

Materials and Methods

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Key Roles of Methods

- The **key purpose** of this section is to provide the reader enough details so they can replicate your research.
- You should provide enough quantitative information (concentration, temperature, weight, size, length, time, duration etc.) so that other researchers can replicate what you did

Key Roles of Methods

- What kind of reader? Even the guy in the supermarket across the street?!
- We mean a researcher with enough basic knowledge of your field!
- Someone who can read and apply the protocols.
- This section **can** have a number of parts, but not all of them may apply to your paper.

Materials and Methods

- **Materials** refers to what was examined; e.g., humans, animals, tissues; also to various treatments; e.g., drugs, gases; and instruments
- **Methods** refers to how subjects or objects were manipulated to address the experimental question; how measurements and calculations were made; and how the data were analyzed

How Should I Structure my Methods?

Study Setting

- Where did I carry out this study and what characteristics did this location have?
 - Only if necessary
- Can the setting's climate affect your outcome?...Malaria
- How about the setting's culture and religion?... HIV/AIDS

Study Type

- Use technical terms;
 - A prospective cohort study with external control group
 - A double-blinded hospital based clinical trial
- How did I design my experiment?

Sampling and Sample Size

- Very Important!!!

Variables

- What / Who did I study and why?
- What did you measure and why?
- What was their actual definition?

Measurement

- What was the measurement equipments?
- Lab or Questionnaire...
- Interview or focus group...

Preparation

- Animal preparation
- Questionnaire development
- How did I handle / house / treat my materials / subjects?
What kind of care / precautions were taken?

Data Collection Procedures

- How did you collect the data? Any protocols?
What equipment did I use
(plus modifications) and where
did this equipment come from
(vendor source)?

Data Processing

- How did you handle the missing data/outliers?
- Data cleaning?

Data Analysis

- A typical mistake;
 - *We used t-test and X^2 and SPSS Software to analyze the data!*
 - *WRONG!!!*
- From simple analysis to harder ones, from descriptive to analytic
- What software?
- How did I control the biases?

Ethical Considerations

- Ethical committee
- Informed consent
- Confidentiality of participants

Should it Be Structured?

- Refer to your journal
 - Whatever they say!!!
- Structured methods are popular...
 - The number of subheadings in the methods section depends on the type of paper.
 - The rule of thumb, “data analysis” section will appear at last; leads the reader to the results

A Few words on Data Analysis and Statistics

- First, remember that even some of the most prolific authors are “statistically challenged.”
 - Consulting a statistician early is well worth the time and expense.

A Few words on Data Analysis and Statistics(cont.)

- All calculations that were used to manipulate the raw data should be mentioned in detail.
- The data analysis section should describe how data were handled, what statistical tests were done, and what p value was deemed to indicate a statistically significant difference.

A Few words on Data Analysis and Statistics(cont.)

- Explain why the statistical tests you selected were appropriate, if necessary.
- Citing a reference for the appropriate statistical test is a good idea, if one is available, as it helps limit questions from the reviewers.
- Describe statistical methods with enough detail to enable a knowledgeable reader with access to the original data to verify the reported results.

Should I Describe Everything in Chronological Order?

- The basic idea is present everything in your experiments, trials, procedures etc. in a way that will make best sense to your reader.
- The fact you did something before or after something else, may not be relevant for your reader, so in such cases chronology is not important.
- However, within a sentence or paragraph, readers should feel they are moving forward chronologically.

Should I Use the Active or Passive?

- Most Methods sections are written in the past simple using the passive form.
- Use active form when it is important who did what (*i.e. Who took the blood samples? Was he/she well-trained*)

How Can I Reduce the Word Count?

- Assuming your readers have basic knowledge of the techniques used in your field, you can delete any superfluous information
- Cite a reference rather than detailing the procedure again if any of your methods are fully described elsewhere (in one of your papers or someone else's)
- Present more than one action per sentence

Can I Use Bullets?

- YES!
- This makes it easier to read and also provides variety in the layout
- However, refer to your journal's style guide to check whether bullets are permissible.
- You only need to number your bullets if each bullet describes a step that is part of a chronological sequence.

Thank you!
James

