

Written Critiques
Environmental Studies 390, Behavioral Ecology
Instructor: Sarah Brosnan

The purpose of a written critique of a journal article is for you to learn to read a scientific publication, then evaluate the paper and give your opinion about its merit and the potential ramifications of the research. Thus, this is a chance for you to express your opinion and produce your own interpretation of a manuscript.

A good critique

A good critique includes several different parts. Remember too, the amount of space you give any topic in the critique should be proportional to the importance of that topic. Don't spend too much time on one relatively unimportant thing and either miss the main point or fail to spend enough time on it.

Initial

Start every critique with a citation of the paper used. This will let me know what you are reading. For proper citation style, see attached document on how to cite.

Summary

First, there should be a summary of the key points of the paper. This should include:

- 1) what the authors tested
- 2) why they were interested in this particular topic
- 3) a summary of the methodology used
- 4) a summary of their results
- 5) a summary of their interpretation of their results (e.g. from their discussion)

Other topics that may be relevant for inclusion in the summary are the statistical methods or model used, or previous work that has bearing on the topic (for instance if the paper refutes previously held beliefs or provides new information about an existing topic). This summary should be approximately 1 page long - or 1/4 to 1/3 the length of the paper itself. Remember not to fixate on the details, problems, or strong points of the paper here. This will be done in the critique section. A summary is just that - a brief discussion of the main points of the paper that allows the reader to know the basis for your later discussion.

Critique

Next should be a critique of the paper itself. This is where you apply the knowledge you have to judge the relative worth of their paper. I recognize that this is the first time many of you have encountered this sort of writing, but use the information you have at hand to make an informed assessment, and feel free to come ask me if you are not sure about something. Topics of interest here may include (but are not limited to):

- 1) Is the experiment successful at testing the question the authors propose?
- 2) Are the observational methods appropriate for the data being collected?
- 3) Do the authors include all of the appropriate controls (or at least state their awareness of the absence of some control) or are there possible explanations for their result that they

do not discuss or rule out? If so, can you think of a way they could have improved the experiment?

4) What methodological problems are there? Is there anything you think could have been done better? Is there a reason they may not have done this? Did they take this into account?

5) Do the authors use statistics that seem to be appropriate for the test? Are their data independent, are their variables not confounded, and do they use the appropriate sampling methods?

6) Do the authors draw appropriate conclusions from their data? Is there something you don't agree with?

7) Is there anything that the authors did that you think is particularly well done, for instance a creative design or a good interpretation that was not immediately obvious?

This section of the paper should be the longest, probably 2.5-3 pages. Not all of the above questions will be appropriate for every paper, and there may be some issues that strike you that are not mentioned above. The point of these questions is not to limit you to their answers but to give you a starting point from which to evaluate the paper's merits. Also, do not be afraid to judge a paper poorly or to judge a paper well. There are plenty of each out there, and the point of a critique is not necessarily to criticize, but can also be a chance to point out when authors do a particularly good job.

Overall evaluation

Finally, there should be a section where you express your opinions about the value of the topic, whether or not you feel that the authors overall were able to sufficiently and convincingly address the topic (remember the details will have been covered in the critique, so do not restate them - this is simply your assessment of whether the good outweighs the bad). This is also the area in which you could address other areas in which you think their results are applicable. This section is mostly opinion - there is no right or wrong answer - but remember that your statements must be supported with statements about the paper or other information that you have. This section should be approximately ½ of a page to 1 page in length.

Properly citing other people's work - e.g. plagiarism

Remember, if you cite another individual's ideas, thoughts, data, analyses, or words without giving them proper credit, you are guilty of plagiarism. Plagiarism is a serious issue in the real world, whether or not you remain in science, thus it will be treated as a serious issue here. Remember to ALWAYS cite everything that you use that was another person's work. This is not restricted to direct quotes. If you mention another individual's study at all, it must be properly documented, and if you mention another individual's ideas, even if they are not yet published, you must give them credit.

Please see the attached sheet on how to properly cite articles, books, and chapters to give you a guide to citations. Also, carefully read the attached paper introduction to give you an idea of how citations are used in the literature. If you would like more information, there are many excellent sources to review, one of the best being the *American*

Psychological Association Publication Manual. When in doubt about whether or not it is proper to cite, always err on the side of citing the reference!

Nuts and Bolts details

This is a critique, not a research paper, so you are not expected to do extensive research on a topic. However, if the authors seem to rely heavily on another paper, or specifically performed the experiment to refute or support another paper, you may want to look this up. Also, don't forget to use the information you gain in class and from your textbook to help form your opinions and support your arguments.

Typically, a critique should be approximately 3-4 pages long (12 pt font, double spaced, 1 inch margins). Be sure to PROOFREAD and SPELL CHECK your critique. Nothing says "I don't care" more than a written document with obvious grammatical and spelling errors. If you aren't sure about phrasing, try reading it out loud to yourself, have a friend proofread it, or ask me. I find that any written document is invariably better if you finish it, put it aside for a few hours to a few days, and then proofread and edit again. This time gives you a little more distance from the work and helps you to see areas of weakness.

Do not start your critique the night before and expect to finish it in an hour! Perhaps the most time consuming portion of a critique is digesting the content of the paper to be evaluated so that you identify problems and successes and get a clear idea of what you are planning to present. This usually requires several readings of the paper, and, especially with topics for which you are not familiar, spacing these readings out over a couple of days often helps comprehension.

Remember, I am here to help with your critique, and if you have any questions, please email me or drop by during office hours so that we can discuss it.

Grading and evaluation

First, do not forget that you **MUST get your paper approved by me prior to writing the critique**. This is done so that you will not end up trying to evaluate a paper that is not good for this style of critique. Papers should be sufficiently detailed to elicit some of these details (e.g. brief communications or short communications will not be long enough) and include a fair amount of background and discussion.

Second, you must **turn in a complete hard copy of the paper you are reviewing** to me with your final version. This is very important, as I cannot grade your critique unless I have a copy of the original article!

In grading your critiques, I am looking for four specific things, which will be weighted equally in my assigning of a grade:

1) Whether or not you accurately and efficiently summarized the paper. Obviously a good evaluation is impossible if you do not have a good understanding of the paper, thus I will be evaluating whether your summary shows a good understanding of what you did.

2) The level of critical evaluation in which you engage. Here, I am looking for you to carefully evaluate all aspects of the paper, to identify problem areas and strengths, and to clearly report these. Simply stating a problem with the paper without stating why it is an issue and how it might be resolved does not show an engaged thought process and will receive a low grade.

3) Your personal opinion of the paper. This is separate from the critique, and most closely resembles the third section of the paper. Here I am looking for your informed evaluation, based on the critique which you have presented, of whether the paper is a good one or not. Once again, this will require a fair amount of thought on your part as you weight the various aspects of the paper.

4) Writing style and clarity. This is extremely important in any written presentation. This includes proofreading for grammatical and spelling errors, making sure the paper flows smoothly and clearly, making sure all of your arguments make sense, and making sure your final evaluation of the paper is supported by the remarks made throughout the critique.

***I will take plagiarism very seriously. For each instance, you will loose a letter grade, so be sure that you have properly cited all of you work. Once again, if you are unsure about how to do so, please come see me.

Don't forget, the first critique will be evaluated and then returned for a re-write. This will help you to learn what it is I am looking for and will keep you from suffering a bad grade because you are unfamiliar with the process. When re-writing the critique, be sure to take into account all of my comments! They are worthless unless you use them. Also, when writing subsequent critiques (for which there will *not* be rewrites) go back and refer to my comments on your previous critiques. I will point out those areas at which you excel as well as suggesting ways to improve the quality, so referring to previous comments will help you to maintain your strengths while improving your weaknesses.

PROPER CITATION STYLE

In your paper, when you either directly quote something (data, interpretation, etc) from another source OR if you paraphrase an idea, method, etc from another source, you must give that source credit in your paper. There are multiple different ways to "correctly" cite papers, depending on which discipline you are in, however for this class you may use the style which I have provided below. In other disciplines, be sure to check and see what their style is. All include the information necessary to find the source, it is mainly formatting that varies.

For this paper, we will use internal citations. Internal citations are placed at the end of the sentence/paragraph with the pertinent information and consist of the author(s) last name(s) and the date of the publication separated by a comma, all inside parentheses. Multiple citations are separated by semi-colons and listed in date order (oldest first), but with all by the same author together. If it is a direct quote, list the page from which it came. If the source is a website that does not have a specific author, list it by its main page.

Examples:

Quote : "Transpiration provides moisture for clouds, eventually resulting in precipitation" (Raven & Berg, 2001 p. 404).

Paraphrasing an idea/ multiple citations: Transpiration is important for the hydrologic cycle, recycling a great portion of the precipitation to the atmosphere (Krebs, 1994; Raven & Berg, 2001).

Website: The USGS provides scientific information to describe and understand our earth (usgs.gov).

At the end of the paper, include a literature cited section which will list the bibliographic information for all of the sources you used, and ONLY the sources that are actually cited in the paper. Use the following format:

Books:

Raven, P. H., and Berg, L. R. 2001. Environment, Third edition. Harcourt College Publishers, Fort Worth.

Papers:

Otoni, E. B., and Mannu, M. 2001. Semifree-ranging tufted capuchins (*Cebus apella*) spontaneously use tools to crack open nuts. International Journal of Primatology **22(3)**: 347-358.

Chapters:

Krebs, J. R., and McCleery, R. H. 1984. Optimization in behavioral ecology. In Behavioural Ecology: An evolutionary approach, 2nd Edn. (Eds J. R. Krebs and N. B. Davies). Sunderland, MA: Sinauer Associates, pp 91-121.

Note that you do not capitalize anything but the first letter of the first word and proper names, excepting in the title of a book, in which you capitalize everything.

Websites:

List the authors of the website, followed by the year and the URL. If some of this information is not available, list what is.

Remember, the point of a literature cited section is that anyone reading your paper could go find the source (easily) and will know what is in it based on what you said about it.

Excerpt from

Brosnan, S. F., Earley, R. L., and Dugatkin, L. A. in press. Observational learning and predator inspection in guppies (*Poecilia reticulata*). *Ethology*.

This includes the Introduction section and complete literature cited section from a paper that I recently wrote. The literature cited section may be used as an example of correct citation style. Note that in this literature cited section, the names of all journals are abbreviated. This is common in journal publications in order to save space, but you are to use complete titles in your citations.

Read the Introduction to get an idea of how to summarize studies quickly and how to critique various aspects. This is very different than the writing that you will be doing, as it is a summary of a large number of different papers that all relate to a similar topic. You will be doing a more in depth summary of a single paper. However, you will get an idea of how the amount of space you dedicate to any one idea is dictated by its overall importance, and you will get a better understanding of how to use internal citations in your work.

Introduction

Predator inspection behavior entails the breaking away of a small group of individuals from a shoal to investigate potential predators at close range and, presumably to determine, among other things, if a predator is satiated or hunting (Pitcher et al. 1986; Magurran & Higham, 1988). In guppies (*Poecilia reticulata*), predator inspection is a social phenomenon insofar as two or more guppies often participate in the inspection bout. In addition, guppies that have participated in an inspection bout prefer to associate with more cooperative co-inspectors, that is, those that approach the predator more closely (Dugatkin & Alfieri 1991). However, inspection is a perilous behavior, as there is a 50% risk of predation associated with close-range predator inspection for the lead fish, and this risk increases as the distance separating them from fellow inspectors increases (Milinski et al., 1997). In fact, this asymmetry in predation risk combined with the cooperation necessary to successfully inspect and the costs inherent in inspection behavior means that predator inspection fits all of the inequalities required to be modeled as a prisoner's dilemma (Milinski et al., 1997). Thus, it might benefit an individual to assess the cooperative nature of other individuals in the group prior to accruing the potential costs of inspecting with these individuals.

Dugatkin & Alfieri (1991) demonstrated that guppies prefer co-inspectors that approached the predator more closely in an inspection bout in which they themselves participated. Three guppies were allowed to inspect a predator together, but each fish was separated from the other two by clear partitions that divided the tank into three lanes. Either immediately following the inspection trial or 4h later, the guppy from the middle lane was given a preference test between the other two inspectors. In both cases, the middle fish preferred to associate with the inspector that had approached the predator more closely.

These experiments indicate that guppies keep track of the behavior of their co-inspectors and that they subsequently draw on this information to discriminate between

cooperative and non-cooperative co-inspectors. Dugatkin & Alfieri (1991), however, did not examine whether individuals demonstrate a preference for one inspector over another after watching an interaction in which they did not actually participate. Observational learning has previously been demonstrated in guppies derived from natural populations in the context of female mate choice. In these cases, females preferred to mate with males who apparently had been more successful at attracting females, i.e. mate copying (Dugatkin, 1992b; 1996ab; 2000; but see Brooks, 1996; Lafleur et al., 1997 for experimental evidence that mate copying does not occur in pet-store and feral populations of guppies).

The notion that animals gather information about their social environs by watching interactions between others has most recently been cast in terms of communication networks and eavesdropping (McGregor and Peake, 2000). Eavesdropping can be considered a special case of observational learning that entails gathering information by watching *interactions* between conspecifics. Much of the recent empirical work in this area has focused on whether fishes eavesdrop on aggressive contests, a context in which the participants likely accrue more costs than the observer (e.g. Oliveira et al. 1998; Earley and Dugatkin, 2002).

Generally speaking, the more costly a particular behavior is to those performing it, the greater the benefits accrued via observation (as opposed to direct experience). Predator inspection, which can have direct negative effects on the inspectors' survival (Dugatkin, 1992a; 1997; Milinski et al., 1997; but see Godin and Davis, 1995ab; Milinski and Bolthausen, 1995), would seem to fit these criteria. Individuals who can assess which group mates are more likely to cooperate in the future without risking the costs associated with predator inspection should have an advantage over those who learn only through interaction. Hence, predator inspection behavior may be ideal for investigating whether individuals can learn about the behavior of conspecifics observationally.

We examined whether guppies prefer individuals that approached a predator more closely after observing, but not participating in, a predator inspection session. Our goal was to determine whether guppies learn about the cooperative tendencies of other inspectors through observation alone, rather than through personal experience. Our experimental design differed from Dugatkin & Alfieri (1991) by the inclusion of initial preference tests (see below) to control for any pre-existing preferences in the guppies, and by visually isolating inspectors via a one-way mirror to separate interaction and observation as the causes of preference formation. For our study, one observer guppy was allowed to watch two other individuals in three different conditions. In the first condition, one of the observed individuals inspected while the other did not, to control for the effect of inspection behavior on the observer's preference. In the second and third conditions, the observer guppy watched two conspecifics inspect either sequentially or simultaneously, respectively. We predicted that observer guppies would prefer inspectors over non-inspectors, and prefer inspectors that approached the predator more closely.

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