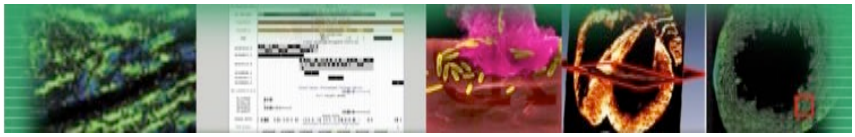
Writing/Speaking Support for 20.109



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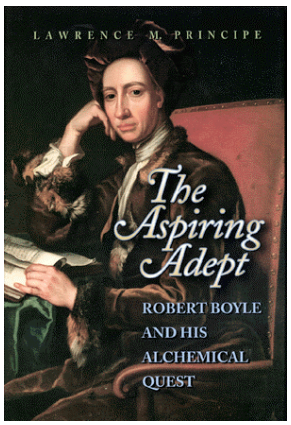
Getting to know you: 2 Truths and 1 Lie

- Write 3 statements about yourself, two of them true and one a lie.

What do you as a reader expect to happen in a research article?

A Brief History of the Research Article
from Swales (1990)

- Mid-17th century: Robert Boyle presents his pneumatic experiments to the Royal Society, public presentations before "witnesses" in order to seek agreement on the results.
- 1665: *The Philosophical Transactions of the Royal Society* is established, the first scientific periodical.
- By 1800 "the definition of experiment moves from any made or done thing, to an intentional investigation, to a test of theory, to finally a proof of evidence for a claim" (Bazerman 1983).
- By 1900, the current format of research article is largely established.



Macrostructure of a Research Article

- ***Introduction*** provides general field or context.
- ***Methods*** follows a particularized path.
- ***Discussion*** moves from specific findings to wider implications.

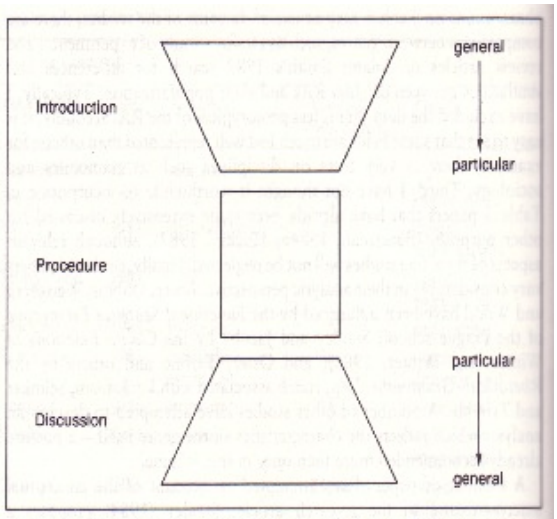
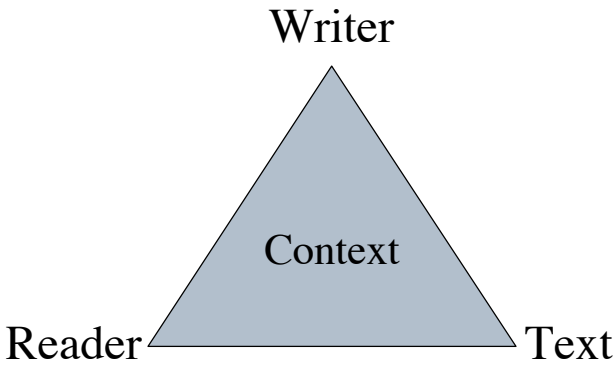


Figure 7 Overall organization of the research paper (Hill et al., 1982).

Scientific writers need to control the rhetoric of scientific writing.

According to Aristotle, rhetoric is "the art of finding in any given case the available means of persuasion."

Any writing act can be described in terms of rhetorical triangles.



Writers balance the relationship between themselves, their texts, their readers, and the context in which this balancing act takes place.

Reality tends to complicate these triangles.

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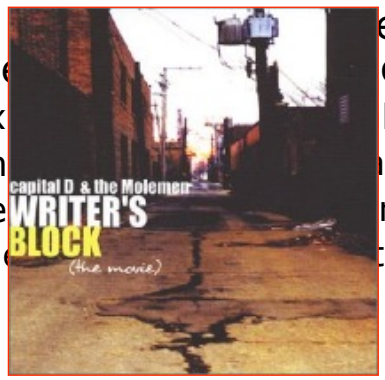

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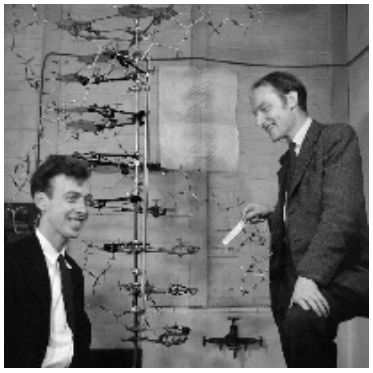
The goal of scientific writing is to court your audience.

Michael Halloran on Watson & Crick's 1953 "The Structure for DNA"

"The April 1953 paper, then, is really just the initial move in a rhetorical strategy aimed at gaining and holding the attention of an audience. As such, it presumes an understanding of *science as a human community* in which neither facts nor ideas speak for themselves, and the attention of the audience must be courted."



Writing and research are complex processes enabled by language.

"Language, oral or written, is an expressive instrument through which we communicate what we have previously thought [or discovered]. It is also the reflective instrument through which we think, alone or with others, about what we are doing." Paul Connolly

Research article scramble

- For the passages from a student!s 20.109 laboratory report on homologous recombination: Which section (Introduction, Methods, Results, Discussion, Figure Captions) does each passage belongs to?

Scientific Writing Essentials--Introduction

The Introduction establishes *context*, *focus*, and *justification*.

Context: Orient your reader to the published literature related to the topic and to essential background information

Focus: Define the research space, stake out territory. What questions are you addressing? What is your hypothesis?

Justification: Show how your work fits into and extends previous work. Argue for the importance of your work.

Swales (1990)

Scientific Writing Essentials--Methods

The Materials & Methods section establishes the logic of experimental design

- Present the **experimental design.**
- Provide enough detail to allow readers to **interpret your results**.
- Give enough detail for readers to **replicate** your work.

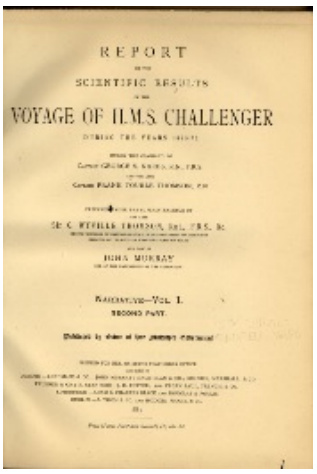
"The key to a successful Methods section is to include the right amount of detail--too much, and it begins to sound like a laboratory manual; too little, and no one can repeat what was done."

Successful Scientific Writing, 2nd ed.

Scientific Writing Essentials--Results

The Results section offers what you found or the answer to the questions you raised in your Intro.

- **Clarity**: Make the data, just the data, easy to find.
  - *Some readers want to interpret your data themselves rather than accepting the interpretation presented in the discussion.*
- **Description**: Describe the data presented in figures and tables.



What Differentiates Results from the Methods?

Methods = *How* the data were accumulated.

Results = *What* data were accumulated.

Readers expect to find the "answers" to your research questions in your Results section.

Scientific Writing Essentials--Tables/Figures

Illustrations display your results and focus your reader on key findings.

- **Condense** large amounts of information
- **Convince** readers of your findings (by showing data quality).
- **Focus attention** on certain findings (e.g., relationship between values).
- **Simplify** complex findings.

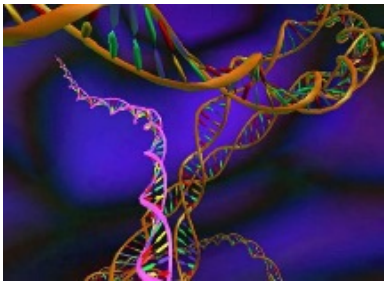


***Illustration Caveat**: The most beautiful illustration cannot hide lousy content--content is key.*

Scientific Writing Essentials--Titles/Captions

Titles and captions allow figures and tables to stand on their own.

- **Guide** the reader to what is most important in the figure.
- **Contextualize** the data shown in terms of purpose and method.
- **Focus attention** on certain findings (e.g., relationship between values).
- **Summarize** the larger point.

Bonus tip!! Titles of tables go on TOP of the table while titles/captions of figures come BELOW the figure.

Scientific Writing Essentials--Discussions

A Discussion offers an interpretation of findings--What do findings mean?

- **Summarize** findings presented in the results section
- **Cite** supporting literature.
- **Explain** discrepancies between your findings and previous reports.
- **Point out** shortcomings of your work and define unsettled points.
- **Discuss** theoretical and practical implications of your work.
- **End** with a short summary or conclusion about the work's importance.

What Differentiates Results from Discussion?

Results = *Data Presentation*

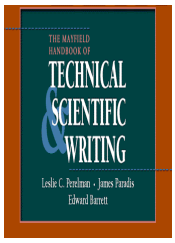
("Experiments showed that . . . .")

Discussion = *Data Interpretation*

("Experiments suggest that . . . .")

However, you still need to choose which data to present in your Results Section (an act of interpretation!).

Good MIT Resources



The Mayfield Guide On-Line

http://www.mhhe.com/mayfieldpub/tsw/home.htm

The MIT Writing and Communication Center

Room 12-132; 617/253-3090

Appointments can be made from http://web.mit.edu/writing/.

Getting to know you, part 2: Letter to Atissa, Neal, and Mya

- What have been your experiences with scientific writing (e.g., lab reports, research articles, reviews)? With other writing tasks?
- What have been your experiences with giving oral presentations (whether scientific or not)?
- How would you describe yourself as a writer? As a public speaker?
- What are your writing/speaking goals for 20.109?