Openness and Evidence Synthesis: An Introduction

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The lockdown has had a profound effect on my appearance

Some general comments about openness

- Scientific and moral initiative for openness
- Open science enables research to be rapidly and openly shared to enhance discovery and accelerate the pace of knowledge development
  - COVID19
- Moral imperative
  - Visibility

What is openness

- Openness in research is more than just open access to published research
- Open scholarship encompasses a range of practices across the entire lifecycle of research from access to literature to data sharing (and reuse)
- The current COVID19 pandemic has shown that immediate open access (OA) to research publications and associated data are crucial but not happening regularly, perhaps, in part, because the research community does not know how to share data

Data sharing

- Data sharing is the process of making the data underpinning a study finding publicly available
- This may involve the sharing of raw data, summary data, and/or analytic code.
- Data sharing is a core open research practice, it allows for direct reproducibility of analyses and for aggregation of multiple openly available datasets.
- Data sharing should not be confused with materials sharing, the latter of which may involve sharing any number of materials associated with a study including (e.g. survey instruments, biological cell lines)

Data sharing

- On the 24th April (2020) a National Institutes of Health webinar revealed that the major US repositories are all coping with COVID19 datasets that are being deposited by researchers without proper de-identification
- An analysis of 535 COVID19 articles on preprint servers found that “only 21% of authors included data availability statements, and only 11% of those made their data available in external repositories”.
- The Canadian Association of Research Libraries noted the COVID19 pandemic has revealed serious gaps in the Canadian data sharing infrastructure, including trained personnel, to curate and enable publication of biomedical and health data

Some general comments about openness

- Types of OS practices:
  - Data sharing
  - OA publication
  - Preprint availability
  - Open study methods/protocol availability
  - Basic reporting
  - Registration

Registration – National Institutes of Health Research, UK

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NIHR will request researchers applying for clinical trial funding to submit the registration history of any previous trials they have conducted, as well as the publication of trial results. The NIHR will then take such information into account when making funding decisions.

Wellcome Trust initiative

- All peer-reviewed research publications relevant to the outbreak are made immediately open access, or freely available at least for the duration of the outbreak
- Research findings relevant to the outbreak are shared immediately with the WHO upon journal submission, by the journal and with author knowledge
- Research findings are made available via preprint servers before journal publication, or via platforms that make papers openly accessible before peer review, with clear statements regarding the availability of underlying data
- Researchers share interim and final research data relating to the outbreak, together with protocols and standards used to collect the data, as rapidly and widely as possible - including with public health and research communities and the WHO
- Authors are clear that data or preprints shared ahead of submission will not pre-empt its publication in these journals

COVID-19 Open Science Practices Dashboard

302 grantees ($600M)

As of February 12, 2021

Transparency Levels - Overall

Open access (postprint)	Use of preprints	Registration	Open study materials	Open data	Use of basic reporting
73% (Target: 100%)	20% (Target: 80%)	62% (Target: 90%)	12% (Target: 80%)	33% (Target: 80%)	47% (Target: 100%)

Transparency Levels - Institutional Level

		Articles (peer-reviewed)	Open access	Use of preprints	Registration	Open study materials	Open data	Use of basic reporting
1	Montreal Neurological Institute	42	90%	35%	77%	21%	51%	60%
2	Ottawa Hospital Research Institute	67	88%	29%	75%	23%	54%	56%
3	UBC - Okanagan	38	75%	31%	60%	19%	40%	50%
≈								
15	University of Toronto	138	32%	7%	32%	6%	10%	22%
16	Western University	114	28%	5%	30%	6%	8%	17%

SPECIAL ARTICLE

Clinical Trial Participants' Views of the Risks and Benefits of Data Sharing

Michelle M. Mello, J.D., Ph.D., Van Lieou, B.S., and Steven N. Goodman, M.D., Ph.D.

ABSTRACT

N Engl J Med 2018;378:2202-11

- Even if OS enables research to be rapidly and openly shared to enhance discovery and accelerate
- the pace of knowledge development, several concerns pertaining to OS practices in the context of C19
- have already emerged

Montreal Neurological Institute

- Tennenbaum Open Science Institute

neuro

Montreal Neurological Institute and Hospital
Institut et hôpital neurologiques de Montréal

Consequences of openness

- Time
- Resources

Data Champions

- Are you practising good research data management?
- Would you like to share your data management tips and tricks in your group/department?
- Would you like to get rewarded for that?

If you answered 'yes' to any of the above, consider becoming a Data Champion!

What is required to be a Data Champion

What are the rewards offered to Data Champions?

Become a Data Champion

Hong Kong Principles

- Enhance research integrity in academic institutions
- Let's move away from the publish and perish and embrace metrics that have societal value

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Concentration of ownership; > 50%

- Reed-Elsevier (> $9 billion)
  - Elsevier (> $3 billion)
- Wiley-Blackwell
- SpringerNature
- Taylor & Francis

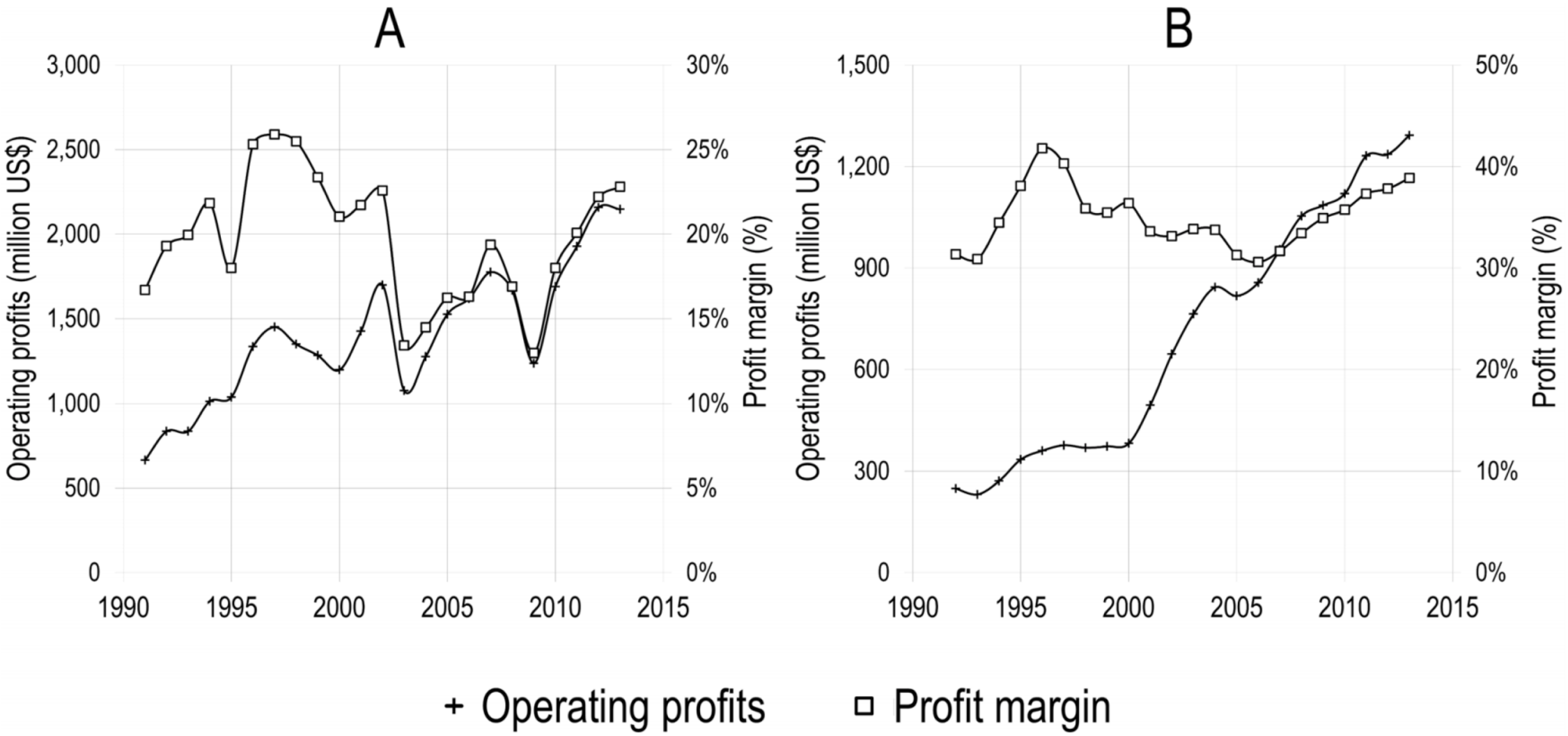

Fig 7. Operating profits (million USD) and profit margin of Reed-Elsevier as a whole (A) and of its Scientific, Technical & Medical division (B), 1991–2013. Compilation by the authors based on the annual reports of Reed-Elsevier. (http://www.reedelsevier.com/investorcentre/pages/home.aspx) Numbers for the Scientific, Technical & Medical division were only available in GBP; conversion to USD was performed using historical conversion rates from http://www.oanda.com.

Author Processing charge (APC)

- COVID19
- Other research output during this time period

Promoting transparency: Transparency and Openness Promotion (TOP)

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SCIENTIFIC STANDARDS

Promoting an open research culture

Author guidelines for journals could help to promote transparency, openness, and reproducibility

By **B. A. Nosek,* G. Alter, G. C. Banks, D. Borsboom, S. D. Bowman, S. J. Breckler, S. Buck, C. D. Chambers, G. Chin, G. Christensen, M. Contestabile, A. Dafoe, E. Eich, J. Freese, R. Glennerster, D. Goroff, D. P. Green, B. Hesse, M. Humphreys, J. Ishiyama, D. Karlan, A. Kraut, A. Lupia, P. Mabry, T. A. Madon, N. Malhotra, E. Mayo-Wilson, M. McNutt, E. Miguel, E. Levy Paluck, U. Simonsohn, C. Soderberg, B. A. Spellman, J. Turitto, G. VandenBos, S. Vazire, E. J. Wagenmakers, R. Wilson, T. Yarkoni**

Transparency, openness, and reproducibility are readily recognized as vital features of science (*1*, *2*). When asked, most scientists embrace these features as disciplinary norms and values (*3*). Therefore, one might expect that these valued features would be routine in daily practice. Yet, a growing body of evidence suggests that this is not the case (*4*–*6*).

A likely culprit for this disconnect is an academic reward system that does not sufficiently incentivize open practices (*7*). In the present reward system, emphasis on innovation may undermine practices that support verification. Too often, publication requirements (whether actual or perceived) fail to encourage transparent, open, and reproducible science (*2*, *4*, *8*, *9*). For example, in a transparent science, both null results and statistically significant results are made available and help others more accurately assess the evidence base for a phenomenon. In the present culture, however, null results are published less frequently than statistically significant results (*10*) and are, therefore, more likely inaccessible and lost in the "file drawer" (*11*).

POLICY

The situation is a classic collective action problem. Many individual researchers lack

Summary of the eight standards and three levels of the TOP guidelines

Levels 1 to 3 are increasingly stringent for each standard. Level 0 offers a comparison that does not meet the standard.

	LEVEL 0	LEVEL 1	LEVEL 2	LEVEL 3
Citation standards	Journal encourages citation of data, code, and materials—or says nothing.	Journal describes citation of data in guidelines to authors with clear rules and examples.	Article provides appropriate citation for data and materials used, consistent with journal's author guidelines.	Article is not published until appropriate citation for data and materials is provided that follows journal's author guidelines.
Data transparency	Journal encourages data sharing—or says nothing.	Article states whether data are available and, if so, where to access them.	Data must be posted to a trusted repository. Exceptions must be identified at article submission.	Data must be posted to a trusted repository, and reported analyses will be reproduced independently before publication.
Analytic methods (code) transparency	Journal encourages code sharing—or says nothing.	Article states whether code is available and, if so, where to access them.	Code must be posted to a trusted repository. Exceptions must be identified at article submission.	Code must be posted to a trusted repository, and reported analyses will be reproduced independently before publication.
Research materials transparency	Journal encourages materials sharing—or says nothing	Article states whether materials are available and, if so, where to access them.	Materials must be posted to a trusted repository. Exceptions must be identified at article submission.	Materials must be posted to a trusted repository, and reported analyses will be reproduced independently before publication.
Design and analysis transparency	Journal encourages design and analysis transparency or says nothing.	Journal articulates design transparency standards.	Journal requires adherence to design transparency standards for review and publication.	Journal requires and enforces adherence to design transparency standards for review and publication.
Preregistration of studies	Journal says nothing.	Journal encourages preregistration of studies and provides link in article to preregistration if it exists.	Journal encourages preregistration of studies and provides link in article and certification of meeting preregistration badge requirements.	Journal requires preregistration of studies and provides link and badge in article to meeting requirements.
Preregistration of analysis plans	Journal says nothing.	Journal encourages preanalysis plans and provides link in article to registered analysis plan if it exists.	Journal encourages preanalysis plans and provides link in article and certification of meeting registered analysis plan badge requirements.	Journal requires preregistration of studies with analysis plans and provides link and badge in article to meeting requirements.
Replication	Journal discourages submission of replication studies—or says nothing.	Journal encourages submission of replication studies.	Journal encourages submission of replication studies and conducts blind review of results.	Journal uses Registered Reports as a submission option for replication studies with peer review before observing the study outcomes.

Thank you