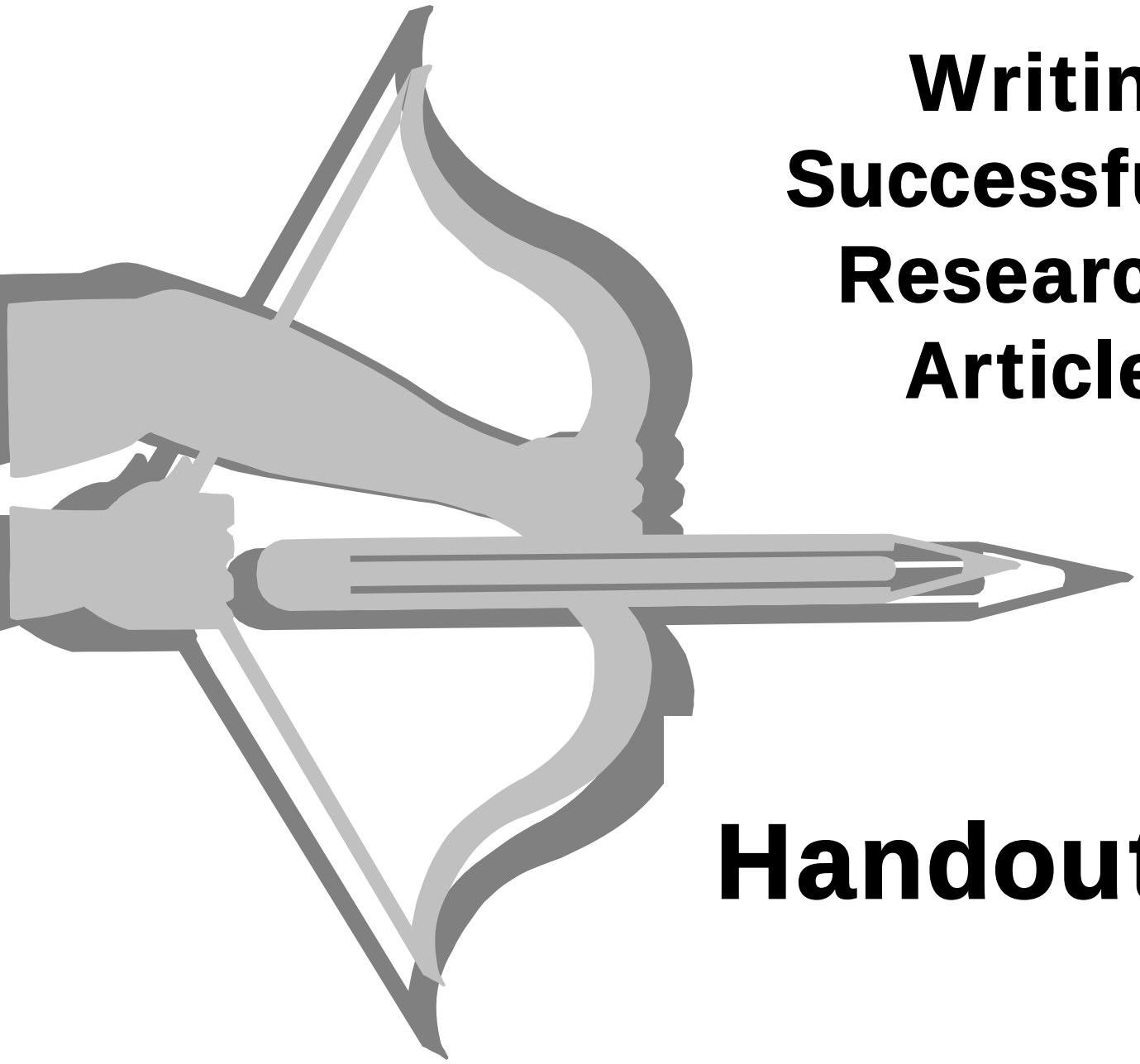

Writing Successful Research Articles

Handout I

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Guidelines for Writing a Research Article

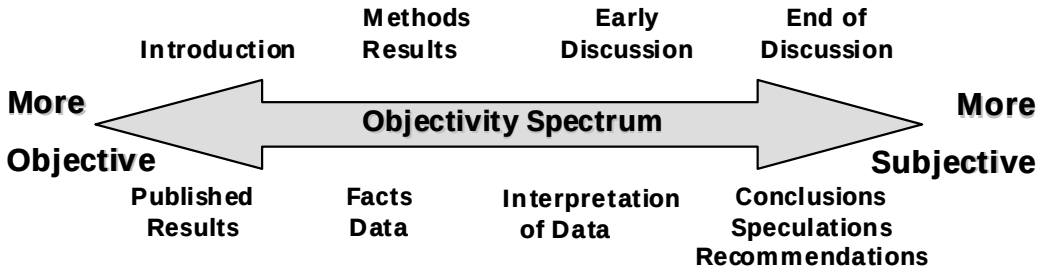
Initial Planning Questions

1. How shall I convert my project into a reportable study?
2. What is this paper trying to prove? Why does it matter?
3. What challenges do I face in putting the argument across? Where and how will I address these issues?
4. What journal should I target?

Abstract	
Strategies	***Content and organization***
➢ Write abstract to help readers decide whether to read or download ➢ Make it clear and informative (address importance, validity, applicability) ➢ Be sure the <u>primary question</u> and <u>conclusions</u> of the paper come through clearly	1. Journals provide length limits and formats 2. Follow same order as sections of the paper (with subheadings if required) 3. Clear summary is more important than details of data (this is not a meeting abstract) 4. State your conclusion clearly, but with essential qualifications: Don't let the brevity of an abstract lure you into overstatement
Introduction	
Strategies	***Content and organization***
➢ Define question to be addressed ➢ Establish the study's importance and novelty ➢ For most medical journals, keep the introduction short and focused	1. Adhere to journal style for length, content 2. In first paragraph, concisely state question and why it matters 3. Next, review essential literature: • Be selective! Summarize background to explain: o choice of question/hypothesis o claim to novelty and significance • Save detailed comparisons with previous studies for Discussion 4. In final paragraph, <u>briefly</u> describe: • Study question or hypothesis • Design • Sample • Methods
Materials & Methods	
Strategies	***Content and organization***
➢ Keep it simple and brief ➢ Define key variables, use names consistently ➢ Use headings for clarity and easy reference ➢ Literature references here should focus on methods	1. Overview of design • Define type: e.g., retrospective or case-control study; prospective, randomized, controlled trial • Say enough about design to allow reader to evaluate the study 2. Description of sample • Population and setting for recruitment • Planned sample size and power • Inclusion/exclusion criteria • Comparison groups, other precautions to minimize bias 3. Study protocol: subject assessment, time course, treatment/intervention, follow-up 4. Specific procedures or instruments • Methods for initial assessments (e.g., dx methods) • Methods to obtain outcome measures (survey instruments, physical measurements, biological assays) • Give more detail where methods are novel, less where previously published 5. Statistical plan and methods • Define terms and describe tests (briefly)

	• Explain rationale for unfamiliar statistical methods
Results	
Strategies	***Content and organization***
➢ Present results systematically; generally use same order throughout paper ➢ Keep like things alike: • Label variables consistently • Use similar formats for tables/figures and statistical notations ➢ Answer all research questions; include negative findings ➢ Let the data speak for themselves: • Presentation should indicate trend in your reasoning, <u>BUT</u> • Generally avoid interpretation of results • Strictly avoid broad conclusions and speculations	1. Typical order of presentation: • Describe sample collected first • Then follow order of hypotheses, chronology, or design elements • In general: o present simple results before complex o give prominence to strongest findings o Provide subsection headings if needed for clarity
	2. Numerical data • Limit graphs, tables to key data; design them to highlight important results • Choose best presentation format: o Use graphics to show relations between data sets o Use tables if specific numbers are essential o Otherwise, use narrative • Briefly interpret figures, tables, images in narrative (but <u>don't</u> reiterate data)
	3. Narrative presentation of results • Stick to the facts • Keep story as simple and focused as possible without distorting meaning o Avoid over-explanation o Avoid detailed data if summary is adequate • Omission of tangential data will almost always strengthen your paper
Discussion	
Strategies	***Content and organization***
➢ Highlight key findings and forestall criticisms ➢ Relate conclusions to original hypotheses ➢ Seek balance in interpreting results: • Over-statement can be fatal, but • Under-statement may hide the importance of study ➢ Be selective! Discuss only results that deserve comment ➢ <u>Don't</u> disparage or attack previous studies; <u>do</u> try to explain differences ➢ Separate conclusions/speculations from interpretations of results	1. General plan for Discussion: • First, highlight key findings in the context of the central purpose of study • Next, evaluate findings in relation to literature • Then discuss limitations of study • End with conclusions and recommendations
	2. Strategic issues in ordering Discussion: • Begin and end with most exciting, convincing, novel results. Put in the middle what is debatable, complicated, or boring • Organize mid-section systematically (e.g. follow order of Results) • Avoid speculations, recommendations, and suggestions for future studies until the end
	3. Discuss other studies in order to: • Compare previous results with your findings • Clarify complex issues raised by your results *Don't repeat literature review from Introduction!* o *<u>There</u> you establish study's importance and novelty* o *<u>Here</u> you use previous reports to confirm, question, or clarify your results (or theirs)*
	4. Discuss limitations as well as strengths • <u>Design weaknesses</u>: cluster in a paragraph before conclusions • <u>Methodological problems</u>: discuss in the context of specific findings • <u>Serious problems</u>: indicate how much they undermine confidence in validity of results (i.e. spin to minimize the damage)
	5. End with a summary of key findings and brief interpretation of their significance • Clearly label speculations and recommendations that go beyond data • Propose specific future studies if suggested by novel results (<u>not</u> needed for simple confirmatory studies)

Sequencing Information Along Spectrum of Objectivity



STEPS FOR EFFICIENT WRITING OF A JOURNAL ARTICLE

Phase 1: Preparation

1. Plan the paper when you plan the study (e.g., introduction and methods)
2. Plan ahead for writing co-authored papers:
    - Agree on first author and order of secondary authors
    - Reach consensus in advance on task-sharing and production schedule
    - Good collective tasks: interpret data, select journal, develop the "argument" of paper
    - A primary writer is essential to collate text contributions, define focus, manage revisions, make final decisions
3. Collect, organize, and prioritize bibliographic materials before you begin to write
4. Get data in order and sketch out tables and figures

Phase 2: Writing and Revising the First Draft

1. Choose journal, and study *Instructions to Authors* and several recent articles to define:
    - total page limit, and length and content of sections (including refs)
    - typical number and size of tables or figures
    - audience
        - Who are your readers?
        - How diverse is this audience?
        - How much do they know about the topic?
        - What is their level of interest in this topic?

    Answers to these questions will determine your style, content, and methods of persuasion.

2. Define your primary purpose, i.e., What scientific question are you addressing and how will you answer it?
    - Write down a brief statement of your focal question/purpose.
    - Keep it handy as you write, to help you (and your reader) stay focused on the main point of the paper.

3. Generate ideas (You need to make the bricks before you begin to build the wall.)
    - capture ideas on tape, in conversation, at keyboard
    - brainstorm with group (e.g., write ideas on post-it notes and sort topics into groups)

- map ideas with sketches, charts, diagrams
- give a seminar and receive feedback

4. Sequence these ideas and shape first draft as quickly as possible (don't obsess over holes yet)

5. Refine the tables and figures

6. Now go back and systematically refine the document (**large scale ⇒ small scale**)
    - Logic and clarity of primary argument
    - Clarity of study design
    - Appropriate (conventional) placement of material in subsections of paper
    - Focus in selection of data to support primary argument (data, refs)
    - Organization of supporting data
    - Logic, clarity, focus, and continuity at paragraph level
    - Brevity and clarity at sentence level
    - Readability and formatting
    - Spelling

Rethink, reprioritize, reorganize, and then rephrase.

Phase 3: Feedback and Final Revisions

1. Recruit reviewers: mentors, specialists, or collaborators, plus one "naive" reader. Never submit a paper that hasn't been read by someone else.
2. Let document lie fallow. Do not read for at least 1 week, preferably 1 month, while the reviewers comments are coming in.
3. Assimilate and evaluate critiques.
4. Revise radically, if needed, but keep sequence of backups.
5. Before you submit the paper, re-review compulsively for:
    - numerical consistency at every level
    - clarity of formatting, especially in figures and tables
    - completeness and accuracy of references
    - conformity to every detail of journal style (especially references)
6. Know when to stop. You'll get another chance to revise when the reviews come back.

WRITING PRODUCTIVITY:
10 TIPS FOR EFFICIENT WRITING

1. The first draft only has to get written to succeed
- Recycle old work to "prime the pumps"
- Write around an outline to avoid blank screen anxiety
- Write what is easiest first (e.g., description before analysis and evaluation)
- Or don't write: draw pictures, dictate, talk to someone to capture main building blocks
- Imitate a good model
- Don't obsess over holes or details (yet)

2. At the start, remain open to new ideas
- Give yourself room for new insights and directions as you compose
- Later, build a consistent, logically ordered progression of ideas

3. Develop regular writing habits
- Write during your personal "prime time" and protect this time from interruptions
- Write regularly (e.g., 1-2 hour periods, 2-4 times/week)
- Avoid binge writing
- Use rituals if they work for you!

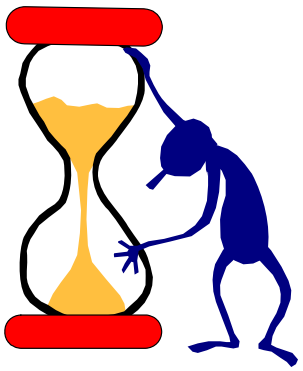
4. Control your writing environment
- Create an environment that enhances your comfort, concentration, and efficiency
- If necessary, mobilize your writing environment!
- Take writing trips or attend writing retreats

5. Multi-task and recycle
- Turn a presentation abstract into a talk, and then into a paper
- Turn a seminar into a grant proposal
- Reuse grant material in papers: Background/Signif ⇒ Introduction; Research Design and Methods ⇒ Materials and Methods

6. End a writing session at a new starting point
- Don't end a session at the end of your ideas
- Before you stop, jot down a quick outline of ideas for your next session

7. If you stall out, step back to get a fresh perspective
- Make a quick outline. Are critical elements missing or duplicated?
- Put the text aside and tell a colleague what you are trying to say
- Dictate your thoughts and listen for key ideas and new insights

8. Revise efficiently, from large to small scale
- Logic and clarity of main argument
- Clear presentation of study design
- Focus, organization of supportive data
- Placement of material in expected places
- Paragraphs: clarity, focus, continuity
- Sentences: clarity and brevity
- Formatting and readability
- Grammar and spelling



9. Exploit the power of the computer
- Compose at the keyboard
- Begin with an outline and fill in the text around it

- Recycle old prose (even emails)
- Free yourself to experiment (e.g., save dated backups, use virtual wastebasket)
- Keep all manuscripts materials on one memory stick
- Develop a literature review table (concepts, refs, applications to study)
- Use electronic tools (esp. a reference manager—but don't let spell check substitute for careful proofing)

10. Expect to revise, and revise again

- Efficiency won't eliminate the need to rewrite and revise
- Anticipate at least 5-6 drafts for papers, 4 for grants

Few (if any) writers avoid the labor of revisions!

SEVEN TIPS FOR FIGHTING PROCRASTINATION

1. Fight to protect your writing time

- Identify writing as a professional priority
- Set aside regular, prime time for writing
- Protect this time vigorously

2. Set time-limited goals and reinforce them

- Set specific writing goals with deadlines
- Publicly announce your goals (to spouse, writing partner, colleagues, or boss)
- Ask for follow-up and reinforcement

3. Divide and conquer

- Subdivide a writing task into manageable units
- Set feasible goals (e.g. cut 10% of the words from a paper)
- Create a timeline and track progress (at least weekly)
- Reward incremental progress
- Celebrate completion

4. Create a writing support system

- Develop a support system to enhance productivity:
  - research team
  - peer-exchange (co-authors or writing partners; weekly productivity sessions)
  - writers' group
  - personal rewards system

5. Maximize the pleasure

- Emphasize what makes writing worthwhile to you—e.g.:
  - Capitalize on creative impulses
  - Use writing to strengthen the conceptual basis of your research
  - Socialize the process (find a partner)
  - Remind yourself of your ultimate goal
- Disguise the task as something more fun: give a talk, ask interested colleagues to review draft of paper

6. **Minimize the punishment**

- Proactively manage personal and professional conflicts
- Avoid exhausting writing binges
- Hire an editor if you need one

7. **Curb your perfectionist urges!**

- Don't aim for "perfection" before the final drafts
- Even then, recognize when enough is enough
- Review process will allow for further refinement from a new perspective

Tools for Scientific Writers

Printed Materials:

Robert Boice. **Professors as Writers**. Stillwater, 1990. *Good on writing motivators.*

Robert A. Day. **Scientific English, A Guide for Scientists and Other Professionals,** 2nd Edition. Oryx Press, Phoenix AZ, 1995. *Good for definitions and simple explanations of grammatical and syntactical terms. Note Appendix 2: Problem Words and Expressions, and Appendix 3: Words and Expressions to Avoid.*

Robert A. Day. **How to Write and Publish a Scientific Paper**, 5th Edition. Oryx Press, Phoenix AZ, 1996. *A standard text on this topic.*

George D. Gopen and Judith A. Swan. The Science of Scientific Writing. **American Scientist, 78**: 550-558, 1990. *Good on organization of ideas into sentences and paragraphs.*

Edward J. Huth, M.D. **How to Write and Publish Papers in the Medical Sciences**. ISI Press, Philadelphia, 1982. *I like Ch. 12, Revising Prose Style.*

William Strunk Jr. and E.B. White, illustrated by Maira Kalman. **The Elements of Style (Illustrated)**, 5th Edition. Penguin Books, New York, NY, 2007. *An inspirational, BRIEF argument for the value of clarity and brevity in prose. This is a classic because it practices what it preaches. (This fifth edition includes charming illustrations, but previous editions contain much the same content.)*

Edward R. Tufte. **The Visual Display of Quantitative Information**. *Complex and elegant.*

Online Materials: (All of these sites will lead you to a wealth of resources.)

- **English Style and Usage:** http://www.bartleby.com/usage/
  - Strunk and White's The Elements of Style (original 1918 version)
  - Fowler's The King's English
- **Common Errors in English** http://www.wsu.edu/~brians/errors/index.html
- **Guide to Grammar and Style, by Jack Lynch** http://andromeda.rutgers.edu/~jlynch/Writing/index.html
- **Guide to Grammar and Writing** http://grammar.ccc.commnet.edu/grammar/
- **Revising Prose, from The Writing Center @ Rensselaer** http://www.rpi.edu/web/writingcenter/revise.html
- **Guide to Grammar and Writing** http://grammar.ccc.commnet.edu/grammar/

Look up these topics relevant to sentences:

- Concise sentence exercises
- Rewriting bloated sentences
- That vs Which
- Parallel form
- Confusion
- Modifier placement

Look up these topics relevant to paragraphs:

- Sentence Variety
- Avoiding Primer Language
- Sentence-combining Skills
- Principles of Organization
- Coherence: Transitions Between Ideas
- Paragraph Development
- Rewriting and Editing
- Principles of Composition

Revising Prose, from The Writing Center @ Rensselaer
http://www.rpi.edu/web/writingcenter/revise.html

A writers' handbook:
http://www.wisc.edu/writing/Handbook/index.html

Medical Library Association publications support:
http://www.mlanet.org/publications/books/pub_support.html

English as a Second Language:
http://www.rpi.edu/web/writingcenter/esl.html
[on article usage]

Workshop Feedback Form

1.	Was the workshop what you expected from its title?	Poorly titled	1	2	3	Well titled
2.	Was this session well planned and run?	Disorganized	1	2	3	Well organized
3.	Did the workshop keep you active and interested?	Too passive	1	2	3	Active, interesting
4.	Were the handouts well designed and useful?	Not useful	1	2	3	Very useful
5.	Did the workshop teach you what you hoped to learn?	Learned little	1	2	3	Learned a lot

Plus-Delta Comments:

[E.g.: comments on content, participation, hand-outs, slides, break-outs, pacing, logistics]

+ What aspects of this workshop were especially useful, valuable, interesting, or new?

Δ When this workshop is repeated, what recommendations do you make for change?

Ideas for future workshops? _____