How to improve the value of your research by making it verifiable

Dr. Corina Logan

Max Planck Institute
for Evolutionary Anthropology

Comparative
Behavioral
Ecology

corina_logan@eva.mpg.de | @LoganCorina

Slides CC-BY-SA 4.0
at osf.io/9jhwc

We won't be...

BULLIED INTO BAD SCIENCE

Leading individuals and institutions in adopting open practices to improve research rigor

Ross Mounce, Stephen Eglen, Adrian Currie, Lauren Maggio

Early Career Rearchers (ECRs) **often feel pressured** into taking actions **against our ethics** to pursue an academic career (e.g., publishing in particular journals)

ECRs: Sign the **petition** to help us change academic culture

Non-ECRs: Join the list of **supporters** by valuing open practices, especially when making decisions about hiring, promotion, and grants

www.BulliedIntoBadScience.org #BulliedIntoBadScience

SHUTTLEWORTH FUNDED

Conducting & evaluating research depends on the ability to:

1. **read, understand, and verify it.**
   Massive amounts of money paid to publishers
   = barrier to researchers, academia, and the public

2. have anyone **generate and disseminate it**,
   regardless of wealth, access to opportunity,
   perception of prestige, and evaluator implicit biases

Conducting & evaluating research depends on the ability to:

1. **read**, **understand**, **and** **verify** **it**.
   Massive amounts of money paid to publishers
   = barrier to researchers, academia, and the public

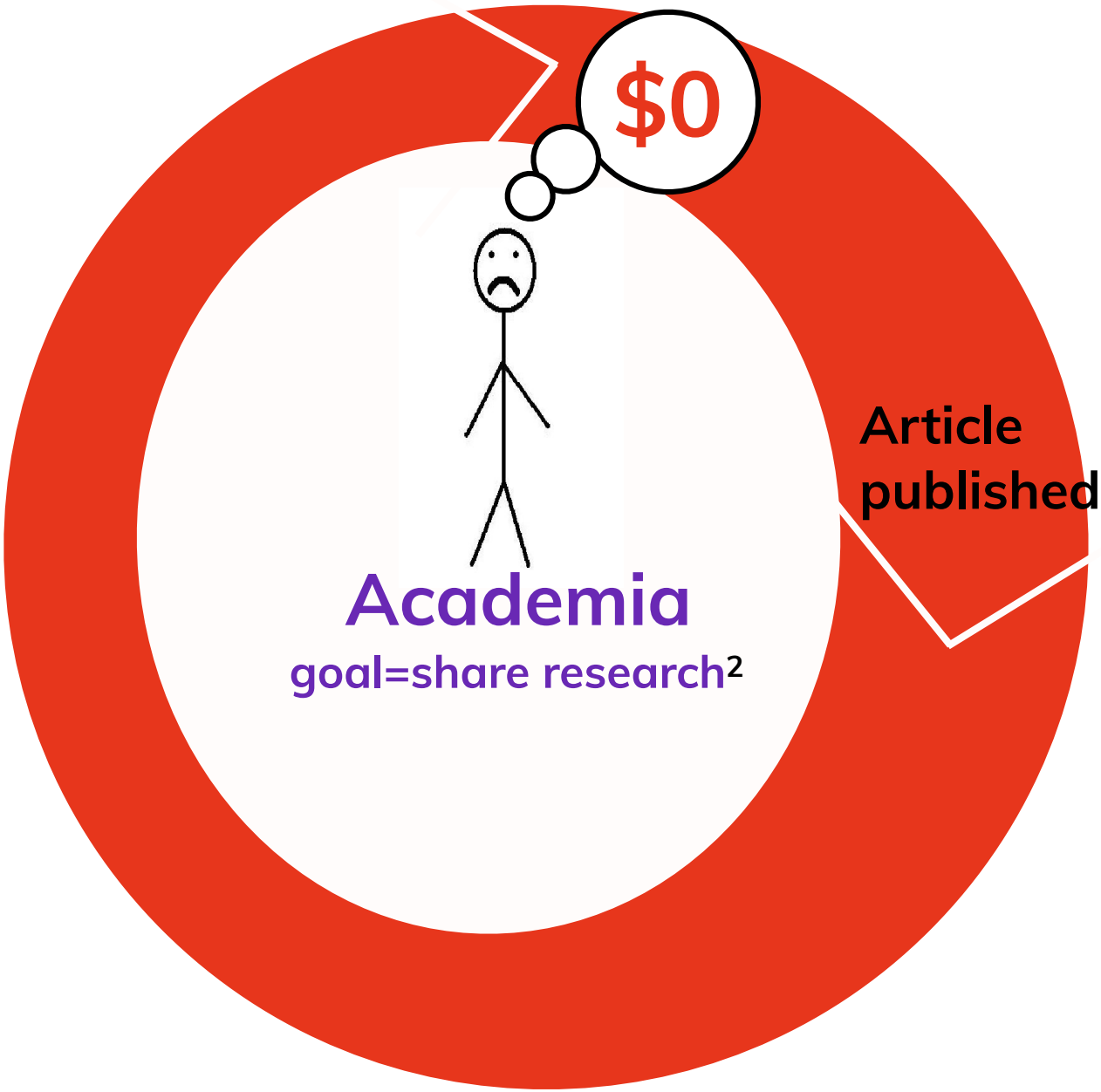
2. have anyone **generate** **and** **disseminate** **it**,
   regardless of wealth, access to opportunity,
   perception of prestige, and evaluator implicit biases

How scholarly publishing works

Exploitative route

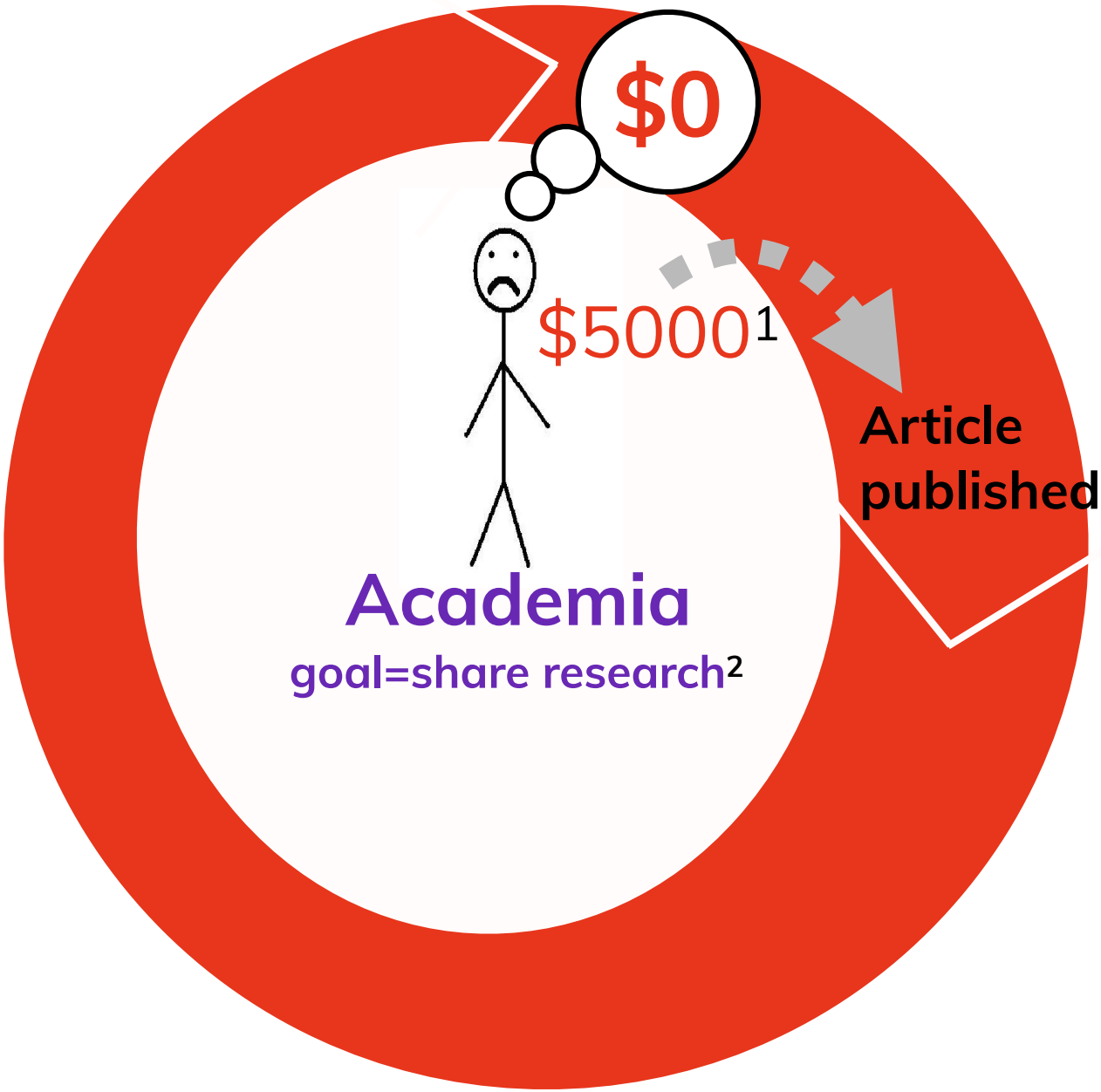
[1]Van Noorden 2013 nature.com/news/open-access-the-true-cost-of-science-publishing-1.12676
[2]Nosek & Bar-Anan 2012 *J Psych Inquiry*
Logan 2017 *F1000Research*

Exploitative route



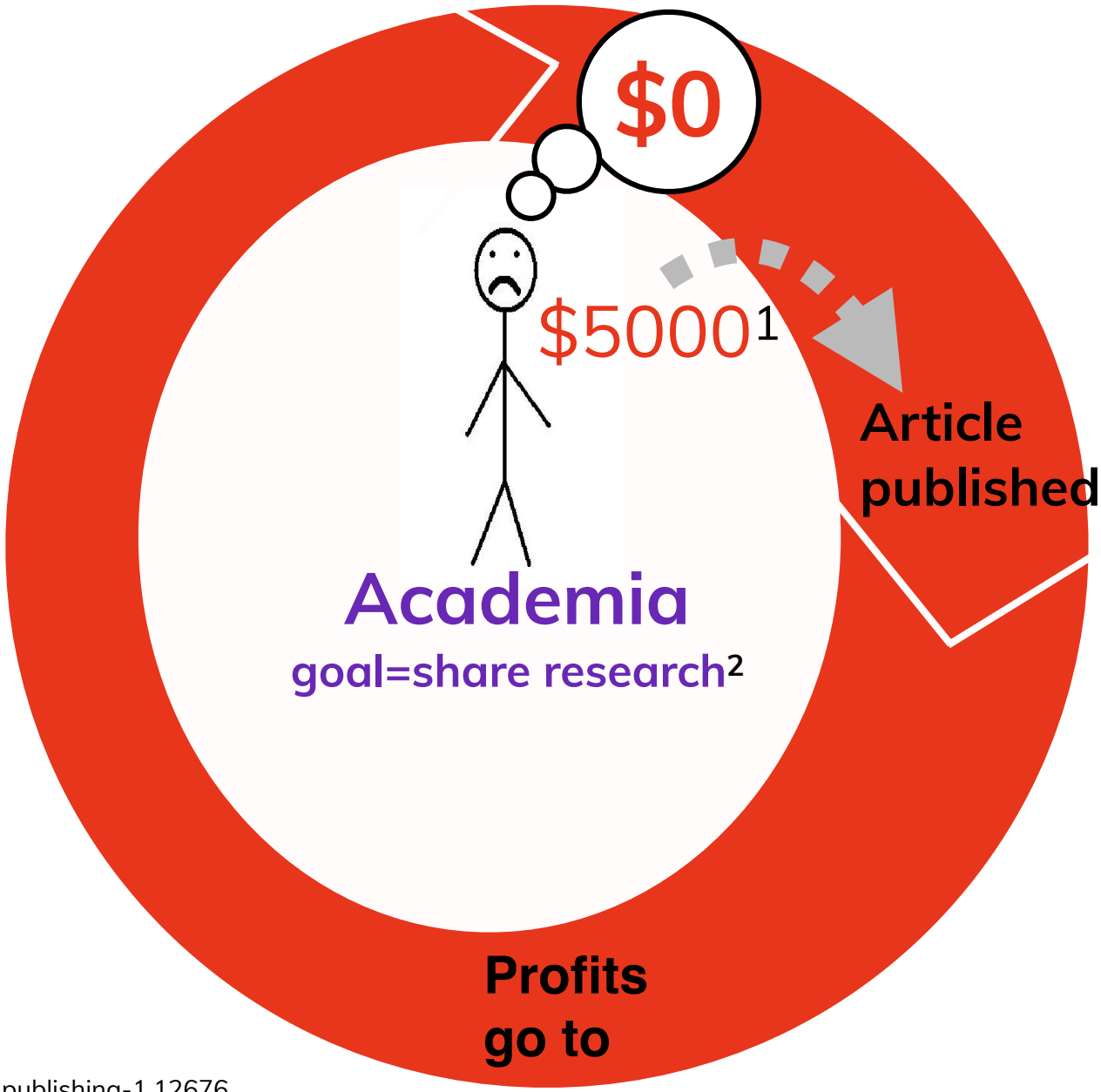
[1]Van Noorden 2013 nature.com/news/open-access-the-true-cost-of-science-publishing-1.12676
[2]Nosek & Bar-Anan 2012 *J Psych Inquiry*
Logan 2017 *F1000Research*

Exploitative route



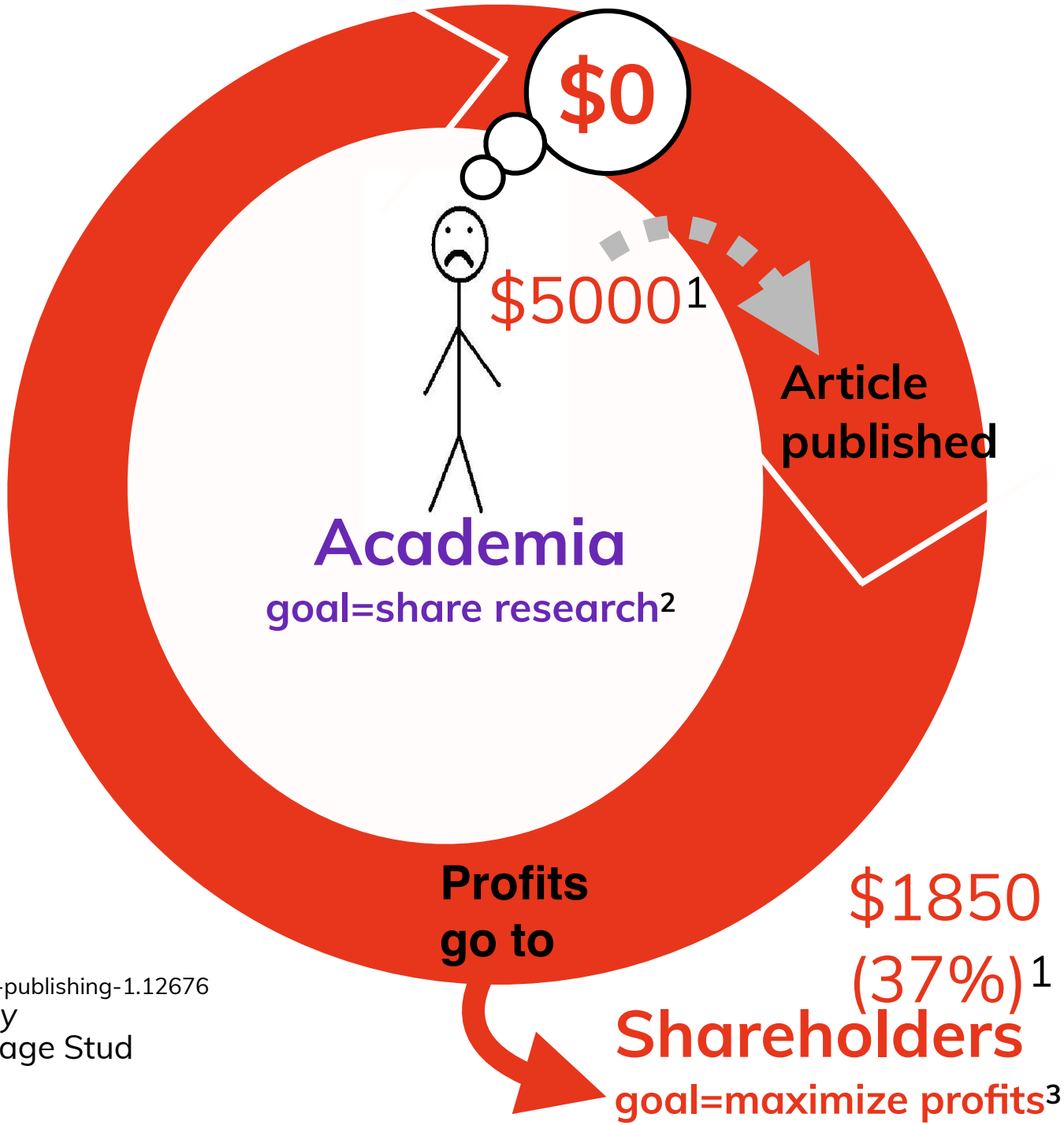
[1]Van Noorden 2013 nature.com/news/open-access-the-true-cost-of-science-publishing-1.12676
[2]Nosek & Bar-Anan 2012 *J Psych Inquiry*
Logan 2017 *F1000Research*

Exploitative route



[1]Van Noorden 2013
nature.com/news/open-access-the-true-cost-of-science-publishing-1.12676
[2]Nosek & Bar-Anan 2012 *J Psych Inquiry*
[3]Husted & de Jesus Salazar 2006 J Manage Stud
[4]Research Information Network 2008
Logan 2017 *F1000Research*

Exploitative route

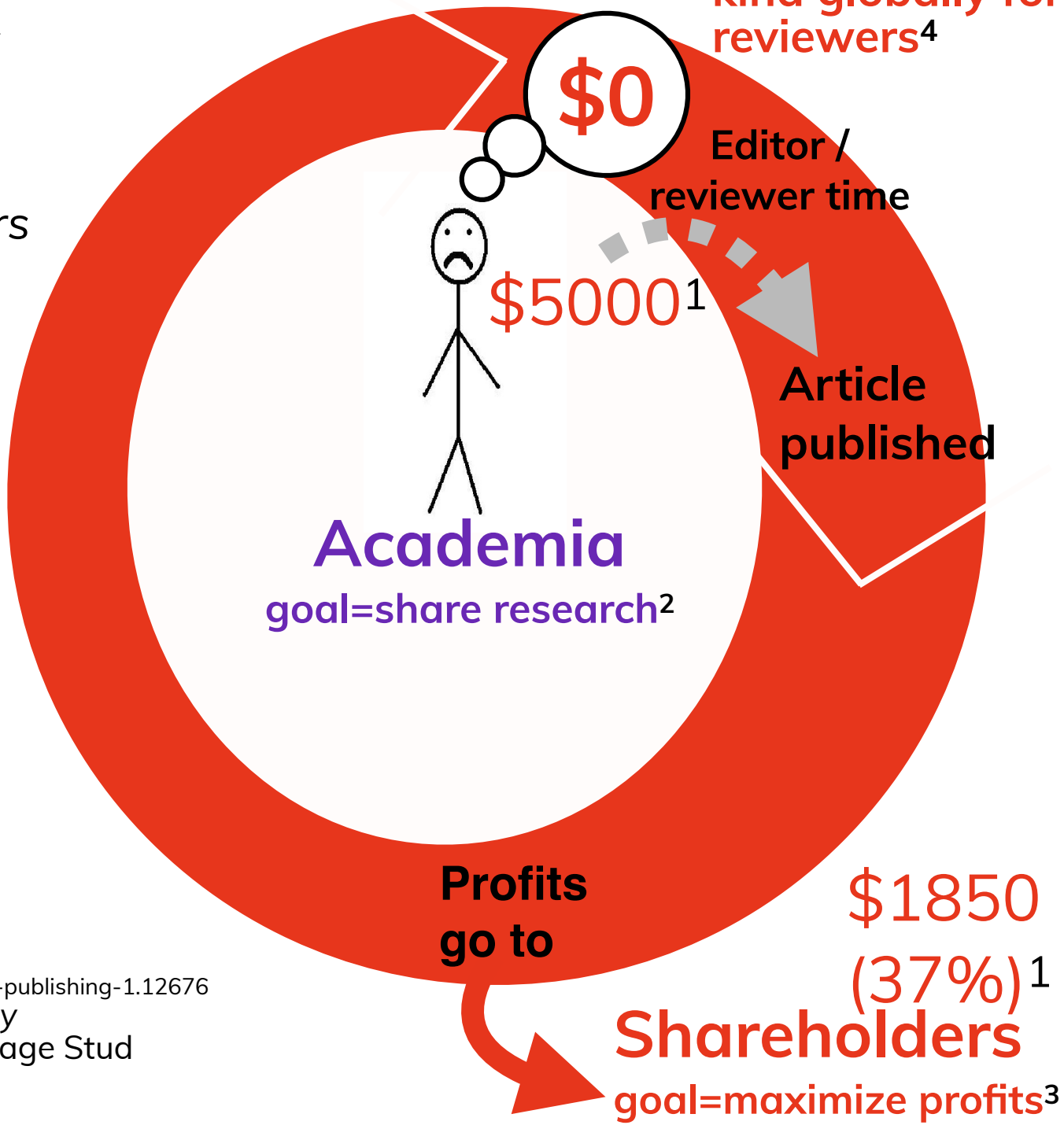


[1]Van Noorden 2013
nature.com/news/open-access-the-true-cost-of-science-publishing-1.12676
[2]Nosek & Bar-Anan 2012 *J Psych Inquiry*
[3]Husted & de Jesus Salazar 2006 J Manage Stud
[4]Research Information Network 2008
Logan 2017 *F1000Research*

Exploitative route

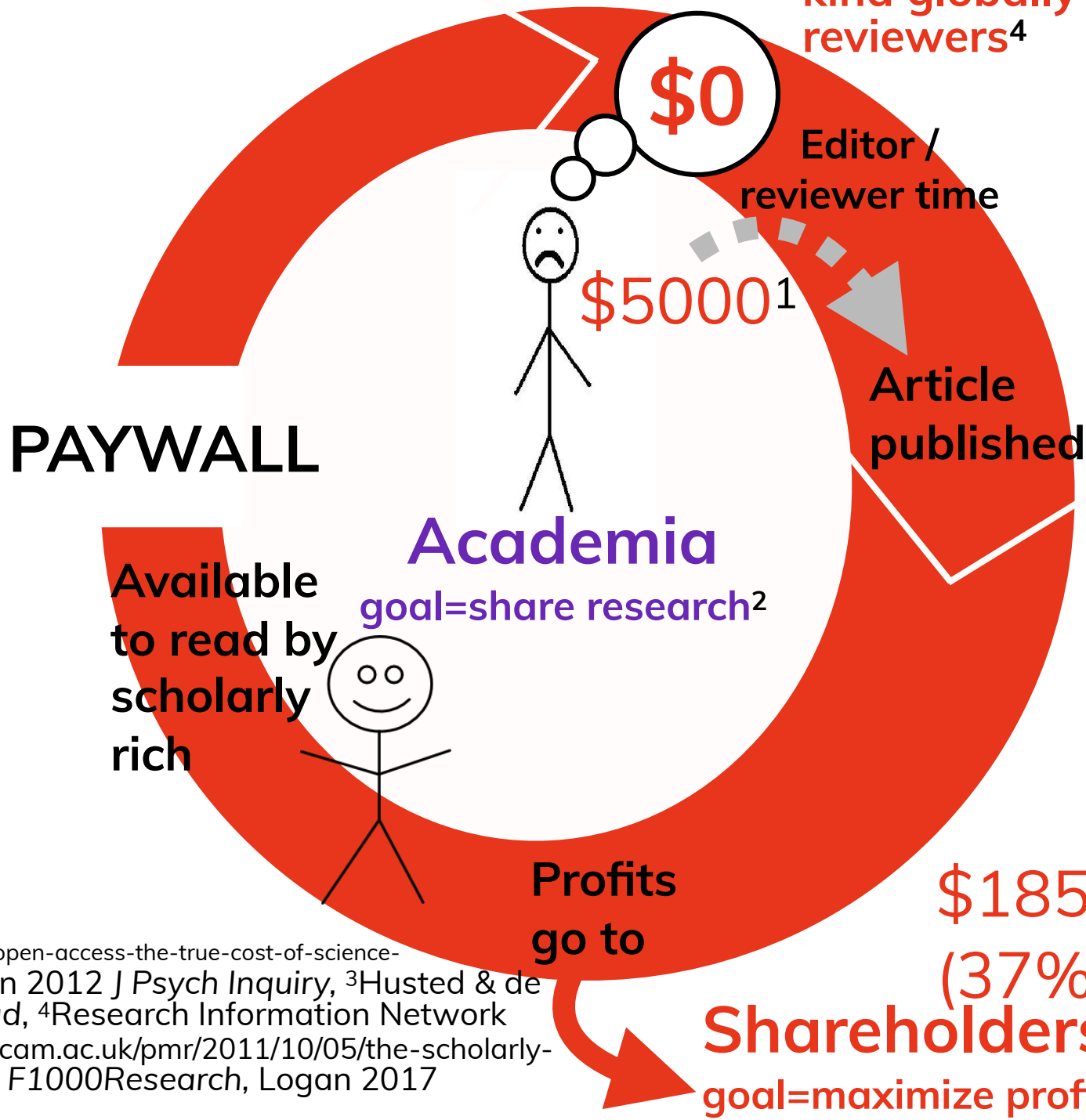
Academics perform quality control at no cost to publishers

What services do publishers actually provide?



[1]Van Noorden 2013
nature.com/news/open-access-the-true-cost-of-science-publishing-1.12676
[2]Nosek & Bar-Anan 2012 *J Psych Inquiry*
[3]Husted & de Jesus Salazar 2006 J Manage Stud
[4]Research Information Network 2008
Logan 2017 *F1000Research*

Exploitative route

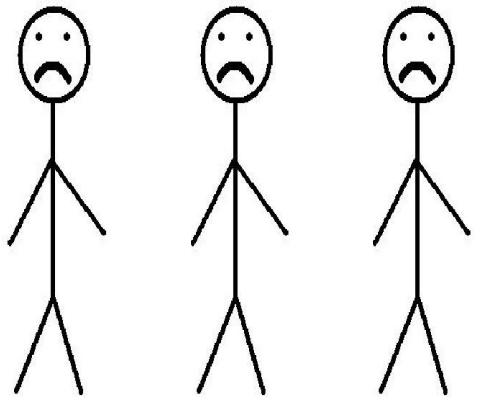


[1]Van Noorden 2013 nature.com/news/open-access-the-true-cost-of-science-publishing-1.12676, [2]Nosek & Bar-Anan 2012 *J Psych Inquiry*, [3]Husted & de Jesus Salazar 2006 *J Manage Stud*, [4]Research Information Network 2008, Murray-Rust 2011 blogs.ch.cam.ac.uk/pmr/2011/10/05/the-scholarly-poor-dentists/, Tennant et al. 2016 *F1000Research*, Logan 2017 *F1000Research*

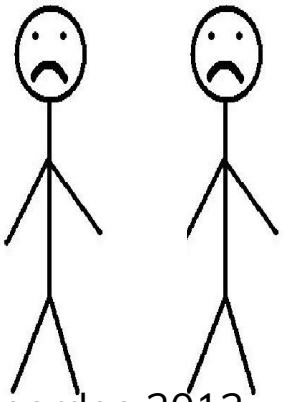
Exploitative route

Indirect discrimination

Patient MD Public



Other researchers



£1.9 billion/yr in kind globally for reviewers[4]

$0

Editor / reviewer time

$5000[1]

Article published

PAYWALL

Academia

goal=share research[2]

Available to read by scholarly rich

Profits go to

$1850 (37%)[1]

Shareholders

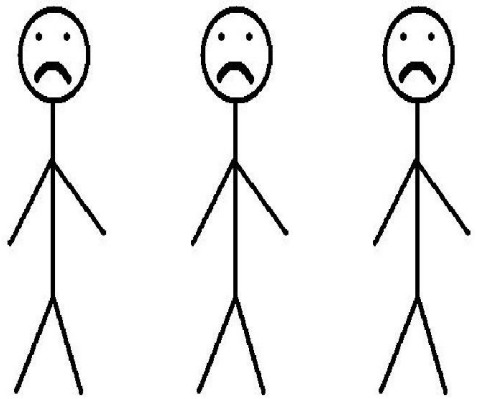
goal=maximize profits[3]

[1]Van Noorden 2013 nature.com/news/open-access-the-true-cost-of-science-publishing-1.12676, [2]Nosek & Bar-Anan 2012 *J Psych Inquiry*, [3]Husted & de Jesus Salazar 2006 *J Manage Stud*, [4]Research Information Network 2008, Murray-Rust 2011 blogs.ch.cam.ac.uk/pmr/2011/10/05/the-scholarly-poor-dentists/, Tennant et al. 2016 *F1000Research*, Logan 2017 *F1000Research*

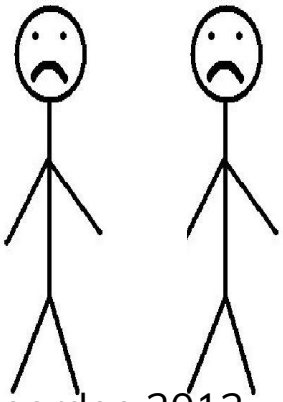
Exploitative route

Indirect discrimination

Patient MD Public



Other researchers



Public funds research

PAYWALL

Academia

goal=share research[2]

Editor / reviewer time

£1.9 billion/yr in kind globally for reviewers[4]

$5000[1]

Article published

Available to read by scholarly rich

Profits go to

$1850 (37%)[1]

Shareholders

goal=maximize profits[3]

[1]Van Noorden 2013 nature.com/news/open-access-the-true-cost-of-science-publishing-1.12676, [2]Nosek & Bar-Anan 2012 *J Psych Inquiry*, [3]Husted & de Jesus Salazar 2006 *J Manage Stud*, [4]Research Information Network 2008, Murray-Rust 2011 blogs.ch.cam.ac.uk/pmr/2011/10/05/the-scholarly-poor-dentists/, Tennant et al. 2016 *F1000Research*, Logan 2017 *F1000Research*

The ethical framework

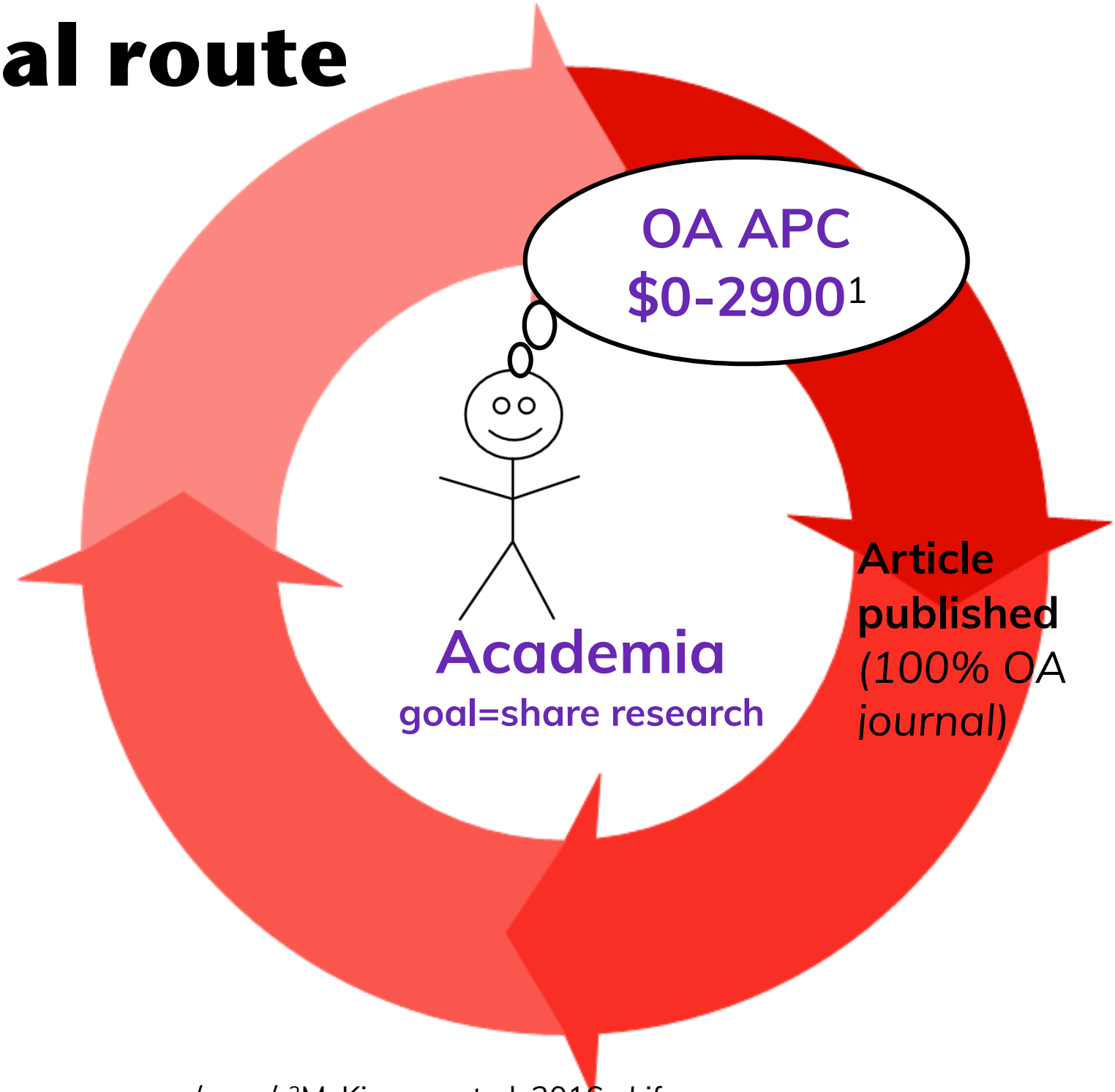
1) Researchers and publishers have a **responsibility to the public** to provide them with **free access to publicly funded products**, which are a common good[1,2]

2) Publishers of research products have a **responsibility to researchers** to value the generation and packaging of knowledge[3]

3) Researchers have a **responsibility to the public to conduct rigorous research** because it will serve as the foundation for the advancement of discoveries, it provides the best value for money, and earns public trust[4]

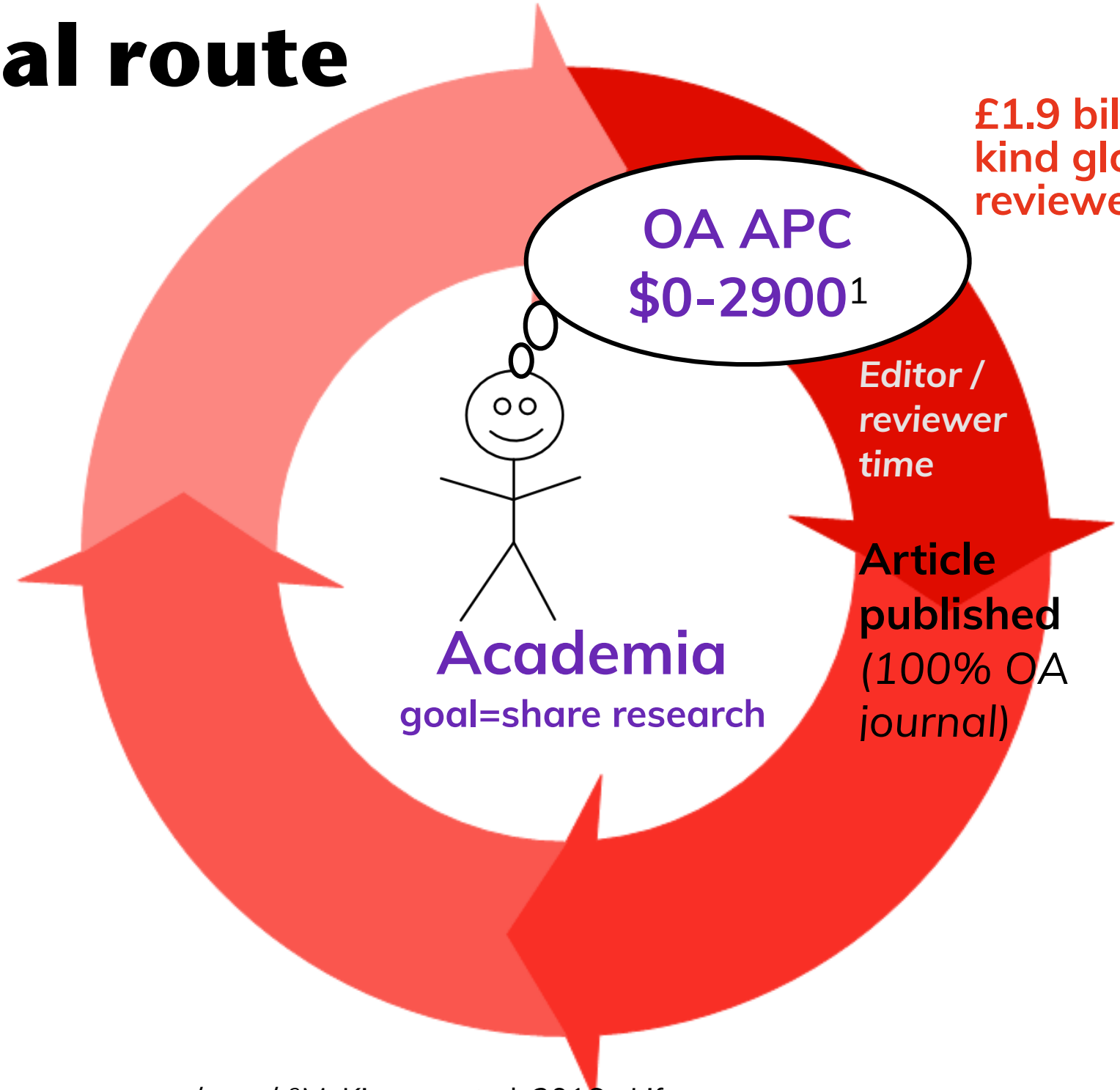
[1]Stilgoe et al. 2013 *Res Policy*
[2]Woodward 1990 *Library Trends*
[3]Fuchs & Sandoval 2013 *TripleC: Communication, Capitalism & Critique*
[4]Nosek & Bar-Anan 2012 *J Psych Inquiry*
Logan 2017 *F1000Research*

Ethical route



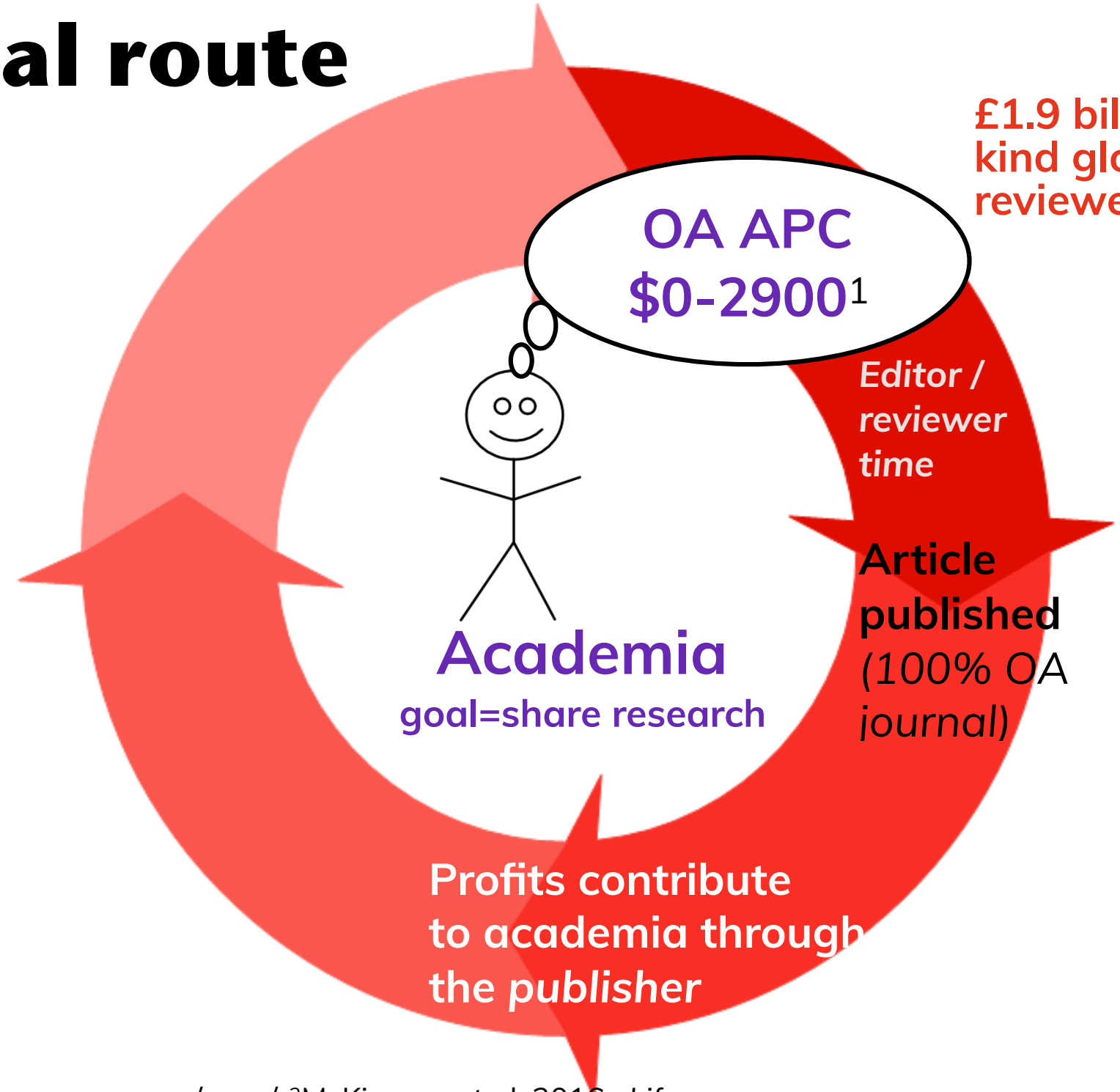
[1]SPARC http://sparceurope.org/oaca/, [2]McKiernan et al. 2016 *eLife*, Tennant et al. 2016 *F1000Research*, Logan 2017 *F1000Research*

Ethical route



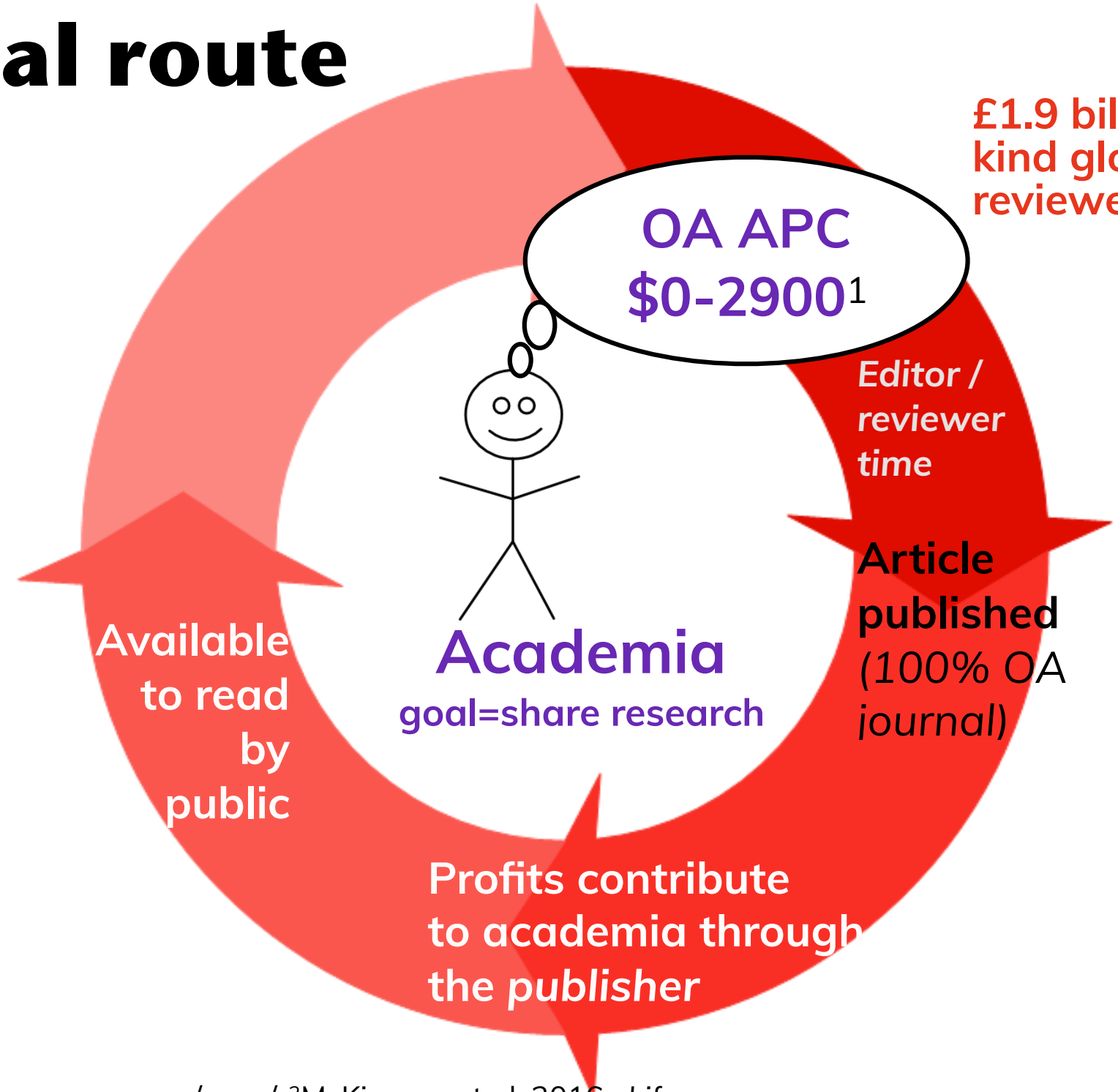
[1]SPARC http://sparceurope.org/oaca/, [2]McKiernan et al. 2016 *eLife*, Tennant et al. 2016 *F1000Research*, Logan 2017 *F1000Research*

Ethical route



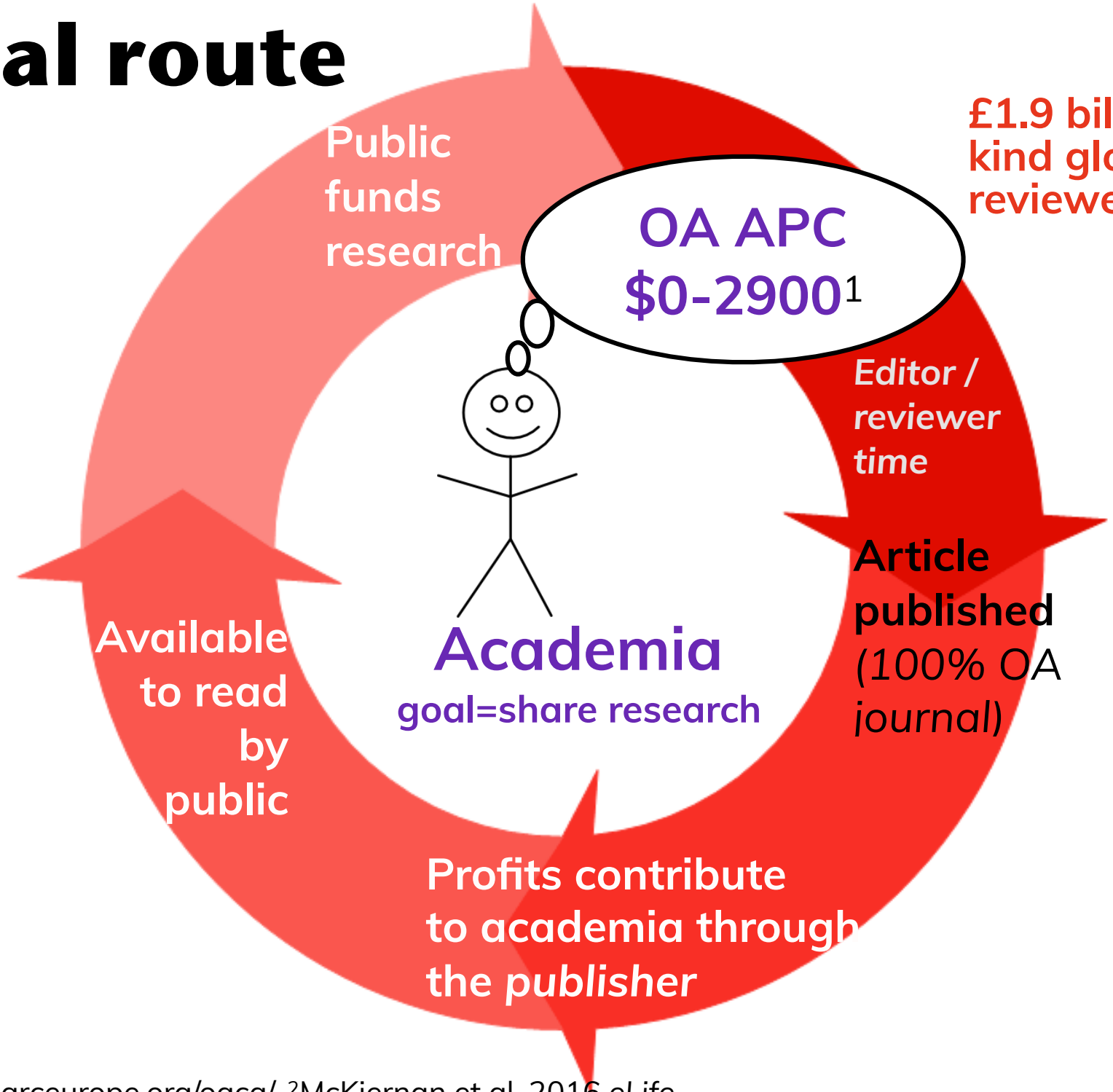
[1]SPARC http://sparceurope.org/oaca/, [2]McKiernan et al. 2016 *eLife*, Tennant et al. 2016 *F1000Research*, Logan 2017 *F1000Research*

Ethical route



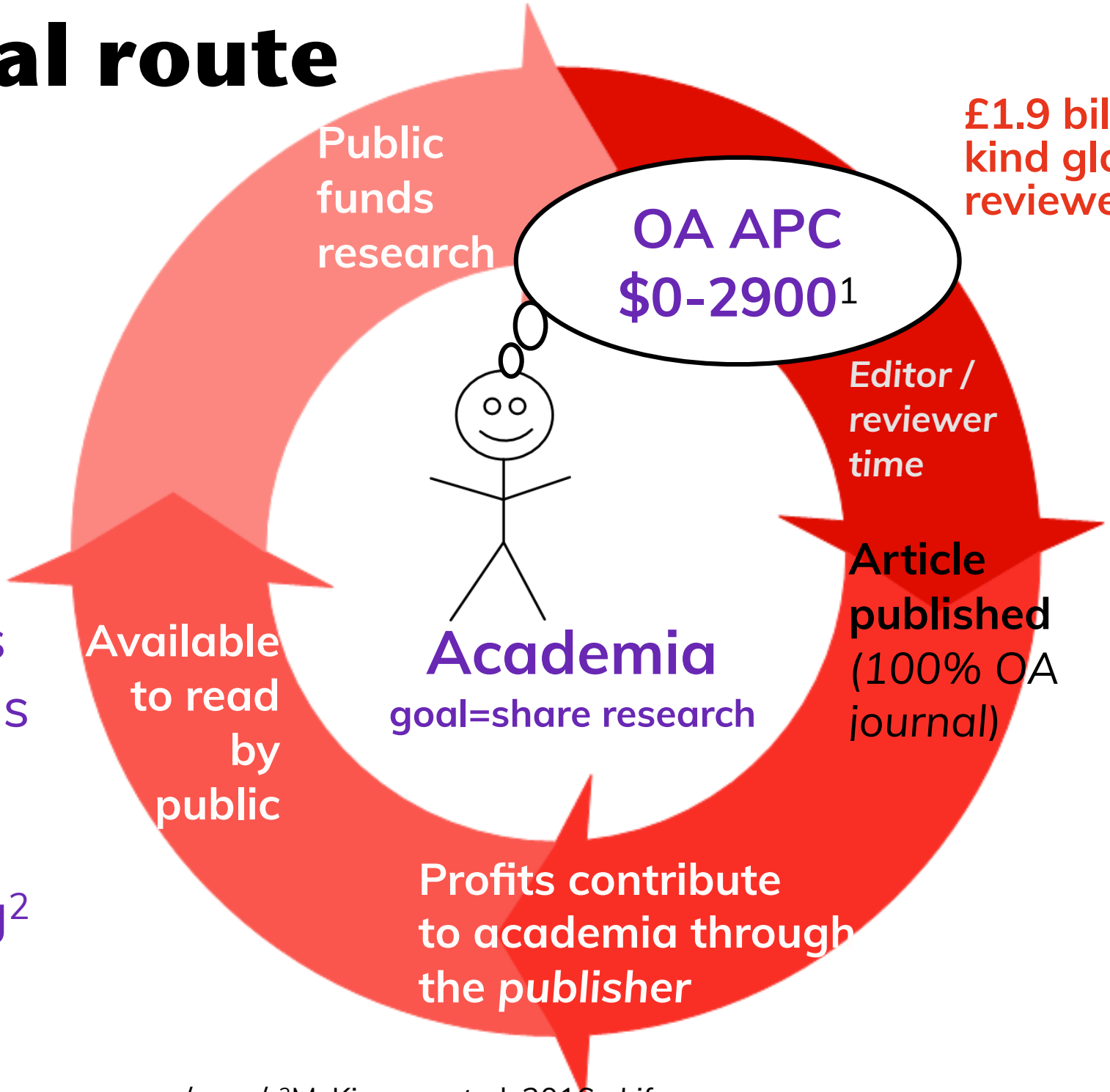
[1]SPARC http://sparceurope.org/oaca/, [2]McKiernan et al. 2016 *eLife*, Tennant et al. 2016 *F1000Research*, Logan 2017 *F1000Research*

Ethical route



[1]SPARC http://sparceurope.org/oaca/, [2]McKiernan et al. 2016 *eLife*, Tennant et al. 2016 *F1000Research*, Logan 2017 *F1000Research*

Ethical route



+ readers
+ citations
+ media
+ jobs
+ funding[2]

[1]SPARC http://sparceurope.org/oaca/, [2]McKiernan et al. 2016 *eLife*, Tennant et al. 2016 *F1000Research*, Logan 2017 *F1000Research*

Conducting & evaluating research depends on the ability to:

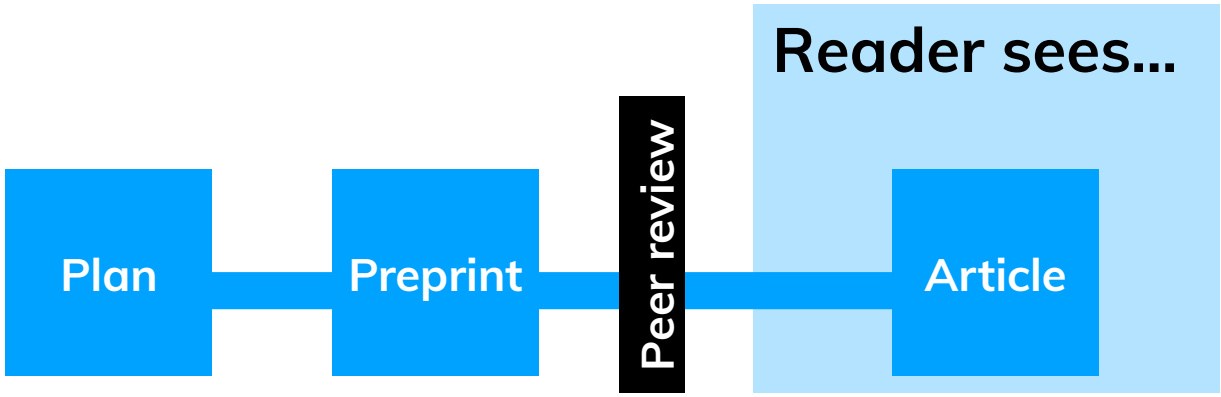
1. **read**, **understand**, **and** **verify** **it**.
   Massive amounts of money paid to publishers
   = barrier to researchers, academia, and the public

2. have anyone **generate** **and** **disseminate** **it**,
   regardless of wealth, access to opportunity,
   perception of prestige, and evaluator implicit biases

Closed peer review = unverifiable

Closed peer review prevents verifiability of the evaluation of the research process

- Prohibits quality control
- Reviews can be inadequate, biased, subjective
- Editors = key to high standards in research and ethics



Resin & Elmore 2016 *Science & Engineering Ethics*,
https://peerj.com/blog/post/100580518238/whos-afraid-of-open-peer-review/

My closed peer review horror story

- I **reviewed an article**, raised many issues, some insurmountable

My closed peer review horror story

- I **reviewed an article**, raised many issues, some insurmountable
- Decision = **Major Revision**

My closed peer review horror story

- I **reviewed an article**, raised many issues, some insurmountable
- Decision = **Major Revision**
- Not cc’ed on further decisions, **no re-review**

My closed peer review horror story

- I **reviewed an article**, raised many issues, some insurmountable
- Decision = **Major Revision**
- Not cc'ed on further decisions, **no re-review**
- Asked to publish a response to accepted article. **Accepted version didn't address comments**; many factual errors

My closed peer review horror story

- I **reviewed an article**, raised many issues, some insurmountable
- Decision = **Major Revision**
- Not cc'ed on further decisions, **no re-review**
- Asked to publish a response to accepted article. **Accepted version didn't address comments**; many factual errors
- Executive editor + handling editor + president of society **refused to acknowledge they accepted the article without proper revision** and **didn't seem to care it was low quality / incorrect**

My closed peer review horror story

- I **reviewed an article**, raised many issues, some insurmountable
- Decision = **Major Revision**
- Not cc'ed on further decisions, **no re-review**
- Asked to publish a response to accepted article. **Accepted version didn't address comments**; many factual errors
- Executive editor + handling editor + president of society **refused to acknowledge they accepted the article without proper revision** and **didn't seem to care it was low quality / incorrect**
- I am mentioned in Acknowledgements

I control where I donate my reviewer/editor time

Reviewing Ethics

If I am invited to review a paper for a journal and/or publisher that is not aligned with my commitment to conducting rigorous science, I accept the review, write the below text in the Comments to the Authors section, and submit the review. I got this idea from the Peer Reviewers' Openness Initiative and modified it to suit my particular ethics.

- - -

My goal is to ethically conduct and promote rigorous science. I avoid exploiting myself as a scientist, I facilitate equality and diversity by ensuring that no one is discriminated against when reading scientific literature I contribute to, and I keep funds in academia (see my paper, presentation, and website for background). I use the mechanism of transparency to achieve my goal so anyone can evaluate my contributions at every step of the process.

Therefore, I am only willing to review papers that:
1) are going to be published gold open access under a CC-BY license,
2) will publish the review history alongside the paper,
3) are submitted to a journal where 100% of the articles are open access, and
4) are submitted to a journal that is published by an academic non-profit organization, or a for-profit corporation that a) has low or no article processing charges, and/or b) heavily invests profits in academia, and/or c) are working to modernize publishing infrastructure for researchers

I am not willing to review this paper at this journal because criteria 2-4 are not met, and it is unclear whether criterion 1 is met.

Sincerely,
Corina Logan
Max Planck Institute for Evolutionary Anthropology

http://www.corinalogan.com/ethics.html

Peer review of preregistrations at PCI

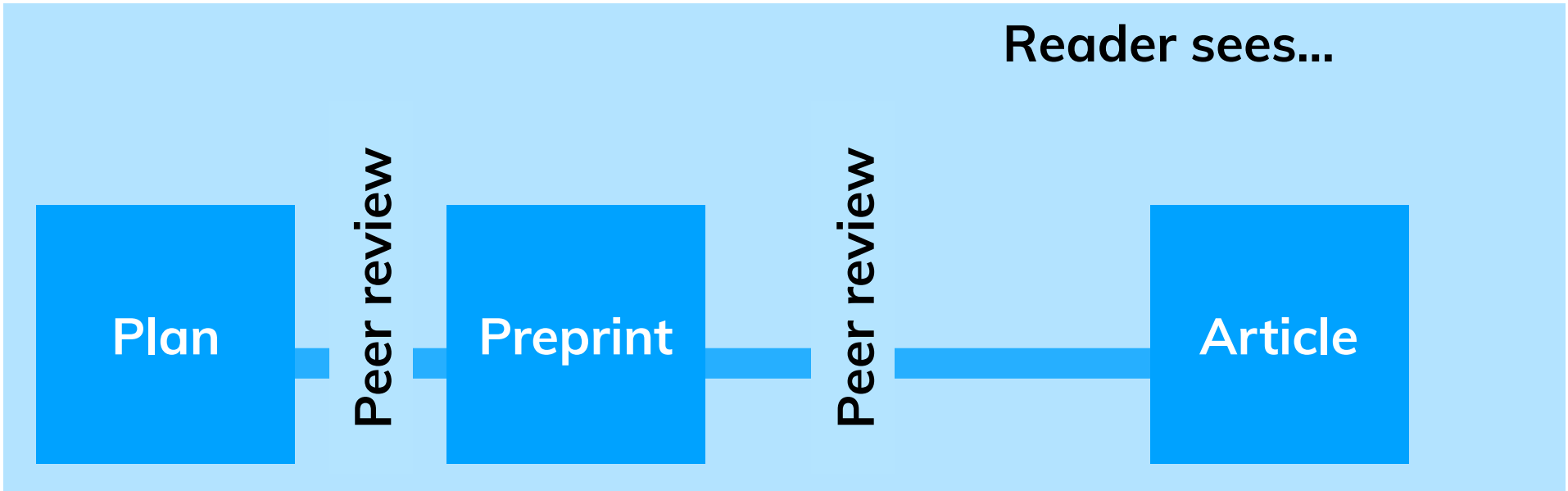
Prevents wasting resources by improving research before it begins

"Flexible registered report"

Peer Community In Ecology
Free and transparent preprint and postprint recommendations in ecology

Peer Community In Evolutionary Biology
Free and transparent preprint and postprint recommendations in evolutionary biology

Allows verification of research process and evaluation process



https://ecology.peercommunityin.org, slides for open peer review talk at JSM: https://osf.io/gwzh6/

Conducting & evaluating research depends on the ability to:

1. **read**, **understand**, **and** **verify** **it**.
   Massive amounts of money paid to publishers
   = barrier to researchers, academia, and the public

2. have anyone **generate** **and** **disseminate** **it**,
   regardless of wealth, access to opportunity,
   perception of prestige, and evaluator implicit biases

Making my research readable and verifiable = better & faster

Making my research readable & verifiable saves time and increases its value

Ideas / Hypotheses

rmarkdown

GitHub

BibTeX

Research plan, protocols, materials

Google Docs

rmarkdown

PsychoPy
Psychology software in Python

FreeCAD
Open Source parametric 3D CAD modeler

GitHub

Data collection & storage

Google Sheets

Prim8 Software

KEEPER

Coordinate team

OSF

Google Photos

Google Calendar

WhatsApp

GitLab

slack

Peer review / evaluation

Peer Community In Ecology
Free and transparent preprint and postprint recommendations in ecology

bioRxiv
THE PREPRINT SERVER FOR BIOLOGY

THE GRACKLE PROJECT

Above the line = open tool
Below = not open

Open = free to use
Most=free to use, all=free for public to read, some=open source

See GenR blog for a conversion of this work flow to all open source tools:
https://genr.eu/wp/making-research-workflow-open-source/

I describe what I love about my workflow at MPI Innovators blog
https://innovatingscholcomm.mpdl.mpg.de/2019/06/10/corinas-workflow/

Conducting & evaluating research depends on the ability to:

1. **read**, **understand**, **and** **verify** **it**.
   Massive amounts of money paid to publishers
   = barrier to researchers, academia, and the public

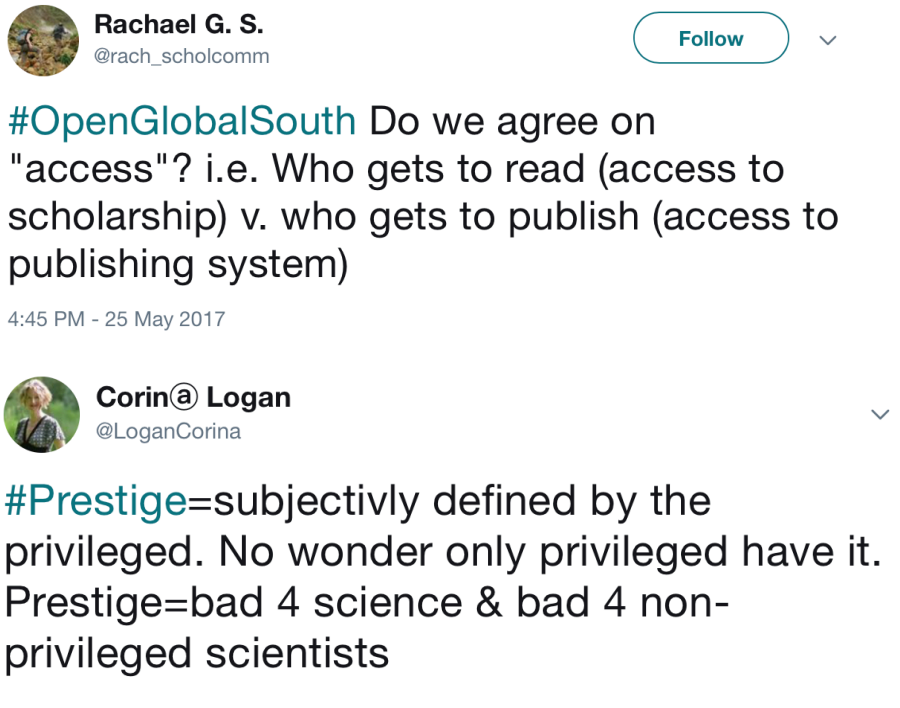
2. have anyone **generate** **and** **disseminate** **it**,
   regardless of wealth, access to opportunity,
   perception of prestige, and evaluator implicit biases

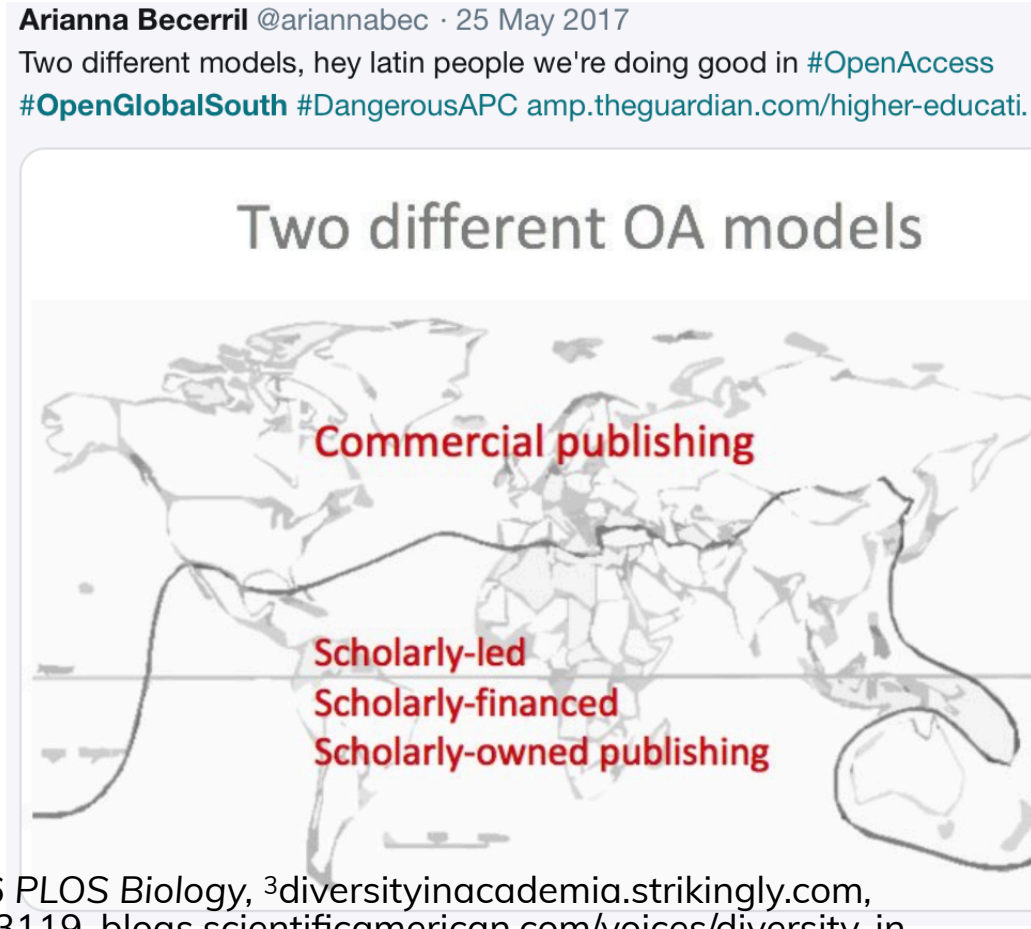
Incentivizing open, evaluating ability

Barriers to knowledge generation

Only people like us can access the knowledge we generate: English-speaking academics at wealthy institutions[1,2] = blocks progress in research & applications

Increasing diversity in research & researchers can help address this limitation[3]





[1]Amano & Sutherland 2013 *Proceedings B*, [2]Amano et al. 2016 *PLOS Biology*, [3]diversityinacademia.strikingly.com, livestream.com/UCDavis/OpenDigitalSouth2017/videos/157043119, blogs.scientificamerican.com/voices/diversity-in-stem-what-it-is-and-why-it-matters/, twitter.com/ariannabec/status/867808894613020672, twitter.com/rach_scholcomm/status/867889362070941696

Tackling the prestige barrier to knowledge generation

Essential requirements in **job adverts:**

- require evidence/willingness to engage in open practices
- assess research quality directly (DORA[1])
- must be good role models for groups traditionally underrepresented in STEM

San Francisco DORA
Declaration on Research Assessment

...because **metrics** can be gamed and are more a **sign of privilege** than quality

Increase diversity via...

- Sign & implement DORA sfdora.org
- Open Science Massive Online Open Course https://opensciencemooc.eu

[1]osf.io/afwre/ & jobs.zeit.de/jobs/muenchen_professur_w3_fuer_sozialpsychologie_121431.html, twitter.com/chrisdc77/status/871733428433104897

Counteracting implicit biases to evaluate ability, not privilege

Women = **less likely to be first authors** of articles in journals with high impact factors[1],
thus men are more likely to have a “good” CV, but only because of implicit biases

Women’s research rated **lower quality** than men’s[2],
thus risk taking (publishing) = more costly (lower payoff)

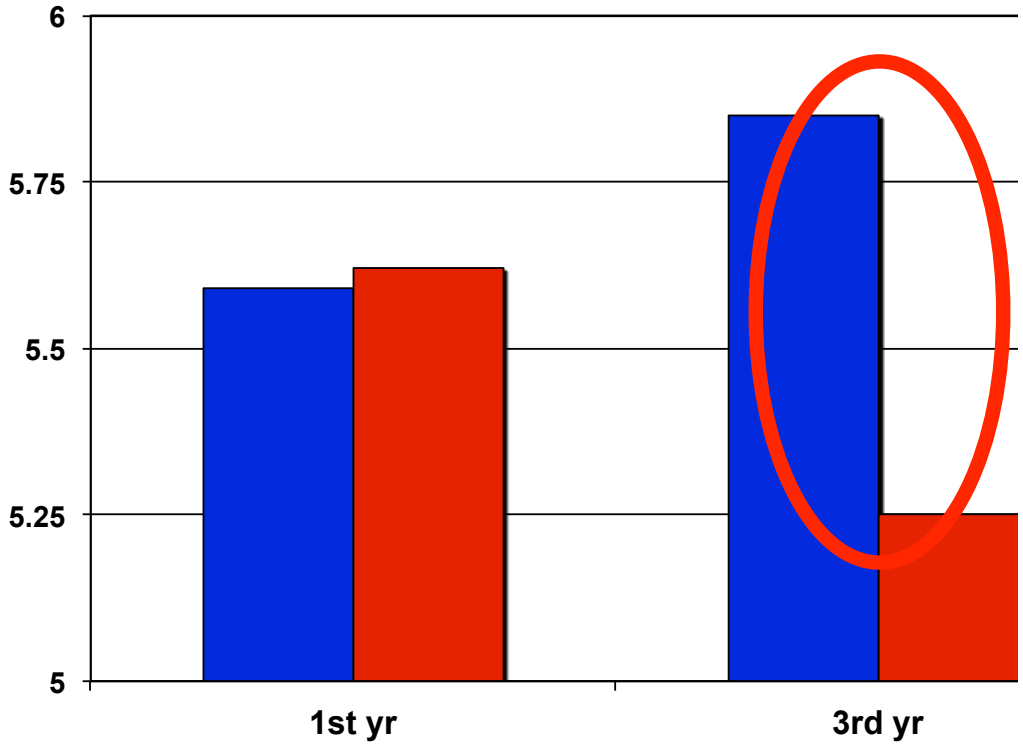
But **are women more risk averse?**

[1]Filardo et al. 2016 *BMJ*, [2]Knobloch-Westerwick et al. 2013 *Sci Comm*

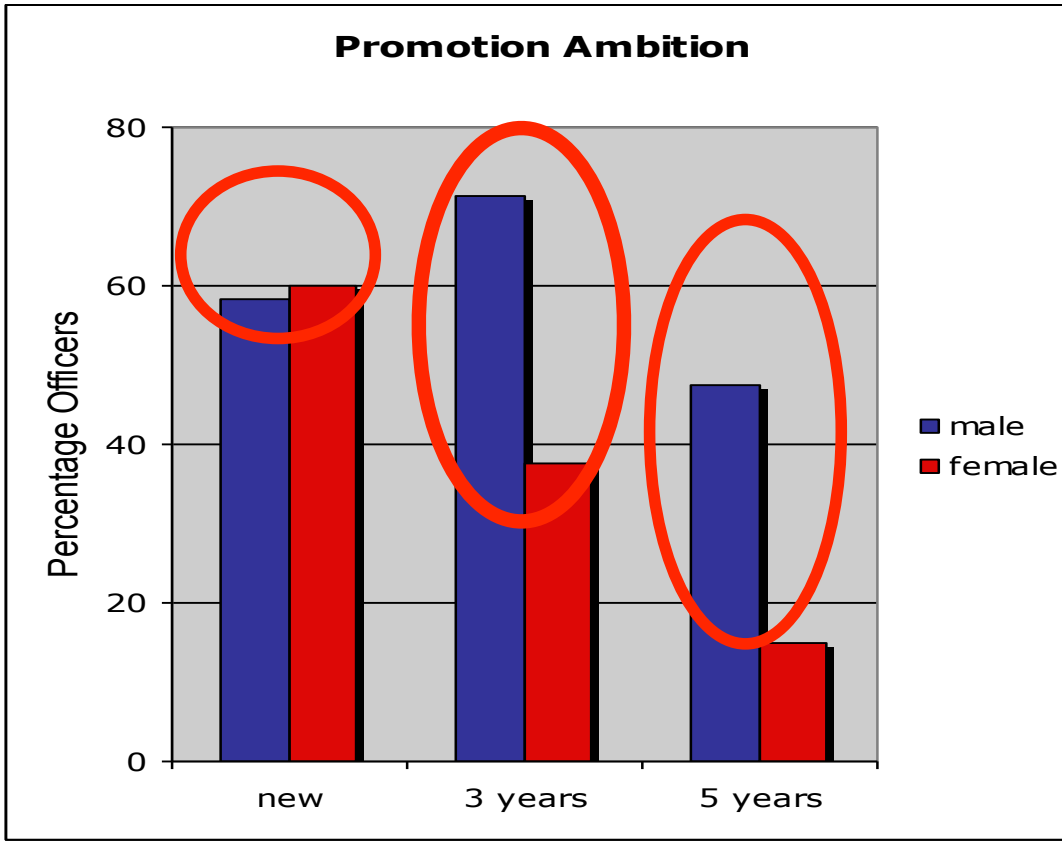
Women are NOT more risk averse than men

Differences in Ambition?

Surgeons



The Police service



Prof Michelle Ryan, 9 May 2017, Gender in STEM conference, Cambridge (*in prep*.)

Women are NOT more risk averse than men

Women are less likely to take risks
(apply, interview, do research, ask for promotion, etc.)
because they are **less likely to receive a reward** for such efforts

Prof Michelle Ryan (*in prep*.); Murray Edwards murrayedwards.cam.ac.uk/sites/default/files/files/Women%20Today%20Women%20Tomorrow%20Survey%20Report.pdf

Women are NOT more risk averse than men

Women are less likely to take risks
(apply, interview, do research, ask for promotion, etc.)
because they are **less likely to receive a reward** for such efforts

"the underrepresentation of women at the top in terms of voluntary decisions not to pursue leadership may be a **strategic response** to discrimination" (Ryan et al. 2007 *Soc Pers Psych Compass*, p. 267)

Prof Michelle Ryan (*in prep*.); Murray Edwards murrayedwards.cam.ac.uk/sites/default/files/files/Women%20Today%20Women%20Tomorrow%20Survey%20Report.pdf

Women are NOT more risk averse than men

Women are less likely to take risks
(apply, interview, do research, ask for promotion, etc.)
because they are **less likely to receive a reward** for such efforts

"the underrepresentation of women at the top in terms of voluntary decisions not to pursue leadership may be a **strategic response** to discrimination" (Ryan et al. 2007 *Soc Pers Psych Compass*, p. 267)

- Challenges at the workplace
- Balancing family and work
- Inadequate training/information
- Personal issues
- Changing career direction
- Other

Non-supportive workplace culture

n=954 female alumna of Murray Edwards College 2014

Prof Michelle Ryan (*in prep.*); Murray Edwards murrayedwards.cam.ac.uk/sites/default/files/files/Women%20Today%20Women%20Tomorrow%20Survey%20Report.pdf

Prestige blocks knowledge generation: Tackling implicit biases

- Consider background of person behind the CV: do they have enough privilege to **access** opportunities considered “good”?
- Consider the **evidence** before judging a top woman harshly[1]
- **Discover** your implicit biases
  https://implicit.harvard.edu
- Gender language **calculator**, use “they”, avoid names
  http://gender-decoder.katmatfield.com/about
- Call on a **woman to ask the 1st question**[2]
  http://diversityinacademia.strikingly.com
- When offering an opportunity (e.g., job, seminar, etc.), **recruit** via groups that support Underrepresented Minorities in the sciences (URMs).
  ALWAYS well qualified URMs - stop and think

Request a woman scientist
500womenscientists.org

[1]Sandberg 2013 Lean In, [2]Carter et al. 2018 PLOS ONE, twitter.com/LoganCorina/status/868491581145444352, nature.com/news/is-science-only-for-the-rich-1.20650?WT.mc_id=FBK_NatureNews&sf81929464=1

I have argued research value increases when...

1. one can **read**, **understand**, **and verify** **it**.
   Massive amounts of money paid to publishers
   = barrier to researchers, academia, and the public

2. anyone is able to **generate** **and** **disseminate** **it**,
   regardless of wealth, access to opportunity,
   perception of prestige, and evaluator implicit biases

We can **stop exploiting and discriminating now** because...

- ethical open options exist
- we can address our implicit biases