓ read

1. **Inga Bartuseviciene**, World Maritime University, Malmö, Sweden
2. **Vairavan C**, AMET Deemed to be University, Chennai, India
3. **Andrea Russo**, University of Split, Split, Croatia

Comments on this article

All Comments (0)

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Alternative publication models

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General Relativity and Quantum Cosmology

[Submitted on 5 Oct 2017 (v1), last revised 8 Oct 2019 (this version, v4)]

Effects of Data Quality Vetoes on a Search for Compact Binary Coalescences in Advanced LIGO's First Observing Run

The LIGO Scientific Collaboration, the Virgo Collaboration: B. P. Abbott, R. Abbott, T. D. Abbott, M. R. Abernathy, F. Acernese, K. Ackley, C. Adams, T. Adams, P. Addesso, R. X. Adhikari, V. B. Adya, C. Affeldt, M. Agathos, K. Agatsuma, N. Aggarwal, O. D. Aguiar, L. Aiello, A. Ain, B. Allen, A. Allocca, P. A. Altin, S. B. Anderson, W. G. Anderson, K. Arai, M. C. Araya, C. C. Arceneaux, J. S. Areeda, N. Arnaud, K. G. Arun, S. Ascenzi, G. Ashton, M. Ast, S. M. Aston, P. Astone, P. Aufmuth, C. Aulbert, S. Babak, P. Bacon, M. K. M. Bader, P. T. Baker, F. Baldaccini, G. Ballardin, S. W. Ballmer, J. C. Barayoga, S. E. Barclay, B. C. Barish, D. Barker, F. Barone, B. Barr, L. Barsotti, M. Barsuglia, D. Barta, J. Bartlett, I. Bartos, R. Bassiri, A. Basti, J. C. Batch, C. Baune, V. Bavigadda, M. Bazzan, M. Bejger, A. S. Bell, B. K. Berger, G. Bergmann, C. P. L. Berry, D. Bersanetti, A. Bertolini, J. Betzwieser, S. Bhagwat, R. Bhandare, I. A. Bilenko, G. Billingsley, J. Birch, R. Birney, S. Biscans, A. Bisht, M. Bitossi, C. Biwer, M. A. Bizouard, J. K. Blackburn, C. D. Blair, D. G. Blair, R. M. Blair, S. Bloemen, O. Bock, M. Boer, G. Bogaert, C. Bogan, A. Bohe, C. Bond, F. Bondu, R. Bonnand, B. A. Boom, R. Bork, V. Boschi, S. Bose, Y. Bouffanais, A. Bozzi et al. (860 additional authors not shown)

The first observing run of Advanced LIGO spanned 4 months, from September 12, 2015 to January 19, 2016, during which gravitational waves were directly detected from two binary black hole systems, namely GW150914 and GW151226. Confident detection of gravitational waves requires an understanding of instrumental transients and artifacts that can reduce the sensitivity of a search. Studies of the quality of the detector data yield insights into the cause of instrumental artifacts and data quality vetoes specific to a search are produced to mitigate the effects of problematic data. In this paper, the systematic removal of noisy data from analysis time is shown to improve the sensitivity of searches for compact binary coalescences. The output of the PyCBC pipeline, which is a python-based code package used to search for gravitational wave signals from compact binary coalescences, is used as a metric for improvement. GW150914 was a loud enough signal that removing noisy data did not improve its significance. However, the removal of data with excess noise decreased the false alarm rate of GW151226 by more than two orders of magnitude, from 1 in 770 years to less than 1 in 186000 years.

Comments:	27 pages, 13 figures, published version
Subjects:	**General Relativity and Quantum Cosmology (gr-qc)**; Instrumentation and Methods for Astrophysics (astro-ph.IM)
Cite as:	arXiv:1710.02185 **[gr-qc]**
	(or arXiv:1710.02185v4 **[gr-qc]** for this version)
	https://doi.org/10.48550/arXiv.1710.02185
Journal reference:	Class. Quantum Grav. 35 065010 (2018)
Related DOI:	https://doi.org/10.1088/1361-6382/aaaafa

Submission history

From: LVC Publications [view email] [via Lvc Publications as proxy]
[v1] Thu, 5 Oct 2017 19:18:51 UTC (4,609 KB)
[v2] Wed, 11 Oct 2017 16:26:26 UTC (4,608 KB)
[v3] Tue, 7 Nov 2017 22:45:22 UTC (4,608 KB)
[v4] Tue, 8 Oct 2019 13:29:33 UTC (4,507 KB)

Open Access

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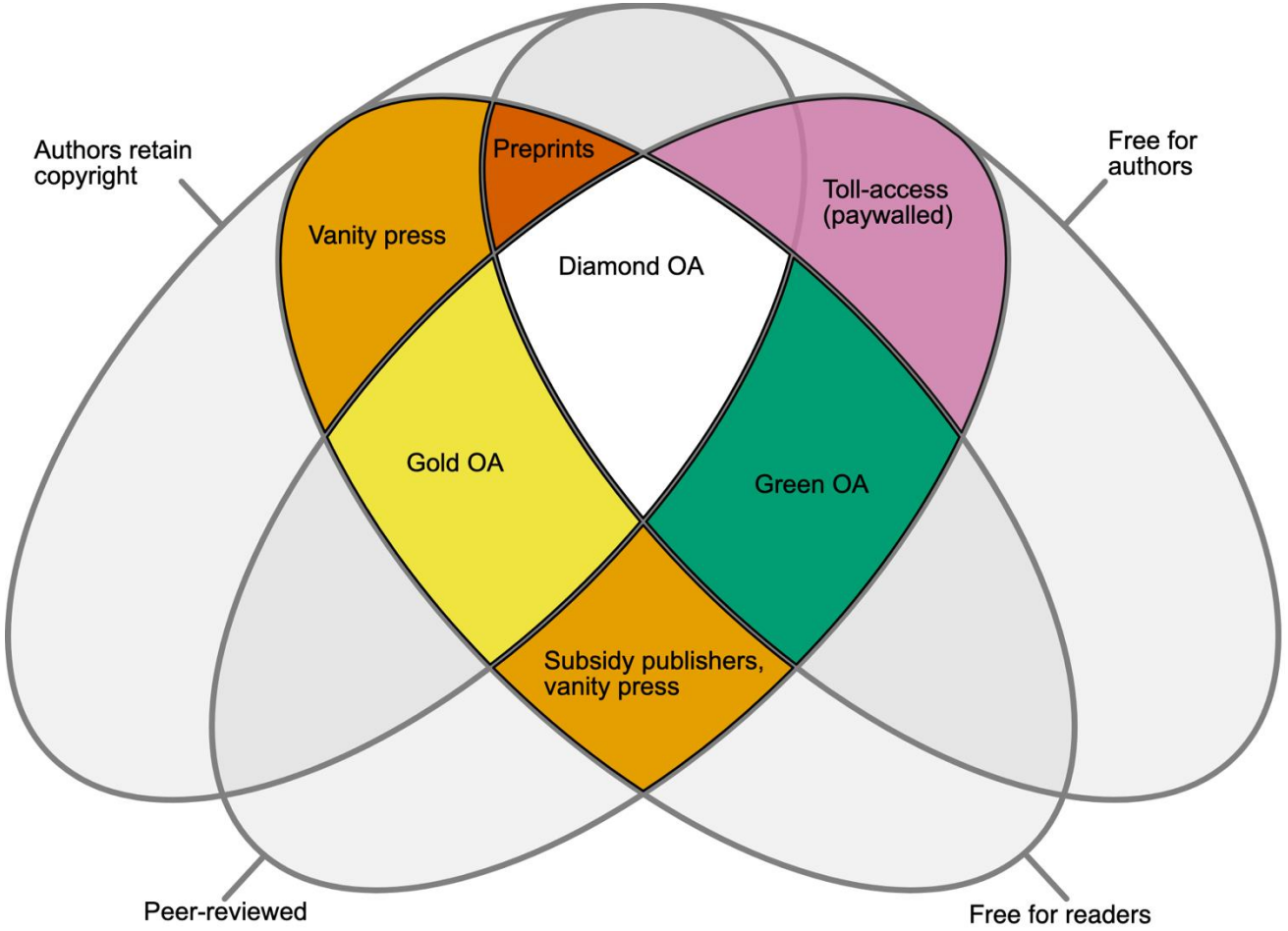
- Obvious moral hazard
  - Predatory journals solicit articles for publication fee, but don't provide quality such as careful reviewing
- Open Access most widespread Open Science principle



PLOS ONE

- Peer-reviewed open access mega journal
- Authors pay article fee; free for readers (Gold OA)
- Papers can be any length, full color throughout, contain supplementary materials and multimedia
- New reviewing concepts:
  - Perceived importance of paper is not criterion for acceptance or rejection
  - Rigor of experiments and data analysis is criterion for acceptance
  - Importance ascertained after publication, through citation, debate, and comment

PLOS One

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OPEN ACCESS PEER-REVIEWED

RESEARCH ARTICLE

Measuring eye vergence angle in extended reality

Mohammed Safayet Arefin, John Edward Swan II, Russell Cohen Hoffing, Steven M. Thurman

Published: November 25, 2025 • https://doi.org/10.1371/journal.pone.0333043

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Abstract
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6 Conclusion
Acknowledgments
References

Reader Comments
Figures

Accessible Data

See the data

This article includes the Accessible Data icon, an experimental feature to encourage data sharing and reuse. Find out how research articles qualify for this feature.

Abstract

Recently, extended reality (XR) displays, including augmented reality (AR) and virtual reality (VR), have integrated eye tracking capabilities, which could enable novel ways of interacting with XR content. In natural settings, eye vergence angle (EVA) changes constantly, based on the distance of fixated objects. Here, we measured EVA for eye fixations on real and virtual target objects in three different environments: real objects in the real world (real), virtual objects in the real world (AR), and virtual objects in a virtual world (VR). In a repeated measures design with 13 participants, EVA was measured while participants fixated on targets at varying distances. As expected, the results showed a significant main effect of target depth such that increasing EVA was associated with closer targets. However, there were consistent individual differences in baseline EVA. There was also a smaller but statistically significant main effect of environment (real, AR, VR) on EVA. Importantly, EVA was stable with respect to the starting depth of previously fixated targets and invariant to the direction (convergence vs. divergence) of vergence changes. In addition, EVA proved to be a more veridical depth estimate than verbal subjective depth judgments.

Figures

Subject Areas

Eye movements
Vision
Eyes
Pupil
Target detection
Eye muscles
Virtual reality
Perception

Citation: Arefin MS, Swan II JE, Cohen Hoffing R, Thurman SM (2025) Measuring eye vergence angle in extended reality. PLoS One 20(11): e0333043. https://doi.org/10.1371/journal.pone.0333043

Editor: Nick Fogt, The Ohio State University, UNITED STATES OF AMERICA

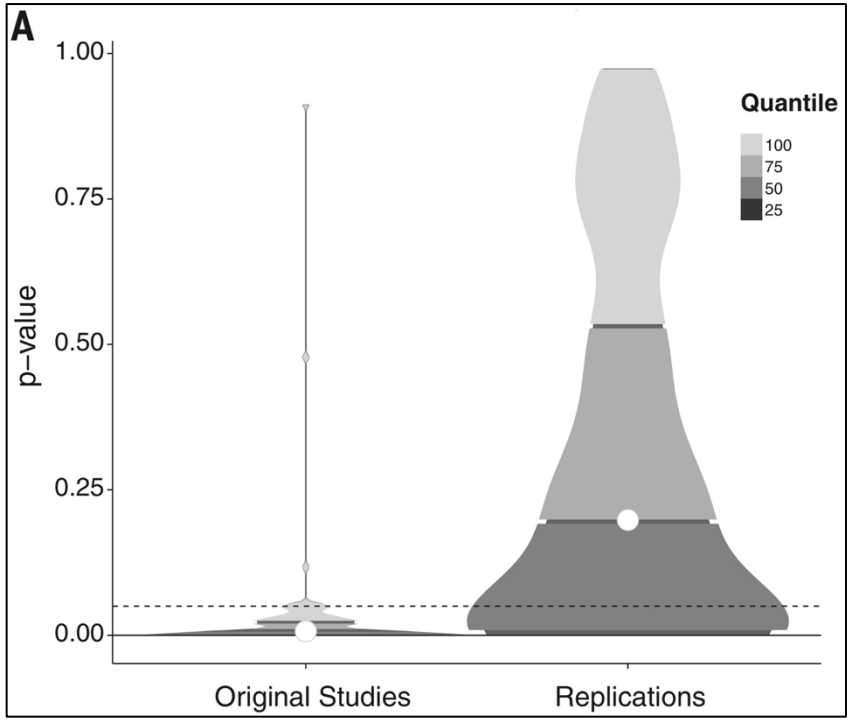
Received: July 3, 2024; **Accepted:** September 8, 2025; **Published:** November 25, 2025

A more radical reviewing and publication model

- A brief history of scholarly publishing and reviewing models
- Consequences of paper-based publishing models
- What is our reviewing model?
- Alternative reviewing models
- Alternative publication models
- A more radical reviewing and publication model
- Potential benefits of new models
- Concluding thoughts

Motivation: preregistered empirical plans

- Before collecting empirical data, create detailed, written plan
  - Hypothesis, methods, analysis
- Removes possibility of *p*-hacking
  - Only significant ($p \leq 0.05$) results analyzed
  - published
  - reported
- P-hacking results in irreproducible research
  - Original studies: *p*-hacking likely
  - Replicated studies: all results reported, no *p*-hacking
- Best practice: publicly preregister the plan
  - Center for Open Science (https://www.cos.io/)



Reproducibility Project: Psychology
$p \leq 0.05$ all 100 original studies
$p \leq 0.05$ for 36 replications

[Open Science Collaboration 2015, 2012]

What if pre-registered plans are peer reviewed?

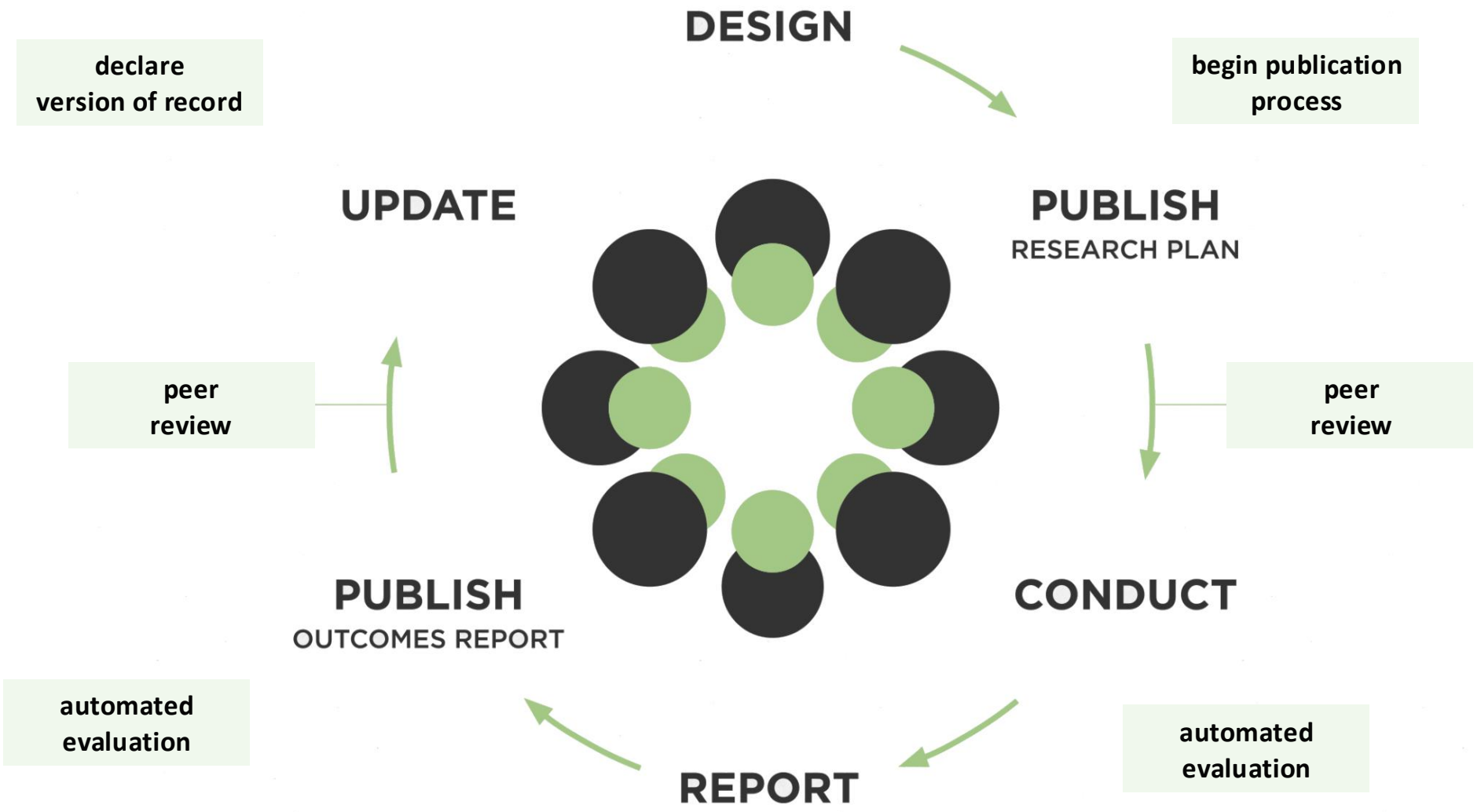
- **If pre-registered plans are peer reviewed (Stage 1), then:**
  - **Reviewers agree that, regardless of outcome, the empirical study should be conducted**
  - **Stage 1 reviews change reviewing context of final paper (Stage 2)**

- **Because results at Stage 1 not yet known ➔ bias against reporting negative results eliminated**

- **Therefore, author incentives change: producing publishable story ➔ producing accurate story**

[https://www.cos.io/initiatives/registered-reports]

Generalize Idea: Lifecycle Journal



[https://lifecyclejournal.org/]

Reviewing and evaluation services

human peer review

PCI
peercommunityin.org

ResearchHub

AI / automated review

paperwizard.

RegCheck

DataSeer

statcheck

[https://lifecyclejournal.org/evaluation-services/]

Shared evolutionary origins of nectarines, sauerkraut and Mr. Bean.

Smith, Smyth, and Smythe

Peer reviewed. *Lifecycle Journal*. Version 1, 1 May 2023; Version 4, 10 June 2024. DOI: lj0001232.v4

- Experiment 1 preregistration
- Experiment 1 materials
- Experiment 1 data
- Experiment 2 data
- Paper

Abstract

In this paper, we delve into the multifaceted interplay between quantum phenomena and cognitive dynamics, elucidating the intricate connections that underpin their complex relationship. Through a synthesis of theoretical frameworks and empirical evidence, we endeavor to unravel the enigmatic synergies between these seemingly disparate domains. Employing a multidisciplinary approach, we traverse the landscape of quantum mechanics and cognitive science, traversing the realms of uncertainty and cognition. Our exploratory analysis navigates the subtleties of entanglement and perception, probing the boundaries of convertional understanding. By weaving together threads of quantum entanglement and cognitive processes, we illuminate novel perspectives that challenge traditional paradigms. Through this synthesis, we aspire to catalyze further inquiry into the profound intersections of quantum phenomena and cognitive dynamics, fostering a deeper appreciation for the inherent complexity of the universe and the mind.

Service	Summary of most recent evaluation	Version	Most recent	Evaluated
Review Commons	Recommended by three reviewers. [Read more]	2, 4	1 August 2024	
repliCATS	Aggregate score = 75% likely to replicate. [Read more]	2	12 October 2023	
ERROR	Found 2 minor errors, 1 major error. [Read more]	1	5 May 2023	
DataSeer	Found 3 of 4 data sets shared. [Read more]	1	4 May 2023	

[Nosek 2024]

Lifecycle journal papers

- When is a paper finished?
  - Author assigns a version to be a Version of Record (can still update later)
  - All versions available
- Isn't this more work than current writing and publishing methods?
  - Perhaps, perhaps not.
  - If rigor of the work is increased ➔ authors find effort more rewarding
  - ➔ authors have increased reputational rewards
- How is it cited?
  - Smith, J. A., Smyth, K. B., & Smythe, L. C. (2024). Shared evolutionary origins of nectarines, sauerkraut and Mr. Bean. *Lifecycle Journal*. DOI: lj0001232.v4
    - Recommended by *Peer Community In: Registered Reports*
    - Reproduced by *Institute for Replication*
    - Analysis rated correct by *Statcheck*

e.g., [Nosek 2024]

Potential benefits of new models

- A brief history of scholarly publishing and reviewing models
- Consequences of paper-based publishing models
- What is our reviewing model?
- Alternative reviewing models
- Alternative publication models
- A more radical reviewing and publication model
- Potential benefits of new models
- Concluding thoughts

Paper-based publishing	Evaluation of research and scholarship	Resulting author reward system	Impact on research enterprise
• Physical printed papers	• Only the paper • Semi-random reviewers; uncertain knowledge • Binary decision • Decision process opaque and unknowable • Permanent and unrevisable	• Novel results • Positive, tidy results • Statistically significant results • Minimal results (more papers) • Minimal motivation to share data, materials, code, etc.	• Replication crisis; low research credibility • Little motivation to correct mistakes or update results • Reward systems unreliable, invalid • Career advancement based on paper and citation counts • Predatory journals, paper mills, research fraud

e.g., [Nosek 2024]

Digital review and publishing	Evaluation of research and scholarship	Resulting author reward system	Impact on research enterprise
• Digital papers • Reviews and evaluation at different points in research lifecycle • All versions open and accessible • Open Science principles	• Only the paper • Semi-random reviewers; uncertain knowledge • Binary decision • Decision process opaque and unknowable • Permanent and unrevisable	• Novel results • Positive, tidy results • Statistically significant results • Minimal results (more papers) • Minimal motivation to share data, materials, code, etc.	• Replication crisis; low research credibility • Little motivation to correct mistakes or update results • Reward systems unreliable, invalid • Career advancement based on paper and citation counts • Predatory journals, paper mills, research fraud

e.g., [Nosek 2024]

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e.g., [Nosek 2024]

Digital review and publishing	Evaluation of research and scholarship	Resulting author reward system	Impact on research enterprise
• Digital papers • Reviews and evaluation at different points in research lifecycle • All versions open and accessible • Open Science principles	• All research products • Open conversation with known reviewers • Multiple assessments and cycles of review • Decision process open and public • Revisable		

e.g., [Nosek 2024]

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e.g., [Nosek 2024]

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e.g., [Nosek 2024]

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e.g., [Nosek 2024]

Digital review and publishing	Evaluation of research and scholarship	Resulting author reward system	Impact on research enterprise
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e.g., [Nosek 2024]

Concluding thoughts

- A brief history of scholarly publishing and reviewing models
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- Alternative publication models
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- Concluding thoughts

Why did you get into science and technology?

- Think back…what inspired you?
- Was it:
  - Applying for grants?
  - Fighting to get papers published in high impact-factor outlets?
  - Fighting for a big h-index?
- Scholarly communication practices ➔ scholarly rewards
  - Current practices misaligned with how knowledge actually produced

e.g., [Nosek, 2024]

- Knowledge production is a social process that supports the dynamic exchange of:
  - Ideas
  - Evidence
  - Explanations
  - Identification of flaws
  - Exploration of alternatives
- Reasons for optimism:
  - There is an energetic scholarly community working to improve current practices
  - Potential of digital review and publishing to improve the process is not yet fully realized

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https://www.cos.io/initiatives/registered-reports

https://lifecyclejournal.org/

https://www.ouvrirlascience.fr/home/

https://www.ouvrirlascience.fr/passport-for-open-science-a-practical-guide-for-phd-students/

Contact Information

J. Edward Swan II

Department of Computer Science and Engineering
Mississippi State University
swan@acm.org

Slide Location:

ed-swan.github.io/teaching/tutorials/Swan-VR2026-Reviewing-Publication-Models.pdf

2026 IEEE VR
DAEGU, KOREA
MARCH 21-25, 2026

Emerging Reviewing and Publication Models to Promote Trustworthy Research and Support Scientific Career Advancement

J. Edward Swan II

Mississippi State University, USA

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