



How to Read a Scientific Paper

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Key Topics

- Types of scientific papers
- Organization of a paper
- Actions to take – to properly read a paper
- Difficulties in reading scientific papers

Types of Scientific Papers

- Original article – information based on original research
- Case reports – usually of a single case
- Technical notes - describe a specific technique or procedure
- Pictorial essay – teaching article with images
- Review – detailed analysis of recent research on a specific topic
- Commentary – short article with author's personal opinions
- Editorial – often short review or critique of original articles
- Letter to the Editor – short & on subject of interest to readers

Effective Medical Writing. Peh WCG &, NG K H *Singapore Medical Journal* 2008 49(7) 522 smj.sma.org.sg/4907/4907emw1.pdf (accessed 05 November 2013)

Organization of a Paper

- Abstract
- Introduction
- Methods
- Results
- Discussion/Conclusions
- Acknowledgements
- References

Note: most scientific journals follow the format of the Structured Abstract. Occasionally, the Results and Discussion are combined – when the data need extensive discussion to allow the reader to follow the train of logic of the research.

Actions to Take

- Skim the article without taking notes:
 - Read the abstract; it will tell you the major findings of the article and why they matter
 - Read first for the ‘big picture’
 - Note any terms or techniques you need to define
 - Jot down any questions or parts you don’t understand
 - If you are unfamiliar with any of the key concepts in the article, look them up in a textbook

- Re-read the article more carefully especially the 'methods' and 'results/conclusions' sections:
 - Carefully examine the graphs, tables, and diagrams
 - Try to interpret the data first before reading the captions and details
 - Make sure you understand the article fully
- Ask yourself questions about the study, such as:
 - What problems does the study address? Why is it important? Is the method good? Are the findings supported by evidence? Are they unique and supported by other work in the field?

- Take notes as you read:
 - this improves recall and comprehension; you may think you'll remember everything but details will slip away
 - develop a template for recording notes on articles
 - can use the structured abstract format (abstract, introduction, methods, results, discussion & conclusions, references)

Difficulties in Reading Papers

- Papers can be poorly written:
 - some scientists are poor writers & others do not enjoy writing; author can be so familiar with the material that he/she cannot see it from the point of view of a reader not familiar with the topic
- Bad writing has consequences for the reader:
 - logical connections are often left out - instead of saying why an experiment was done, or what ideas were being tested, the experiment is simply 'described'; papers often are cluttered with 'jargon'; authors often do not provide a clear road-map through the paper

- The reader cannot easily understand what the experiment was:
 - the descriptions are not well-written and it is ambiguous what was done
 - authors refer back to previous papers; these refer in turn to previous papers in a long chain; it is unclear which methods were used in this experiment
- Authors are uncritical about their experiments:
 - if they firmly believe in a particular model, they may not be open-minded about other possibilities; these may not be tested experimentally, and may go unmentioned in the discussion
 - authors do not clearly distinguish between fact and speculation especially in the Discussion/Conclusions

- The sociology of science:
 - many authors are ambitious and wish to publish in trendy journals; they overstate the importance of their findings, or put a speculation into the title in a way that makes it sound like a well-established finding