Statistical Methods
15 Critical Appraisal

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Critical appraisal

❑ What is critical appraisal?

❑ Methods

❑ Categories of questions:

  ➢ Screening questions

  ➢ Design/method questions

  ➢ Results questions

  ➢ Applicability questions

❑ Raff's advice on reading research articles

❑ Activities

What is critical appraisal?

❑ The process of assessing and interpreting published evidence by **systematically** considering its validity, relevance and results

❑ Developed in medical research – motivated by biased / poor quality reviews

❑ Targets of critical appraisal:

➢ Original quantitative studies (primary studies, original research)

➢ Reviews (meta analyses, secondary studies)

➢ Original qualitative studies (less data driven)

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Categories of questions

❑ Screening questions:
  ➢ Do I need to pursue this paper?

❑ Design/method questions:
  ➢ How was the data collected?
  ➢ How was the data analysis method chosen?

❑ Results questions:
  ➢ Are results clearly stated and supported by the analysis?

❑ Applicability questions:
  ➢ Are the results helpful to you?

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Screening questions: Are the results of the study valid?

1. Did the research address a clearly focused question in terms of:

   ➤ The population studied

   ➤ The action carried out

   ➤ The outcomes considered

   ➤ The comparisons being made

2. Did the authors use the right type of study? The right type of study would:

   ➤ Address the research question

   ➤ Have an appropriate study design

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Screening results

❑ If the answer to both screening questions is "yes":

➢ Continue on to the other categories of questions as you appraise the article

❑ If the answer either questions is "no" then your time will probably be better spent elsewhere

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Design/method questions

❑ Is the research design clearly described?

❑ Are the research methods appropriate for the topic being investigated?

❑ Are any advantages or disadvantages of the design acknowledged by the researchers?

❑ Is there a clear statement about who participated in the research?

❑ Is there a clear statement about how the participants were selected?

❑ Is the selection of participants appropriate to the design?

❑ Is there a clear statement about the number of people taking part in the research?

Results questions

❑ Is the presentation of results clear and unambiguous?

❑ Are all the results presented?

❑ Do the tables and charts used give a clear picture of the sample data and results?

❑ Are the charts used appropriate?

❑ Are the tables easy to use?

❑ If percentages are recorded, are actual numbers also clearly shown?

❑ Are results of tests interpreted rightly?

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Applicability questions

- ❑ What is the context of this research?
- ❑ How generalizable are its findings within this context?
- ❑ What is your context?
- ❑ What are the similarities/differences between these contexts?
- ❑ How generalizable are the findings to your context?

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Raff's advice on reading research articles

1. Start with the introduction, not the abstract
2. Identify the big question in the field
3. Summarise the background
4. Identify the specific question(s) of the article
5. Identify the approach
6. Draw a diagram to represent each method used
7. Read and summarise each result
8. Evaluate whether the results answer the specific question(s)
9. Read the discussion/conclusion
10. Read the abstract
11. Find out what others say about the article
12. Evaluate the citations

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Activity

❑ Use the critical framework given at:
http://learntech.uwe.ac.uk/da/Default.aspx?pageid=1445 to review the article:
http://www.ifets.info/journals/5_3/moule.html

❑ Compare your answers with:
http://learntech.uwe.ac.uk/da/Default.aspx?pageid=1446

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Activity

❑ Use the critical framework given at: http://learntech.uwe.ac.uk/da/Default.aspx?pageid=1445 to review this article: http://www.bmj.com/content/326/7384/305.pdf%2Bhtml

❑ Compare your answers with: http://learntech.uwe.ac.uk/da/Default.aspx?pageid=1447

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Activity

❑ Use Raff's checklist:
http://violentmetaphors.com/2013/08/25/how-to-read-and-understand-a-scientific-paper-2/ to review this paper:
http://www.sciencedirect.com/science/article/pii/S0264410X13001333#

❑ Compare your answers with:
http://violentmetaphors.com/2013/09/08/an-example-of-how-to-read-a-vaccine-safety-study/

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Activity

❑ Use the principles given in: http://journalaccess.aspb.org/ReadaSciPaper/How%20to%20Read%20a%20Scientific%20Paper%20M%20Williams%20Mar%202013.pdf to review this paper: http://www.plantphysiol.org/content/159/2/759

❑ Compare your answers with pages 1-7 of: http://journalaccess.aspb.org/CaseStudy/CaseStudy%20for%20How%20to%20Read%20a%20Sci%20Paper%20M%20Williams%20Mar%202013.pdf

Recap

❑ Critical appraisal is a valuable tool for systematically selecting and evaluating research studies

❑ Critical appraisal involves evaluating the validity, results and applicability of research

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