Style

Correct style in scientific and academic English is taught at several universities [6], [8], [9].
The characteristics of good style are the same in all fields, be it medicine, law, social sciences, linguistics, OR general English!

I. Hedging

Sometimes an author is overly cautious. There may be several reasons for this: it emphasizes the limitations or limited applicability of their results, they want to protect themselves against possible research and measurement errors or they want to express modesty. However, it is easy to overdo it. Excessively cautious language makes the paper less powerful.

II. Simplicity and clarity

Many writers feel that a scientific or academic text is more serious and scientific if it is more complicated and verbose. However, on the one hand, such a text is more difficult for readers to understand, and on the other hand, the writer is easily confused by the overcomplicated sentences, and the result is a confusing, unclear text with numerous errors, especially if the language is not the writer's native language.
For example, if an engineer has to design a machine, they are rightly expected to make the machine as small and light as possible, with the least possible consumption, and operate with the best possible efficiency. I do not believe that a physicist, mathematician, doctor, chemist, should work less efficiently.
And indeed, similar efficiency is expected of a scientist writing a scientific paper.
An engineer cannot design unnecessary, functionless elements into a machine just because they look "elegant" or "cool", make the machine seem more complicated and therefore more "important", even if they reduce efficiency and increase consumption.
In exactly the same way, you cannot abuse language and communication this way.

This is not only my opinion—major publishers, including Elsevier, Springer, Science, and Nature expect simple, accurate and understandable language.

Elsevier [1]:

> *Eliminate "noise words". Read your text carefully. Remove words and phrases that do not convey information that relates to your point.* ***For example, "it should be noted that the insertion" can be said more simply "the insertion... "***

Springer [2]:

> *When writing your manuscript, be as brief as possible without omitting essential details. A common mistake that authors make is trying to include too much information in their sentences. When sentences are long, most readers will have to read the sentence at least twice to understand the ideas presented.*
>
> *Your readers, like you, are busy and want to find the relevant information quickly and efficiently. To improve the readability of your writing, use short sentences. This can be achieved by presenting only one idea per sentence and limiting the sentence length to a maximum of 20–25 words.*

Of course, when necessary, you can write sentences longer than this, but they should also be clear and understandable and not every sentence should be long.

Springer [2] also advises authors to write simply. Many authors have the misconception that they must use complicated language because they are describing complicated things, but as Springer writes, this is a misconception.

Keep it simple! Simple language is usually clearer; it is more precise and concise than complex language. ***Many authors incorrectly assume that they should use complicated language as they are often describing something that is sophisticated, when in fact it can confuse the reader and weaken your message*** .

Nature [3]:

To reach their goal, ***papers must aim to inform, not impress*** . ***They must be highly readable — that is, clear, accurate, and concise*** . *They are more likely to be cited by other scientists if they are helpful rather than cryptic or self-centered.*

Science [4] :

Write concisely (e.g., "even though," not "in spite of the fact that").

OWL Purdue Online Writing Lab (Purdue University) [6]:

The goal of concise writing is to use the most effective words. Concise writing does not always have the fewest words, but it always uses the strongest ones. ***Writers often fill sentences with weak or unnecessary words that can be deleted or replaced*** . ***Words and phrases should be deliberately chosen for the work they are doing. Like bad employees, words that don't accomplish enough should be fired.*** *When only the most effective words remain, writing will be far more concise and readable.*

I would add to this that only a simple, concise, easy-to-understand style is elegant. Overcomplicated writing is not "scientific", it just means that the author lacks the ability to write elegantly and efficiently.

William Strunk Jr. is a professor of English [7]:

Vigorous writing is concise. ***A sentence should contain no unnecessary words, a paragraph no unnecessary sentences, for the same reason that a drawing should have no unnecessary lines and a machine no unnecessary parts. This requires not that the writer make all his sentences short, or that he avoids all detail and treats his subjects only in outline, but that every word tells.***

So, it is not that every sentence should be very short—it is more readable and enjoyable if we vary the length of the sentences, but the text should always be clear and easy to understand even on first reading.

Duke University's Scientific Writing Resource online course [8] writes:

However, scientific writers sometimes needlessly inflate their writing in length and complexity in an effort to "sound scientific" or convey intelligence. ***In truth, it takes a deeper understanding to explain a complex topic simply and succinctly.***
The best scientists can communicate complicated results to intelligent readers outside their field. Long, complex writing does not imply good science.

II/ 1. Let us get rid of unnecessary words, phrases and sentences!

a) Professional writers often use unnecessary terms that mean nothing [8] [11]. Some examples:

It is worth noting that…
It is important to realize that…
Let us not forget that…

A sentence that says nothing but mentions the existence of a figure or a table does not carry any meaningful information, therefore it is bad style and it is better to eliminate it. Do not write sentences like this:

The tensile curve can be seen in Fig. 1.

If you are writing about a phenomenon that is shown in a figure or a table, mention the number of the figure or table in parentheses at the end of the sentence, for example:

The peak temperature of the endothermic curves shifted towards lower temperatures (Fig. 1)

Scientific Writing Booklet [21]:

Do not say:
"It is clearly evident from Fig. 1 that bird species richness increased with habitat complexity". Say instead :
"Bird species richness increased with habitat complexity (Fig. 1)". [21]

Avoid extra words:
"It is shown in Table 1 that X induced Y" --> "X induced Y (Table 1)." [21]

It is also unnecessary to analyze the shape of a figure in detail in the text. To describe where it is straight, where it curves and to what degree, etc. If a section of the curve has scientific value, is unexpected, and is related to the results of the research, its analysis may be justified, but only then.

b) Sometimes in English two words have the same or very similar meaning, but the author uses them together. [9]

mutual agreement	→	*agreement*
future prospects	→	*prospects*

c) English phrases that are unnecessarily long (can be omitted or replaced by one word) [8] [9]:

in a careful manner	→	*carefully*
a large majority of	→	*most*
prior to	→	*before*

d) Many authors like to use complicated words. However, they not only make reading more difficult but they are often used incorrectly as well [8]. Use simple, easy-to-understand words. Some examples in English:

ameliorate	→	*improve*
elucidate	→	*show*
methodology	→	*method*
utilize	→	*use*

e) In **the *Conclusion* section, do not repeat the *Abstract* chapter (and do not copy entire sentences from it), focus on the results instead** [11].

f) Do not write about your own article. Do not detail what you will write about in which chapter. This is unnecessary, the reader will see it anyway.

III. Sentence structure

Not only the overcomplication of sentences can make the text unintelligible, but also the incorrect structure of the sentences.

III/1. Long, complicated things should be at the end of the sentence!

In the English language, there is a general rule that long and complicated phrases, clauses, etc. like to be at the end of the sentence—it is good style if they are.
This also automatically means that the subject of the sentence should not be too long.

Without the verb, we don't know what the subject is doing, or what the sentence is all about. As a result, the reader focuses attention on the arrival of the verb and resists recognizing anything in the interrupting material as being of primary importance. [20]

Follow a grammatical subject as soon as possible with its verb. [20]

Springer also emphasizes this in its guidelines for authors [19].

The above-mentioned rule is an important, general rule in the English language. I would like to illustrate it with just one example (I underlined the object with a dashed line and the adverb with a wavy line):

1. *Put the book on the table.*

This is the correct word order. The following sentence is in incorrect word order:

~~*Put on the table the book.*~~

However, if the object is long, it has to go to the end of the sentence!

Put on the table the book that I bought yesterday, even though you told me not to .

A long subject is incorrect style (I underlined the subject):

> *Injection molding, which has been used for more than a century due to its low cost per item if used for mass production, is the most widely used plastic processing technology.*

To correct it, we have to break the sentence into several sentences.

Injection molding has been used for more than a century. If it is used for mass production, the cost per item is low. It is the most widely used plastic processing technology.

It is similar when the subject is a long list. Rephrase the sentence so that the list comes at the end of the sentence.
Long subject:

> *Melt temperature, holding pressure, holding time, residual cooling time, shot weight and mold temperature are important technological variables of injection molding.*

Short subject:

> *Important technological variables of injection molding include melt temperature, holding pressure, holding time, residual cooling time, shot weight and mold temperature.*

Although the use of the passive is often justified and correct, it can easily result in a subject that is too long, which is a disastrous stylistic error.

Long subject (terrible):

Mathematical models that can adequately describe the bonding of amorphous and semicrystalline thermoplastics even with fiber reinforcement will be created.

One solution is to use the active voice.

We will create mathematical models that can adequately describe the bonding of amorphous and semicrystalline thermoplastics even with fiber reinforcement.

However, if we do not know who the "actor" is (this is less likely here), then for example:

Mathematical models will be created, which can adequately describe the bonding of amorphous and semicrystalline thermoplastics even with fiber reinforcement.

or:

Mathematical models will be created to describe the bonding of amorphous and semicrystalline thermoplastics even with fiber reinforcement.

III/2. Put new information at the end of the sentence and old information at the beginning of the sentence (cohesion) [14].
It is characteristic of the English language that the end of the sentence is stressed, and whatever is there is usually automatically stressed. We usually put what we want to emphasize at the end of the sentence. So, if new information is put at the end of the sentence in English, it is almost always automatically emphasized.

The end of the sentence, the place of natural emphasis, is called "stress position" [23].

Readers … search for certain information in particular places. If these structural expectations are continually violated, readers are forced to divert energy from understanding the content of a passage to unraveling its structure. As the complexity of the content increases moderately, the possibility of misinterpretation or non-interpretation increases dramatically. [20]

It is a linguistic commonplace that readers naturally emphasize the material that arrives at the end of a sentence. We refer to that location as a "stress position." If a writer is consciously aware of this tendency, they can arrange for the emphatic information to appear at the moment the reader is naturally exerting the greatest reading emphasis. [20]

The beginning of the sentence is called "topic position" when it comes to style [22].

Place the person or thing whose "story" a sentence is telling at the beginning of the sentence, in the topic position. [20]

Readers expect a unit of discourse to be a story about whoever shows up first. "Bees disperse pollen" and "Pollen is dispersed by bees" are two different but equally respectable sentences about the same facts. The first tells us something about bees; the second tells us something about pollen. The passivity of the second sentence does not by itself impair its quality; in fact, "Pollen is dispersed by bees" is the superior sentence if it appears in a paragraph that intends to tell us a continuing story about pollen. Pollen's story at that moment is a passive one. [20]

Place appropriate "old information" (material already stated in the discourse) in the topic position for linkage backward and contextualization forward. [20]

In our experience, the misplacement of old and new information turns out to be the No. 1 problem in American professional writing today. [20]

If you start the sentence with new information, the reader receives it without context. They try (incorrectly) to link it to the previous sentence (if there is a previous sentence). When they get to the end of the sentence, they have to rethink what they read due to the lack of cohesion. This makes it difficult to interpret the text.

Example of text without cohesion:

> *Petrol engines are different from Diesel engines. Better efficiency and lower fuel consumption make Diesel engines very popular. Higher compression ratios make better efficiency, and therefore lower fuel consumption possible. Petrol engines have 50 to 100 per cent lower compression ratios than Diesel engines.*

It is obvious that this text is difficult to follow—at the beginning of each sentence, we feel "Where on earth did this come from?" If the sentences start with known information and end with new information, the text is immediately clearer:

> *Petrol engines are different from Diesel engines. Diesel engines are very popular because of their better efficiency and lower fuel consumption. Better efficiency, and therefore lower fuel consumption are the result of higher compression ratios. The compression ratio of a Diesel engine is 50 to 100 per cent higher than that of a petrol engine.*

One of the uses of the passive construction in English is that it allows for word order to change. Example of text without cohesion:

> *Most plastic products in households are manufactured by injection molding. American inventor John Wesley Hyatt and his brother invented injection molding in 1872.*

If we put the second sentence in the passive, known information is placed at the beginning of the sentence, and new information is placed at the end of the sentence. In this case, for example, the use

of the passive is correct. (At the beginning of the second sentence, "Injection molding" could simply be "It").

Most plastic products in households are manufactured by injection molding. Injection molding was invented by American inventor John Wesley Hyatt and his brother in 1872.

III/3. The action should be expressed by a verb, and the "actor" should be the subject (if possible). [13]

Readers expect the action of a sentence to be articulated by the verb.
If the actions are not to be found in the verbs, then we as readers have no secondary structural clues for where to locate them. Each of us has to make a personal interpretive guess; the writer no longer controls the reader's interpretive act. [20]

We can form a noun or other part of speech from a verb. We feel it is natural and easy to follow if the action is expressed by a verb. However, a common problem in technical language is that the action is expressed by a noun formed from a verb. Linguists call this nominalization.
It is not natural (nominalization), so it is worse style:

*We performed an **analysis** of the sample.* — *analysis/analysis* - noun

Beautiful:

*We **analyzed** the sample.* — *analyze/analyze* – verb

Comment:
The passive voice only partially meets this requirement, so it is more difficult to follow a text with passive structures. Therefore, although the passive is perfectly correct and good in English in the right place, beware of its excessive use. The big publishers also expect the authors to use the passive only in justified cases. Naturally, the passive is still much better than nominalization!

Of course, nominalization also has its place in technical language—when it refers back to an earlier sentence, summarizing it.
Correct:

*We analyzed the sample. The **analysis** did not show anything unusual.*

IV. The structure of paragraphs and text
Not only the complexity of the sentences, phrases or words or bad style can make a text unintelligible, but also the incorrect structure of the text.

The first step is to decide what should be included in the different chapters and larger units of the text. This is given for a study, since it has "standard" chapters.
A well-styled text consists of paragraphs. A paragraph consists of several sentences and details one main idea. The first sentence of the paragraph (the *topic sentence* in English) summarizes the main idea, and the other sentences of the paragraph detail it.
Unfortunately, it is a common mistake that the writer does not group the sentences into paragraphs according to the main ideas, but just writes the sentences one after the other, as the thoughts come to their mind; this way a "paragraph" can easily be 40–50–60 lines long (and often not very clear), because not every sentence is "in its place", in the appropriate paragraph. It happens that the same idea, or even the same sentence with minimal changes, comes back again after 10–20 sentences, because the writer forgot that they had already written it. If the sentences and paragraphs do not follow logically from each other, it makes the text confusing. Sometimes the author "presents" each measurement result in the body of the text and compares the measured results there, too. Often over 10–20–30 sentences. Is it surprising if it is all very confusing for the reader? Presenting the results in tables and figures is much shorter and clearer—you can trust the reader to interpret a table or graph without much explanation. Of course, if you get novel or unexpected values, you can briefly comment on their novelty (for example, the shape of curves), but do not overdo it.

IV/1. Coherence of paragraphs [13]
As I mentioned above, the first sentence of a paragraph summarizes the main idea of the paragraph, and the rest elaborates, so practically the entire paragraph is about the same main idea.

It is worth reading the sources, because they are very good and some of them also have good examples. References [5], [8], [9], [10], [13], [14], [16], [17], [18], [21], and **[20]** are especially good.

References:

1. https://www.elsevier.com/__data/promis_misc/adveiwrsty051203.pdf Retrieved on August 15, 2022
2. https://www.springer.com/gp/authors-editors/authorandreviewertutorials/writinginenglish/concise-writing/10252678 Retrieved on August 15, 2022
3. https://www.nature.com/scitable/topicpage/scientific-papers-13815490 Retrieved on August 15, 2022
4. http://www.sciencemag.org/site/feature/contribinfo/prep/res/style.xhtml Retrieved on September 4, 2017
5. http://womeninwetlands.blogspot.hu/2013/12/it-is-important-to-note-thatand-other.html Retrieved on August 15, 2022
6. https://owl.purdue.edu/owl/general_writing/academic_writing/conciseness/index.html Retrieved on October 25, 2022
7. https://www.goodreads.com/author/quotes/6437238.William_Strunk_Jr_ Retrieved on September 4, 2017
8. https://sites.duke.edu/scientificwriting/lesson-3-concision-and-simplicity/ Retrieved on July 28, 2022
9. http://advice.writing.utoronto.ca/revising/wordiness/ Retrieved on September 4, 2017
10. http://www.biomedicaleditor.com/hedging.html Retrieved on September 4, 2017
11. https://www.publishingcampus.elsevier.com/websites/elsevier_publishingcampus/files/Guides/2014-01-15-Manuscript-preparation.pdf Retrieved on September 4, 2017
12. https://www.ldoceonline.com/dictionary/work Retrieved on September 4, 2017
13. https://sites.duke.edu/scientificwriting/lesson-1-subjects-and-actions/ Retrieved on July 28, 2022
14. https://sites.duke.edu/scientificwriting/lesson-2-cohesion-coherence-and-emphasis/ Retrieved on July 28, 2022
16. The Paramedic Method - OWL Purdue University https://owl.purdue.edu/owl/general_writing/academic_writing/paramedic_method.html
17. Eliminating Wordiness exercise – Purdue Online Writing Lab https://owl.purdue.edu/owl_exercises/sentence_style/eliminating_wordiness_test/eliminating_wordiness_exercise_1.html
18. Writing in Plain Style - Purdue Online Writing Lab https://owl.purdue.edu/owl/general_writing/writing_style/plain_style%20.html
19. https://www.springer.com/gp/authors-editors/authorandreviewertutorials/writinginenglish/subject-and-verb-placement/10252686
20. "The Science of Scientific Writing" UC San Diego (University) https://cseweb.ucsd.edu/~swanson/papers/science-of-writing.pdf
21. Marc E. Tischler's Scientific Writing Booklet - University of Arizona https://www.ic.unicamp.br/~ariadne/mo901/2s2013/Sci-Writing-ari.pdf Retrieved on June 30, 2023
22. https://www.springer.com/gp/authors-editors/authorandreviewertutorials/writinginenglish/topic-position/10252688
23. https://www.springer.com/gp/authors-editors/authorandreviewertutorials/writinginenglish/stress-position/10252690