Some General Comments and Pointers on Scientific Writing

Jan Lipfert, 2017-01-12

The flow of logic. Try to make the logical connections between statements in the text clear. In general, do not just juxtapose sentences that make true statements, but make clear how the statements are related.
Good words to highlight the logical connections are: *However, in contrast, conversely, in addition.*

Be explicit about what your main points are and where you are going. As a general rule, every chapter should start with an introductory paragraph that lets the reader know where to place the chapter in the general context and what the chapter is about. Similar, every subsection should start with a "topic sentence" or two that lets the reader know where this section is going.

Referring to figures, tables, and references. There are no absolute rules how to refer to figures, tables, and references in scientific writing. However, in my experience it works best if you refer to figures/tables/references in the main text to back up your statements, usually after the statement or at the end of a sentence. Do not describe figures in the main text.

Example:
DO SAY: *The measured conductance increases with temperature (Figure 2, red circles) and the data are well described by a linear relationship (Figure 2, solid line).*
DO NOT SAY: *Figure 2 shows a plot of the measured conductance as a function of temperature. The red circles are the experimental data and the straight line is a fit of a linear model.*

Clearly distinguish experimental observations and their interpretation. Often it is important and useful to clearly distinguish between the direct experimental observation and models/interpretation of the experimental data. The experimental observations should be as solid and uncontestable as possible. If you are not sure about your measurements, you should do additional controls/measurements/experimental work and seriously question whether the work should be published at this stage. The interpretation of the data, in contrast, can be less sure. There might be no good model that explains the data at this stage. There might be multiple competing models that can explain a given set of experimental observations. This ambiguity is a normal part of science. Your presentation of the work should reflect this distinction. It works usually well to first describe the experimental observations and to only later discuss their interpretation. It is okay to give even speculative and unsure interpretations of experimental results, if it is clear from the text that you are giving a possible, but speculative interpretation. In this case, use statements like
The data might suggest that…
The finding that the conductance increases with temperature might indicate that… / suggests a possible role of …
We speculate that… / We hypothesize that…

Be specific. Avoid statements like “this”, “those”, “this finding”, “these observations”, but rather state explicitly what finding or observation you are referring to.

Complete all comparatives. Whenever you use a comparative, such as *larger, brighter, more rapid*, etc. you must complete the comparative by explicitly stating what is compared to what.
DO NOT SAY: *YOYO stained DNA is brighter.*
DO SAY: *YOYO stained DNA is brighter than ethidium bromide stained DNA.*

Referring to different sections of your text. In general, avoid statements like “as discussed previously”, “as described before”, etc. Either the reader remembers it, in which case you do not have to say it again. Or the reader does not remember it, in which case the statement does not help and is only irritating. However, you can certainly refer to other sections of your text, but only if this makes a specific point and refers to a specific section (in which case you refer to this specific section explicitly).

Avoid statements that do not help the reader. Do not use statements/phrases like “it is obvious”, “it can easily be seen”, “amongst many others”, etc.; if the reader knows what you are talking about, he/she does not learn anything new. If they do not know what you are talking about, statements like this do not help and are only irritating.

Avoid the “weasel words”. Word like “fairly”, “generally”, “mostly”, etc. are imprecise and should be avoided in scientific writing, at least as a general rule.

Avoid colloquial language. There are many words and expressions that are perfectly fine in spoken language, but have no place in formal written language. An important example are contractions, i.e. “can’t”, “don’t”, “wouldn’t”, etc.; they should always be written out in written language, i.e. use “cannot”, “do not”, “would not” instead.
It goes without saying that you should not use slang or swear words in scientific writing.

Spelling. Do use a spell checker. It will not find all mistakes, since many spell checkers only check whether every word exists in a pre-determined library. However, it is very useful to catch simple typos.

Singular/plural. Make sure your verbs and nouns and words like this/that etc. are in plural/singular agreement. Most spell checkers will not complain, as they only check whether all words exist.
In particular the word “data” is always plural (the singular is “datum”).

Units and numbers. Always put a space between a number and its unit (the only exceptions are the symbols for degree, minute, second: º, ’, and ’’). In Latex, this will typically involve stopping the math mode before you type the unit. In English, use a decimal point and not a comma. Do not put a space after the decimal point (or comma, if writing in say Dutch or German) in numbers.