

Grammar

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Abstract—The most severe grammar problems exhibited by students involve sentence structure, punctuation (especially commas), passive voice, mixed use of tenses, and apostrophe errors. This handout helps students identify and correct these mistakes.

I. SENTENCE STRUCTURE

A sentence must have both a subject and verb in order to be complete. If it has both, it qualifies as an *independent clause* (one that can stand alone). If either the main subject or main verb are missing, it is a *dependent clause* (which cannot stand alone). Remember that a “subject” is not just any noun; it is specifically that noun which is doing the main action of the sentence. The worst mistake students make is to think that a dependent clause can stand alone as a sentence.

Bad example: We tested the assumption of constant acceleration. By measuring position versus time. [*second sentence is missing a subject*]

Possible fix: We tested the assumption of constant acceleration by measuring position versus time. [*dependent clause attached to first sentence*]

The second mistake students make is to join two clauses together improperly. A sentence consists of *either* an independent clause by itself, *or* two (or more) clauses joined together. In order to join clauses together, connecting words must be used between the clauses. The most common conjunctions are: and, because, but, or, nor, for, so, yet. Other connecting words are also possible, such as before, after, when, then, which, etc.

Bad example: Position versus time was measured, a calibration was first performed. [*connecting words missing*]

Possible fix: Position versus time was measured, after a calibration was performed. [*“after” connects these two independent clauses*]

II. PUNCTUATION

Punctuation mistakes usually revolve around three symbols: commas, semi-colons, and colons.

A. Commas

Commas are used in two main ways: a) to join independent and dependent clauses (as in the second example above); and b) to separate items in a series.

1) Joining Clauses with a Comma

When joining clauses, keep in mind that at least one of the clauses in the sentence must be independent. A dependent

clause can be placed *before* the independent clause, *after* the independent clause, or *in the middle* of the independent clause.

Example: After obtaining plots for each mass, we used the voltage-position relationship to convert the data. [*dependent clause placed before independent clause connected by “after”*]

Example: The equipment used was the Motorola 68HC11 microcontroller, which includes an analog-to-digital converter. [*dependent clause placed after independent clause, joined by “which”*]

Example: We used the voltage-position relationship, mentioned above, to convert the data. [*dependent clause placed in the middle of independent clause*]

2) Separating Items in a Series with a Comma

When listing items in a series, you must place a comma between each item. Please note that newspapers and magazines use a different style—they often leave out the final comma. However, the goal of academic writing is to make everything crystal clear, so the final comma is critical.

Example: The design included an analog-to-digital converter, a temperature sensor, and light-emitting diodes.

B. Semi-colons

Students mistakenly think that a semi-colon can always replace a comma. However, a semi-colon can only replace a comma when listing items in a complex series. The other use of semi-colons involves replacing a *period* between sentences that are closely related. If you are not entirely sure how to use a semi-colon, you should avoid it.

Example: Appendix A includes: voltages measured for pressure and temperature transducers; equations used for calibrating those voltages, including actual pressures and temperatures; and a graph showing the relationship between temperature and pressure. [*semi-colon acts here like a “super-comma” between items*]

Example: The experiment went as expected; no unusual events occurred. [*a period could also be used here, but it would be too disjointed*]

C. Colons

Colons are used a) to introduce a list, and b) to replace a period when the first sentence points directly to the second. The latter use is more complicated, so I recommend that students avoid it.

Example: The unusual harmonic values recorded in Table I are: -0.125 and 4.25 in column 4; -0.33 and 6.76 in column 5; and -1.35 and 2.56 in column 6.

Example: Significant heat losses were recorded by researchers: values ranging anywhere from 63% to 98% were common in the literature.

III. PASSIVE VOICE

Students write in the passive voice too often, probably because they are confused about what passive voice is. In a passive-voice sentence, the subject has “disappeared” or is implied rather than explicit. Look for sentences with verb forms like “... was done” or “...were made.” Also, watch out for sentences that begin with “There were...” or “It was...”:

Example: The theoretical values of temperature were calculated for each pressure value. [*who is doing the calculating?*]

Example: There were many variations in temperature. [*what is the main subject here?*]

Passive voice is not necessarily “wrong.” Particularly in the sciences, many authors still insist on using passive voice when describing a project, almost as if the experiment had performed itself. More and more, though, scientists are realizing that passive voice makes for difficult reading. If your professor allows it, you should consider using active voice when describing *observations* or *procedures*. Passive voice, on the other hand, is best for describing *results*, but it can also be used for procedures, perhaps in combination with active voice.

Example: Three different temperatures were obtained from each of the three pressure valves. [*passive voice for results*] However, we did not observe an increase in cooling efficiency with any of the valves. [*active voice for observations*]

Example: Global efficiencies were calculated for each run. First we measured heat loss, and then we determined variations due to environmental factors. [*combination of passive and active voice for procedures*]

If you use active voice in scientific writing, you should stick to “we” rather than “I” (as in the examples above) because it sounds more formal.

IV. TENSE

When writing research papers, students often mix tenses. They will begin a paragraph with past tense and shift to present tense, or vice versa. In general, you should maintain your writing in either one tense or the other. For technical writing, past tense is always appropriate when describing procedures performed or results obtained. However, you should switch to present tense when making generalized statements that are true outside of the experiment’s context.

Example: We measured point efficiencies and found significant fluctuations in the values. This was probably due to variations in ethanol composition. [*past tense used in these two sentences*] Even so, these results indicate that an increase in steam pressure does not produce an increase in reboiler efficiency. [*present tense used here*]

V. APOSTROPHES

Apostrophes are used in two cases: a) when forming a contraction, or b) when forming a possessive noun. The biggest mistake students make is trying to use an apostrophe to form a plural. *Apostrophes are almost never used to form a plural noun*, although they will appear with *possessive plural nouns*. Possessive pronouns never have apostrophes.

A. Contractions

Contractions *always* have apostrophes. A contraction is formed when part of a word has been left out. For example, the apostrophe in “it’s” means that letters have been left out (“it is”). Technical writing is very formal, so contractions shouldn’t—er, should not—be used.

B. Possessive Nouns

Possessive nouns *always* have apostrophes and usually an extra “s” to denote possession. (A noun is possessive if it “owns” something. For example, “the researcher’s findings” means that the findings *belong* to the researcher.) Confusion arises when the noun being made possessive already ends in “s” or in an “s”-like sound such as “x” or “z.” Where should the apostrophe be placed? Should you add another “s”? Different style manuals have different rules, so you will see this done differently. Strunk and White advise adding another “s” except for proper names ending in “s”:

- the *mass*’s acceleration rate
- *Rogers*’ method

C. Possessive Plural Nouns

Possessive plural nouns *always* have apostrophes but not an extra “s.” The rule of thumb is: **Make the noun plural first, then add the apostrophe:**

- the *researchers*’ assumptions
- the *masses*’ acceleration rates

D. Possessive Pronouns

Pronouns *never* have apostrophes, even when they are showing possession:

- its, hers, theirs, ours.

E. Exceptions

The only time an apostrophe is used to form a plural (and NOT show possession) is with symbols that need visual clarification to denote plurality.

- Email addresses never contain two @’s.
- The b/s’s in the figure refer to bits per second.

Acronyms, however, usually do not need an apostrophe to denote plurality, since they are all caps:

- We used two PCs in the experiment.