

How to improve paragraph structure

This material is adapted from *English Solutions for Engineering Research Writing* <http://www.hanyangowl.org>

A sentence in English is the basic unit of grammar and thought. However, the paragraph is the basic unit to organize that thinking. If a student asks me if a sentence is correct, I usually ask them for the context of where that sentence came from. In short, without paragraphs, there is only grammar, not really writing. A sentence can be perfectly correct grammatically, but may not be the right sentence for that particular paragraph. The sentences before and after a sentence can affect the meaning of the sentence and how a reader understands that sentence.

In research and professional writing, we don't communicate in sentences, but in paragraphs. Even email should not be written sentence by sentence with no paragraph organization. When you write a formal email, for example, you should organize your sentences into paragraphs. There are four essential concepts that should be understood about paragraphs.

- Generally have one clear main idea per paragraph in the form of a topic sentence.
- Understand the structure of the paragraph.
- Understand the method of development of the paragraph.
- Show how the ideas are related to other ideas, sentences, or sections of your work.

To be well-structured paragraphs must be clearly organized around one main idea that is explained and supported. Paragraphs that explain, analyze, or persuade usually have the following structure.

4.1. Basic paragraph structure

Structure	Notes
Transition sentence (optional)	The paragraph may open with a transition from a previous paragraph. Transition sentences or clauses may also occur between the controlling ideas that elaborate the topic sentence in the paragraph.
Background information (optional)	Before the main point of the paragraph is given, there may be some background information on the topic that provides some context for the reader before the topic sentence is introduced.
Topic sentence (recommended)	The topic sentence gives the main point of the paragraph that must be explained, defined, proven, or analyzed. It is almost always at the beginning of the paragraph. The topic sentence may also give the controlling ideas that structure the paragraph, such as a main idea being divided into two points. Not all types of paragraphs, such as conclusion paragraphs or transition paragraphs, may have a clear topic sentence. However, it is suggested.
Elaboration of the topic sentence (optional)	The topic sentence may be a very general statement. The elaboration sentence gives more specific details of the structure of the paragraph that follows (Reid, 2000 p. 24). The elaboration may also give the controlling ideas that structure the paragraph.

Supporting sentences (required)	This is the standard type of sentence that develops the topic sentence. All of the sentences in the paragraph should support the topic sentence. If a new topic is introduced, a transition or a new paragraph should also be introduced.
Conclusion (optional)	A sentence that summarizes the key points of the paragraph. Suggested if the paragraph is long or difficult, or if many ideas have been introduced. For example, a conclusion sentence is often found at the end of a paragraph that reviews previous research.

The following is a paragraph from an engineering article about coal that has been divided for the purpose of analysis.

EXAMPLE

Paragraph	Analysis
<u>Coal</u> , the most abundant, widely distributed, and economical fossil fuel, is a solid with high carbon content but low hydrogen content (usually less than 6%).	Background information
As a solid, <u>coal</u> is not easily used as a <u>transportation fuel</u> .	
However, <u>transportation fuels</u> and other chemicals may be derived from coal through * <u>liquefaction</u> .	Transition to the topic of transportation fuel
The two methods to convert solid coal into liquid fuel are <u>direct liquefaction</u> and <u>indirect liquefaction</u> .	Topic sentence: Main idea of the paragraph, liquefaction.
<u>Direct liquefaction</u> , the most efficient route currently available, with catalyst and a hydrogen donor solvent at very high temperature and pressure, can convert coal into artificial petroleum. <u>In indirect liquefaction</u> , coal is completely gasified with steam. The gasification products are mixed with H ₂ and CO with the removal of sulfur-containing species. Over a catalyst at relatively low pressure and temperature, the mixture reacts to produce the final synthesis liquid fuel.	Elaboration of the topic sentence; Contains the two controlling ideas of the paragraph.
By adjusting the composition of catalyst, hydrogen/carbon ratio, temperature, pressure, etc., one can obtain a variety of different products, such as paraffins, olefinic hydrocarbons or alcohols [4].	Supporting sentences; Each of the two controlling ideas is explained, direct and indirect liquefaction. The rest of the paragraph is structured around these two controlling ideas.
Source: Z. Wu et al. Fuel 84 (2005) p.1790 ©2005	
	Conclusion

Note: *liquefaction means to make something liquid.

4.2. The topic sentence

What is a good topic sentence? It introduces a proposition that must be argued, explained, or analyzed. When we read a topic sentence we are introduced to the main idea of a paragraph. However, the topic sentence is more likely to occur in paragraphs that argue, explain, or analyze a point. Each paragraph, no matter how long, should only have one main point contained in the topic sentence. However, this main point may contain controlling ideas that

explain the main topic in further detail. When you start to discuss a new topic, it is time to change the paragraph.

"Topic sentences appear most frequently as the first sentence in a paragraph. This position helps readers become oriented immediately to the paragraph's topic and facilitates communication (e.g., an estimated 95% of paragraphs in professional/technical writing begin with their topic sentences)."

Source: http://web.mit.edu/writing/Writing_Process/topicsentence.html

What are the possible functions of a topic sentence?

A topic sentence may

- Introduce a proposition to be proven or explained.
- Show the structure of the paragraph by indicating the items to be discussed.

One way to tell if a sentence is a topic sentence is to see if the rest of the paragraph answers the implied question of the topic sentence.

EXAMPLE

"However, transportation fuels and other chemicals may be derived from coal through liquefaction."

Implied question → **How are they derived from liquefaction?** The rest of the paragraph answers this question of how liquefaction occurs.

Not all paragraphs may be structured like this, however. Some paragraphs may be transitions to a new section of a paper. Some paragraphs may be conclusions and others may introduce a list. Some engineering papers even have conclusions that are just a numbered list of key points.

1) Elaboration of the topic sentence

Sometimes the topic sentence is too general or doesn't have clear controlling ideas. Therefore, we need to provide an additional sentence that gives more detail in order to show the structure of the paragraph (Reid, 2000, p.24).

EXAMPLE

[Topic sentence→] However, transportation fuels and other chemicals may be derived from coal through liquefaction. **[Elaboration→]** The two methods to convert solid coal into liquid fuel are direct liquefaction and indirect liquefaction.

Here we have the topic of this paragraph: deriving coal through liquefaction. However, the author probably thought that this topic sentence needed to be more exact to fit in one paragraph. The topic sentence was limited to the two controlling ideas of direct and indirect liquefaction.

2) Controlling idea(s)

The controlling idea indicates what the paragraph will say more exactly about the topic. It may be found in the topic sentence itself or in the elaboration of the topic sentence in the next sentence. It limits or controls the topic to a specific aspect of the topic sentence in that paragraph.

EXAMPLE

[Topic→] The two methods to convert solid coal into liquid fuel are **[Controlling idea→]** direct liquefaction and **[Controlling idea→]** indirect liquefaction.

In our example, the paragraph is about converting solid coal into liquid fuel. To make this topic suitable for one paragraph, it has to be limited in some way. This is done by limiting the paragraph to talking about direct and indirect liquefaction, which are the controlling ideas. Everything in the rest of the paragraph is controlled by these two ideas that help to structure the rest of the paragraph. Without such a structure, a paragraph can be unorganized.

4.4. Paragraph structure analysis

A writing researcher named Frances Christensen developed a useful method to analyze paragraph structure. Just like sentences, paragraphs are developed by coordination, equal parts of the paragraph, or subordination, one sentence giving more information about the previous sentence. In English, there is also a general preference for general to specific order of information. If we combine these concepts, we can see the structure of a paragraph more easily by looking at the “level of generality.” Sentences in paragraphs tend to be organized from most general to more specific sentences in a paragraph.

To identify the Level of Generality for each sentence in a paragraph, we can assign a value ranging from 0–4 or more as follows.

4.4.1 Level of Generality paragraph analysis

Level	Explanation
0	A sentence that summarizes a previous paragraph, provides background as a way to introduce a new topic, provides a transition to the new paragraph or controlling idea, or concludes the paragraph.
1	The most general sentence containing the main idea in the topic sentence of the paragraph. The main idea may have two or three parts or controlling ideas, however. For example, “There are two types of X: Y and Z. These controlling ideas are often the repeated key words of the rest of the paragraph.
2	A more specific sentence that elaborates an idea in #1
3	An even more specific sentence that elaborates an idea in #2
4	An even more specific sentence that adds information to # 3, # 4, as necessary.

Source: Adapted from http://www.uwc.ucf.edu/Writing%20Resources/Handouts/checking_para_coherence.htm

Here is an example analysis with the value at the end of the sentence. Words are underlined to show how they are linked back to the previous sentence.

EXAMPLE

Coal, the most abundant, widely distributed, and economical fossil fuel, is a solid with high carbon content but low hydrogen content (usually less than 6%) **0**. As a solid, coal is not easily used as a transportation fuel **0**. However, transportation fuels and other chemicals may be derived from coal through liquefaction **0**. The two methods to convert solid coal into liquid fuel are **direct liquefaction** and **indirect liquefaction** **1**. **Direct liquefaction**, the most efficient route currently available, with catalyst and a hydrogen donor solvent at very high temperature and pressure, can convert coal into artificial petroleum **2**. In **indirect liquefaction**, coal is completely gasified with steam **2**. The gasification products are mixed with H₂ and CO with the removal of sulfur-containing species **3**. Over a catalyst at relatively low pressure and temperature, the mixture reacts to produce the final synthesis liquid fuel **4**. By

adjusting the composition of catalyst, hydrogen/carbon ratio, temperature, pressure, etc., one can obtain a variety of different products, such as paraffins, olefinic hydrocarbons or alcohols [4] 0.

The paragraph structure above looks like this.

- 0) Background
- 0) Background
- 0) Transition
- 1) Topic sentence containing two controlling ideas: direct liquefaction and indirect liquefaction
 - 2) Direct liquefaction
 - (No supporting sentences)
 - 2) Indirect liquefaction
 - (Both are marked #2 to show they are of equal coordinate value.)
 - 3) more specific information on the process of indirect liquefaction
 - 4) more specific information on # 3
- 0) Conclusion

From our analysis, it is clear that there is one main idea here: How to produce liquid from coal through **liquefaction**. This main idea is divided into two parts. The first part 2) above is direct liquefaction, which is not developed because there are no supporting sentences of level 3 or 4, and the other part 2) indirect liquefaction, which is explained with supporting examples. Finally, there is a conclusion. There are two parts labeled 2) because they are coordinate: they are at the same level of generality, two controlling ideas of the topic sentence. In the conclusion, the keywords catalyst, hydrogen/carbon ratio, temperature, and pressure are repeated, so we know that they refer to the two methods of liquefaction.

The Level of Generality test is an excellent way to analyze your own writing. It can indicate paragraphs that are not well-structured, or it can help you to analyze examples of good writing. If your paragraphs lack enough level 3 or 4 sentences, your controlling ideas may not be fully supported with information or examples. However, this method is more effective for sentences in the introduction and discussion sections of research writing. Methods sections may have process paragraphs that explain how to do something in a series of steps, which may all be equal. Abstracts also do not follow this structure.

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