

Research Design

11: communicating research plans

Initial questions?

research proposals

research proposals, *general content*

Executive summary / Abstract

Statement of the problem

Research questions

Hypotheses

Importance of the study

Literature review

Research plan

Population of interest

Sample selection

Sampling methodology

Sample size

Operational procedures

Data security

Brief schedule

Data collection

Outcomes (dependent variables)

Treatments (independent variables)

Variables

Statistical analyses plan

Limitations and uncertainties

References

So how do we bring these content together?

research proposals, example generic *structure* — common for federal agencies that fund research

I. Title

II. Abstract

III. Project description

A. Results from prior agency support

B. Problem statement and significance

C. Introduction and background

- Relevant literature review
- Preliminary data
- Conceptual, empirical, or theoretical model
- Justification of approach or novel methods

D. Research plan

- Overview of research design
- Objectives or specific aims, hypotheses, and methods
- Analysis and expected results
- Timetable

E. Broader impacts

IV. References cited

V. Budget and budget justification

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Title | accurately represents the *content* and *scope* of the proposal.

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Abstract | frames the goals and scope of the study, briefly describes the methods, and presents the hypotheses and expected results or outputs.

Sets up proper expectations, so be careful to avoid misleading readers into thinking that the proposal addresses anything other than the actual research topic.

Try for no more than two short paragraphs.

research proposals, example generic *structure* — common for federal agencies that fund research

- I. Title
- II. Abstract
- III. Project description
 - A. Results from prior agency support
 - B. Problem statement and **significance**
 - C. Introduction and background
 - Relevant literature review
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Significance | begins with the big picture and then funnels the reader through the hypotheses to the goals or specific aims of the research.

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 - B. Problem statement and significance
 - C. Introduction and background
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 - Preliminary data
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[Literature review](#) | sets the stage for the proposal by discussing the most widely accepted or influential papers on the research.

The key here is to provide context and be able to show where the work would extend what has been done or how it fills a gap or resolves uncertainty, etc.

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I. Title

II. Abstract

III. Project description

A. Results from prior agency support

B. Problem statement and significance

C. Introduction and background

- Relevant literature review
- **Preliminary data**
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- Justification of approach or novel methods

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Preliminary data | can help establish credibility, likely success, or novelty of the proposal.

But avoid overstating the implications of the data or suggesting you've already solved the problem.

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III. Project description

A. Results from prior agency support

B. Problem statement and significance

C. Introduction and background

- Relevant literature review
- Preliminary data
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Research plan | The goal is to keep the reader focused on the overall significance, objectives, specific aims, and hypotheses while providing important methodological, technological, and analytical details.

Contains the details of the implementation, analysis, and inferences of the study.

Convince the reader that the project can be accomplished.

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Objectives, hypotheses, aims, methods |
Objectives refer to broad, scientifically far-reaching aspects of a study, while *hypotheses* refer to a more specific set of testable conjectures. Specific *aims* focus on a particular question or hypothesis and the *methods* needed and outputs expected to fulfill the aims.

Of note, these points will typically have already been briefly introduced earlier, *e.g.*, in the abstract. Bring in more detail here.

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Analysis and expected results | If early data are available, show how you will analyze them to reach your objectives or test your hypotheses.

If such data are unavailable, consider culling data from the literature to show how you expect the results to turn out and to show how you will analyze your data when they are available.

Complete a table or diagram, or run statistical tests using the preliminary or "synthesized" data. This can be a good way to show how you would interpret the results of such data.

review

group projects

References

Friedland, Andrew J., Carol L. Folt, and Jennifer L. Mercer. *Writing Successful Science Proposals*. Third edition. New Haven: Yale University Press, 2018.

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Oster, Sandra, and Paul Cordo. *Successful Grant Proposals in Science, Technology and Medicine: A Guide to Writing the Narrative*. Cambridge ; New York: Cambridge University Press, 2015.

Schimel, Joshua. *Writing Science: How to Write Papers That Get Cited and Proposals That Get Funded*. Oxford ; New York: Oxford University Press, 2012.