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## Research Reporting Critique

### Background

This exercise is designed so that each student can practice and improve his/her skills in the following areas:

- reading and understanding scientific literature,
- attention to methodological detail,
- appraisal of reporting, including quality, accuracy & completeness, as well as other nuances (as appropriate)
- structured critical appraisal of scientific content,
- basic study design & methodology,
- distinction between weak & strong scientific evidence,
- cogent argument supported by appropriate, scholarly references,
- organization and prioritization of information, and
- oral and/or written communication.

### Critique One Article

As we agreed, you may write your critique or present it in our second Journal Club.

The following instructions are divided into three parts:

- I. Instructions for all critiques
- II. Additional instructions for written critiques
- III. Additional instructions for Journal Club presentations

Please review the instructions carefully and see me with any questions as soon as possible.

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### **I. Instructions for all critiques**

1. Read your article(s)
  - Review your notes, course handouts, online materials, etc. Use these as background as you read and evaluate your article(s).
  - **Take Notes.** Use an approach discussed in class or one of your own, but **do not rely simply on highlighting** portions of the text. It will not be enough to guide you in this work.
  - Apply either the **Research Reporting Evaluation Criteria / New Treatment** (the

Please discuss any questions that come up as you prepare this assignment. If you aren't sure, chances are someone else is wondering the same thing.

Though our course focuses on *Medical Research Reporting*, our primary goal is the development of your **Scientific Inquiry** skills. I hope that each of you appreciates how important quality and accuracy is in medical reporting. **But** for our purposes, most important is your competence reviewing, evaluating and presenting research in the scholarly literature.

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one we used for Baker), or the criteria outline from ***Critical Reading of Scientific Medical Literature*** (from WHO standards), distributed in class\*.

- Remember these schemas will both get you to the same place in understanding the article. They are for **your review** purposes only. Once you understand the how the authors address each criteria, you have the basis for evaluating the work<sup>†</sup>.

2. Evaluate the article: both the research and how it is reported.

- Think of the steps in the scientific method as your review the work. (e.g., *Is the hypothesis supported by prior research? Or more broadly: Does the work build on what is already known?*)
- Reviewing your notes. Then read the article again. While some things will be obvious initially, will notice additional details each time you reread it.
- Take more notes.
- Where questions remain, use your own research skills to find clarity<sup>‡</sup>. Apply the approaches & resources we've discussed in class. For example:

If you are not comfortable with some of the researchers' assumptions, check their references.

Unsure how the findings fit what was found by other researchers? Search for current scientific sources reporting similar work.

3. Summarize what you know.

- Per above, you may have to explore other sources (e.g., supporting references from your article, conflicting findings from other researchers).
- Prepare an outline.
- Ensure that you give an overview of the article and that you carefully critique the most important aspects of the paper.

4. Review your outline.

- ***Focus on the content that is most important for understanding the value of the work.***
- Keep in mind that each article/study is a small part of the understanding built

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\* Both are linked on my auxiliary site: [http://campus.lakeforest.edu/frank/pages/bio141\\_resources.html](http://campus.lakeforest.edu/frank/pages/bio141_resources.html)

<sup>†</sup> As we discussed in class, sometimes a missing element is unnecessary (e.g., generally well understood). In other cases this reflects a deficiency in the article or research. For example, you may see a potential bias, poor support for important assumptions, variable measurement that doesn't reflect the concepts studied (operational definitions) or questionable generalization to broader populations.

<sup>‡</sup> When you get stuck, see me or a librarian – or, if you believe it will be helpful, each other or another faculty member – for assistance.

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through the work of the larger scientific community. Think about how this article fits into scientific knowledge.

- From your outline, prepare a written paper or presentation for our Journal Club.

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## II. Additional instructions for written critiques

If you elect to write up your critique, prepare a short paper that describes the article and your appraisal.

Papers are due anytime before Monday, **May 6 at 8:30am**.

1. As discussed in class, **scientific writing must be clear and precise**. In this exercise, you are making a kind of argument and your language is your means of communication. Edit, revise, proofread.

*Good ideas appear flawed when presented sloppily\*.*

Please review the grading rubric for the course prior to preparing your paper.

### 2. Formatting

- The paper should be approximately 5-10 pages, though your content will determine the precise length.
- Other formatting details:
  - ✧ single spaced, approximately one blank line between paragraphs (including bibliography entries)
  - ✧ margins  $\pm 1$  inch
  - ✧ on each page, your name and page number + total pages (e.g., page 1 of 5)
  - ✧ double-sided printing for the printed copy
  - ✧ APA-style in-text references

3. Content: Include each of the sections below.

#### a. Title Page

your name  
article title  
date  
course number and name  
abstract for your paper

Regarding the abstract, I highly recommend that you compose it after you finish writing the rest of the document. Obviously it will not follow the structured abstract format. Instead, it should be a paragraph (two at most) that describes the paper. Here is one of the opportunities you have to 'drive home' the most important parts of your work.

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\* See *Writing* in our syllabus, page 8-9.

- b. Description of the article: Briefly outline the paper so that your reader to understands it enough to appreciate your critique. Include the elements necessary to describe the research.

At the same time, remember that your critique is not merely an article summary. This section is only a small part of your paper.

- ✓ background of the work,
- ✓ research questions and/or hypotheses,
- ✓ methods, including sampling, variable definitions, measurement & analyses,
- ✓ potential biases and other flaws,
- ✓ results & conclusions,
- ✓ how the paper fits current scientific knowledge,
- ✓ generalizability and implications,
- ✓ limitations and suggestions for subsequent scientific exploration, and
- ✓ authors' conclusions

- c. Critique Elements: In separate sub-sections, present the elements of your critique. Identify the most important of your assessments – both positive and negative – and present them clearly, with appropriate supporting references. Expect to have a minimum of three areas of focus.

For example, if you fault sample selection methods explain why and how this limits the work. Does it suggest bias or just limits to generalizability? What do you conclude about the work given your observations.

In some cases, these sub-sections will be long and detailed. Others may be brief. Elucidate both your observations and their impact on findings and conclusions. Always explain the extent to which the item enhances or detracts from the quality and utility of the material.

Use references wherever they are needed\* (both to your original article and to outside sources, as appropriate).

For each of the articles, you should be able to identify plenty of items for discussion. Do not feel obligated to exhaustively find everything, but do put together a thoughtful list. As you read (and reread) your article, keep a running list of issues. This will be a very long list. From it, determine the most important items and follow up on them.

- d. Conclusion: Sum up your critique, and – here again – ‘drive home the take-away message’. This section need not be long, but it does require careful thought and precise writing. Here, you lead your reader to focus on the important issues, details & questions. Done well, the conclusion confirms the validity of your argument.
- e. Bibliography: APA style, as always.

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\* Remember to carefully evaluate each statement, checking to see if one might reasonably ask, “How do you know?” And, of course always indicate the page for specific items you discuss (paragraph number is helpful, too, but not

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**Grading:** Evaluation will be based on both the content of the critique and the quality of the paper with attention to all of the following items\*.

a. Accuracy

- ✓ understanding of the material
- ✓ appropriateness of critical elements
- ✓ focusing on the most important elements (i.e., central questions & issues)
- ✓ application of course concepts to evaluation
- ✓ sufficient content
- ✓ describe background necessary to understand the work
- ✓ employ thoughtful, logical arguments
- ✓ main points emphasized
- ✓ rational conclusions

b. Quality of written presentation

- ✓ writing style appropriate to academic setting & scientific content
- ✓ easy-to-follow
- ✓ clear, understandable, obviously well-researched and prepared
- ✓ appropriate in-text references
- ✓ complete and accurate bibliography
- ✓ adherence to assignment instructions

**Upload each of the following items to Moodle.** Put all digital materials into a single zip archive and upload the one file. Label the file with your name as follows:

<name>\_critique.zip

example: MargaretFrank\_critique.zip or Margaret\_critique.zip

If any articles are only available in hard copy, that's fine. Write on the top of each hard-copy article the following: your name & the article you critiqued (1<sup>st</sup> author's last name & date).

Submit the following items:

- a. your complete paper in a pdf file
- b. copies of all articles referenced<sup>†</sup> (though not the original one(s) which I already have

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### III. Additional instructions for Journal Club presentations

- You will present your article and critique during one of the last two sessions of the semester or on the day scheduled for the final exam.
- Plan to take 15-20 minutes, plus 5-10 minutes for questions and discussion.

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\* Again, I recommend reviewing the grading rubric for the course.

† If you only have hard copies, give them to me and label as specified above.

- While not necessary, visual tools can be helpful. If you plan to use PowerPoint or other presentation tools, please have no more than 10 to 15 slides in your presentation so that we can meet our time constraints.
- If you use visual aides, please **submit a copy of your files** to me via Moodle.
- Also submit a complete bibliography prior to your presentation (via Moodle) and copies of all articles you reference\*.
- If you need equipment of any kind **ask me to reserve it at least 24 hours in advance**. Also, I recommend arranging to test equipment before class†.
- Handouts, while also not necessary, can be useful for lengthier content.
- Be sure that you plan the actual presentation of your work and practice it.

**Grading:** Evaluation will be based on both understand of the work and its presentation with attention to all of the following items‡.

a. Presentation

- ✓ clear concise description of the paper
- ✓ focusing on the most important elements (i.e., central questions & issues)
- ✓ content that is sufficient & efficient
- ✓ providing background necessary to understand the work
- ✓ presentation style appropriate to academic setting & scientific content
- ✓ logical sequence
- ✓ easy-to-follow
- ✓ main points emphasized
- ✓ clear, understandable, obviously well-planned
- ✓ adherence to assignment instructions

b. Each presentation should, if only momentarily, touch on

- ✓ background of the work,
- ✓ research questions and/or hypotheses,
- ✓ methods, including sampling, variable definitions, measurement & analysis approach,
- ✓ potential biases and other flaws,
- ✓ results & conclusions,
- ✓ how the paper fits current scientific knowledge,
- ✓ generalizability and implications,
- ✓ limitations and suggestions for subsequent scientific exploration, and
- ✓ conclusions to be drawn from the work.

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\* No need to include a copy of the article you are critiquing, I have that already.

† This time, please make sure you both request and test equipment in advance. No more running around frantically hunting for cables, okay? (Actually, you can run around, but I prefer plan in advance.)

‡ I recommend reviewing the grading rubric for the course, as well.

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- c. It is the presenter's responsibility to 'bring home' the 'big picture' (i.e., essential information) drawing our focus to the important issues, details & questions.
  - d. Prepare to respond to questions or observations from the audience.
    - ✓ demonstrated understanding of the article and
    - ✓ when unable to answer a question, knowledge of how to approach the question to find an answer

**Before your presentation, upload each of the following items to Moodle.** Put all digital materials into a single zip archive and upload the one file. Label the file with your name as follows: <name>\_critique.zip  
example: MargaretFrank\_critique.zip or Margaret\_critique.zip

If any articles are only available in hard copy, that's fine. Write on the top of each hard-copy article the following: your name & the article you critiqued (1<sup>st</sup> author's last name & date).

Submit the following items:

- a. complete bibliography, including your article(s) and any others you reference in your presentation
- b. copies of all articles referenced\* (though not the original one(s) which I already have
- c. audiovisual materials used in your presentation, if any
- d. handouts, if any

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\* If you only have hard copies, give them to me and label as specified above.

## Articles for Journal Club/Critique

### A few things to keep in mind before you begin

- Some articles include color figures. I don't have a color printer, but you may. Alternately, look at them online.
- Shorter articles aren't necessarily easier to understand or critique.
- I have included some supplements and corrections, but it is always useful to check journals' websites for updates. Also, some attachments are very long, so I didn't want to use the paper (e.g., >100 page author disclosures for SPARTAC).
- It may be necessary to read and reference additional articles to support your critique.

### As you read your article and prepare your critique ...

- Identify & focus on the most important elements (i.e., central questions & issues).
- Your presentation (oral or written) should contain content that is sufficient & efficient so that the audience understands & your arguments are supported.
- Apply the skills & concepts we discussed & practiced during the semester. Refer to course materials (handouts, notes, etc.). See me if you have questions or need some guidance.

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## Neuroscience Topics

Appleby B, Nacopoulos D, Milano N, et al. (9Jan2013). A Review: Treatment of Alzheimer's Disease Discovered in Repurposed Agents. *Dementia and geriatric cognitive disorders*, 35(1-2),345791. Retrieved 10Apr2013 from <http://www.karger.com/Article/Fulltext/345791>

Dai M, Freeman B, Shikani HJ, et al. (17Oct2012). Altered Regulation of Akt Signaling with Murine Cerebral Malaria, Effects on Long-Term Neuro-Cognitive Function, Restoration with Lithium Treatment. *PloS one*, 7(10),e44117. Retrieved 10Apr2013 from <http://dx.doi.org/10.1371/journal.pone.0044117>

Ramos-Cabrer P & Campos F. (2013). Liposomes and nanotechnology in drug development: focus on neurological targets. *International Journal of Nanomedicine*, 8: 951-960. doi: 10.2147/IJN.S30721

Stafford MR, Jackson H, Mayo-Wilson E, et al. (18Jan2013). Early interventions to prevent psychosis: systematic review and meta-analysis. *BMJ*, 346,f185. Retrieved 10Apr2013 from <http://www.bmj.com/content/346/bmj.f185>

NOTE: Safford includes a correction and supplemental materials. van Os & Murray is commentary accompanying the Safford article.

van Os J & Murray RM. (18Jan2013). Can we identify and treat "schizophrenia light" to prevent true psychotic illness? *BMJ: British Medical Journal*, 346,f304. Retrieved 10Apr2013 from <http://www.tips-info.com/images/stories/dokumenter/vanOs-2013ed.pdf>

Tulloch JK, Carr RR & Ensom MHH. (2012). A Systematic Review of the Pharmacokinetics of Antiepileptic Drugs in Neonates With Refractory Seizures. *The Journal of Pediatric Pharmacology and Therapeutics*, 17(1): 31-44. doi: 10.5863/1551-6776-17.1.31

## Other Topics

Bolland MJ, Barber A, Doughty RN, et al. (18Mar2013). Differences between self-reported and verified adverse cardiovascular events in a randomised clinical trial. *BMJ Open*, 3(3),e002334. Retrieved 10Apr2013 from <http://bmjopen.bmj.com/content/3/3/e002334.abstract>



Gunn C, Weber J & Kruger M. (10Jan2013). Midlife women, bone health, vegetables, herbs and fruit study. The Scarborough Fair study protocol. *BMC Public Health*, 13,23. Retrieved 9Apr2013 from <http://www.biomedcentral.com/1471-2458/13/23>

Hosseini-nezhad A, Spira A & Holick MF. (20Mar2013). Influence of Vitamin D Status and Vitamin D<sup>>3</sup> Supplementation on Genome Wide Expression of White Blood Cells: A Randomized Double-Blind Clinical Trial. *PloS one*, 8(3),e58725. Retrieved 10Apr2013 from <http://dx.doi.org/10.1371/journal.pone.0058725></sup>

Howard J, Malfroy M, Llewelyn C, et al. (2013). The Transfusion Alternatives Preoperatively in Sickle Cell Disease (TAPS) study: a randomised, controlled, multicentre clinical trial. *The Lancet*, 381(9870): 930-938. doi: 10.1016/S0140-6736(12)61726-7

Mostafavi S-A, Mohammadi MR, Hosseinzadeh P, et al. (2012). Dietary intake, growth and development of children with ADHD in a randomized clinical trial of Ritalin and Melatonin co-administration: Through circadian cycle modification or appetite enhancement? *Iranian journal of psychiatry*, 7(3): 114-119.

Pay extra attention to the journal. You will have to look into other papers on the topic and determine how the findings fit those of other researchers.

Ostojic SM, Niess B, Stojanovic M, et al. (2013). Creatine Metabolism and Safety Profiles after Six-Week Oral Guanidinoacetic Acid Administration in Healthy Humans. *International journal of medical sciences*, 10(2): 141-147. doi: 10.7150/ijms.5125

Perichart-Perera O, Balas-Nakash M, Rodriguez-Cano A, et al. (29Nov2012). Low Glycemic Index Carbohydrates versus All Types of Carbohydrates for Treating Diabetes in Pregnancy: A Randomized Clinical Trial to Evaluate the Effect of Glycemic Control. *International Journal of Endocrinology*, 2012,296017. Retrieved 10Apr2013 from <http://dx.doi.org/10.1155/2012/296017>

SPARTAC Trial Investigators. (2013). Short-Course Antiretroviral Therapy in Primary HIV Infection. *New England Journal of Medicine*, 368(3): 207-217. doi: 10.1056/NEJMoa1110039

Wang Q, Ma A, Bygbjerg IC, et al. (26Feb2013). Rationale and design of a randomized controlled trial of the effect of retinol and vitamin D supplementation on treatment in active pulmonary tuberculosis patients with diabetes. *BMC Infectious Diseases*, 13,104. Retrieved 10Apr2013 from <http://www.biomedcentral.com/1471-2334/13/104>

Weinblatt ME, Schiff M, Valente R, et al. (2013). Head-to-head comparison of subcutaneous abatacept versus adalimumab for rheumatoid arthritis: Findings of a phase IIIb, multinational, prospective, randomized study. *Arthritis & Rheumatism*, 65(1): 28-38. doi: 10.1002/art.37711

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I selected these articles because I believe they each have plenty of good material for you to explore. Some clearly are better than others. All should be interesting and challenging. The challenges, however, are different depending on the article.

Please do not delay beginning your critique. As you know, this is a slow, demanding process.

I hope you will wind up with an article that satisfies you, and highly discourage changing to another once you begin. However, if you can't continue with your article, we'll find another.

Lastly, if you prefer working with another student, the Stafford & SPARTAC articles are appropriate for either an individual student or a paired team.