

Qu'est-ce que l'Open Science ?

Matthieu P. Boisgontier, MSc, MPT, PhD, HDR

13 Novembre 2020

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Boisgontier MP (2020) Qu'est-ce que l'Open Science ?
<https://doi.org/10.17605/OSF.IO/94ZJ2>

1. Qu'est-ce que l'Open Science ?
2. Questionable Research Practices (QRPs)
3. Partageons !
4. Preprints
5. Null results
6. Open Access \neq Open Science
7. Pre-registration & Registered Reports
8. Évaluer la qualité scientifique
9. Est-ce stratégique d'être un « Open Scientist » ?

1. Qu'est-ce que l'Open Science ?

- C'est un **état d'esprit** qui valorise l'**ouverture** et la **coopération** plutôt que l'individualisme.



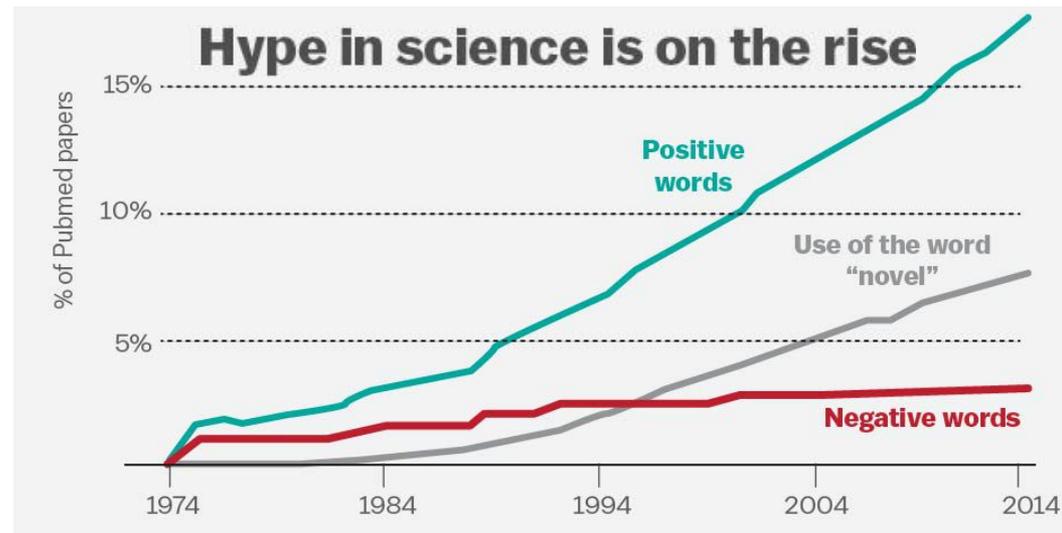
1. Qu'est-ce que l'Open Science ?

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- C'est **partager** un maximum de données, de codes d'analyse, et de documents afin que d'autres chercheurs puissent **vérifier** et **réutiliser** nos travaux le plus facilement possible.



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- C'est **valoriser les bonnes pratiques à chaque étape** du processus de recherche plutôt que de se focaliser sur le résultat final de ce processus.
- C'est soutenir l'**équité**, la **diversité**, et la **viabilité** du système scientifique.

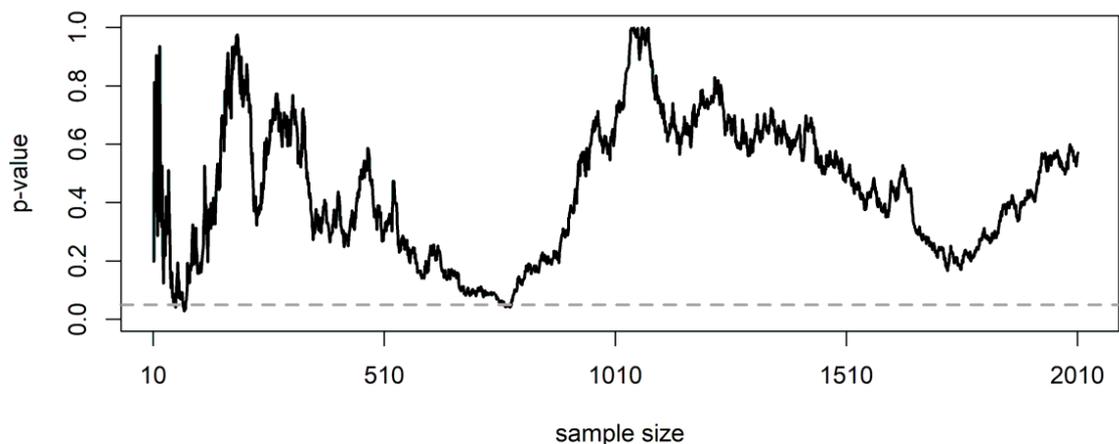
1. Qu'est-ce que l'Open Science ?

- L'Open Science fournit un **cadre** permettant de **minimiser les pratiques de recherche douteuses (QRPs)**.
- Transformer cet **état d'esprit** en **culture** permettrait donc d'obtenir des **connaissances plus conformes au réel**.

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2. Questionable Research Practices (QRPs)

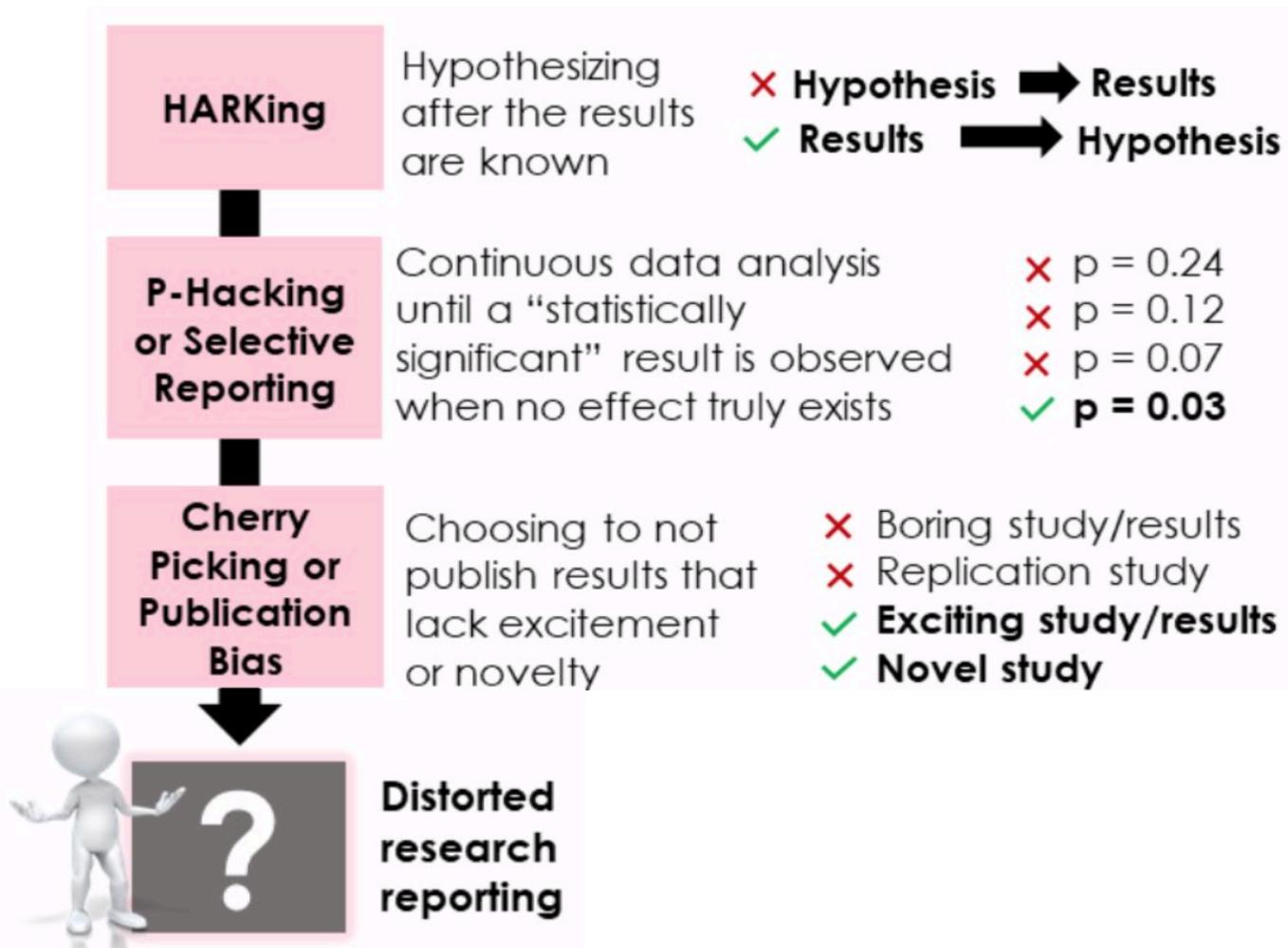
HARKing	Hypothesizing after the results are known	<p>✗ Hypothesis → Results</p> <p>✓ Results → Hypothesis</p>
P-Hacking or Selective Reporting	Continuous data analysis until a "statistically significant" result is observed when no effect truly exists	<p>✗ $p = 0.24$</p> <p>✗ $p = 0.12$</p> <p>✗ $p = 0.07$</p> <p>✓ $p = 0.03$</p>



Tracé d'une valeur p , calculée pour un test t simple, pour des échantillons de 10 à 2010 observations, lorsque l'**hypothèse nulle est vraie**.

Parce que les valeurs p sont uniformément distribuées, la valeur p se déplace de façon aléatoire entre 0 et 1.

2. Questionable Research Practices (QRPs)

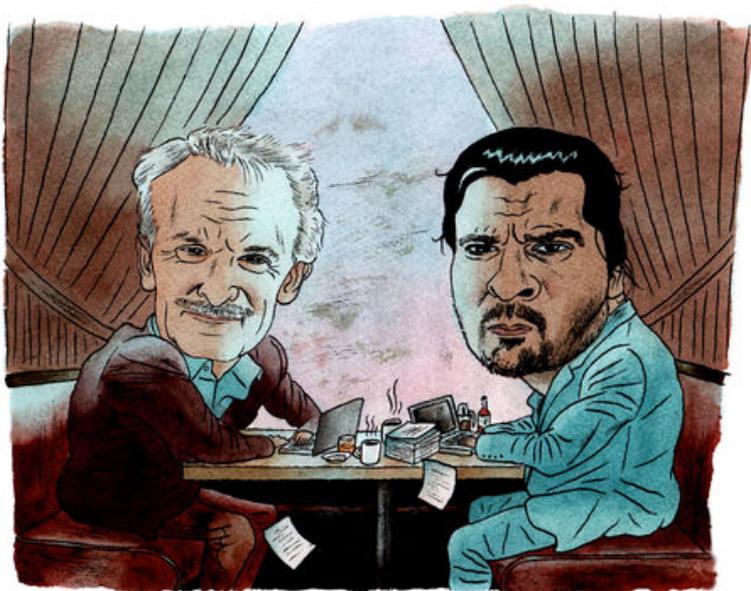


2. Questionable Research Practices (QRPs)

Les pratiques de recherche douteuses aboutissent à des **preuves trompeuses** qui **déforment notre perception de la vérité.**

2. Questionable Research Practices (QRPs)

Détection des erreurs



Nick Brown (left) and James Heathers (right) act as enforcers when they spot anomalies in the literature.

“What we do is *error detection*. That’s all. Forget about fraud.”

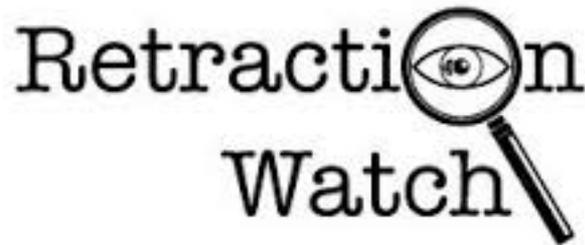
James Heathers

2. Questionable Research Practices (QRPs)

Erreurs \neq Fraude

Fraude scientifique : Distorsion **intentionnelle** du processus de recherche ayant conduit à la **falsification** ou la **fabrication** du message scientifique.

Augmenter la transparence du processus de rétraction des articles scientifiques

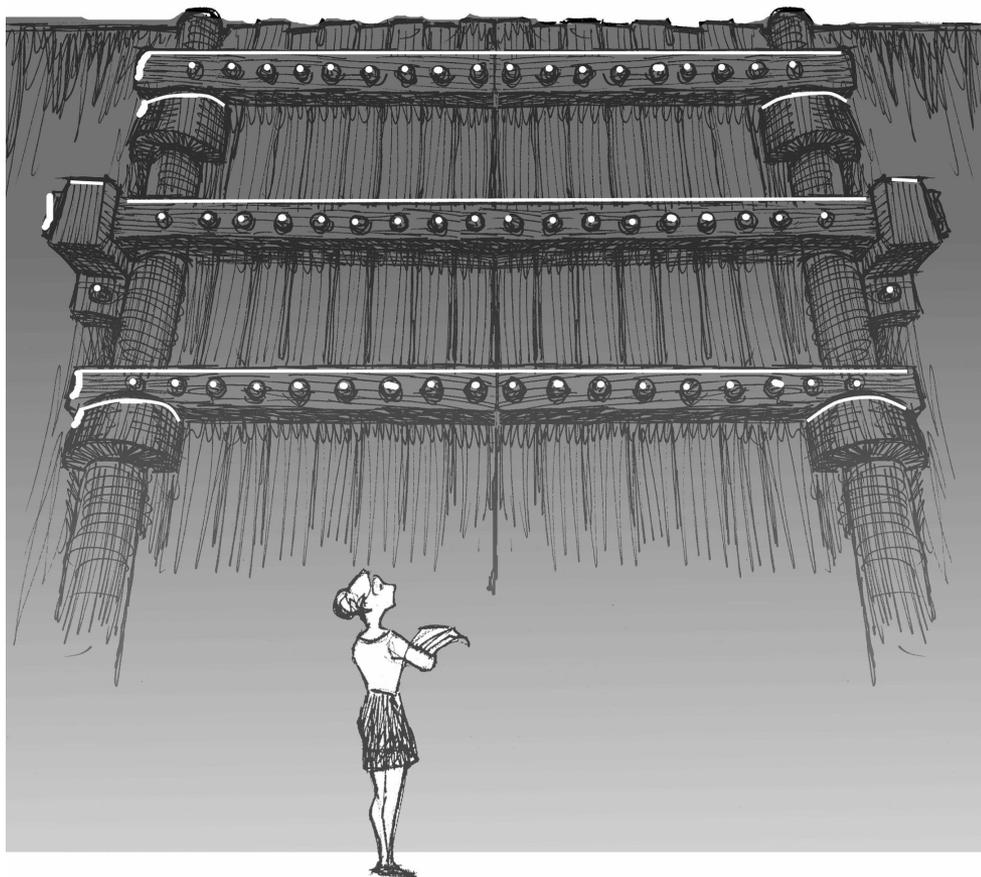


<https://retractionwatch.com>

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3. Partageons !

Pourquoi partager ?



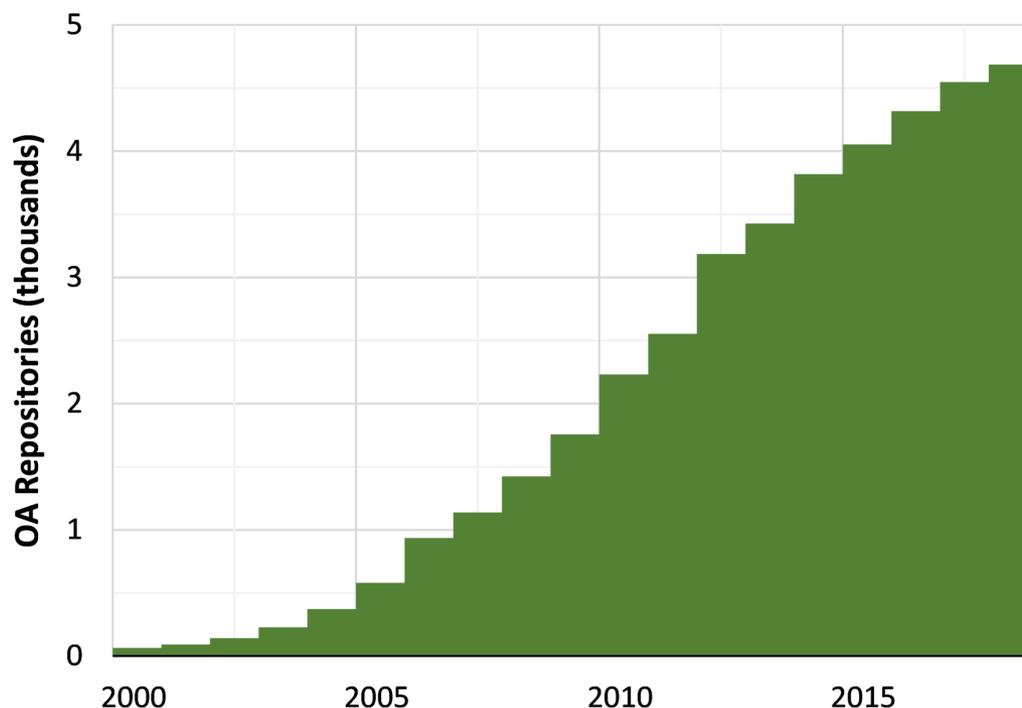
- **Améliorer le travail collaboratif.**
- **Améliorer la qualité de la science.**
- **Accès généralisé à la science.**

3. Partageons !

Comment partager ?

Registry of Open Access Repositories (ROAR)

Registre des archives ouvertes



3. Partageons !

Comment partager ?



Open Science Framework



3. Partageons !

- Peur de se faire « voler » ses idées et de perdre l'exclusivité.



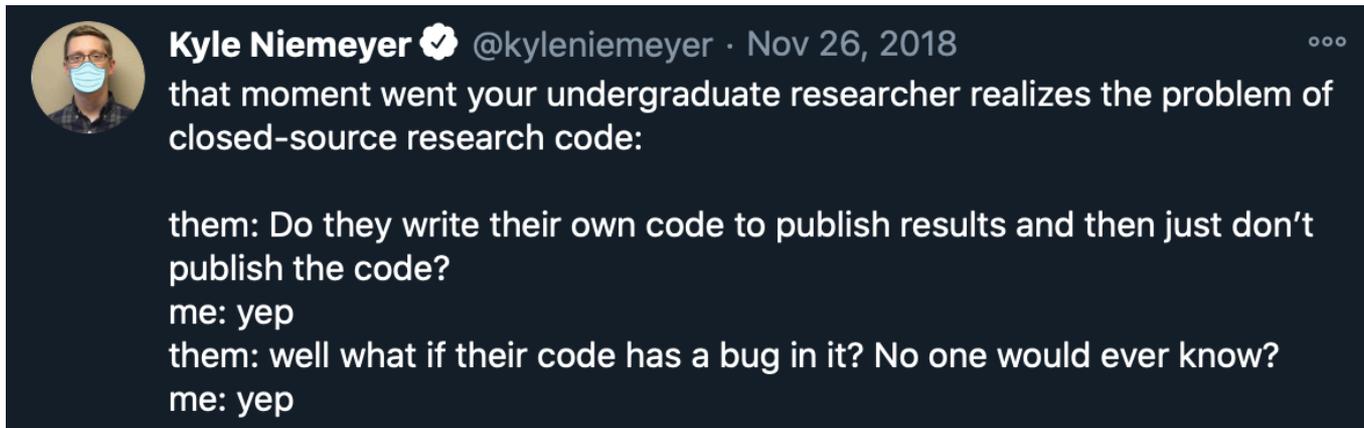
3. Partageons !

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Souvent :

- **Égoïste, présomptueux, et irréaliste.**
- **Gaspillage d'argent et de temps.**

- Peur d'avoir fait des erreurs



3. Partageons !

- Peur de se faire « voler » ses idées et de perdre l'exclusivité

Souvent :

- **Égoïste, présomptueux, et irréaliste.**

- **Gaspillage d'argent et de temps.**

- Peur d'avoir fait des erreurs

- **Tout le monde fait des erreurs.**

- **Plus nos erreurs sont corrigées tôt,
Moins nous avons l'occasion de les reproduire.**

3. Partageons !

Est-ce que les journaux sont favorables à ce partage ?



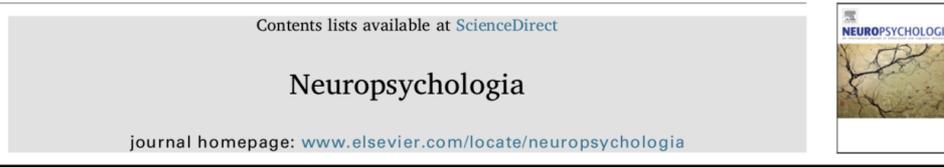
“Authors should **consider** storing primary data in a public repository linked to the manuscript”



« This journal **mandates** and peer reviews data sharing. »

3. Partageons !

Comment encourager, nous aussi, ce partage ?

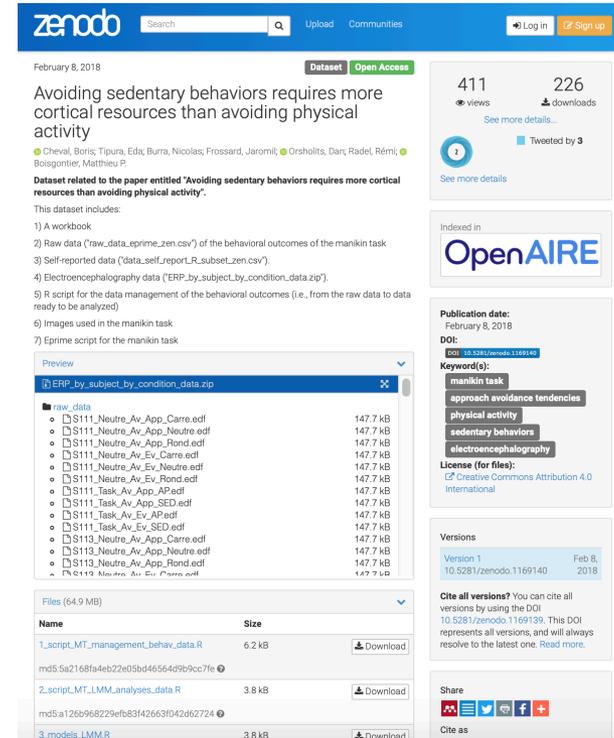


Avoiding sedentary behaviors requires more cortical resources than avoiding physical activity: An EEG study

Boris Cheval^{a,b,c,d,*}, Eda Tipura^{a,e}, Nicolas Burra^a, Jaromil Frossard^{a,f}, Julien Chanal^a, Dan Orsholits^d, Rémi Radel^g, Matthieu P. Boisgontier^{h,i,*}

ABSTRACT

Why do individuals fail to exercise regularly despite knowledge of the risks associated with physical inactivity? Automatic processes regulating exercise behaviors may partly explain this paradox. Yet, these processes have only been investigated with behavioral outcomes (i.e., based on reaction times). Here, using electroencephalography, we investigated the cortical activity underlying automatic approach and avoidance tendencies toward stimuli depicting physical activity and sedentary behaviors in 29 young adults who were physically active or physically inactive but with the intention of becoming physically active. Behavioral results showed faster reactions when approaching physical activity compared to sedentary behaviors and when avoiding sedentary behaviors compared to physical activity. These faster reactions were more pronounced in physically active individuals and were associated with changes during sensory integration (earlier onset latency and larger positive deflection of the stimulus-locked lateralized readiness potentials) but not during motor preparation (no effect on the response-locked lateralized readiness potentials). Faster reactions when avoiding sedentary behaviors compared to physical activity were also associated with higher conflict monitoring (larger early and late N1 event-related potentials) and higher inhibition (larger N2 event-related potentials), irrespective of the usual level of physical activity. These results suggest that additional cortical resources were required to counteract an attraction to sedentary behaviors. Data and Materials [<https://doi.org/10.5281/zenodo.1169140>]. Preprint [<https://doi.org/10.1101/277988>].



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Cheval B, et al. Avoiding sedentary behaviors requires more cortical resources than avoiding physical activity: an EEG study. *Neuropsychologia*. 2018;119:68-80.
<https://doi.org/10.1016/j.neuropsychologia.2018.07.029>

3. Partageons !

Comment encourager, nous aussi, ce partage ?

Lorsque vous expertisez un article,
vous pouvez encourager les auteurs à partager.



Martin Hagger @MartinHagger · Sep 29, 2018

⋮

In the interests of encouraging #openscience I am including the following phrase at the end of every peer review I conduct: "I encourage the authors to make their measures/protocol, data, analyses, & output open access" (if they haven't already done so).

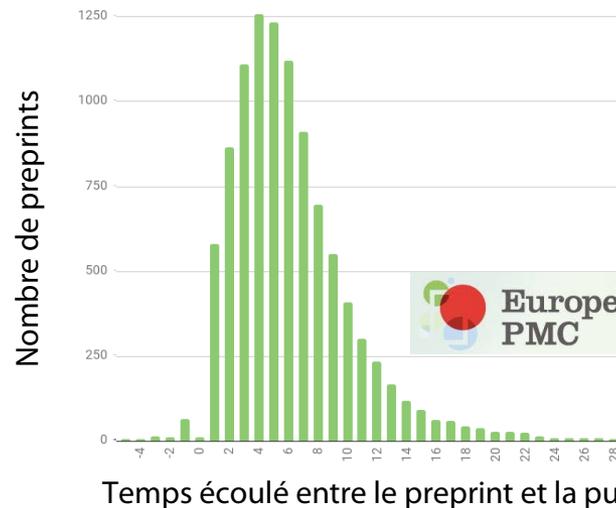
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4. Preprints

Article partagé publiquement **avant avoir été expertisé** par des pairs.

“If you want to be 1 year behind,
don't read preprints.”

Jeff Leek



4. Preprints

Quelles erreurs sont détectées par l'expertise des pairs ?



What errors do peer reviewers detect, and does training improve their ability to detect them?

Sara Schroter¹ • Nick Black² • Stephen Evans² • Fiona Godlee¹ • Lyda Osorio² • Richard Smith¹

¹ BMJ, BMA House, Tavistock Square, London WC1H 9JR, UK

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Correspondence to: Dr Sara Schroter. E-mail: sschroter@bmj.com

Journal of the Royal Society of Medicine



DECLARATIONS

Competing interests

FG is the editor of the BMJ, SS is a senior researcher for the BMJ, RS is the former editor of the BMJ and NB, SE, and SS review for the BMJ

Funding

This study was funded by the NHS London Regional Office Research & Development Directorate. The views and opinions expressed in this paper do not necessarily reflect those of NHSE (LRO) or the Department of Health

Ethical approval

The ethics committee of the

Abstract

Objective To analyse data from a trial and report the frequencies with which major and minor errors are detected at a general medical journal, the types of errors missed and the impact of training on error detection.

Design 607 peer reviewers at the BMJ were randomized to two intervention groups receiving different types of training (face-to-face training or a self-taught package) and a control group. Each reviewer was sent the same three test papers over the study period, each of which had nine major and five minor methodological errors inserted.

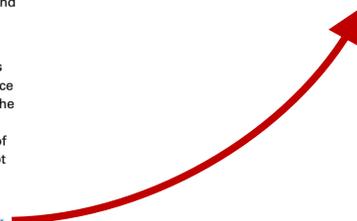
Setting BMJ peer reviewers.

Main outcome measures The quality of review, assessed using a validated instrument, and the number and type of errors detected before and after training.

Results The number of major errors detected varied over the three papers. The interventions had small effects. At baseline (Paper 1) reviewers found an average of 2.58 of the nine major errors, with no notable difference between the groups. The mean number of errors reported was similar for the second and third papers, 2.71 and 3.0, respectively. Biased randomization was the error detected most frequently in all three papers, with over 60% of reviewers rejecting the papers identifying this error. Reviewers who did not reject the papers found fewer errors and the proportion finding biased randomization was less than 40% for each paper.

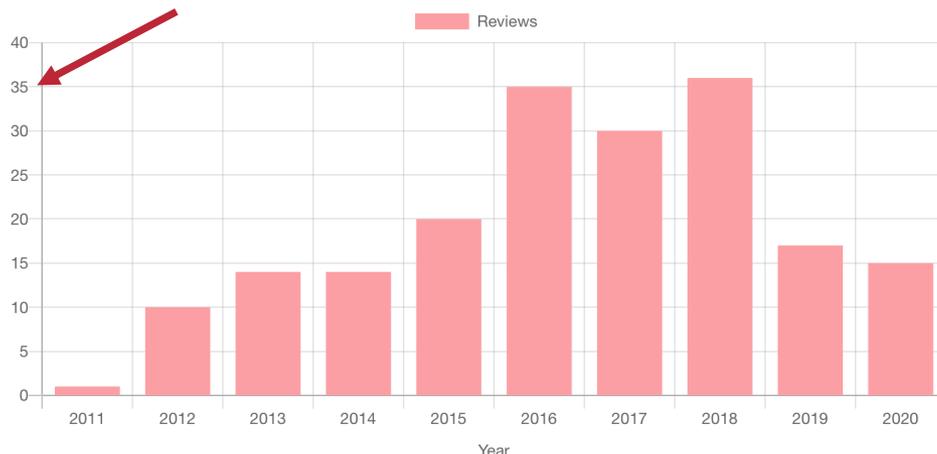
Conclusions Editors should not assume that reviewers will detect most major errors, particularly those concerned with the context of study. Short training packages have only a slight impact on improving error detection.

“Editors should not assume that reviewers will detect most major errors”



4. Preprints

Le système d'expertise par les pairs est saturé.



Decline to Review Manuscript.

Thank you for considering the request to review the manuscript "Investigating the ef

It would be very helpful if you could indicate why you are unable to review this manusc

Select reason to decline: * Others

Additional Comments

Tahoma 2

B / U ₂ s² S

I decline to review this manuscript as I'm part of the team which submitted it.

Decline



Matthieu Boisgontier @MattBoisgontier · Jul 5, 2017
 .@frontiersin: 22 review invitations in June. Seriously?

4. Preprints

Journaux prédateurs



BEALL'S LIST

OF POTENTIAL PREDATORY JOURNALS AND PUBLISHERS

Investigation of energy production by synchrotron, synchrotron and laser radiations in human cancer cells, tissues and tumors and evaluation of their effective on human cancer cells, tissues and tumors treatment trend

Alireza Heidari* and Ricardo Gobato*

*Faculty of Chemistry, California South University, 14731 Comet St. Irvine, CA 92604, USA

*State Secretariat for Education of Paraná, Laboratory of Biophysics and Molecular Modeling Genesis, Bela Vista do Paraíso, Paraná, Brazil

Development of synchrotron, synchrotron and LASER radiations increased significantly in human cancer cells, tissues and tumors that led to their effective attention to the creation of human cancer cells, tissues and tumors treatment trend. The best methods and techniques for decreasing human cancer cells, tissues and tumors is investigation of energy production by synchrotron, synchrotron and LASER radiations in human cancer cells, tissues and tumors and evaluation of their effective on human cancer cells, tissues and tumors treatment trend. To achieve this goal, according to the studies by factors in the process such as pH, temperature and retention time, among the systems were used for this purpose, single-stage systems under synchrotron, synchrotron and LASER radiations possesses higher efficiency. In the conversion process of the system, human benign cancer cells, tissues and tumors were produced with efficiency 99% in total. Efficiency 99% was obtained after irradiating of synchrotron, synchrotron and LASER radiations on malignant human cancer cells, tissues and tumors under synchrotron, synchrotron and LASER radiations for transformation process to benign human cancer cells, tissues and tumors with the passage of time [1-212].

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<https://beallslist.net>

<https://scholarlykitchen.sspnet.org/2019/05/01/cabells-predatory-journal-blacklist-an-updated-review/>

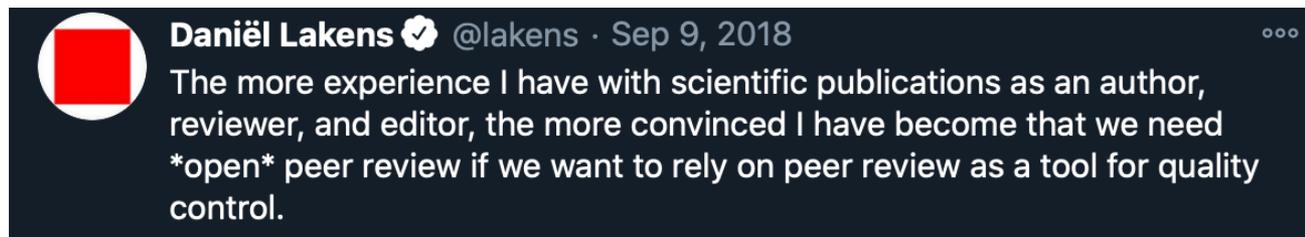
Matthieu.Boisgontier@uOttawa.ca
http://matthieuboisgontier.com



uOttawa

4. Preprints

Développement des open peer-reviews



Royal Society Open Science, European Journal of Neuroscience
BMJ, BMC, PLOS, Nature Communications,

Transparence
Qualité
Crédit
Pédagogie
Représailles

4. Preprints

De quand datent les preprints ?

arXiv.org > physics > arXiv:physics/9403001

Physics > Popular Physics

→ *[Submitted on 25 Apr 1986]*

Desperately Seeking Superstrings

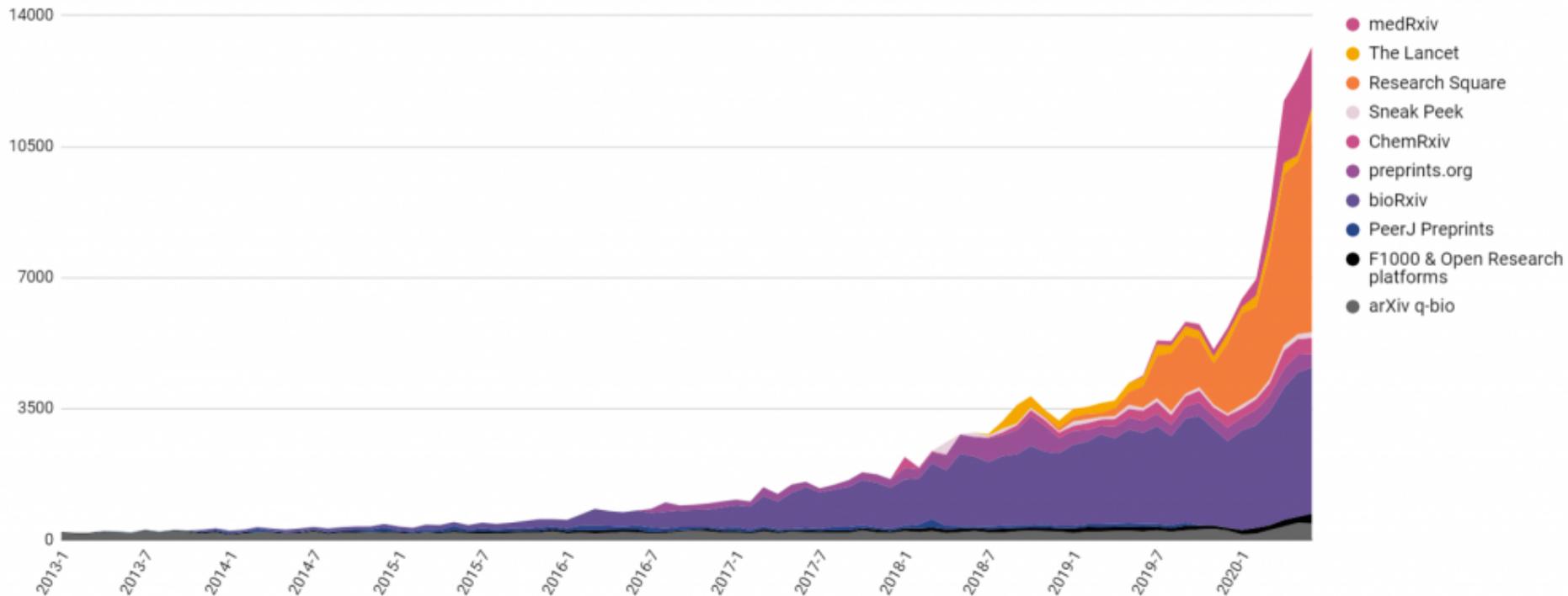
Paul Ginsparg, Sheldon Glashow

4. Preprints

Evolution du nombre de preprints publiés par mois (2013-2020)

Biomedical preprints per month through 2020-06

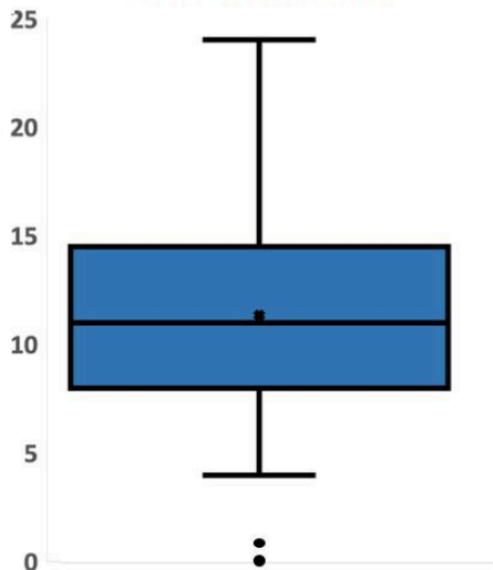
Sources: Jordan Anaya (PrePubMed), Naomi Penfold, EuropePMC, arXiv, Crossref, SSRN



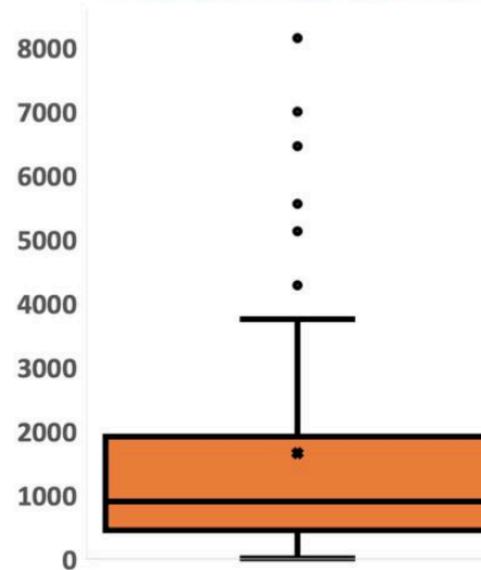
4. Preprints

Qui preprint ?

Number of Years Since First Citation of the Main Author



Total Number of Citations of the Main Author (last or first)



Data from the *SportRxiv* repository
for Sport, Exercise, Physical Activity, and Health Research (2018-2019)

4. Preprints

Faut-il preprinter ?

"We have found that papers submitted from a **#preprint** server to **@JNeurophysiol** are more likely to be accepted & receive more attention when published in final form."



4. Preprints

Faut-il preprinter ? Le point de vue des financeurs.



European Research Council

Established by the European Commission

Preprints are highlighted as accepted publication type as part of applicants' track records



**NSERC
CRSNG**

Preprints are important vehicles for disseminating research results.



National Institutes of Health

Turning Discovery Into Health

The NIH encourages investigators to use interim research products, such as preprints, to speed the dissemination and enhance the rigor of their work. This notice clarifies reporting instructions to allow investigators to cite their interim research products and claim them as products of NIH funding.



4. Preprints

Faut-il preprinter ?



Yoda of Neuromechanics @maxdonelan · Dec 17, 2018



It took far too long, but as a lab we are now committed to using pre-print servers. This is our first. It is fitting that it is also the first of Surabhi Simha's submitted manuscripts, with a few more to follow.

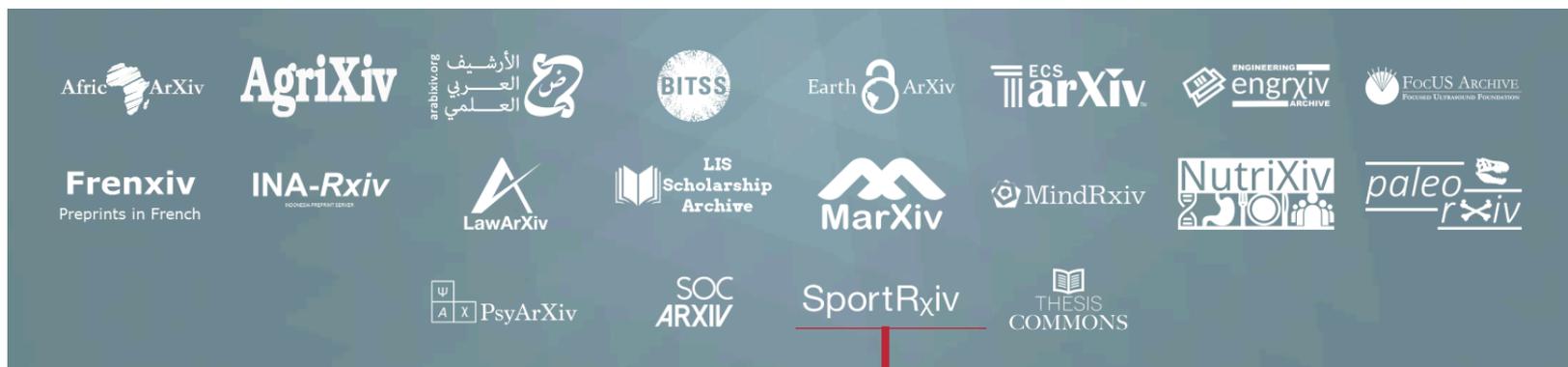


Andrew Pruszynski @andpru · Oct 19

Posting preprints is standard. Do it.

4. Preprints

Où preprinter ?



4. Preprints

Est-ce que le journal dans lequel je souhaite publier accepte les articles déjà préprintés ?



Welcome to Sherpa Romeo

Sherpa Romeo is an online resource that aggregates and analyses publisher open access policies from around the world and provides summaries of publisher copyright and open access archiving policies on a journal-by-journal basis.

Enter a journal title or issn, or a publisher name below:

Journal Title or ISSN

Publisher Name

www.sherpa.ac.uk/romeo

4. Preprints

Postprints

Article publié **après expertise** par les pairs et avant qu'il n'ait été formaté par un journal.



Période d'embargo de 6 mois - 1 an



Sherpa Romeo

Léa Perez
Assistance utilisateurs - HAL
Centre pour la Communication
Scientifique Directe
**« La plateforme HAL ?
A quoi ça sert ? »**

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5. Null results

Que faire quand il n'y a pas d'effet de notre variable indépendante ?



5. Null results

Que faire quand il n'y a pas d'effet de notre variable indépendante ?

**Un résultat non significatif
n'est pas une preuve de l'absence d'effet.**

(On échoue à rejeter l'hypothèse nulle)

Test d'équivalence,
Estimation Bayésienne,
Facteurs de Bayes.

Package 'TOSTER'



5. Null results

Que faire quand il n'y a pas d'effet de notre variable indépendante ?

AVANT
avoir compris
les tests d'équivalence



APRÈS
avoir compris
les tests d'équivalence



5. Null results

Parfois plus difficiles à publier

THE QUEST 1,000 € NULL RESULTS AND REPLICATION STUDY AWARD

Publish your NULL results – Fight the negative publication bias!



Offre 1000€ à ses chercheurs s'ils publient des résultats nuls ou une étude de réplication.

5. Null results

Parfois plus difficile à publier



Rink Hoekstra
@RinkHoekstra

Elsevier editor Spada acknowledging that null results are not even considered for Addictive Behaviors, seemingly not realizing how problematic that is. Offering a lower prestige alternative journal doesn't make that right.



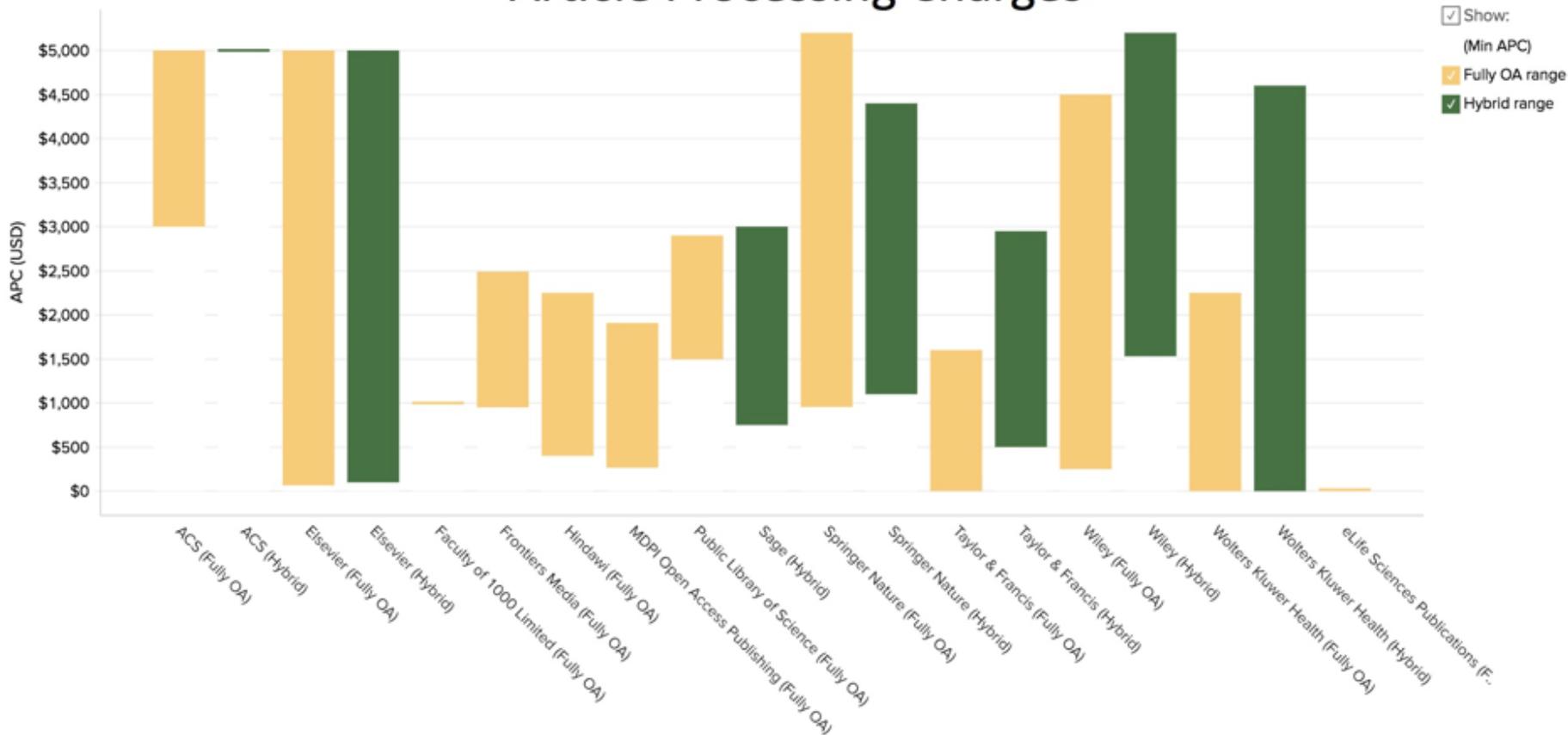
Anders Jespersen
@AndersAzimuth

Great questions from the audience on where there is space for replications?
The answer from [@MarinaP63](#) is that from Journal of Neuroscience there is a sister journal for replications. But why is it only for sister journals, and not in the main ones?

1. Qu'est-ce que l'Open Science ?
2. Questionable Research Practices (QRPs)
3. Partageons !
4. Preprints
5. Null results
- 6. Open Access \neq Open Science**
7. Pre-registration & Registered Reports
8. Évaluer la qualité scientifique
9. Est-ce stratégique d'être un « Open Scientist » ?

6. Open Access ≠ Open Science

Article Processing Charges



Source: Publishers' websites (Nov/Dec 2016), Delta Think 2016 survey data, STM Association 2012 and 2015 reports, Delta Think analysis. Please see our notes on [Methodology](#). © 2017 Delta Think, Inc. All rights reserved. May not be reused without permission.

6. Open Access \neq Open Science

La communauté scientifique est en désaccord avec ces frais de traitement des articles (APC) qui sont trop élevés.

Thursday, the entire editorial board of the Elsevier-owned Journal of Informetrics resigned in protest over high open-access fees and commercial control of scholarly work. Today, the same team is launching a new fully open-access journal. [insidehighered.com/news/2019/01/1...](https://www.insidehighered.com/news/2019/01/1...)

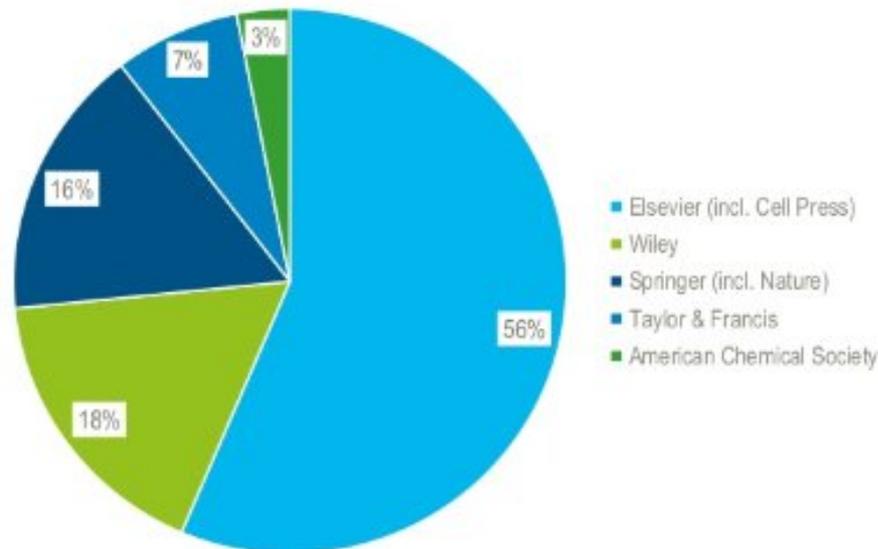
6. Open Access ≠ Open Science

- Les universités européennes paient **€500 millions/an** pour avoir accès aux articles scientifiques.

Division of costs by publisher (periodicals only)

Total reported = 475 267 400 EUR
(data for 29 countries)

eua EUROPEAN
UNIVERSITY
ASSOCIATION



Typically, the publishers' annual increase varies between 3.3% - 4.7%. On average, the annual increase is 3.6%.

- Le montant est de **\$300 millions** pour les universités canadiennes.

6. Open Access ≠ Open Science

La communauté scientifique en désaccord avec ces abonnements trop onéreux.

SCIENCE

The Real Cost of Knowledge

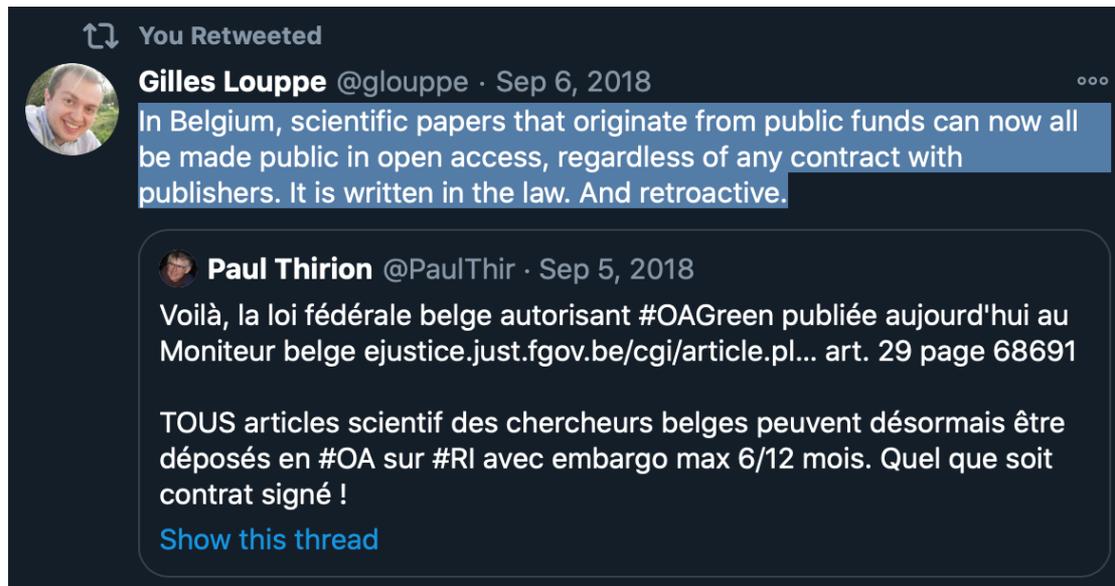
The University of California has broken with one of the world's largest academic publishers. Is this the end of a very profitable business model?

SARAH ZHANG MARCH 4, 2019

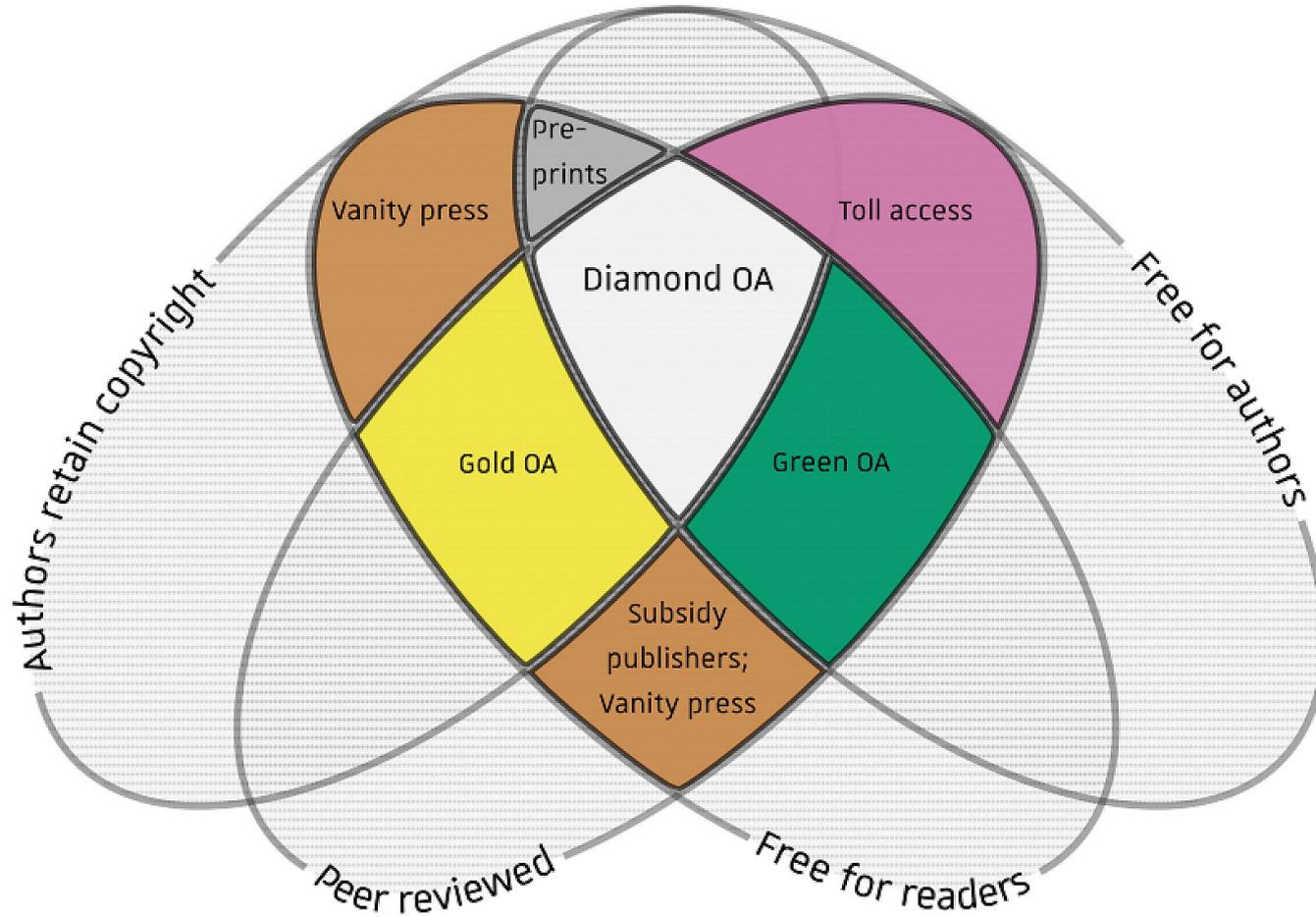
Norway joins the ranks of Germany and Sweden, cancels subscription with Elsevier

6. Open Access ≠ Open Science

“En Belgique, les articles scientifiques provenant de **fonds publics peuvent être rendus publics en libre accès**, quel que soit le contrat avec les éditeurs. C'est écrit dans la **loi**. Et **rétroactif**.”



6. Open Access ≠ Open Science



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7. Pre-registration & Registered Reports

20 Nov. 2020 – 11h00



Cyril Forestier
Maitre de Conférence
Le Mans Université
(France)

7. Pre-registration & Registered Reports

Deux types de recherche

Recherche exploratoire

- Pour se **familiariser** avec un phénomène.
- Pour développer des **hypothèses** qui devraient être approfondies.

Recherche confirmatoire

- Pour **répondre** à une question de recherche théorique spécifique.
- Basée sur des **hypothèses statistiques prédéfinies**.

7. Pre-registration & Registered Reports

Pre-registration : Consiste à publier, **sans expertise par des pairs**, la description d'une étude scientifique à venir afin de **limiter les pratiques de recherche douteuses**.



<https://aspredicted.org>



<https://osf.io>

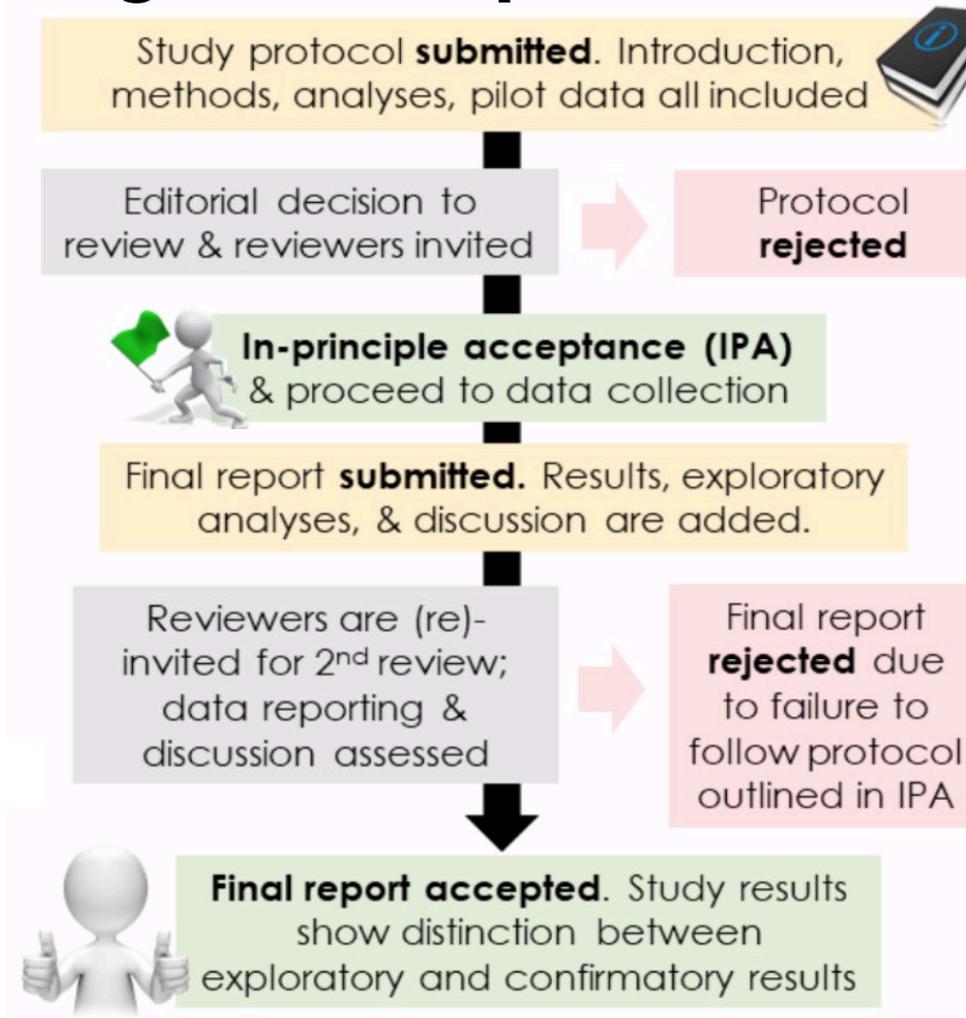
7. Pre-registration & Registered Reports

Registered Reports : Consiste à **faire expertiser** l'introduction, la méthodologie, et les données pilotes d'une étude scientifique afin qu'elle ne soit acceptée pour publication dans un journal. Ceci **avant que les données ne soient collectées** et donc que les résultats ne soient connus. Les RR permettent de limiter les pratiques scientifiques douteuses et le **biais de publication**.



7. Pre-registration & Registered Reports

Processus des RR



7. Pre-registration & Registered Reports

Quels journaux proposent le format Registered Report ?

266 journaux au total

58 Psychologie

10 Neuroscience

4 STAPS

- Human Movement Science
- Psychology of Sport and Exercise
- Registered Reports in Kinesiology
- Frontiers in Sports and Active Living



Open Science Framework

<https://cos.io/rr>

7. Pre-registration & Registered Reports

Est-ce que les Registered Reports réduisent le biais de publication ?

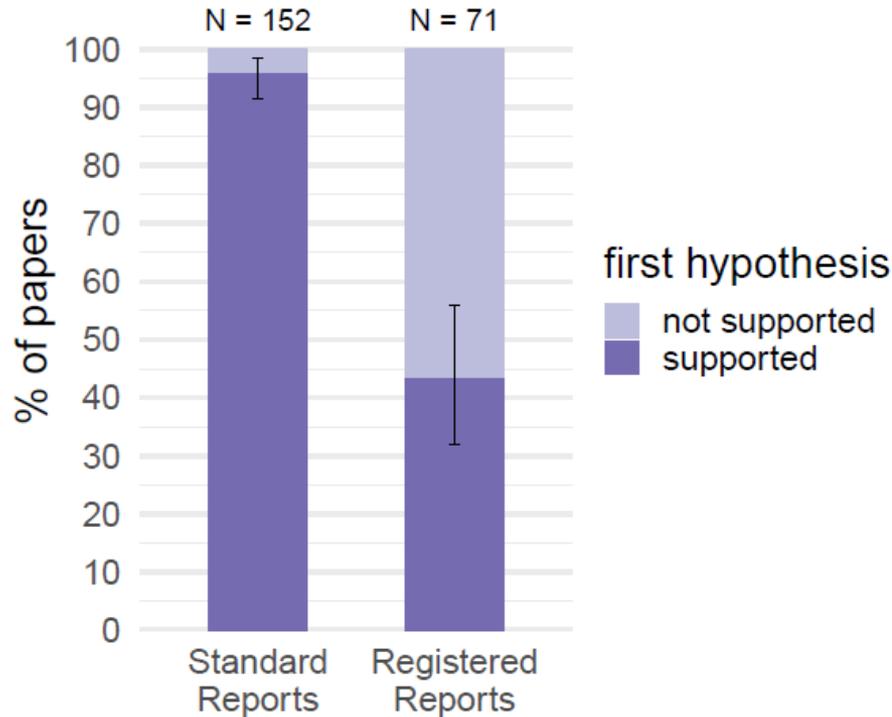


Figure 2. Positive result rates for standard reports and Registered Reports. Error bars indicate 95% confidence intervals around the observed positive result rate.

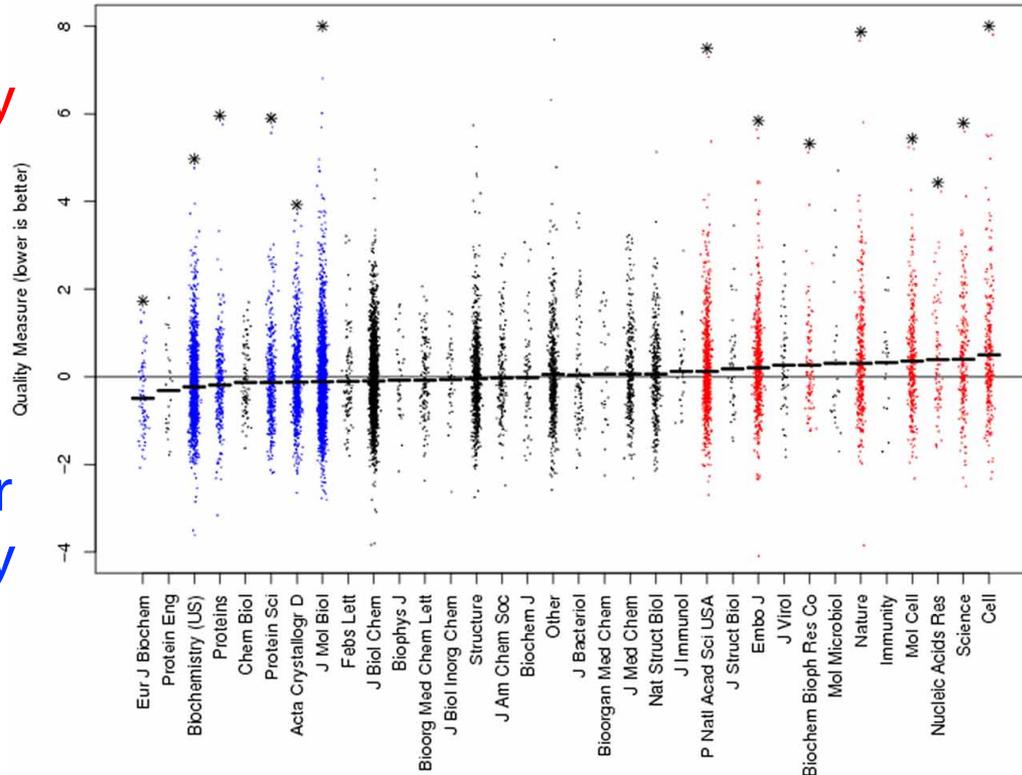
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8. Évaluer la qualité scientifique

Le facteur d'impact, un indicateur trompeur et pervers.

Lower quality

Higher quality



Lower IF

Higher IF

“Studies in high-ranking journals are often less methodologically sound than those published in other journals.”

8. Évaluer la qualité scientifique

Le facteur d'impact, un indicateur trompeur et pervers.

Matthieu Boisgontier @MattBoisgontier · Feb 20, 2019

...

Journal Impact Factors are used by publishing companies to have an upper hand on research assessment. Committees using #JIF as an assessment tool further strengthen these #ForProfit companies instead of strengthening the scientific community 1/2

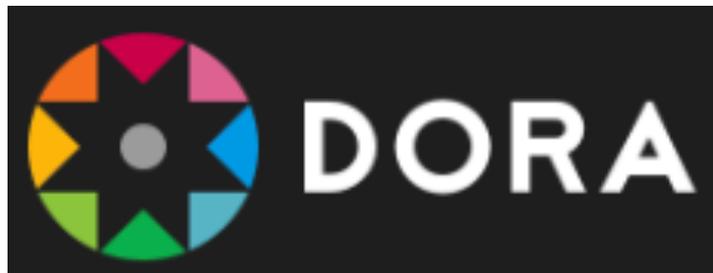
Matthieu Boisgontier @MattBoisgontier · Feb 21, 2019

...

Scientists assessment should focus on best publication practices (#RegisteredReports #OpenScience #Reproducibility), Methodological & Technical #Skills, Services to the community (#PeerReview & #Editorial Activities) & to society (#SciComm) - and make results a dead currency. 2/2

8. Évaluer la qualité scientifique

Améliorer les méthodes d'évaluation de la recherche et des chercheurs.



San Francisco Declaration on Research Assessment

C'est la communauté scientifique qui détermine le prestige d'un journal.

8. Évaluer la qualité scientifique

Améliorer les méthodes d'évaluation de la recherche et des chercheurs.



Costin Antonescu

@CostinAntonescu



Replying to [@CostinAntonescu](#)

Please, please, please do not write that trainee's paper is good because it is in a journal(s) with X.XX impact factor. If published in a field-specific journal, DO state if and how journal is well-regarded in that particular field.

8. Évaluer la qualité scientifique

Améliorer les méthodes d'évaluation de la recherche et des chercheurs.

**Évaluez l'impact de la science,
pas du journal.**



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9. Est-ce stratégique d'être un « Open Scientist »

C'est quoi être un « scientifique ouvert » ?

Vous n'êtes **pas obligé de faire de la science ouverte tout le temps**. L'important c'est de **connaître les options** qui sont disponibles et de les utiliser lorsque cela est possible.

Si vous avez déjà partagé des données, du code, preprinté, « préinscrit » votre protocole **ou** rendu des documents de recherche disponibles gratuitement, vous êtes un « open scientist ».

9. Est-ce stratégique d'être un « Open Scientist »

Recrutement



Desired Start Date: 2019/07/01

Funding Type: Budget Funded

Closing Date: 2018/10/01

Available Openings: 1

[Save Job](#) [Apply Now](#)

[Return to Previous Page](#)

The Department of Psychology at the University of British Columbia-Vancouver campus (psych.ubc.ca) invites applications for a tenure-track position at the assistant professor level in health psychology, which will begin July 1, 2019.

Candidates must hold a PhD before starting the position.

We are seeking applicants with strong research records appropriate to a research-oriented doctoral program. We are looking for outstanding health psychology candidates, regardless of research specialization, but we are especially interested in candidates whose research focuses on biopsychosocial processes in health and disease, and/or health behaviors. Applicants should have research interests that complement existing strengths in the department (psych.ubc.ca/faculty/index.psy). The successful candidate will be expected to maintain a program of scholarly research that leads to publication; conduct effective undergraduate and graduate teaching and research supervision; and contribute to departmental service.

Applications are to be submitted online through the UBC Faculty Careers website at: www.facultycareers.ubc.ca. Applicants should upload by the deadline the following documents in the order listed: cover letter, CV, research statement, teaching statement, evidence of teaching effectiveness, and 3 publications. In their research statement, [we encourage applicants to discuss their past and/or planned research approach in the context of ongoing discussion in the sciences about research practices, replicability, and open science](#). In addition, applicants should arrange to have at least three confidential letters of recommendation submitted via email to ubcpsycjobs@psych.ubc.ca.

“We encourage applicants to discuss their past and/or planned **research approach** in the context of ongoing discussion in the sciences about **research practices, replicability, and open science**”



Matthieu.Boisgontier@uOttawa.ca
<http://matthieuboisgontier.com>

9. Est-ce stratégique d'être un « Open Scientist »

Financement



Evaluation of Research Careers fully acknowledging Open Science Practices

Rewards, incentives and/or recognition for researchers practicing Open Science

Manuscript completed in July 2017.



29/06/2020

Signature d'une déclaration conjointe en faveur de la science ouverte par un réseau d'agences françaises de financement de la recherche

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Matthieu.Boisgontier@uOttawa.ca
<http://matthieuboisgontier.com>



uOttawa

Qu'est-ce que l'Open Science ?

Matthieu P. Boisgontier, MSc, MPT, PhD, HDR

13 Novembre 2020

Matthieu.Boisgontier@uOttawa.ca
<http://matthieuboisgontier.com>

Boisgontier MP (2020) Qu'est-ce que l'Open Science ?
<https://doi.org/10.17605/OSF.IO/94Z12/>



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