

Research papers and theses: The writing thereof

10 aprile 2013

We will be reading:

- Writing Science: How to Write Papers That Get Cited and Proposals That Get Funded, Joshua Schimel, 2011

Learning goals

- Understand what should go into a research paper
- Understand how to structure the paper and its sections
- Understand how to write a compelling story

Tips to become a better writer

- Rewrite, rewrite, rewrite
- Get feedback from others
- Read other writers and analyze what they do
- Read books about writing

Practical books for writing in English

- Thesaurus
- Strunk and White, *The Elements of Style*

Review of paper/thesis sections

Sections of a thesis or paper

- Title
- Abstract
- Introduction
 - Hypothesis/Question
- Method
 - Participants
 - Materials
 - Procedure
 - Analysis
- Results
- Discussion
- (Conclusion)
- Acknowledgements
- References
- (Appendix)

Sections: Your Advertisement

- Title
- Abstract

The Title

- The first, and probably the only thing that most people will read of your paper

A Title May Include

- Your independent variable(s)
- Your dependent variable(s)
- Your group sample

Actual Titles from CHI2013

- Analyzing user-generated YouTube videos to understand touchscreen use by people with motor impairments
- Extracting usability and user experience information from online user reviews
- Predicting users' first impressions of website aesthetics with a quantification of perceived visual complexity and colorfulness

What is *Your* Title?

The Abstract

- The second thing people will read
- Most people who see your paper will stop here
- Many people who quote you will only have read the abstract !!!

The Abstract

- It is a tiny version of your paper
 - What you studied
 - How you studied it
 - What your results were
 - What those results mean

Sections: Your Justification

- Introduction
 - Hypotheses or Questions

The Introduction

- Overall area or problem under consideration
- Funnel
- Section construction:
 - Overview of your argument
 - Your argument
 - Summary of the argument
 - Link to next section

The hypothesis/question

- Your independent variable: what factor are you manipulating?
 - Background color, text order presentation...
- Your dependent variable: what parameter are you measuring?
 - Typing speed, pulse, number of errors...

Hypothesis vs. Question

- H: A red colored background should result in more typing errors than a green colored background
- Q: Will the color of the background affect the number of errors during typing?

What is your hypothesis or question?

Sections: Your Recipe Booklet

- Method
 - Participants
 - Materials
 - Procedure
 - Analysis method (quantitative or qualitative)

Method: wet ingredients

- Participants
 - Age (range, mean, standard deviation)
 - Gender distribution
 - Cultural background, language
 - Anything else that is PERTINENT to your study (controlled or manipulated variables like expertise in the area, physiological problems, preferences...)

Method: dry ingredients

- Materials
 - Computer, program, smartphone, tablet...
 - Questionnaire, survey...
 - Lab room, lighting, sound levels...

Method: Mix in a bowl...

- Procedure
 - Where? When?
 - What did you say before?
 - What were the groups? How many in each?
 - What did the groups do? In what order?
 - What did you say during?
 - How long was it? What marked the end?
 - What did you say after?
 - What did you give them as a reward or thank you?

Method: Stick a toothpick in it

- Analysis
 - Quantitative:
 - What statistical analysis did you use? Why?
 - If not well known, describe it in some detail
 - Qualitative:
 - What qualitative analysis approach did you use? Why?
 - If not well known, describe it in some detail

Sections: Your Contribution to Science

- Results
- Discussion
- Conclusion (if needed)

Results

- Your analysis approach
- Most important to least important results
- Indicate the results clearly
- Give the statistical results, if applicable (e.g., $F_{(1,22)} = 25.1, p < 0.01$)
- Figures and tables make for easier reading

Discussion

- Summarize your results, again in order of importance
 - How do they compare to other studies?
 - What do your results mean, globally?
- What are the limits of your study?
- Future research

Conclusion

- For a thesis or a research article published in a journal
- Usually because you have several experiments

Sections: Addenda

- Acknowledgements
- References
- Appendices

Acknowledgements

- Did an agency finance this research?
- Did other students help with running the studies or analyzing the data?
- Did somebody help shape the research or the paper through really good suggestions or reviews?

References

- Include only the papers you mentioned in the text

Appendices

- Questionnaires or surveys
- Illustration of study set-up, if pertinent
- Stimuli used, such as images or text
- Raw results if not too voluminous
- Figures or tables too long for the main text

Sources

- http://www.colby.edu/biology/BI17x/writing_papers.html
- <http://www.psych.upenn.edu/~baron/labrep.html>

For next week, read

- The science of scientific writing, George Gopen and Judith Swan, American Scientist
 - <http://www.americanscientist.org/issues/pub/the-science-of-scientific-writing/1>
- 21 suggestions for writing good scientific papers,
 - <http://course1.winona.edu/mdelong/EcoLab/21%20Suggestions.html>