



Chapter 3. Grammar Reminders and a Little Technical Writing

This chapter contains basic information, such as “Subject-Verb Agreement”, as well as more unusual aspects of writing, such as “Anthropomorphism”.

Anthropomorphism

Anthropomorphism is “an interpretation of what is not human or personal in terms of human or personal characteristics” (Merriam-Webster's Collegiate Dictionary. Tenth Edition. Springfield (MA): Merriam-Webster, Inc.; 2002). You can read more about it in the [Merriam-Webster Online Dictionary](#).

Anthropomorphism seems to occur more frequently in texts about software.

Example:

A function to determine all features in a particular region of a Bioseq **need not care** what types of features **they** are.

Rewrite as:

A function to determine all features in a particular region of a Bioseq **is not affected by** what types of features **there** are.

Although text that has been anthropomorphosized may be entertaining, an international audience is better served by presenting text in a straightforward manner.

Common Errors

Here are the top seven errors, with specific examples of correct usage underlined.

1. “as/because”

Do not use “as” when “because” is meant.

- Supplied as: The polyA tail of an mRNA (cDNA) sequence should never be trimmed as it provides a useful landmark.
- Should be: The polyA tail of an mRNA (cDNA) sequence should never be trimmed because it provides a useful landmark.

2. “comprise” and “compose”

Remember that “the whole comprises the parts”. The following examples use the words correctly.

- The *FMRI* gene comprises 18 exons interspersed over ~40,000 base pairs of sequence.

- b. The Alu repeat family comprises short, interspersed elements present in multiple copies in the genomes of humans and other primates.
- c. The second model comprises three closely spaced exons.
- d. OMIM comprises descriptive, full-text MIM entries, a tabular synopsis of the Human Gene Map, clinical synopses, and mini-MIMs.
- e. Segmented Bioseqs are *composed of* pointers to other raw sequences in GenBank.
Never use “comprised of”. Use “composed of” instead.

3. “due to”

Do not use “due to” as a substitute for “because of” or “attributable to”. These sentences are correct.

- a. ...or whether the similarity observed is attributable to chance alone.
- b. Much of the success of the project is attributable to the flood of new molecular data.
- c. The term refers to similarity attributable to descent from a common ancestor.
- d. Many of them exist in the coding region of a gene, but the precise location cannot be resolved because of an error in the alignment of the exon.
- e. If a gene has multiple transcripts because of alternative splicing, then a variation can have several different functional relationships to the gene.
- f. GenBank annotation staff would respond to a request for a list of Accession numbers that are due to appear in upcoming issues of a publisher’s journal(s).

4. “from... to ...” and “between... and ...”

The “from... to ...” construction **contains** the end points, but the “between... and ...” construction **excludes** the end points.

- a. No space is allowed between the value and the field name.
- b. FMR1 resides somewhere between markers DXS532 and DXS7389.
- c. The bars represent matches from residues 3 to 60.

5. “it’s” *versus* “its”

“It’s” is a contraction of “it is”. If you are having trouble using “it’s”, just substitute “it is” in your sentence and see if it makes sense. If so, then you are using “it’s” correctly. “Its”, on the other hand, shows possession or refers to itself. Most errors occur because of the incorrect use of the contraction—“it’s”. The confusion probably arises from the way in which possessives are formed in English, for example, Belinda’s cat, Jeff’s boat, but its mechanism, etc.

- a. The sequence of each exon is an individual raw Bioseq in its own right.
- b. It’s the lock that is lost, not its combination.

6. “since/because”

Use “since” when referring to time.

- a. During each build, we cluster the data submitted since the last build into the existing refSNPs and form new refSNPs when necessary.
- b. The set of new data entering each build typically includes all submissions received since the close of data in the previous build.
- c. Data are presented by quarter since operations began on July 25, 2000.
- d. Because the execution of the search algorithm is decoupled from the formatting, the results can be delivered in a variety of formats without rerunning the search.

- e. XML is also structured output but can be produced from ASN.1 because it has equivalent information.

7. “which/that”

The word “which” usually introduces information that is “extra” (or interesting but not the point being made at the time), meaning that the sentence is complete and imparts what is necessary without the information that is introduced by “which”. The word “that”, on the other hand, introduces information that is necessary to understanding the meaning/intent of the sentence.

- a. The resulting file, which PHRAP outputs in “.ace” format, consists of the sequence itself plus the associated quality scores.
- b. The alignment information is extracted into a Seq-align, which is packaged as annotation (Seq-annot) associated with the BioSeqSet.
- c. An Entrez “node” is a collection of data that is grouped together and indexed together.
- d. Entrez is designed to infer relationships between different data that may suggest future experiments or assist in interpretation of the available information.

Gender Neutral

Use gender-neutral language.

For example, change:

mankind → humanity

best man for the job → best person for the job

the common man → average person, ordinary people

mailman → mail carrier

congressman → congressional representative

policeman → police officer

Other ways to handle this problem are to recast a sentence in the plural, reword to eliminate gender problems, or replace the masculine pronoun with “one” or “you”.

Hedging

Hedging takes place when an author wants to “evade the risk of commitment especially by leaving open a way of retreat” (Merriam-Webster's Collegiate Dictionary. Tenth Edition. Springfield (MA): Merriam-Webster, Inc. 2002). Usually, the sentence will read something like, “This assay may provide a better way of identifying mutant genes”. It is reasonable to temper one's confidence about a new method.

Sometimes authors do not realize they are using a kind of hedging when they unintentionally express a lack of confidence by using certain phrases, such as “intends to”, “aims to”, and “has the goal of”.

Examine this sentence: “GenBank aims to provide a searchable database of sequences.”

Contrast that sentence with this one: “GenBank is a searchable sequence database”.

This is a more confident statement, and the reader is not distracted from the main thought.

Point of View: First Person, Second Person, Third Person

The point of view describes whether a person is:

- **describing events as a participant**, such as “I raced to catch the train before it could enter the tunnel” (told in the first person because it uses “I”)
- **giving instructions to someone directly**, such as “You must catch the train before it reaches the tunnel” (“you” is used for second person)
- **relating events about others**, such as “He failed to catch the train before it reached the tunnel” (third person because of “he”)

The most common error occurs when different points of view are mixed; usually, the second-person “you” is mixed with a third person point of view:

Example:

“The data are entered as field names. One must be careful to end each field name with a delimiter code. You don't have to worry about whether the delimiter code is in uppercase or lowercase. One must then exit this subroutine to run the next portion of the program.”

In the example above, the second-person “you” has been used in a paragraph of third-person sentences. To keep the same point of view, one could have said, “One does not have to worry about whether the delimiter code is in uppercase or lowercase.”

Sometimes “one” is considered a little formal. If a formal approach is not needed, consider this approach, which uses an implied “you”:

“Enter the data as field names, being careful to end each field name with a delimiter code. Either uppercase or lowercase may be used in delimiter codes because they are case insensitive. After entering all of the data, exit the subroutine and continue with the next programmed task.”

First person uses: **I, we**

Second person uses: **you**

Third person uses: **he, she, it, one, they**

Check your text for consistency in the use of point of view. Check the use of “you” first.

Scientific English: Past, Present, and Simple

One of the finer points of science writing in English is the expression of the degree of acceptance of information by the use of present tense and past tense. Established knowledge (statements of fact, natural laws, universal (established) truths, or a widely held tenet of science) is given in the **simple present tense**, and the new results and findings of an author's own research are given in the **simple past tense**. Once an author's findings are published **and** become an established truth (generally accepted by experts in the field), they are referred to in the present tense.

These ideas are complex but are illustrated below:

1. Simple present tense:
 - PubMed Central **is** the National Library of Medicine's digital archive of full-text journal literature.
 - Entrez **is** the text-based search and retrieval system used at NCBI for all of the major databases.

2. Simple past tense (isolates the event in the past):

- The cells **were** produced by continuous proliferation of the hybridoma cell line.
- The lytic ability of the T8 cell subset **was** examined.

Some authors, especially those whose native language is not English, are not as aware that the use of past and present tenses signals the status of the presented information. Because the use of the simple present tense signals that something is a general truth, the reader is given some feeling of certainty about the information. A misinterpretation of the significance of the findings could occur if the wrong tense is used. The use of the simple present tense when first presenting **one's own findings** could be perceived as arrogant as well.

Even the demonstration of significant results in one's own study is **not a reason** for using the present tense in the Discussion section of the paper first reporting those results. However, explanations of graphical presentations of data, such as tables and figures, should use the present tense. For example, when referring to Table 3, it is fine to say: "Table 3 **shows** that the mean yield is lower than expected."

Note to Authors: To avoid misunderstanding, report **your findings** in the past tense.

A fascinating, detailed account of this convention is provided in:

- Burrough-Boenisch J. Examining present tense conventions in scientific writing in the light of reader reactions to three Dutch-authored discussions. *English for Specific Purposes* 2003;22(1):5-24.

Additional information about the use of tenses in science is provided in:

- Matthews JR, Bowen JM, Matthews RW. *Successful scientific writing: a step-by-step guide for biomedical scientists*. 2nd edition. Cambridge: Cambridge University Press; 2001.

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Subject-Verb Agreement

Subject and verb agreement means that if the subject is singular, the verb must be singular. If the subject is plural, the verb must be plural. This sounds very simple, but people run into trouble because of intervening phrases (phrases that come between the subject and the verb). For example, this type of sentence gives many people trouble:

- The number of birds was impressive.

The subject of the sentence is "number" (singular), and the verb is "was" (singular). The plural word "birds" is part of a prepositional phrase (that intervenes between the subject and the verb) and therefore is not considered when checking for subject-verb agreement.

Voice: Active versus Passive

When the subject of the sentence performs the action of the verb, the sentence has been constructed in active voice.

- I hit the ball across the yard.

If the subject is being acted upon, then the sentence has been constructed in the passive voice.

- The ball was hit across the yard.

The choice of active or passive sentence structure affects the emphasis in the sentence (see also “Emphasis” in the section [Style Points and Conventions](#)). The **beginning** of the sentence receives more emphasis in the active voice. The **end** of the sentence receives more emphasis in the passive voice. Both can be used to advantage.

Passive Voice

Advantages of passive voice:

- minimizes or leaves out the role of the person performing an action (for cases where you do not know who did it, do not want to mention who did it, or who did it is irrelevant)
- softens the tone or makes the message less personal

Disadvantages of passive voice:

- makes the sentence wordy and awkward
- adds formality

Sentences constructed in passive voice often begin with “There is” and “There are”. Most sentences can be improved by changing to active voice:

- **Instead of:** “There are dozens of research resources at NCBI.”
- **Consider:** “NCBI offers dozens of research resources.”

Active Voice

Advantages of active voice:

- Shorter sentences are easier to read (“was” and “by” are usually eliminated).
- Sentences are more dynamic, forceful, clearer, stronger, and concise.

Disadvantage of active voice:

- Sentence overuse emphasizes the doer of the action.

Mixing Voices

Do not mix active and passive constructions in the same sentence. An easy way to check for passive voice is by asking, “Who did that?” If you cannot give a definite answer, the sentence is passive.

Scientific writing most often uses passive sentence construction to give the author less importance and to focus attention on the facts at hand. But scientific writing can be made more engaging by using some sentences in active voice as well.

Strike a balance between the use of active voice and passive voice. Both have their uses. Consider the emphasis in the sentence and whether the sentence needs to be more dynamic. The use of more constructions in the active voice makes text more engaging.

Wordy Constructions to Avoid, Substitutions of Common Phrases, Plainer Synonyms

To write concisely, you must eliminate superfluous detail. Sometimes, this is just a matter of eliminating some phrases altogether. Take the phrase “is designed to”. Unless the design is the point of the sentence, drop this phrase. Type this search in Google: “is designed to” site:ncbi.nlm.nih.gov. Look at the results and try mentally dropping the phrase “is designed to”. Was the sentence adversely affected or improved?

The following list contains helpful suggestions for writing more succinctly.

a number of → few, many, several, some

a majority of → most

accordingly → therefore

accounted for the fact that → because

actually → (consider eliminating this word)

additional → more, added, other

additionally → and, also

adequate number of → enough

adjacent to → close to, near, next to

advantageous → useful, helpful

along the lines of → similar to

an innumerable number of → innumerable, countless, many

an order of magnitude → 10 times

antecedent to → before

anterior to → before

anticipate → expect

any particular type of → any

are of the same opinion → agree

as a consequence of → because of

as a means to → to

as a result of → because of, from

as far as our own observations are concerned, they show → we observed

as regards → about, concerning

as to → on, for, about, of

ascertain the location of → find

at an early date → soon

at present → now, currently

at such time as → when

at the place where → where

at the present moment → now

at the present time → now

at the time that → when

at this point in time → now

basically → (consider eliminating this word)

because of the fact that → given that

by means of → with, in, by

by reason of → because of

by virtue of → by, under, because of

caused injuries to → injured

completely filled → filled

concerning the matter of → on, for

concur → agree

connect together → by

consequence → result

consequently → therefore

consider all factors carefully → consider

consolidate → combine, join

constitute → make up

deem → consider, think, treat as

definitely → (consider eliminating this word)

definitely proved → proved

demonstrate → show, prove

designate → appoint, name, choose, set

despite the fact that → although

diminish → lessen, reduce

discontinue → stop

due to the fact that → because

during such time as → while

during the course of → during, while

during the period from → from

during the time that → while, when

elucidate → explain, clarify

enumerate → list, name

equally as → equally

equivalent → equal, the same

excessive number of → too many

fabricate → build, make

facilitate → make easier, help

fewer in number → fewer

following → after

for a period of → for

for all intents and purposes → (consider eliminating this phrase)

for the purpose of → to, for

for the purpose of examining → to examine

for the reason that → because

frequently → often

from the point of view of → from, for

furthermore it would seem → and

generally → (consider eliminating this word)

give proper consideration to → consider

give rise to → cause

goes under the name of → is called

future plans → plans

has a tendency to → tends

has the ability to → can

has the capability of → can, is able

has discretion to → may

have a negative impact → hurt, harm

hence → therefore

identical → same

if conditions are such that → if, when

illustrate → show

impact → affect, influence

implement → carry out, begin, start, create, set up

in a precise manner → precisely

in a satisfactory manner → satisfactorily

in a situation where → if, when

in addition to → besides, also

in all cases → always, invariably

in an adequate manner → adequately

in back of → behind

in case → if

in close proximity to → near

in connection with → with, about, concerning, for

in excess of → more than, over

in favor of → for

in lieu of → instead of, rather than

in order to → to, for

in proximity to → close to, near

in reference to → on, for

in regard to → on, for

in relation to → on, for

in spite of the fact that → although

in terms of → in, for, about

in the absence of → without

in the amount of → for

in the case in which → when

in the case of → in, with

in the course of → during, while

in the event that → if, when

in the nature of → like, similar to

in the near future → soon

in the neighborhood of → about, roughly

in the place in which → where

in this instance, however → but

in view of the fact that → because

in the vicinity of → close to, near

inasmuch as → given that

inception → start, beginning

indicate → show, suggest

indication → sign

individual → person

initial → first

initiate → begin, start, set up

institute → begin, start, set up

is able to → can

is authorized to → may

is capable of → can

is in a position to → can, may

is permitted to → may

it has been reported by Smith → Smith reported

it is (omit)

it is believed that (omit)

it is felt that (omit)

it is important that → must, should

it is necessary that → must, should

it is often the case that → often

it is possible that the cause is → the cause may be

it is probable that → probably

it is this that → this

it is worth pointing out that → note that

it would appear that → apparently

it would thus appear that → apparently

kind of → rather (or consider eliminating this phrase)

lacked the ability to → could not
large amounts of → much
large in size → large
large numbers of → many
located in → in
located near → near
magnitude → size
manufacture → make
methodologies → methods
modification → change
modify → change
necessitate → require
necessitates the inclusion of → needs, requires
necessity → need, requirement
no later than September 30 → before October 1
notification → notice
notwithstanding → despite
notwithstanding the fact that → although
numerous → many
objective → goal, aim
on a daily basis → daily, every day
on account of → because
on behalf of → for
on or before September 30 → before October 1
on the basis of → by, from, because of
on the grounds that → because
on the part of → by
on the occasion of → on
on the part of → by
ongoing → continuing, active
opt for → choose

optimum → best

option → choice

oval in shape, oval-shaped → oval

owing to the fact that → because

parameter → limit, boundary, guideline, condition

particular → (consider eliminating this word)

past history → history

preclude → prevent

preferable → best, better, preferred

posterior to → after

previous → earlier, last, past

previous to → before

previously → before, earlier

principal → main, chief

prior → earlier

prior to → before

provided that → if, but

really → (consider eliminating this phrase)

referred to as → called

regarding → about, on, for

represents → is, makes up, stands for

responsible for → causes, has charge of

results so far achieved → results thus far, results to date

retain → keep

round in shape → round

serves the function of being → is

situated → placed, sits, lies

smaller in size → smaller

sort of → (consider eliminating this phrase)

subsequent to → later, after

subsequently → later, afterwards, then

sufficient → enough

sufficient number of → enough

take into consideration → consider

terminate → end, stop

termination → end

the organism in question → this organism

the majority of → most

the question as to whether → whether

the reason why is that → because

the tests have not as yet → the tests have not

the treatment having been performed → after treatment

there are (omit)

there can be little doubt that this is → this probably is

there is (omit)

there is a need for → must, should

this is a subject that → this subject

this is a topic that → this topic

there is no doubt but that → doubtless, no doubt

through the use of → by, with (not “via”)

throughout the entire area → throughout the area

throughout the whole experiment → throughout the experiment

transpire → happen

type of → (consider eliminating this phrase)

two equal halves → halves

under circumstances in which →

under the provisions of → under

until such time as → until

used to fulfil → needed

utilize → use

visualize → think of, imagine

warrant the use of → must or should have, require

was of the opinion that → believed

with a view to → to, for

with a view to getting → to get

with reference to → about

with regard to → about, concerning

with respect to → on, for

with the exception of → except for

with the object of → to, for

with the result that → so that

without some kind of → without