Boosting Your Academic Writing Skills

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Why is writing important?

"Papers or it never happened"

Your work doesn't contribute to the scientific community unless others can read about it, build on it, learn from it

Why is writing important?

In proposals, good writing is just as important as good content

You may have a great project planned, but if the reviewing committee doesn't understand it from your proposal, you will not get the time/money/award.

Why is writing important?

Publications matter for your record

Your scientific reputation depends on how many papers you write and how impactful they are.

You can communicate good science in poorly-written papers, but it will reduce the impact

Learning to write effectively is much easier than solving difficult scientific problems!
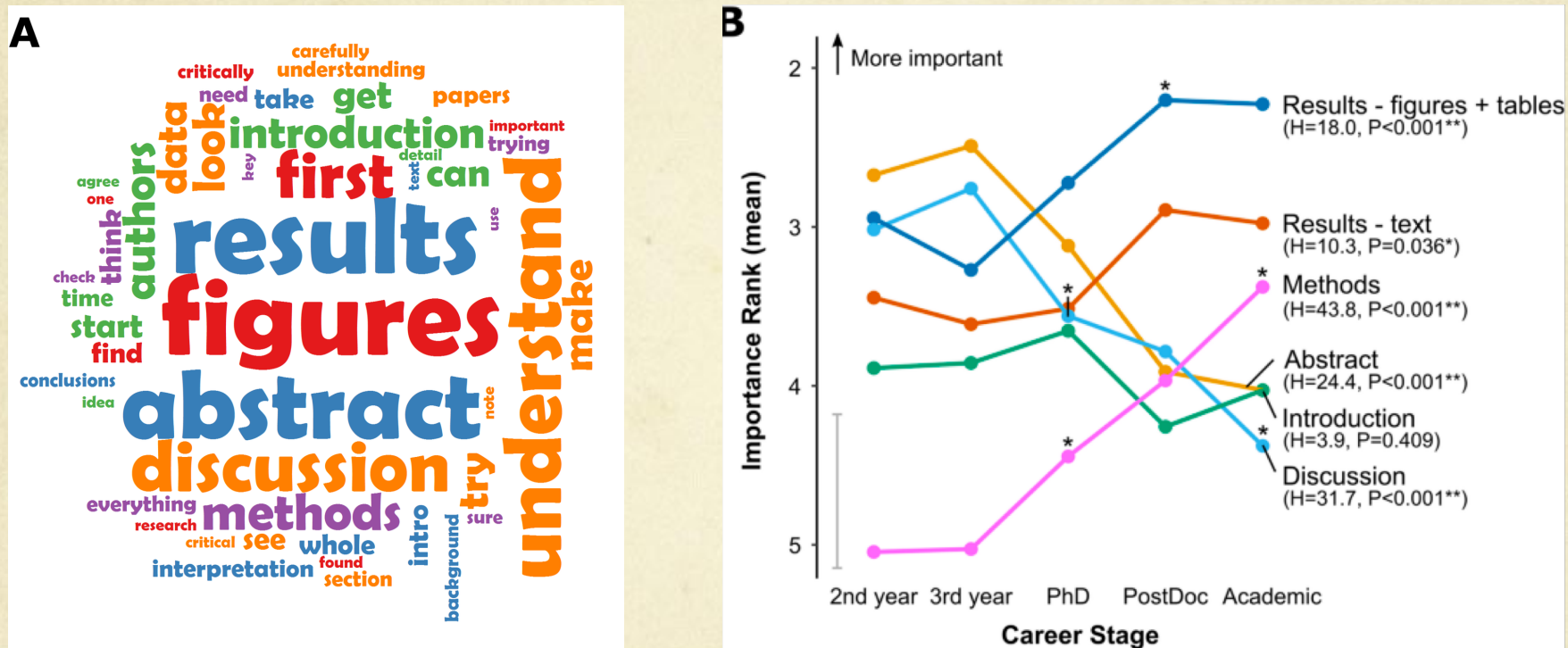
Before you start

○ When is it time to start writing a paper? (When do you have enough material?) MPU = Minimum Publishable Unit

○ How much material should you include? (How long should it be?) arxiv.org:0809.0692

○ What journal should you send your paper to? (This choice will also influence the writing style)

○ To arXiv or not to arXiv? And if yes, when?

○ "In order to understand how best to improve writing, we would do well to understand better how readers go about reading."

George D. Gopen, Judith A. Swan (1990)

I *know* how to read, thank you

What's the most important part of a paper?

Hubbard, K. E., & Dunbar, S. D. (2017). PloS one, 12(12), e0189753
https://doi.org/10.1371/journal.pone.0189753

OK, so … writing **is** important. What now?

- Take the time to improve the things you're writing now. Good writing (and editing!) takes time, but it's worth it.

- With practice, it will be easier and faster to write better.

Top 5 guidelines for newbies

1. Be concise. Don't use ten words when five would do

2. Use professional, not conversational wording

3. Be specific. Quantify adjectives (large, small, short etc.) and comparatives (more, less, larger, greater, smaller, etc)

4. Avoid demonstratives: "this", "those", "that" without specifying what the demonstrative is referring to

5. Use citations appropriately

Word Choice for first paper writers

Use professional, not conversational wording.

Conversational   Professional

To see if   => To test whether

We put the   => We placed the

The plot shows   => Figure X shows

We ran the model => The models were calculated

The points on Figure X => The data shown on Figure X

Read papers to write papers! If papers that you read do not use certain words, don't use them yourself.

Tips from scientific writers

○ "A number of" is meaningless. Say how many you mean.

○ Quantify descriptives:

"Strong", "large", "small", "weak", "faint", "luminous" need quantification. Your idea of large might not be my idea of large.

e.g., The galaxy has large emission-line ratios.

=> The galaxy has large emission-line ratios (log ([NII]/Ha) > 1.0; log([OIII]/Hb) > 0.5).

Tips from creative writers:
Be Specific

○ **Avoid demonstratives: "this", "those", "that" without specifying what the demonstrative is referring to.**

○ **Clarify comparatives (more, less, larger, greater, smaller, etc)**

e.g, "However, only 40% of the objects optically classified as containing AGNs are globally dominated in the infrared by their AGN activity. This shows that the optical technique for classifying the nuclear energy source is more sensitive as a consequence of the higher spatial resolution that can be obtained."

This what?

More sensitive than what?

Avoid using passive voice.

by zombies

○ The data were reduced using the standard python reduction package.

^

Who reduced the data? Did it come from the archive pre-reduced, or did you reduce it yourself?

Avoid using passive voice.
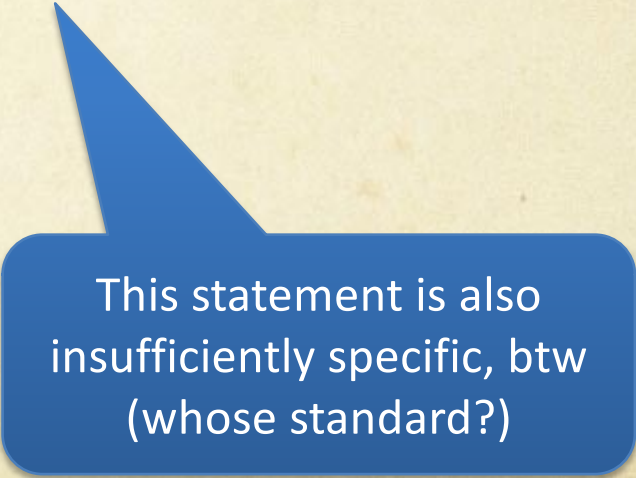
by zombies

○ The data were reduced using the standard python reduction package.

Who reduced the data ... rom the archive pre-reduced, or did you r...

Avoid using passive voice.

○ The data were reduced using the standard python reduction package.

○ We reduced the data using the standard python reduction package.

This statement is also insufficiently specific, btw (whose standard?)

Other common grammar mistakes

○ Don't make an object possessive: e.g., "NIRSpec will be observing the galaxies' rest-frame UV spectra at these extreme redshifts"

○ Inappropriate use of "time" words: Don't use **"while"**, **"since"** or **"as"** <u>except</u> to indicate the relationship of events in time.

We often use "while" when we mean "whereas" or "although"

We often use "as" when we mean "because"

We often use "since" when we mean "because"

Use <u>the proper word</u>, not the <u>time</u> word, unless it is a <u>time concept</u>!

Tips from creative writers: paragraphs

- The four elements essential to good paragraph writing are: **unity, order, coherence,** and **completeness**.

- The first sentence of the paragraph (called the topic sentence) should give the reader a good understanding of what will be in the paragraph.

- First sentences should be like **"stepping stones".** You should be able to read the whole paper by just reading the first sentences of each paragraph, like stepping stones.

Tips from creative writers: paragraphs

Outline your plan for the paper: know what your main point is going to be

○ First sentences should be like **"stepping stones".** You should be able to read the whole paper by just reading the first sentences of each paragraph, like stepping stones.

Use citations correctly

○ **What to cite**

Facts, figures, ideas, or other information that is not common knowledge

Ideas, words, theories or exact language that another author used in other publications[1]

○ **Two distinct styles**

M28 is a globular cluster in Sagittarius (Messier 1764)

Discovery paper; earliest known reference

The globular cluster M28 is home to 12 known millisecond radio pulsars (e.g. Begin 2006; Bogdanov et al. 2011b)

Use e.g. for later works that support statements

[1] http://libguides.mit.edu/citing

Let software do the work

○ **Document preparation**

Seek templates from the web or better yet your fellow students!

Use WYSIWYG LaTeX editors; e.g. TeXShop
http://pages.uoregon.edu/koch/texshop/

Collaborative document editing with Overleaf
(http://overleaf.com)

○ **Bibliography management**

BibTeX + natbib, Papers, EndNote, Zotero, Mendeley etc.

Tips from creative writers: sentence structure

- **Put the most important part of the sentence first**

- **Remove excess words**

e.g., "In these diagrams, there is a reddening/mixing ambiguity in that at any one place in the diagram, there is a range of starburst temperatures, AGN reddening, and mixing of the two components which can place a galaxy at that position." (41 Words)

=> Different starburst temperatures, AGN reddening and the relative ratio of starburst to AGN activity can produce the same line ratios on the optical diagnostic diagrams. (25 Words)

Activity Plan:

- With your neighbor, rewrite the given sentence (5 minutes)

- Groups of 3-4 pairs will compare their sentences and select the best, or merge them to produce an even better one. Add your final sentence to the Google doc (link circulated by email). (10 minutes)

Sentence structure exercise

Rewrite the following sentence to:

○   Put the most important part of the sentence first

○   Remove excess words

"In any case, although the detailed shape of the derived star formation history can be affected by this choice, the range of smoothing parameters we are using neither change the overall interpretation of the star formation history nor the mean age and metallicity values, which is what we are going to use across the paper." (55 Words)

Sentence structure exercise

Rewrite the following 2 sentences to:

- Put the most important part of the sentence first

- Remove excess words

- Avoid demonstratives without clarification

- Clarify comparatives

"However, only 40% of the objects optically classified as containing AGNs are globally dominated in the infrared by their AGN activity. This shows that the optical technique for classifying the nuclear energy source is more sensitive as a consequence of the higher spatial resolution that can be obtained." (48 Words)

More writing resources

- The Elements of Style by William Strunk (1911)

  http://www.gutenberg.org/files/37134/37134-h/37134-h.htm

- Internet resources for Scientific Writing

  http://pubs.acs.org/subscribe/archive/ci/31/i02/html/02inet.html

- Pearson Handbook http://www.pearson.com.au