Writing Scientific Papers

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SBS Professionalism Fall 2019
Why should a profession that trades in words and dedicates itself to the transmission of knowledge so often turn out prose that is turgid, soggy, wooden, bloated, clumsy, obscure, unpleasant to read, and impossible to understand?

- Steven Pinker

There is no such thing as good writing, only good rewriting.

- Robert Graves

Thanks to @WriteScientific, aka Prof Brian Waters
Scientific Writing and Communication (AGRO/HORT 403/803)
& Meredith Steck at the UNL Writing Center
Whether you love it or hate it, writing is challenging

• Table discussion:
  • What are barriers to writing?
  • What facilitates good writing?
Common myths that are barriers to writing

- I can't find a big enough block of time to write
- My space is not conducive to writing (too noisy, busy)
- I can only write at best place X
- I need to do one more analysis or make one more graph
- I need to compile all my resources/citations for the paper before I start writing
Writing as Practice:
Come to know yourself as a writer

• Write down three of your strengths as a writer (hard)

• Write down three things that present barriers to productive writing for you (easy)

• Write down three things that facilitate a productive writing session for you
Writing as Practice:
Be mindful and intentional

- Write every day (sustainable writing practice)
- Use SMART goals
- Reflect and self-assess
- Recognize where and how you find momentum in writing
- Writing retreats/groups/partners #Accountability

How to Write a Lot by Paul Silvia
https://www.academiccoachingandwriting.org/academic-writing/academic-writing-blog/vi-set-smart-goals
Sustainable Writing Practices

- SMART goals
  - Specific, measurable, achievable, relevant, time-bound
- Parking downhill
- Pomodoro
- Publishing pipeline

https://www.academiccoachingandwriting.org/academic-writing/academic-writing-blog/vi-set-smart-goals
Sustainable Writing Practices: Pomodoro

- Time-management strategy
  - Break down writing task into four 25 min intervals with 5 min breaks
  - Adjust timing so that you maximize productivity (reflection)
- Handout
Sustainable Writing Practices: A paper pipeline

- An organizational scheme for multiple writing projects
- Doing something every day that moves your projects forward
- Pipeline Thinking: How can I take this project to the next step in the pipeline? What would that take?
- Clogs or leaks in the pipeline?

#PublishingPipeline
Erin Marie Furtak, PhD
Univ of Colorado Boulder
@furtak

https://www.chronicle.com/article/My-Writing-Productivity/236712
Sustainable Writing Practices: Reflection

1. What were your (SMART) goals for today?
2. Did you meet your goals for today? And if not, why not?
3. How many minutes did you write today?
4. What type of (internal) resistance did you experience today?
5. What was your biggest (external) challenge today?
6. What treat did or will you give yourself today?
7. What went well today that you can be proud of?
8. Open question: This is an (optional) open space for anything you want to consistently reflect on as part of your daily update.
9. What are your goals for tomorrow? For the week?
There is no one way to write a scientific paper, (but …)

• Table discussion:
  • What makes a better paper? A better introduction?
  • What makes for a bad paper? A bad introduction?
There is no one way to write a scientific paper, (but …)

- Excellent papers
  - Have a narrative arc
  - Introduction presents the relevant information, leads the reader to an important gap in knowledge, and how this paper will fill in that gap
  - Conclusions are aligned with gaps, the promises and the results
    - A second introduction in the discussion may mean that the introduction is the wrong set up
  - Writing is concise, clear and considers the reader
There is no one way to write a scientific paper, (but …)

• Some basic templates (from Brian Waters, UNL)
  • The current facts —> existing work explains these facts poorly —> need better explanation/understanding
  • X is extensively studied —> something is missing —> fill in the gap
  • There are contradictory theories about X —> resolve the tension
  • Society/community needs technology/method X —> current technology/method is limited —> improve technology/methodology
  • Less compelling is simply extending previous studies
Concise, clear writing that considers the reader

• You want your reader to enjoy your paper

• Readability can be quantified
  • Google “readability test tool”
  • Number of words and number of polysyllabic words per sentence

• One idea per sentence

• Fewer words

• Problematic writing makes the reader work too hard
  • Excessive abstraction, careless diction, order of sentences or phrases is confusing, excessive compression, inconsistency, metadiscourse
The ubiquitous effects of temperature on biological rates in ectotherms and of energy metabolism on fitness traits warrant quantification and mechanistic dissection of how temperatures well within critical thermal limits modify the pleiotropic effects of mitochondrial–nuclear interactions on suites of organismal traits.

Concise, clear writing that considers the reader
Concise, clear writing that considers the reader

<table>
<thead>
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<th>TEST RESULTS:</th>
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<tbody>
<tr>
<td>Your text has an average grade level of about 27. Ooh, that's probably a bit too complicated. Have you thought about using smaller words and shorter sentences?</td>
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<th>READABILITY INDICES</th>
<th>Value</th>
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<td>Flesch Kincaid Reading Ease</td>
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<tr>
<td>Flesch Kincaid Grade Level</td>
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<td>Gunning Fog Score</td>
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<td>SMOG Index</td>
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<td>Coleman Liau Index</td>
<td>23.2</td>
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<tr>
<td>Automated Readability Index</td>
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</table>

<table>
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<th>TEXT STATISTICS</th>
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<tr>
<td>No. of sentences</td>
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<td>No. of words</td>
<td>42</td>
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<tr>
<td>No. of complex words</td>
<td>16</td>
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<tr>
<td>Percent of complex words</td>
<td>38.10%</td>
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</table>
Editing/writing exercise

- Choose a paper
  - Because ... you like it, you don’t like it, you think it could be better, you wrote it, your arch-rival wrote it, your advisor wrote it, it is highly cited, it has never been cited

- Edit for structure
  - Analyze the structure of the Introduction (what does each paragraph achieve?) or a paragraph (what does each sentence achieve?)
  - How would you improve?

- Or, edit for readability
  - Put a paragraph or sentence in the Readability Test Tool
  - Can you edit to improve the readability?

- Work in a Google Doc to do this as a group activity