

Writing Scientific Manuscripts

a guide for undergraduates

Copyright 2005, Journal of Young
Investigators, Inc.

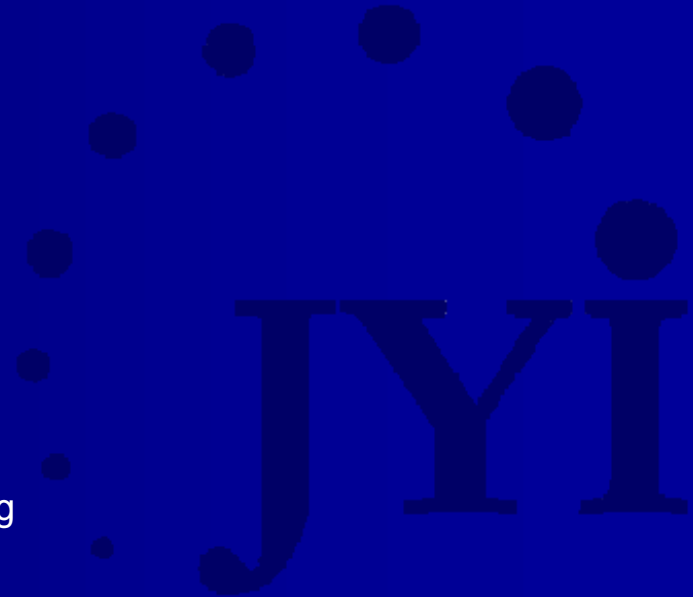


Table of Contents

- **Introduction**
- **Part I: Publication & Peer Review**
 - **Deciding to Publish**
 - **Submitting Your Paper**
 - **After Submission**
 - **Overview of Peer Review**
 - **Purpose of Peer Review**
 - **How It Works**
 - **The Role of Editor**
 - **Limitations and Issues**

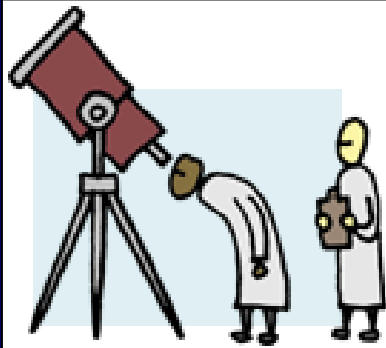
Communicating Results

Publishing the results.

- A scientific article must tell the reader
- **what** the question to be answered is,
- **why** the question is important or relevant,
- **background** information, a
- **precise** description of how the work was done, the
- **data** that were collected, and the
- **scientist's evaluation** of what the data mean.



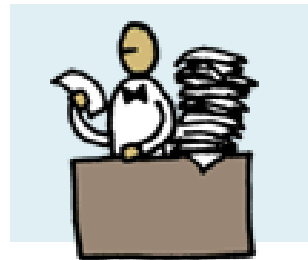
JYI



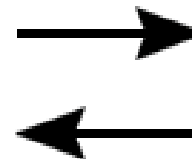
Scientists study something.



Scientists write about their results.



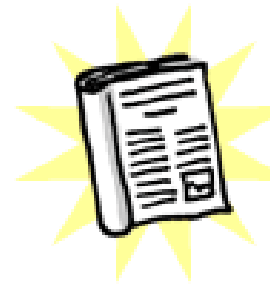
Journal editor receives an article and sends it out for peer review.



Peer reviewers read the article and provide feedback to the editor.



Editor may send reviewer comments to the scientists who may then revise and resubmit the article for further review. If an article does not maintain sufficiently high scientific standards, it may be rejected at this point.



If an article finally meets editorial and peer standards it is published in a journal.

The peer review process

Peer review Process

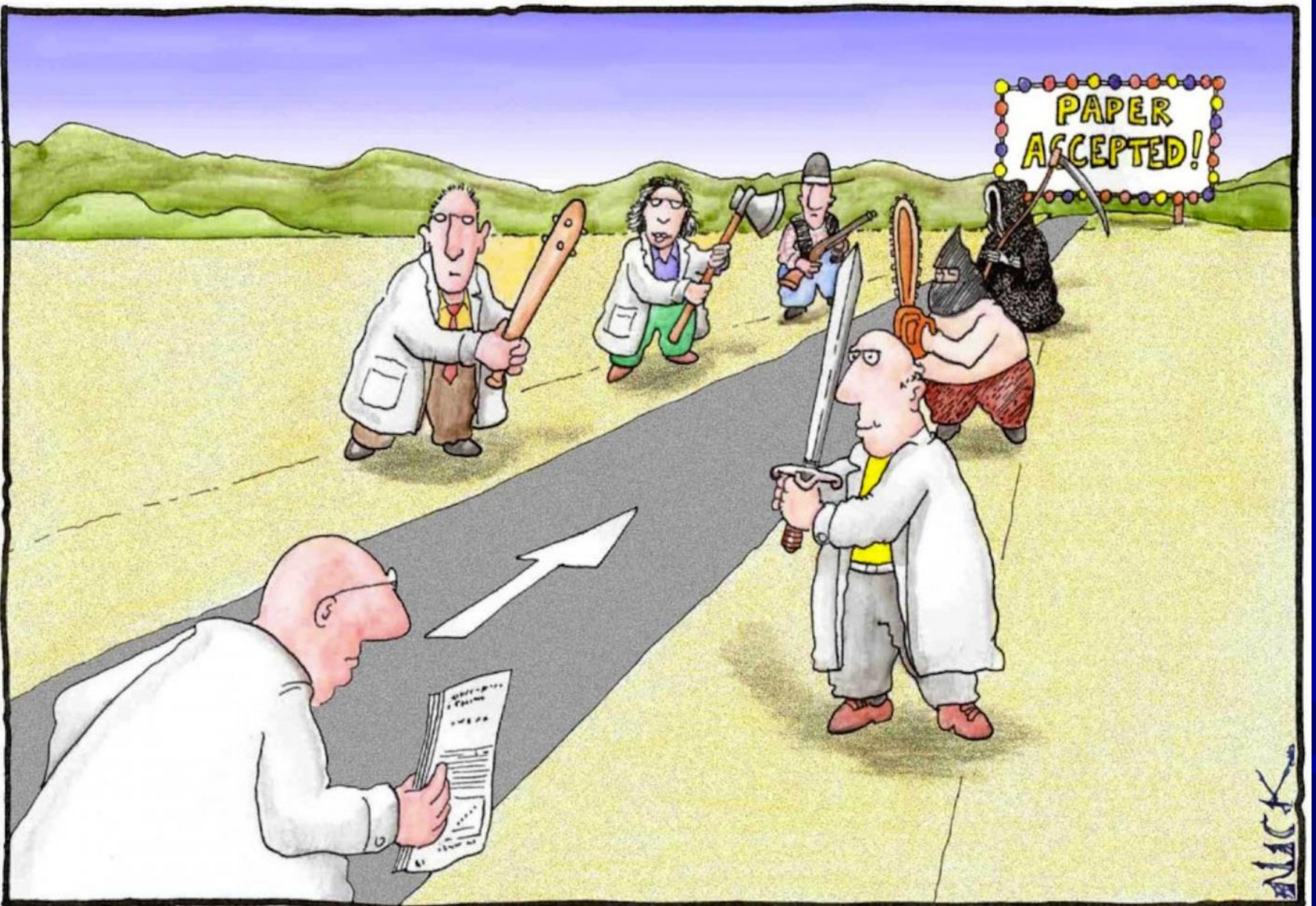
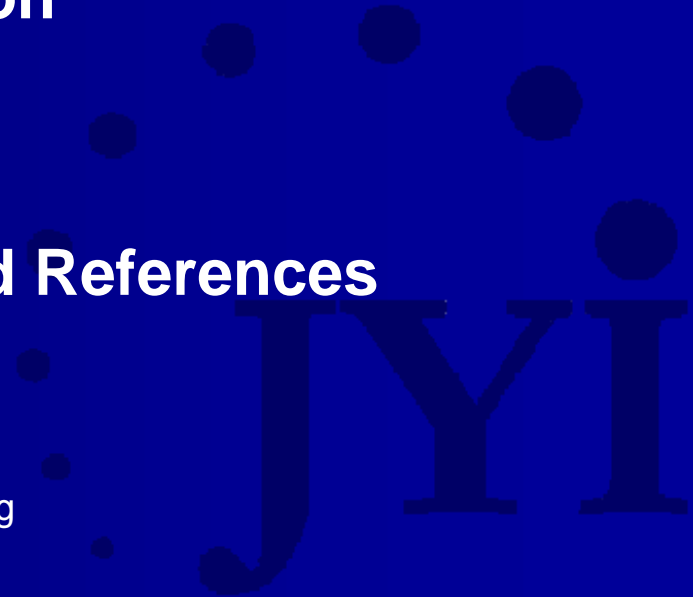


Table of Contents Cont'd

- **Part II: Writing a Scientific Manuscript**
 - **The Scientific Manuscript**
 - **Word Choice**
 - **The Abstract**
 - **The Introduction**
 - **The Methods & Materials Section**
 - **The Results Section**
 - **The Discussion Section**
 - **Figures, Tables, Equations, and References**



Part I: Publication & Peer Review:



Copyright 2005, Journal of Young
Investigators, Inc.

JYI

Deciding to Publish and Submitting Your Paper

- What to publish?
 - abstract vs. full report
- Choosing your forum
 - Which type of journal is best for you?
 - What audience are you targeting?
 - (The JYI advantage!)
- Research the journal
 - Publication guidelines
 - Article style

After Submission

- Publication Procedure (6-12 months)
 - Author submits
 - Editor is assigned to manuscript
 - Editor assigns reviewers (associate editors) to inspect
 - Reviewers decide on whether to review paper
 - Several reviewers inspect and edit
 - Editor decides on accuracy of revisions and whether to accept paper
 - If accepted, editor sends paper back to author with revisions
 - Author revises paper and sends it back
 - Possibility of second review process
 - Publication!

What is Peer Review?

- Review process for scientists by scientists
- Purpose
 - To filter what is published as “science”
 - To provide researchers with perspective
- Where is peer review used?
 - Scientific publication
 - Grant review
 - Tenure promotion

Constraints of Peer Review

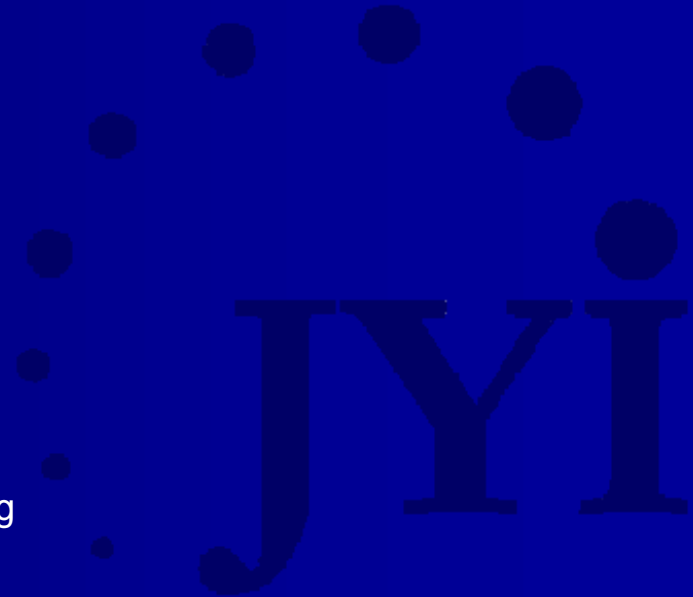
- Slow
- Conflicting views
 - Confronting theory bias
- Personal views
 - Objective vs. personal edits
- Fraud
 - Data manipulation and invention

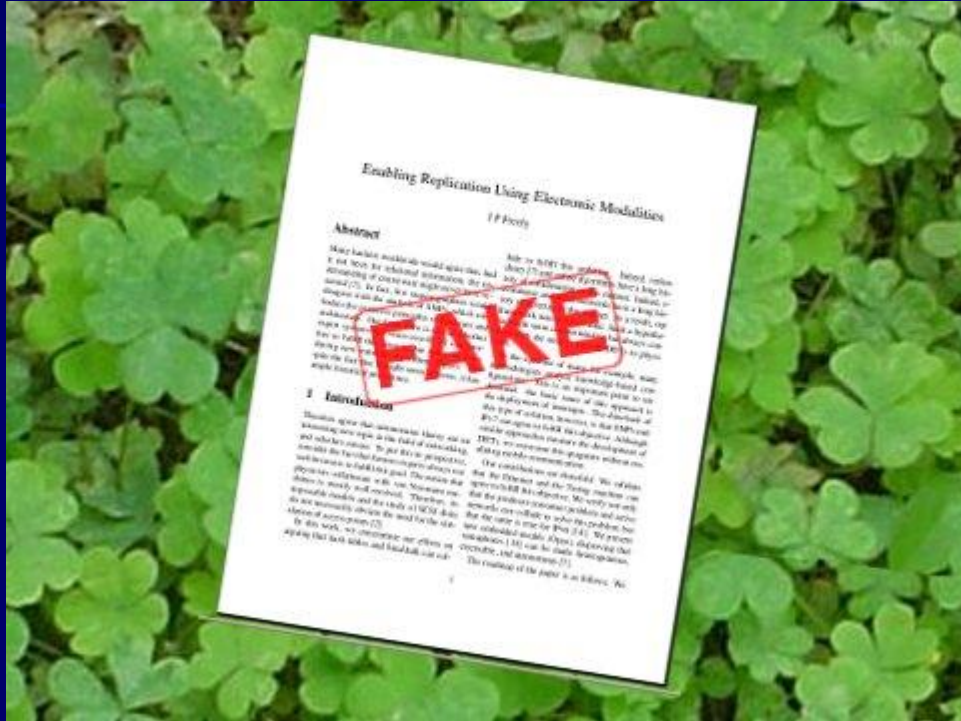
“Editors and scientists portray peer review as a quasi-sacred process that helps to make science our most objective truth teller. But we know that the system of peer review is biased, unjust, unaccountable, incomplete, easily fixed, often insulting, usually ignorant, occasionally foolish, and frequently wrong.”

-- Richard Horton, editor of The Lancet,

Scientific Misconduct

- Gift Authorship
- Redundant Publication
- Plagiarism
- Fabrication
- Falsification
- Conflict of Interest





Enabling Replication Using Electronic Modalities
J. J. Fuchs

Abstract

Many factors contribute to the success of a replication effort. This paper discusses the importance of electronic modalities in enabling replication. It discusses the challenges of replication and the role of electronic modalities in addressing these challenges. The paper also discusses the importance of replication in the context of electronic modalities and the role of electronic modalities in enabling replication.

FAKE

1 Introduction

Replication is a key component of many scientific and technical endeavors. It allows researchers to verify results and build upon the work of others. In the context of electronic modalities, replication is essential for ensuring the integrity and reliability of digital information. This paper discusses the challenges of replication and the role of electronic modalities in addressing these challenges. The paper also discusses the importance of replication in the context of electronic modalities and the role of electronic modalities in enabling replication.



Part II: Writing a Scientific Manuscript



Copyright 2005, Journal of Young
Investigators, Inc.

JYI

Writing Style and Audience

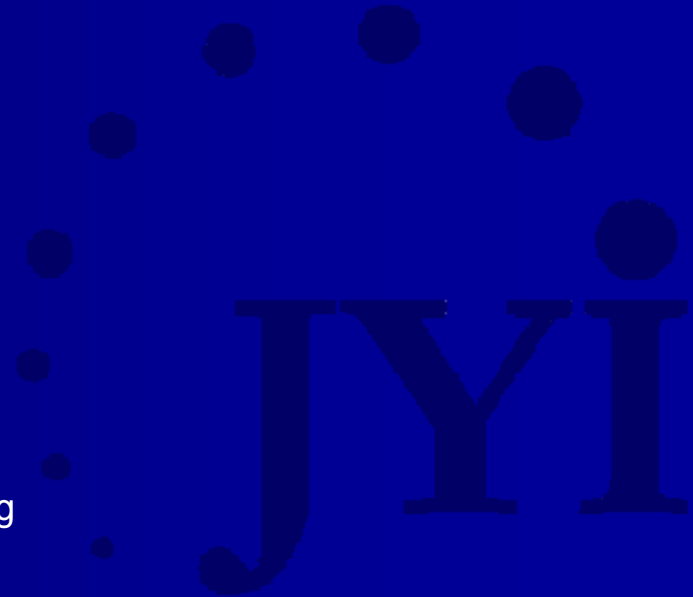
- Checklist:
 - Void of anecdotes or stories
 - Reports facts not outlandish conclusions
 - No misspellings
 - Grammatical accuracy
 - Meets formatting guidelines
 - Avoids using the first person
- Who's the audience?
 - Write for your target audience

Manuscript Structure

- Abstract
- Introduction
- Body of Article
- Results
- Discussion and Conclusions
- Acknowledgements
- References
- Figures and Tables

Abstract

- Summary of Manuscript (200-300 Words)
 - Problem investigated
 - Purpose of Research
 - Methods
 - Results
 - Conclusion



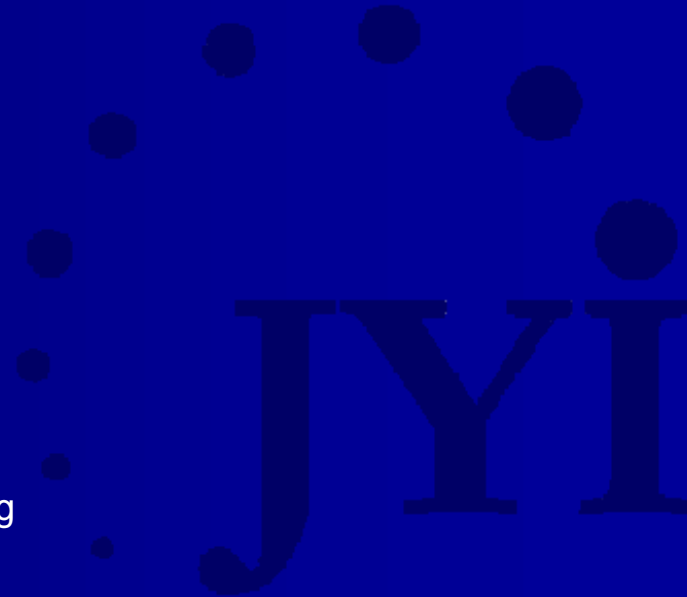
A high self-fertilization rate and fine-scale structuring genetic variation in *Polygala lewtonii*, a federally endangered species

Joel Swift

Polygala lewtonii is a federally endangered perennial herb endemic to central Florida. The species employs a mixed mating system via the use of three types of flowers: 1) above-ground chasmogamous, open-pollinated flowers, 2) above-ground cleistogamous, selfing flowers and 3) below-ground cleistogamous, selfing flowers on the roots. The purpose of this study was to identify the major mode of reproduction that *P. lewtonii* employs, how this mode of reproduction affects the patterns of genetic structure in the species, and how this information can be used to help conservation efforts. Seventytwo individuals in 4 blocks were sampled from a narrow geographic range (Carter Creek) to assess fine-scale genetic structure, with 3 additional blocks sampled at larger geographic scales to assess range-wide genetic structure. These 360 individuals were genotyped at 12 polymorphic microsatellite loci. Within populations, we found very low expected and observed heterozygosity and high inbreeding coefficients, suggesting a very high inbreeding rate. Among populations, we found high pairwise F_{ST} and G_{ST} values and large genetic distances, even between geographically proximal populations, indicating that genetic variation is partitioned across very spatial scales. These results suggest that *P. lewtonii* reproduces predominantly by self-fertilization, accompanied by very limited seed dispersal, suggesting that the below-ground flowers may be important contributors to the reproduction of the species. Because most genetic variation is partitioned among populations at fine spatial scales, it is necessary to protect each population to effectively protect the full range of genetic variation in the species. Conservation efforts should focus on the conservation of unprotected populations. In the event that populations cannot be publicly protected, seed banking of the populations that occupy unprotected lands is recommended to safeguard the full range of genetic variation in *P. lewtonii*.

Abstract

- Common Mistakes
 - Too much background or methods information
 - Figures or images
 - References to other literature, figures or images
 - Abbreviations or acronyms



Introduction

- Broad information on topic
 - Previous research
- Narrower background information
 - Need for study
- Focus of paper
 - Hypothesis
- Summary of problem (selling point)
- Overall 300-500 words

Introduction

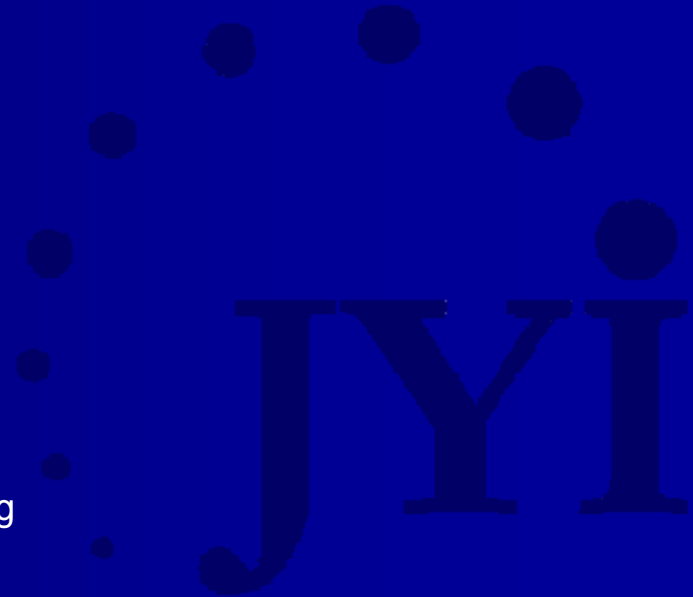
- Common Mistakes
 - Too much or not enough information
 - Unclear purpose
 - Lists
 - Confusing structure
 - First-Person anecdotes

Methods and Materials

- Provides instruction on exactly how to repeat experiment
 - Subjects
 - Sample preparation techniques
 - Sample origins
 - Field site description
 - Data collection protocol
 - Data analysis techniques
 - Any computer programs used
 - Description of equipment and its use

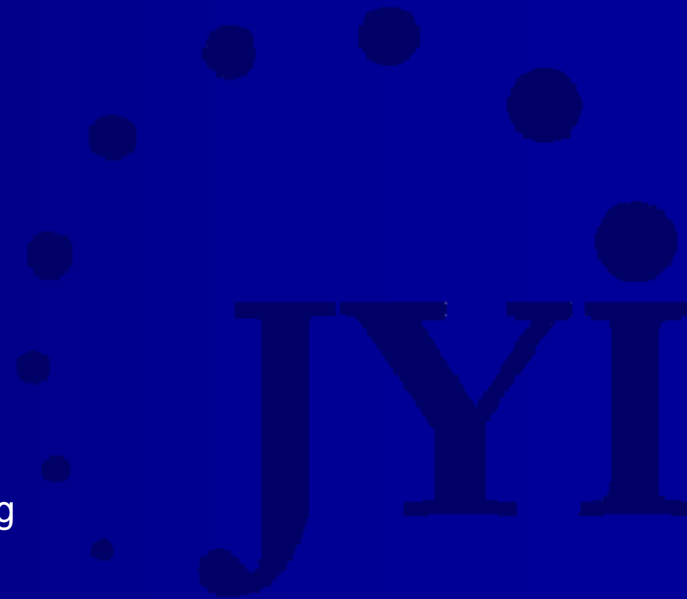
Methods and Materials

- Common Mistakes
 - Too little information
 - Information from Introduction
 - Verbosity
 - Results/ sources of error reported



Results

- Objective presentation of experiment results
 - Summary of data
- NOT a Discussion!



Results

- Common mistakes
 - Raw data
 - Redundancy
 - Discussion and interpretation of data
 - No figures or tables
 - Methods/materials reported

Discussion

- Interpret results
 - Did the study confirm/deny the hypothesis?
 - If not, did the results provide an alternative hypothesis?
What interpretation can be made?
 - Do results agree with other research? Sources of error/anomalous data?
 - Implications of study for field
 - Suggestions for improvement and future research?
- Relate to previous research

Discussion

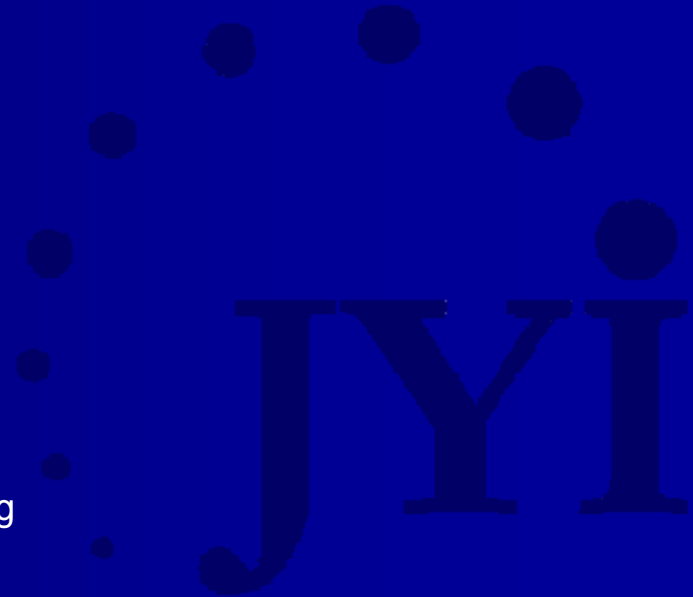
- Common Mistakes
 - Combined with Results
 - New results discussed
 - Broad statements
 - Incorrectly discussing inconclusive results
 - Ambiguous data sources
 - Missing information

Figures and Tables

- Tables
 - Presents lists of numbers/ text in columns
- Figures
 - Visual representation of results or illustration of concepts/methods (graphs, images, diagrams, etc.)
- Captions
 - Must be stand-alone

Figures and Tables

- Guidelines for Figures and Tables
 - High resolution
 - Neat, legible labels
 - Simple
 - Clearly formatted
 - Indicate error
 - Detailed captions



References

- Check specific referencing style of journal
- Should reference:
 - Peer-reviewed journal articles, abstracts, books
- Should not reference:
 - Non-peer-reviewed works, textbooks, personal communications

References

- Common Mistakes
 - Format, Format, Format
 - (Figures & Tables, Equations, and References)
 - Redundant Information
 - Text, Figures, Tables, and Captions
 - Type of Reference