

# Writing/Speaking Support for 20.109

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Neal Lerner

Atissa Banuazizi

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## Some summary comments on Mod. 1 Portfolios, Parts 1 and 4

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- **Audience:** Imagine for both the editorial rebuttal and the business plan that your reader is a fairly general one, i.e., not familiar with the assignment or its context.
    - *Rebuttal:* You'll need to explain/summarize fully the point that you are rebutting (to be fair, at least).
    - *Business plan:* Write as if you're proposing to an outside funding source, one not necessarily familiar with the Registry and its context.
  - **Justification:**
    - *Rebuttal:* Be sure to justify why it is important to draw a distinction between genetic engineering and biological engineering (i.e., answer the readers' "why should I care?" question).
    - *Business plan:* Be sure to focus on a problem that your plan is the solution for. If everything is working well, why propose a change?
  - I'd be glad to conference with you to talk about your revision!
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## What do you as a reader expect to happen in a research article?

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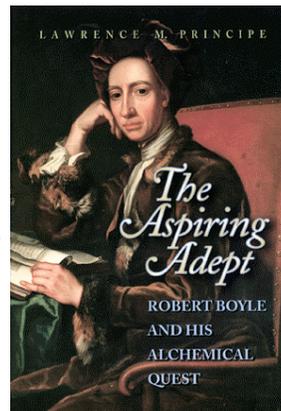
- An abstract (summarizes the paper quickly)
  - In the intro, a summary of the area, why the problem is important.
  - Results!
  - A methods that allows another to replicate the experiment.
  - Background information to give context.
  - Some sort of conclusion based on the results.
  - Figures that summarize the data.
  - References to previous research.
  - A summary (to remind me of what's important and what the "take-home message" is.
  - Discussion that explains the results.
  - Order and cohesiveness to all of this.
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## A Brief History of the Research Article

from Swales (1990)

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- 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.

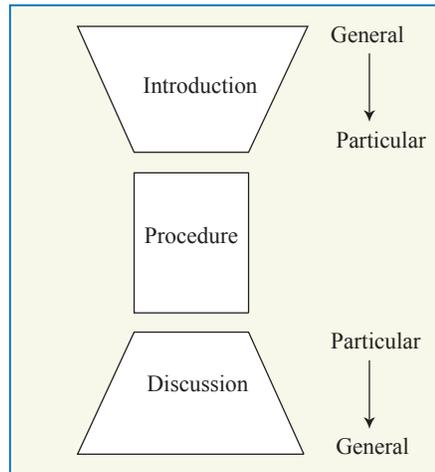


Courtesy of Princeton University Press. Used with permission.

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## Macrostructure of a Research Article

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



Overall Organization of the Research Paper (Hill, et. al., 1982.)  
Figure by MIT OpenCourseWare.

## The research process and writing process share essential stages.

### Research involves:

- Posing initial questions
- Exploring questions through discovery
- Revising questions based on findings
- Communicating findings to a specific audience

### Writing involves:

- Starting with an idea
- Exploring ideas through writing
- Revising based on reader's needs
- Presenting final product to a specific audience

*In both processes language is a tool of both discovery and communication.*

Writing and research are complex processes enabled by language.

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Courtesy of [Melanie Cook](#).



Courtesy of [jpschlumbohm](#).

"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

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Scientific writers need to control the rhetoric of scientific writing.

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Political cartoon about U.S. Congress and "empty rhetoric."

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

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## The goal of scientific writing is to court your audience.

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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."

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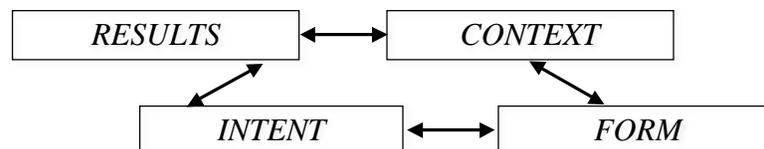
Photo removed due to copyright restrictions. James Watson and Francis Crick with model of DNA.

## Scientific Writing as Juggling Act

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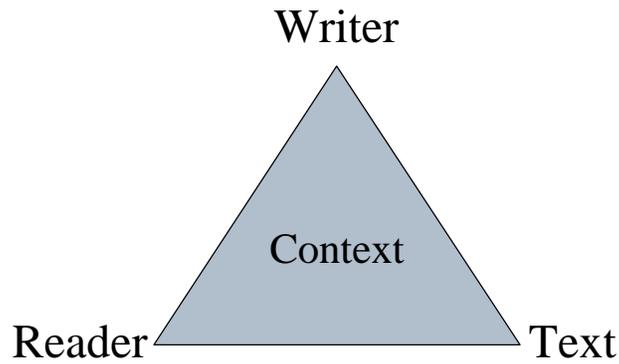


Courtesy of 'GraphicReality'.



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

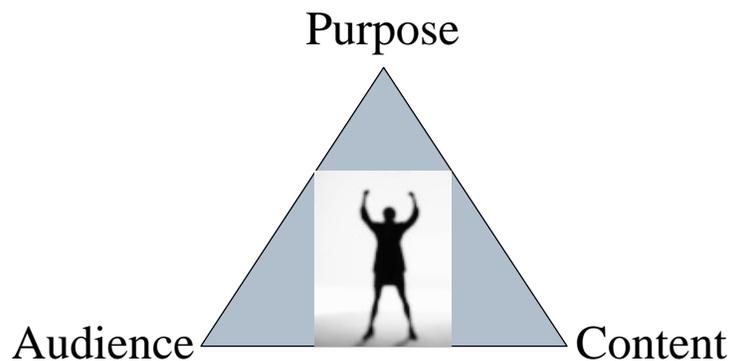
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Writers balance the relationship between themselves, their texts, their readers, and the context in which this balancing act takes place.

## More Rhetorical Triangles

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## Reality tends to complicate these triangles.

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### Multiple Purposes:

- To explain
- To entertain
- To persuade
- (To get an A)

### Multiple Audiences:

- Real reader
  - Imagined reader
  - Peers
  - Instructors
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## List the steps in your writing process for the Mod. 2 Introduction:

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1. Organized ideas/brainstorm what to write (based on previous knowledge and research conducted).
  2. Created an empty shell of the structure (to be filled), i.e., an outline.
  3. Tried to think of larger story used to open the intro; what would audience related to?
  4. Find the information (do research on databases, in readings, etc.)
  5. Find out what info you need to find (look through previous outline, decide what your uncertain about).
  6. Look at lab notebook, assignment, experimental protocol, class Wiki
  7. Decide what was relevant (based on background reading).
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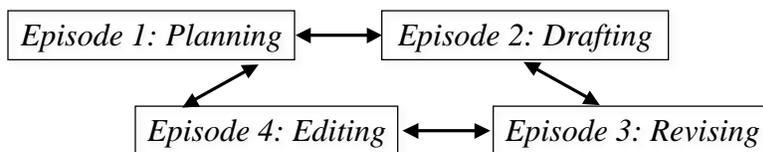
## Modeling the writing process lets us know at which points we encounter trouble.

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Courtesy of [Melanie Cook](#).

Goals/Questions for the Writer  
What do I know about my topic?  
What is my purpose for writing?  
Who are my intended readers and how much do they know about my topic?  
How is this task like others I have had before?  
What structure will work best for my topic?



## Effective writers are able to self-monitor their composing strategies

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Courtesy of [Jeffrey Barke](#).

1. *Declarative Knowledge*: Knowing what strategies are available
2. *Procedural Knowledge*: Knowing how to use a strategy.
3. *Conditional Knowledge*: Knowing how and when to use a strategy.

The goal is to develop all three types of knowledge about each phase of the writing process.

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## What is the purpose of an abstract?

- A stand alone, mini-version of the paper (250 words or less).
- Describes the main sections of the paper.
- States the purpose, findings, and impact of the work.
- The goal is an economy of words.



## The Essentials of an Abstract

from the UW Madison Writing Center

In an abstracts you address this question:

- What is the report about, in miniature and without too much detail?

By doing the following

- *State main objectives*: What did you investigate? Why?
- *Describe methods*: What did you use?
- *Summarize the most important results*: What did you find out?
- *State major conclusions and significance*: What do your results mean? So what?)



## Abstract unscramble

Zebrafish are useful vertebrates in which to carry out large-scale mutagenic screens to identify developmentally important genes.

In order to follow the development of the zebrafish immune system, we previously isolated and characterized the recombination activating genes, *rag1* and *rag2*.

This paper describes the cloning and characterization of another such marker, *ika1*, which encodes a zinc finger transcription factor necessary for early lymphocyte differentiation.

Whole mount in situ hybridization revealed expression of *ika1* in 24 hr embryos in the intermediate cell mass, the first site of hematopoiesis (Weinstein et al., 1996), and the head.

We also report the continuing efforts to create transgenes with the green fluorescent protein-coding region under the control of the promoters of *rag1* and *ika1*.

Fish containing these transgenes could then be mutagenized and screened quickly and easily for mutations in the immune system.

## Abstract Exercise: Lessons for Writing Science

- It is essential to understand the rhetorical functions of units of discourse (large: abstract; small: sentence within the abstract)
- You need to bring to bear what you know (whether tacit or explicit knowledge) on the writing task at hand.
- Scientific writing has particular rhetorical requirements.

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Jackson Pollock doing an "action painting."  
Photo by Hans Namuth.

## Good MIT Resources

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*The Mayfield Guide On-Line*  
[<http://www.mhhe.com/mayfield/pub/tsw/home.htm>]

*The MIT Writing and Communication Center*  
Appointment preferred but not required

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The goal of writing instruction in 20.109  
is better research, better writing.

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Final questions?

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