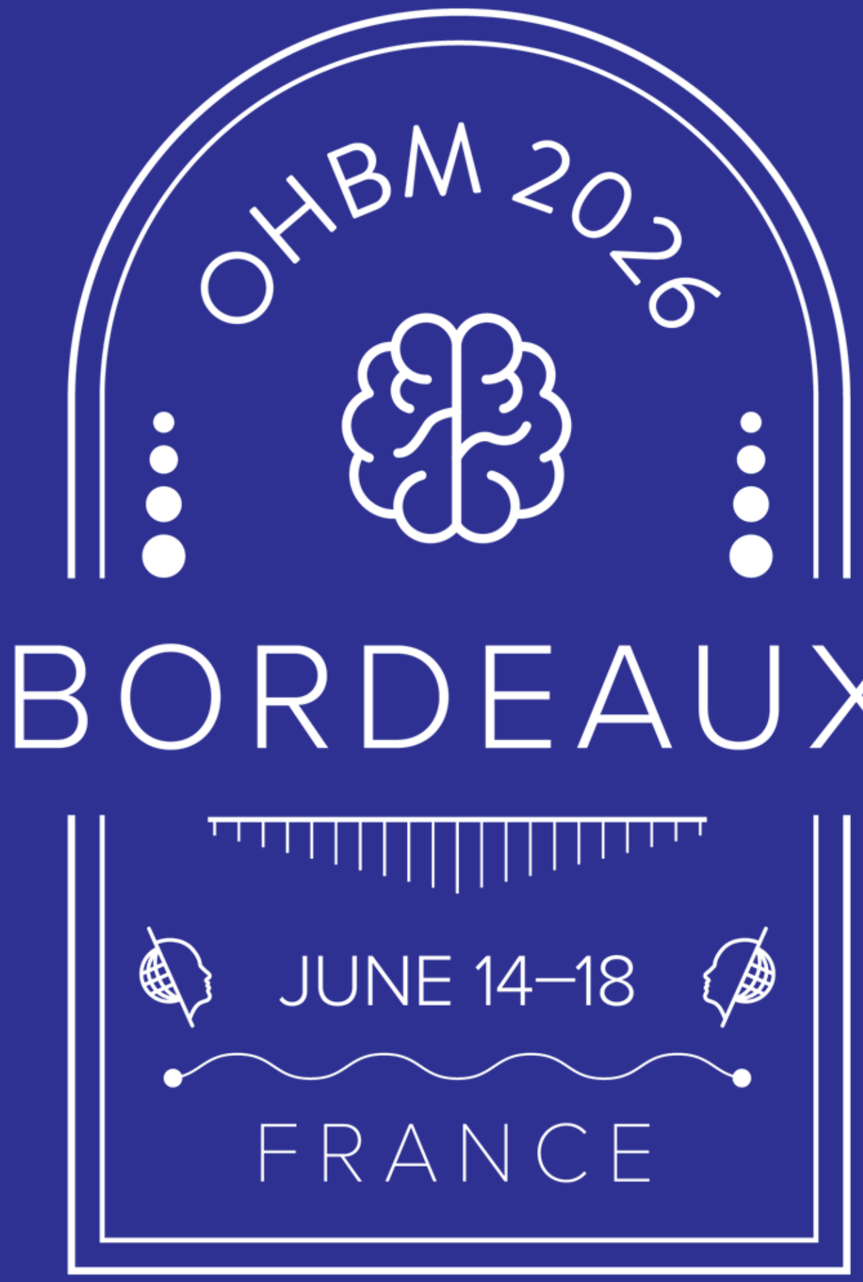

Registered Reports (RRs) in Neuroscience

Trainee-to-Editor Perspectives and Paths to Adoption

OHBM 2026 DISCLOSURES

None of the speakers nor organizers have conflicts of interest in relation to this roundtable to disclose.

LEARNING OBJECTIVES

1. Identify and name questionable research practices (QRPs) and bias risks in neuroimaging while being able to critically evaluate incentive structures that support QRPs.

2. Analyze the main shortcomings and friction points of RRs and identify concrete action points required for RRs to function as an effective tool.

3. Critically appraise the fit between the RR format and your own research endeavors, identify opportunities, and define practical steps to implement RRs in your studies.

THIS ROUND TABLE'S FORMAT

- Two moderated rounds of perspectives from the four panellists.
- A one-minute take-home pitch from each panellist.
- Audience Q&A — about ten minutes at the end.
- Sixty minutes total. Please jot down questions as we go.

A TRAINEE-TO-PUBLISHER PANEL

Céline Provins
Trainee Perspective

Marta
PCL BR Board
Topor

Peter Bandettini
Aperture Neuro

Henrietta Howells
Nature Neuroscience

ORGANIZERS

B. Franceschiello

O. Esteban

On-site

C. Chambers

S. Eickhoff

G. Learmonth

Online

Céline Provins
Trainee Perspective

Marta Topor
PCI-RR Board

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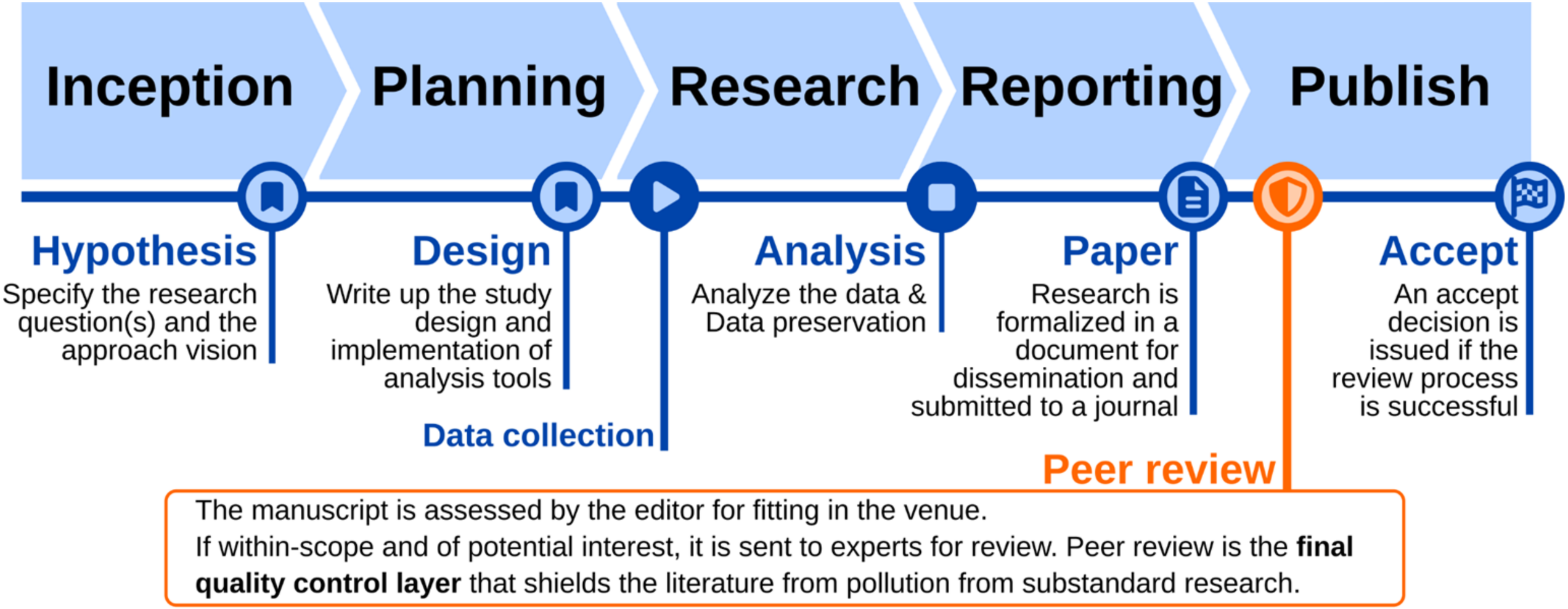
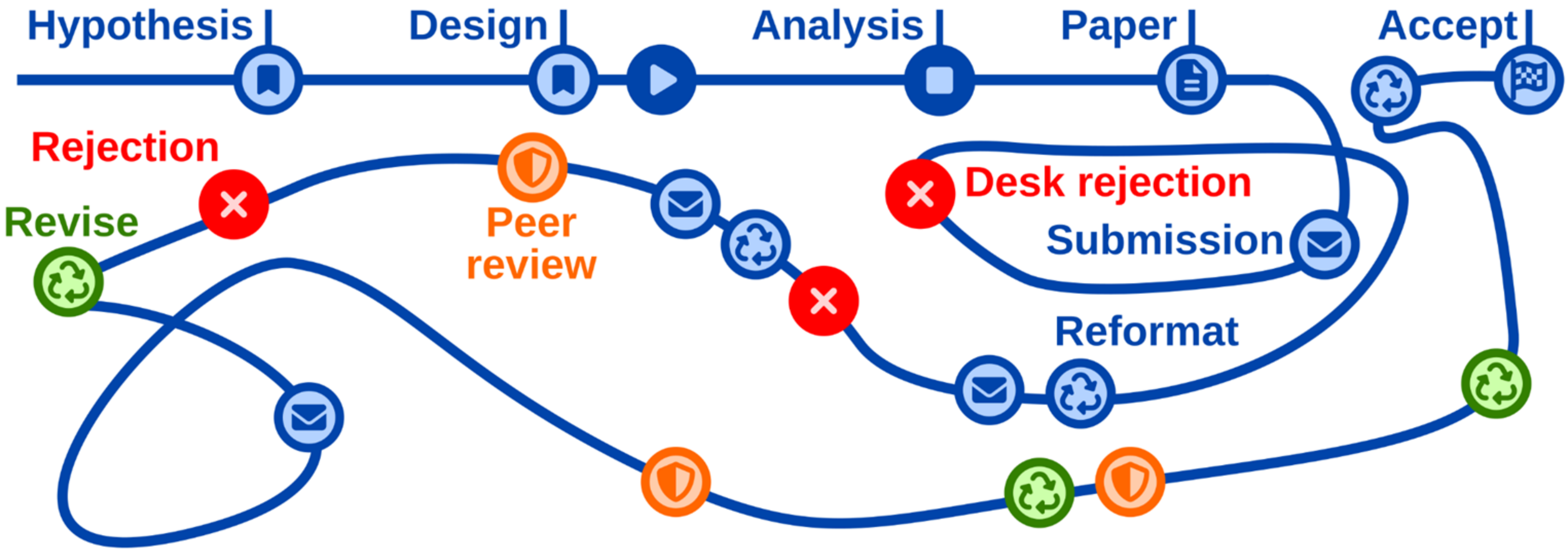
OHBM 2026

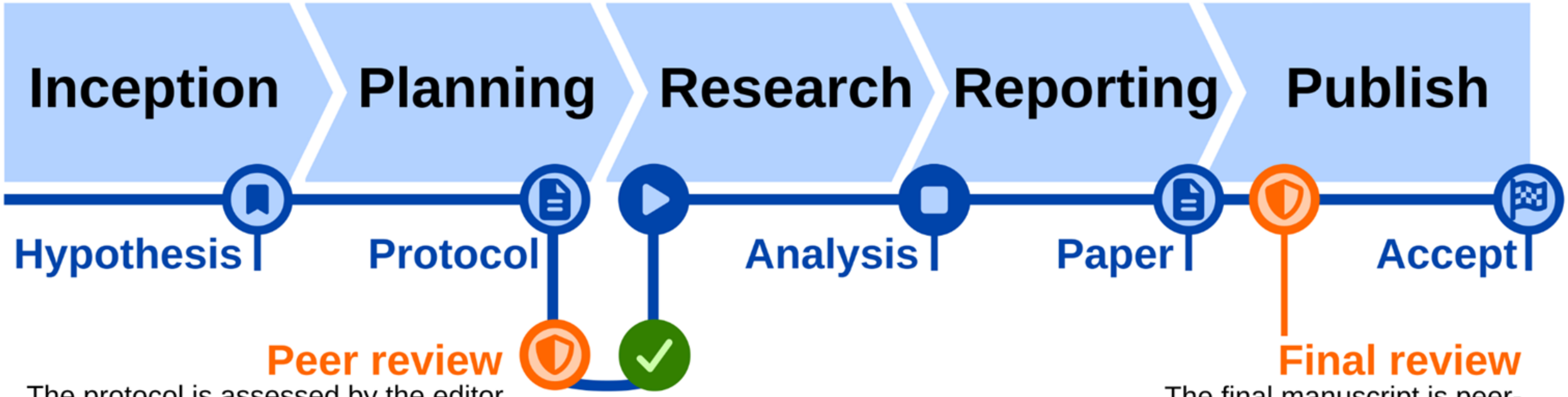
THE “CANONICAL” PUBLICATION WORKFLOW



THE *ACTUAL* PUBLICATION WORKFLOW



THE *RR* PUBLICATION WORKFLOW



Peer review

The protocol is assessed by the editor for fitting in the venue **before data collection starts**. If within-scope and of potential interest, it is sent to experts for review. RRs add an **early quality control layer** to protect from research waste.

Protocol acceptance

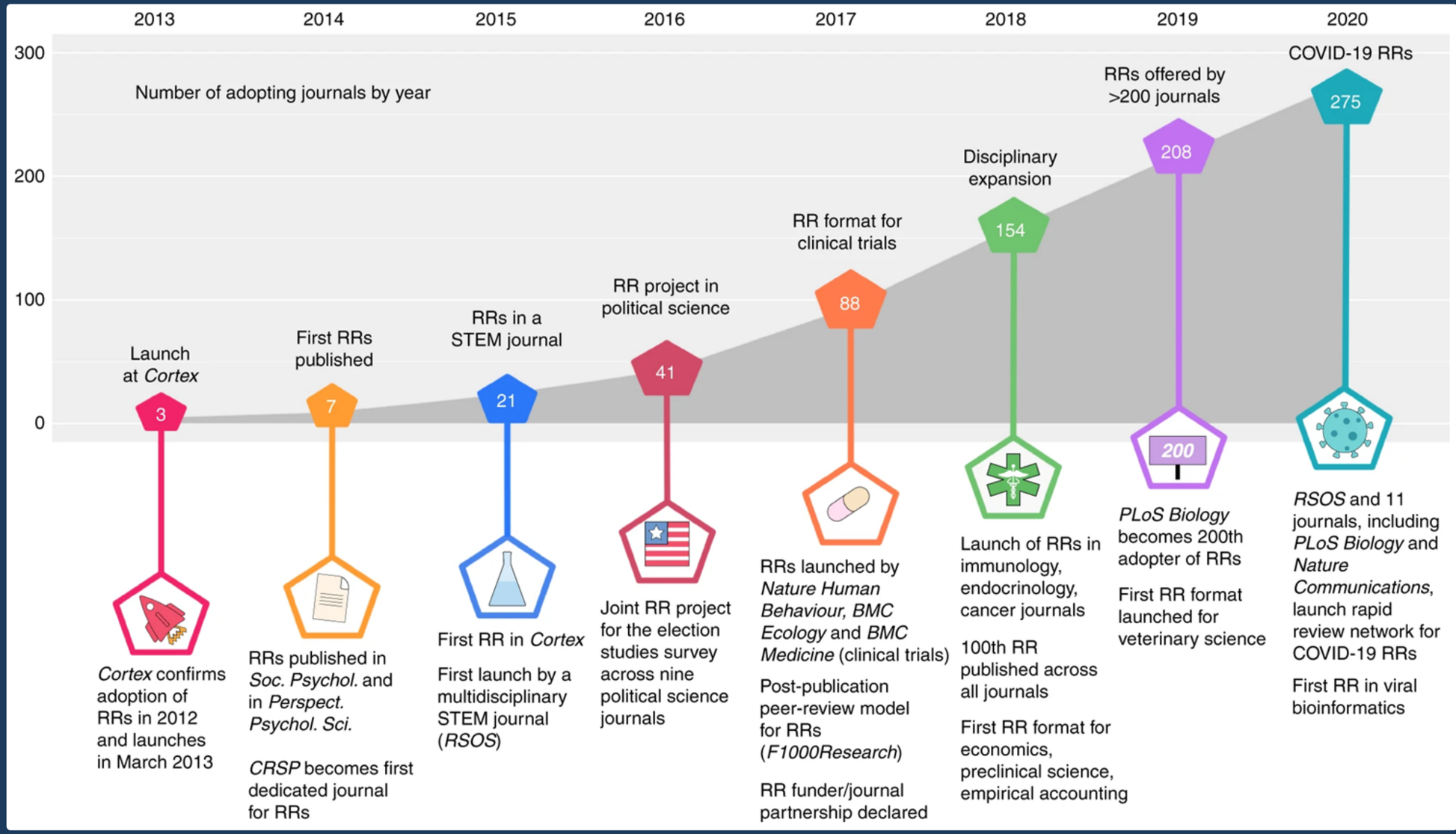
Upon acceptance, data collection may start. The journal **commits to publish** the manuscript independently of the direction of the results

Final review

The final manuscript is peer-reviewed. Acceptance is contingent on adherence to the approved protocol and transparent reporting of all deviations. Reviewers and editors assess that **the research faithfully implemented the protocol**.

Marta Topor

Adoption of RRs by journals



Chambers, C.D., Tzavella, L. *The past, present and future of Registered Reports.* Nat Hum Behav 6, 29–42 (2022). doi:10.1038/s41562-021-01193-7

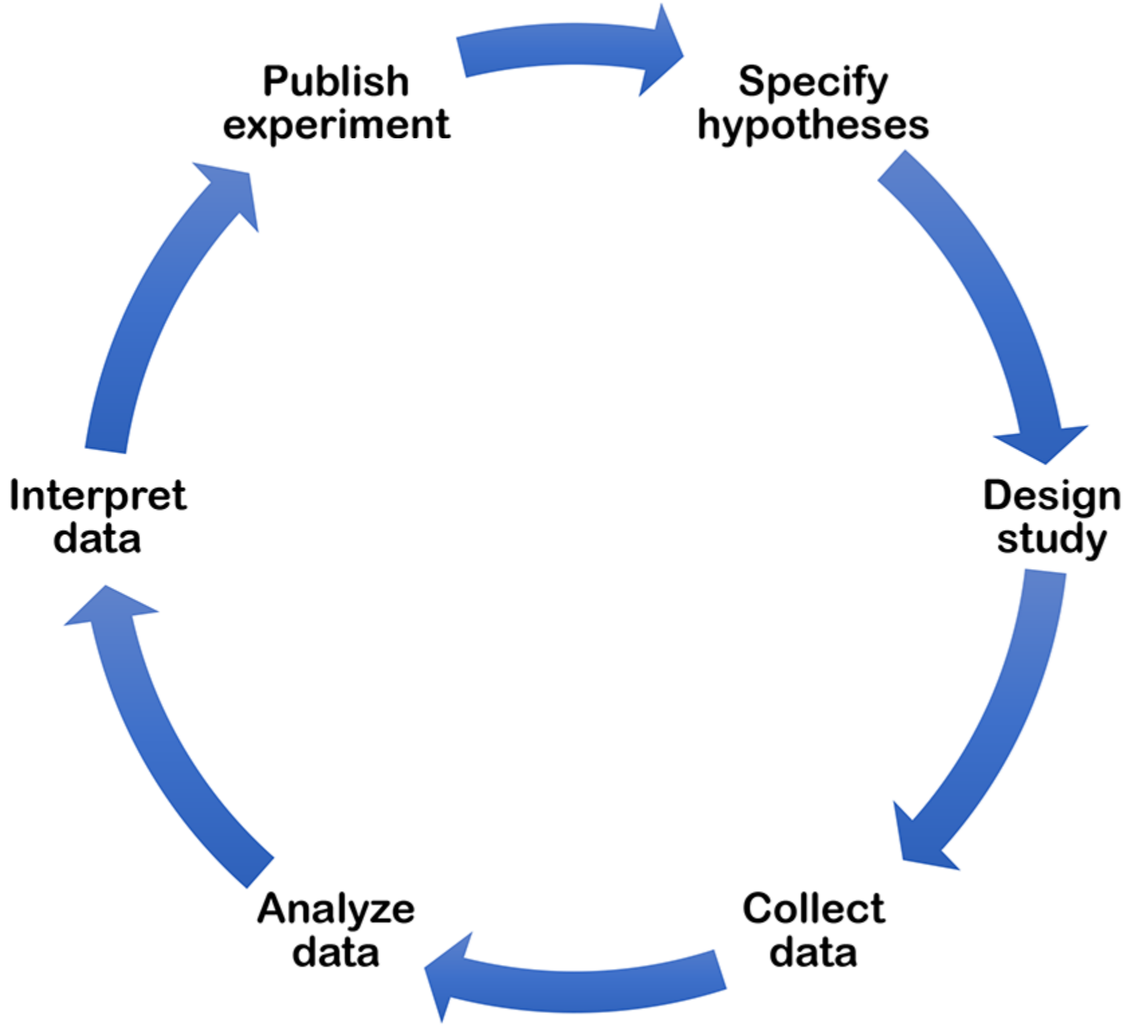
The PCI RR (Peer Community In: RRs)

- PCI is a peer-review platform:
  - community-run & journal-independent
- No journal pre-selection
  - removes another bias source
- Recommenders coordinate review
- Uses OSF as a support platform
- Substantial documentation layer
  - Take the (open) recommender test!

PCI RR’s friendly journals

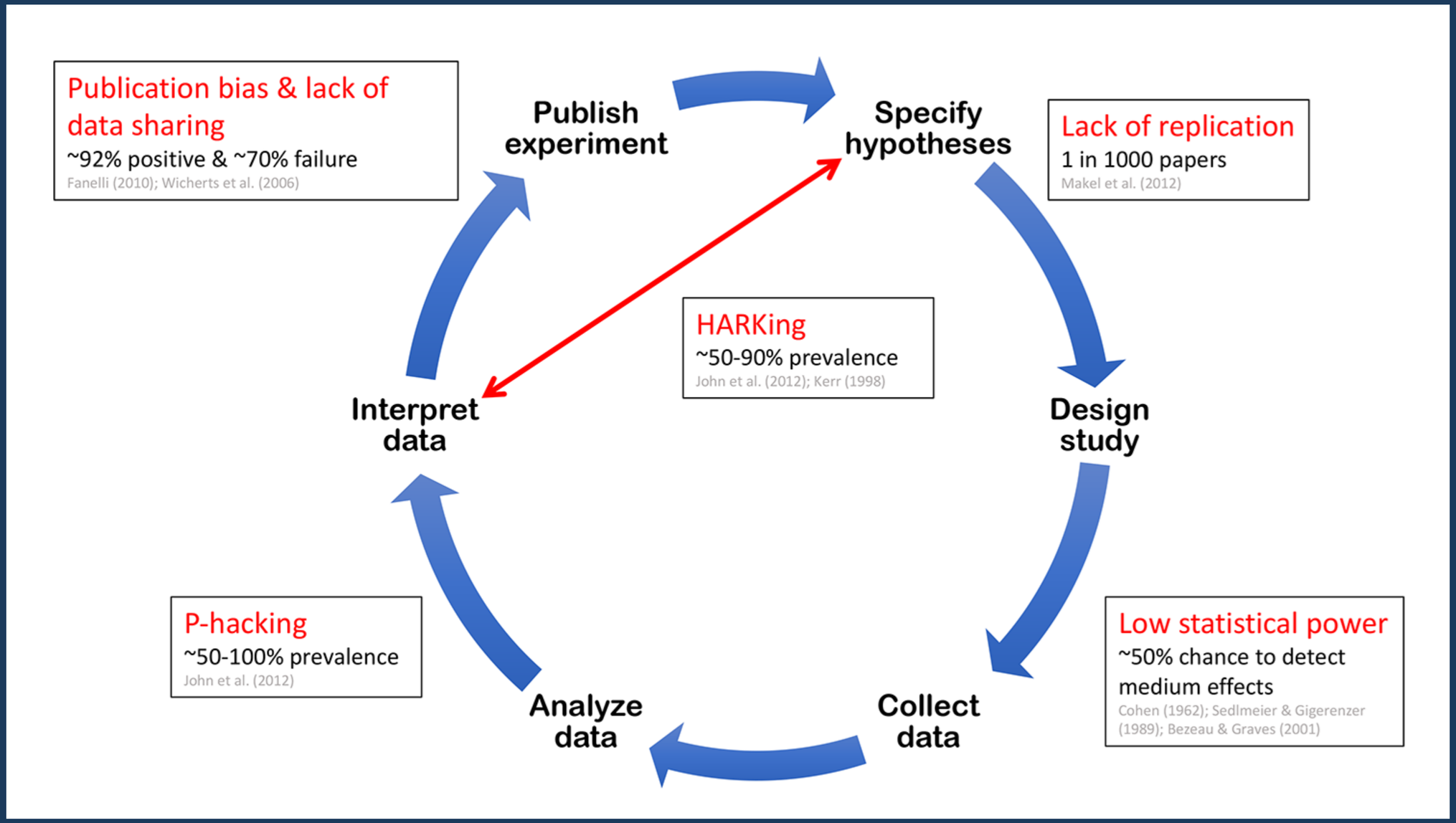
- RR with a PCI-RR Stage 2 acceptance → publishable in any friendly journal
- Authors can also keep the work as a peer-reviewed preprint
- No specific target journal needed —
- Peer Community Journal
- Growing list of friendly journals across disciplines

Hypothetico-deductive cycle



Center for Open Science - https://www.cos.io/initiatives/registered-reports

Questionable Research Practices (QRP)



Center for Open Science - https://www.cos.io/initiatives/registered-reports

Do RRs address the file drawer problem?

- RRs are effective in rigorously publishing null results

  Scheel et al. 2021: standard literature is 96% vs. 44% in RRs

- Unanticipated ≠ unreportable

  RRs opens the publication record to properly executed but failed experiments

An RR example I particularly like

Recommendation

Share Post Printable page

How do stimulus structure and subjective experience shape EEG measures of consciousness?

Marta Topor *based on reviews by Michał Bola, Stefan Wiens, Marcin Koculak and 1 anonymous reviewer*

A recommendation of:

STAGE 1

Measuring conscious contents using EEG complexity

Sergio Ponce de Leon, Kristina C. Backer, Martin M. Monti, Jeff Yoshimi

https://osf.io/msnzp

version 6

READ REPORT ON SERVER

Abstract

EN AR ES FR HI JA PT RU ZH-CN

Submission: posted 29 April 2024

Recommendation: posted 04 February 2026, validated 09 February 2026

Cite this recommendation as:
Topor, M. (2026) How do stimulus structure and subjective experience shape EEG measures of consciousness?. *Peer Community in Registered Reports*, . https://rr.peercommunityin.org/articles/rec?id=777

Recommendation

The proposed study by Ponce de Leon et al. (2026) is a comprehensive investigation of conscious content and conscious level measured with electroencephalography (EEG). The use of EEG provides many opportunities for consciousness research by facilitating the observation of brain responses to various stimuli with particularly high temporal precision. The study follows the programmatic track in an attempt to comprehensively explore various factors relevant to consciousness. Two tasks presenting stimuli of different modalities, visual and auditory, will be used. The study will

PCI-RR in numbers

- nearly 900 submissions to date
- 310 Stage 1 recommendations
- 156 Stage 2 IPAs

- 186 recommenders

Peter Bandettini

Perspective of:

- EIC of Aperture Neuro
- Researcher mostly of Methods Development

RRs fill an important function:

- Reduce bias towards positive findings
- Force upfront scrutiny of hypotheses, design, power, and plans.
- Curb such practices as “p-hacking” or other strategies to bring out results.
- Separate confirmatory from exploratory analysis.
- For tightly framed hypothesis-driven studies, RRs help foster high quality work.

...but at what cost?

The points in a study that are areas of potentially questionable practices (design, analysis, interpretation) are also areas of flexibility that allow the knowledgeable and skilled researcher who follows best practices to iterate effectively.

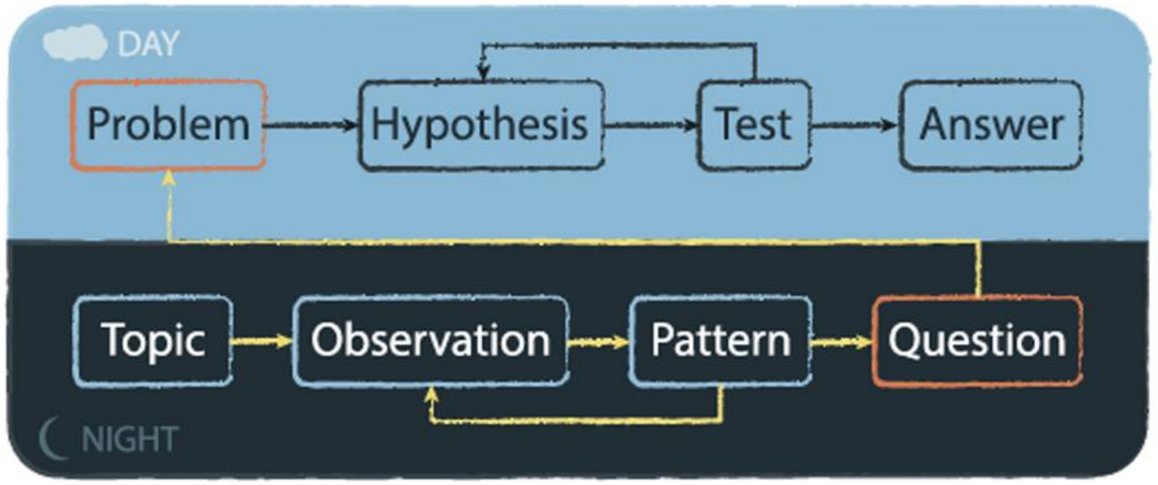
RRs: Design, analysis, interpretation subject to peer review before data collection starts.

Regular papers: Entire study - design, data, interpretation - is subject to peer review when paper is submitted.

Primary Talking Points

- **We all agree that the goals of RRs are important, but do RRs embrace and foster the best of how science is done?**

How we typically explain how science works.



How science actually works.

Yanai, I., Lercher, M. What is the question?. *Genome Biol* **20**, 289 (2019). https://doi.org/10.1186/s13059-019-1902-1

How I have generally done my research.

- **Identify open questions, possible connections, or assumptions from the literature and/or current models.**
- **Initial iteration.**
  - Form a set of testable questions and perform small set of experiments.
- **Iterate the testing & analysis.**
  - Collect data and inspect everything carefully from all angles, each based on a prediction or hypothesis (hybrid hypothesis driven/exploratory).
  - Start to form more specific questions…or completely different questions as new ways of collecting/analyzing data are explored.
- **Refine the hypothesis or generate a new hypothesis.**
- **Once the question and approach is set, perform the experiment without delay:**
  - Modulate a variable (pulse sequence, task, etc..) use extra measures as controls, make a best prediction, and run the optimized experiment to test for that prediction.
- **Analyze and Interpret the data. Submit the paper to be published.**
- **Refine the model of the system or method based on results - generate new questions.**

Primary Talking Points

- **RRs leverage best practices, but is there a cost?**
  - *What wouldn't a researcher do that is otherwise potentially useful if they decided on using the RR mechanism?*
  - *Do reviewers really know better than the researcher what the best study design is for their experiment…so much so that they hold up the study for months to make sure it is "correct?"*
  - *Does "locking in" really help, especially if the researcher realizes a flaw in the experiment once data are being collected.*

- **Are there any common yet good practices that are hindered?**

- **Are there other ways to foster best practices?** *(more standardized "best practice" information?)*

- **How might RRs be more effective towards fostering the best science?**

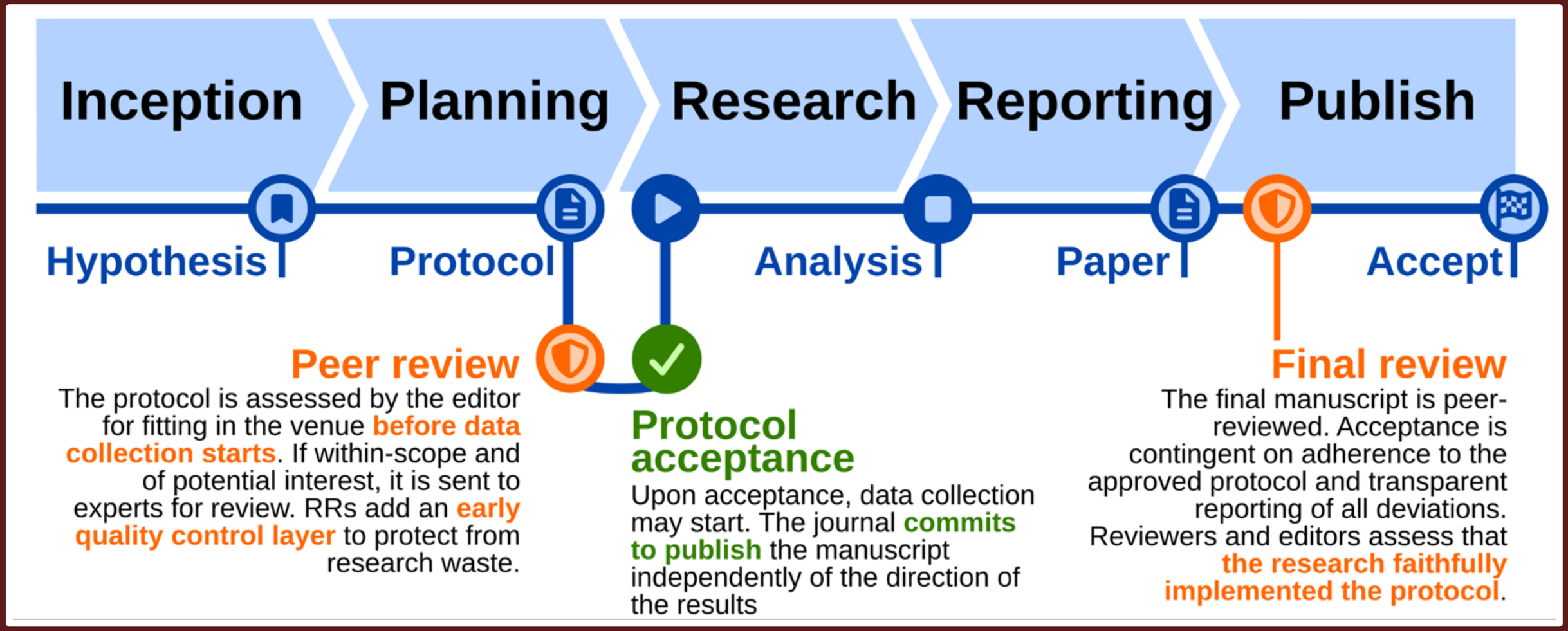
Primary Talking Points

- What is the goal of RRs? - to have all papers with data to be RRs or to simply ensure best practices and important negative findings?
- What fraction of studies, ideally, should be published as RRs?
- How might RRs evolve? Is the workflow still being improved? What are the challenges?
- What is the incentive for a researcher who has no problem getting their work published and follows best practices and does not want to wait and subject to review their study design to reviewers who may not appreciate the nuances of their approach?

Common (mis)perceptions

- RR hinders the natural scientific process.(too much up front planning, not enough iteration)
- One needs data to optimize an experimental approach.
- RRs are best for certain kinds of studies (simple, large N testing).
- The negative results of RRs may be for unknown experimental reasons that are not caught by Stage 1 or 2 review and potentially artifactual (many ways to do an experiment wrong but only one to do it right).
- The frontloading of study design review slows progress, as the most impactful studies are never from the first iteration of an experimental design. (too much overhead which de-incentivizes researchers to embrace RRs)
- The RR process takes away the final decision for acceptance by the Journal editors.
- The most groundbreaking papers have not been RRs.

Timing


Inception
Planning
Research
Reporting
Publish
Hypothesis
Protocol
Analysis
Paper
Accept
Peer review
The protocol is assessed by the editor for fitting in the venue before data collection starts. If within-scope and of potential interest, it is sent to experts for review. RRs add an early quality control layer to protect from research waste.
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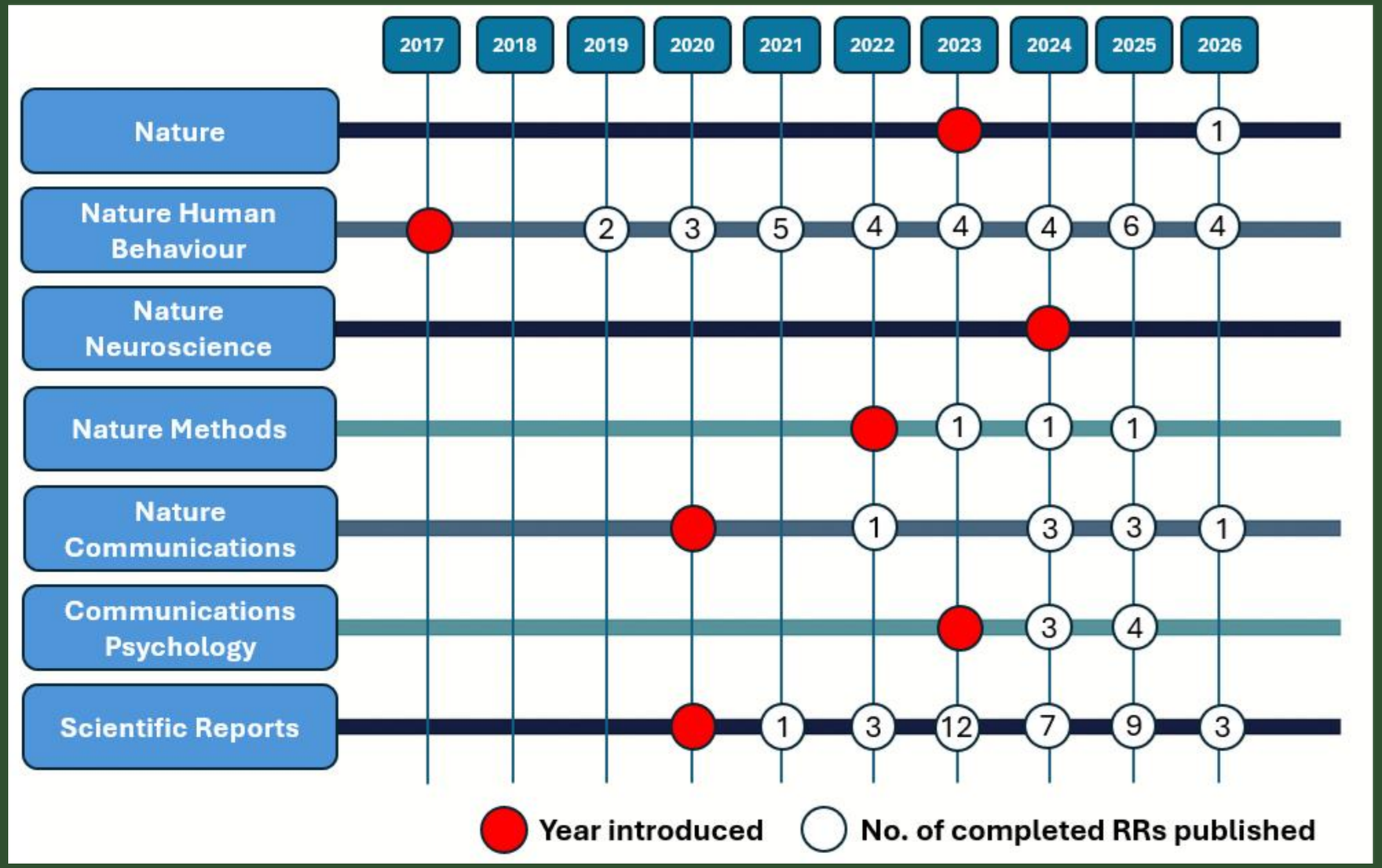
Timing


Inception
Planning
Research
Reporting
Publish
Hypothesis
Protocol
Analysis
Paper
Stage 2 acceptance
Editorial Assessment
Stage 1 acceptance
Editorial Assessment
Review Round 1
Review Round 3
Final review

Henrietta Howells

The Nature Portfolio and RRs



- Senior Editor at Nature Neuroscience
- Helped to launch Registered Reports at Nature Neuroscience
- Handle the peer review of Registered Reports

Submission to acceptance

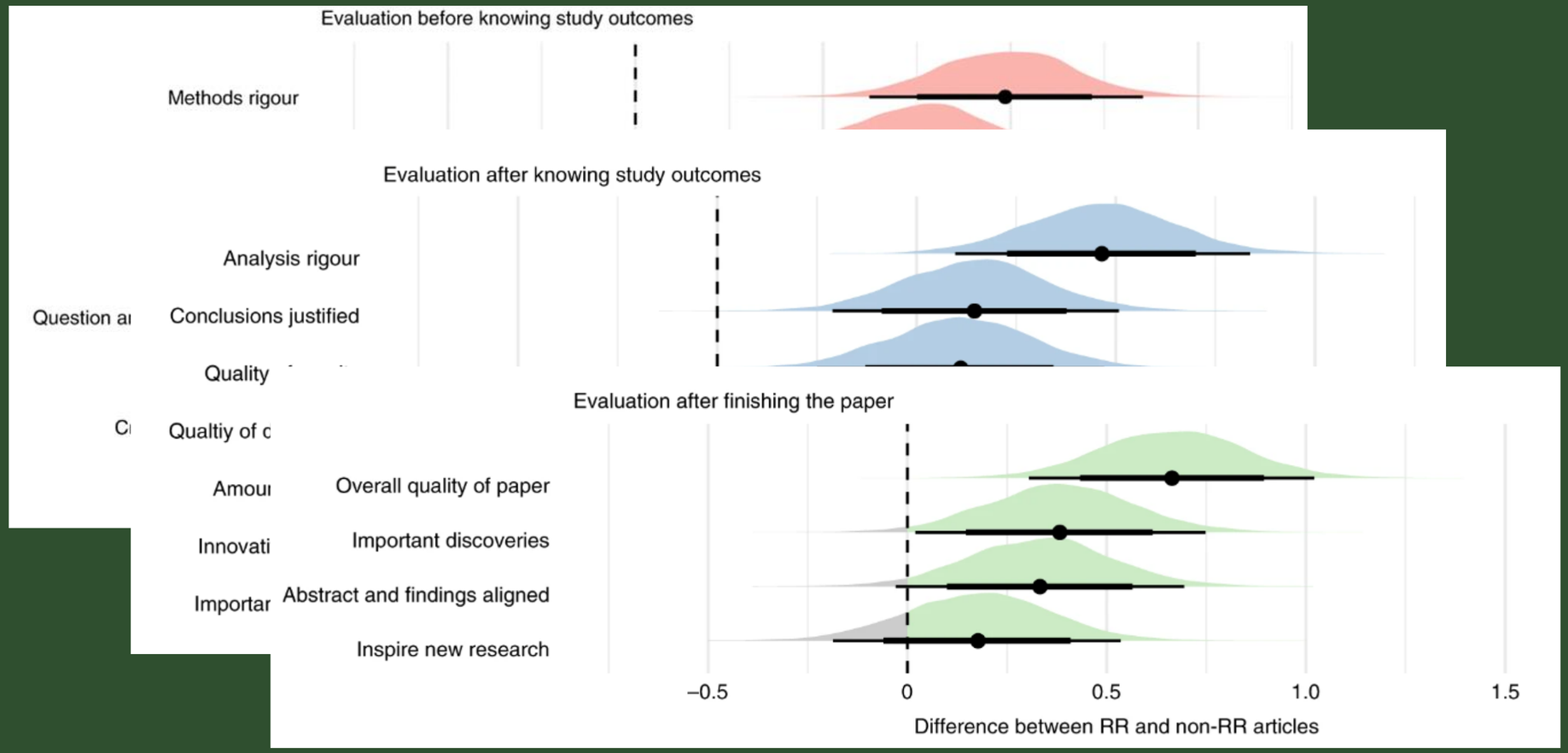
- Nature Research Journals: median 3 years, range 1-6 years
- Communications Psychology: median 2 years, range 1-2 years

Editorial challenges when handling RRs

- Editorial assessment
  - Initial pitch may be hugely improved following peer review so can be difficult to assess prospective impact
  - Hypothesis-driven fits better but may limit discovery of more impactful findings

- Operational challenges
  - Identifying reviewers with RR expertise
  - Reviewer continuity between Stage 1 and Stage 2
  - Reviewer disagreements (often due to difference in experience with RRs)
  - Timelines - trainees disproportionately affected, rapid methods evolution in neuroimaging
  - Deviations from plan at Stage 2 have to be managed carefully

Do RRs improve the quality of studies?



Soderberg et al. 2021, Nature Human Behaviour

Given these data, it would be hard to make the case that registered reports make things worse.

— Higgs & Gelman 2021, Nature Human Behaviour

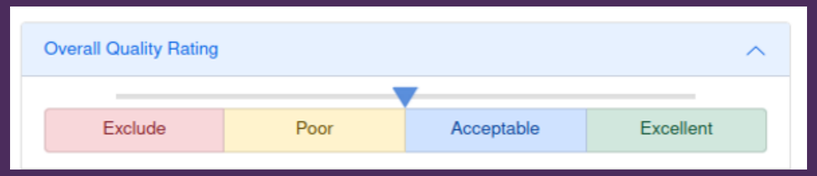
Céline Provins

RR1: How a pre-Stage 1 simulation saved the study

- Study goal: assess whether defacing influences human perception of quality
- Original design: Likert-scale ratings, many raters, nested

  → continuation ratio model

- Pre-data simulation → models wouldn't converge at any sample size
- Redesign:
  - only few raters rating same subset of data
  - interval scale on MRIQC reports
  - → linear mixed-effects models



- Pre-data simulation saved the paper before any data were collected

RR1: A deviation lesson learned the hard way

- Committed to a post-hoc power calculation to assess result significance — fundamentally wrong
- Should have written to the editor to remove it; we didn't know
- Flagged in the discussion: "don't do this"

Deviations harm most when poorly handled and most of all when unreported but excellent learning opportunity

RR2: the spine of my PhD program

- Study goal: characterize the reliability of functional and structural connectivity leveraging repeated acquisition on a single, healthy individual

Peer review at Stage 1 improved the plan dramatically
without it, scanner time, volunteer time, and trainee time wasted.

e.g., we originally planned to run resting state fMRI with eyes closed -
frequently lead to sleep onset
- limit comparability with other big datasets

How RRs supported my PhD

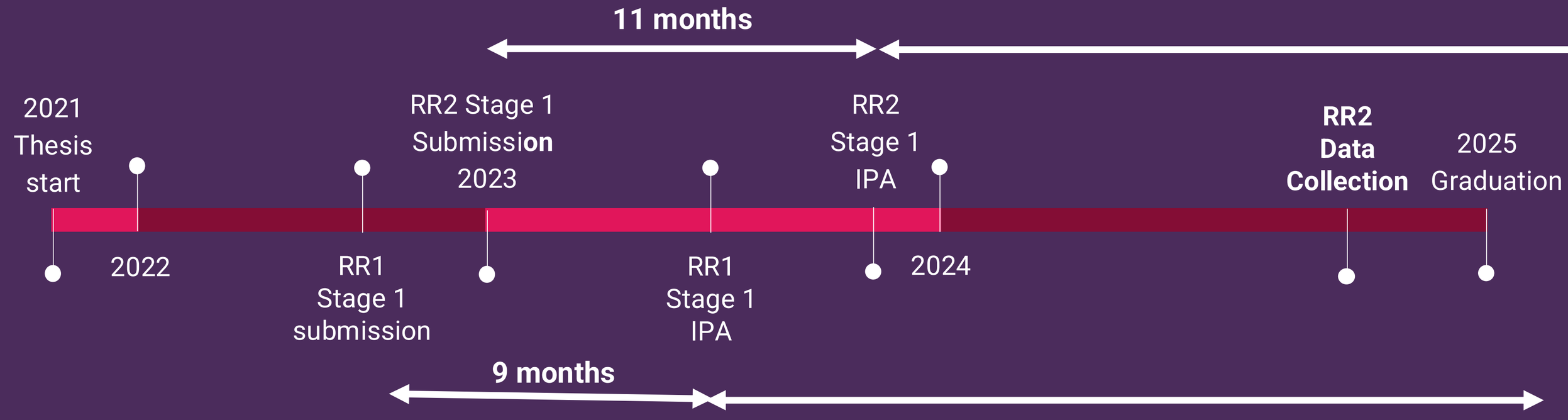
- Thought more structurally — avoided fatal errors

- Decisive at thesis defence:
  - Protocol paper + Stage 2 + Stage 1 IPA
  - Plenty of material to present despite delayed data collection

- Above typical PhD output — more rigorous, more visible

Céline Provins

Stage 1 timelines · 9 + 11 months



RR1: 2.5 years from first Stage 1 submission to published

Plan for the front-load.

Where the bottleneck sat

PLOS Bio → authors

We made mistakes; the recommender, rightly, made us catch them.

Nature Methods → reviewers

Mix of valuable feedback and Stage-2-speculative demands — things that belong at the results phase.

Example:
Comment on which findings will generalize?

When NOT to do an RR (trainees)

- Biggest benefits:
  - Forces thorough design thinking
  - Constructive feedback before acquisition
  - Publication "guaranteed"

- Outweighs initial front-load

Almost never.
The format is the right choice for a trainee.

Henrietta Howells

Case study

[To add anon]

Improving the process

- Advocacy
- Clear editorial policy and guidance
- Reviewer training and guidance
- Transfer pipelines between journals
- Publish peer review alongside the RR (transparent peer review)
- Develop transparent frameworks to account for deviations at Stage 2
- Consider flexibility in RR requirements for disciplines that require it (e.g. neuroimaging)

Nature guidelines for RR authors and reviewers

More reviewer guidance

Peter Bandettini

The traditional pipeline is agnostic

By design, agnostic between confirmatory and exploratory —
both have a home, both can find a venue,
both can be evaluated on their own terms.

Asymmetry of evidence

- When a car runs, all critical systems must be operational
  (positive finding ↔ rich inference)

- … when it doesn’t, one or more failed and we rarely can tell which one
  (null finding ↔ weak inference)

- Sometimes, the car runs only once for the test drive
  “Winner’s curse” and false positives

Exploratory as "anything else"

Every methods-development paper, every iterative analysis,
every data-exploration paper —
labelled "anything else".

Structural effect: confirmatory becomes the default named category.

[examples of exploratory research poorly served by RRs — Peter to insert]

Marta Topor

Keeping the car example: informational asymmetry

- “The market of lemons” (Vazire, Collabra: Psychology, 2017):
  - In a used-car market where the buyer can’t look under the hood buyers can only offer “average” prices
  - Sellers pull off their good cars (undervalued), eventually, only lemons remain in market
  - Trust collapses quickly

- The solution is to **maximize transparency**:
  - Making it safe for scientists to publish correctly-run null results
  - “Looking under the hood” when there’s still possibility for adopting a solution (Stage 1)

Addressing the timeline: scheduled RRs

Scheduled review · snapshot triage

Reviewers pre-commit to a one-week window.
The process becomes predictable on both sides — author and reviewer.

6-point bias-control-level scale

Level 6 — no data exist at Stage 1 (simplest case)
Lower levels apply graded safeguards: third-party hold-out, blinded analysis, sealed envelope
Opens the format to designs that look like they don't fit.

[Marta to supply PCI-RR Stage 1 turnaround stats]

Non-primary RRs (when data exist)

Level	Data already exist or will exist prior to IPA	Data are accessible to the authors	Data have been accessed by the authors	At least some data have already been observed by the authors	Key variables in the data have been observed by the authors	Authors have already analysed key variables in the data	Risk of bias due to prior data observation	Multi-disciplinary inclusivity
6	*Level 6 description:* No part of the data or evidence that will be used to answer the research question yet exists and no part will be generated until after IPA (so-called "primary RR")							
	✗	✗	✗	✗	✗	✗	Zero	Very low
5	*Level 5 description:* ALL of the data or evidence that will be used to answer the research question already exist but are currently inaccessible to the authors and thus unobservable prior to IPA (e.g. held by gatekeeper)							
	✓	✗	✗	✗	✗	✗	Very low	Very low
4	*Level 4 description:* At least some of the data/evidence that will be used to answer the research question already exists AND is accessible in principle to the authors (e.g. residing in a public database or with a colleague) BUT the authors certify that they have not yet accessed any part of that data/evidence							
	✓	✓	✗	✗	✗	✗	Low	Low
3	*Level 3 description:* At least some data/evidence that will be used to the answer the research question has been previously accessed by the authors (e.g. downloaded or otherwise received), but the authors certify that they have not yet observed ANY part of the data/evidence							
	✓	✓	✓	✗	✗	✗	Moderate	Moderate
2	*Level 2 description:* At least some data/evidence that will be used to answer the research question has been accessed and partially observed by the authors, but the authors certify that they have not yet sufficiently observed the key variables within the data to be able to answer the research question AND they have taken additional steps to maximise bias control and rigour (e.g. conservative statistical threshold; recruitment of a blinded analyst; robustness testing, multiverse/specification analysis, or other approach)							
	✓	✓	✓	✓	✗	✗	High – additional steps required to control bias	High
1	*Level 1 description:* At least some of the data/evidence that will be used to the answer the research question has been accessed and the authors HAVE sufficiently observed the key variables to be able to answer the research question, but the authors certify that they have not yet performed ANY of their preregistered analyses, and, in addition, they have taken stringent steps to reduce risk of bias. Such measures will be similar to the countermeasures required for Level 2 but even more intensive, including an extremely conservative statistical threshold, recruitment of a blinded analyst, comprehensive robustness testing, the use of a broad multiverse/specification analysis, or other approaches for controlling risk of bias.							
	✓	✓	✓	✓	✓	✗	Very high – stringent steps required to control bias	Very high

(1) determine the **risk level** that we incur into bias; and

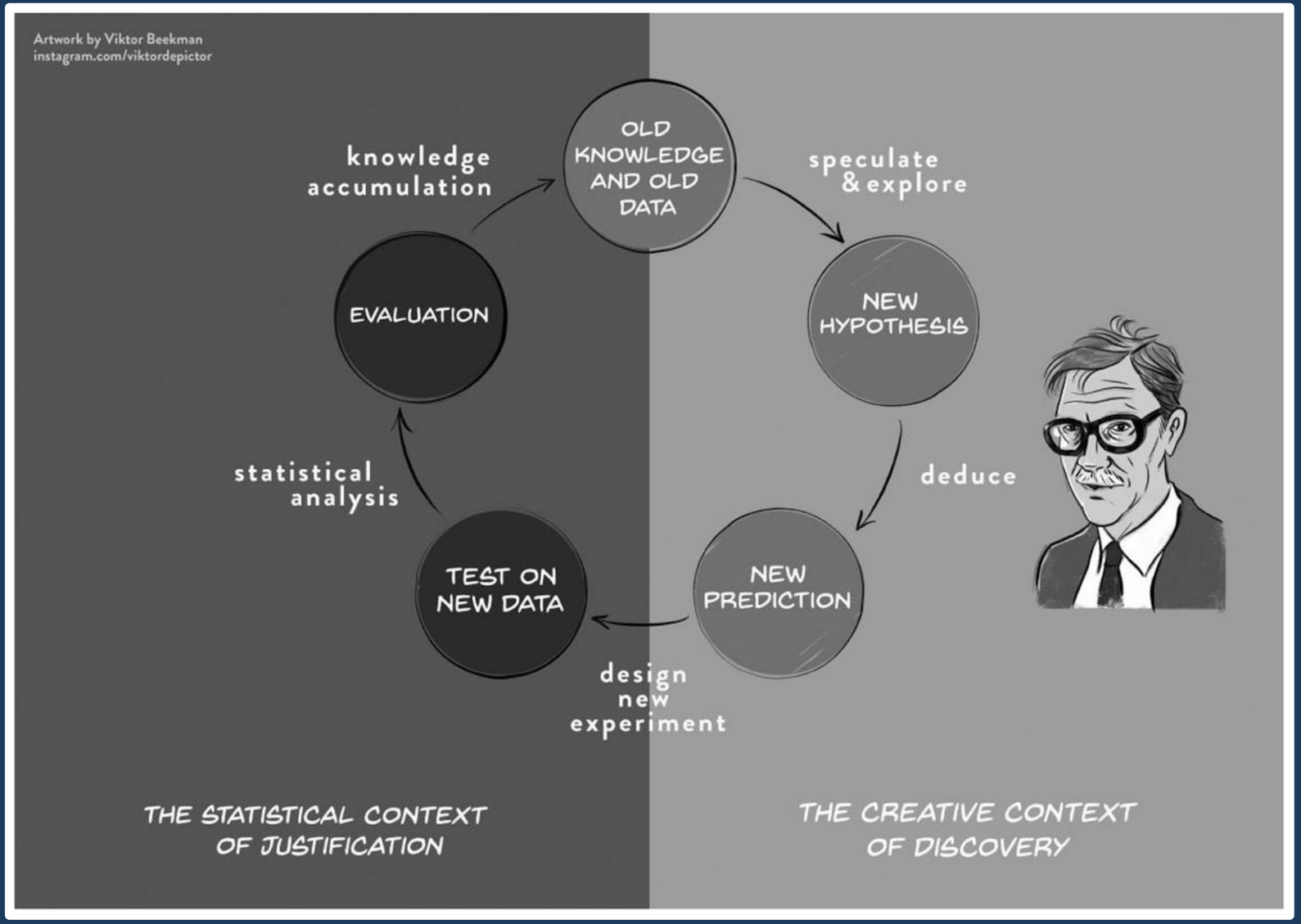
(2) shield the protocol with **statistical & QC countermeasures**

Risk levels have different implications for different types of studies, e.g, exploratory analyses or evidence syntheses.

Some friendly journals set the desired risk level.

https://rr.peercommunityin.org/about/full_policies#h_95790490510491613309490336

Exploration and confirmation depend on one another



The Creativity-Verification Cycle in Psychological Science: New Methods to Combat Old Idols

Perspectives on Psychological Science, 13(4), 418-427. (2018) doi:10.1177/1745691618771357

Cortex Exploratory Reports

Exploratory work with its own name,
its own standards, its own venue.

— McIntosh 2017, Cortex

Two ambiguity regimes — choose the better one.

TAKE-HOME MESSAGES

Necessary cultural changes may turn out to be too demanding for an already pressured system. Nonetheless, looking forward!

TAKE-HOME MESSAGES

RRs may seem hard to adopt, but the PCI-RR experience demonstrates that they are very workable - engage today!

TAKE-HOME MESSAGES

We should invest in RRs to make them scalable, and they should be seen as complementary rather than replacing the standard format

TAKE-HOME MESSAGES

Good science's workload is the same whether you use RRs or not.
RRs helped my career and they will help yours too.

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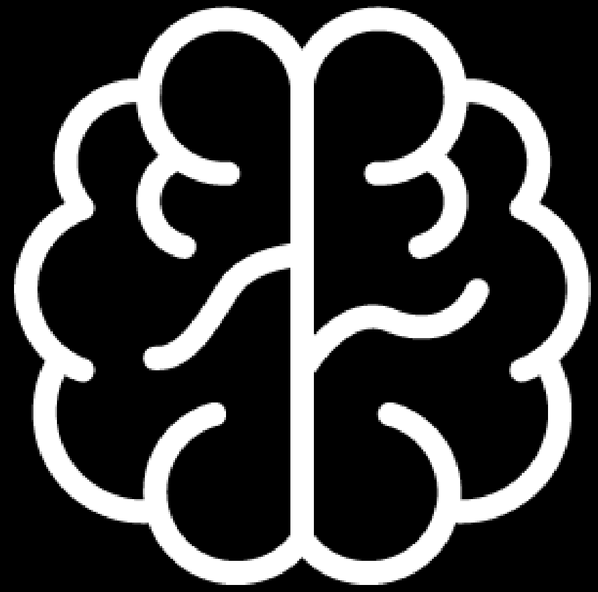
Good science's workload is the same whether you use RRs or not. RRs helped my career and they will help yours too.

THANK YOU – QUESTIONS & OPINIONS?

- Ask anything on what's been said today. Share your views, for or against RRs.

- Special interest on feedback on:
  - New RRs track on Aperture Neuro
  - Possibility of an RR track at OHBM



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