

Avoiding the Pitfalls of Grammar and Punctuation

For a long time, I had difficulty making good grades in English classes because I couldn't reconcile the rules my English teachers would teach in composition classes with the abuses of those rules that I found in literature classes. Then one day I realized that just as there are different levels of dress that depend on the formality of the occasion, so too are there different levels of grammar and punctuation rules that depend on the formality of the writing. For that reason, Mark Twain could use fragments and contractions in *The Adventures of Huckleberry Finn*, but I couldn't use those same fragments and contractions in my English compositions.

Many mechanical rules, such as the rules governing pronoun references, are intended to eliminate ambiguities. Other mechanical rules, such as using a plural verb with a plural subject, meet readers' expectations. However, some grammar rules, such as not ending a sentence with a preposition or not splitting infinitives, are more difficult to justify. In some cases, eliminating the preposition from the end of a sentence improves the sentence by tightening it. In other cases, though, not having a preposition at the end convolutes the sentence, as in Winston Churchill's sarcastic remark about the rule: "Ending a sentence with a preposition is something up with which

I will not put." In this second class of cases, the rule becomes akin to wearing a tuxedo when a simple coat and tie is sufficient. Nonetheless, many managers and editors expect us to follow these tuxedo rules of grammar and punctuation even though most readers no longer have them as expectations. As a writer, you have two choices: 1) break the rule and say "to hell with" what these tuxedo critics think, or 2) work around the rule to appease the tuxedo critics.

Although tuxedo rules cause a lot of consternation between editors and writers, tuxedo rules themselves are noticed by only a few readers. Other grammar and punctuation rules, though, are noticed by most readers and are needed for efficient writing. This appendix presents a review of rules from the latter category. What about using the computer's checker for grammar and punctuation? As with the computer's spell-checker, the checker for grammar and punctuation is useful, but cannot do the job alone. Such a checker can find certain mistakes such as subject-verb disagreements, but not others such as dangling modifiers. In the end, you must decide whether the sentence is correct.

Avoiding the Common Pitfalls of Grammar

Grammar is the system of rules by which words are arranged into meaningful sentences. Although many English-speaking people complain about grammar, the number of grammatical rules in English is small compared with the number of rules in other languages such as German. The following rules address common pitfalls of grammar in scientific writing:

1. *Do not join two independent clauses with an adverb.* Sentences are the fundamental units of expression in sci-

tific documents. Readers expect you to write in sentences. When your sentences run on, your readers lose their place in the paragraph. They also lose their confidence in you.

The most common type of "run-on" occurs when the writer tries to use an adverb, such as "therefore" or "however," to join two independent clauses. In such cases, you should do one of the following: (1) begin a second sentence, (2) join the clauses with a semicolon, or (3) join the clauses with a coordinating conjunction such as "and," "or," or "but."

- | | |
|-------------|--|
| Mistake: | There is no cure for Alzheimer's, <i>however</i> , scientists have isolated the gene that causes it. |
| Correction: | There is no cure for Alzheimer's. However, scientists have isolated the gene that causes it. |
| Correction: | There is no cure for Alzheimer's; however, scientists have isolated the gene that causes it. |
| Correction: | There is no cure for Alzheimer's, but scientists have isolated the gene that causes it. |

2. *In a list, present the items in a parallel fashion.* As with the first rule, this rule is important because of reader expectations. If your first slice of pie is apple, then readers expect the remaining slices to be apple.

- | | |
|-------------|--|
| Mistake: | The process involves three main steps: cooling, chopping, and <i>pulverization</i> . |
| Correction: | The process involves three main steps: cooling, chopping, and pulverizing. |

3. *Have modifiers point to the words that they modify.* Failure to follow this rule causes ambiguities.

- | | |
|-------------|---|
| Mistake: | First, you find a latent print. <i>After being detected</i> , you dust with the powder. |
| Correction: | First, you find a latent print. After detecting the latent print, you dust with the powder. |

4. *Have each subject agree in number with the verb.* When you have a singular subject, readers expect you to use a singular verb, and when you have a plural subject, readers expect you to use a plural verb.

- Example: A series of shocks often precedes a large earthquake. (*Singular subject, singular verb.*)
- Example: Two aftershocks of the earthquake were almost as powerful as the earthquake itself. (*Plural subject, plural verb.*)

Deciding whether some subjects are singular or plural is not straightforward. For instance, compound subjects are sometimes treated as single units:

Under these conditions, the simultaneous seeding of the fluid's flow and measurement of the fluid's temperature is difficult.

Also, some foreign words such as "criterion" (Greek), "phenomenon" (Greek), and "stratum" (Latin) have unusual plurals: "criteria," "phenomena," and "strata."

Mistake: The phenomena *was* studied.

Correction: The phenomena *were* studied.

Moreover, words such as "none," "some," and "all" are singular in some instances, but plural in others.

Example: Some of the water *was* wasted.

Example: Some of the dolphins *were* infected.

Finally, if the subject consists of two singular nouns joined by *or*, *either...or*, or *neither...nor*, the subject is singular and requires a singular verb.

Example: Neither oxygen nor nitrogen *is* a noble gas.

If the subject consists of two plural nouns joined by *or*, *either...or*, or *neither...nor*, the subject is plural and requires a plural verb.

Example: Neither ceramics nor gases *conduct* electricity at low voltages.

If the subject consists of a singular noun and a plural noun joined by *or*, *either...or*, or *neither...nor*, the number of the second noun determines whether the verb is singular or plural.

Example: Neither the pilot nor the crew members *were* present. ("Crew members" *is plural; therefore, the verb is plural.*)

5. In each section of a document, maintain the same reference frame for the tenses of verbs. If in a section, you assume that an event of that section occurred in the past, then that event should remain in the past for the entire section:

Experiment. The experiment consisted of a Wolfhard-Parker burner in a stainless-steel container. The burner slot for the fuel flow was rectangular and was surrounded on all sides by passages for flow of air. Previous experiments had shown that such a geometry provides a nearly two-dimensional flame.

Because the first sentence of this section places the experiment in the past tense, all details in this section occurring during the experiment are in the past tense, and all details occurring before the time of the experiment are in the pluperfect tense (for example, "had shown"). Notice that the last detail ("provides") is in the present tense because it is a time-independent fact.

Should the writer choose to have the experiment occur in the present tense, the reference frame shifts up one notch, as do all verbs except those presenting time-independent facts.

Experiment. The experiment consists of a Wolfhard-Parker burner in a stainless-steel container. The burner slot for the fuel flow is rectangular and is surrounded on all sides by passages for flow of air. Previous experiments have shown that such a geometry provides a nearly two-dimensional flame.

Avoiding the Pitfalls of Punctuation

Punctuation rules are important. They have been devised to eliminate ambiguities in language. Pay attention to the way strong writers such as William Safire use punctuation marks. Few things undercut the authority of a piece of writing more than a simple mistake in punctuation.

The Period. The period is the most powerful piece of punctuation at your disposal. In many scientific documents, periods are not used often enough. Too many sentences go on and on, taxing the reader's concentration:

For temperatures above 1100K, the four fuels examined had about the same ignition delay when the ignition delay was defined as the time to recover the pressure loss from fuel evaporation, in spite of the large variations in ignition delay among the four fuels at lower temperatures.

There are too many ideas packed into one sentence. Clarity demands more than one sentence.

Ignition delay is the time required to recover the pressure loss from fuel evaporation. Despite the large variations in ignition delay at lower temperatures, the four fuels had about the same ignition delay for temperatures above 1100K.

Although you should generously use periods to apportion your ideas into separate sentences, you should avoid using periods to abbreviate. When used in abbreviations, periods often trip readers; readers think they've come to the end of the sentence:

Fig. 1.1 shows a gamma-ray line, i.e., radiation at a single gamma-ray energy level, that theorists had predicted would result from N. Cygni.

This sentence is choppy. By varying punctuation and cutting needless abbreviation, you can make a much smoother sentence.

Figure 1-1 shows a gamma-ray line (radiation at a single gamma-ray energy level) that theorists had predicted would result from Nova Cygni.

The Comma. Commas cause headaches for many scientists and engineers. Some scientists and engineers paint their sentences with commas. These scientists and engineers use commas anywhere there's the slightest suggestion of a pause. The result is that readers must wade through each sentence.

Although many warnings, from governments, have been issued about acquired immunodeficiency syndrome, also known as AIDS, we think that, for, at least, the next decade, its incidence will continue to increase.

This sentence reads too slowly. You *must* cut the commas after "warnings," "governments," and "that." You *could* also cut the commas surrounding "at least" and following "decade."

Other scientists and engineers scorn commas. These scientists and engineers will use commas only in the most extreme cases, and sometimes not even then. The result is that readers trip over ambiguities.

After cooling the exhaust gases continue to expand until the density which was high in the beginning reaches that of freestream.

This sentence needs a comma after "cooling" and a set of commas around the clause "which was high in the beginning." For more discussion about using commas with the word "which," see Appendix B.

There are many rules for commas. Some rules are straightforward. For instance, you should use commas to set off contrasted elements (these expressions often begin with "but" or "not").

The shark repellent with 20% copper acetate and 80% nigrosene dye was quite effective against Atlantic sharks, but ineffective against Pacific sharks.

Many injuries result from shark bumps, not shark bites.

Also, in a series of three or more items you should use commas to separate each item. Therefore, write

...neopentane, perdeuteroneopentane, or neoocotane.
...sales, production, and research and development.

Many writers in journalism and literature drop the last comma in a series, as long as no ambiguity results. Because of the complexity of items in scientific lists, though, there often are ambiguities. For that reason, I recommend

leaving in the final comma. What about lists in which there wouldn't be ambiguities? I still recommend leaving in the comma for consistency's sake. In a document, a writer establishes certain punctuation patterns that after a few pages the readers come to expect. Leaving in the comma reinforces one of those patterns.

Although the rules for commas in a series and commas setting off contrasting elements are straightforward, many comma rules are hazy. For example, using a comma after an introductory phrase depends on the situation:

In nine cases the people were infected by a rare strain of the virus that did not cause AIDS.

Placing a comma after "cases" is optional. Few readers would notice whether you did or didn't. Some introductory phrases, however, require a comma.

When feeding a shark often mistakes undesirable food items for something it really desires.

You need a comma after "feeding."

When the comma rules are hazy, how do you decide whether to use commas? First, you should realize that the purpose of commas is to eliminate ambiguities. Comma rules aren't arbitrary. They have a specific purpose: to prevent readers from tripping over language. Therefore, when unsure about a comma, think about whether your readers would trip if the comma weren't there. Be consistent, though, in your use of commas. If you punctuate a sentence structure one way in the beginning of a paper, then try to punctuate that structure the same way throughout.

The Colon. Colons introduce lists:

We studied five types of Marsupialia: opossums, bandicoots, koalas, wombats, and kangaroos.

Colons should not, though, break continuing statements.

The five types of Marsupialia studied were: opossums, bandicoots, koalas, wombats, and kangaroos. (*incorrect*)

The five types of Marsupialia studied were opossums, bandicoots, koalas, wombats, and kangaroos. (*correct*)

Besides introducing lists, colons are also used for definitions:

The laboratory growth of this germanium crystal made possible a new astronomical tool: a gamma-ray detector with high-energy resolution.

The Semicolon. The semicolon is often misused in scientific writing. Some scientists toss semicolons into sentences whenever they're unsure what punctuation to use. The semicolon is an optional piece of punctuation—you don't have to use it. In fact, many good writers don't. The semicolon has two specific purposes, though. First, it connects two sentences closely linked in thought:

There is no cure for Alzheimer's disease; it brings dementia and slow death to thousands of Americans every year.

Second, semicolons separate complex items in a list:

Four sites were considered for the research facility: Livermore, California; Albuquerque, New Mexico; Los Alamos, New Mexico; and Amarillo, Texas.

Note that commas could not effectively separate these items, because each item contains a comma.

The Dash. The dash, or em-dash, sets off parenthetical remarks that cannot be set off by commas:

The unique feature of the design is a continuous manifold, which follows a unidirectional—as opposed to serpentine—flow for the working fluid.

Dashes are also used to set off end phrases and clauses that would be ambiguous if set off by commas:

After one year, we measured mirror reflectivity at 96%—a high percentage, but not as high as originally expected.

Be careful with the dash. Too many dashes will break the continuity of your writing. Also, note that dashes (—) are different from minus signs (–) and hyphens (-).

Quotation Marks. In the United States, end quotation marks go outside of periods and commas. This rule confuses many scientists and engineers because in Great Britain, quotation marks often appear inside of periods and commas.

- | | |
|------------------|--|
| U.S. Mistake: | According to Pauling, "Science is the search for truth". |
| U.S. Correction: | According to Pauling, "Science is the search for truth." |

Hyphens. Compound words are common in scientific writing. Sometimes you can find the accepted spelling of these compounds in the dictionary. Many times, though, you can't. In such cases, you have to decide whether to hyphenate. Should you write fly ash or fly-ash? flow field or flow-field? cross section or cross-section? There are no clear-cut rules here. Many compounds start out as two words and then acquire hyphens after years of use. Although no clear-cut rules exist, identifying the compound's part of speech (noun or adjective) will help you decide.

The trend in spelling compound nouns is away from the use of hyphens because hyphens make the writing appear more complex. Therefore write

- cross section
- flow field
- fly ash

When compounds appear as adjectives in front of nouns, the trend is to use a hyphen to avoid misleading the reader. Therefore, write

- cross-sectional measurements
- flow-field predictions
- fly-ash modeling

References

- Bernstein, Theodore M., *The Careful Writer: A Modern Guide to English Usage* (New York: Atheneum, 1965).
- Fowler, H. W., *A Dictionary of Modern English Usage*, 2nd ed. (Oxford: Oxford University Press, 1965).
- Funk, Robert, Elizabeth McMahan, and Susan Day, *The Elements of Grammar for Writers* (New York, Macmillan Publishing Co., 1991).
- Hodges, John C., W. B. Horner, S. S. Webb, and R. K. Miller, *Harbrace College Handbook*, 12th edition (Fort Worth, TX: Harcourt Brace, 1994).
- Sabin, William A., *The Gregg Reference Manual* (New York: McGraw-Hill, 1985).