

## **GUIDELINES FOR WRITING PROPOSALS**

*(This material borrows generously from “Guidelines for writing and publishing scientific papers” by Guy Baldassarre, SUNY-ESF)*

The watchwords of successful scientific writing are clarity, brevity, and organization. These concepts are essential because you must provide sufficient detail so that a reasonably knowledgeable reader can interpret the validity of your work (or proposal), and you must do so within strict page or word limits. These limits also play an important role. It is important for you to understand that professional scientists are faced with a staggering amount of papers and proposals to review so it is imperative that you write information-rich text without redundant or superfluous information. Grant reviewers faced with a stack of proposals will look for any reasonable way to efficiently identify the most meritorious work, and quality of writing may be the key to getting your work reviewed fairly. Even if you have the most brilliant idea, you still need to get the point across quickly, and give reviewers only what they need to evaluate that you have the means to conduct the work appropriately. One of the hardest tasks as a graduate student can be learning how to convey the right information in a succinct manner without loss of meaning.

This guide is intended to help you improve your writing, starting with your project proposals for this course. To follow are the required elements of a research proposal, the key information to include in each section, and suggestions for how to achieve parsimony in your writing. The key to parsimony is revise, revise, revise ... consider what each word contributes to a sentence and whether you might say the same thing in a sentence containing fewer words. In the immortal words of Strunk and White: “Make definite statements. Eliminate useless words.”

### **THE TITLE**

Always include a title. Generally speaking, a poor title is among the surest ways to insure that your paper will not be read, whereas a good, informative title will encourage readership. More critical to a proposal (or paper in review) is that an overly general title risks overstating the potential inferences drawn from the research, which could be interpreted as the author(s) intentionally over-inflating the value of their work or, worse, that the authors do not understand that the work conducted (or proposed) doesn't actually relate to the title.

Consider the following when developing the title:

- (1) be brief (usually <10 words), but be specific and informative.
- (2) where appropriate, include the nature of the study, principal species involved, and geographic location.
- (3) do not use "cute," poetic, or idiomatic titles.

For example, consider a study of bird species diversity in Meadow Brook Marsh, a forested wetland located in the Adirondack Region of New York. A title like “Bird Species Diversity” excludes too much information, and readers might not be inclined to look further into the paper. A better title would be “Bird Species Diversity in a Forested Wetland in the Adirondacks, New York.” This title provides a better stage for the paper or proposal to come.

## THE INTRODUCTION

The introduction is the most critical part of a manuscript or proposal because it *sets the stage* for your paper by stating the reason for the paper's existence, summarizing the body of literature laying the foundation for the work, and explicitly lays out your research objectives. If the problem (i.e., scope) of the paper is not stated clearly and understandably, the reader will have little interest in your solution and often reads no further. The suggested "rules" of a good introduction are as follows:

- (1) Work from general to specific from the start of this section to the end, as well as within each paragraph. Each paragraph starts with a topic sentence that conveys what the paragraph is about and is followed by supporting sentences that provide greater detail on that topic. Finish each paragraph with a transition statement that makes a connection (conceptually) to the topic sentence of the paragraph to follow.
- (2) Before writing, outline the major points or key bits of information you need to include. Organize those thoughts into paragraphs of like information, and then to organize the flow the paragraphs leading up to your specific objectives (which should be in your last paragraph). How many paragraphs do you need to convey the information?
- (3) Generally, your first paragraph focuses on the overarching theme into which your specific research fits (don't shoot too general on this), clearly present the nature and scope of the problem to be investigated. It is in this paragraph that you convince the reviewer that your work is worthwhile.
- (4) In the first and subsequent paragraphs, review the pertinent literature so as to orient the reader. Recognize that simply because a paper is written on your study species or area of interest does not make that work pertinent to your own. Keep your research question in focus. Highlight research that provided key insights into your question, identified key knowledge gaps, or perhaps tried to answer your question but did so in an unsatisfactory way. By the time you get to your last paragraph (where you state exactly what your research entails), you should have made a compelling case for why your research is needed and why your approach is the right way to go about it. Your objectives should emerge as the obvious next step from these introductory paragraphs.
- (5) Finally, in the last paragraph state explicitly what you will do (but do not delve into the specific methods). Clearly identify your objective(s), using words like ... "The objective of this research is ..." or "I will test/determine/model ...". Watch for 'weasely' phrases like "... establish the relationship between x and y ..." and replace such sentences with specific hypotheses like "I expect (or hypothesize) y to increase with increasing x ..." or "I expect x1 will have a greater effect on y than x2 ...".

Introductions often are not long and indeed may be the shortest part of a scientific paper (although they generally take up more space in a research proposal). The important point is to develop a quality introduction as a means of orienting the reader to proceed further into the paper and giving them a clear picture of what your research entails.

## **METHODS**

The main purpose of this section in a scientific proposal is to provide enough detail that another competent professional can evaluate the validity of your intended work. Part of the struggle is identifying what is the most salient information to present. The questions a reviewer asks include: are your methods appropriate to the question, and given the kind of data you have? Will you be able to detect the differences you seek? What is your sampling design, and what specific variables will you measure? For this course you may be relying on data collected by someone else rather than from a study you design. Even so, you must describe those data sufficiently. In fact it is even more important to help me understand the limitations of the data you have and what analysis they might be suitable for. What kind of data are they (counts of animals from aerial surveys, telemetry locations from collared individuals, counts from hauls of netted individuals, density or percent cover data from point/transect/quadrat sampling)? In what units are your dependent and independent variables measured? What is the resolution and extent of the sampling? What is your unit of replicate? What is your sample size? These are all crucial to helping me guide you to the most appropriate methods for analyzing your data.

Some considerations for this section are:

- (1) Although in a scientific paper you generally would refer the reader to a reference of a particular technique rather than provide a step-by-step description of the whole process, for this class I need to see that you understand the approach. So for the proposal it is wise to err on the side of too much explanation when it comes to a statistical test or data manipulation (like a GIS analysis).
- (2) Always include the dates of each sampling period. For example, do not just write "water chemistry was sampled with a portable water analysis kit." Rather, "We sampled water chemistry each day at 1000 from 1-30 June 1997 at 3 randomly located stations in the wetland."
- (3) If your methods are lengthy, use subheadings to organize. For example, if you conducted a study involving a variety of components, subheadings might be Soil and Water Analysis, Vegetation Analysis, Bird Census, etc.
- (4) How will you test your hypotheses? What statistical test will you use. Note that *regression* is a general category of methods that include linear regression (for continuous data), poisson regression (for count data), and logistic regression (for response variables having only 2 possible values) to name but a few. Be explicit about your data and what methods you will employ. Strive for specificity rather than generalities as much as possible.

## **ANNOTATED BIBLIOGRAPHY**

*(adapted from Cornell University Library web information)*

An annotated bibliography is a list of citations to books, articles, and documents. Each citation is followed by a brief (usually about 150 words) descriptive and evaluative paragraph, the annotation. The purpose of the annotation is to inform the reader of the relevance, accuracy, and quality of the sources cited. In contrast to the paper abstract (the purely descriptive summaries

often found at the beginning of scholarly journal articles or in periodical indexes), annotations are descriptive and critical; they expose the author's point of view, clarity and appropriateness of expression, and authority.

*Example:*

**Waite, L. J., Goldschneider, F. K., & Witsberger, C. (1986). Nonfamily living and the erosion of traditional family orientations among young adults. *American Sociological Review*, 51, 541-554.**

The authors, researchers at the Rand Corporation and Brown University, use data from the National Longitudinal Surveys of Young Women and Young Men to test their hypothesis that nonfamily living by young adults alters their attitudes, values, plans, and expectations, moving them away from their belief in traditional sex roles. They find their hypothesis strongly supported in young females, while the effects were fewer in studies of young males. Increasing the time away from parents before marrying increased individualism, self-sufficiency, and changes in attitudes about families. In contrast, an earlier study by Williams cited below shows no significant gender differences in sex role attitudes as a result of nonfamily living.

## **GENERAL WRITING STYLE FOR SCIENTIFIC PAPERS**

To follow are general guidelines for concise exposition. This should serve as a useful reference for your graduate writing exercises and should be referred to often.

### **VOICE**

There are two “voices” in English: passive and active. Basically, if the subject of a sentence performs the action, the sentence is in active voice. The sentence is in passive voice if the subject of the sentence receives the action. The active voice is usually preferred because it is both more direct and less wordy. Consider the examples below:

- (a) The dog was called by Mary. (Passive)
- (b) Mary called the dog. (Active) ... *Note reduction in words by 33%.*

Hence, rather than write "The activity patterns of Robins were examined at Cranberry Lake", write "I determined the activity patterns of Robins at Cranberry Lake."

### **PERSON**

Use first-person pronouns (I, we) to denote agents of action, which avoids wordiness and confusion. Write “I found A was greater than B” versus “It was found that A was greater than B.”

## **TENSE**

Scientific writing uses two major tenses: present and past.

Here are general rules:

- (1) Established information: present tense.
- (2) Methods and Results sections: past tense.
- (3) Presentation of data: present tense.
- (4) Attribution of information (e.g., someone else's work): past tense.

## **OTHER GENERAL POINTS**

- (1) Avoid short, choppy word sequences because they are nearly always a sign of wordiness, e.g., "The ducks used to be," "The data are significant because," "There may have been," etc. These phrases can almost always be removed entirely without loss of clarity. Learn to spot wordiness by homing in on these short, choppy sequences (often around the verb "to be"). The "cure" is usually simple and obvious, once the problem is diagnosed. Here are a few examples:

Replace "a number of" with "many."

Replace "based on the fact that" with "because."

Replace "first of all" with "first."

Replace "for the purpose of" with "for."

Replace "in order to" with "to." In general, omit the phrase "in order to."

Replace "due to the fact that" with "due to" or "because."

Replace "during the time that" with "while."

Replace "in the month of May" with "in May."

Replace "it is interesting to note that" with the first word after "that."

- (2) Avoid using nouns as adjectives. For example, rather than "Summer Mallard activity budgets," use "Mallard activity budgets in summer."
- (3) Rework your paper several times. Eliminate unnecessary words and repetition, look for good organization and flow. Check paragraph structure remembering there are 4 main points to a well-constructed paragraph: (1) each paragraph begins with a solid topic sentence that quickly and clearly introduces the reader to the topic of that paragraph, (2) each sentence in the paragraph relates to that topic, (3) there is good transition between sentences, and (4) there is good transition between paragraphs. Proof read the final copy for typographical errors and misspellings. Also, have a colleague read and critique your paper before submission. Spell check and proof read your final version, even if you have only made a few corrections. The goal of reworking your paper: be a superb *rewriter*!

## **OTHER WRITING RULES-OF-THUMB**

- (1) In a series, always use A, B, and C; not A, B and C (note difference in comma placement).
- (2) Generally, avoid using a comma to join a compound predicate.  
Wrong: The birds were captured, and then banded.  
Correct: The birds were captured and then banded.
- (3) Do use a comma to join two independent clauses.  
Wrong: We collected birds but we released mammals.  
Correct: We collected birds, but we released mammals.
- (4) Use a comma to set off introductory phrases. Consider the following sentences with and without this introductory comma:  
At night birds roosted in cavities  
At night, birds roosted in cavities.
- (5) Avoid constructing sentences with “respectively,” which forces the reader to match items with those that appear earlier in the sentence. Example: The mass of males and females was 45 and 30 kg, respectively. Better: Mass was 45 kg for males and 300 kg for females.
- (6) Do not use the construction “and/or.” The slash is used to denote the mathematical operation of division or to represent concentration (as in per). Example: The birds we captured were migrating and/or molting. Better: The birds we captured were migrating, molting, or both.
- (7) Do not use a colon to separate a verb or preposition from the associated object.  
Wrong: Our objectives were: (1) to measure the variable A, and (2) to test response B.  
Correct: Our objectives were to measure variable A, and test response B.
- (8) Proper use of “that” and “which.” Use that to introduce restrictive clauses (i.e., clauses that are essential to the meaning of the sentence), and use which to introduce nonrestrictive clauses, which are clauses not essential to the sentence.
- (9) Put modifiers in their place! Adjectives modify nouns and adverbs modify verbs, predicates go with subjects, etc. Put such pairs near each other. Example: The ducks at the far end of the lake were captured. Better: We captured the ducks at the far end of the lake. Note how the subject and predicate are now joined, in this case by switching to first person.
- (10) Do not misuse the demonstrative pronouns “this” and “these.” Writers often begin sentences with either word used as a noun, which is confusing because all pronouns need antecedents (the noun they replace), and it is difficult to have a clear antecedent at the beginning of a sentence! Example: This means the data are inconclusive. Better: This analysis means the data are inconclusive. In general, whenever you use a pronoun, be sure the antecedent is crystal clear. Consider the following: We suggest cessation of feeding in January initiates an increase in digestive efficiency of pheasants, but this is not

sufficient to maintain fat reserves. (“This” can refer to either supplemental feeding or digestive efficiency).

- (11) Recognize and eliminate dangling participles. First, recognize that a dangling participles occurs when the participle form of a verb (the -ing or -ed form) has no agent (subject) to perform the action attributed to the verb. Consider the following example: Ferrets were located at night using spotlights operated from trucks. Another one of my favorites: Rabbits were spotted using a 100-W spotlight from the top of a 4WD vehicle.
- (12) When rewriting, you often can eliminate the preposition “the” from a sentence, and there are LOTS of them in a paper.
- (13) Similarly, you can often eliminate the word “that.”  
Example: The data suggest that the lake was polluted.  
Better: The data suggest the lake was polluted.
- (14) Always check subject–verb agreement. Plural or compound subjects take plural verbs, and singular subjects take singular verbs. Further, always remember that data *are* plural.
- (15) Common prefixes like post, non, pre, multi, inter, intra, mid, anti, bi, etc., are almost never hyphenated.
- (16) An adverb ending in “ly” plus a participle or adjective is always open, never hyphenated.  
Wrong: poorly-attired man.  
Correct: Poorly attired man.
- (17) Hyphenate a verb–adverb before a noun but not after.  
Example: The well-attended function was enjoyed by all.  
Alternative: The function was well attended.
- (18) Hyphenate confusing compound adjectives. For example, consider the phrases “new car owner,” new-car owner,” and “new car-owner.”
- (19) Do not worry much about split infinitives, which are verbs divided by adverbs, unless the modifier is far away from the verb. For example, The dogs were running wildly versus The dogs were wildly running. Even in the case of infinitives like “to sample” or “to decide,” split infinitives are sometimes acceptable. Consider: To sample randomly versus to randomly sample. Generally, the “to” form of an infinitive is more likely to remain unsplit, but where would the Enterprise be without “to boldly go.”

## **WORD CHOICE**

**Affect–Effect:** Affect is a verb that means to influence, whereas effect is usually a noun meaning result.

**Among–Between:** Use among when a relation is between more than two items, and use between when the comparison is between only two items.

Circadian: About 24 hours.

Compare–Contrast: Compare points out likenesses, whereas contrast points out differences.

Compose–comprise: Compose means to make up, whereas comprise means to include.

e.g.–i.e.: the former means for example, whereas the latter means that is.

Ensure–insure: Ensure means to make certain, whereas insure means to assure against loss.

Farther–Further: Further indicates “greater in degree,” whereas farther indicates more distance.

Example: We walked two miles farther to discuss things further.

If–Whether: If is used to express conditions, whereas whether is used to express doubt. If it rains,  
the game is postponed. I wonder whether it will rain.

Impact: Impact primarily means the striking of things against each other and secondarily means effect. Hence, use effect as in “The effect of the experiment was . . .” not “The impact of the experiment was . . .”

In–Into: In means motion within a narrowly defined space, whereas into usually comes after a verb and means motion into space. Example: We walked into the room.

Irregardless: This word should never be used. Use regardless.

Live trap–Livetrap: The former is a noun and the latter is the verb.

Percent–Percentage: Percent is an adjective (usually) or a noun, whereas percentage is a noun meaning part of a whole expressed in hundredths. Hence, percent error, not percentage error.

Precision–Accuracy: Precision denotes refinement (e.g., 3.45 is more precise than 3.4), whereas accuracy denotes correctness.

Principle–Principal: Principal means a sum of money or a chief person, and as an adjective denotes main or chief. Principle is always a noun and means a truth, a rule.

Since–Because: Since means from some time in the past, whereas because means “the reason that.” Since 1980, the goose population has increased because of abundant food.

Then–Than: Than is a conjunction used for comparison, whereas then is an adverb denoting time.

To–too: To is a preposition (to the lake), whereas too is an adverb meaning also.

Utilization: Substitute the word use.

Very: Very, surely, extremely, and similar words have been overused as modifiers to the point of losing some of their value. Use these words carefully.

While: Means “during the time that.” Use for time relations but not as a synonym for whereas, although, and similarly, all of which do not imply time.