

Research Paper Instructions

Ethology and Behavioral Ecology Spring 2010

Purpose of Paper: I want to encourage you to read the recent primary literature and synthesize what you learn there with what you have learned in this and other courses. I also want to give you the chance to take "ownership" of part of the course instead of simply studying the topics I have deemed important. This is to be a very tightly focused and written paper¹. This is increasingly the style of all scientific writing. To get a sense of what I mean, I there will be a link with this assignment to an example paper from the scientific literature that is relevant to this course. The difference between it and your paper is that you will not need a methods section since you are not reporting original research of your own (except in a library sense).

Assignment: You will write an original 6-8 (aim for 7) page paper (see technical specifications at the end of this document). The paper will be on a **topic of your choosing**² with three restrictions –

- It must be on animal behavior with an emphasis on the approaches commonly used in ethology, behavioral ecology or neuroethology. I do not want a psychology or, for example, molecular biology paper unless it can be justified within the topics above. Nor do I want any "Our Friend the Beaver" type papers.
- I would like you to avoid papers that are centered primarily on humans. Certainly there are topics that might involve human behavior or relationships between animal and human behavior but the experiments and treatments must center on animals. Moreover, I would strongly prefer you avoid species with long domestication histories such as farm animals and the most common types of pets. Animals with some domestication history that are commonly used as study animals in behavior (example: birds such as zebra finches or parrots) are fine, however.
- I must approve the topic, general outline, and main sources (see below).

The approaches used may be either empirical and/or theoretical – i.e., you can write a paper based, for instance, on field studies of some type of animal or you could deal with some theoretical aspect of animal behavior (most likely behavioral ecology) such as modeling processes that we did not discuss in class or some mix of the two.

Your paper must rely almost entirely on the primary literature and not review articles, and/or popular accounts. Specialized books (not texts – but edited volumes or scholarly treatises) are also appropriate. Internet sources may be used if they are appropriate, rigorous, and if used sparingly. You should expect to use a minimum of 6 sources. **DO NOT WRITE YOUR ARTICLE PRIMARILY BASED ON ONE SOURCE ARTICLE WITH MINOR REFERENCES TO OTHERS – THIS WILL SIGNIFICANTLY LOWER YOUR GRADE.** Likewise, do not use a review article as your primary source. These articles are useful starting points but should largely be considered to be secondary sources unless they present significant new syntheses or models. Finally, do not write papers that are essentially summaries of 2-3 articles.

¹ By tightly focused, I mean a specific problem – not something like "sexual selection" or "social behavior in ants." By tightly written, I mean well organized and not wordy.

² Please do not ask me to suggest topics. Look over your text, the syllabus, and the literature in deciding your topic. I will make concrete suggestions only when I see a well-formed idea.

You should start looking through the reserve readings for the course and the journals as soon as you return from break to start getting ideas as to what you would like to write about. One other thing that might be helpful would be to look through the parts of the text that we have not yet covered.

The paper must contain synthetic discussion (see below). Papers that are nothing more than literature reviews or whose synthesis relies entirely of what is presented in articles with no thought on your part will not earn the highest grades.

I don't think I need to tell you this, but, just to be sure, you may **not** turn in a paper that is from another class.

Deadlines:

Topic submission: You must **submit a title and brief outline with at least 5 sources by Wed. March 24 – DO THIS ELECTRONICALLY** Failure to do so will result in a 3 pt. (per day the title is late) penalty on the final project. I will let you know if the project is suitable by the start of the next week at the latest. **NOTE: YOU ARE STRONGLY ENCOURAGED TO SUBMIT EARLIER, IF POSSIBLE.**

FIRST DRAFT: You will turn in your first draft no later than the start of class on MONDAY APRIL 12. Note that first drafts are graded and are worth 50% of your final grade. My comments will be general about organization, content, and style. I may give you some examples of how to re-write your paper but I will not do it for you. I will not make extensive corrections of grammar -- my purpose is not to be your copy editor (and I am a pretty poor one anyway). Nevertheless, the suggestions should help you substantially improve your paper, if it needs to be. Clearly, it is in your interest to turn in the best possible paper you can – there is nothing better than "fine as is" or only minor suggestions. My comments will be on the paper copy you give me, not on the electronic (but you must submit both. I will return papers in the order I received them electronically; the last will be returned no later than the end of the day Monday April 19. **Late first drafts are penalized by 1/3 rd of a grade step (treating the half of the points as a total) per day including weekend days.**

FINAL DRAFT: Submission has two parts. The entire paper must be **submitted electronically and in paper** no later than **the start of class MONDAY April 26 (unless changed on the class website)**. In class you must also turn in a paper copy along with all note cards and copies of sources you used for the paper. Please put them in a sturdy, closable envelope with your name on it. This is to give me an idea of the process of your work. **Papers will be marked down 1/3 rd of a grade step each day they are late (where late means that I get it after the deadline).**

Technical Instructions:

The entire paper should be **1.5 spaced with 1" margins top and bottom, 1.25" right and left. Use 12-point "Times" face font throughout except where symbols are needed, if at all.**

Length of paper: The text must be 6 to 8 pages in length. Please note that this is a change from the course information sheet (brought on by a large class size). Papers that are shorter or significantly longer will be penalized. **PLEASE GIVE THE TOTAL WORD COUNT ON THE TITLE PAGE.** Getting the length correct, including and appropriate amount of information (for instance, not stretching out a small amount) and writing clearly, succinctly and in an organized manner are important parts of the assignment. Sometimes this will involve altering the scope and/or refocusing the paper. Please note that the **length of the paper DOES NOT INCLUDE the title page nor does it include any figures or the literature cited.**

Sources: Do not rely primarily on journal articles from journals that are available on line when there are other good sources. For example, PNAS articles are freely available and are generally excellent – but they should not be your only sources just because they are easy to get. Good scholarship demands you look for relevant articles, even when they are relatively hard to find. Hint – start early so you can get relevant articles. Use Google Scholar to look for old articles in various archives or on investigators personal websites. On the other hand, avoid using websites as information sources as they are not peer-reviewed. This is not to say that you cannot use such sources – just that such use should be extremely restricted. Also take a look at supplementary data when it is available. Good sources for behavior articles include the following journals:

Animal Behaviour

Behavioral Ecology and Sociobiology

Ethology

Behavioral Ecology

PNAS

Nature

Science

Ecology

Taxon-based specialty journals (e.g., *The Journal of Arachnology*, *Journal of Mammalogy*, *Copeia*, *The Auk*, *Condor*, etc.)

Organization: The paper must have the following sections:

- **Title page** with title and your name and the course name and year and total word count.
- **Abstract** – a concise summary of the paper without references included. No more than 200 words. No citations.
- **Introduction** – a short section that outlines your project – the question you are addressing and how you intend to answer it. You should use citations. This should be a couple of paragraphs at most.
- **Literature review** –an organized presentation of the literature that you have reviewed, all aimed carefully at your main question. No quotes may be used; everything should be paraphrased into your own words. All material summarized from articles must be footnoted (see format below). Good scientific writing is not typically a paragraph with a citation at the end. Nor is it useful neither to rely primarily on one article nor to use that article to find earlier ones and then cite what you have just read in the first one. You will see plenty of examples of how to write in the articles you read. Pay particularly close attention to the writing in the introduction and discussions of those articles. This should be the longest section of the paper.
- **Discussion** – Please try to confine your synthesis and ideas to this section. It typically will be 1-2 pages at the most. It is OK to put forth some of your ideas in earlier in the literature review as long as it is clear that is what you are doing and it makes the most sense to do so. Try to minimize restating material from earlier except with very brief summaries or references to earlier material. Making judgments about the weakness of strengths of studies you have previously discussed is a valid thing to do in the Discussion.
- **Please number pages.**
- **Citations:**
 - In text, use numbers in parentheses (e.g., blah blah (2).) The citations should come immediately after the idea being cited. There may be

several citations to one sentence. Try to avoid a common student pattern – one citation to a paragraph. **The numbering of the citations should be according to the first time you use them. The citations will be listed in your "Literature Cited" section by number – not alphabetically.** A citation can be used multiple times but it will always have the same number.

- **In the "Literature Cited"** number each article according to its first use in the text. Each individual citation should follow the following general formats:
 - Journal articles should be cited as:
 1. (or whatever) Bailey, W. J., P. C. Withers, M. Endersby & K. Gaull. 1993. The energetic cost of calling in the bushcricket *Requena verticalis* (Orthoptera: Tettigoniidae: Listroselidinae). *Journal of Experimental Biology* 178, 21-37.
 - Books should be cited as:
 2. (or whatever) Fletcher, N. H. 1992. *Acoustic Systems in Biology*. Oxford: Oxford University Press. 333pp.
 - Articles or chapters in edited books should be cited as:
 3. (or whatever) Bennet-Clark, H. C. 1995. Insect sound production: transduction mechanisms and impedance matching. In *Biological Fluid Dynamics* (ed. C. P. Ellington and T. J. Pedley), pp. 199-218. Cambridge: The Company of Biologists Ltd.
 - Webpages should be cited as:
 4. (or whatever) Walker, T. J. & T. E. Moore. 2004. Singing Insects of North America.
[http:// buzz.ifas.ufl.edu/](http://buzz.ifas.ufl.edu/)
 (Active links need not be added – the publication year usually can be found on academic web pages).

Figures and Tables: Each figure must have its own legend. If you choose to put figures in text (I recommend this) just be certain that your text is long enough (see "length of paper", above). **Figure legends do not count in the paper length** so add them after you are sure the paper is long enough (if any are long). In the same regard, do not include descriptions of figures in both the text and legends and in any case, keep the descriptions as succinct as possible. Use only text and tables that are truly needed. This is not an art project.

Examples of titles from previous classes:

- Behavior mechanisms of Atlantic Salmon and Eel migrations
- Why being close works in mimicry – a theoretical investigation
- Brood parasitism in birds as an arms race
- The ecology of bi-parental care in mammals
- Acoustic mimicry in burrowing owls
- The ecology of oviposition strategies in Lepidoptera
- Eusociality in Insects: Driven by Kin Selection?
- Courtship behavior and the costs of copulation in *Drosophila melanogaster*.
- Good genes, honest signaling and ornamentation in female mating selection.
- The Continuum of Batesian and Müllerian Mimicry.
- The Effects of Trichromatic Color Vision on Foraging Behavior in Primates.

- Conditions of Altruism.
- The evolution of combat in ant species and the application of Lanchester's laws of combat in hostile populations.
- The development of sexual dimorphism in accordance with the handicap principle, and the environmental influence associated with secondary sex characteristic development.
- Prenatal learning and its importance in early postnatal development.
- Eusociality in African Mole-Rats.
- A Comparison of the Evolution of Altruistic Behavior: Hymenoptera versus Termites.
- Siblicide: A mechanism for increased survival.
- An Examination of Play Behaviors and Their Adaptive Significance.
- Females come first... except when mating. A look into Protandry in Birds (clever titles are fine but stay within good taste).