**Designing Your Research Project:**

**Part II. Writing the Research Proposal**

**Proposal Overview**

Research proposals are usually written to obtain funding or approval for an investigation you hope to carry out. As such, they must be clear and concise, as well as *convincing*. Your proposal will be judged by the clarity of your logical arguments – *does what you plan to do make sense given what we already know about the subject?* It is your job not only to introduce the reader to what is already known (in the Introduction), but to convince them that the question you are asking is a logical extension of prior research on the topic and will fill some important knowledge gap. Collaborative research proposals are extremely common, as most research is carried out in a team. It is up to your group to decide how to divide up the work, but everyone is expected to put in equal work, and take part in editing and revising all sections of the proposal.

**Proposal Format**

**All proposals must be on 8.5 x 11” paper, in 10 point Arial font, double-spaced, with 1” margins on all sides.** Write in *active voice* and make sure verb tenses are consistent within sections (*present, past, future*). Your proposal should include the following sections, in this order:

* Title (max. 10 words)
* Authors (alphabetical by last name)
* Introduction (max. 500 words)
* Methods (max. 300 words)
* Expected Results (max. 250 words)
* Discussion (max. 500 words)
* References
* Materials Needed – this may be submitted as a separate file or as an appendix the end of your proposal

Use the worksheet in the Appendix to help you come up with the content for each section. Include section headings for all sections except title and authors. The intro, methods, results and discussion must be in complete sentences. Use citations for statements made within the text, with correct formatting.

**Proposal Submission**

The proposal draft must be submitted as a **.docx, .doc, or .rtf** file via email to your instructor and Writing Fellow. **No PDFs accepted!** In addition every person in the group is to bring an anonymous printed hard copy to class for peer review (remove all names from the paper). The final research proposal must be submitted via email to your instructor only.

**Appendix II: Research Proposal Worksheet**

**Use this worksheet to help you outline the content of your paper. Note that the order of the content within each section can be modified as you see fit. The most important thing is that the information you present flows logically.**

**TITLE (max. 10 words)**

* **What is the title of your research project?** A good title should concisely state what the research is specifically about. Avoid colloquial language, humor, and word play.

**AUTHORS**

* List the full names of the authors alphabetically by last name

**INTRODUCTION (max. 500 words)**

The introduction *introduces* the reader to the topic, and should be structured from general to specific. Start with the overarching topic or theme and why it has captured your interest or is important. Give your research question. Then, as you introduce readers to what is already known about the topic, tell a story that logically progresses to how you arrived at your specific question. Almost every statement you make in an introduction will need to be supported by a citation. Near the end of the introduction, concisely state your hypothesis. A clear hypothesis should make it clear what the independent and dependent variables are. Here’s a checklist for your Introduction (please note, the examples given are fabricated!):

* States the overall subject area on which you’re proposing to do research.

Example: “*Lionfish are an aggressive invasive species in coral reef ecosystems”.*

* Describes the specific purpose of your proposed research project. (What question are you trying to answer?)

Example: *“We plan to investigate the impact of Lionfish on the abundance and diversity of herbivorous fish on a Belizean reef.”*

* Presents several previous findings that describe the current state of knowledge about the topic are described and properly cited.

Example: *“On Jamaican reefs, lionfish were selective, preying primarily on other predatory fish (Dickerson, Smith, and Heeley 2014)”.*

* Uses prior findings to provide a rationale for the research proposed.

Example: *“The preferential consumption of predatory fish by Lionfish could reduce predation pressure on herbivores, leading to an increase in their abundance relative to reefs without Lionfish”*

* Your hypotheses are clearly stated, and identify the specific independent and dependent variables.

Example: “*We hypothesize that the abundance of herbivorous fish will be positively correlated to the abundance of lionfish, however we expect the diversity of herbivores to be lower in sites with more lionfish”.*

* Identifies a knowledge gap that the proposed research will fill, or contribution it will make to science.

Example: “*Since many coral reefs are threatened by overgrowth of algae, lionfish could be providing an indirect benefit to coral reefs if in fact their presence leads to an increase in herbivores.”*

**METHODS**

The methods should describe the how, where, and when of your hypothesis test. The actual procedures you will use must be described in active voice and future tense. If you are testing more than one hypothesis, describe the methods in the same order as you presented your hypotheses. Here’s a checklist of what the Methods should include:

* Identifies the location, habitat types or study sites, and dates where the project will be carried out the project.
* Describes the specific data that will be collected, with *units* *(what will you measure?)*
* Provides sufficient detail on *how* the measurements or data will be obtained. *(Including size and number of plots or transects, duration and frequency of data collection, procedures or special equipment to be used in the process, description of control treatment, and sample size/# of replicates.)*
* Explains how the data will be analyzed *(what calculations will you make, and how will you determine if the results confirm or reject your hypothesis)*?

**EXPECTED RESULTS – INCLUDE A GRAPH of how you expect your data to look.**

In a proposal, you do not yet have the results since you haven’t done the project yet. In this section you will describe what you *expect* to find by carrying out this project. Proposal requests also are unlikely to ask you to make up hypothetical data either. You will do it in this class to help you learn to think about the data you will collect and how you will analyze and present it.

* Describes the results that will be reported. (*Include appropriate summary statistics, like means, variance, etc)*
* Explains how you will know with confidence that your hypothesis is supported by the data *(Think about how much of a difference you need to see in your dependent variable between groups?)*
* Gives hypothetical results that would support your hypothesis.
* Includes a graph that displays hypothetical results in an appropriate way.
* Describes what data may look like if hypothesis is not supported.

**DISCUSSION**

After the results, the discussion may be the most important part of a scientific paper.  **It is NOT a place to simply repeat the results!** Again, until you have results it is hard to write a complete discussion since you aren’t yet sure what you will find. In the proposal, the discussion should indicate that you’ve thought about alternative outcomes of your research and what they might mean. You’ll want to bring in additional references that show findings consistent with or contradictory to what you expect your results to be. The discussion is also the place to talk about how your research might be used, what benefits it brings to the field or to society as a whole, and what new questions or future research directions it points to. Wrap up the story of your work – what is the take home message and where do we go from here?

* Explains what it means if the data supports the hypothesis. (*Hint: Go back to your justification here)*
* Gives possible explanations for alternative outcomes *(What might it mean if your results don’t turn out the way you expected them to. Do NOT focus on human error here; think about alternative hypotheses)*
* Discusses the broader importance or significance of doing this study. *(Relate back to the knowledge gap or importance you identified in the Intro).*
* Includes several citations, including at least one that wasn’t in the Intro!
* Results are not repeated. Rather they are woven into statements about what they mean or how they fill the knowledge gap.

**REFERENCES**

List here all the references you cited in the proposal, in alphabetical order by author. For two papers by the same author(s), put in chronological order. Use correct citation formatting!