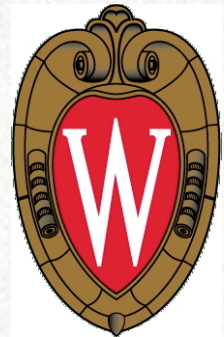


# Achieving a Readable Style

## Part 1: Word Choice

*A writing workshop presented by BACTER  
(Bringing Advanced Computational Techniques to Energy Research)  
University of Wisconsin-Madison  
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The logo for BACTER, featuring the word in a stylized font. The letters 'B', 'A', 'C', 'T', 'E', and 'R' are black, while 'A', 'C', and 'T' are red. A red and black zigzag line runs along the bottom of the letters.

*Let's start by acknowledging that  
Science is Hard to Read*

“There is no form of prose more difficult to understand and more tedious to read than the average scientific paper.” –Francis Crick

# *Why?*

- Ever-increasing specialization
- Explosion of acronyms and jargon
- Complexity of the ideas being conveyed

## *Another reason?*

Science is also hard to read because of the way scientists have been trained (or not) to communicate; the written style they choose to use...



# *The specific problems with scientific writing are well known*

- How experts communicate (2000) *Nature Neuroscience*
- Enhancing the mission of academic surgery by promoting writing skills. PA Derish et al. (2007) *Journal of Surgical Research*
- The science of scientific writing. G Gopen and J Swan (1990) *American Scientist*
- The infectiousness of pompous prose. MW Gregory (1992) *Nature*
- Clear as mud. J Knight (2003) *Nature*
- How to write consistently boring scientific literature. K Sand-Jensen (2007) *Oikos*
- Compliance (Communicate please with less abbreviations, noun clusters and exclusiveness) MJ Tobin (2002) *American Journal of Respiratory and Critical Care Medicine*
- On scientific writing. C. Van Wray (2007) *Journal of Parenteral and Enteral Nutrition*

# *We'll be looking at several of them*

## Word Choice

- Acronyms
- Plain language
- Wordiness

## Sentence Structure

- Subject-verb agreement
- Maintaining linkage
- Noun clusters
- Passive voice

## *But wait, won't an editor take care of these issues for me?*

- “*PLoS ONE* staff **do not copyedit** the text of accepted manuscripts; it is therefore important for the work, as presented, to be intelligible.”
- “In the interests of speed, manuscripts **are not extensively copyedited** and authors are requested to check their texts carefully before submitting them so that proofs will require only correction of typographical errors.” (*Bioinformatics*)
- “Manuscripts **will not be extensively copy-edited...**” (*J. Comput. Biol.*)

## *The goal*

To dazzle readers with your science  
rather than distract them with your writing.



# *The issues we'll be tackling...*

## **Part One: Word Choice**

- Acronyms
- Plain language
- Wordiness

## *Use acronyms sparingly*

- Some acronyms (abbreviations) are so familiar, they're like words to us: ATP, DNA, BLAST
- But discipline-specific abbreviations (e.g., SVM, CBM, CPD) require us to expend energy memorizing new terms as we read – energy that can be better spent trying to understand the research

## *Guidelines for using acronyms*

- Always define them
- Keep them out of the abstract
- Use an acronym only when an unwieldy word or phrase occurs 10 or more times
- Limit yourself to 2 to 3 discipline-specific acronyms per manuscript
- Substitute a word instead; e.g., Instead of “OR” for olfactory receptors, write “receptors” after the first use

--MJ Tobin (2002) *American Journal of Respiratory and Critical Care Medicine*

**BACTERIA**

## *Plain language*

“Some authors apparently believe that they must impress the reader (and the editor) with their erudition and mastery of multisyllabic words in order for their work to be given the appreciation it deserves. This is a mistaken notion. With scientific writing, as with most other forms of communication, the simplest and most direct statement of the intended message is always best.”

--The top 10 reasons why manuscripts are not accepted for publication (2004) *Respiratory Care*

**BACTERIA**



## *Use plain language*

Whenever possible, substitute simple words for more complex or unfamiliar ones.

- “Use” instead of “utilize” or “utilization”
- “Include” instead of “comprise” (Note that “comprised of” is incorrect; should be “composed of”)
- “Happen” instead of “transpire”
- “Explain” instead of “elucidate”
- “Most” instead of “a majority of”
- “Cause” instead of “effectuate”

## *How can this be made simpler?*

Original: “A good proximal understanding of the normal behavioral repertoire of astrocytes is a prerequisite for understanding the large number of pathophysiological conditions that may arise from dysfunctional situations as well as for assessing the potential of the astrocyte as a therapeutic target. However, our current concepts of even long known aspects of this repertoire are quite obscure.”

## *Some possible solutions...*

Revised: A **better** understanding of the normal **behavior** of astrocytes is **needed** before we can deduce their role in **disease** or assess their potential as therapeutic targets. However, our knowledge of even their **most basic** behavior is still **incomplete**.

- good proximal (?) → better
- behavioral repertoire → behavior
- prerequisite → needed
- large number of pathophysiological conditions that may arise from dysfunctional situations → disease
- current concepts → knowledge
- long known aspects → most basic
- quite obscure → incomplete

## *A related issue: Wordiness*

Original: A good proximal understanding of the normal behavioral repertoire of astrocytes is a prerequisite for understanding the large number of pathophysiological conditions that may arise from dysfunctional situations as well as for assessing the potential of the astrocyte as a therapeutic target. However, our current concepts of even long known aspects of this repertoire are quite obscure.

**(57 words)**



## *Wordiness*

Revised: A better understanding of the normal behavior of astrocytes is needed before we can deduce their role in disease or assess their potential as therapeutic targets. However, our knowledge of even their most basic behavior is still incomplete.

**(38 words)**

# *Causes of wordiness*

Wordiness often results from using nouns instead of verbs.

- “is a **consequence** of” instead of “**results** from”
- “Our findings lead us to the **conclusion**” instead of “From our findings, we **conclude**”
- “we performed the **purification**” instead of “we **purified**”
- “the **addition** of” instead of “adding”

# *Causes, con't*

Wordiness also arises from using unnecessary words.

- “more unique” instead of “unique”
- “pooled together” instead of “pooled”
- “in order to” instead of “to”
- “based on the fact that” instead of “because”
- “what the explanation is” instead of “why”
- “it was observed during the course of the experiment” instead of “we observed”

## *How can this paragraph be trimmed?*

Original: “This discussion is my concept of the way that a scientific paper should or should not be written. It is not intended to criticize, but to improve precision and enhance communication. Not everyone will agree with me, but those who follow these suggestions likely will have fewer rejections and do less revising. In this era of “publish or perish,” it is imperative to produce manuscripts based on quality research, but even the best research may be lost to science if the scientific community is unable to understand the text in which it is presented.” **(94 words)**



## *Some ways to cut*

Revised: This discussion is my concept of **how** a scientific paper should ~~or should not~~ be written. It is not intended to criticize, but to improve precision and enhance communication. Not everyone will agree with me, but those who follow these suggestions likely will have fewer rejections and do less revising. In this era of “publish or perish,” **everyone must** produce manuscripts based on quality research, but even the best research may be lost to science **if it's not communicated well.** (77 words)

## *Another example*

Original: “Many people when asked what is the most critical or far-reaching part of a scientific paper would answer: the results or conclusions drawn from the research conducted. I beg to differ. The single most critical item in any scientific paper is—the title. Hundreds, if not thousands, of people will read a title when searching for information on a particular topic in the various bibliographic services on the internet or in libraries...Thus, for the intended audience to be reached, clarity of intended meaning and proper order of words used in a title should be of paramount concern to authors.”

**(99 words)**

## *Many words can simply be deleted...*

Revised: Many people when asked what is the most critical ~~or far-reaching~~ part of a scientific paper would answer: the results or conclusions drawn from the research ~~conducted~~. I beg to differ. The ~~single~~ most critical item ~~in any scientific paper~~ is—the title. Hundreds, if not thousands, of people will read a title when searching for information on a ~~particular~~ topic ~~in the various bibliographic services on the internet or in libraries~~...Thus, for the intended audience to be reached, clarity of ~~intended~~ meaning and proper order of words ~~used~~ in a title should be of paramount concern ~~to authors~~. (76 words)



*And a slight rewrite makes it even shorter*

Revised: Many people when asked what is the most critical part of a scientific paper would answer: the results or conclusions drawn from the research. I **disagree**. The most critical item is —the title. Hundreds, if not thousands, of people will read a title when searching for information on a topic...Thus, **whether you reach your intended audience depends greatly on the clarity of your title.**

**(64 words)**



*Next...*

## Sentence Structure

- Subject-verb agreement
- Maintaining linkage
- Noun clusters
- Passive voice