When is it okay to exclude outliers?

a) When the data does not make sense
b) When we perform an outlier analysis and the data point is shown to be significantly different from others in the group.
c) When the data point does not support my hypothesis
d) When removing the data point gives me a $p < .05$
e) When there is a documentation in the lab notebook (at the time the experiment was performed) that justifies exclusion

How does the population of samples affect the statistic analysis? For instance, if I have two groups, each group has 50 samples, the t-test shows they do not have the significant difference to each other. However, when I increase the samples to 200, the significant difference may be presented?

Rigor and Reproducibility
May 27, 2021

When doing an experiment, is it necessary to reproduce the results with different biological samples?

Are technical replicates sufficient?

Are 3 biological and 3 technical replicates enough and should they always be performed?

For a qPCR experiment, what determines a different biological sample?

Can I plate cells from one flask onto different wells, and treat them as biological replicates?

How important is the Rigor and Reproducibility section on an NIH grant proposal?

a) Scored section
b) Considered a “tie-breaker” when two proposals are all else equal
c) Required but not as heavily weighted as other sections of the proposal
d) Absolute make or break

How complex should an experimental design be to be considered a good standard for NIH rigor of prior research section?

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Rigor and Reproducibility
May 27, 2021

How does one address the rigor and reproducibility in a R01 proposal?

	Applies to which applications	Where do I find it in the application	Where do I include it in my critique	Addition to review criteria	Affect overall impact score?
Rigor of prior research	All	Research Strategy (Significance)	Significance	Is the prior research that serves as the key support for the proposed project rigorous?	Yes
		Research Strategy (Approach)	Approach	Are there plans to address weaknesses in the rigor of prior research that serves as the key support for the proposed project?	
Rigor of proposed research (Scientific Rigor)	All	Research Strategy (Approach)	Approach	Are there strategies to ensure a robust and unbiased approach?	Yes
Consideration of Relevant Biological Variables such as Sex	Projects with vertebrate animals or human subjects	Research Strategy (Approach)	Approach	Are there plans to address relevant biological variables, such as sex, included for vertebrate animal or human studies?	Yes
Authentication of Key Biological and or Chemical Resources	Projects involving key biological or chemical resources	New attachment	Additional Review Considerations	Comment on plans for identifying and ensuring validity of resources	No

What are some ways to approach rigor and reproducibility with respect to computational modeling?

How long should data/code be kept after the project is published? Is it the PI (corresponding author) or student/postdoc's (first author) responsibility to maintain it? What if the PI leaves the institution and/or closes the lab, would the student/postdoc need to maintain their data/code even after they've left the lab too? Where should it be archived?

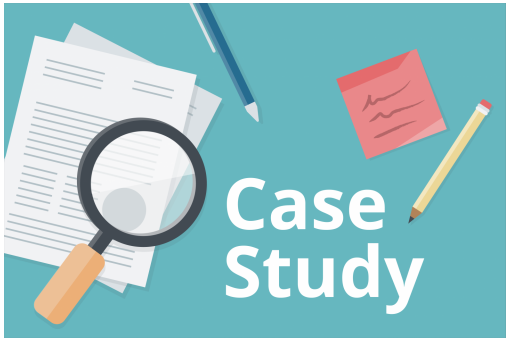
For assays that are very sensitive to user technique, how do you ensure that the results are reproducible across different labs?

a) Ask someone from a different lab to repeat the experiment and report average results of the data
b) Repeat at least 3 times in at least 2 different labs
c) Clearly note in the publication that “results may vary” across labs
d) Once results are statistically significant, they can be published
e) If results cannot be reproduced by different labs, they should not be published

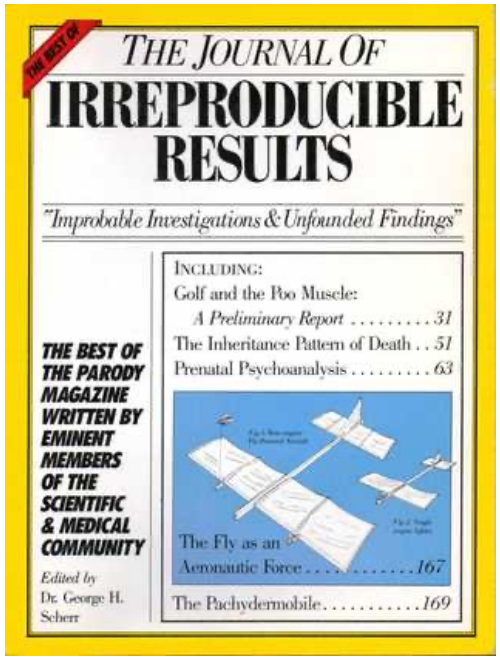
What are the limitations when choosing a "representative figure" for publication?

If an assay has a large amount of batch effects, but trends and/or statistical significance are consistent across experiments, what principles should be followed (other than choosing the data with the greatest magnitude, tightest error bars, "best looking", etc.)?

A student conducts research in the lab of a faculty member who is not her academic advisor. Her academic advisor demands to be author on any publication from the student's thesis work without having helped in any step of the conception, preliminary analyses, data collection, or writing of the student's thesis document. The faculty advisor tells the student this is what is done at their institution and he will not sign off on her thesis without an agreement that he will be an author?



If journals typically do not reproduce studies prior to publication, is it possible that published studies of less than popular topics may go extended periods of time before a reproducibility issue may be uncovered, if ever? Or is there a mechanism to prevent such issues?

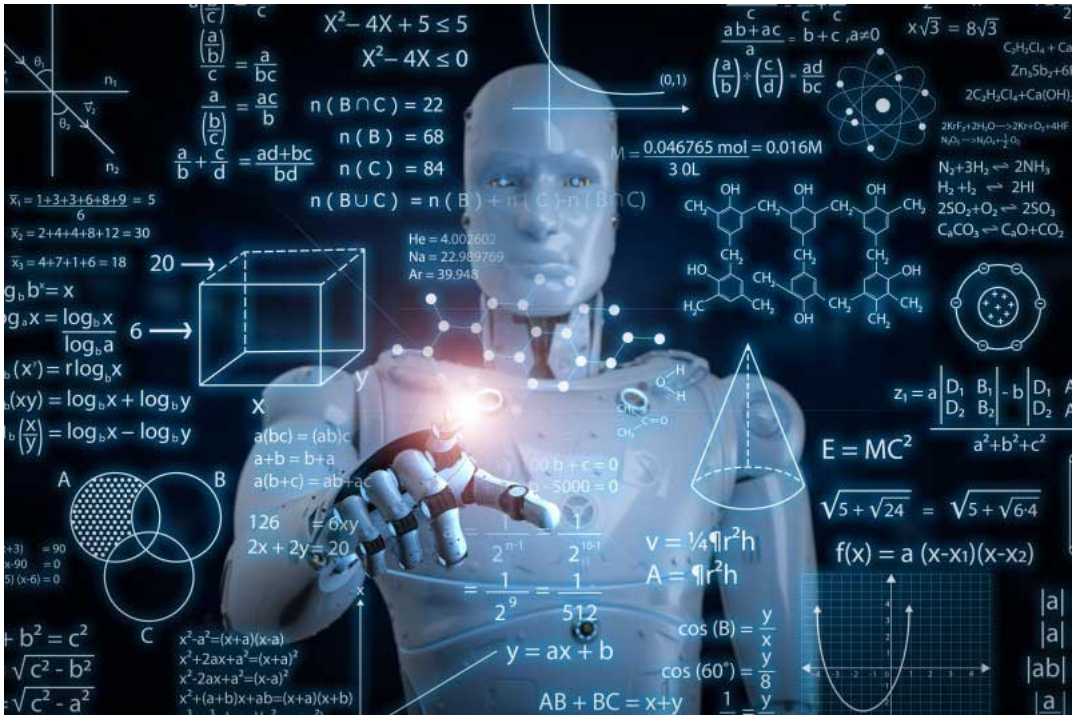


If I do some research and I get good results which end up being published, but years later I try to reproduce the same protocol and results, and they are negative. What would be the course of action? Is it better to retract the paper before it gets disputed?

a) Retract immediately
b) Defer to joint vote of all authors
c) Inform other authors that if results cannot be reproduced within the following month, you will move forward with retraction
d) Ignore and hope no one notices

Publishing negative results is a very difficult thing to do, despite the immense importance of negative results to the scientific process. I feel that this imparts a pressure for positive results, especially considering the importance of publications in grant writing, perhaps pressuring scientists into designing flawed studies or massaging data to fit their hypotheses (whether it's intentional or not). How would addressing this pressure for positive results affect general reproducibility issues?

What are the appropriate metrics to quantify rigor and reproducibility in AI models?



How can we remain unbiased? As a researcher, how can we promote unbiased research? And what effort is made by the funding agency and journal publishers to promote unbiased research?

Rigor and Reproducibility
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With the COVID pandemic, we have seen the rapid publication of a lot of information that is heavily covered by the media. How can we best communicate this information to the public as data that is still in early stages without losing public confidence in the scientific process? What metrics of rigor still do we need to look for in studies about a disease where very little is known and significant amounts of information is rapidly being discovered?

If an experiment is performed twice, with one significant result and one which did not reach significance, how should that be reported?

a) Both results should be reported
b) Do not mention the data that did not reach significance
c) As long as both demonstrated the same trend and one is significant, you can report it as significant overall
d) To avoid rejection by editorial review, you should perform more experiments before publishing

How can you enhance inter-lab reproducibility in animal studies – especially when gut microbiota have such a huge impact on host physiology?

At what point are key resources expected to be authenticated?

a) Before publication
b) After data is acquired from 3 or more reproducible experiments
c) Once the experiment does not reproduce results observed in previous experiments
d) Once resource is acquired

Using the same mouse model, my lab is unable to reproduce the data published by a collaborator. This information is crucial, especially to the patient population. However, 'negative data' are usually considered not attractive enough to be published by scientific journals. What should our lab do with these data?

Rigor and Reproducibility
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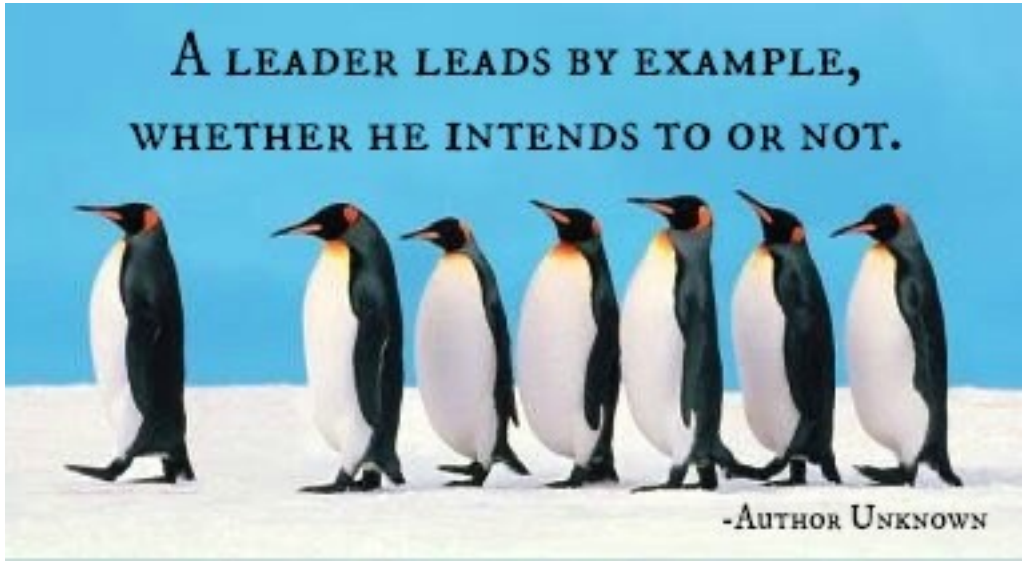
What are better ways to engage younger students, as a mentor, on the importance of rigor and reproducibility during the more formative years in graduate school?

As a postdoc, what are ways in which I can promote the importance of rigor and reproducibility to incoming graduate students and other new members of the lab beyond "leading by example" in the lab setting?



A post-doc conducted mice experiment with 6 animals in the treatment group and 6 animals in the vehicle control. The results were promising but did not achieve statistical significance (p=0.06). The PI suggested repeating the same experiment with 4 additional mice in each group. As a result of these two experiments, they got significant results and they decided to combine these experiments (10 mice in each group) and publish it.

Is this okay?

Rigor and Reproducibility
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1) What steps are necessary to determine a novel discovery vs results of systematic error?

2) On the topic of reviewing literature, what resources are available to ascertain the reproducibility of a lab's results besides performing the experiment yourself? Where to find and how to look for duplicated experiments.

3) How detailed should supplementary information be to ensure reproducibility?

4) What are tell-tale signs that a study shouldn't be regarded as legitimate or reproducible?

5) What are key planning steps to designing an easily replicable project?