

DANGLING MODIFIERS

Introduction

In scientific papers, we often come across subordinate clauses starting with verb + *ing*, *to* + verb and the 3rd form. **This is high-level grammar and it is quite likely that you did not learn about it in great detail.**

I. -ing clauses.

1. They can be adverbials. In this case, the adverbial **refers to the subject of the sentence**, i.e. the “actor” of the clause is the subject of the sentence. The adverbial can have several meanings, but I will not go into details now.

Examples:

I went home laughing at the clowns in the street.

I went home and **I** laughed.

He went in, locking the door behind him.

He went in and **he** locked the door.

The -ing clause can also be at the beginning of the sentence, in which case, we usually separate it from the rest of the sentence with a comma:

Cleaning the windows, I heard a noise. → While I was cleaning the windows, I heard a noise.

I heard the noise and **I** cleaned the windows.

Not knowing the language, she decided to use Google translate.

She did not know the language and **she** used Google translate.

2. The clause beginning with -ing can also be an adjective (clause).

For example:

Sitting Bull

The bull sitting in the field is mine.

If the adjective (underlined with a dotted line) is short, it is before the noun. If it is “long”, it is behind the noun (see the second example).

The book lying on the table is a very good book.

I can't give you the book lying on the table.

The noun to which the adjective (clause) refers can be anywhere in the sentence.

3. The -ing form can also be a noun or noun phrase, for example:

Getting up early on the weekends didn't make him happy.

There is usually no problem with such sentences, unless there is a **preposition**, for example:

After looking out of the window for a long time, we noticed that the rain had stopped. 😊

Even though *looking* is after a preposition, it still refers to the subject *we*, just as we saw above with adverbs! The following sentence would therefore be incorrect:

~~After looking out of the window for a long time, the rain stopped.~~ 😞 (The rain was looking out of the window.)

~~While listening to music, lunch was cooked.~~ 😞 Unfortunately, lunch was listening to music here.

Correctly:

While listening to music, we cooked lunch.

(Although technically, *while* is not a preposition, it behaves like one.)

II. The third form can also be adjectival or adverbial, similarly to -ing.

1 Adjective. This meaning does not usually cause problems in papers. It has a **passive** meaning.

I am excited.

This is a broken window.

The window broken by Jack yesterday was an expensive window.

2 Adverbial. This causes many problems. It also has a **passive** meaning.

Similarly to *-ing* forms, **3rd form adverbials also refer to the subject of the sentence.**

Asked if he thought everything was all right, he said many things could be improved.

(He was asked...)

III. To + verb can also introduce an adverb or adverbial clause.

1. Adverbial

In this case, *to* + verb **also refers to the subject of the sentence!** Instead of *to*, you can use *in order to* (more official) or *so as to* (even more official).

I went to the restaurant to have lunch.

I went to the restaurant in order to have lunch.

I went to the restaurant so as to have lunch.

(I had lunch.)

I ate little in order not to be fat.

(I didn't want to be fat.)

2. Adjective or adjectival clause—in this case it means “must” or “will”. This meaning does not cause many problems in scientific papers.

Joe is the man to do the work. = *Joe is the man who has to do/ will do the work.*

3. Noun

To + verb is often used as a noun after a verb or adjective:

I want to play.

It is nice to swim.

A common mistake with verb + *ing*, *to* + verb or 3rd form adverbial clauses is that the subject of the clause is an inappropriate noun phrase (or it has no subject at all). This is called a dangling modifier. **The solution: the subject of such subordinate clauses should always be the subject of the main clause!**

Unfortunately, the problem is not that simple. In scientific and academic English, it is very common that adverbial clauses starting with verb+*ing*, a 3rd form or *to* + verb are not matched with the subject of the sentence. This is unfortunately so widespread that a considerable number of English-speaking authors do not consider it a mistake, nor do they notice it when they read or even write such sentences.

However, in my opinion, this is not acceptable. The language of scientific articles should reach a certain standard, just as we expect the presented scientific results to reach a certain standard!

The online material of the Duke University Scientific Writing Resource says the following [13], with which I fully agree:

In modern English usage, dangling modifiers are considered errors.

Unfortunately, they are rampant in scientific writing. I believe this is a result of religious reliance on passive voice. Joseph Williams has this to say about dangling modifiers:

[The] implied subject differs from the explicit subject of the clause it introduces... When that happens, the modifier dangles.

Writers of scientific prose use this pattern so often, however, that it has become standard usage in their community.

In my opinion, we should consider this not a license to make mistakes, but a rebuke of the scientific community. Just because everyone does it, it doesn't make it the best thing to do. I think we should make the effort to avoid dangling modifiers because they confuse readers.

I believe that the image of an author, or even the university they represent, is (greatly) influenced by how correctly and accurately (or incorrectly) they use the language!

Common errors

1. verb +ing clause.

Consider the following sentence:

The mechanical properties of the metal can be further improved using traditional techniques. 😞

Who used traditional techniques here? Either the **mechanical properties...** (the subject of the sentence, grammatically this is what “using” refers to), or if we do not accept this (we should not), then it is **not defined**, which is also very undesirable. In this case, the clause is an adverbial clause. We can say that the meaning is clear from the situation, but **it is very inelegant to abuse redundancy** (see the end of this guide). Correction:

Humans used the techniques, so the subject should be a "human", e.g. you, we, scientists, workers, etc., for example:

We can further improve the mechanical properties of the metal using traditional techniques.

Of course, it may be that the passive structure sounds better in the given sentence (as in this specific example as well), so we need to rephrase the sentence to improve it.

The mechanical properties of the metal can be further improved with traditional techniques.

There is no verb+ing clause, so there is no problem! Replace “using” with “with” or “with the use of”!

A word of advice:

Don't use “using” in a passive sentence as an adverbial (like in the above example)! You will almost inevitably make an ugly dangling modifier. It is very difficult to make a passive sentence where “using” is correctly used as an adverbial. Here is a rare example:

Jack was seen using a telescope. – This sentence is correct but here, Jack was using the telescope, not the person who saw Jack!

If the subordinate clause starting with verb+ing is a noun and is preceded by a preposition, it is still true that the subject of the subordinate clause is the subject of the sentence.

After analyzing the samples, we measured the plants daily. 😊

After looking out of the window for a long time, we saw that the rain had stopped. 😊

If we were to change the subject of the sentences, for example, put them in the passive, it would be a bad idea. **A very bad idea.** The sentences would be terribly incorrect...

After analyzing the samples, the plants were measured daily. [5] 😞 – the plants analyzed the samples Ouch!!!

Some more examples:

Before adding the compound, it was determined that the solution's pH was 6.4. 😞 [4]

In this case, it added the compound. Who is “it”? Maybe Stephen King's clown? Or we didn't say who, but it would be necessary here. A passive structure without thinking? Hmm... **Bad idea.** A possible fix:

Before adding the compound, we determined that the solution's pH was 6.4. 😊

When changing a fuse, the electricity should first be switched off. 😞 [12]

It would be nice if the electricity could replace the fuse itself (or possibly turn itself off – Industry 4.0 😊). If this does not happen, it is undefined who replaces the fuse, and that is not acceptable 😊.

Correction:

When changing a fuse, you should first switch off the electricity. 😊

The preposition by is common in scientific papers in the sense that it introduces a method or procedure.

We produced the part by extrusion.

The part was produced by extrusion.

The part was produced by injection molding.

Although injection molding ends in -ing, the problem of matching does not arise here because it is a general method, not a specific action. There are also some common industrial processes ending in -ing that sound just as good in such a sentence as injection molding, e.g. milling, turning, casting, etc.

If the “method” is a longer -ing structure (so there is a chance that it is not a general method, but a solution or action used in a specific case), we should be very careful with the passive, because there is a

high chance that the sentence will be incorrect. **We can generally say that the subject of the subordinate adverbial clause with -ing should be the subject of the sentence.**

2. Problems with subordinate adverbial clauses starting with the 3rd form

Driven by the idea of environmental consciousness, biodegradable polymers have been gaining importance recently.

The subject of the sentence is biodegradable polymers, so **polymers** are concerned with the protection of the environment. This is probably not what the writer meant. This sentence is not so easy to correct, it needs to be reworded a bit so that the problematic part disappears. A possible solution:

As a result of environmental consciousness, biodegradable polymers have been gaining importance recently.

3. to +verb clauses

Such adverbial clauses tend to cause the greatest problems for authors of scientific texts in their adverbial meaning (adverbial of purpose). Let us see some examples. The sentences can be corrected in several ways, but now I only write one correction everywhere.

To improve his results, the experiment was done again. [3] (the experiment wanted to improve his results)

😞 → *To improve his results, he did the experiment again.* 😊

To investigate the source of nutrients, eggshell membranes were compared. [5] (the eggshell membranes wanted to investigate the source...)

😞 → *To investigate the source of nutrients, we compared eggshell membranes.* 😊

In order to improve efficiency, it is necessary to optimize the process. 😞

The subject of *in order to improve efficiency* is a meaningless *it* (or maybe the clown? 😊) or if we do not accept this (we should not), the subject of the subordinate clause is not defined, which is also very bad. Some possible corrections:

In order to improve efficiency, we have to optimize the process. 😊

If efficiency is to be improved, the process has to be optimized. 😊

It is necessary to optimize the process so that efficiency can be improved. 😊

It is often not easy to correct such sentences, they have to be carefully rewritten, and sometimes it is not even possible to return the original meaning exactly.

4. Redundancy

Someone might think of the objection:

“Maybe the subject of the adverbial structure is not defined, but it is usually clear from the context who performed the action—if it can be guessed anyway, why bother with matching? Leave me alone!” 😊

Well then, let's talk about redundancy.

Redundancy means that something happens more than once or there are several of it, and the occurrences after the first one are not used for anything (for now). This can be useful or useless and annoying.

It is useless if e.g. someone explains something to me that I understand at first, but they tell me the same thing over and over again because they don't know or believe that I understood it the first time.

It is, however, useful in technology, when engineers design machines with safety in mind. For example, cars usually have dual-circuit brake systems, which means that two independent brake systems slow the car down, so if one fails, the car can still be safely stopped and driven to the service station, even if it is far away. The same solution is used for aircraft systems, only there's three of everything because in the event of a failure, it may be necessary to fly thousands of kilometers (e.g. over an ocean), and an uncontrollable plane is usually a bigger problem than an uncontrollable car.

There is also redundancy in language, so it often (but not always!) happens that someone speaks incorrectly, but we still understand what they say, because redundancy helps. Take the plural for example:

*There **are three** apples on the table.*

In how many ways did I express the plural? Three ways (I indicated them with green and bold). If I make a mistake in two of these, we still understand that it's plural:

*There is **three** apple on the table.* (But don't say that!)

As an error it is “okay”, but if we do it on purpose, **we are abusing redundancy, which is a very ugly thing and a big No-No.**

Anyone who says that people will understand anyway, no matter how we say it, so we don't have to bother with "complicated" grammar, is encouraging people to *abuse redundancy*, which, as I wrote above, is a very ugly thing.

Don't do this in scientific papers either, for example **don't write sentences like this, even if they are not ambiguous, and their meaning is clear from the context:** 😊

Strong a was composite produced fiber with carbon reinforcement.

I am serious. Do not write sentences like this in a scientific study saying "grammar is not so important, an expert understands from the context what I mean". 😊

Although the sentence sounds extremely silly, there is enough redundancy in the meaning so there is no misunderstanding. But let us not be complacent.

Redundancy can take only a limited number of grammar, vocabulary, pronunciation, spelling, etc. mistakes.

Here is just one example:

If instead of *I am eating with my duck*, I say *I am eating my duck*, then what? I missed one tiny little word, sorry. Why do you have to be so hysterical about this? One little word! "The meaning is obvious anyway from the context"!

Yeah, sure... 😊

And indeed, at all levels, it has often happened to me that I was communicating with a student or colleague in English, and although I understood all the words and grammar in the sentence (of course 😊), the sentence was completely meaningless to me, or perhaps I completely misunderstood it because there were so many mistakes in it. It happened during English classes I was teaching, from beginner to advanced level, but also while reading scientific papers.

So don't be so sure that people will "understand it anyway", because redundancy runs out surprisingly fast and communication breaks down (usually a lot sooner than most people think).

Sources:

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