

2003 REU Communications Workshop



“Writing a scientific research article”

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Objectives

Dissemination of knowledge

Transmit your message/story

Target as broad an audience as applicable
(affects choice of journal)



Clarity, conciseness, accuracy
Logical progression of thought

Significance

Your contribution to your field

Establish your area of expertise

Publications extremely important to reputation

Do you get results?

Graduate school acceptance

Increased likelihood of funding

Tenure/job promotion

Largest audience to “present” to



Types of Articles

Research articles

- most common type of publication
- **focused study** leading to new discovery

Review articles

- summary of multiple works (**key papers**)
- intended to broadly educate/introduce

Technical communications

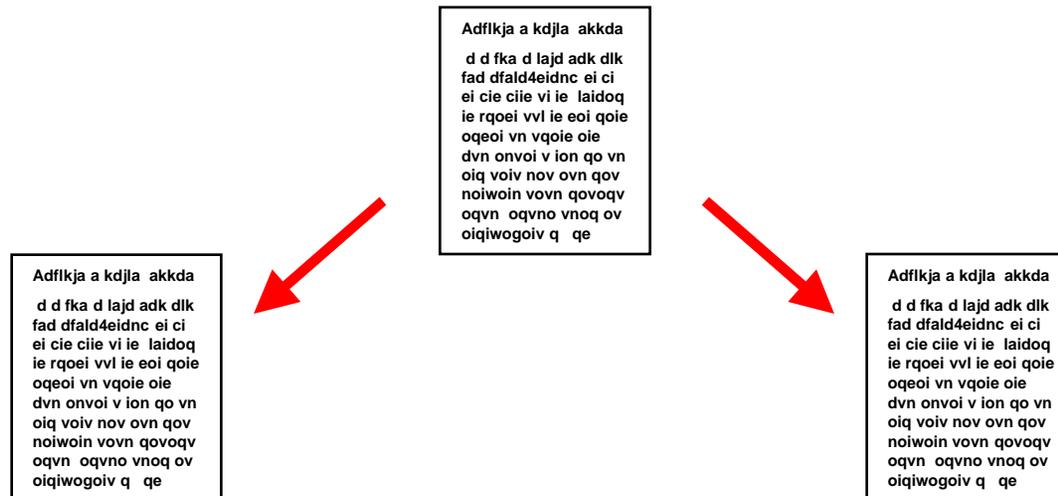
- detailed description of **novel methods**
- generally lack “scientific” question

General Rules

Can only publish new material once
- must be original work

Don't break up a single study into 2 papers
- attempt to generate more publications

**** some instances where it's okay ****



General Rules (cont'd)

- ◆ **Don't plagiarize!**
 - from others or yourself
- ◆ **Don't falsify data!**
 - threat of losing credibility
- ◆ **Active** rather than passive voice
- ◆ **Verb tense**
 - **past tense**, you're reporting completed work
 - Intro & Discussion may be present tense

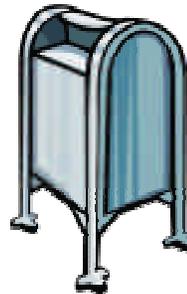
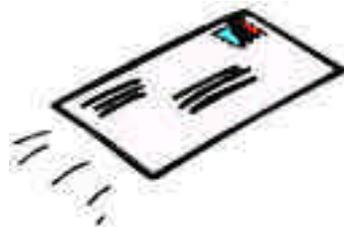
Stages of Writing

1) Getting in the mood

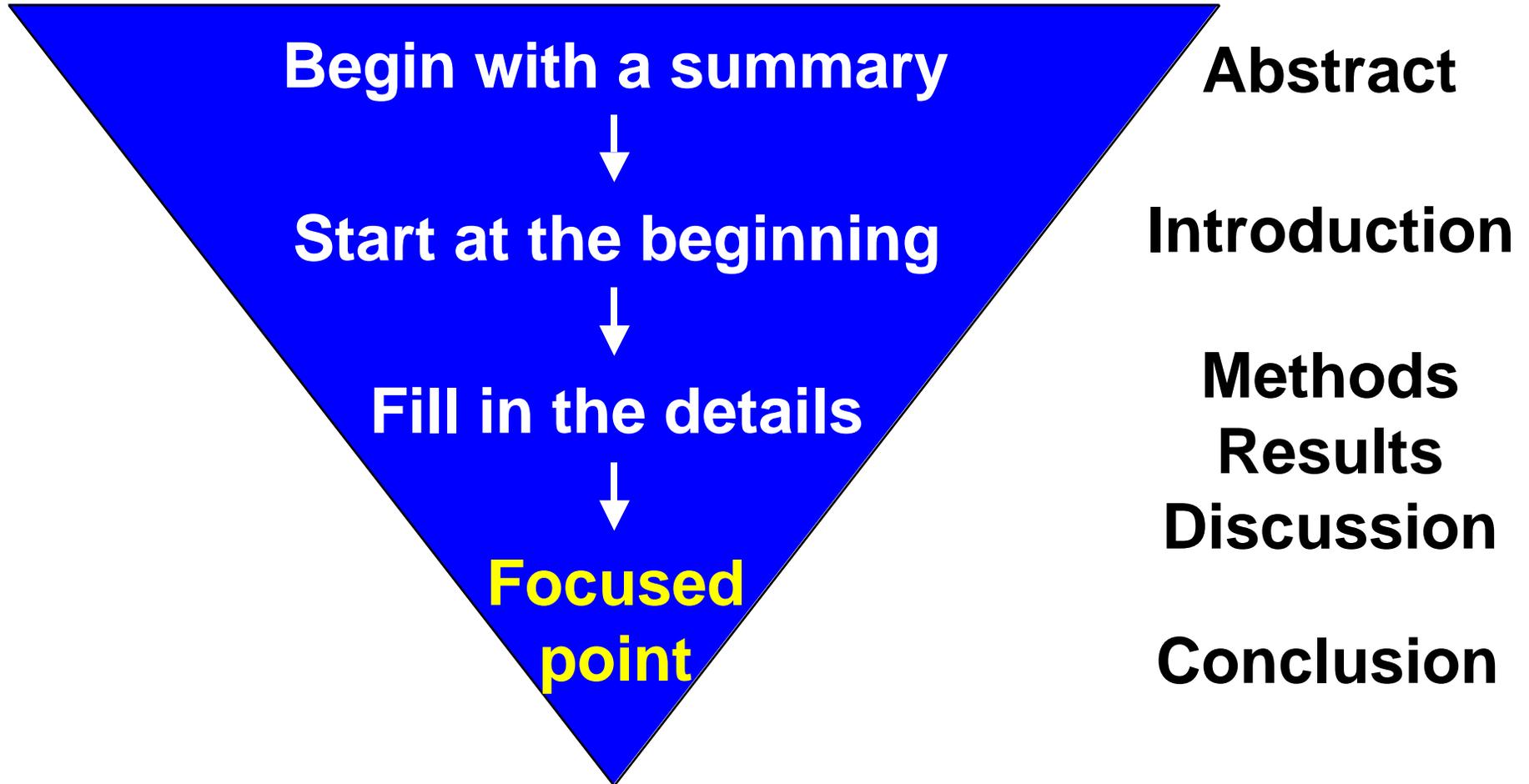
2) Writing a first draft

3) Revising, revising, revising

4) Completion (sending it out)



Inverted Triangle



** Style due to news reporters getting cut off over the airways*

Writing Strategy

One section at a time

Start with the easiest first

List the main idea(s)

Outline the paper

Use subheadings in sections

Fill in the information

Details of protocols and results

Fine tune the writing

Grammar, spelling, etc.

Smooth out the sections

Use **transitions** between

Paper vs. Presentation

Paper

- 1) Title
- 2) Abstract
- 3) Introduction
- 4) Materials & Methods
- 5) Results
- 6) Discussion (Conclusion)
- 7) Acknowledgments

Presentation

- 1) Title
- 2) Introduction
- 3) Materials & Methods
- 4) Results & Discussion
- 5) Conclusion
- 6) ~~Future Work~~
- 7) Acknowledgments

Ordering of Sections

Order of Appearance

- 1) Title
- 2) Abstract
- 3) Introduction
- 4) Materials & Methods
- 5) Results
- 6) Discussion (Conclusion)
- 7) Acknowledgments

Actual Writing

- 1) Materials & Methods
- 2) Results
- 3) Discussion (Conclusion)
- 4) Introduction
- 5) Acknowledgments
- 6) Title
- 7) Abstract

Main Components of Paper

Introduction

- grab the **ATTENTION** of the audience
- start general  narrow to focus
- present related/relevant background material
- *state hypothesis/objective of study*

Main Body

- Methods & Results
- clearly explain experimental procedures
- present the data; *relate main findings*

Ending

- Conclusions, Acknowledgments
- *repeat main findings, relate back to hypothesis*
- future directions/implications of results

Note: These are the **same as for a presentation**; just a different media!

Title

Delete unnecessary words

Succinct & powerful

Broad, yet specific

Don't overstate, but make it interesting

Use keywords & buzzwords

Attracts interests, comes up in searches

No abbreviations

Except common words (i.e. DNA)

Abstract

Summary of complete study

Introduction, methods, results, conclusions

Relatively short (150-300 words)

Dependent on the journal

Should stand alone

No specific references (to figures or citations)

Limit methods to 1-2 sentences

Unless you're writing a "methods" paper

Most important section

Most widely read, after the title

Will determine who reads your paper

Introduction

Background (1st part)

Intro to general field
What's been done
Why? (rationale)

Objective (2nd part)

Your relevance
Hypothesis (purpose)
What you've done

Comparable to discussion

Maybe write after the discussion

Trying to capture the reader's attention

Set the stage, don't give away everything

Judicious choice of references

Use the "big" ones, insinuate broad applicability

Materials & Methods

All elements of research used to produce results

Can it be repeated?

Includes specific equipment and supplies

(i.e. model #'s and vendors)

Use citations for previously described methods

Still give a brief description

Make sure you reference the “original”

Balance between details and citations

Much more detailed than for presentation

On-line supplemental information

Results

Presentation of the data

Keep concise & clear

The “meat” of the paper

Data supporting hypothesis & aims

Most relevant information

Include everything mentioned in the Discussion

Present in logical order

Same order as materials & methods

Not necessarily chronological order

Big discovery - go back & characterize

Results (cont'd)

Reporting of the data

Integrate text and data (images, graphs)

Specific mention of figures & tables

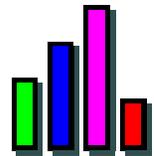
Presented in the same order as text

Refer to data using “... (*Figure 1*)”

Judicious choice/arrangement of data

Limited space (smaller “canvas” size)

Present “analyzed”, not raw data



Avoid interpretation

Unless Results & Discussion combined

Discussion

Interpretation of the data (Results)

Describe larger meaning of the work

Within the context of:

The study itself

Previously published research

Data are never “good” or “bad”

More likely, “expected” or “unexpected”

Mention conflicting or negative results

Use literature to broaden discussion

Compare results & conclusions

Be careful & tactful

Discussion (cont'd)

Show your intelligence

Propose explanations for results
Chance to display analytical skills
Do you understand what you did?



Be creative & imaginative

Imply potential implications of the results
Allude to future work or direction

Conclusions contained within Discussion

Maybe divided into a sub-section

Acknowledgments

List those who helped (but not authors)

Helpful discussions

Physical/technical assistance

Donated reagents

Facilities used/groups

i.e. UWEB or NESAC/BIO

Funding source(s)

May list individually for some authors

NIH or NSF grant #'s