

Revising: Part 1, Subjects and Actions

Our classes on writing are taken from the online Scientific Writing Resource at Duke University. <http://cgi.duke.edu/web/sciwriting/>

In turn, they credit these two references for most of the main ideas:

The Science of Scientific Writing, by George Gopen and Judith Swan. American Scientist, November–December 1990.

<http://www.americanscientist.org/issues/pub/the-science-of-scientific-writing>

Style: Ten Lessons in Clarity and Grace, by Joseph Williams.

The goal of writing is communication. These lessons do not put forth absolute rules. If the intent of the writer is communicated, the writing was effective, regardless of rules kept or broken. Instead of rules, these lessons provide principles of communication and writing from the reader's perspective. If you know what readers expect, then you can fill that expectation. Approaching writing like this will help you improve your written communication.

Subjects and Actions

Sentences usually communicate 2 main pieces of information: 1) who is the sentence about, and 2) what did they do? You can help readers find this information using cues in your sentence structure.

To do so, you need to be able to find the subject and the verb in a sentence. Here are some examples. Can you find the subjects and verbs?

I went to the store.

The algorithm works rather efficiently thanks to profiling.

The random smoothing splines are invoked by calling the RANDOM statement.

Principle 1: Put actions in verbs

Verbs are action words: they describe motion, like to explore, to examine, or to observe. Verbs can be turned into nouns, which changes the word from an action to a thing. This is called a nominalization. Nominalizations are nouns that contain a hidden action.

Here are some examples of scientific verbs and their nominalizations: regulate/regulation, analyze/analysis, occur/occurrence, understand/understanding, investigate/investigation.

There is nothing inherently wrong with nominalizations, but many scientific writers misuse them by using abstract nouns to convey action. This creates a disconnect between structure and meaning — the intended action is no longer found in the verb. **Most readers expect the main action of a clause to be found in a verb.** If you fail to put your intended action in a verb, your reader must work to determine where the action is. Compare:

We performed an analysis on the data. **OR** We analyzed the data.

Scientific writing regularly disguises the main actions in nouns, costing reader energy. If you overuse nominalizations, you can improve your writing by restructuring your sentences to capture actions in verbs.

Revision Technique: 1) Go through your manuscript and underline all nominalizations. Take a closer look at these words to see if they should be changed to verbs. 2) Go through the manuscript and underline all the verbs. For each verb, ask yourself this question: Does this verb capture the action in the sentence? 3) Try rewriting the sentences

The ABC database has been subject to different improvements, modifications, and extensions in structure and content over the years.

Significant positive correlations were evident between the substitution rate and a nucleosome score from resting human T-cells.

Principle 2: Put characters in subjects

The character is the actor (the entity performing the action). Readers expect the main character in a clause to be found in the subject. Characters can be (and often are) abstract nouns, like expression level or exon usage.

Here are some examples. Imagine these sentences in a paragraph discussing bacteria. Here are two examples that use the subjects differently. In the first example, there is a disconnect between subject and intended main character. In the second version, the content is the same, but the structure is changed. The main character is now found in the subject.

The movement in the liquid medium of the bacteria was accomplished by microflagella.

The bacteria move themselves in the liquid medium with microflagella.

In the first sentence, the grammatical subject was an abstract noun (movement), which is really describing the action of the main character. The second example is clearer because the intended actor (what's the sentence about?) is the same as the grammatical subject (bacteria).

Principle 2b: Subject Shifting

More importantly, science writing often has the problem of subject shifting — when subjects change erratically throughout a paragraph. It's fine to change the grammatical subject from one sentence to the next if you intend to change the topic. But often, writers intend to discuss a particular topic for several sentences (the topic doesn't change), but change the grammatical subjects. You can fulfill reader expectations by maintaining a logical flow of grammatical subjects in a paragraph. There are two primary ways to accomplish this: 1) Maintain a common subject throughout a one-topic paragraph 2) Shift the subject appropriately according to the story

In this 4-sentence paragraph, the topic and the main character are primate genome sequences. In the first example, the grammatical subject matches the topic. Underline the subjects of the sentence.

To understand human evolution, genomes from related primates are necessary. For example, several primate genomes are needed to identify features common to primates or unique to humans. Fortunately, such genome-wide exploration is now a reality; in the past 5 years, genome sequences of several nonhuman primates have been released.

In this alternative example, the grammatical subjects shift, while the topic of the paragraph stays the same. This paragraph says the same thing as the previous one:

To understand human evolution, genomes from related primates are necessary. For example, identification of features common among primates or unique to humans will require several primate genomes. Fortunately, scientists can now do such genome-wide exploration; in the past 5 years, the community has released several nonhuman primate genome sequences.

Principle 3: Keep subjects near verbs

Recall the two primary pieces of information a reader looks for: who is the sentence about? what are they doing?

When these two pieces of information are far apart, that usually means one of them isn't arriving until the end of the sentence. This confuses readers, because they can't piece together the whole picture without answers to these questions.

For example, can you understand this sentence on the first reading? Compare with the second sentence.

- Farmers that understand the difference between the soil requirements of plants when they are seedlings and their requirements when they are mature are in high demand.
- Farmers are in high demand if they can understand the difference between the soil requirements of plants when they are seedlings and their requirements when they are mature.

In the first, the subject Farmers is separated from the verb phrase are in high demand by 21 words. If we reduce this distance, we get a more understandable (though still not perfect) sentence:

Revision Technique 1) Identify the main subject and its verb in your sentence. 2) If they are far apart, rephrase the sentence to bring them closer together.

Peanuts, shrimp, almonds, milk or anything else with lactose, and wheat or anything with gluten all represent things that people are commonly allergic to.

The number of different mechanisms that may exist for cells to interpret morphogens, and the importance of design features such as feedback or local cell-cell communication, is unclear.

Name: _____

Which principle do you think you struggle the most with? Why?
