Optimizing Scholarly Communication: 30 Tips for Writing Clearly

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Objective: To share with potential authors tips for communicating their ideas more clearly in a scholarly manuscript.

Description: Communicating scientific, technical, or medical information so that readers can understand its meaning requires logical organization and proper use of language. These 30 tips review basic English grammar and suggest ways authors can clearly and concisely present their material. We admonish authors to avoid common errors such as writing in the passive voice, overusing abbreviations, and emphasizing unimportant facts.

Conclusion: Attention to matters of writing style enhances clear communication, which must be the prime objective of scientific writing.

Why do you want to write a scholarly manuscript: to get your name in print; to impress your boss, spouse, parents, colleagues, or friends; to add a few lines to your resume; to get tenure or a promotion; or to communicate your ideas to those who read your manuscript? Most of the above goals are easily accomplished; the last is not. It takes great effort to clearly communicate even simple ideas.

Clear communication must be the prime objective of scientific writing.[18] It requires good thinking, not fancy word processing.[15] Ideas must be presented precisely and logically, in an orderly manner that flows smoothly from idea to idea. This process of developing ideas clearly and logically captures readers' attention, keeps them reading, and maximizes the possibility that they will apply the information to their clinical practice, teaching or research.

Content, structure, and clarity of presentation are the major elements of effective scholarly communication. You are on your own with content. We address proper structure in a companion manuscript;[14] here we present the following 30 tips for clear writing. As with the companion manuscript, we present this material in a numbered list format for the reasons given there.

PARTS OF SPEECH AND GRAMMAR

1. Manuscripts are a collection of paragraphs, which are a collection of sentences, which are a collection of phrases and clauses, which are made from words. Words are classified as one or more of the nine parts of speech. These are reviewed in Tables 1 and 2 and are discussed in any grammar text; our favorite was written by Day.[4]

2. **Sentence:** Try to write in short sentences. Usually, they are easier to understand than long ones.

3. **Paragraph:** Paragraphs are not just chunks of text; rather they are logically constructed passages organized around a single major idea[16] presented in the first sentence of the paragraph. All other sentences in the paragraph develop and amplify the idea. Construct, order, and connect paragraphs to guide readers from one topic to the next, along a logical train or thought. Each paragraph should be able to be read and understood in isolation from the rest of the manuscript.

4. **Voice:** Voice refers to the action of a verb, which can be active or passive. A verb with a direct object is in the active voice. When the direct object is converted into a subject, the verb is in the passive voice (see the sentences below). A passive verb is always a verb phrase consisting of a form of the verb *be* followed by a past participle. The subject of a passive verb does not act. The active voice is usually preferred, for reasons presented later (see Active Versus Passive Voice).

ACTIVE VOICE	PASSIVE VOICE
Priscilla *applied the brace.*	The brace *was applied* by Priscilla.
We *measured* temperature every 5 minutes.	The temperature *was measured* every 5 minutes by the authors of this study.

5. **Person:** Person is the form of a verb or a pronoun which indicates whether a person is speaking (first person), is spoken to (second person), or is spoken about (third person). Use first person when telling what you did, second person when describing how to perform a technique, and third person to explain what others did.

FIRST PERSON	
I see the boy.	*We* recommend this technique.
SECOND PERSON	
Can *you* see the boy?	*Apply* two strips vertically.
THIRD PERSON	
He sees the boy.	*Each subject* lifted 100 lbs.

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Table 1. The Parts of Speech

1. Articles–a, an, or the
   a. Indefinite article
   b. Definite article

2. Nouns–words for people, places, things, or ideas
   a. Proper and common nouns
   b. Concrete and abstract nouns
   c. Collective and mass nouns

3. Adjective–words that modify a noun or pronoun

4. Pronouns–words used to replace nouns
   a. Personal pronouns
   b. Demonstrative pronouns
   c. Relative pronouns
   d. Interrogative pronouns
   e. Indefinite pronouns
   f. Reflexive pronouns

5. Verbs

6. Adverbs

7. Conjunctions–used to connect words, phrases or clauses
   a. Coordinating conjunctions
   b. Subordinating conjunctions
   c. Coordinating adverb

8. Prepositions–combine with nouns or pronouns, usually expressing direction or location

9. Interjections–words, phrases, or sentences expressing emotion

Table 2. Parts of Speech*

Three little words you often see
Are ARTICLES, a, an, and the.
A NOUN's the name of anything;
As *school* or *garden, hoop* or *swing.*
ADJECTIVE tell the kind of noun;
As *great, small, pretty, white, or brown.*
Instead of nouns the PRONOUNS stand;
Her face, *his* face, *our* arms, *your* hand.
VERBS tell of something done;
To *read, count, sing, laugh, jump,* or *run.*
How things are done the ADVERBS tell;
As *slowly, quickly, ill,* or *well.*
CONJUNCTIONS join words together;
As men *and* women, wind *or* weather;
The PREPOSITION stands before
A noun, as *in* or *through* a door.
The INTERJECTION shows surprise;
As *oh! how pretty! ah! how wise!*
The whole are called nine parts of speech,
Which reading, writing, speaking teach.

6. **Tense:** Tense is the form of the verb that indicates its relation to time. Inflection (eat, eats, eating, ate, eaten) and the use of auxiliaries (will eat, have eaten, had eaten, will have eaten, etc) show the tense of the verb. Use past tense when referring to events of the past, present tense when giving instruction, and future tense when referring to events yet to occur. A common error involving tense is failing to use past tense when describing previous research or writing.

7. **Number:** Number refers to whether a noun, a pronoun, a demonstrative adjective, or a verb is singular (book, I, this, was) or plural (books, we these, were). Sentences and paragraphs must be internally consistent concerning number. "John and Roy taped using his own technique" is incorrect because "John and Roy" is plural and "his" is singular.

WRITING CONCISELY

8. Vigorous writing is concise[22] and direct.[9] A sentence should contain no unnecessary words and a paragraph no unnecessary sentences.[22] This does not mean that all sentences and paragraphs should be short or lacking in detail, but that every word should be purposeful.[22]

9. Write directly. State the conclusion; then reference it. If the conclusion needs amplification, do it following statement of the main idea. **Note:** This advice refers to presenting results where your reference is your statistical test–see Structure Tip 26[14] as well as when discussing others' results and writings.

Be as Brief as Possible

10. Whatever you write, shortening–*condensing*–almost always makes it tighter, straighter, and easier to read and understand. Following are six suggestions to help you write concisely:[23]
    a. Present your points in logical order. Attempt to communicate your thoughts clearly in the fewest possible words.
    b. Don't waste words telling people what they already know, but be careful in your assumptions of how much people know.
    c. Cut out excess evidence and unnecessary anecdotes and examples.
    d. Look for windy phrases, the most common word wasters. For example, replace "at the present time" with "now," and "in the majority of instances" with "usually."
    e. Look for passive verbs that you can make active. Invariably, this produces a shorter sentence.
    f. When you've finished, stop. This means don't keep rambling on and on when you have already said what you wanted to say. For example, the previous sentence (and this one too).

Keep Vocabulary Simple

11. Your prime purpose should be to *explain* something, not to prove that you are smarter than your readers.[16] Using big, uncommon words tends to slow down (and perhaps annoy) the reader, while familiar words and phrases enhance understanding. Day[4] used the following five statements to condemn complicated vocabulary in writing:
    a. Thoughts are communicated more effectively with forceful, simple, and direct vocabulary than with technical or scientific jargon and worship of polysyllables.[5]
    b. "Long words name little things. All big things have little names, such as life and death, peace and war, or dawn, day, night, love, or home. Learn to use little words in a big way. It is hard to do. But they say what you mean. When you don't know what you mean, use big words. They often fool little people."[20]

c. "Big words can bog down; one may have to read them three or four times to make out what they mean . . . Short words are bright like sparks that glow in the night, moist like the sea that laps the shore, sharp like the blade of a knife, hot like salt tears that scald the cheek, quick like moths that flit from flame to flame, and terse like the dart and sting of a bee."[25]

d. "Too many scientists, and perhaps members of all professions, want to 'sound' scholarly. Therefore, they sometimes dress up a simple thought in an outrageous costume. Sometimes, the thread of the idea gets lost along the way, and all we see is the frayed costume. As for me, I don't want the costume. If I have learned anything from my years of experience in scientific writing, editing, and publishing, it is this: Simplicity of expression is a natural result of profound thought."[4]

e. "We have not known a single great scientist who could not discourse freely and interestingly with a child. Can it be that the haters of clarity have nothing to say, have observed nothing, have no clear picture of even their own fields?"[21]

12. Don't use words, expressions, or phrases known only to people with specific knowledge or interests. For example: "A scientist, using scientific jargon, wrote, 'The biota exhibited a one hundred percent mortality response.' He could have written: 'All the fish died.'"[23]

13. **Use "first-degree" words.** "These words immediately bring an image to your mind. Other words must be 'translated' through the first-degree word before you see the image."[23]
    a. For example: The logic for when to use or not use abbreviations [Tip 14] applies here.
    b. "A speech writer for President Franklin D. Roosevelt wrote, 'We are endeavoring to construct a more inclusive society.' FDR changed it to, 'We're going to make a country in which no one is left out.'"[23] By using more common words, FDR communicated his thoughts more clearly.

Avoid Overusing Abbreviations

14. Most abbreviations, acronyms, and initialisms are strongly discouraged in scientific writing.[1,3,5,12,13] Use only abbreviations that are widely known and accepted.[1,3,5,13] Other abbreviations are usually a sign of lazy writing and confuse and/or slow down readers.[1,5] An unknown abbreviation causes the reader to pause, search for the abbreviation's meaning, and mentally 'translate it.' For instance; "IBM" is instantly recognized; most readers to not have to pause and translate it. Therefore, it is an acceptable abbreviation. And since most readers would pause after reading "International Business Machine" and mentally translate it into "IBM," the abbreviation is preferred. The same logic applies to using first-degree words [Tip 13].

15. Keep "abbreviations to a minimum. The editor will look more kindly on your paper, and the readers of your paper will bless you forever."[5]

Prune Empty Words

16. One of your chief tasks when rewriting is to prune all words that lack meaningful content.[23] "Empty words" are words that cloud rather than clarify meaning. For example, *there* or *it* at the beginning of a sentence are often empty words; they de-emphasize the important elements in the sentence. The sentence conveys its message better if the subject is at the beginning of the sentence. Consider the following:
    a. **poor:** There are several techniques that could be utilized to tape an ankle.
       better: The ankle can be taped several ways.
    b. **poor:** It is my opinion that knee braces are helpful.
       better: My opinion is that knee braces are useful.
       better still: I think knee braces are useful.

EMPHASIZE FACTS–NOT WHO WROTE THEM

17. Many writers unintentionally put too much emphasis on names of other writers. This often occurs when they begin a sentence with the authors' names. Such writing tends to emphasize the authors and diverts the reader's attention from the facts. Compare the clarity of the following two sets of examples. [NOTE: References are part of the examples; they do not refer to references at the end of this paper.]
    a. **Muddled Example A**
       Coppin, Livingston, & Kuehn (4) used the same procedure as Johnson and Leider (10) but found different results. Coppin et al (4) found that grip strength significantly decreased immediately following immersion of the forearm. Strength recovery returned to normal after 40 minutes and no increases in postimmersion strength were recorded. This differs with Johnson & Leider (10) who stated that they observed significant strength increase 80 minutes posttreatment.
       Clearer Example A
       Controversy exists concerning the effect of ice water immersion on strength. (4,10) Forearm strength had increased 80 minutes postimmersion (10) and decreased immediately following immersion but returned to normal within 40 minutes postimmersion (4) in studies using similar procedures.
    b. **Muddled Example B**
       Still another of the body's systems affected by overtraining is the cardiovascular system. Dressendorfer and associates (2) determined that overtrained athletes exhibited elevated exercise heart rates. Additionally, overtrained athletes required longer time periods for return to normal heart rate following activity. The literature is unclear regarding the effect of overtraining on blood pressure. Mallerowicz and Barron (10) reported increases in resting blood pressure in overtrained athletes. Wolf (14) showed a lowered resting blood pressure. Verma et al (13) observed a lengthened time to return to basal blood pressure levels after exercise in overtrained athletes.
       Clearer Example B
       Still another of the body's systems affected by overtraining is the cardiovascular system. Overtrained athletes exhibit elevated exercise heart rates (2) and require longer for

their heart rates (2) and blood pressure (13) to return to normal following activity. The literature is unclear regarding whether overtraining results in increased (10) or decreased (14) resting blood pressure.

ACTIVE VERSUS PASSIVE VOICE

18. Personal pronouns (I, we) and the active voice *should be used* in scientific and technical writing. At one time, people thought it was improper to use personal pronouns and to write in the active voice, and these thoughts persist. But, medical editors and scientific and technical writing experts have been trying to change these ideas for more than 30 years.[7,17,24]

19. Writing in the passive voice often is dry, dull, rigid, pompous, ambiguous,[6,7,17,24] ". . . weak, evasive, convoluting, confusing, tentative, timid, sluggish, amateurish, obscene, and immoral."[2] Furthermore, "it is not 'more scientific' and 'objective' to use the passive voice; it is only more imprecise–and cowardly, . . . weasel-worded."[19]

20. "Authors sometimes resort to the passive voice to avoid the presumed immodesty of the personal pronoun 'I.' In doing so, they often introduce ambiguity."[6] "The passive voice, of course, is appropriate in certain circumstances . . . Use of the passive voice, however, to avoid the personal pronouns 'I' and 'we' to evade a direct statement or identification of the opinion, is merely false modesty."[8]

21. The passive voice is characterized by weak verbs. *To be* is a prime offender among weak verbs. Try this easy step in reviewing your work: Scrutinize every *is, are, was,* or *were.* Can you create a stronger sentence by eliminating it? This trick will not apply in every case, but you might be surprised at how often you can put it to work.[11]

22. "Circumstances sometimes necessitate use of the passive voice to avoid absurdities or convoluted phraseology. Here, as everywhere and always, good sense and judgment–hallmarks of the good editor–will prevail and will suggest the choice. If it is not really important to know which specific unit did the laboratory studies, for example, the passive voice is appropriate."[19]

PARALLELISM

23. The essence of parallelism is that similar ideas are expressed in a similar, or parallel, fashion.[10] Writers often fail to observe parallelism in a serial list (items separated by commas). This occurs, for example, when noun phrases and verb phrases are intermingled in the serial list [see Example A]. This also applies to phrases in an indented list [see Example B]. You can use numbers or letters or bullets, but it is still a list, and the items in a list should be parallel whether they are single words, phrases, or sentences.
    a. **Nonparallel Example A**
    The manufacture claims the new dynamometer is more user friendly [a verb phrase], has more data storage capability [a verb phrase], and faster printing [a noun phrase].

    Parallel Example A
    The manufacturer claims the new dynamometer is more user friendly, has more storage capability, and prints faster.

    b. **Nonparallel Example B**
    The Lachman test is preferred over the anterior drawer test for evaluating anterior cruciate ligament tears because:
    1. moving the knee to 90° is sometimes painful,
    2. negates the chance that joint mice will lock the joint,
    3. less influence of hamstring guarding

    Parallel Example B
    The Lachman test is preferred over the anterior drawer test for evaluating anterior cruciate ligament tears because it:
    1. is sometimes painful to move the knee to 90°,
    2. negates the chance that joint mice will lock the joint,
    3. lessens the influence of hamstring guarding.

24. An easy way to check for parallelism is to read the sentence repeatedly, each time eliminating all but one phrase. For instance, from Example A of Tip 23, "The manufacturer claims the new dynamometer faster printing" does not sound right; ". . . dynamometer prints faster" does sound right.

REPORTING NUMBERS AND UNITS

25. In general, numbers of a single digit (1–9) should be written out (ie, "nine," not "9"). Numbers of multiple digits (ie, 2.3 or 10 and great) are written in numerical form unless they occur at the beginning of a sentence, in which case they are written out. Exceptions: addresses, ages, dates, designators (chapter 3), figure/table numbers (Fig 1), money, temperature (8° C), time (2 weeks, 2 seconds, etc), time of day, and units of measure (25 mm, 2 g, etc).

26. Report numbers to the same precision or one more decimal place than what you measured. For example, if you measured torque in while numbers, you report "113.5 Newtons" not "113.45 Newtons." If you measured to the nearest 10 pounds you can report to the nearest pound, not to the nearest 1/10 of a pound. Precision of the instrument dictates the precision you report.

27. Units must be reported according to the style of the journal; ie, English or metric.

GENERAL HINTS

28. The word "data" refers to many numbers and is therefore plural. Use adjectives such as "these" and "those" with data, not "this" or "that."

29. Researchers don't "find," "discover," or "prove" things; they "observe" and "report" them.

30. Forget all the above rules while writing your first draft; focusing too much on style may hinder your thought processes. Get the concepts on paper first; then rewrite and rewrite until the concepts are clear.

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