

## Coursera: Writing in the Sciences

笔记本: Writing

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作者: Wanda

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# **Week1: Make Good Writing**

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## **Basics**

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## 1. What makes good writing:

1. Good writing communicates an idea clearly and effectively. It takes having sth to say and clear thinking.
2. Good writing is elegant and stylish. It takes time revision and a good editor.

## 2. What makes a good writer:

1. Having sth you passion about to say!
2. Logical thinking
3. A few simple rules

## 3. Other things to do to become a better writer:

1. Read, pay attention, and imitate, not limited to science paper but all kind of edits
2. Write in a journal
3. Talk about your research before trying to write about it
4. Write to engage your readers, try not to bore them
5. Stop waiting for 'inspiration'
6. Accept that writing is hard for everyone
7. Revise. Nobody gets it perfect on the first try. Write the first draft fast, and pay attention to revising.
8. Learn how to cut ruthlessly. Never become too attached to your words.
9. Find a good editor, a person out of your field.

## Overview

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1. Cut unnecessary words and phrases. Learn to part with your words!
2. Use strong verbs. Verbs drive sentences, whereas nouns slow them down. Change nouns to verbs!
3. Unnecessary jargons will slow down readers
4. Use active voice. Passive voice is hard to understand

## Cut the clutter

1. If you catch yourself reaching thesaurus to find another word, make sure do you even need the second instance of that word at all?
  1. e.g. illustrate the challenges
  2. SOLUTION: you may only need one word; and it's ok for you to repeat your key words. Don't change them!
2. If you want to indicate that sth is well-known, just by putting citation/references, not "as we all know"
3. COMMON CLUTTER

- 1. Dead weight words and phrases
  - As it is well known
  - As it has been shown
  - It can be regarded that
  - It should be emphasized that
- 2. Empty words and phrases
  - basic tenets of
  - methodologic
  - important
- 3. Long words or phrases that could be short
  1. ■ 4. Unnecessary jargon and acronyms
    - muscular and cardiorespiratory performance
    - Gliomagenesis
    - miR
  2. ■ 5. Repetitive words or phrases
    - studies/examples
    - illustrate/demonstrate
    - challenges/difficulties
    - successful solutions
  3. ■ 6. Adverbs
    - very, really, quite, basically, generally, etc.
  4. Long(dead weight) words/phrases that could be short

Wordy	Crisp
A majority of	Most
A number of	Many
Of the same opinion	Agree
Less frequently occurring	Rare
All three of the	The three
give rise to	caused
Due to the fact that	Because

Wordy	Crisp
have an effect on	affect
based on the assumption that, assuming that	if
not good	poor
the result of	due to
in many instances	often
can be regarded as	is

## More Tricks

### 1. Eliminate negatives

1. to be more clear: They did not believe it is harmful-> They believe it is safe

■ Not honest	dishonest
■ Not harmful	safe
■ Not important	unimportant
■ Does not have	lacks
■ Did not remember	forgot
■ Did not pay attention to	ignored
■ Did not succeed	failed

### 2. Eliminate there are/there is

1. will make the verb more attracting
2. There be is always removed together with "that, which, who"
3. e.g. there will be -> yield

### 3. Omit needless prepositions

1. "that" and "on" are often superfluous.
  - The meeting happened (on) Monday.

### 4. Avoid using acronyms / initialisms unless it's very common to all, even those not in your small field: like RNA

## Homework

### 1. Give a five-letter word that means the same thing as: "has no" .

- lacks

### 2. Revise:

1. One example of laser interferometry in action is it can be used for the measurement of the drift of a micro cantilever over time.
  - (For example, )Laser interferometry can be used to measure the drift of a micro cantilever.

2. Many women with BRCA mutations take prophylactic steps towards reducing their risk of ever getting the cancer because early detection is not perfect.
  - Many women with BRCA mutations opt for prophylaxis, because early detection is imperfect.
3. There are extensive quality control measures that are unique to this pipeline.
4. The aim of this paper is to provide a review of the basic principles of quantum physics.
  - This paper provides an overview of the principles of quantum physics.

## Week 2 Language

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### Use active voice

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1. Passive voice is used to omit responsibility. Add an agent: Who does what to whom?
2. Advantages of active voice
  1. Emphasizes author responsibility
  2. Makes sentence easier to read!
  3. Reduce ambiguity
3. WHEN is OK to use passive voice?
  1. In the methods section where what was done is more important than who did it. (Or you will start every sentence with 'We')
4. It is fine to use personal pronouns in scientific writing and other formal writing.
  1. The active voice is livelier and easier to read.
  2. Not use personal pron. does not lend objectivity.
  3. Claim responsibility.

### Verbs

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1. Use strong verbs
  1. to avoid adv: e.g.
    1. report approximately -> estimate
    2. estimate sth. in the future -> project
  2. use 'to be' purposefully and sparsely
  3. don't turn verbs into nouns
    1. Nouns could not show action and bring in ambiguity(who does what?)

e.g.

Provide a <u>review</u> of	review
Offer <u>confirmation</u> of	confirm
Make a <u>decision</u>	decide
Show a <u>peak</u>	peaks
Provide a <u>description</u> of	describe

2. Keep the subject and main verb(谓语) close together at the start of the sentence!

## Week 3 Punctuation

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### Separate

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dash and parentheses are considered slightly less formal than the comma, colon, semicolon, and period.

	<b>Comma</b>	
	<b>Colon</b>	: 1 explanation/amplification; 2 quote, list of quotes;
1 add emphasis 2 insert an abrupt definition / description don't overuse!	<b>Dash</b>	3 2nd is to amplify or extend the 1st
	<b>Parentheses</b>	0 sth could be ignored
	<b>Semicolon</b> ;	link two independent clauses
	<b>Period</b> .	

RULE OF THREE: when the number is in doubt, give three examples.

### Colon

- 用作扩展时：后的句子首字母有时大写

2. misuse:

1.

EXAMPLE, what not to do!:

Two **aspects** of alcohol use are related to brain injuries: **as** a factor associated with risk of an injury such as a motor vehicle crash, and as a factor in TBI diagnosis, recovery, or survival after injury.



There should be a noun as the "aspects" implied

Two aspects of alcohol use are related to brain injuries: **its association** with risk of injury, such as motor vehicle crash, and its post-injury influences on TBI diagnosis, recovery, or survival after injury.

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2.

In one project we have a nutritionist, a psychologist, statisticians, a computer specialist, and dietitians: a whole range of specialties.



Set up a list first

In one project we have a whole range of specialties: a nutritionist, a psychologist, statisticians, a computer specialist, and dietitians.

## Dash

a dash is a mark of separation stronger than a comma, less formal than a colon, and more relaxed than parentheses.

WARN: use a dash only when a more common mark of punctuation seems inadequate.

## Parallelism

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1. make the tense of all words connected by [and, or, but]

**Not Parallel:**

This research follows four distinct phases: (1) establishing measurement instruments (2) pattern measurement (3) developing interventions and (4) the dissemination of successful interventions to other settings and institutions.

**Parallel:**

This research follows four distinct phases: (1) establishing measurement instruments (2) measuring patterns (3) developing interventions and (4) disseminating successful interventions to other settings and institutions.

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## Paragraph

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1. 1 para, 1 idea

1. When you are changing idea, break to two paragraph rather than throwing a transition word

2. give the punch line early

3. the first and last line are the most important

4. build up by logic:

1. general -> specific

2. time

5. Don't overuse transition words (however, hence, interestingly, etc.)

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## Week4: Writing Process

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Make sure you following the 3 steps SEPERATELY:

## **1. Prewriting**

- Collect, synthesize, and organize information
- Brainstorm take-home messages
- Work out ideas away from the computer
- Develop a road map/outline

## **2. Writing the first draft**

- Putting your facts and ideas together in organized prose

## **3. Revision**

- Read your work out loud
- Get rid of clutter
- Do a verb check
- Get feedback from others

Time distribution:

Prewriting: 70%

Writing: 10%

Revision: 20%

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# **Pre-writing**

## Get organized first!

- Don't try to write and gather information simultaneously!
- Gather and organize information BEFORE writing the first draft.

1. Process: Think about what you need, go and find those information, throw them into your blank document
2. Build an organizing system for your thoughts ahead of time
3. Roadmap: think your sections and paragraphs. Roadmap is broader than outline.

4. Do brainstrom away from your computer

- Write on the go!
  - While exercising (Turn off that ipod!)
  - While driving alone (Turn off the radio!)
  - While waiting in line (Put down the magazine!)
- Work out take-home messages
- Organize your paper
- Write memorable lines

5. Compositional organization: put liked sentences and paragraphs together, and

- 3. Don't "Bait-and-Switch" your reader too many times.

When discussing a controversy, follow:  
arguments (all)  
counter-arguments (all)  
rebuttals (all)

don't put your readers back and forth

## Writing

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- Don't be a perfectionist!
- The goal of the first draft is to get the ideas down in complete sentences in order.
- Focus on logical organization more than sentence-level details.
- Writing the first draft is the hardest step for most people. Minimize the pain by writing the first draft quickly and efficiently!

## Revision

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1. Sentence Level

1. read it aloud

2. check your verb

Underline the main verb in each sentence.

Watch for:

(1) lackluster verbs (e.g., There are many students who struggle with chemistry.) there be

(2) passive verbs (e.g., The reaction was observed by her.)

(3) buried verbs (e.g., A careful monitoring of achievement levels before and after the introduction of computers in the teaching of our course revealed no appreciable change in students' performances.).

3. cut useless words

- Dead weight words and phrases (it should be emphasized that)
- Empty words and phrases (basic tenets of, important)
- Long words or phrases that could be short (muscular and cardiorespiratory performance)
- Unnecessary jargon and acronyms 专有名词
- Repetitive words or phrases (teaches clinicians/guides clinicians)
- Adverbs (very, really, quite, basically)

2. Overall Level

1. write main idea in the margin, shift paragraph to make logic flow

3. Ask outside for comments

1. They don't have to be specialists, just intellegant. ask them point out hard part

Without any technical background, they should easily grasp:

- the main findings
- take-home messages
- significance of your work

- 2.

4. Find a good editor

## Check List for Final Draft

1. Consistency

2. Numerical Consistency

- Do the numbers in your abstract match the numbers in your tables/figures/text?
- Do the numbers in the text match those in the tables/figures?
- Do the numbers in each table/figure match those in other tables/figures?

3. Reference

1. Make sure the reference contains needed information **directly**

- Reference does not provide the indicated information/fact.
  - Authors misinterpreted or exaggerated the findings from the original source.
  - Reference cites a secondary source rather than a primary source. (Citation propagation!)
- 2. ■ Authors mis-numbered the references.

3. Avoid citation propagation: Come back to the source message, and assume other authors are making mistakes in their citation!

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# Week5: Recommended order for writing a manuscript

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- 1. Tables and Figures
- 2. Results
- 3. Methods
- 4. Introduction
- 5. Discussion
- 6. Abstract

## Tables and Figures

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Editors, reviewers, and readers may look first (and maybe only) at titles, abstracts, and tables and figures!

Figures and tables should stand alone and tell a complete story. The reader should not need to refer back to the main text.

1.
  - Use the fewest figures and tables needed to tell the story.
  - Do not present the same data in both a figure and a table.
- 2.

## TABLES VS FIGURES

- **Figures**
  - Visual impact
  - Show trends and patterns
  - Tell a quick story
  - Tell the whole story
  - Highlight a particular result
- **Tables**
  - Give precise values
  - Display many values/variables

## Table

A table is usually preferable to a figure for displaying many values and variables at once.

### Titles

- Identify the specific topic or point of the table.
- Use the same key terms in the table title, the column headings, and the text of the paper
- Keep it brief!
- Example: “Descriptive characteristics of the two treatment groups, means  $\pm$  SD or N (%)”

### Footnotes

- **Use superscript symbols to identify footnotes, according to journal guidelines;**
    - A standard series is: \*, †, ‡, ¶, #, \*\*, ††, etc.
  - **Use footnotes to explain statistically significant differences**
    - E.g., \* $p<.01$  vs. control by ANOVA
  - **Use footnotes to explain experimental details or abbreviations**
    - E.g., EDI is the Eating Disorder Inventory (reference)
    - Amenorrhea was defined as 0-3 periods per year
- 

Acronyms should be defined within the table.

***Model your tables from already published tables! Don't re-invent the wheel!!!***

- **Follow journal guidelines RE:**
  - Roman or Arabic numbers
  - centered or flush left table number, title, column, headings, and data
  - capital letters and italics
  - the placement of footnotes
  - the type of footnote symbols
- **Most journals use three horizontal lines: one above the column headings, one below the column headings, and one below the data**

Don't use grid lines! (->unprofessional)

Give units

Don't include too much columns

## Figure

Types:

## 1. Primary evidence

- electron micrographs, gels, photographs, pathology slides, X-rays, etc.
- indicates data quality
- "Seeing is believing"

## 2. Graphs

- line graphs, bar graphs, scatter plots, histograms, boxplots, etc.

## 3. Drawings and diagrams

- illustrate an experimental set-up or work-flow
  - indicate flow of participants
  - illustrate cause and effect relationships or cycles
  - give a hypothetical model
  - represent microscopic particles or microorganisms as cartoons
- 

## Legends

\*\*Allows the figure to stand alone.

May contain:

1. Brief title
2. Essential experimental details
3. Definitions of symbols or line/bar patterns
4. Explanation of panels (A,B,C,D, etc.)
5. Statistical information (tests used, p-values)

## Graph

Scatter Plots

\*Used to show relationships between two variables (particularly linear correlation)

\*Allows reader to see individual data points=more information!

## Tips

- Tell a quick visual story
- Keep it simple!
- Make it easy to distinguish groups  
(e.g., triangles vs. circles vs. squares  
is not easy!)
- If it's too complex, maybe it belongs in  
a table

## Result

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Here the result means the table/graph's outcome.



### Results ≠ Raw Data

- The results section should:
  - *Summarize* what the data show
    - Point out simple relationships
    - Describe big-picture trends
    - Cite figures or tables that present supporting data

Never "literally read the table" for the reader (i.e. present the data in the table in paper) but view the table's result in high level.

## Tips

- **Break into subsections, with headings (if needed)**
- **Complement the information that is already in tables and figures**
  - Give precise values that are not available in the figure
  - Report the percent change or percent difference if absolute values are given in the table
- **Repeat/highlight only the most important numbers**
- **Don't forget to talk about negative and control results**
- **Reserve the term “significant” for statistically significant**
- **Reserve information about what you did for the methods section**
  - In particular, do not discuss the rationale for statistical analyses within the Results section.
- **Reserve comments on the meaning of your results for the discussion section**

Result is what your data show. Don't add their meaning.

## Methods

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- Give a clear overview of what was done
- Give enough information to replicate the study (like a recipe!)
- Be complete, but make life easy for your reader!
  1. Break into smaller sections with subheadings
  2. Cite a reference for commonly used methods
  3. Display in a flow diagram or table where possible
- You *may* use jargon and the passive voice more liberally in the methods section

It's ok to use passive voice and jargon: it is more important to stress what is done.

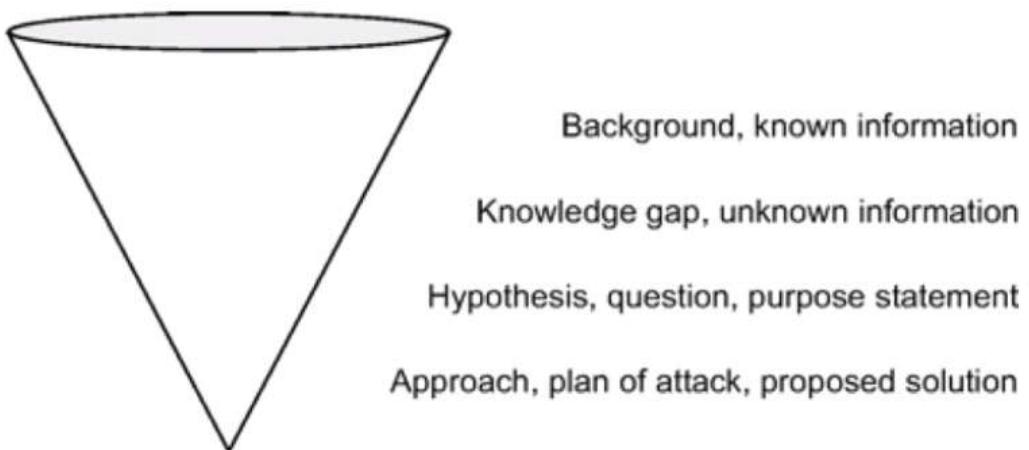
# Introduction

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Report methods in past tense ("we measured"),

But use present tense to describe how data are presented in the paper ("data are summarized as means  $\pm$  SD")

Shape it as a cone:



Better to write only 3 paragraphs:

1. What's known
  2. What's unknown
    - limitations and gaps in previous studies
  3. Your burning question
  4. Your experimental approach
  5. Why your experimental approach is new and different and important (fills in the gaps)
- What is known and unknown can appear alternately.
- Approximate paragraph lengths:  
1. What's known ≈ Paragraph 1  
2. What's unknown ≈ Paragraph 2  
3. Your burning question, 4. Your experimental approach, 5. Why your experimental approach is new and different and important (fills in the gaps) ≈ Paragraph 3

## Tips

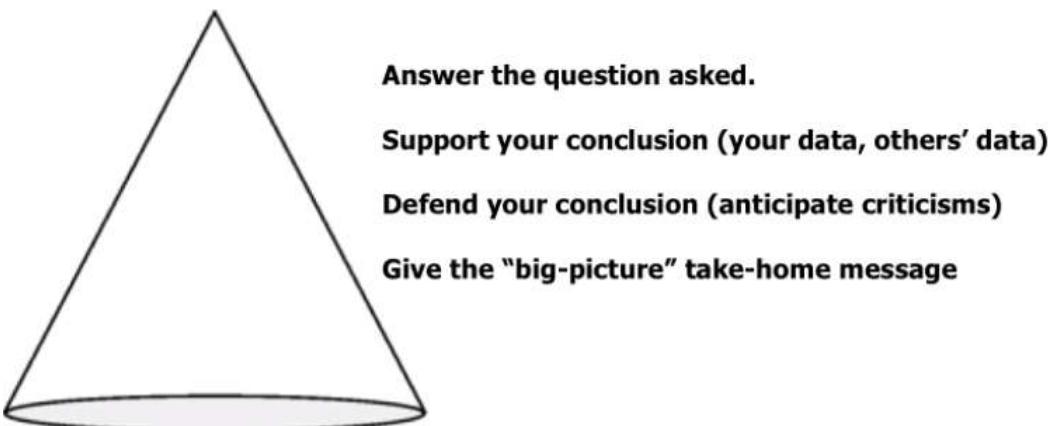
- Keep paragraphs short
- Write for a general audience
  - clear, concise, non-technical
- Take the reader step by step from what is known to what is unknown. End with your specific question.
  - Known→Unknown→Question/hypothesis
- Emphasize how your study fills in the gaps (the unknown)
- Explicitly state your research question/aim/hypothesis:
  - "We asked whether"; "Our hypothesis was"; "We tested the hypothesis that"; "Our aim/s were"
- Do not answer the research question (no results or implications).
- Summarize at a high level! Leave detailed descriptions, speculations, and criticisms of particular studies for the discussion.

## Disscussion

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Disscuss section is the most challenging part to write.

Invert the corn:



Because you have posed questions in the introduction, you have to answer them at the start of discussion.

Make sure to present the reseASON why your study matters.

It's ok to repeat your contribution because it's important.

Key finding (answer to the question(s) asked in Intro.)	<ul style="list-style-type: none"> <li>Start with: "WE FOUND THAT..." (or something similar)</li> <li>Explain what the data mean (big-picture!)</li> <li>State if the findings are novel</li> </ul>
Key secondary findings	
Context	<ul style="list-style-type: none"> <li>Give possible mechanisms or pathways</li> <li>Compare your results with other people's results</li> <li>Discuss how your findings support or challenge the paradigm</li> </ul>
Strengths and limitations	<ul style="list-style-type: none"> <li>Anticipate readers' questions/criticisms</li> <li>Explain why your results are robust</li> </ul>
What's next	<ul style="list-style-type: none"> <li>Recommended confirmatory studies ("needs to be confirmed")</li> <li>Point out unanswered questions and future directions</li> </ul>
The "so what?": implicate, speculate, recommend	<ul style="list-style-type: none"> <li>Give the big-picture (human) implications of basic science findings</li> <li>Tell readers why they should care</li> </ul>
Strong conclusion	<ul style="list-style-type: none"> <li>Restate your main finding.</li> <li>Give a final take-home message.</li> </ul>

Tie your study to humans!

## Tips

- Showcase good writing!**
  - Use the active voice**
  - Tell it like a story**
- Start and end with the main finding**
  - "We found that..."**
- Don't travel too far from your data**
  - Focus on what your data do prove, not what you had hoped your data would prove**
- Focus on the limitations that matter, not generic limitations**
- Make sure your take-home message is clear and consistent**

Try to present all possible limitations in your study, even if you don't have great solutions for them. This ensure the readers of your validity.

## Abstract

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"abstract" means "pull out" literally. Write it after you have written your paper.

- Overview of the main story
- Gives highlights from each section of the paper
- Limited length (100-300 words, typically)
  
- Stands on its own
- Most often, the only part people read

1. start with a one-sentence statement of some **background**.

Give the reader some context, maybe motivate the importance of the work.

2. explicitly state the research **aim or question**, like at the end of the introduction section. : "We asked whether, we hypothesized that or we speculated that"

3. give a quick summary of the **experiments** that you did.

You can pull all these pieces right out of the method section, but make it minimal.

4. a couple of key **results** and just a few important numbers.

5. **conclusion**: answer the question that you asked or the hypothesis that you were testing in your study.

What's the implication, why does this research matter?

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## Note of Tense

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For tense in the whole paper:

**Past**, when referring to study details, results, analyses, and background research:

- We found that
- Subjects may have experienced
- Miller et al. found

**Present**, when talking about what the data suggest:

The greater weight loss suggests

The explanation for this difference is not clear.

Potential explanations include

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## Week 6: Ethical Details

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# Plagiarism

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Plagiarism is when you try to pass off another person's writing as your own. Includes:

1. Cutting and pasting a sentence, or even phrase, and putting that into your own work.
2. Slightly re-arranging or changing those words here or there.
3. Borrowing descriptions or definitions directly from websites like Wikipedia.
4. A subtle one: cite the same references one-by-one.

When you are writing, you need to put things completely into your own words, or if you are going to borrow someone else's words, you need to put that material **in quotation marks and cite the source**.

Remember 7~10 words at the same is already a plagiarism.

## Example

- **Original Version (Wikipedia):** Ernest Miller Hemingway (July 21, 1899– July 2, 1961) was an American author and journalist. His economical and understated style had a strong influence on 20th-century fiction, while his life of adventure and his public image influenced later generations. (Source: Wikipedia)
- **Plagiarized Version:** Ernest Hemingway's thrifty and understated style strongly influenced 20th-century fiction. His audacious lifestyle and public image also influenced later generations.

## Self-plagiarism

Self-plagiarism is that you rehashing your own data or sentences from one published paper to a new one.

Despite being unethical, you may be violating copyright laws from the journal that owns the published paper.

One possible exception to this is that there may be some duplication of text within the materials and methods section.

# Right Path

- You must understand the material well enough to put it in your own words!

You can paste materials into a doc, but remember to put them in quotes. When you start to work, you have to:

- Work from memory
- Draw your own conclusions
- Do not mimic the original author's sentence structure or just re-arrange the original author's words.

# Authorship

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Think about the authorship before you write the paper.

Questions to answer:

1. Who gets authorship? Who are you going to include as an author on your paper?
  1. An author listed on the paper takes responsibility for its content. If it's fraud or retracted all authors are to blame.
  2. If someone only gives a slight help but not fully involved in, they won't be willing to appear in the author list.
2. What's the author order?
  1. Order implies the authors' relative contributions.
  2. The first author is usually the person who wrote up the draft of the paper, might have been the person who collected all the data, often a graduate student, or a junior person.
  3. The last position is usually the senior author, the head of the lab or research team, or the senior person who oversaw the research.

# Acknowledgement Section

1. Cite fundation
2. Acknowledge people who you don't feel merit authorship, and who probably don't want to be authors on the paper, but gave you some materials, offered some statistical consulting or some other advice.

## **Guest/Ghost Author**

The two issues are especially true in the field of medicine.

1. A ghost author is a professional writer who usually a company hires to draft a manuscript. At the end of the day the writer is not listed as an author on the manuscript though they may have written the whole paper.
2. Guest/honorary author: This is when a company does a study, analyzes the data, draws their conclusions, drafts the paper, then they ask an academic researcher at a prestigious university and invite them to be an author, often the first author on the paper.

# **Week 7: Other Types of Writing in Science**

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## **Literature Review**

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### **Goal**

- Goals:
  - Synthesize and evaluate the recent primary literature on a topic.
  - Summarize the current state of knowledge on a topic.
  - Address controversies.
  - Provide a comprehensive list of citations.

### **Types**

- Non-systematic review
  - Sometimes called a “narrative” review.
  - May not be comprehensive.
  - Qualitative review.

Two more technical ones:

- **Systematic review**
  - Attempts to find and summarize all relevant studies. May even include unpublished work.
  - Follows a rigorous search strategy using pre-defined exclusion and inclusion criteria. Searches multiple databases.
  - Evaluates the quality of each study using rigorous, pre-defined criteria. (often quantitative)
- **Meta-analysis**
  - A systematic review that additionally uses statistical techniques to pool data from independent studies (sometimes including unpublished studies).

The following part is only about the narrative review.

## Tips

- Start with a more broad search, and then narrow it.
- Clearly define your thesis or theme.
- Invest time getting organized!
- Divide the review into sections with separate headings.
- Consider putting information in tables, figures, and/or sidebars.
- Write for a broad audience

Don't abbreviate too much.

And don't assume prior knowledge.

Write in a lively, engaging, and easy to read style

## Structure

Logic organization is more important in review articles!

- **Abstract**
- **Introduction**
  - Clearly state the aim of the review

- **The body of the paper**
    - Divide into sections
    - Summarize the literature, organized based on methodology or theme.
    - Analyze, interpret, critique, and synthesize studies.
  - **Conclusion and future directions**
    - What recommendations can you make?
    - What gaps remain in the literature? What future studies would help fill in these gaps?
  - **Literature cited**
- 

## For Who in Academic Fields

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// Jumped  
// Hopefully I will need this part one day:)

### Grants

## Why submit a research proposal?

- Clarifies and deepens your thinking
- Increases productivity and impact
- Critical in all career paths
- Securing funding is an accomplishment and has positive career benefits

### Tips

1. Start Early and Gather Critical Information
2. Create a Game Plan and Write Regularly
3. Find Your Research Niche
4. Use Your Specific Aims Document as Your Roadmap
- 5. Build a First-Rate Team of Mentors**
- 6. Develop a Complete Career Development Training Plan**
7. STOP! Get Feedback!
8. Tell a Consistent and Cohesive Story
9. Follow Specific Requirements and Proofread for Errors and Readability
- 10. Recycle and Resubmit**

Yuan K., Cai L., Ngok SP., Ma L., Botham CM. *Ten Simple Rules for Writing a Postdoctoral Fellowship*. PLoS Computational Biology. 2016 Jul 14; 12(7):e1004934.

Here just list a few tips given in the course.

1. When writing grants, it is important to include a detailed timeline for the research, as this demonstrates feasibility.
2. The background/significance section is similar to the introduction section of a manuscript. It should
  1. motivate the importance of the research question;
  2. point out gaps and limitations in the previous research;
  3. and briefly say how the new research will fill in these gaps and limitations.
3. When writing your methods, you should use strong words like "expect" and "can" and avoid weak words like "hope" and "try."
4. It is helpful to solicit feedback from scientists outside your field.

## Letter of Recommendation

## Personal Statements

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### Tips

- 1. Make it *personal*
  - Speak from the heart
  - Reveal who you are
  - Strive for flair, not “blah”
- 2. Give specific examples and stories
  - “Show, don’t tell.”
- 3. Don’t read your CV line by line
  - Highlight relevant experiences
- 4. Avoid big words you don’t understand and avoid clichés
- 5. Show interest in/flatter your readers
  - Do your homework *maybe name drop some professors*
  - Be specific about why the specific program/institution/award appeals to you
- 6. Explain gaps and failures
  - Don’t ignore these in hopes that reviewers won’t notice the issue! *Show your growth in failures!*

Personal essays are a good place to address any gaps or weaknesses in your record.

Reviewers will likely have concerns about these gaps and weaknesses; by addressing them directly, you help alleviate these concerns and also demonstrate your ability to overcome obstacles.

## Elements

### Opening/Lead

- Start strong!
- Be creative
- Be descriptive or tell a story
- Impart who you are and what matters to you
- Don't be boring!!
- It's OK if it's a little long if it's compelling!

Start with compelling stories. Let readers know something unique about you.

## Body of the Essay

- Where do you want to go?
- What experiences have led you to this point?
- What makes you a strong candidate?
  - Address weaknesses, and turn them into strengths.
- Why this *specific* program/institution/fellowship?

Showing what you want to let the readers know, not telling. (e.g. give a set of achievements on sports to prove you are a high-achiever, focus, dedicated, etc. without saying any of these words)

Don't just read off your CV.

It would be better to highlight one of the first author publications.

Tell the reader about the experience.

What was involved in that research?

How did it feel doing that research?

Was it exciting?

How did it motivate you?

Were the findings interesting?

Did you come across any challenges that you had to figure out how to overcome?

Show that you understand the institution, and praise them. Mention big names even if you just heard a report from them.

## Conclusion

- End strong!
- Consider circling back to your opening story or description

# Week8: Reach Broader Audiences

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This week is about topics like Talking With the Media, Panel Interview, Writing for general audiences, Writing a science news story, Interviewing a scientist, Socil media, Concluding Remarks.

Here I only select some interesting things to take note.

## Writing for General Audiences

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1. Start with the take-home message. Tell readers up front the most important things they should care. (Whilas science writing start with the background.)
2. Recongnize and avoid jargon (including not just technical terms but also "scientist-speak", e.g. leverage, wide useage, activity volume).
  1. Use what the readers are familiar with. The name of statistical tests are not a good choice.
3. Unpack the science. Explain everything, step-by-step. Use analogy.
4. Fiter out unnecessary details (e.g. numbers). Lay audiences don't need to know all the nitty-gritty scientific details.
5. Get the point faster. Assume the readers are intelligent, and can infer by themselves.
6. Tell a story. Using story to connect science and your readers.
  1. Use story-telling techniques to set a scene (tech: appeal to the 5 senses: sight, taste, touch, hearing, and smell)
  2. Focus on characters, they are human beings
  3. Follow a plot (drama and suspense)

## Example

1. "It is worth noting that in addition to intertumor genetic heterogeneity, variability between cells within individual tumors has been observed."

==>

The genetic changes that cause cancer not only vary between different tumors, but also between different cells within the same tumor.

2. "Here we leverage the wide usage of smartphones with built-in accelerometry to measure physical activity at the global scale. We study a dataset consisting of 68 million days of physical activity for 717,527 people, giving us a window into activity in 111 countries across the globe. We find inequality in how activity is distributed within countries and that this inequality is a better predictor of obesity prevalence in the population than average activity volume."

==>

Researchers used data from smartphones to look at the walking habits of 717,527 people from 111 countries. Countries with the widest gaps between the most active and least active people also had the highest obesity rates. Surprisingly, this "activity inequality" was a stronger predictor of obesity than the total amount of activity.

## Writing a Science News Story

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1. Any good news story should answer the 5W1H, the who, what, where, when, why, and how.
2. Science News Story follows a formula.
  - **Lead**
  - **Nut Graf**
  - **First quote (3-6 paragraphs down)—brings in the human element**
  - **Body of the story**
    - **What was done before**
    - **What was done in this study—key experiments/key findings**
    - **Implications/caveats**
  - **Kicker**

### The Lead

## The lead (also spelled "lede");

- The first paragraph
- Grabs the reader's attention
- Imparts the heart of the matter (simple and focused)

## Guidelines...

- 1-2 sentences
- Aim for <35 words
- Use the main verb to carry the main news, and use action verbs
- Give complementary, but different information than the headline.
- Provide some, but not necessarily all, of the 5 W's and 1 H

In most news stories, the essential facts of a story are included in the **lead**, the first sentence or two of the story. Good leads try to answer who, what, when, where, why, and how as quickly as possible.

Quotes do not make good leads.

## **Nut Graf**

In journalism, a nut graph (nutshell paragraph) is a paragraph that explains the context of the story.

Shortly after the lead paragraph, the so-called 'nut graf' flushes out the story: the 5 W's (who/what/where/why/when) and the H (How).

Occasionally, the nut graf is hidden-contained within the lead or strewn throughout several paragraphs. But usually, it's identifiable.

## **Quote**

- Give a human dimension to the story
- Provide evidence
- Provide opinion
- Provide color and flavor
- Flush out the main idea
- Move the story along

The first quote tells you the big picture significance of the paper.  
In many cases, first quote are actually a quote of someone.

## Attribution

1. Use ["xxx", Prof xx said.]  
Not ["xxx", said Prof xx.]  
Unless you add a long description after the name.
2. News writers generally stick to said or says as their verb.  
Be careful about using other verbs like noted or remarked.  
Those have connotations that may add unwanted meanings to the quote. e.g.  
Noted implies that what the person said is a fact.

## Body

Flushes out the story—walk the reader through the important parts of the research

- What was done before
- Research question
- Key experiments
- Key findings
- Caveats (if room)
- Outside commentary (if room)
- Implications (if room)

## Kicker

- The ending.
- Leaves the reader feeling satisfied.
- Often circles back to the lead.
- A quote can be effective.

## Grammar Issues

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1. The word "data" is plural. Say the data "ARE" and the data show.

1. **datum** is the singular form (we hardly ever do)

2. AFFECT VS EFFECT

1. A for verb, E for noun

2. Both second points in the picture are very specific

- **Affect is the verb "to influence"**
  - *The class affected her.*
  - As a noun, affect denotes feeling or emotion shown by facial expression or body language, as in "The soldiers seen on television had been carefully chosen for blandness of affect" (Norman Mailer).
- **Effect is the noun form of this influence**
  - *The class had an effect on her.*
  - As a verb, effect means to bring about or to cause, as in "*to effect a change*"

3. Compare to VS Compare with

- Compare to = to point out *similarities* between different things
- Compare with\*\* (used more often in science) = to point out *differences* between similar things

ex: "Shall I compare thee to a summer's day?"

ex: *Brain tumors are relatively rare compared with more common cancers, such as those of the lung, breast, and prostate.*

4. That VS Which

1. The example:

1. that: there are more than one vial, and contained her RNA is important

2. which: only one vial, we all know, RNA is nor important that can be removed
3. Roughly, a which without a comma should be a that (essential clause, defining the subject 0

# Reference Book

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1. On Writing Well
2. The Elements of Style