

Section 4. Results as an IMRD component

Unit 1. Results: Structural analysis

Today we are here to talk about the structure of another section in a research paper. You will learn basic components of the Results section and find out how it is structured.

The title “Results” in a research paper may vary in different disciplines and journals. Instead of Results, it is sometimes called “Analysis” or “Data Analysis”. The table on your screen shows four options for the subtitles from this point until the end of the research paper. There are four popular ways the research paper evolves from this point. You can see that some sections can be united – as in options C and D.

In all cases this section reports comments on what was found or observed, and if the subtitle contains the word Discussion (i.e. Results and Discussion), it includes some or all of the Discussion. In most cases, the results of any work can be given in graphs, tables, equations or images. Why, then, should writers bother to write a Results section? Why not simply provide good graphs or tables with clear titles and perhaps a few notes to comment on each?

There are many **reasons for writing a results section**. Firstly, some results may be more *interesting or meaningful* than others, and this is difficult to represent in tables and graphs. Secondly, it is also important *to relate results to research goals*. Thirdly, in some cases writers may want to provide background information *to explain* why a particular result occurred or *to compare* their results with those of other researchers. Additionally, the results can be problematic. Perhaps some experiments were not entirely successful and writers may want to state possible reasons. However, one of the main reasons for writing a results section rather than relying on graphs, tables, or other images is that writers need *to convey their own understanding and interpretation of the results to the reader*. Furthermore, results alone don't tell the whole story. In that case, a table or a graph of the results will do.

Readers don't have to agree with the writer, but they do need to know the writer's opinion and understanding of the findings.

Let's have a closer look at the parts of a sample Results section analyzing what the writer is doing in each sentence of the sample. One way to figure out what the writer is doing in a sentence is to look at the grammar and vocabulary clues.

Ask yourself:

- What is the tense of the main verb?
- What is that tense normally used for?
- Is it the same tense as in the previous sentence?
- If not, why has the writer changed the tense?
- What words has the writer chosen to use?

Now, read a sample Results section that you can see on your screen. The title of the paper is "Comparing Tensile Strength between Alloy and Non-Alloy Materials: Modelled Results vs. On-Site Measurements". Try to answer the questions mentioned. Continue watching to check yourself. I can see that you are back with us, so, what is the writer doing in each sentence of this sample?

In Sentences 1 and 2 the writer refers to **the findings and conclusions** obtained by other researchers. Why not start directly with the results? If the writer begins by describing individual results, the reader will need to build an overall scheme or pattern of these results by putting those individual results together. This is difficult for the reader to do. So, writers arrange the information so that it is easy for a reader to process it.

As with all subsections, it is more "*reader-friendly*" to start with some introductory material. This can be done in two ways: by offering an overview of the current section. Here, it is quite usual to begin with general statements about what was found "In most cases", "generally speaking", "overall". Or it can be done by referring back to something from the previous sections.

In Sentences 3 and 4 the writer **refers back to his/her own methodology** and adds more information about it. Why mention methodology? One reason for doing this is to *highlight important aspects of the materials, equipment, or methods* used to achieve a result. Another reason is to remind the reader of the methodology. Also, the more detailed details of the methodology are often described here rather than in the previous section, which may contain only a basic overview of the method. The more specific and complex the method, the more likely this is.

Background information is as general and necessary here as anywhere else. In this case, information is provided about the tools or devices used to achieve the results. In our model this is expressed with: "AN alloy properties modelling framework developed by Ka."

In Sentence 5 the writer **invites the reader to look at a graph/figure/table** etc. Why does the writer need to invite the reader to look at the graph? Because the reader needs to *stop reading and take a look at the figure*; and try to *understand* it or *interpret* the data in it. Then the reader will return to the text and keep that interpretation in mind while reading on. If the data in the figure is very clear and has only one possible interpretation, the results are very clear and easily interpreted. So it is ok to let the reader view them before commenting on them. However, the data in many figures, tables and photographs can be interpreted in more than one way, in which case the writer comments on the results in that figure before inviting the reader to take a look. Otherwise, the reader may interpret it differently from the writer.

In sentence 6, the author **refers to specific results** and uses **subjective and evaluative language** to compare them with the results of another study (consistent with). Why does the writer compare his/her results with other studies? Authors must find their results on the “research map” of their subject area. This means that authors must show readers how and where their results fit into the existing research picture, so authors should compare their results with those in the literature. Authors develop this “map” of their research in more detail during the Discussion section, but to do so effectively they must first compare their results to existing results. So, is the order important? The *order* in which writers present their results to the reader is very *important*. In some cases they represent the most important results, but it may be necessary to first describe the results that underlie or lead to the more important results.

Why does the writer use *evaluative language*? Well, results do not speak for themselves. In some cases, results can be objectively stated in numerical or non-evaluative language. However, a brief description of what is contained in the figures and tables is not what the reader will be able to see for themselves. Comments that authors make about their findings influence readers’ findings. For example, if the author states: “As can be seen in Fig. 1, the two curves are very similar” – the reader will focus on the similarity between the curves. However, if they write: “As can be seen in Fig. 1, the two curves are noticeably different” – the reader will notice the difference between them.

In Sentence 7 the writer **offers a general statement about his/her results** to begin a new paragraph. In this sentence, the writer is moving on to more interesting, controversial results, and communicates this to the reader by starting a new paragraph and using a signal “However” at the start of the sentence.

In Sentence 8 the writer **refers to specific results**, uses language to **comment** on the results, and **compares** them with the results of another study “A striking difference”. Science writing uses a variety of words and phrases to achieve that “wow!” feeling.

In Sentences 9 and 10 the writer **selects specific results to describe in more detail**, using language that comments on the results. For instance: considerably lower, generally, frequently far lower. Explanations can be given by providing background factual information to explain why a particular result took place, for example, information about the properties of the material studied or the type of method used. Here, we need to understand the difference between:

1. The explanation of a result (why it occurred as it did)
2. The evaluation of a result (what the numbers mean)
3. The implication of a result (what the result suggests or implies)

In the Results section writers normally *provide direct* comments to evaluate the results later in the Discussion section.

In Sentence 11 the writer **refers to the method used to analyse the results**. Let’s move on to the next sentence.

In Sentence 12 the writer **mentions a problem in the results** and uses **quantity language** (slightly) to minimize its significance. Why does the writer mention the problem? Failure to mention an issue suggests that the author does not have sufficient expertise to recognize the issue, which adversely affects the author’s professional authority. In contrast, incorporating discussion of issues into one’s work does exactly the opposite. This demonstrates that the authors have complete control over their research and can clearly assess it. In addition, it provides authors with an essential element of discussion/conclusion. Directions and suggestions for future research.

In Sentence 13 the writer **refers to the implications** and applications of the work done. Most writers give some indication of what their results mean, i.e. the implications of their results, towards the end of the Results section.

Here are the functions of the sample Results section. We can group our functions into four basic components:

1. Revisiting the research aim/existing research
 - Revising/expanding methodology
 - General overview of results
2. Invitation to view results
 - Specific/key results in detail, with or without explanation
 - Comparisons with results in other research
 - Comparisons/s with model predictions
3. Problems with results
4. IV. Possible implications of results

As with the Methodology model, this is a “menu” from which writers can select items appropriate to their research topic and the journal they are submitting to.

To sum up, we have identified the basic component of the third section of a research paper in IMRD format – Results. We have also learnt that the Results section comments on the results achieved, it mentions the problems occurred. We also learnt Evaluative language that is used to focus the reader on the findings and to minimize the effect of the problems.

That’s all for today. Do some practice tasks and see you in the next video on Grammar peculiarities of the Results section.