How to Write a Scientific Paper

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The questions to ask yourself first…

Is the paper worth writing?

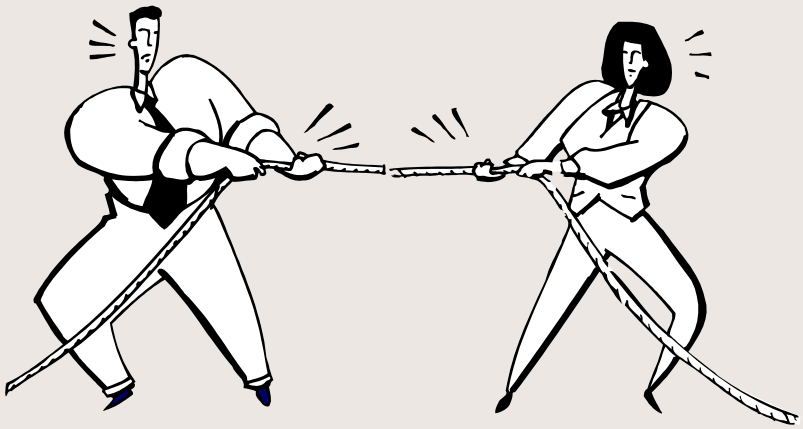
- What's in the literature?
- "So What?"
- It's a lot of work (average 20-30 drafts). Don't do it unless its worth it.

What do I have to say?

- A single question clearly stated with adequate evidence for the answer.
- Try stating the question and its answer in one simple sentence.

Is it one or more papers?

- Putting too much in one paper makes it diffuse and less compelling than if its focused



- Salami Science?

OK, So you want to/need to write a paper --> next questions

a. What is the right format for the message (original article/review?)

b. What is the right audience—who cares?

c. What journal should I choose?

Which journal?

- i. Is topic of my paper within its scope and format?
- ii. Would it match my audience?
- iii. Ask mentor or other senior researchers: appropriateness
- iv. Impact Factor
- v. Consequences of wrong decision: time lost; failure to publish

Calculation for journal impact factor*

A= total cites in 2015

B= 2015 cites to articles published in 2013-14 (this is a subset of A)

C= number of articles published in 2013-14

D= B/C = 2015 impact factor

**Weights review articles heavily and is higher in scientifically better populated fields*

To find out a journal's impact factor

Search on Impact Factor (current year - 2 years)

(e.g. for now,

search: impact factor 2015

A scientific article as a critical argument

a. Statement of problem; posing a question
b. Presentation of evidence
c. Assessment of the validity of the evidence in the face of ..
    a. strengths/weaknesses
    b. other evidence
d. Conclusions

Literature Search First

- What has been done and what can you say that's new?
- Be thorough in your search:---a high sensitivity/low specificity search.

The Title Page: Do it early—title; authors and their order; sources of support

a. Establishes responsibilities in paper writing
b. Avoids hurt feelings

The Process of Paper Writing

- Create an outline first
- Plan on multiple drafts:
  - Filename with dates
  - One filename written over with new draft
- Tables/figures early: prompt more analysis
- Deadlines for you and coauthors

The Introduction

- Draw audience in; be provocative
- Target journal specific audience
- Identify gaps in knowledge
- End with question/hypothesis

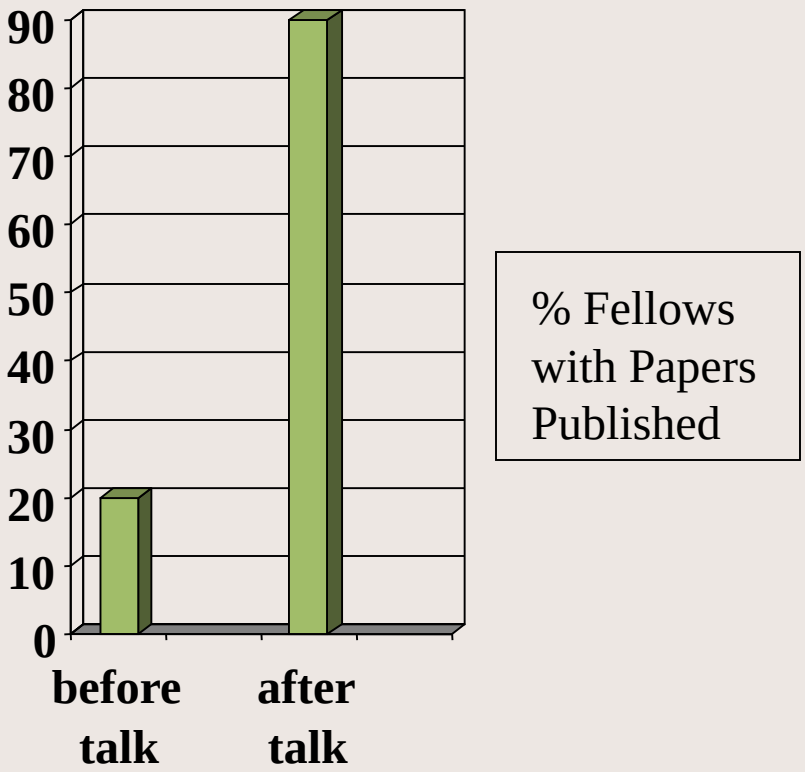
Knee Pain, Why?

The Methods Section

- Should include subheadings
- Write clearly enough to be understood by nontechnical reader and be replicated
- Past tense

The Results Section

- Organize around tables/figures
- Present tabular results selectively in text
- Past tense
- No interpretation; just the facts!
- Tables should stand on their own



The Discussion Section

- 1st paragraph: answer question/hypothesis
- Remainder:
  - Evidence pro and con: literature review
  - Strengths/limitations of your study
  - Implications of findings (be conservative)
  - Other findings of your study
- Last Paragraph: conclusion

Getting Tense!
PAST and PRESENT

- When quoting *previously published work*, refer to it in *present tense* (e.g. penicillin treats strep throat)
- When describing your *own study*, refer to work in *past tense* (e.g. we tested a new antibiotic for strep throat)

Pop Quiz: The good scientific paper …

A. Is focused on a specific question(s).

B. Covers a broad spectrum of disease or methodologic questions

- Less is More.

Pop Quiz: In a good scientific paper ...

A: Abstract and tables and figures are understandable without reading whole paper.

B. Abstract and tables and figures are understandable only with reading whole paper.

Pop Quiz: In a good scientific paper …

A: Writing is in passive voice (e.g. it was found that…).

B. Writing is in active voice (we found that…).

C. Writing mixes active and passive voice.

Pop Quiz: In a good scientific paper …

A: A term defined in the methods section is used again and again (a rose, a rose, a rose)

B. Various synonyms for a term are used to prevent reader boredom. (a rose, a flower with a thorny stem, a fragrant flower)

- Define a term and use it consistently. Otherwise, you'll confuse the reader.

Pop Quiz: In a good scientific paper ...

A: Writing is flowery

B. Writing is concise

- Generally, the shorter, the better

Proofread before Submitting

- ✓ Are terms used consistently throughout?
- ✓ Do numbers in abstract match numbers in text and tables?
- ✓ Do citations in text match references?
- ✓ Are Syntax and Grammar acceptable

A brief synopsis of writing an abstract

- It's a minipaper:
  - Introduction (usually 1-2 sentences)
  - Methods (often longest part)
  - Results
  - Discussion is limited to concluding statement
- Like a paper, requires many drafts, most oriented to presenting argument concisely

Getting the Reviews of Your Paper

- “The reviewer is always right.” (whether they are or not!)
- Don’t respond quickly. Digest reviews.
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If your paper was rejected…

- Was it sent out for review? If not, consider changing type of journal
- If reviews don't suggest changes, send it out quickly to another journal
- The 3 journal rule.