Reviewing for Transparency and Rigor: What Authors and Reviewers Should Know

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Developmental Editor: Current Protocols in Neuroscience

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A few questions to start…

For Authors:

1) How many have read a new procedure in a paper and ultimately could not replicate the method? Why?

2) How often do you publish a full account of your experimental procedures – are they the same steps you have written on sticky notes?
   • Why do you skip steps when writing up papers?

For Reviewers:

1) How often do you read a methods section and not understand the procedures? Do you ask authors to elaborate on the procedures?

2) If it bothers you that authors don’t elaborate on their procedures, then why don’t you elaborate in your research articles?
What is Peer Review and Why Do We Need It?
In its basic form

“A process by which a scholarly work is checked by a group of experts in the same field to make sure it meets the necessary standards before it is published or accepted”

- Merriam-Webster
Ultimate Purpose of Peer Review is...

Maintain the integrity of science by filtering out invalid or poor quality articles.
30 million researcher hours spent reviewing papers in 2013

15,000,000+ hours spent on redundant reviews every year

Rubriq, 2013
The Frequency of Retractions are Increasing at an Alarming Rate

40% of retracted articles attributed to honest error or nonreproducible findings

28% - Research misconduct
17% - Redundant publication
15% - Unstated reasons

Steen et al., 2013
What are the Most Common Reasons for Retraction?

**Honest error**
- Errors in sample or data
- Inaccuracies or unverifiable information
- Irreproducibility
- Redundant publication (discovery that some aspects have already been published)
- Disputes over authorship attribution

**Misconduct**
- Undisclosed conflicts of interest
- Plagiarism or self-plagiarism
- Salami slicing (using the same data set to publish multiple studies)
- Data fabrication or manipulation
- Lack of adherence to ethical protocols
- Duplicate submissions (to different journals at the same time)
(Current) Peer Review Process

Overall Impressions of an Article

• What is the main question addressed by the research? Is it relevant and interesting?

• How original is the topic and does it add to the subject area compared with other published materials?

• Are data significant and novel?

• Is the paper well written?

• Are the conclusions consistent with the evidence and are the results important?

• If the author is disagreeing significantly with the current academic consensus, do they have a substantial case? If not, what would be required to make their case credible?

• If the paper includes tables or figures, what do they add to the paper? Do they aid understanding or are they superfluous?
The Changing Face of Peer Review

- Transparency in peer review (Next slide)
- Reviews based on soundness of research (methodology, results, reporting) NOT novelty, importance, interest (i.e., Scientific Rigor)
- New Technology (robotic automation)
- Cross Peer-Review (Editor/Reviewer interactions)
- Post Publication Review
# Types of Peer Review

<table>
<thead>
<tr>
<th>Modality</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single-blind</strong></td>
<td>• Encourages frank opinion</td>
<td>• Reviewers may be unnecessarily critical</td>
</tr>
<tr>
<td>Traditional</td>
<td>• No retribution from author</td>
<td>• Authors fear their work is purposefully delayed</td>
</tr>
<tr>
<td>Author known</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reviewer unknown</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Double-blind</strong></td>
<td>• Prevents bias</td>
<td>• Author still identifiable (writing style, topic, citations)</td>
</tr>
<tr>
<td>Innovative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Author unknown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reviewer unknown</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Open</strong></td>
<td>• More honest (transparent)</td>
<td>• Less honest (polite)</td>
</tr>
<tr>
<td>Innovative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Author known</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reviewer known</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Post-publication</strong></td>
<td>• Encourages further checks, dialog</td>
<td>• Quality control of comments</td>
</tr>
<tr>
<td>Everybody knows</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Notes
- Single-blind: Author known, Reviewer unknown
- Double-blind: Author unknown, Reviewer unknown
- Open: Author known, Reviewer known
- Post-publication: Everybody knows
What Editors Look For When First Receiving a Manuscript…

**ALL JOURNALS**
- Scope
- Format (commentary, full paper, review, etc.)
- Understandability

**MOST JOURNALS**
- Novelty
- Importance (in specific field/in related discipline)
- Interest

**FEW JOURNALS**
- Transparency/reproducibility
- Experimental design
- Correct statistical analyses

**Editors are not always qualified to evaluate the technical merits of manuscripts. This is the job of the referees.**
What Goes Into an Effective Introduction?

- **What is already known** about the subject, related to the paper in question
  - Is there sufficient scientific background (including relevant references) to understand the motivation, context, and rationale for the study
- **What is not known** about the subject and hence what the study intends to examine (or what the paper seeks to present)
- The significance of the work is established: why was the study conducted
- Are the scope and objectives clearly stated and…
  - …is the hypothesis evidence-driven?
Why Should One Provide Detailed Methods and Materials?

- Provides the information by which a study’s validity is judged
- REMEMBER the methods section must provide enough information so that:
  - Experiments can be repeated by others to evaluate whether results are **reproducible**
  - Peer reviewers and the readers must be able to judge whether results and conclusions are **valid**
The Experimental Design

How well a study is designed can influence the results, conclusions and reproducibility

Start with a good hypothesis (developed in intro)
Define the objectives (what you want to test)
What is the strategy (how will you achieve this)
What are the operational details (performed in practice)
What is Reproducibility

How does it differ from Repeatability?

Our goal as scientists is to confirm or disprove experimental results, but in order to do so, you have to be able to convince your colleagues and peers that your study was well-designed and executed.

Independent reproducibility guarantees objectivity of scientific results, which is at the core of scientific inquiry. It lays the claim to truth and without this claim, we give up on science!
Why Is it Difficult to Reproduce Findings?

Publication and Selection Bias

- Poor experimental design
- No statistical significance (the file drawer problem)
- Too high a number of “false positives”
- Inaccurate use of statistics (p-hacking)
- Reward impact

- An argument towards generalizability and the potential to yield new insight
Is There Proper Description of Experimental Subjects and Subject Allocation

• Experimental Subjects

• Are the total number of animals/subjects used in each experiment and each experimental group justified (e.g., sample size calculations)

• How are animals/subjects allocated to experimental groups, including randomization, blinding, matching and order in which experimental groups were assessed (e.g., counterbalancing).

• Do the authors provide the Ethics statement
## Animal Studies Must Include Detailed Housing And Husbandry Information

<table>
<thead>
<tr>
<th>Journal</th>
<th>Age/weight</th>
<th>Light cycle</th>
<th>Light lux</th>
<th>Room temp</th>
<th>Room humidity</th>
<th>Transport duration</th>
<th>Cage cleaning</th>
<th>Handling</th>
<th>Animals per cage</th>
<th>Cage size</th>
<th>Phys. enrich</th>
<th>Acclimat to facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavior Genetics</td>
<td>70</td>
<td>90</td>
<td>10</td>
<td>80</td>
<td>40</td>
<td>0</td>
<td>10</td>
<td>10</td>
<td>70</td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Behavioral Neuroscience</td>
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<td>80</td>
<td>0</td>
<td>30*</td>
<td>20*</td>
<td>0</td>
<td>0</td>
<td>20***</td>
<td>60**</td>
<td>0</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
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<td>0</td>
<td>50</td>
<td>20</td>
<td>0</td>
<td>10</td>
<td>30***</td>
<td>80**</td>
<td>20</td>
<td>10</td>
<td>10</td>
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<tr>
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<td>50</td>
<td>0</td>
<td>10</td>
<td>10</td>
<td>0</td>
<td>0</td>
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<td>30**</td>
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<td>European Journal of Neuroscience</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>30**</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Frontiers in Behavioral Neuroscience</td>
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<td>90</td>
<td>0</td>
<td>40*</td>
<td>40*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>90**</td>
<td>20</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Neurobiology of Learning and Memory</td>
<td>90</td>
<td>90</td>
<td>0</td>
<td>60</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>20***</td>
<td>50</td>
<td>20</td>
<td>0</td>
<td>30****</td>
</tr>
<tr>
<td>Pharmacology Biochemistry and Behavior</td>
<td>100</td>
<td>90</td>
<td>0</td>
<td>50*</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>80**</td>
<td>20</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Physiology and Behavior</td>
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<td>90</td>
<td>0</td>
<td>60</td>
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<td>0</td>
<td>0</td>
<td>10</td>
<td>60**</td>
<td>40</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Psychopharmacology</td>
<td>90</td>
<td>80</td>
<td>0</td>
<td>50*</td>
<td>40*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>80</td>
<td>10</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total %</strong></td>
<td>82</td>
<td>80</td>
<td>1</td>
<td>44</td>
<td>20</td>
<td>0</td>
<td>2</td>
<td>10</td>
<td>63</td>
<td>15</td>
<td>4</td>
<td>15</td>
</tr>
</tbody>
</table>

One hundred articles published in 2010 were chosen, using a random number generator, from 10 different journals that publish scientific papers in the field of behavioral neuroscience. The total percentage of articles reporting the specified housing and husbandry procedures are listed.

*Articles stated that climate was controlled but did not provide temperature/humidity.
**Articles varied in group housing numbers within experiments (e.g., 2–3 per cage) or stated animals were “group housed” but did not give number.
***Daily handling but did not specify how many days or duration of handling.
****Acclimation to facility was provided, but did not specifically state how many days.

Prager et al., 2011
Human Rights & Research Registration

Human rights, privacy, confidentiality

- For medical studies on humans, journals should require
  - Statement of ethics committee approval
  - Conforms to standards
    - Declaration of Helsinki
    - US Federal Policy for the Protection of Human Subjects
    - European Medicines Agency Guidelines for Good Clinical Practice
  - Subject consent, removal of identifying information
  - Various subject-specific guidelines including full demographics if available
Animal Research & Reporting Guidelines

**Animals in Research**

- Same rigor as humans
- Encourage the **3 Rs**
  - Replacement: use of non-animal methods
  - Reduction: methods which reduce the number of animals used
  - Refinement: methods which improve animal welfare
- Reporting standards
  - Study design, statistical analysis
  - Experimental procedures
  - Experimental animals
  - Housing and husbandry
- Required author statement of accordance with relevant institutional, national guidelines and regulations

**Resources**

- Medical: [EQUATOR Network](https://www.equator-network.org)
- Life sciences: [FORCE 11](https://force11.net);
- Animal research:
  - [ARRIVE guidelines](http://www.arriveguidelines.org)
  - National Research Council’s [Institute for Laboratory Animal Research](https://ilar.org) guidelines
  - Landis et al: [Standards for reporting animal studies](https://www.biomedcentral.com/info/policies/standards)
  - Minimum Information Guidelines from Diverse Bioscience Communities ([MIBBI](https://mibbi.org))
  - [Biosharing](https://biosharing.org)
  - Livestock reporting: [REFLECT statement](https://www.reflect-statement.org)
Sex Matters!!!

An Issue whose time has come: Sex/gender influences on nervous system function

• Sex and gender play a role in how health and disease processes differ across individuals

  • Consideration of these factors in research studies informs the development and testing of preventative and therapeutic intervention in both sexes

  • Basic and preclinical biomedical research focused on male animals and cells, obscuring understanding of key sex influences on health processes and outcomes

• Account for sex as a biological variable

• Adequate consideration of both sexes in experiments and disaggregation of data by sex allows for sex based comparisons and may inform clinical intervention
A Proper Statistical Design Involves Knowing Whether Data are Independent

<table>
<thead>
<tr>
<th>Measurements per subject or specimen</th>
<th>Non-independent data?</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Independent</td>
<td>No: Independent</td>
<td>Eight pups from 8 different mothers are each assigned to Group 1 or Group 2 (n=4/group)</td>
</tr>
<tr>
<td>Group 1</td>
<td>No subjects or specimens are related to each other</td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B: Longitudinal/Repeated Measures</td>
<td>Yes: Within Subject</td>
<td>Longitudinal studies The same samples are tested under different conditions</td>
</tr>
<tr>
<td>Time or Condition 1</td>
<td>Multiple measurements/subject or specimen; Design may also include 2 or more groups</td>
<td></td>
</tr>
<tr>
<td>Time or Condition 2</td>
<td>2+</td>
<td></td>
</tr>
<tr>
<td>C: Between Group Clusters</td>
<td>Yes: Between Groups</td>
<td>One pup from each litter is assigned to Group 1, while a second pup from each litter is assigned to Group 2</td>
</tr>
<tr>
<td>Group 1</td>
<td>Each subject or specimen in Group 1 is related or matched to one subject or specimen in Group 2</td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>D: Within Group Clusters</td>
<td>Yes: Within Group</td>
<td>Pups from 2 litters are assigned to Group 1, while pups from 2 different litters are assigned to Group 2</td>
</tr>
<tr>
<td>Group 1</td>
<td>Some subjects or specimens within each group are related to each other</td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>E: Between and Within Group Clusters</td>
<td>Yes: Within &amp; Between Groups</td>
<td>Two or more pups from each litter are assigned to Group 1, while other pups from the same litter are assigned to Group 2</td>
</tr>
<tr>
<td>Group 1</td>
<td>Subjects or specimens in Group 1 are related to other subjects or specimens in Group 1 as well as some subjects or specimens in Group 2</td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Weissgerber et al, 2016 (JNR)
Detailed Study Design, Experimental Procedures and Data Handling Improve Reproducibility

- **Describe the materials** used in the study (source, catalog #, RRID)
- **Provide precise details of all procedures** including how materials were prepared
- What is the **sequence of manipulation and measurement procedures**
- Are appropriate **control experiments** included
- **REPLICATES:** how often are experiments performed (for blot experiments: duplicates, triplicates, etc.) – biological vs. technical replicates
- How are **exclusion criteria, outliers** defined and handled; were **data removed** prior to analyses, and **randomization procedures** clearly stated?
Surgical preparation

Electrodes should be implanted using standard approved stereotaxic methods under aseptic conditions.

6. Induce anesthesia using an appropriate inhalation anesthetic chamber with isoflurane (2.5%) mixed with oxygen. Using a 1-ml syringe with a 26-G needle, inject 2 mg/kg dexamethasone subcutaneously (s.c.) about 30 min prior to any drilling in order to minimize the impact of brain swelling on targeting.

7. After inducing anesthesia, shave the mouse's scalp using the clippers. Place the mouse in the stereotaxic frame, use betadine and ethanol to sterilize the skin, and make an incision in the skin at the location where the headstage will be implanted.

The mouse should be maintained on continuous isoflurane anesthesia throughout surgery, with anesthesia levels adjusted (0.6% to 1.5% mixed with oxygen) while monitoring for breathing rate and reflexes.

8. Inject 0.1 ml of 0.25% bupivacaine (s.c.) at the site of the incision for local anesthesia.

9. Monitor the mouse's body temperature using the temperature controller, and maintain temperature at 37°C throughout the surgery.

10. Cover the eyes, whiskers, and edges of the surgical incision with antibiotic ointment to prevent damage during surgery (e.g., from dripping dental cement).

11. After ensuring that the skull is level in all directions to within 30 μm, use a bone marker to mark Bregma and the stereotaxic coordinates of the targeted brain regions.

12. Remove the muscular attachment at the intersection of parietal, temporal, and occipital bones.

Electrical muscle activity can interfere with neural recordings. Removing the attachments helps reduce that source of noise and does not appear to impair neck mobility.
# Research Resource Identifiers (RRIDS)

A persistent and unique identifier for referencing research resources.

<table>
<thead>
<tr>
<th>Antibody ID</th>
<th>Antibody Name</th>
<th>Target Antigen</th>
<th>Vendor</th>
<th>Cat Num</th>
<th>Proper Citation</th>
<th>Reference</th>
<th>Clonality</th>
<th>Clone ID</th>
<th>Host Organism</th>
<th>Comments</th>
<th>v_uuid</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB_2296313</td>
<td>Kv1.2 potassium channel antibody</td>
<td>Kv1.2 potassium channel NULL</td>
<td>UC Davis/NIH NeuroMab Facility Go To Vendor</td>
<td>75-008</td>
<td>(UC Davis/NIH NeuroMab Facility Cat# 75-008, RRID:AB_2296313)</td>
<td>PMID:17111377, PMID:17185748, PMID:17651419, PMID:18400887, PMID:18509034, PMID:18937345, PMID:18953054, PMID:1911865, PMID:19156860, PMID:19270340, PMID:19379822, PMID:19805030, PMID:20089912, PMID:20133599, PMID:20164332, PMID:20506478, PMID:20575068</td>
<td>monoclonal antibody</td>
<td>K14/16</td>
<td>mouse</td>
<td>Originating Manufacturer; manufacturer recommendations: IgG2b ICC, IB, IHC, KO; Immunohistochemistry; Immunoprecipitation; Western Blot</td>
<td>d4b7cb6c-b91b-55a8-9c18-68751522bf6e</td>
</tr>
</tbody>
</table>
Justify Your Data Analysis

• What statistical tests will be used for inferential data
  • Justified statistical approaches, report assumptions
  • Describe and justify data transformation - interpretations should be only about the transformed data and not the original data
  • **Descriptive statistics**, such as confidence interval, effect sizes, mean and standard deviation (SD) or standard error of the mean (SEM) need to be represented graphically or numerically in the text
• Power Analyses
• An argument for using nonparametric tests
What You Should Review in a Results Section?

- Are findings clearly summarized and do authors point the reader to the relevant data in the text, figures and/or tables.
  - Text should **complement** the figures or tables, not repeat the same information
- Are key results presented without interpreting their meaning and do authors:
  - Report the descriptive statistics (e.g., mean ± SD or SEM)
  - Quantify all statements concerning significance numerically
  - Report the test statistic, degrees of freedom, test value, and \( P \)-value and sample size
- Results sections should be written with accuracy, brevity and clarity…
  - BUT readers cannot be expected to extract important trends from the data unaided
Graphically Representing Data

**TABLE 1. Quick guide to figures that basic scientists often use**

<table>
<thead>
<tr>
<th>Study Type</th>
<th>Type of Outcome Variable</th>
<th>Objective</th>
<th>Type of Figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-sectional</td>
<td>Categorical</td>
<td>Compare values for two or more groups</td>
<td>Bar graph</td>
</tr>
<tr>
<td></td>
<td>Continuous</td>
<td>Compare values for two or more groups</td>
<td>Small n: Univariate scatterplot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Medium n: Box plot with data points overlaid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Large n: Box plot, violin plot or kernel density plot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Scatterplot</td>
</tr>
<tr>
<td>Longitudinal /</td>
<td>Categorical</td>
<td>Examine relationship between two continuous variables</td>
<td>Line graph</td>
</tr>
<tr>
<td>repeated measures</td>
<td>Continuous</td>
<td>Examine changes over time, for one or more groups</td>
<td>Small datasets with 2 time points or conditions: spaghetti plot and univariate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>scatterplot showing change scores*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Larger datasets, or datasets with &gt;2 time points or conditions: Interactive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>line graph or line graph and univariate scatterplot(s) showing change scores</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>for time points where important changes occur</td>
</tr>
</tbody>
</table>

*When working with paired data, it is important to show change scores to allow the reader to assess the direction and magnitude of changes and determine whether responses vary among subjects.

Weissgerber et al., 2016
Different Datasets Can Lead to the Same Bar Graph

Figure 2

<table>
<thead>
<tr>
<th>Test</th>
<th>A</th>
<th>B: Symmetric</th>
<th>C: Outlier</th>
<th>D: Bimodal</th>
<th>E: Unequal n</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-test: Equal var.</td>
<td>0.035</td>
<td>0.050</td>
<td>0.026</td>
<td>0.063</td>
<td></td>
</tr>
<tr>
<td>T-test: Unequal var.</td>
<td>0.035</td>
<td>0.050</td>
<td>0.026</td>
<td>0.035</td>
<td></td>
</tr>
<tr>
<td>Wilcoxon</td>
<td>0.054</td>
<td>0.073</td>
<td>0.128</td>
<td>0.103</td>
<td></td>
</tr>
</tbody>
</table>
A Discussion Addresses Each of the Experiments

• Do authors **Interpret the results** in light of what was already known about the subject of the investigation
  
  • Do the results provide answers to the **testable hypothesis**?
  
  • Do the findings agree with what others have shown?
  
  • What is our **new understanding** of the problem investigated and outlined in the Introduction; what are the logical next steps?
  
  • Do the authors consider how the results of other studies may be combined to derive a new or perhaps better substantiated understanding of the problem
  
• No new results are introduced in the Discussion
Data Accessibility

- Data Repository to make underlying scientific publications discoverable, freely usable and citable
- Make research data openly available and integrated in scientific literature
Abstract and (if Required) Significance Statement

- Does the abstract accurately identify the basic content of the study?
  - What are the principal objectives and scope?
  - **VERY CONCISELY** state the results and conclusions
- Significance statements are distinct from abstract
  - Allows readers from many different fields to understand the paper’s importance
  - Should provide clear context for the paper’s implications
- Key Words - https://www.nlm.nih.gov/mesh/MeSHonDemand.html
Does the Title Accurately Describe the Main Finding and Subjects Studied

**ARTICLE**

doi:10.1038/nature09856

Post-traumatic stress disorder is associated with PACAP and the PAC1 receptor

in women, not men
Ethical Problems

Guidelines

◆ Every reputable journal has them

◆ Simple set of guidelines that outlines the responsibilities of authors, editors, and reviewers

◆ Designed to ensure that everyone is treated fairly in the whole publication process

http://exchanges.wiley.com/ethicsguidelines

http://publicationethics.org
Detecting Overlap

Many journals use CrossCheck by iThenticate
Generally, no set rules for rejecting due to overlap identified by software
More of a tool to detect potential issues, which are then checked by an editor

Judgment call:
• A certain percentage of overlap is usually acceptable
• But if there is significant reuse without citation, the paper will be rejected/retracted

http://google.com or http://scholar.google.com
http://plagiarism-detect.com/
http://www.plagium.com/
http://www.plagscan.com/seesources/
http://plagiarism-detector.com/
http://www.scanmyessay.com/ (Viper)
http://www.dustball.com/cs/plagiarism.checker/
http://www.plagiarismsoftware.net
Manipulation Can Occur in Text or Within Images
Self-Plagiarism (text recycling)

How much text overlap with an author’s own previous publications is acceptable?

Method
Introduction
Discussion/Conclusion
Data

Self-Plagiarism & Dual Publication

Citing own previous work: same rules apply as any other paper; remember – most journals are hungry for original material!

Dealing with papers published in other venues
- Depends on subject area and individual journal rules
  - Physics, economics: tradition of working papers
  - Life sci, medicine, chemistry: can be a more serious transgression
- Conference Proceedings: should have substantial elaboration and citation

Publishing a translation
- Need permission from original publisher
- Should cite original paper
- Inform editor upon submission
Conclusions

Questions? Concerns? Complaints?

Peer review can be costly, time consuming, biased and inconsistent…

…BUT as authors and peer reviewers, focusing on experimental design, methods, and execution will improve the process and ensure results are transparent and reproducible
Questions?
Statistical Issues in Reproducibility

Why do we use Statistics?

- To determine the parameters that make the model the best description of the data
- Supplement an “estimate” with a measure of precision

Statistics and Reproducibility

- Reproducing an experiment under similar circumstances should result in compatible results
- Most authors do not report:
  - Power calculation
  - Assumptions
  - Replicates

“A statistical test is like a used car. It may sparkle, but how reliable it is depends on the number of owners and how they drove it – and you can never know for sure” – Harry Collins
Different Representations of the Same Behavioral Data

A. Mean +/- SEM

B. Differences: condition2 - condition1

C. Paired observations

D. Paired observations