

# Paragraph Outline Template

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get [academic] things done

# Paragraph Outline for [Project Name]

## 1. Introduction

### 1.1 Motivation Paragraphs

¶-1 *Broad Motivation:* To start this first paragraph, describe a broad scientific or social problem that your research will address. Then describe a smaller component of that problem. Then a smaller component still. Continue narrowing down until you reach a unique problem that your research will address. After reading this paragraph, the reader should know your niche problem and how it contributes to a wider, more significant problem.

¶-2 *Specific Research Topic:* The previous paragraph focuses on problems; this paragraph focuses on the science attempting to solve those problems. Start this paragraph with something like, “To solve [niche problem], researchers are [description of your broader research field.” Then, as in the previous paragraph, use narrower and narrower descriptions to travel from your broad research discipline down to your specific research topic.

### 1.2 Background/Literature Review Section

¶-1 *Literature Precedent:* Introduce how the literature currently addresses the specific research topic. This paragraph acts as an introduction to summarize the rest of the Background. It introduces each of the research area subtopics that you’ll discuss in the following paragraphs.

¶-2.1\* *Weakness Scope:* A short paragraph—introduce the research area that relates to a particular literature weakness. Describe the various aspects of the area—methods, focus, results—and cite a handful of relevant publications.

¶-2.2\* *Weakness References:* Describe a few key publications in that research area. Elaborate a small number of articles whose research techniques you will cite in the Methods, or whose research results you will cite in the Discussion. Highlight the articles’ contributions and point out any shortcomings. These shortcomings should provide examples of how individual studies in this subtopic display the weakness you are identifying.

¶-2.3\* *Weakness Synthesis:* A short paragraph—synthesize the previous paragraph’s shortcomings into a broader weakness in the literature. Identify the omissions, caveats, limitations, invalid assumptions, or other gaps that define this particular weakness.

*\*(Repeat the paragraphs 2.1-2.3 for each weakness you wish to discuss. Usually two or three weaknesses provide enough information to build a research gap.)*

### 1.3 Research Question Paragraphs

¶-1 *Research Gap:* After identifying a few different weaknesses in the literature, synthesize those weaknesses into one cohesive void in the literature—the research gap. That gap tells the reader what the literature does not know.

¶-2 *Research Question:* Given the research gap, describe the research question that your project will answer. This may include some supplementary questions, but identify one overarching question that those supplementary questions fit underneath. Include a hypothesis if needed.

## 1.4 Closing Paragraphs

¶-1 *Additional References:* You may need to cite some additional publications that don't contribute to the research gap, and weren't cited in the Background section. You might, for example, use experimental methods from a different research field. Cite those types of publications here as succinctly as possible. You can elaborate these references later—e.g. in the Methods or Discussion section—but it is helpful to introduce them now. The most efficient way to do that is to start this paragraph like, “To answer this research question, we apply [such and such methods] from [such and such research field]. [Researcher Name 1], for example, use [method 1] to study [research question 1], and [Researcher Name 2] use [method 2] to study [research question 2].”

¶-2 *Closing:* This last paragraph describes how answering your research question will advance science and improve society. It ties the research question back to the Introduction's broader motivations; it reiterates the Introduction's main points in reverse. For example, “By addressing [research question], this project fills [research gap]. Filling that research gap advances [niche research topic area] by [description of how the project advances the topic]. These advancements improve our understanding of [connection to broader scientific field]. That improved understanding helps to [connection to narrow motivation], which contributes to solving [broad motivation].”

## 2. Methods

### 2.1 Summary Paragraphs

¶-1 *Opening:* Repeat the research question, describe the experimental data that will answer the research question, then summarize the experiment that will produce that data.

¶-2 *Overview:* Give a one-sentence summary of each Methods stage/subsection. For each subsection's one-sentence summary in this paragraph, state what was done and why.

¶-3 *Limitations:* Provide a one-sentence summary of each limitation. End this paragraph with a sentence describing how, despite the limitations, your experiment adequately answers the research question. For example, “Despite these limitations, our experiment produces statistically significant data that show [very broad results summary, e.g. 'how variable X relates to variable Y under Z circumstances'] to answer [research question].”

### 2.2\* Experiment Stages Sections

¶-1 *Summarize:* Describe the experiment stage and why you use this particular technique.

¶-2 *Elaborate:* These paragraphs describe the technique with enough detail for the reader's general understanding. These paragraphs should progress logically. In these paragraphs, you might also elaborate publications whose methods you've built on.

¶-3 *Transition:* Connect to the next subsection. For example, describe how this stage's output becomes input data for the next experiment phase.

*\*(Repeat section 2.2 for each stage of the experiment, e.g. Data, Samples, Apparatus, etc.)*

## 2.3 Limitations Section

¶-1\* *Experiment Limitation*: Start this paragraph with a quick introductory sentence: for example, “Our experiment is limited by [Limitation A] and [Limitation B].” Then elaborate each limitation in this and the next paragraphs.

*\*(Repeat paragraph 1 for each of the experiment’s limitations.)*

¶-2 *Minimize the Limitations*: Describe how, despite the experiment’s limitations, its output data adequately answer the research question. For example, “Despite these limitations, the experiment produces data suitable for answering the research question. The data show how [variable X relates to variable Y under Z circumstances]. Our analysis shows these findings to be statistically significant.”

## 2.4 Closing Paragraphs

¶-1 *Closing*: Reiterate the whole experiment—i.e. summarize each subsection—and remind the reader how the output data produces findings that answer the research question. This paragraph should mimic the Methods first two paragraphs.

# 3. Results & Discussion

## 3.1 Opening Paragraphs

¶-1 *Opening*: Reiterate the research question and foreshadow how your results will answer it. Focus on the main finding, but don’t go too deep into the details yet. For example, “To answer [research question] we show how [variable X relates to variable Y under Z circumstances]. Our results show that [more specific language about the relationship between variable X and Y], which we elaborate in the following section.”

## 3.2\* Findings Sections

¶-1 *Summarize*: This paragraph summarizes all of the information in the rest of the subsection. Begin by describing the finding in more detail than the subtitle does.

¶-2 *Segue to Figure*: Briefly introduce the figure. Explain what data the figure shows and how those data support the finding.

¶-3 *Elaborate the Figure*: Discuss the figure in more detail. Describe important features of the figure’s data—trends, outliers, intersections, etc.—that add context to the finding.

¶-4 *Interpret the Finding*: Translate the finding into new knowledge. Take the finding’s objective facts and interpret them into conclusions that are relevant to answering the research question. Move this paragraph to the Discussion Section if needed.

¶-5 *Apply the Interpretation*: Take your conclusion from the previous paragraph. Use it to describe how the finding addresses the research question, or use it to describe how the finding elaborates the main finding.

¶-6 *Broaden the Interpretation*: Take the conclusion and its application from the last two paragraphs and apply it to the broader literature. Discuss how it fills the research gap or how it can be generalized to comment on your broader research field. Compare your findings to other publications’.

*\*(Repeat section 3.2 for each of the supplementary findings.)*

### 3.3 Conclusion Section

¶-1 *Reiterate the Project*: Reiterate the research question, methods summary, and main finding. For example, “To answer [research question], we [summary of the experiment.] The experimental data show how [variable X relates to variable Y under Z circumstances].”

¶-2 *Reiterate the Limitations*: Briefly repeat the limitations. End the paragraph with something like, “Despite these limitations, our experiment adequately answers the research question because [provide some supporting argument here that mimics the Minimize the Limitations paragraph in the Methods].”

¶-3 *Answer the Research Question*: Reiterate the main result and main conclusion and describe how they answer the research question. Summarize how any supplementary findings elaborate the main finding and conclusion. Repeat any important Discussion points.

¶-4 *Generalize*: Mimic the Introduction’s second paragraph. Use your results to make general conclusions about your larger research field. You might discuss how your results changed the research gap and how those changes might influence your broader research field.

¶-5 *Motivate*: Explain how your project-specific conclusions and the general conclusions about your larger research field connect back to your research motivations. This paragraph mimics the Introduction’s last paragraph. Though the Introduction’s last paragraph is uncertain—i.e. it generally predicts how your project might impact your motivation—the Conclusion’s last paragraph is concrete—i.e. now that you know the results, your project does impact your motivation and you can describe that impact more confidently.