

FROM:

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GCRC Research Education Seminar

Organizing and Writing the Biomedical Paper

UAMS Office of Grants and Scientific Publications

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Today's Objectives

- Review the **basic components** of scientific papers.
- Offer some **tips** on **developing a systematic approach** to the tasks involved in preparing a manuscript for submission to a journal.

Acknowledgments

- Mallia M. Organizing the biomedical paper. In: Minick P, ed. Biomedical Communication: Selected AMWA Workshops. Bethesda, MD: American Medical Writers Association; 2001:101-116.
- Welch HG. Preparing manuscripts for submission to medical journals: the paper trail. Effective Clinical Practice, May/June 1999. American College of Physicians Online.

Before you start...

Content Or Form?

"...**content** transcends **form** in the selection of manuscripts for publication in *Radiology*... [but] In the competition for selection among submissions of comparable scientific merit, papers prepared with greater care invariably receive a higher priority for publication."

- *Stanley S. Siegelman, MD, Editor Radiology* 1988;166:278-280

Who Is an Author?

- An author should have participated sufficiently to take public responsibility for the work's content.
- An author should have substantially contributed to the following:
 - conception and design, or analysis and interpretation of data
 - drafting of the article or revising it critically for important intellectual content
 - final approval of the version to be published.
- All these conditions must be met.

The First Step

- Select a journal to which you intend to submit your paper.
- Familiarize yourself with its style and format.
- Make sure your paper is suitable for the intended journal.
- Visit the journal's Web site.
 - Read the Instructions to Authors and the journal's Editorial Policies.

Getting Underway...

Components of a Scientific Paper: AIMRaD

- **A**bstract
- **I**ntroduction
 - Why you did what you did
- **M**ethods (and Materials)
 - What you did
- **R**esults
 - What you found
- **D**iscussion
 - What it might mean

High-Visibility Elements

- Title
- Abstract
- Introduction
- Tables
- Figures

Title

- Highest of high-visibility elements
 - Your first chance to stimulate interest
 - Editors look at first
 - Readers are most likely to look at or read
- Give serious thought to wording of title
 - Follow guidelines in Instructions to Authors
 - Should accurately, specifically, and completely identify the central topic
 - Should introduce the key terms of the research question stated in the Introduction

When/Where to Start?

- Start early!
- Think about the main message
 - Write down the "key messages" or "take home points"
- Start with Methods
- Start with Introduction
- Start with Results

Introduction: Purpose and Language

- Motivate your readers to **care** to know
 - Why the work was done
 - Why they should care
- Write a strong first sentence
- Repeat the **key terms** of the paper's title and the research question

Introduction: Structure

- Structure it like a funnel or inverted pyramid
 - **What is the general problem** or current situation?
 - **What is the specific problem** or controversy?
 - How did this study help?
- Keep it short: one or two typed pages

Methods and Materials

- Must give a clear overview of
 - What was done
 - How it was done
- Should be thorough enough for the study to be reproduced
- Use subheadings to guide readers
- Describe statistical analysis employed
- Write in past tense

Results

- What were the findings?
- Be brief and to the point
- Use tables and figures to present data
- *Significance*: report confidence intervals, standard deviations, and *P* values
- Write in past tense

Discussion: Overview

- What do your findings mean?
- Describe the principles, relationships, and generalizations implied by the results
- Keep as short as possible, so readers grasp take-home message

- Should be organized with a beginning, a middle, and an end

Discussion: Beginning

- Sentence 1: Clearly state the answer to the research question
- Next, your conclusions based on the results—strongest evidence first
- Never begin with a survey of background information
- Never repeat background information from Introduction

Discussion: Middle

- Interpret the results: how they support the answer to the research question
- Discuss topics relating to the answer in descending order of importance
- Discuss your own or others' studies, placing your findings in their context

- Present your least impressive results
- Explain any study limitations
- Explain any unexpected findings
- Anticipate valid criticisms
- Help your readers gauge
 - What can be confidently learned
 - What is more speculative

Discussion: End

- End strong: what's the take-home message?
- Restate the answer to the research question
- Mention possible applications, implications, or speculations
- Consider what next? Suggest future work

Abstract

- Write the abstract for the first draft
- Focus on the basic components:
 - What question was asked? (background)
 - What was supposed to happen? (tested hypothesis)
 - How and in whom was the study done? (methods)
 - What was found? (results)
 - What does it mean to others? (conclusion)

References

- Follow the journal's Instructions to Authors
- Invest in a reference citation database manager
- Be as rigorous and accurate in citing and preparing your references as you are in the conduct your scientific experiments

Revise, Listen, Revise, Be Patient

- Revise, revise, revise ... in response to feedback from others
- Don't wait until the paper is done to get feedback
- Sit down and interact with a colleague giving feedback: more helpful than scribbled notes
- Be patient: Don't rush the writing process

From Taylor DM, Brown AF. Analysis of the study design and manuscript deficiencies in research articles submitted to Emergency Medicine. Emerg Med (Fremantle). 2001;13(4):444-450.

Where did they go wrong...?

Common Deficiencies

- Ambiguity of methods (77%)
- Conclusions not warranted by data (72%)
- Ambiguity of results (68%)
- Poor referencing (56%)
- Inadequate study design description (51%)
- Study limitations not described (51%)
- Unclear tables (49%)
- Overly long discussion (49%)
- Inadequate definition of terms (49%)
- Subject selection bias (40%)

<http://www.marquette.edu/aegs/advice/publishing.htm>

How to Write Academic Articles for Publication

Adapted from a PFF presentation handout by Professor Michael A. Fahey, S.J.

PRELIMINARIES:

1. Make sure that your computer has a standard software program. Most writers in the humanities use Microsoft Word or Word Perfect. Use a laser printer for the work you submit. Avoid use of unusual type fonts or small type.
2. Obviously your submitted manuscript should be meticulously formatted. Never staple the pages together. **Never** put notes at the bottom of the page. They should always be separate (and **double spaced**) at the end of the manuscript (endnotes). Some journals state they want two paper copies of the text. When you submit your paper copies usually state that the text is also available on diskette, and in what format, but don't send a diskette unless asked for or the journal instructs you otherwise. They will become interested in the diskette only if the text is accepted for publication.
3. Always write a polite **cover letter** to the editor in which you also state that the article is not being simultaneously submitted to another journal and that the text has not been previously published.
4. Don't send a manuscript that is too long. Be sure to give your full address together with your office and home telephone numbers, your FAX number if you have one, and your e-mail address. Check in the journal for instructions on how to submit a manuscript. Most journals have websites nowadays, with specific information on formatting, submission, length, etc.
5. If you receive a rejection slip, send your manuscript out again soon to another journal with some adjustments especially if reasons were given for the rejection. Rejection doesn't necessarily mean that an article is a poor one; it may simply indicate that the journal has another article on a similar topic in the works or that the article's literary genre does not match the journal. Most articles that are accepted for publication will be "re-writes"; the editor

typically asks an author to resubmit the piece with some indicated changes, shortening of manuscript, etc. Then the editor will do some copy-editing for stylistic elegance, punctuation, capitalizations, etc.

6. Write for a specific journal within a spectrum of journals that you read regularly. Choose from among the list of journals that you presumably read regularly or at least follow closely. Note its range of interests and any peculiarities of their formatting, especially of book titles and journal articles. Consult your department professors about which journals to envisage. There are obviously different levels of journals, and the more specialized the more difficult they are to get published in.

WRITING:

7. When you compose be prepared to rewrite many times to create prose that reflects easy flow, clarity, etc. Write out your "first thoughts" in no particular order, then compose a flexible outline of what you want to do. Write your introductory paragraph last. Read your semi-final text out loud so that your ear can be attuned to judge whether the prose is smooth.

8. Have a good dictionary such as *Merriam Webster's Tenth Collegiate Dictionary* (not just for spelling but for standards on hyphens, etc.). This dictionary is available through the MARQCAT system (via Britannica). Also have a good thesaurus, and a work such as *Webster's New Dictionary of Synonyms*. Consult *The Chicago Manual of Style: The Essential Guide for Writers, Editors, and Publishers* 14th ed. (U. Chicago P., 1993) and Kate Turabian's *A Manual for Writers* (See below). Use American spelling unless you are writing for a British journal. Use the style favored by the journal you are submitting your manuscript to. (English Students: some literature journals use MLA; many use Chicago.)

9. Use a good book on matters of style, even a simple one such as Strunk and White's *The Elements of Style* 4th ed. (Allyn and Bacon, 2000). (Also available online.) Also very good is Joseph M. Williams, *Style: Ten Lessons Toward Clarity and Grace* 6th ed. (Addison-Wesley, 1999). Note especially what they say about eliminating "dead wood," "avoiding passives," not using dummy subjects such as: it is, there is, one finds, etc. Be careful to distinguish between the proper use of "that" and "which." Most publishers, especially book publishers, are purists in this regard. Same with split infinitives. Avoid like the plague the word "we" or "our" because you can not presume to know whether there is a bond between you and the reader. If you are talking about yourself say "I" or "me" and avoid the use of the Victorian, polite "we." Use inclusive language.

10. Get a colleague, friend, spouse or agreeable professor to read your semi-final draft. Organize an informal writers' workshop with other graduate students where you exchange and critique essays.

11. Writing attractive prose is not easy. You learn to recognize good prose by reading good published works, especially by British authors who frequently have a better command of the written language. Note especially how good writers compose the opening paragraphs of their essays and how they conclude. Read works (even fiction) by recognized authors. Read a major newspaper every day, especially the editorials, the "op-ed" columns, the reviews of books, plays, films, etc. A magazine that has high standards of writing (such as *Harper's* or *The New Yorker*) also attunes your ear to attractive, clear, idiomatic prose.

12. Good prose should never be dull. It can and should draw upon other areas of creative intuition, especially the fine arts and literature. It should appeal to your life experience and to that of your readers.

13. Remember Aristotle's golden rules: Every piece of writing should have a beginning, a middle, and an end. The beginning should "render the reader benevolent, attentive and docile." The "divisio" (after the introductory paragraph) should state baldly how you are going to proceed: points a, b, c and d. Then in the "conclusio" repeat

what you have done. Your first draft should read: "In this essay I will do a, b, c, and d. " and "In this essay I have shown a, b, c, d" but then in subsequent drafts disguise the obvious character of the *divisio* and *conclusio*.

14. Write for a specific audience with a designated level of competence. This will be in function of the journal chosen. Remember the audience will be intelligent but not always familiar with your data. *Haute vulgarisation* (high class popularization) is another level of publication, and at this level you can make use of more general weekly periodicals.

15. Use endnotes to inform and to provide follow-up information or source location especially if you are "borrowing" someone else's original insight. But don't overdo the footnotes to try to impress. This is a common North American fault.

16. At first write shorter pieces. They are easier to get published. Even a factual account of a professional conference you attended is worthwhile.

17. Historical pieces or surveys of literature (or book reviews) are easier genres to begin with since they rely heavily on the work of others. If you use these genres be careful however to include your own insights.

18. Have a clear idea of what you are doing, in terms of bringing your field of learning "forward." Remember that every discipline publishes material according to different functional specialties. Remember that your task is not complete if all you do is provide "oratio obliqua" (what others have said) without the specialties peculiar to "oratio directa" (what you yourself judge to be the case).

19. Present what the Germans call the "Stand der Forschung" regarding the topic about which you are writing. In other words, show a command of the secondary literature in books and articles at least for the last five years. This will require bibliographical searches via the various bibliographical tools available in your discipline.

20. Don't underestimate the book review as a literary genre. Nonnally you should be invited by a book review editor to review a books. But if you have special competencies, e.g., command of other languages: Spanish, Polish, Russian, German, Italian, Dutch, etc., or special competence in a period or author (because that is the area of your dissertation) you might want to write to a book review editor and volunteer your services. A book review should not just summarize the book, but should incorporate personal judgments. You should be polite even if you disagree with the author (and especially if you are just beginning your writing/teaching career).

ONGOING DEVELOPMENT:

21. Keep an accurate list of your publications, and a file set of your offprints. Use offprints (or photocopies thereof) for publicity purposes or when being interviewed for a job.

22. Cultivate contacts at professional meetings of your field. Try to give papers at least at regional meetings of professional societies.

23. Try your hand at translation of shorter pieces from time to time, e.g., book reviews or editorials. It will help you better understand the genius of the English language. Try to devote at least 30 minutes a day to writing on your word processor.

Other Resources: Walter W. Powell, *Getting into Print: the Decision-Making Process in Scholarly Publishing* (U. Chicago P.); Kate Turabian, *A Manual for Writers of Term Papers, Theses, and Dissertations*, Chicago Guides to Writing, Editing, and Publishing (U. Chicago P., 1996); Jacques Barzun and Morris Philipson, *On Writing, Editing,*

and Publishing: Essays Explicative and Hortatory, Chicago Guides to Writing, Editing, and Publishing, 2nd ed. (U. Chicago P., 1986).