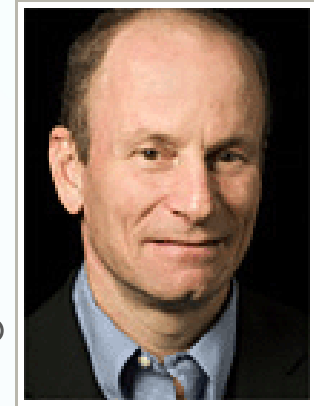


ELSEVIER

How to write a world-class paper

Stephen G. Lisberger
Associate Editor, Neuroscience
Professor, University of California San Francisco

Who am I?



- Systems neuroscientist with interests in motor learning and in how we use vision to guide our eye movements.
- Author of over 100 papers in peer-reviewed journals.
- Former "Reviewing Editor" and "Senior Editor" for the Journal of Neuroscience.
- Current Associate Editor, soon to be Editor in Chief of IBRO's flagship journal, Neuroscience.
- True believer in the value of peer review and in the branding of specific Journals.

Who am I?



IBRO's *Neuroscience*



- Broad readership
- General neuroscience content
- Working scientists as editors
- Rapid review and publication
- Impact factor ~3.8
- Published by Elsevier

How to write a great paper

- Good, thorough, properly controlled science
- Choice of Journal
- Manuscript preparation
- Submission mechanics
- Dealing with editors
- Revisions/rejections/rebuttals
- Ethics

Good science

- It is impossible to write a good paper on the basis of lousy science. Don't try.
- Plan ahead. Think about controls, statistical power, and completeness. Even if you can get a tiny advance published, it doesn't help science.
- Find role models: a paper in your field that is admired, or a scientist whose work seems particularly good and relevant.
- Take your time and get it right.
- Keep thorough records and data notebooks. Keep results of all data analysis, not just what you plan to publish.

Choice of journal

- What is the correct format for your paper? 4 figures and 2,000 words (Nature) or 12 Figures and 10,000 words (Neuroscience)?
- How many scientists will want to read your paper?
- Is the paper intended for a few specialists, or for a broader audience?
- How much time do you have to try to get your paper in the "best" possible journal?

Choice of journal

- Be honest with yourself.
- Very few papers get published in the very top journals -- Nature, Science, Nature Neuroscience, Neuron.
- Terrific careers have been made publishing in quality journals run by working scientists: J. Neurosci, J. Neurophysiol, J. Comp. Neurol., Neuroscience, Exp. Brain Res. European Journal of Neuroscience, and so on...
- If you are realistic about where your paper really belongs, you will not waste time aiming too high and working your way down what I call the "food chain".
- I understand the pressures to publish in a Journal with a very high impact factor. I think they are hurting neuroscience as a field.

Manuscript preparation

- Cover page
 - Title
 - Authors
 - Affiliations
 - Abstract
 - Keywords
- Should be informative but brief
- Recall that title, keywords, and abstract are used for electronic searches. Many journal articles are found through google!
- Authorship is a special right and privilege. More on this later.

Title

A *good* title should contain the **fewest** possible words that **adequately** describe the contents of a paper.

DO

Convey main findings of research

Be specific

Be concise

Be complete

Attract readers

Title

A *good* title should contain the **fewest** possible words that **adequately** describe the contents of a paper.

DON'T

Use unnecessary jargon

Use uncommon abbreviations

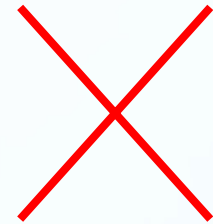
Use ambiguous terms

Use unnecessary detail

Focus on part of the content only

Title

Motor learning in smooth pursuit eye movements is in the cerebellar cortex and the deep cerebellar nuclei



Effect of cerebellar lesions on motor learning in smooth pursuit eye movements



Abstract

Abstract format varies widely among journals.

A good abstract is an art form.

I usually write the abstract of my paper last.

Read some abstracts from the journal you've chosen to get the right idea.

Abstracts are important!

Editors use them to screen papers for review and to choose handling editors.

Prospective reviewers use them to decide whether or not to agree to review a paper.

Abstract

A sensory stimulus causes responses in many neurons across a population. We have explored biologically-plausible implementations that allow the sensory stimulus to be estimated or “decoded” from the population. In our model, decoding neurons integrate their inputs at least across 100 ms, incoming spikes are weighted by the preferred stimulus of the neuron of origin, and a local, cellular non-linearity allows sensory estimates to be independent of the amplitude of the neural population response. The proposed computation is sub-optimal as a sensory estimator, but works as well as traditional decoding models in estimating target speed from a model population of neurons that are tuned for different speeds. It has advantages in terms of efficient and realistic neural computation.

This is a brief, descriptive abstract intended for a journal with a general readership

Abstract

Smooth pursuit eye movements are variable, even when the same tracking target motion is repeated many times. We ask whether variation in pursuit could arise from noise in the response of visual motion neurons in area MT. In physiological experiments, we evaluated the mean, variance, and trial-by-trial correlation in the spike counts of pairs of simultaneously recorded MT neurons. The correlations between responses of pairs of MT neurons are highly significant and are stronger when the two neurons in a pair have similar preferred speeds, directions, or receptive field locations. Spike count correlation persists when the same exact stimulus form is presented repeatedly. Spike count correlations increase as the analysis window increases because of correlations in the responses of individual neurons across time. Spike count correlations are highest at speeds below the preferred speeds of the neuron pair, and increase as the contrast of a square wave grating is decreased. In computational analyses, we evaluated whether the correlations and variation across the population response in MT could drive the observed behavioral variation in pursuit direction and speed. We created model population responses that mimicked the mean and variance of MT neural responses as well as the observed structure and amplitude of noise correlations between pairs of neurons. A vector averaging decoding computation revealed that the observed variation in pursuit could arise from the MT population response, without postulating other sources of motor variation.

This is a more structured abstract that goes through each result in the paper

Abstract

A good abstract:

- Is precise and honest
- Stands alone
- Uses no technical jargon
- Is brief and specific
- Cites no references

Manuscript preparation

- Main text
 - Introduction
 - Methods
 - Results
 - Discussion
 - Supplementary material and Appendices
- Each section has a clearly defined purpose
- Different journals have different length requirements -
- follow them!
- I usually start by making good versions of all figures.
- Then, I write in the following order: Methods, Results, Discussion, Introduction, Abstract

Introduction

Provide the necessary background information to put your work into **context.**

It should be clear from the introduction:

- Why the current work was performed
 - aims
 - significance
- What has been done before
- How your paper adds to knowledge

Introduction

DO

- Consult the Guide for Authors for word limit
- “Set the scene”
- Outline “the problem” and hypotheses
- Ensure that the literature cited is balanced, up to date and relevant
- Define any non-standard abbreviations and jargon

Introduction

DON'T

- Write an extensive review of the field.
- Cite disproportionately your own work, work of colleagues or work that supports your findings while ignoring contradictory studies or work by competitors.
- Describe methods, results or conclusions other than to outline what was done and achieved in the final paragraph.
- Use terms like “novel” , “highly original” and “for the first time”.

Results

A description of the experimental approach and the main findings of the research.

DO

- Use figures and tables to summarize data (more on figures and tables later).
- Include enough statistical analysis to persuade the reader.
- Write a story about your Results.

Results

DON'T

- Repeat material that is already in the Methods section.
- Write the results as Figure legends.
- Include "discussion" or "introduction" unless it is truly essential.

My general rule is one page of typescript for each Figure or Table. Of course, fields will differ, but if you have much less than this I am immediately concerned about whether there is any story to tell.

Graphics

Figures and tables are **the most effective way to present data.**

BUT:

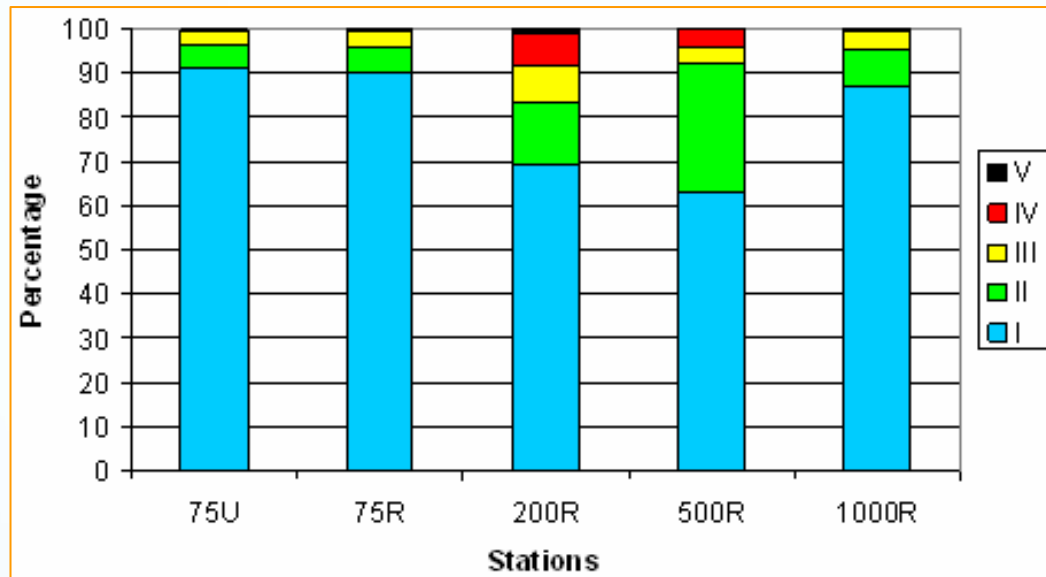
- Neatness counts -- graphics should look pretty.
- You need to design your figures carefully.
- As a general rule, a figure should be deleted if it can be replaced with one or two sentences in the text and a few numbers.

Graphics

Five rules for making figures

- Design your figures carefully and make them in the final size you desire in the published paper.
- Make all your figures uniform -- same line style, same font and font sizes, etc.
- No unnecessary text in the figures.
- Use color only when it is essential.
- If a colleague cannot immediately tell what is shown in a figure, you probably need to redesign it.

Graphics



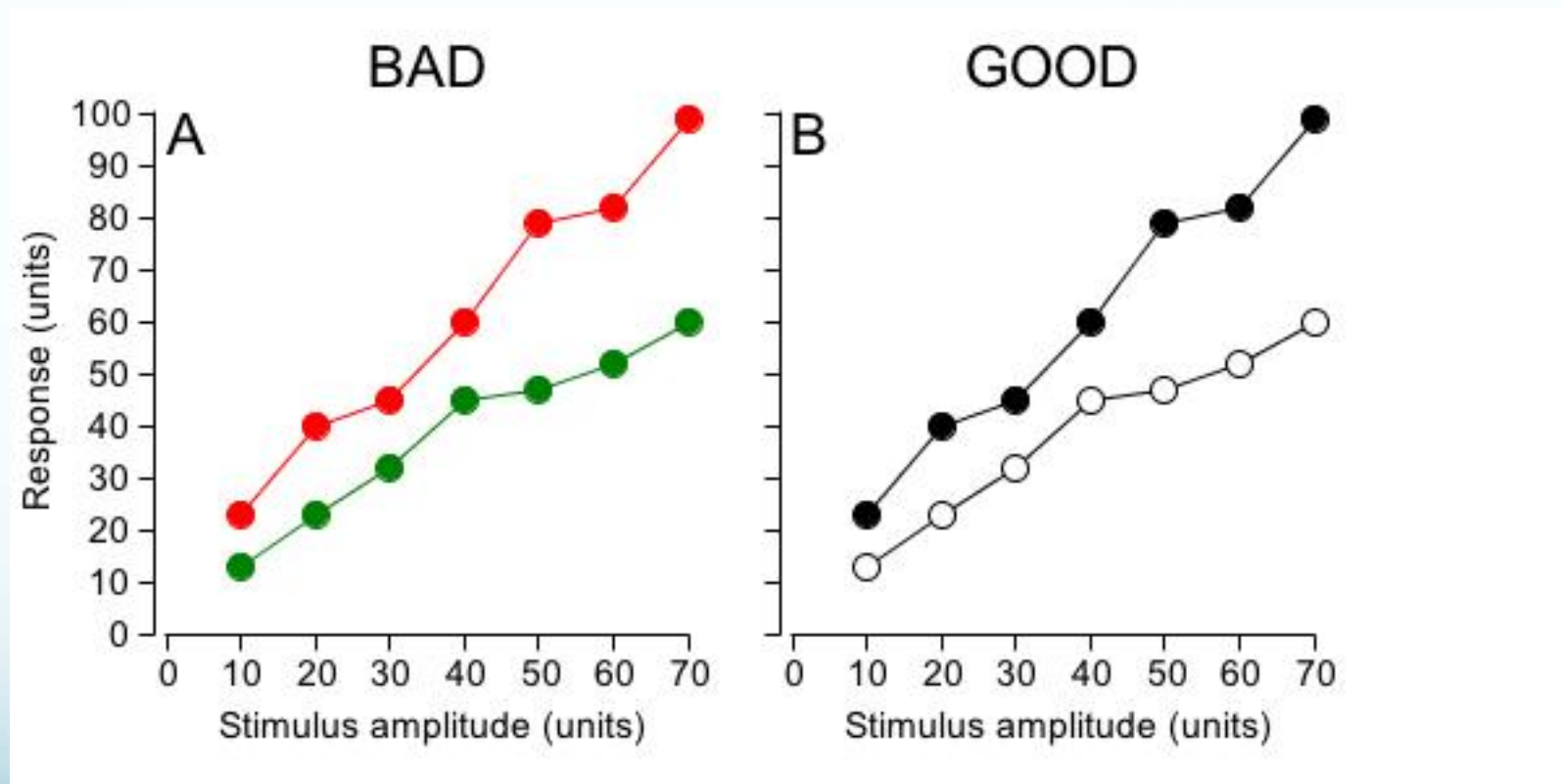
The figure and table show the same information, but the table is more direct and clear and uses less space.

ECOLOGICAL GROUP					
Station	I	II	III	IV	V
75U	91.3	5.3	3.2	0.2	0.0
75R	89.8	6.1	3.6	0.5	0.0
200R	69.3	14.2	8.6	6.8	1.1
500R	63.0	29.5	3.4	4.2	0.0
1000R	86.7	8.5	4.5	0.2	0.0



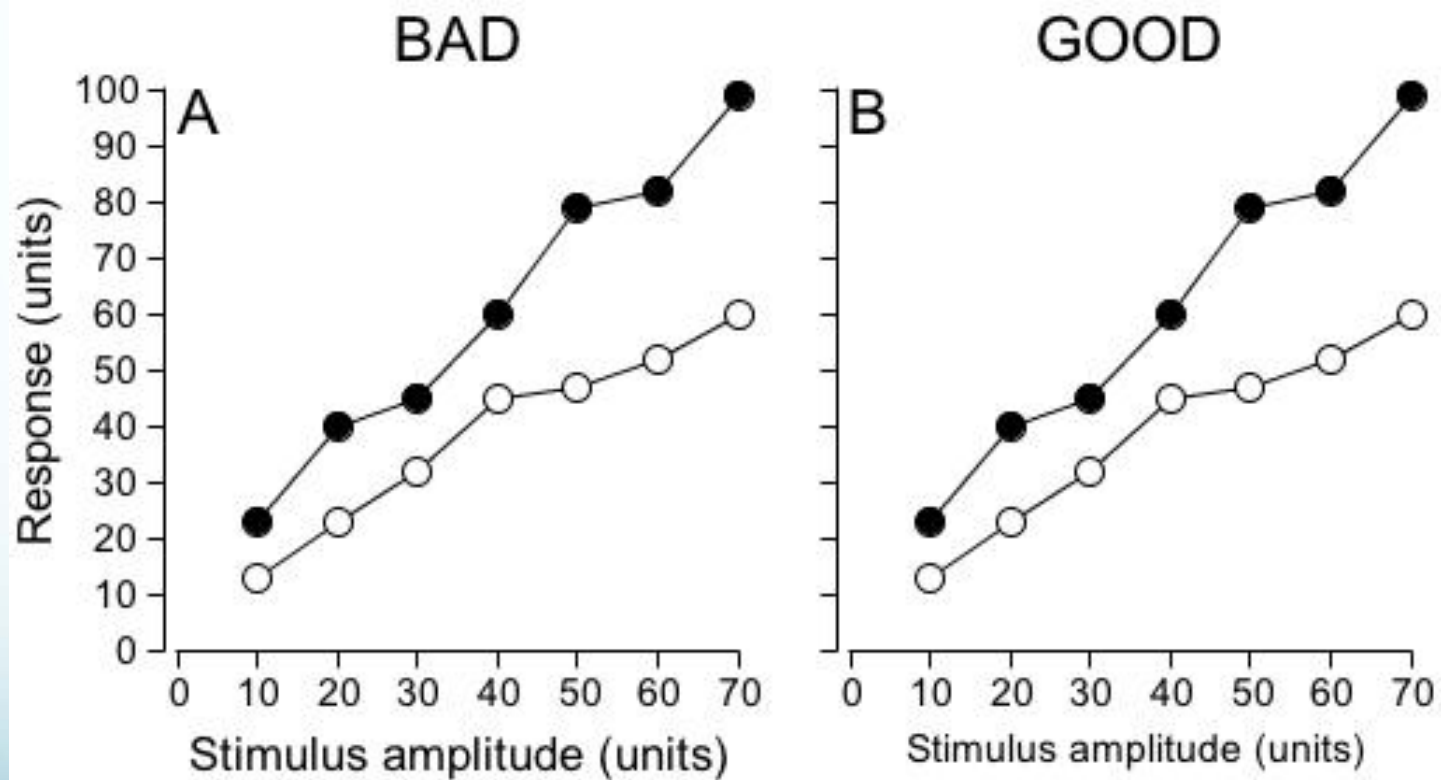
Graphics

Use color only when it adds to the presentation.



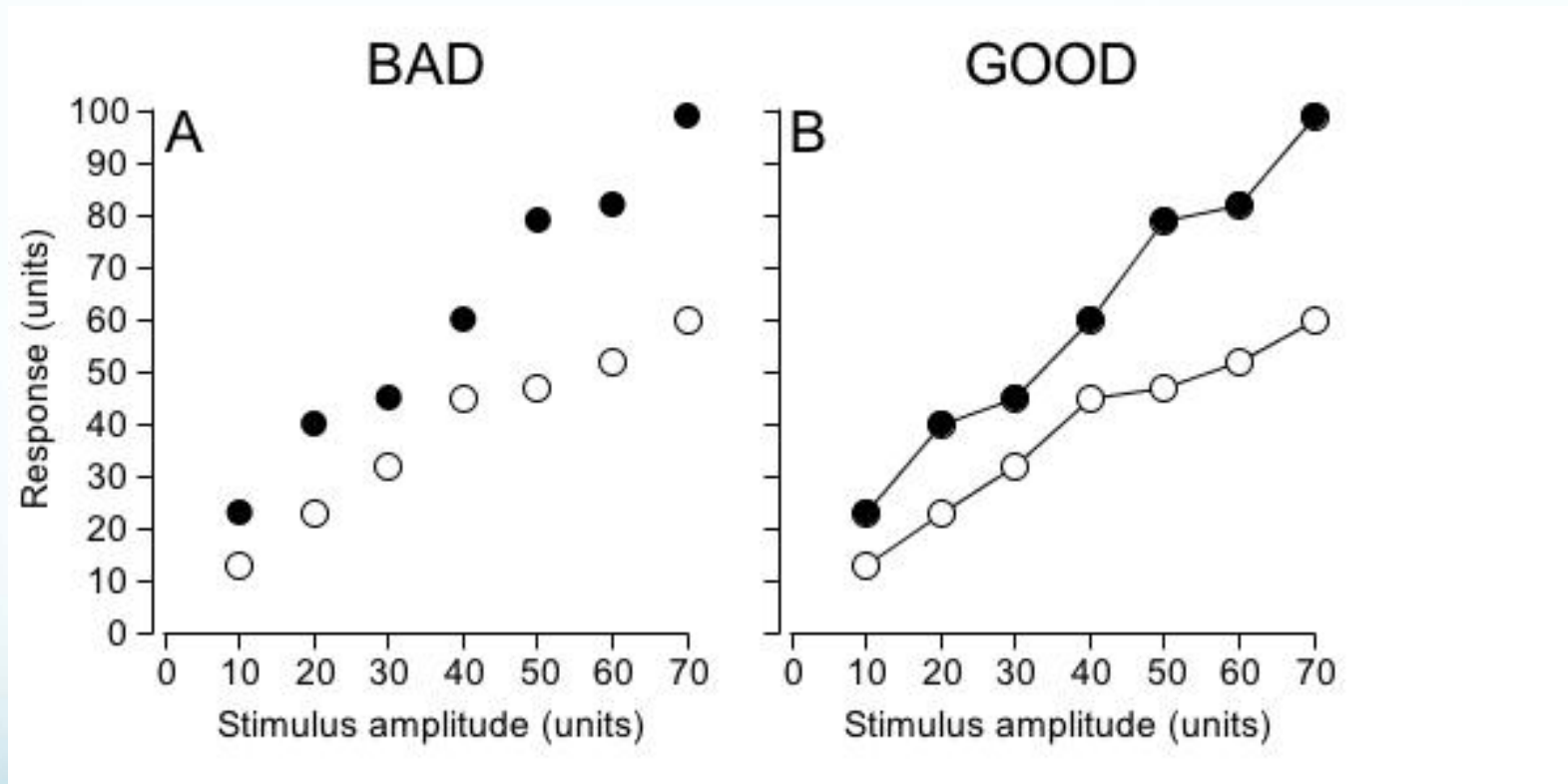
Graphics

Make all fonts the same size (except "A" and "B")



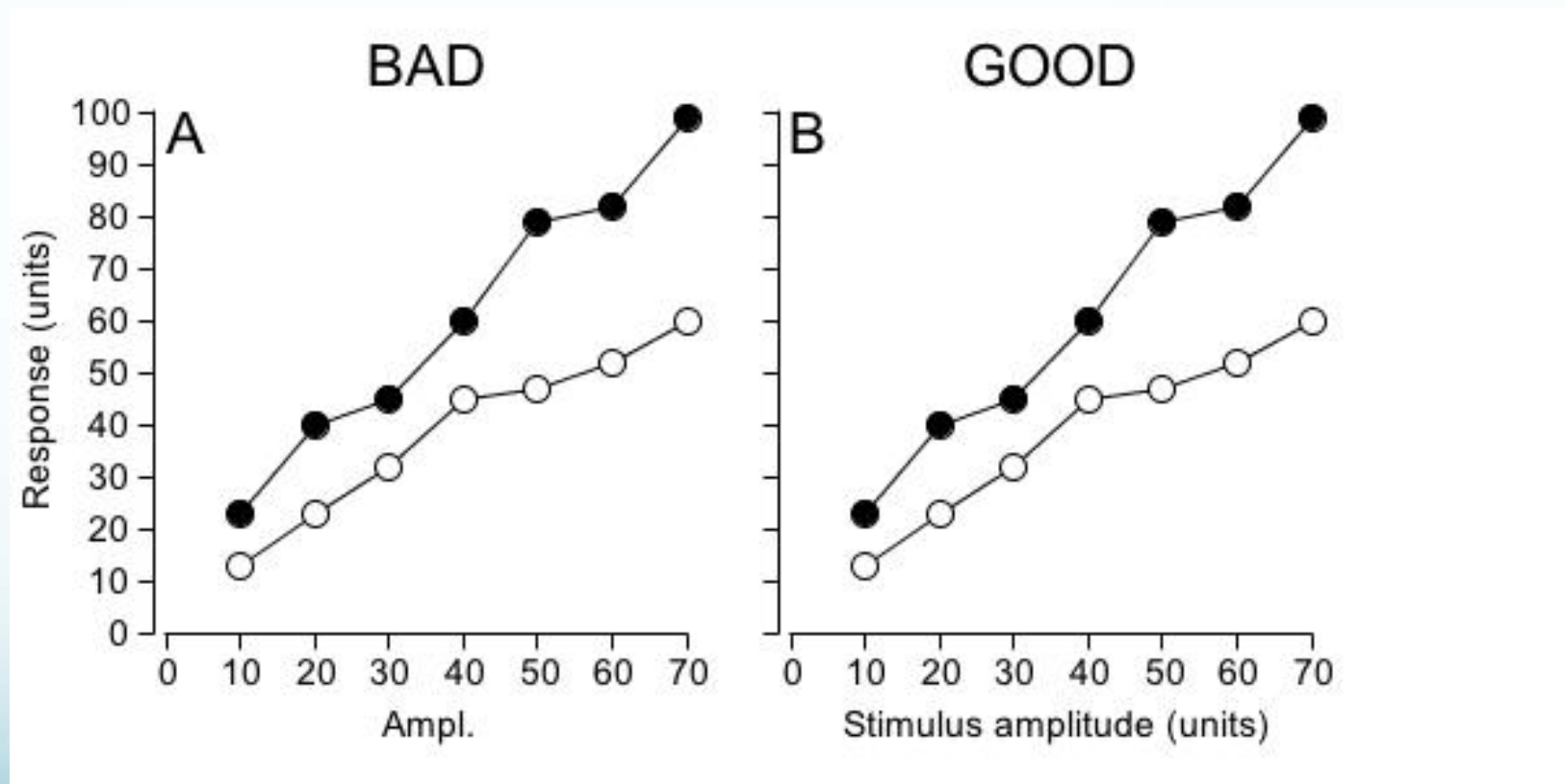
Graphics

Connecting the dots makes the graph easier to read



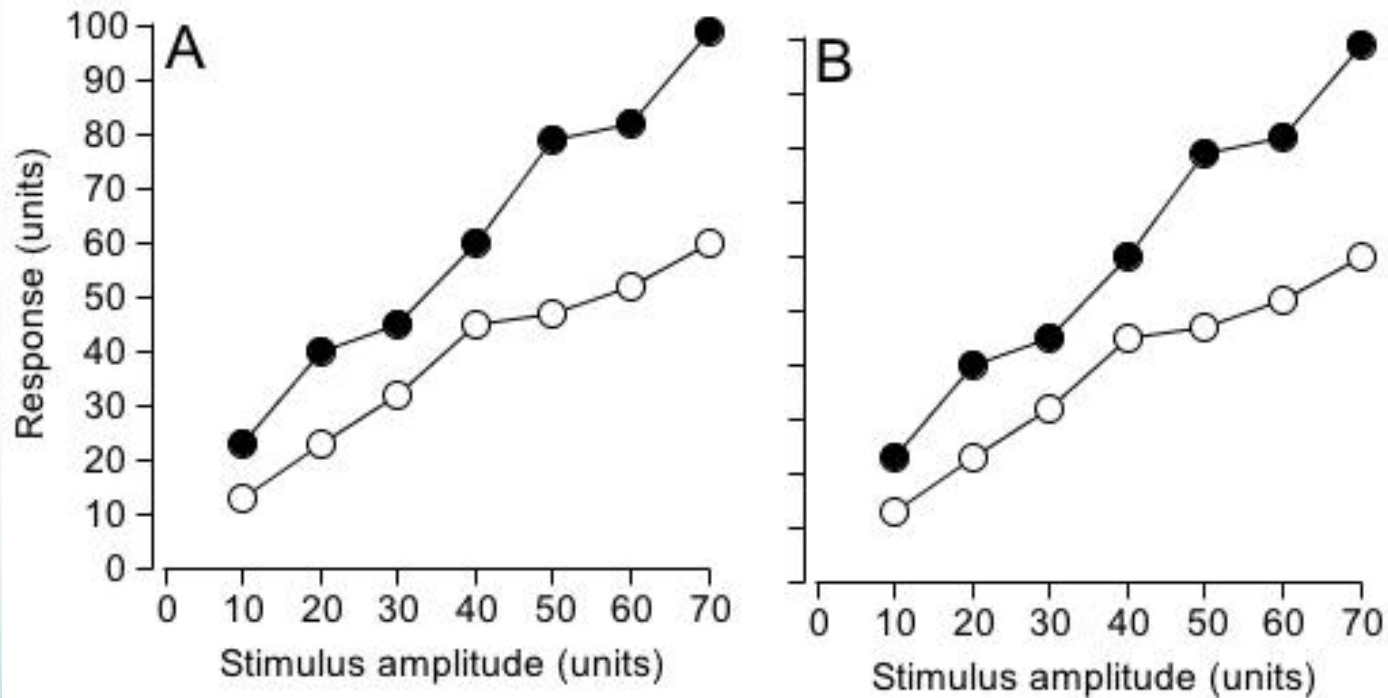
Graphics

Use axis labels and legends that are as descriptive as space allows



Graphics

Align graphs perfectly with each other



Graphics

Make companion graphs the same size

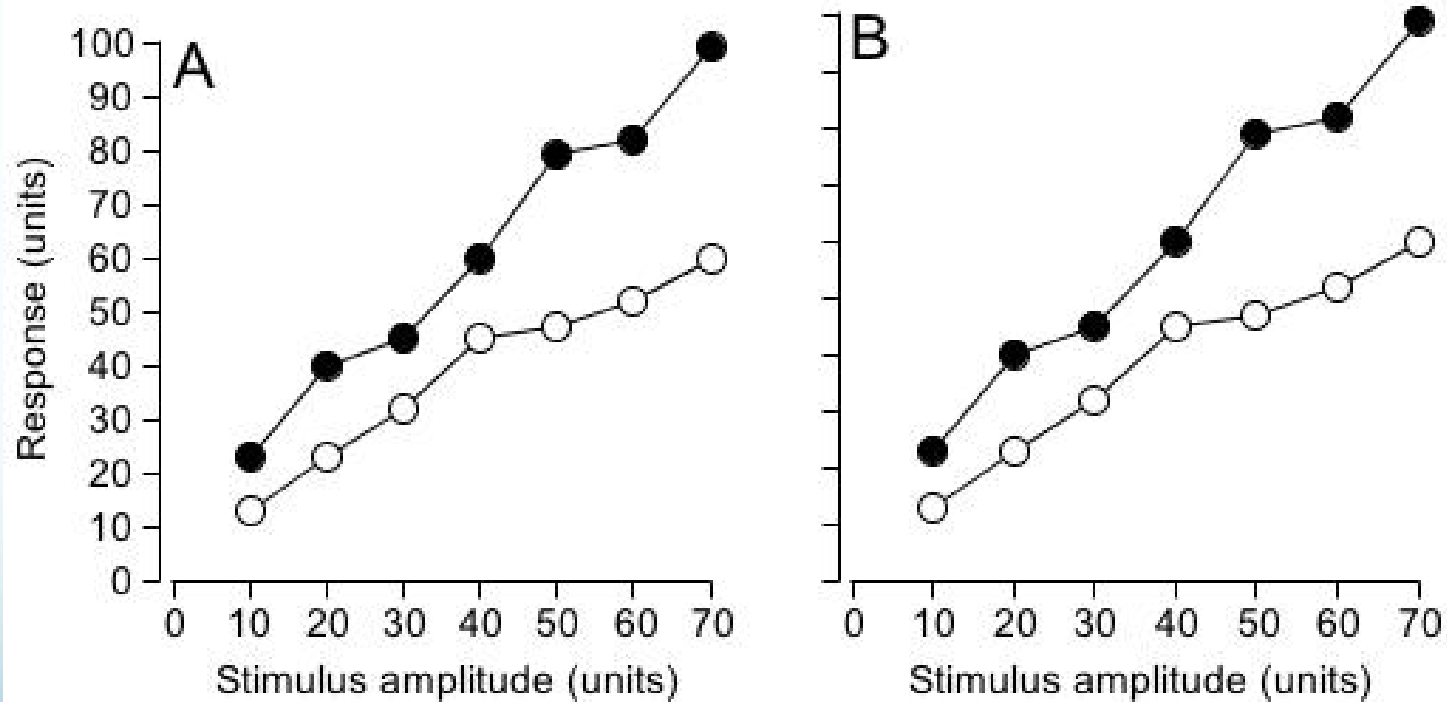


Figure legends

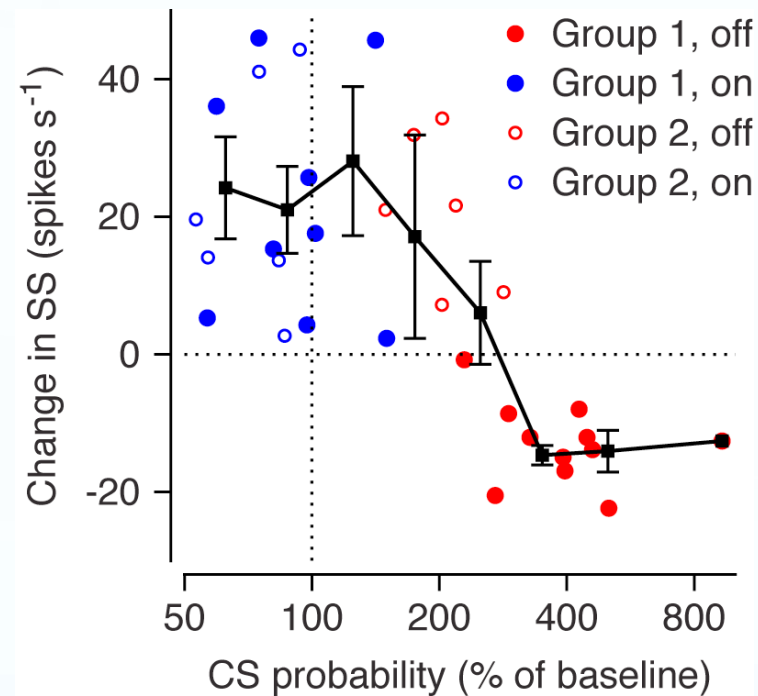
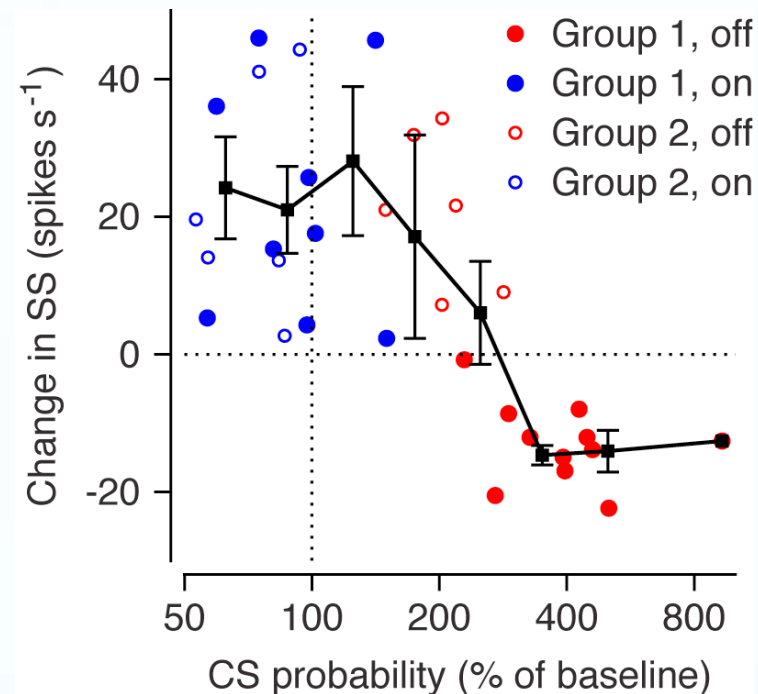


Figure 4. Quantitative relationship between complex spike probability in learning trials and learned changes in simple spike activity in probe trials. Each point plots the results of one learning experiment on one Purkinje cell and shows averages across all the trials in the learning block. Analysis intervals for the complex spike probability and the learned change in simple spike firing are indicated in Figure 3. Filled and open symbols indicate data from group 1 (n=11) and group 2 (n=6) Purkinje cells; blue and red symbols indicate learning in the on-direction and off-direction of the Purkinje cell under study.

Results



Results: Across Purkinje cells, the probability of a complex spike during learning was a good predictor of the size and direction of the learned change in simple spike firing in each individual Purkinje cell (Fig. 4). For learning in the off-direction, group 1 Purkinje cells had a high probability of emitting a complex spike in the learning trials and showed large learned decreases in simple spike firing in probe trials (filled red circles); group 2 Purkinje cells were less likely to emit a complex spike during learning and showed learned increases, rather than decreases, in simple spike firing (open red circles). For learning in the on-direction, neither group of Purkinje cells emitted very many complex spikes in the learning trials and both showed learned increases in simple spike firing during the probe trials (open and filled blue circles).

Statistics

- Use appropriate statistical tests and define them with all relevant parameters:

mean \pm SD

- Report *P* values:

$p=0.0035$ rather than $p<0.05$

- Avoid exotic tests and do not bury the reader in statistical data that is not essential.

Discussion

- Summarize your main findings.
- Consider limitations of the study.
- Relate your findings to other relevant studies.
- Give your interpretation and other possible interpretations.
- Indicate the general implications of your study.

But, keep it short -- I use 1,500 words as a guideline for the Discussion of a full length paper.

Discussion

Stay close to your data

Avoid

- Making “grand statements” that are not supported by the data

Example: “This novel optimization method will enormously reduce the learning time”

- Introducing new results or terms

Discussion

Put your study into **CONTEXT**

Describe how it represents an advance in the field.

Suggest future experiments.

BUT

Avoid repetition with other sections.

Avoid being overly speculative.

Do not over-emphasize the impact of your study.

Acknowledgements

Acknowledge anyone who has helped you with the study, including:

- Researchers who supplied materials or software.
- Anyone who helped with the writing or English, or offered critical comments about the content.
- Anyone who provided technical help.

State why people have been acknowledged and ask their permission.

Acknowledge sources of funding, including any grant or reference numbers.

References

Check the Guide for Authors for the correct format.

Avoid

- Personal communications, unpublished observations and submitted manuscripts not yet accepted. If you must cite a submitted manuscript, include it with your submission.
- Outdated papers.
- Citing articles published only in the local language.
- Excessive self-citation and journal self-citation.

Supplementary material

Avoid supplementary material. If it is important to the paper, it should be in the paper. I predict that supplementary material is going to be eliminated by most journals within the next 5 years, mainly because it is largely un-reviewed.

Acceptable supplementary material would be supportive of the main text, but not *appropriate* for publication within the main body of the paper

- Data
- Code
- Video data

With the caveat that I think these should be stored on your own website.

Mechanics of writing in English

I know this is a major challenge for most of you.

But again, neatness counts. Get help!

- From a colleague
- From a language editing service
- From a native English speaker who knows the science

A well-written paper will get more favorable reviews than a poorly written one.

Your paper is precious, invest in it.

Submission mechanics

- Correct length and format
- Cover letter
- Reviewer suggestions

Correct length and format

Consult the Guide for Authors for word and graphic limits.

Check available categories: full paper, brief paper, communication.

Make sure your paper is appropriate for the Journal you have chosen.

Cover letter

- This is your chance to speak to the editor directly.
- Keep it brief, but convey the particular importance of your manuscript to the journal.

This is your opportunity to convince the journal editor that they should publish your study, so it is worth investing time at this stage. Have an experienced colleague help you.

Suggest reviewers

- You may suggest reviewers and exclude people who you think are inappropriate due to conflict of interest or other issues.
- Make strong suggestions. Do not avoid the most appropriate choices.
- Do not suggest close colleagues or former students or postdocs.
- If you wish to exclude someone you can say that they are a competitor, or that they have a "conflict of interest".
- Editors actually use your suggestions, and their respect for you grows if you make good suggestions.

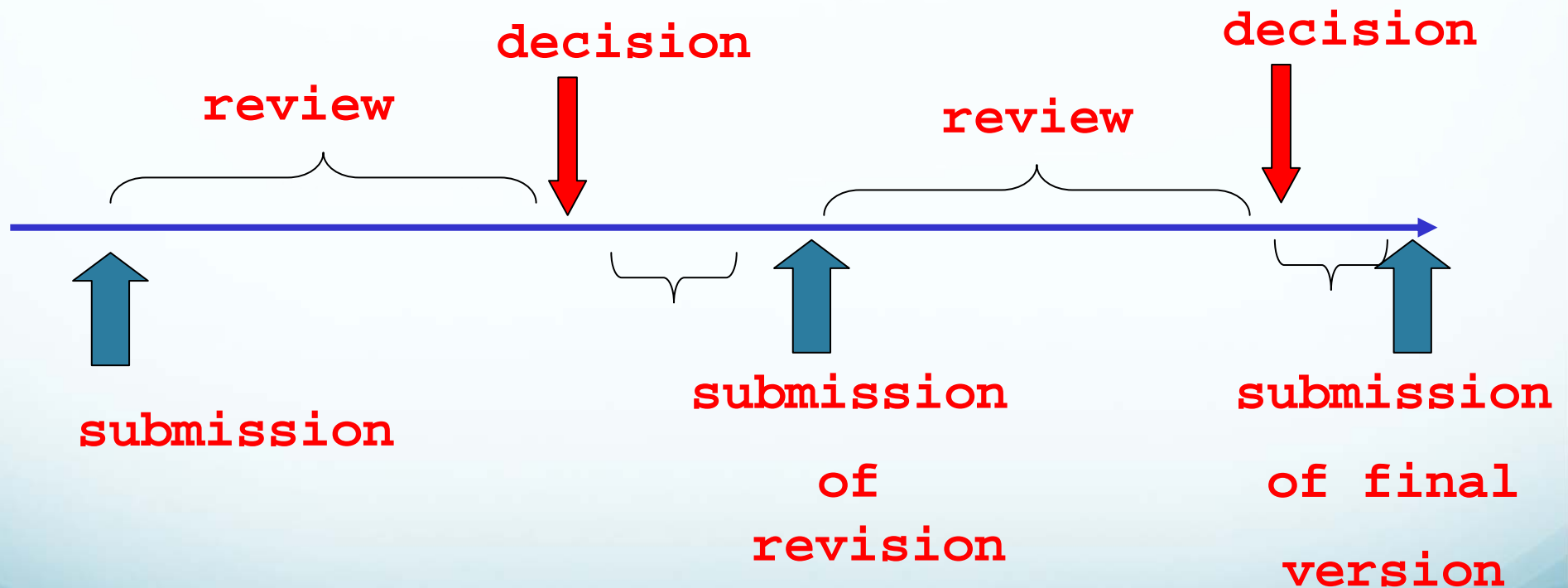
Final checks

Careful manuscript preparation can prevent early rejection. Don't rely on reviewers to improve your paper.

What can you do to ensure your paper is in the best possible state prior to submission?

- Ask colleagues to take a look and be critical.
- If necessary, get a colleague or approved editing service to improve the language and ensure that the manuscript adheres to the requirements.
- Check that the scope of the paper is appropriate for the selected journal - change journal rather than submit inappropriately.

Manuscript submission: milestones



Dealing with editors

Read the decision letter carefully and read and consider the reviews. Do not make any quick moves. Sleep on it!

If you were invited to revise and resubmit

- Write a detailed response to the comments.
- Respond to all points; even if you disagree with a reviewer, provide a polite, scientifically solid reply rather than ignore their comment.
- Make changes in the paper itself, don't just rebut.
- Provide page and line numbers when referring to revisions made in the manuscript.
- Perform additional calculations, computations, or experiments if required; these usually make the final paper stronger.

Dealing with editors

Read the decision letter carefully and read and consider the reviews. Do not make any quick moves. Sleep on it!

If your paper was rejected with invitation to resubmit

- Try to understand what the reviewers and editors really want you to do.
- Don't take short cuts. Your paper will be rejected if you make only cosmetic changes.
- Once you've decided how to proceed, do any required additional work and then proceed as indicated for a revision on the prior slide.

Dealing with editors

Read the decision letter carefully and read and consider the reviews. Do not make any quick moves. Sleep on it!

If your paper was rejected without apparent recourse

- Try to understand why the paper was rejected.
- You always have the option to appeal, but you will succeed only if you have a very good case.
- If you decide to write the editor, be thorough. Explain how you would modify the paper to address the reviewers' criticisms.
- Most appeals are unsuccessful, so be sure that you have a strong case before initiating this time-consuming process.
- Don't annoy the editor!
- Whatever you do, make sure your comments are clear, thoughtful, polite, and succinct.

Accepting rejection

Don't take it personally! Everyone gets papers rejected, even Nobel laureates.

- Try to understand why the paper has been rejected.
- Evaluate honestly - will your paper meet the journal's requirements with the addition of more data or is another journal more appropriate?
- Don't resubmit elsewhere without significant revisions addressing the reasons for rejection and checking the new Guide for Authors.

Accepting rejection

A possible strategy for submitting elsewhere

- In your cover letter, declare that the paper was rejected and name the journal.
- Include the referees' reports and show how each comment has been addressed.
- Explain why you are submitting the paper to this journal; is it a more appropriate journal?
- For many journals, you can use the "Neuroscience Peer Review Consortium":
<http://nprc.incf.org>

Ethics

Unethical behavior includes:

- Multiple submissions
- Redundant publications
- Plagiarism
- Data fabrication and falsification
- Improper use of human subjects and animals in research
- Improper author contribution

Multiple submissions

Multiple submissions save your time but waste editors'.

Competing journals exchange information on suspicious papers.

You must not send your manuscripts to a second journal UNTIL you receive the final decision from the first journal.

The editorial process of your manuscripts will be completely stopped if the duplicated submissions are discovered.

Redundant publication

Do not submit for consideration in another journal a previously published paper or previously published data.

- Previous publication of an abstract during the proceedings of conferences usually does not preclude subsequent submission for publication, but full disclosure should be made at the time of submission
- Many journals now allow you to place your paper on a legitimate pre-print site during the review process.

Plagiarism

"Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit, including those obtained through confidential review of others' research proposals and manuscripts"

Federal Office of Science and Technology
Policy, 1999

Plagiarism

Plagiarism is a serious offence that could lead to paper rejection, academic charges and termination of employment. It will seriously affect your scientific reputation

DON'T DO IT!

Plagiarism-corrective actions

Notice of violation posted electronically (retraction of journal).

Prohibition from publishing in periodical(s).

Rejection and return of papers in reviews and queues.

Data fabrication and falsification

- Fabrication is making up data or results, and recording or reporting them.
- Falsification is manipulating research materials, equipment, processes; or changing / omitting data or results such that the research is not accurately represented in the research record.

Unethical research

- Experiments on human subjects or animals should follow related ethical standards, namely, the Helsinki Declaration of 1975, as revised in 2000 (5).
- If doubt exists concerning the compliance of the research with the Helsinki Declaration, authors must explain the rationale for their approach and demonstrate approval from the institutional review body.

Authorship

- Authors must make a substantial contribution to the paper.
- Inclusion of someone who does not deserve authorship and exclusion of someone who does are equal offenses.
- All authors must read and approve the final version of the paper before it is submitted.
- Authorship complaints will result in immediate suspension of the review process, or retraction of the paper.
- Resolution of authorship complaints will be referred to your institution, and will not be attempted by the Editors of most journals.

How to write a great paper

- Good, thorough, properly controlled science
- Choice of Journal
- Manuscript preparation
- Submission mechanics
- Dealing with editors
- Revisions/rejections/rebuttals
- Ethics

This presentation is available at: [http:// www.paperpub.com.cn](http://www.paperpub.com.cn)