

Unit Three

Problem, Process, and Solution

In Unit Two we mainly explored one common kind of underlying structure to academic writing, that of general-specific movement. This structure will prove useful in later units when producing data commentaries (Unit Four) or writing introductions to research papers (Unit Eight). In this unit, we explore and practice a second underlying structure in academic writing, that of problem-to-solution (PS) movement, which we introduced briefly in Unit One and touched on in Unit Two. This structure will again prove useful later when writing critiques (Unit Six) and Introductions (Unit Eight). So, clearly this structure is one of the more important ones in academic writing, especially if you consider how much academic research activity is aimed at solving problems, which may be discussed in published research articles, various kinds of research proposals, and case reports in certain fields, to name a few examples. Beyond looking at the overall organization, we have built into the problem-solution structure some discussion of process descriptions. In many cases, it makes sense to see describing the parts of a process as the steps required to provide a solution to some problem. Alternatively, a problem may be described in terms of a process—for example, how malware infects a mobile phone or how a tsunami (tidal wave) forms.

As we have seen, general-specific passages tend to be descriptive and expository. In contrast, problem-solution texts tend to be more argumentative and evaluative. In the former, students and junior scholars will most likely position themselves as being informed and organized and in the latter as questioning, perceptive, and convincing. We say this because you may need to convince your reader that your problem is indeed a problem and/or that your solution is reasonable.

The Structure of Problem-Solution Texts

We begin this unit with a passage on a topic that is likely of interest to you and others who want or perhaps need to publish. Although it is written from the perspective of research in Biomedicine, we think it raises some points that are relevant for all junior scholars.

TASK ONE

This passage discusses the need for junior scholars or novices to receive training in scientific writing. Before you read, discuss the first question with a partner.

1. How important is it for you to publish in journals in your field? Why? What are some challenges that novices may face?

**Scientific Writing of Novice Researchers:
What Difficulties and Encouragements Do They Encounter?**

Shah, J., BA, MS; Shah, A., MD, MPH;

Pietrobon, R., MD, PhD, MBA. (2009).

Academic Medicine, 84, 511–516.

- ① Clear communication of research findings is essential to sustain the ever-evolving biomedical research field.
- ② Serving as the mainstay for this purpose, scientific writing involves the consideration of numerous factors, while building up an argument that would convince readers and possibly enable them to arrive at a decision.
- ③ Those who report research must attend to the soundness of the subject matter, to the nature of the intended audience, and to questions of clarity, style, structure, precision, and accuracy.
- ④ These factors, along with the weight of responsibility to the scientific community, make scientific writing a daunting task.
- ⑤ Consequently, many researchers shy away from this critical element of research, which may impede the progress of science and their own scientific careers.

⑥ The ability to accurately and effectively communicate ideas, procedures, and findings according to readers' expectations is the primary skill required for scientific writing. ⑦ Additionally, skills such as the ability to relate and interlink evidence, to lend permanence to thoughts and speech, to enable one's writing to serve as a future reference to others, and to protect intellectual property rights¹ need to be developed and tempered* over a period of time.

⑧ These skills are necessary for all researchers, but especially for novice researchers in the beginnings of their careers so that they do not face failure and lose valuable time learning these skills later.

⑨ Individuals entering the research field with no or little experience with past publications qualify as novice researchers. ⑩ Even clinicians intending to explore and publish findings about research questions based on their clinical practice need to learn these skills to effectively contribute to health care.

⑪ Instruction in scientific writing and subsequent publication in peer-reviewed journals will help novice researchers refine their ideas and increase their expertise, because the act of writing is itself a valuable tool for learning and for fostering the scientific thought process²—this aligns with the principles of the writing to learn movement.^{3,4} ⑫ Effective writing skills help new scientists take part in the ongoing, ever-evolving scientific conversation.⁵

⑬ The practice of scientific writing develops habits of reflection² that make for better researchers, and publication in respected journals strengthens the scientific process, while playing a crucial role in career advancement.

*made stronger through experience.

2. The passage includes the four parts of the standard problem-solution text, as shown in Table 2. Which sentences belong to each part? What is the general point being discussed in each part?

TABLE 2. Parts of a Problem-Solution Text

Situation	background information on a particular set of circumstances	
Problem	reasons for challenging the accuracy of the figures; criticisms of or weaknesses surrounding the current situation; possible counterevidence	
Solution	discussion of a way or ways to alleviate the problem	
Evaluation	assessment of the merits of the proposed solution(s)	

Note that sometimes an incomplete solution is offered; an incomplete solution may introduce a new problem, which then needs to be addressed. This type of text may look different (see Table 3).

TABLE 3. Variation of a Problem-Solution Text

Situation	background information on a particular set of circumstances
Problem	reasons for challenging the accuracy of the figures; criticisms of or weaknesses surrounding the current situation; possible counterevidence
Partial solution	discussion of a way or ways to alleviate the problem
Evaluation	assessment of the merits and limitations of the proposed solution(s)
New solution	discussion of a new way or ways to alleviate the problem
Evaluation	assessment of the merits of the proposed solution(s)

3. Do you agree or disagree with the opening sentence? Why or why not? What would be the reaction if the statement were about a field other than biomedicine? Why do you suppose the authors chose this as their starting point?
4. What is your reaction to the point made in Sentence 7?

5. Put a check mark (✓) next to the aspects of the text that contribute to the authors' attempts to convince you. How convinced are you that novices should receive instruction in scientific writing?
- a. the problem-solution organization
 - b. the flow of ideas
 - c. references to other published papers (indicated by the superscripted numbers at the ends of some of the sentences)
 - d. claims that are stated cautiously (see Unit Four)
 - e. the explanation of the causes of the writing challenges
6. Where do you think the authors are more convincing? Is it in stating the problem or in suggesting the solution? Why?
7. Put a check mark (✓) next to the items that you think could strengthen the text and would lend support to the argument.
- a. a quote from a study that shows the progress of science is slowed because researchers do not write up their work
 - b. some statistics indicating that writing instruction is beneficial
 - c. some data on the relationship between writing (publishing) and career advancement
 - d. an explanation of the writing to learn movement mentioned in Sentence 11
8. Do you have any experience of your own to contribute to the discussion? Have you been involved in a publication? Would you agree or disagree with the authors' point that scientific writing involves the creation of an argument?
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Language Focus: Mid-Position Adverbs

In the section on style in Unit One (beginning on page 14), we noted that adverbs tend to occur within or near the verb in formal academic writing. In this Language Focus, we develop the point further. First, look at this occurrence from the text in Task One (Sentence 2).

. . . scientific writing involves the consideration of numerous factors, while building up an argument that would convince readers and *possibly* enable them to arrive at a decision.

You might wonder why it matters where the adverb is placed. After all, you could, following the rules of grammar, place *possibly* at the beginning or the end of the main clause.

. . . *possibly* scientific writing involves the consideration of numerous factors, while building up an argument that would convince readers and enable them to arrive at a decision.

. . . scientific writing involves the consideration of numerous factors, while building up an argument that would convince readers and enable them to arrive at a decision *possibly*.

While grammatically acceptable, the placement of adverbs in sentence-initial position in written academic texts is rather uncommon (Virtanen, 2008). More importantly, if the adverb is in sentence-final position, this may have an unintended effect on the reader. Specifically, if you recall from Unit One, the old-to-new pattern of information flow places the new information at the end of the sentence. Information at the end is therefore a reasonably good candidate for the beginning focus of the next sentence (Virtanen, 2008). In our example, then, the placement of *possibly* at the end could create the expectation that the next sentence will explore why the authors are not fully committed to the point.

. . . scientific writing involves the consideration of numerous factors, while building up an argument that would convince readers and enable them to arrive at a decision *possibly*.

While some readers . . . , other readers

Alternatively, it might suggest that the author is not convinced by the point just made. Thus, the placement of the adverb can influence your reader's ability to anticipate the development of your ideas.

TASK TWO

Find a single adverb to replace the phrase in *italics* and then place the adverb in mid-position.

1. The provisions of the law must be applied *with care*.
2. Part II of this paper describes the laws of the U.S. that pertain to agricultural biotechnology *in only a couple of paragraphs*.
3. Myopia, which is referred to as shortsightedness *most of the time*, is a common cause of visual disability throughout the world.
4. This study revealed that American and Japanese thresholds for sweetness and saltiness did not differ *a lot*.
5. *As a rule*, pulsed semiconductor lasers do not use the broad gain bandwidth to full advantage in the generation of subpicosecond pulses.
6. Environmental managers are faced with having to determine the extent of environmental contamination and identifying habitats at risk *on a regular basis*.
7. The water supply lines must be inspected to prevent blockages *now and then*.
8. Although many elaborations of this model have been developed over the years, *to a considerable extent* all of them have followed the traditional specification in presupposing that an individual will choose to make a tax report.

The text on novice writers includes a few references to other published papers to support the claims (Sentences 7 and 11–13). Whether and why to include references is a matter of some complexity and is dealt with in Unit Eight. Here we simply point out that a well-placed and well-chosen reference can give credibility to your points. In this next task, pay attention to the references and consider why they were included.