

Style Points for Scientific Writing

Scientific writing follows its own style conventions. According to these conventions, some ways of writing are not useful when writing scientifically. Others are just plain wrong, even if the same words are acceptable in other types of writing such as history or literature. We have compiled the list below from the "tip lists" of others on scientific writing as well as from common errors that we come across at the Psychology Writing Center.

1. Sentence and paragraph construction. Aim for brevity.

Avoid long sentences. Comprehension falls rapidly as sentences exceed about 16 words. Try to avoid writing more than one thought per sentence. Don't run on. A semicolon can serve as a period. Unless you have a good reason to use a semicolon, just use a period.

Avoid overlong paragraphs. If you have fewer than two to three paragraphs per page, look for natural breaks. If none exist, you are probably alternating between themes or ideas, and may need to reorganize.

2. Passive vs. active voice. Active voice is usually clearer and more to the point. Replace "nests are built" with "birds build nests". Write "I found" instead of "it was discovered". Don't be afraid to use the passive voice if it really is clearer (as we do in this paper), but favor using subject, verb, object.

Passive: It is recommended by the authors of the present study that tribbles are not given to Klingons.

Active: We recommend that you do not give tribbles to Klingons.

Passive: The tribbles were exterminated by the Klingons.

Active: The Klingons exterminated the tribbles.

3. Correct word use. Make sure that you understand the meaning of words that you use. The following words are commonly misused in scientific writing.

Significant. Use in a statistical context only. The opposite of significant is "nonsignificant" (not "insignificant"). Significance refers to differences, not results.

Yes: The differences between the control and experimental groups were nonsignificant.

No: The differences were insignificant.

The results were nonsignificant.

This theory has significant implications for women as well as men.

Confound. A confound refers to some unplanned factor that may have affected the results of an experiment. An uncontrolled factor that equally affects both experimental and control groups is not usually seen as a confound.

No: The results were confounded because the thermostat failed during testing on a hot day, and participants in both experimental and control groups expressed discomfort.
(Does not describe a confound.)

Yes: The thermostat failed and room temperature rose to uncomfortable levels only during testing of the control group, which may have confounded the results.

Less vs. Fewer.

Less: When referring to collective noun (e.g., "less time")

Fewer: When referring to multiple items (e.g., "fewer copulations")

Which vs. That. As a general rule, if changing "which" to "that" does not alter the meaning, then "that" is probably correct.

Former and Latter. Avoid using these words to refer back. Doing so doesn't save many words, and too often it makes the reader backtrack to determine which was which.

Because vs. Since. "Because" is often clearer than "since".

- 4. Correct verb tense.** Verb tense can be tricky, so choose it with care. Keep verbs parallel. Use the present tense for generalizations and stable conditions. For example, use present tense to describe a theory that is currently held: "Theory of mind refers to". Use past tense for specific citations and when referring to specific results; e.g., "Sudley (1969) showed", "We found".

Never report descriptions of behavior in the future or subjunctive tense; "The female will (would) vocalize" becomes simply "The female vocalized".

In general (there are always exceptions), these are the verb tenses typically used in the following sections of a research paper:

Abstract: past tense

Theory: present tense

Methods, Results: past tense

Discussion: often alternates between past tense (when discussing results of current study: "we found") and present tense ("our results are consistent with" or "the theory of natural selection predicts that").

- 5. Correct noun use.** Nouns are regularly misused as adjectives. This habit leads to the ugly practice of piling up nouns in front of the noun they modify, i.e., a "type II motor skill nest construction behavior."
- 6. Needless words.** "Vigorous writing is concise. A sentence should contain no unnecessary words...for the same reason that a drawing should have no unnecessary lines and a machine no unnecessary parts. This requires not that the writer make all his sentences short, or that he avoid all detail and treat his subjects only in outline, but that every word tell." (Strunk & White, 1979, p. 23). This advice is true about writing in general, but lean writing is particularly important in scientific writing, because of its emphasis on conveying quantitative information efficiently.

Use superlatives sparingly or not at all. If a word expresses an absolute quality or condition, the comparative has no place. You can almost always delete "very", "quite", "rather", "somewhat", and similar words.

Avoid needless circumlocutions. The construction "was dependent upon" has the same meaning as "depended on". "There were two chicks that pecked" becomes "Two chicks pecked".

Don't use clichés (e.g., "plays a role").

Below we list examples of these and other words that are useless or incorrect in scientific writing, with suggested alternatives:

<u>Don't use</u>	<u>Better</u>
fact	evidence
prove	support
plays an important role	is important because
due to the fact that	because
a decreased number of	fewer
time period	time
longer time period	longer
brown in color	brown
round in shape	round
has been shown to be	is
it is possible that	may
demonstrate	show
exhibit	show
utilize	use
in other words	thus/hence/therefore
adverbs	<i>eliminate</i>
in this experiment/study	<i>eliminate</i>
it is interesting to note that	<i>eliminate</i>
it would thus appear that	<i>eliminate</i>
it may seem reasonable to suppose that	<i>eliminate</i>
Interestingly	<i>eliminate</i>

7. **Proofread.** Remember, your paper has your name on it. It represents you. Don't be responsible for careless errors such as these: "The tribbles where divided intotwo groups eight. both groups was fed a deit containing 8 % protein."

References and Suggested Reading

Strunk, W. Jr. & White, E.B. (1979). *The elements of style* (3rd ed.). New York: MacMillan.

Pechenik, J. (1997). *A short guide to writing about biology* (3rd ed.). New York: Addison-Wesley.

Zinsser, W. (1998). *On writing well* (6th ed.). New York: HarperCollins.

We gratefully and shamelessly drew many of the examples used here from the article, "On Writing Clear, Economic Prose", by George Barlow, former editor of *Ethology*.