

Writing Scientific Research Articles

Strategy and Steps

Abridged and Glossed Edition

A full version of this book is available for purchase at Wiley.com

Margaret Cargill and Patrick O'Connor

Margaret Cargill BA, DipEd, MEd (TESOL)
Adjunct Senior Lecturer
School of Earth and Environmental Sciences
The University of Adelaide
South Australia 5005
Australia

Patrick O'Connor BSc, PhD
Visiting Research Fellow
School of Earth and Environmental Sciences
The University of Adelaide
South Australia 5005
Australia



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Introduction to the Abridged and Glossed Edition

This edition has been prepared for the Wiley Chinese Scholars Network and contains selected chapters only of the book 'Writing scientific research articles: Strategy and steps'. Key words and phrases in these chapters have been identified and 'glossed' (translated/interpreted) in Chinese. No other changes have been made to the text. Because not all the chapters are included here, some things mentioned in the text are not present – for example, the Answer Pages. (A full version of the book is available for purchase at Wiley.com.)

The chapters included here are The Introduction (which is Chapter 8 in the full book); A process for preparing a manuscript (Chapter 15 in the full book); and Developing discipline-specific English skills (Chapter 17 in the full book).

We hope you will find this edition helpful!

Margaret Cargill and Patrick O'Connor
Adelaide, January 2012



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CHAPTER 1

The Introduction

As your primary reading audience [主要读者] of editor and referees will probably start reading at the Introduction, an effective Introduction is particularly important. Referees are likely to look here for evidence to answer the following questions. [审稿人很有可能依据这一部分内容回答以下问题]

- 1 Is the contribution new?
- 2 Is the contribution significant?
- 3 Is it suitable for publication in the journal?

1.1 Five stages to a compelling Introduction

Applied linguistics researchers have identified five main stages [主要步骤] that commonly appear in research article Introductions (Figure 1.1). These stages have been identified through analyzing many published articles [通过分析大量已发表文章而确定的], and interesting variations have been found across different subdisciplines of science. However, for our purposes in this book, the five broad stages give us a useful framework that is flexible enough to be applicable in most contexts [非常灵活、适用于多数情况的有用框架]. But please remember that they do not represent a recipe to be followed unreflectively [这些步骤不是要大家像遵循秘诀似的不假思索地盲从]; rather, they provide a pattern for you to test on papers in your own field [一个用于对你自己学科领域中论文（写作）进行摸索学习的模式], and to refine into a useful tool for your own use.

These stages do not always occur strictly in the order given in Figure 8.1, and some may be repeated [不总是严格按照图8.1所示的次序出现，有时还有可能会重复（出现）] within a given Introduction. For example Stage 2/Stage 3 sequences often recur when an author wants to justify specific aspects or components of a study. To help you see what we mean by these stages, we first ask you to read the article introduction presented in Table 1.1 and consider our identification of the stages and their locations.

Task 1.1 Introduction stages

Read the introduction of your selected PEA [提供的范文], decide if all stages are present, and mark where each one begins and ends. (Remember that it is possible that stages may be repeated or come in a different order to that suggested in Figure 1.1.)

Compare your findings with our suggestions in the Answer pages.

Now, do the same for your own SA [（你从你自己的学科领域）选择的文章]. Discuss your findings with a colleague or teacher if appropriate.

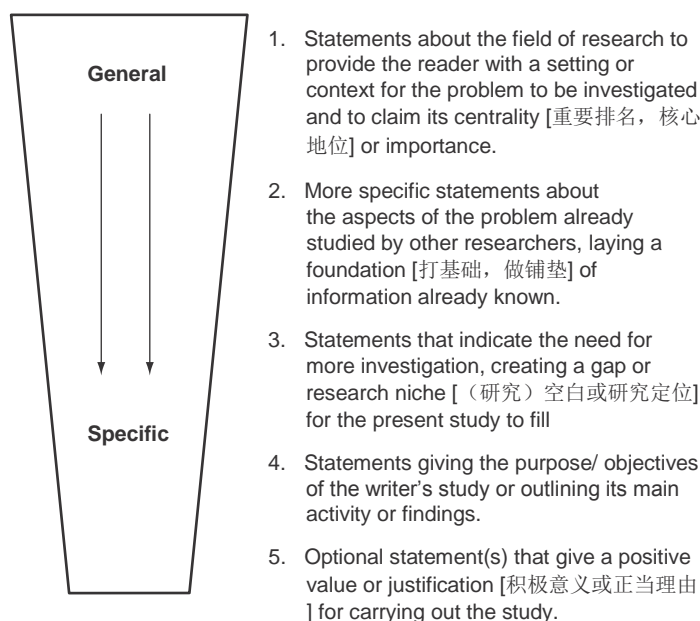


Fig. 1.1 Five stages of an Introduction to a science research article (after Weissberg & Buker 1990).

Table 1.1 Identification of stages in the Introduction to “Use of *in situ*

¹⁵N-labelling to estimate the total below-ground nitrogen of pasture legumes in intact soil-plant systems” (McNeill *et al.* 1997).

Extract	Stage
Current estimates of the below-ground production of N by pasture legumes are scarce and rely mainly on data from harvested macro-roots (Burton 1976; Reeves 1984) with little account taken of fine root material or soluble root N leached by root washing. Sampling to obtain the entire root biomass is extremely difficult (Sauerbeck and Johnen 1977) since many roots, particularly those of pasture species (Ellis and Barnes 1973), are fragile and too fine to be recovered by wet sieving. Furthermore, the interface between the root and the soil is not easy to determine and legume derived N will exist not only as live intact root but in a variety of other forms, often termed rhizodeposits (Whipps 1990).	Stage 1 Stage 3 in “scarce” and “little account”
An approach is accordingly required which enables <i>in situ</i> labelling of N in the legume root system under undisturbed conditions coupled with subsequent recovery and measurement of that legume N in all of the inter-related below-ground fractions.	Stage 1 Stage 3 (broad gap)
Sophisticated techniques exist to label roots with ¹⁵ N via exposure of shoots to an atmosphere containing labelled NH ₃ (Porter <i>et al.</i> 1972; Janzen and Bruinsma 1989) but such techniques would not be suitable for labelling a pasture legume within a mixed sward.	Stage 2 Stage 3
Labelled N ₂ atmospheres (Warembourg <i>et al.</i> 1982; McNeill <i>et al.</i> 1994) have been used to label specifically the legume component of a mixed sward via N ₂ fixation in nodules. However, these techniques require complex and expensive enclosure equipment, which limits replication and cannot be easily applied to field situations; furthermore, non-symbiotic N ₂ fixation of label may occur in some soils and complicate the interpretation of fate of below-ground legume N.	Stage 2 Stage 3

Table 1.1 (Continued)

Extract	Stage
The split-root technique has also been used to introduce ^{15}N directly into plants by exposing one isolated portion of the root system to ^{15}N either in solution or soil (Sawatsky and Soper 1991; Jensen 1996), but this necessitates some degree of disturbance of the natural system. Foliar feeding does not disturb the system and has the additional advantage that shoots tolerate higher concentrations of N than roots (Wittwer <i>et al.</i> 1963). Spray application of ^{15}N -labelled urea has been successfully used to label legumes in situ under field conditions (Zebarth <i>et al.</i> 1991) but runoff of ^{15}N -labelled solutions from foliage to the soil will complicate interpretation of root-soil dynamics. Russell and Fillery (1996), using a stem-feeding technique, have shown that in situ ^{15}N -labelling of lupin plants growing in soil cores enabled total below-ground N to be estimated under relatively undisturbed conditions, but they indicated that the technique was not adaptable to all plants, particularly pasture species. Feeding of individual leaves with a solution containing ^{15}N is a technique that has been widely used for physiological studies in wheat (Palta <i>et al.</i> 1991) and legumes (Oghoghorie and Pate 1972; Pate 1973). The potential of the technique for investigating soil-plant N dynamics was noted as long as 10 years ago by Ledgard <i>et al.</i> (1985) following the use of ^{15}N leaf-feeding in a study of N transfer from legume to associated grass. The experiments reported here were designed (i) to assess the use of a simple ^{15}N leaf-feeding technique specifically to label in situ the roots of subterranean clover and serradella growing in soil, and (ii) to obtain quantitative estimates of total below-ground N accretion by these pasture legumes.	Stage 2 Stage 3 Stage 2 Stage 3 Stage 2 Stage 3 Stage 2 (Stage 3 implicit [暗示] in “potential”) Stage 4 (aims of the pre sent study)

1.2 Stage 1: Locating your project within an existing field of scientific research

Constructing the right setting for your paper

In Stage 1, authors mostly begin with broad statements that would generally be accepted as fact by the members of their reading audience. The present tense is often used for this kind of statement because one function of the present tense in English is expressing information perceived as always true. Sentences written in the present perfect tense are also common in Stage 1, expressing what has been found over an extended period in the past and up to the present. These statements may or may not include references, depending on the field and the topic of the paper.

Task 1.2 Introduction Stage 1 analysis

- 1 Check the first paragraphs of the Introductions of the two PEAs and complete Table 1.2. Then check your answers with our suggestions in the Answer pages.

(Continued)

Task 1.2 (Continued)

- 2 Now repeat the exercise for your SA, compare your findings with those for the PEAs, and discuss any differences with a colleague or teacher, if appropriate.

Table 1.2 Task 1.2: Introduction Stage 1 analysis

Question	Kaiser et al. (2003)	Britton-Simmons and Abbott (2008)
Are some sentences written in the present tense? How many?		
Are some sentences written in the present perfect tense? How many?		
Which tense is used more? Why do you think this is the case?		
How many sentences contain references?		
What kinds of sentences do not have references?		

Authors then seek to move their readers smoothly from these broad, general statements towards one sub-area of the field, and then to the authors' own particular topic. One way to think about this is to begin in a selected country and imagine you are moving from that country (the broad area where the Introduction begins) and zooming in on a province in that country, and finally focusing on a particular city, which represents the topic area of research to be presented in the paper.

Task 1.3 Country to city in Stage 1

- 1 Look at the Introduction of your selected PEA. What is the country? The province? The city?

Check your answers against our suggestions in the Answer pages.

- 2 Now do the same task for the Introduction to the SA you are analyzing. Country? Province? City?
- 3 Now try to suggest these three features for your OA. Remember, your "city" is not your purpose for conducting the study, but rather the specific topic area for your paper. Country? Province? City?

Writers move their readers through these steps by linking their sentences through the positioning of *old* and *new information*. Old information is any information that the reader already knows; it is placed towards the beginning of sentences. New information comes towards the end of sentences. (This convention is very important for improving flow in all forms of technical writing.) See Task 1.4.

1.3 Using references in Stages 2 and 3

In Stages 2 and 3 of an Introduction (see Figure 1.1) authors use selected literature from their field to justify their study and construct a gap or niche for their own work.

Task 1.4 Identifying old or given information

Look at the extract from the Introduction in Kaiser et al. (2003) below and underline the words that represent or refer to *old information* (information the reader already knows about, also called *given information*).

Legumes form symbiotic associations with N₂-fixing soil-borne bacteria of the *Rhizobium* family. The symbiosis begins when compatible bacteria invade legume root hairs, signalling the division of inner cortical root cells and the formation of a nodule. Invading bacteria migrate to the developing nodule by way of an 'infection thread', comprised of an invaginated cell wall. In the inner cortex, bacteria are released into the cell cytosol, enveloped in a modified plasma membrane (the peribacteroid membrane (PBM)), to form an organelle-like structure called the symbiosome, which consists of bacteroid, PBM and the intervening peribacteroid space (PBS; Whitehead and Day, 1997). The bacteria, subsequently, differentiate into the N₂-fixing bacteroid form. The symbiosis allows the access of legumes to atmospheric N₂, which is reduced to NH₄⁺ by the bacteroid enzyme nitrogenase. In exchange for reduced N, the plant provides carbon to the nodules to support bacterial respiration, a low-oxygen environment in the nodule suitable for bacteroid nitrogenase activity, and all the essential nutritional elements necessary for bacteroid activity. Consequently, nutrient transport across the PBM is an important control mechanism in the promotion and regulation of the symbiosis.

They write sentences supported by *references* to the literature they have selected. In this context, the term literature refers to all the published research articles, review articles, and books in a given field. The term also includes information published on websites that have been peer-reviewed or belong to organizations with appropriate scientific reputations.

Referencing: how to do it and why you need to

References to other published studies, also known as citations or in-text citations, can be used in all stages of the Introduction, as you have seen in the samples we have looked at. They appear in the text either as a surname and year in brackets, e.g. (McNeill 2000), or as a number, e.g. ⁷. The details of the presentation depend on the style stipulated by the journal. Check the Instructions to Contributors of your target journal for the necessary information on referencing style. These references *refer* to the list of references at the end of the paper, where the full publication details are written.

Citations are particularly vital in showing that you know clearly the work that has been conducted by others in your city area (see Task 1.3 above), and therefore what has not been done and needs to be done: the gap that your study will fill. This function is carried out in Stages 2 and 3. What you are required to do here is, in effect, to construct an argument which justifies your own study and shows why and how it is important.

Using citation to develop your own argument

Below are examples of parts of paragraphs using three different citation methods the references cited have been invented for demonstration purposes only). These can be

information is given prominence in the sentence; and weak author prominent, where the ideas of author(s) are given prominence, but author names do not appear in the main part of the sentence. Observe how the different methods contribute to the way in which the writer's argument is developed. (N.B. For this section, the term *author* is used for the author of a published paper that is being cited; the term *writer* is used to refer to the person writing the text that cites the author's work.)

Information prominent citation

Shrinking markets are also evident in other areas.* The wool industry is experiencing difficulties related to falling demand worldwide since the development of high-quality synthetic fibres (Smith 2000).

This is the default style in many areas of science and is the only style used in the Introductions of the two PEAs. However, there are two other options that should also be part of a writer's repertoire, for use when appropriate.

Author prominent citation style 1

Shrinking markets are also evident in other areas. As Smith (2000) pointed out, the wool industry is experiencing difficulties related to falling demand worldwide since the development of high-quality synthetic fibres.

This style gives more option to show the writer's view of the cited fact. In this case, it shows that the writer (you!) agrees with Smith.

or Author prominent citation style 2

Shrinking markets are also evident in other areas. Smith (2000) argued that the wool industry was experiencing difficulties related to falling demand worldwide since the development of high-quality synthetic fibres. However, Jones et al. (2004) found that industry difficulties were more related to quality of supply than to demand issues. It is clear that considerable disagreement exists about the underlying sources of these problems.

This style also allows the use of verbs such as *argued*, which give the reader advance notice that a however or some other contrast may be coming, and indicate that what is being cited is not necessarily accepted as correct by you, the writer. However, there is a danger attached to the author prominent style. If it is over-used, it can make the text sound like a list, rather than a logically constructed argument. We recommend that you use this style sparingly, perhaps when you are approaching the specifics of the gap your study will address. It is also useful to pay close attention to the papers you read in your own field, to check how often, if at all, this style appears.

or Weak author prominent citation

Several authors have reported that the wool industry is experiencing difficulties related to falling demand since the development of high-quality synthetic fibres (Smith 2000, Wilson 2003, Nguyen 2005). For example, Smith (2000) highlighted ...

*This first sentence is a "topic sentence" for the paragraph: its function here is to form a link to the previous paragraph (which discussed shrinking markets), and to alert the reader to the topic of the current paragraph. Topic sentences are an effective way of creating logical flow in science writing.

Task 1.5 Citation styles in an authentic example

Read the Introduction extract presented in Table 1.3 and observe how the different citation styles are used.

Table 1.3 Use of different citation styles in a segment of the Introduction from McNeill et al. (1997).

Introduction text	Citation style
Foliar feeding does not disturb the system and has the additional advantage that shoots tolerate higher concentrations of N than roots (Wittwer et al. 1963).	Information prominent
Spray application of ¹⁵ N-labelled urea has been successfully used to label legumes in situ under field conditions (Zebbarth et al. 1991) but runoff of ¹⁵ N-labelled solutions from foliage to the soil will complicate interpretation of root-soil dynamics.	Information prominent
Russell and Fillery (1996), using a stem-feeding technique, have shown that in situ ¹⁵ N-labelling of lupin plants growing in soil cores enabled total below-ground N to be estimated under relatively undisturbed conditions, but they indicated that the technique was not adaptable to all plants, particularly pasture species. Feeding of individual leaves with a solution containing ¹⁵ N is a technique that has been widely used for physiological studies in wheat (Palta et al. 1991) and legumes (Oghoghorie and Pate 1972; Pate 1973). The potential of the technique for investigating soil-plant N dynamics was noted as long as 10 years ago by Ledgard et al. (1985) following the use of ¹⁵ N leaf-feeding in a study of N transfer from legume to associated grass.	Writer's evaluation statement
	Author prominent
	Information prominent
	Author prominent, but using the passive voice so that the link (technique) can come first in the sentence as old information.

This method has a general reference to authors in the subject and then more than one reference in the brackets. It is followed here by an author prominent citation. This style can be useful as a topic sentence when beginning a new subtopic or line of argument. Note that this style requires the use of the present perfect tense (*have reported*).

Writers choose their citation method to fit with the way their paragraph is advancing their argument.

Citing when you cannot obtain the original reference

Editors usually require that writers cite only those papers that they have actually read. However, if you cannot obtain the original article and are therefore obliged to rely on another author's interpretation of a fact or finding you want to cite, you may use the following form of secondary citation in-text.

[The finding or fact you want to cite] (Smith 1962, cited in Jones 2002).

In such cases, only Jones (2002) appears in the reference list.

1.4 Avoiding plagiarism when using others' work

Another important reason to pay careful attention to referencing is to avoid plagiarizing other people's work unintentionally. Plagiarism is using data, ideas, or words that originated in work by another person without appropriately acknowledging their source. It is generally regarded as a form of cheating in academic and publishing contexts, and papers will be rejected if plagiarism is detected. Incomplete citation also prevents your gaining credit for knowing the work of other researchers in the field. Effective and inclusive citation helps you present yourself as a knowledgeable member of the research community, which can be important in terms of the impression you make on referees evaluating your manuscripts. It also allows others to benefit from the sources of information you have used.

Avoiding plagiarism requires writers to do two things: to be aware of the kinds of situations where inadvertent plagiarism is likely to occur; and to develop effective note-taking practices to ensure they remain aware of the status of their notes as they convert them into sentences in a paper for submission.

Task 1.6 Identifying plagiarism

Below are two versions of the same information, adapted from the Introduction in McNeill et al. (1997). In version 2, identify where the writer has plagiarized by writing in his or her own voice ideas that originated in another document (as demonstrated in version 1).

Version 1 Russell and Fillery (1996), using a stem-feeding technique, have shown that *in situ* ^{15}N -labelling of lupin plants growing in soil cores enabled total below-ground N to be estimated under relatively undisturbed conditions, but they indicated that the technique was not adaptable to all plants, particularly pasture species.

Version 2 Russell and Fillery (1996), using a stem-feeding technique, have shown that *in situ* ^{15}N -labelling of lupin plants growing in soil cores enabled total below-ground N to be estimated under relatively undisturbed conditions. However, this technique is not adaptable to all plants, particularly pasture species.

Check your answers in the Answer pages.

The important thing to watch for is that it is clear to your reader whether the idea or fact you are using in each and every sentence is your own, or has come from the work of another person. If it comes from someone else's work, cite them! It is possible that the person whose idea it originally was will be a referee of your paper, and they will be sure to notice the problem. In any case, the referees will know the literature well, so it is very important to be accurate in your citation practices.

Remember also that direct quotations using quotation marks or inverted commas ("...") are extremely rare in science writing. This means that authors need to paraphrase sentences that appear in the work of other authors, rather than copying them verbatim. However, remember also that you can expand your repertoire of sentence structures by removing the content (most often the noun phrases, indicated by NP in the example below) from sentences that appeal to you and re-using the shell (or sentence template) for your own content. For example, from the sentence in Task 1.6, version 1, you could reuse this shell:

[Authors], using [NP1], have shown that [NP2] enabled [NP3] to be estimated under [adjective] conditions, but they indicated that the technique was not adaptable to all [NP 4], particularly [NP 5].

See Chapter 3 for more details of this approach.

1.5 Indicating the gap or research niche

This is Stage 3 of an Introduction (see Figure 1.1), and it can be written in a multitude of ways. As discussed previously, authors often present a broad gap early in the Introduction, and a more specific one close to the end. Examples include the following, taken from Britton-Simmons and Abbott (2008) (see Chapter 19):

However, understanding how these processes interact to regulate invasions remains a major challenge in ecology.

Despite its acknowledged importance, propagule pressure has rarely been manipulated experimentally and the interaction of propagule pressure with other processes that regulate invasion success is not well understood.

It is presently unclear how different disturbance agents influence long-term patterns of invasion.

It is common to find so-called signal words that indicate that a Stage 3 statement is being made. In the examples above such signal words include *however*, *remains a major challenge*, *rarely*, *not well understood*, and *presently unclear*.

Task 1.7 Signal words for the research gap or niche

Reread the Introductions from McNeill et al. (1997) (see Table 1.1) and your selected PEA, and identify the signal words that indicate a gap is being described. List them and then check the list against our suggestions in the Answer pages.

Task 1.8 Drafting your own Introduction: Stage 3

Begin to draft Stage 3 for the Introduction of your own paper, if appropriate.

1.6 Stage 4: The statement of purpose or main activity

At the end of the Introduction authors set up the readers' expectations of the rest of the paper: they tell them what they can expect to learn about the research being presented.

As indicated in Figure 1.1, Stage 4 of the Introduction is generally in the form of the aim or purpose of the study to be reported, or the principal activity or finding of the study. Authors have considerable flexibility in choosing how they will word their Stage 4, and it can be instructive to pay attention to how this is done in each paper that you read for your research. You may like to keep a list of possible wordings, to help when you come to the writing of your own papers.

Task 1.9 Stage 4 sentence templates

Identify the Stage 4 in the Introduction in McNeill et al. (1997), presented in Table 1.1, and in your selected PEA. We have provided a shell, or sentence template, from each one in the Answer pages.

Task 1.10 Drafting your own Introduction: Stage 4

Draft a Stage 4 for the Introduction of your own paper, if appropriate. Write it so that it runs smoothly on from your Stage 3 gap statement, to form the closing part of your Introduction. Make sure that all the keywords in your title have been used in these sentences, to meet the expectations you set up for your readers when they read the title.

1.7 Suggested process for drafting an Introduction

[建议使用的起草引言部分的步骤]

Here is a summary of a process for drafting an Introduction. It is useful *after* you have made the key decisions about the results you will include in the paper, and what they mean for the audience who will read the paper.

- 1 Begin with Stage 4. Write an aim statement, or a statement describing what the paper sets out to do. It is usually the easiest part of the Introduction to write. It will appear in the final paragraph of the Introduction, but it is useful to write it early in the drafting process [但在写草稿过程中先写这一部分是个十分有用的策略].
- 2 Draft Stage 3 next: the gap or need for further work [研究空白或需要深入开展的工作]. As we have seen in the previous sections, there may be one or more sub-gaps at different places in your Introduction, as well as a Stage 3 statement that leads into Stage 4. Consider beginning your Stage 3 sentences with words such as *however* or *although*, and incorporating words indicating a need for more research, such as *little information*, *few studies*, *unclear*, or *needs further investigation*.
- 3 Then think about how to begin Stage 1, the setting. Think about your intended audience and their interests and background knowledge, and the ideas you have highlighted in your title [你的目标读者群、他们的兴趣所在和知识背景, 以及你在标题中强调的观点]. Try to begin with words and concepts that will immediately grab the attention [引起注意] of your intended readers.
- 4 Next arrange the information you have collected from the literature into Stage 2. This is a very important part and you will probably need quite a bit of time to write it. You may need to do some more searching of the literature [做更多的文献检索工作], to make sure you have done the best possible job of finding the relevant work [尽可能地找到(所有)相关文献] in the area and the most recent studies.
- 5 Combine the stages into a coherent Introduction [连贯的引言]. You may need to add additional sentences providing background, and/or to rearrange sentences or sections to get the best possible logical development [尽可能地使语言具有较强的

逻辑性]. Section 1.8 focuses on strategies for revising your Introduction to enhance the logical flow [增强表达的逻辑性] of the writing, once you are happy with the content you have included [在你对写进引言部分的内容感到满意之后].

1.8 Editing for logical flow[修改逻辑错误]

In English writing, the responsibility rests with the writer to ensure that the reader recognizes the logical flow of the argument being presented [作者有责任确保读者能够看出文中所阐释论点的逻辑关系]. This is not the case in all languages! However, even for writers with English as a first language, the strategies for achieving this goal in their writing are often not obvious. We suggest some important strategies in the following sections. We have mentioned several of these previously in the book, but this section brings them together into a coherent set and provides you with some practice in improving poor examples.

Strategy 1: Always introduce ideas [介绍/阐释你的观点]

Use informative [能提供有用信息的] titles, subheadings and introduction sections to set up expectations in your readers [引起读者的期望].

A key to effective scientific and technical communication in English is to set up expectations in your reader's mind, and then meet these expectations as soon as possible [尽早满足读者的期望].

Make the wording of your subheadings [副标题的措辞], if your target journal uses them, a part of the process of telling your reader what to expect next [（作为）向读者介绍下文内容的过程的一部分], in much the same way that the paper's title alerts them to the main message of the paper as a whole. In paragraphs, use the first sentence as a topic sentence to orient your readers to the main point or purpose of the paragraph [帮助读者把握该段文字重要观点或领悟作者主要目的的主题句]. Topic sentences can also be used to link the upcoming paragraph to the one that precedes it; see Task 1.11 [用于连接段落；见练习1.11 【仅完整教材可见】].

Strategy 2: Move from general information to more specific information [由一般阐述到具体解释]

Readers of English text expect that they will read general information about any topic or point first, before encountering details, examples, or other more specific information.

Consider the following sample paragraph and decide whether it meets the requirement [判断它是否符合要求] to move from the general to the particular. Alternatively, is there a sentence that seems to be too general late in the paragraph? [段落中靠后的句子是不是看起来过于宽泛？] (Sentences are numbered to make it easier to refer to them later.)

¹Pleuropneumonia (APP) [胸膜肺炎] can present as a dramatic clinical disease or as a chronic, production limiting disease in pig herds. ²A sudden increase in the number of sick and coughing pigs and a sharp rise in mortalities [死亡率] among grower/finisher pigs [生长肥育猪] may herald an outbreak [预示（疾病）爆发] of APP in a herd. ³On the other hand, signs may be limited to a drop in growth rate and an increase in grade two pleurisy lesions in slaughter pigs.

⁴The disease surfaced in the Australian pig population during the first half of the 1980s and ten years later was regarded as one of the most costly and devastating diseases affecting the Australian pig industry.

Task 1.11 Topic sentence analysis

What information would you expect to find in the paragraph introduced by each of the following sentences? What do you think was the focus at the end of the previous paragraph?

1 Propagule pressure is widely recognized as an important factor that influences invasion success (MacDonald et al. 1989; Simberloff 1989; Williamson 1996; Lonsdale 1999; Cassey et al. 2005).

2 Two classes of putative Fe(II)-transport proteins (Irt/Zip and Dmt/Nramp) have been identified in plants (Belouchi et al., 1997; Curie et al., 2000; Eide et al., 1996; Thomine et al., 2000).

Look at an article you have not read before and read the first sentences of each of the paragraphs in the Introduction. Can you predict the content of the paragraphs? N.B. The first sentence is very often but not always the topic sentence of the paragraph.

Do you agree that Sentence 4 is more *general* than the other sentences? In that case, the paragraph could be improved by moving Sentence 4 to the beginning of the paragraph, as below. Some slight changes of wording have also been made to improve the sense.

Pleuropneumonia (APP) surfaced [出现] in the Australian pig population during the first half of the 1980s and ten years later was regarded as one of the most costly and devastating diseases affecting the Australian pig industry. It can present as a dramatic clinical disease or as a chronic, production limiting disease in pig herds. A sudden increase in the number of sick and coughing pigs and a sharp rise in mortalities among grower/finisher pigs may herald an outbreak of APP in a herd. On the other hand, signs may be limited to a drop in growth rate and an increase in grade two pleurisy lesions [2度胸膜炎病变] in slaughter pigs [肉猪].

Strategy 3: Put old (or given) information before new information [将旧信息/已知信息放在新信息之前]

To understand the basis of this recommendation, consider first the two short paragraphs below. Both contain exactly the same information, but in a different order [完全一样的信息，但顺序不同]: decide whether one version is easier to understand than the other.

Version A ¹Clay particles have surface areas which are many orders of magnitude greater than silt or sand sized particles. ²The ability of soils to shrink when dried is controlled by the interactions of these clay surfaces with water and exchangeable cations.

Version B ¹Clay particles have surface areas which are many orders of magnitude greater than silt or sand sized particles. ²The interactions of these clay surfaces with water and exchangeable cations control the ability of soils to shrink when dried.

Readers usually agree that version B is easier to follow [更容易理解]. The following section seeks to explain why this should be so. When readers begin to read sentence

2 of either version of the paragraph, they already know all the information that is included in sentence 1; therefore all the sentence 1 information can be described as old or given information in this context [因此, 在这种情况下, 句子1中的全部信息均可被描述为旧信息或已知信息]. In version A, it is not till the second half of sentence 2 that readers encounter [遇到 (此处指读到)] a reference to this old information again (clay surfaces). All the information at the beginning of sentence 2 is new information, and so the sentence does not follow the recommendation to put old information before new information. This structuring contributes to making the passage difficult to follow [这种结构导致了这段文字理解起来比较困难]. In version B, the information order has been changed to put the old information at the beginning of sentence 2 and the new information at the end.

Task 1.12 Old information before new information

Which sentence needs changing to follow the guideline given above?

Pleuropneumonia (APP) surfaced in the Australian pig population during the first half of the 1980s and ten years later was regarded as one of the most costly and devastating [毁灭性的] diseases affecting the Australian pig industry. It can present as a dramatic clinical disease or as a chronic, production limiting disease in pig herds. A sudden increase in the number of sick and coughing pigs and a sharp rise in mortalities among grower/finisher pigs may herald an outbreak of APP in a herd. On the other hand, signs may be limited to a drop in growth rate and an increase in grade two pleurisy lesions in slaughter pigs.

Check your answer in the Answer pages.

Strategy 4: Make a link between sentences within the first seven to nine words [在句首用7-9个字连接前文]

Another way to describe the difference between versions A and B under Strategy 3 relates to how many words the reader has to read in the next sentence (sentence 2 in each version) before encountering a link with what is already known (the old information). In version A, the reader has to read 15 words before finding the first link, which is the word *clay*. In version B, however, the first link word comes as word five of sentence 2. Making this link within the first seven to nine words of sentences enhances the readability of the writing: that is, the ease with which readers will process the information presented [在句首用7-9个字连接 (前文) 能够增强文章的可读性。也就是说, 这种做法使读者容易理解文章内容]. Sentence 3 in Task 1.12 works better when it is re-written as follows.

An outbreak of APP in a herd may be heralded by a sudden increase in the number of sick and coughing pigs and a sharp rise in mortalities among grower/finisher pigs.

In this version, the fourth word (APP) provides the old information, and old information precedes [先 (出现) 于] new information. The method used to change the information order in the sentence was to change an active voice verb [改变 (动词的) 主动语态], may herald, to a passive voice verb, may be heralded [改成 (动词的) 被动语态]. This method is often useful to improve flow within paragraphs. In our opinion, promoting flow in this way is a more important consideration than avoiding the passive voice at all costs, as is sometimes recommended in writing manuals [像一些写作手册推荐的那样, 要不惜一切代价避免使用被动语态].

Strategy 5: Try to include the verb and its subject in the first seven to nine words of a sentence [尽力将动词及主语放在句首的 7-9 个词]

Read the following two sentences and consider how easy they are to follow [考虑一下这些句子是否容易理解].

¹The definition of seed quality is very broad and encompasses different components for different people. ²The quality and quantity of flour protein, dough mixing requirements and tolerance, dough handling properties and loaf volume potential are quality parameters of wheat seed for bread bakers.

Sentence 2 is not easy to follow because readers have to read a very long subject of 19 words before they arrive at the verb *are*. Sentences with very long subjects and short verbs at the end are often called top-heavy sentences [头重脚轻的句子]. In both the edited versions below, sentence 2 has been changed so that the verb and its subject fit within the first seven to nine words, and the list of items (which makes up the new information in the sentence) comes at the end.

Edited version A ¹The definition of seed quality is very broad and encompasses different components for different people. ²Quality parameters of wheat seed for bread bakers are the quality and quantity of flour protein, dough mixing requirements and tolerance, dough handling properties and loaf volume potential.

Edited version B ¹The definition of seed quality is very broad and encompasses different components for different people. ²For bread bakers, quality parameters of wheat seed are the quality and quantity of flour protein, dough mixing requirements and tolerance, dough handling properties and loaf volume potential.

As a general rule, if you want to write a list, it should come at the end of its sentence [如果你想（在某个句子中）罗列很多信息，应确保把这部分放在句子末尾].

Task 1.13 Revising top-heavy sentences

Change these top-heavy sentences so that each has a verb and its subject within the first seven to nine words.

- 1 In this project the *Rhizoctonia* populations of two field soils in the Adelaide Plains region of South Australia were characterised.
- 2 A balance between deep and shallow rooting plants, heavy and light feeders, nitrogen fixers and consumers and an undisturbed phase is needed to achieve maximum benefit through rotation.

Compare your answers with the suggested improvements in the Answer pages.

Task 1.14 Revising your own Introduction for flow

If you are writing a draft Introduction as you proceed through this book, take time now to revise it using the strategies discussed in Chapter 1.

A process for preparing a manuscript

[准备初稿的程序（步骤）]

There are many different ways to proceed towards preparing a manuscript for submission to a journal, but the process often seems to take a very long time and involve a considerable amount of back-tracking and reworking [重审和重写]. Indeed, multiple drafts [多次修改] are a necessary part of manuscript writing – as co-authors make their respective contributions and the paper's story [文章的(主题)故事] is refined [完善] and strengthened [强化] – but it is in everyone's interests to streamline [流水线化; 程序化] the process as much as possible. Here we present a possible set of steps for you to consider.

2.1 Initial preparation steps [准备（文稿）的初始步骤]

- 1 Select a “package” of results [选择拟发表的结果] that you think will make a paper. Collect the relevant data [搜集相关数据] and discuss with your potential co-authors issues such as these.
 - What are the take-home messages [中心思想; 主要结论] from these data (what story do the data tell)?
 - Is this the best package of data to concentrate on? [这些是不是最理想的核心数据?] Should more data be included to strengthen the story, or should some data be removed [需要删除一些数据] to ensure that a single, coherent story [一个连贯的故事] can be told?
 - Who are the target audience [目标受众 (即读者群)] for the paper, how significant is the story [该研究的意义如何] told by the data, and therefore which journal should be selected [应该投稿哪个期刊] as the target?
 - How will the work of preparing the manuscript be divided up (i.e. who will do what) [谁应该做什么]?
 - Who will be listed as authors, and in what order will their names be shown? [谁应署名? 署名顺序怎么安排?] Who should be acknowledged [得以致谢] for assistance? (It might be helpful to consult a source such as the website developed by the International Committee of Medical Journal Editors for criteria to use in determining who qualifies as an author [确定谁有署名资格]; www.icmje.org/index.html#author.)
 - What timeline is feasible? [什么样的时间安排比较可行?] At which stages will the co-authors read drafts? [共同作者在哪个阶段阅读初稿?] (Once a decision has been made about this issue, you can insert steps at relevant places in the list below that refer to responding to feedback from co-authors.)
- 2 Give a short talk [做一个简短的报告] to a small group of your colleagues and present some back- ground and reasons for the research [本项研究的背景和动因] (Stages 2 and 3 of the Introduction); the aims or hypothesis [目的或假设]; an outline

of key methods [主要方法纲要]; all the data needed to tell the story [阐述故事所需的数据](all the figures, tables, and other text); and a discussion of the results and their meaning [对结果及其意义的讨论]. Ask the group to provide feedback on anything which was not clear [就任何（表达）不够清楚的地方提供反馈意见] in your presentation and any questions they have about the research [关于该项研究的任何问题].

- 3 Obtain the Instructions to Contributors for the target journal and consider setting up a document template [建立一个文档模版] following the guidelines provided.
- 4 Refine the tables and figures that present the data (following the journal's guidelines). As part of this process, consider whether all the tables and figures are necessary to tell the story [考虑是不是所有的图表对于表达文章主题都是必需的], and combine or delete [合并或删除] as appropriate. Make sure the take-home message of each table and figure is clearly visible to a reader [读者可以看得清楚], and easy to identify from the text in the title or legend [可以很容易地从表头或图例中找到（拟表达的意思）].
- 5 Draft the Results section, highlighting the take-home messages [强调主要结论].
- 6 Write bullet points [列出要点] on possible ideas to include in the Discussion.
- 7 Draft or refine the paper's title to capture the paper's main message [能反映文章主题思想的标题].
- 8 Draft the Methods section, or its equivalent [（方法部分的）等效内容].
- 9 Draft the Introduction. Consider writing the stages in the order 4, 3, 1, 2, with Stage 5 (if present) at the appropriate place for your particular story.
- 10 Draft the Discussion section, and the Conclusion if it is to be present.
- 11 Draft an Abstract/Summary.
- 12 Draft a set of keywords.
- 13 Put all the pieces together to form a complete first draft.
- 14 To refine your manuscript, follow the suggestions in section 2.2.

2.2 Editing procedures

- 1 Put the completed draft aside for a while [把.....放在一边]. The literature on this topic suggests that you need at least 48 hours away from the draft [你需要至少48小时不去读那份初稿] before you can read what you actually wrote, as opposed to what you think you wrote.
- 2 When you come back to the document, print off a paper copy and read the document through from the beginning with the aim of identifying places where content changes are needed [找出需要修改的地方]. Don't stop to make any changes, just put marks in the margin or under problem words, to indicate the places you will need to return to later [不要停下来进行任何修改，只需在空白处或问题词汇下方作标记，以示这些地方需要重新审视].
- 3 Once you have reached the end of the document, go back to the beginning.
Work on improving each problem you identified [对标出的所有问题进行修改和完善].
- 4 Then edit it again, as before.
- 5 Do this as many times as necessary. When you have completed this part of the process, you should be satisfied with the science [对科学内容感到满意] of what you have written.

6 Now edit for so-called discourse features [对语言表达方面进行修改]: these are the language features that contribute to the flow and linking of the sections and sentences [帮助连贯和衔接各片段和各个句子的语言特征].

- Check that subheadings appear wherever they are needed.
- Check that paragraphs have topic sentences [主题句] where appropriate.
- Check that paragraphs and sentences follow our guidelines on leading from the general to the particular and on giving old information before new [将已知信息（旧信息）放在未知信息（新信息）之前].

7 Edit for spelling, punctuation, and grammar.

- Check especially for the mistakes you often make: use the Find feature of your word processor.
- *Always* have the computer's spelling checker switched on, but remember its limitations and that it cannot identify where you have used a word that is correctly spelled but is not the correct one in the context; e.g. if you type there where you mean *their*, or *it's* where you mean *its*. You will also need to add to the program's dictionary all the technical terms you use (checking carefully that they are spelled correctly when you add them!). Then you can be confident that every time a red wiggly line appears there really is an issue to be addressed.
- Check for punctuation and italics, especially *et al.* and species names. (Different journals have different conventions [惯例] about these issues, so make sure you check in the Instructions to Contributors to find out what applies [适用于] in the journal where you will submit.)
- If you use English as an additional language [母语不是英语], editing your own writing for grammatical accuracy needs special care. We suggest that you use a ruler and hard copy of the text (i.e. do not try to do this on the computer screen). Start with the *last* sentence of a section and lay the ruler under the sentence. Read the sentence and check its grammar; i.e. making sure that the verbs and subjects agree, that singular and plural forms are used appropriately, that the verb tense is correct, and that the articles (a/an/the) are used appropriately. Then move the ruler up the page and read the sentence before the one you just checked. In this way you are less likely to be distracted [因.....分散注意力] by issues other than the ones you are supposed to be looking for: the grammatical ones. Remember, you are already happy with the science of the manuscript, after completing Steps 1–5 above as many times as necessary! Now you are only focusing on the grammar.

8 Edit for the correctness and consistency [一致性] of the referencing and the reference list.

- If you are using one of the commercially available bibliographic software programs, such as Endnote or Reference Manager, most of this step has been done for you, but you will still need to check that the output of the program [程序输出的结果] appears as you want it and that no entries have been produced that have anomalies [异常] or inconsistencies [不一致], which can occur if data has been entered into the program incorrectly.
- If you have produced the reference list manually, you will need to check carefully for these three things.
 - i Does every reference in the text have a corresponding entry [相应的条目] in the list?
 - ii Does every entry in the list appear at least once in the text?
 - iii Do all references in the text and all entries in the list follow the style stipulated by the journal [该期刊规定的格式] exactly (i.e. including punctuation, spacing, use of italic and bold fonts, and capitalization (the use of capital letters))?

- 9 Edit for layout: view each page singly using Print Preview to ensure that headings stay with the following text and running headers [页眉标题] appear or not as stipulated in the Instructions to Contributors for your target journal.
- 10 Check that you have followed the formatting requirements as provided in the Instructions to Contributors, including in regard to the placement in the manuscript of tables and figures and their titles and legends, and the provision of any supplementary data [补充数据] to appear on an associated website, if applicable in your case.
- 11 Final check: do a final read-through to catch the “little” mistakes that may have slipped by. It can be very helpful to ask a colleague or friend to do this for you: remember also to make yourself available to do the same for them when their turn comes to submit a manuscript.

2.3 A pre-review checklist

Now you are ready to ask for some serious feedback [经过深思熟虑的反馈意见或建议] on the article, from people outside the author team. One option [选择] for this step is to provide your critical reader [具批判性眼光的读者] with a list of questions to respond to. In Table 2.1 we provide such a list, which has been developed on the basis of the material covered in this book. An electronic version of the checklist is available on our website (www.writeresearch.com.au) so that you can easily download and adapt it to your specific purposes and the conventions of your own discipline.

Another option, perhaps to be used after the checklist, is to ask an experienced colleague to pre-review your manuscript; that is, to read it as if they were reviewing it for the journal. If appropriate you could provide them with the example Referee’s Evaluation Form given in Figure 2.2.

Table 2.1 Checklist for review of paper drafts.

- 1 Does the title reflect [反映; 表达] accurately the content of the paper?
- 2 Are the significant words [重要词汇] in the title near the beginning to catch a reader’s attention [引起读者的注意]?
- 3 Does the Introduction begin with the big issue of topical/scientific interest [主要的时事性话题或科学问题] and then narrow down to the specific topic of the paper [收拢至该文章的具体主题]?
- 4 Does the Introduction locate the study effectively within the recent international literature in the field [引言部分是否参照该领域近期国际文献对本项研究进行了有效定位]?
- 5 Does the Introduction highlight a gap that the research fills, or present a need to extend knowledge in a particular Area [强调该研究填补的空白, 或指出拓展某一研究领域的必要性]? (Does it say why the work was done? [开展该项研究的原因])
- 6 Does the Introduction end with a clear statement of the aim/hypothesis of the research [明确指出本研究的目的/假说], or summarize the main activity of the paper [概述本文的主要研究内容](depending on the field and relevant journal conventions)?
- 7 Are the methods, including statistical analysis, appropriate for the questions addressed and the study conducted? [该方法(包括统计分析部分)是否适用于提出的问题和开展的研究?]
- 8 Are the materials and methods given in enough detail to convince a reader of the credibility of the results [详细得足以令读者对结果的可靠性信服]?
- 9 Do the results provide answers to the questions raised in the Introduction, or fulfil the objectives given? [回答在引言部分提出的问题, 或者达到预期目的]

- 10 Are the results presented in a logical order [按照逻辑顺序](either similar to the order of presenting the aims or methods, or similar to the order in which the Discussion is presented).
- 11 Are all the tables and figures needed to tell the story of the paper? Could any be combined or deleted?
- 12 Do all the tables and figures stand alone? [是否所有的图表都具有自明性?] (i.e. can readers understand them without going back to read the text of the paper?)
- 13 Does the Discussion begin with a reference to the original aim/hypothesis/question? [讨论部分的开头谈及最初的研究目标/假设/ (科学) 问题了吗?]
- 14 Are the results compared with other relevant findings from the literature? Are you aware of any other comparisons that could be made? Are appropriate explanations/speculations included about reasons for observed similarities, differences, and other outcomes? [就所观察到的相似、相异或者其它结果, 有没有给出合理的解释或推测?]
- 15 Are appropriate statements made about the wider significance of the results, [这些结果更为广泛的意义]their limitations, and/or their implications for practice and/or future research directions?
- 16 Does the paper end with an appropriate concluding paragraph or section that emphasizes the key message(s) and their significance to the field? [强调主要结果及其对该研究领域的意义]
- 17 Is the list of references complete (all the works in the list are referred to in the paper, and all the works referred to in the paper are in the list)?
- 18 Are the reference list and in-text references formatted accurately and in the right style for the target journal?
- 19 Does the Abstract include all the information required by the journal, and does it highlight appropriately the key results and their significance?
- 20 Does the Abstract adhere to the word limit [严格按照字数限制 (撰文)] and follow the prescribed format of the target journal?
- 21 Are the selected keywords those that will best allow the article to be located by the full range of its prospective readers? [使整个可能的读者群都能检索到这篇文章]
- 22 What additional comments do you have for strengthening the paper?

Once you have responded to the feedback received in this way, and done a final check, you are ready to submit your manuscript. Good luck!

Developing discipline-specific English skills

3.1 Introduction

It can be helpful to think of the English you need to write about your research as one English among many Englishes [许多（专业）英语中的一种]: the English of marine biology [海洋生物学（专业）英语], for example, or the English of plant biotechnology [植物生物技术英语]. Therefore, to a certain extent, people new to a research field need to develop their discipline-specific English [发展他们的专业英语] even if English is their first language. We have included the aspects of English usage that are of general interest for scientist authors in the previous chapters on writing each section of an article. This chapter, on the other hand, focuses on those aspects of English grammar and usage that are of particular relevance to science authors who use English as an additional language (EAL) [母语非英语]. We begin with a discussion of types of error and how they are likely to affect the perceptions of editors and reviewers. We then introduce two strategies [策略] that can be useful for developing discipline-specific English writing skills: the concept of sentence templates [句型的概念] and a computer-based tool called ConcApp [一款名为“ConcApp (AdTAT)”的计算机工具]. We then focus on a selected range of features of scientific writing in English [选出的一系列科技英文写作的特点] that we find present problems for many EAL science authors. We hope you will find something useful for addressing your own needs within these three different approaches.

3.2 What kinds of English errors matter most?

Communicating meaning clearly is the crucial factor in scientific writing. It is worth thinking for a moment about what aspects of writing in English might interfere most seriously with clear communication of meaning.

What do journal editors say?

As long as the science is good and can be clearly understood, I don't worry too much about the English – I have copy editors who can fix that. (Personal communication, October 2005, editor of an Australian-based international journal)

Task 3.1 Types of error

- 1 Discuss (or make individual notes): if you were an editor of an international journal published in English, what problems might you anticipate when editing articles submitted by scientists from EAL backgrounds?
- 2 Below we list some types of error that are often made by EAL writers. Complete Table 3.1 by writing the number of each error type in the appropriate column in terms of how often and/or how seriously you think that error affects the communication of meaning in science writing: rarely/ slightly; sometimes/moderately; or often/seriously.

Table 3.1 Task 3.1, part 2: Exercise in assigning types of English language errors to three possible levels of effect on meaning.

Rarely/slightly affects meaning	Sometimes/moderately affects meaning	Often/seriously affects meaning
---------------------------------	--------------------------------------	---------------------------------

Error types to be used in completing Table 3.1.

- 1 Incorrect usage of singular/plural forms (e.g. all tea leaves sample were oven dried).
- 2 Over-complex/inaccurate grammatical structures (e.g. This may be due to lower pH hinders dissolution of soil organic matter and decreases total dissolved Cu concentration because of Cu-organic complex reducing.).
- 3 Non-agreement of verbs and subjects (e.g. the results of this study suggests that ...).
- 4 Incorrect choice of preposition (e.g. similar with the results of other researchers).
- 5 Non-standard usage of the articles *a/an* and *the* (e.g. the accumulation of Cu in human body).
- 6 Non-standard selection of modal verbs (e.g. *would* versus *will*, *can* versus *could* or *may*).
- 7 Incorrect choice of part of speech (e.g. drought resistance varieties).
- 8 Non-conventional selection of tense (e.g. present tense to refer to results of the study being reported).

See the Answer pages for some comments on these error types and how they can be perceived by readers.

- 3 List these error types again under the following headings according to the priority you give to avoiding them in your own writing: high priority/ medium priority/low priority. See the Answer pages for ideas about what types of strategies can be effective for addressing each error type.

Although not all journals have the copy-editor option, it seems that the quality of the science is a primary concern across the board: see the following quotations, from the Elsevier online editors' forum (www.elsevier.com/wps/find/editors.editors/editors_update/issue10d, accessed 16 January 2008).

This is a long-standing problem. In the past it was solved to a large extent by detailed copy-editing of accepted papers. I became aware that this was apparently no longer being done when papers started appearing with ungrammatical titles.

For the researcher and for the reviewer, we should emphasize the scientific contents of their work. Language skills should not be the barrier.

The Authors may have important data, which is useful for the Community, and must be helped.

The key points appear to be these:

- good science is the most important thing; but
- the science needs to be clearly understandable.

Our suggestions for achieving this are to:

- write short sentences first (two clauses only) and join them later if needed; and
- aim to develop a repertoire of ways of expressing meanings that are useful in your discipline (a repertoire is a range of possibilities to choose from).

The following sections provide some ways to develop your repertoire.

3.3 Strategic (and acceptable!) language re-use: sentence templates [高明的语言重用策略（可接受的哦！）：句型]

Recent research on EAL authors writing for publication in English has found that re-using language from other papers in the same field is a common strategy [重用同领域中其它文章的语言是一种常见策略], but there is considerable discussion about when it is acceptable to re-use language [什么情况下重用语句是大家所接受的?], and when the practice crosses into what can be called “textual plagiarism” [什么做法会变成所谓的“语句剽窃”] (Flowerdew & Li 2007). What seems clear is that for science writing there is a divide in the way people think about the content [（科技论文中）工作的原创性多见于（研究）内容] – the science – and the way they think about the language used to express the content. The originality of the work is seen mostly to reside in the content: the data and their analysis and interpretation. This situation differs somewhat from that pertaining to writing in the humanities and social sciences, where the language is seen to form the argument, and therefore the content of the writing. Nevertheless, the very clear convention in academic writing in English is that, to avoid the suspicion of plagiarism, authors should use their own words to paraphrase the findings or conclusions of other researchers, as well as citing the source of the information [学术英文写作非常明确的惯例是，为避免抄袭的嫌疑，作者应当用自己的话阐释他人的研究成果或结论，并需引注出处]. The section below suggests a way in which EAL and other authors can be more confident about avoiding inappropriate language re-use, while still taking advantage of the effective writing of other authors to develop their own repertoires [在更有把握避免不恰当语句重用的同时，仍可以利用其他作者的有效表达（方式）来建立自己的句库]. This option involves the construction of sentence templates [句型的构建] for later re-use. We do this by separating the structure or framework of a sentence from the so-called content chunks, the noun phrases [通过把句子的结构或框架与被称作内容语块（名词词组）的部分分开].

To understand this concept first read the purpose statement below, from an article by Li et al. (2000) entitled “Water use patterns and agronomic performance for some cropping systems with and without fallow crops in a semi-arid environment of northwest China”.

As part of a long-term research effort aimed at establishing a sustainable rainfed farming system in the semi-arid and sub-humid regions of northwest China, this paper presents a detailed study on the water use patterns and agronomic performance for some cropping systems with and without fallow crops in a semi-arid environment.

The objectives of this study were to: (1) determine the grain and aboveground biomass production and water-use efficiency of individual crops grown in the rotation; (2) analyze the seasonal and inter-annual patterns of soil water storage and utilization as well as water stress for the four major rotation crops such as winter wheat, corn, potato and millet; (3) determine the grain and aboveground biomass production and water-use efficiency for different rotation systems and evaluate the capacities of the rotation systems with and without fallow crops to utilize soil water storage in conjunction with seasonal precipitation; (4) establish whether the introduction of fallow crops into the wheat monoculture significantly influences the quantity of water stored in the soil that will be used by the subsequent wheat crop; and (5) discuss the characteristics of soil conservation for different rotation systems.

If we cross out all the noun phrases that relate just to this particular study, what remains is a series of frameworks that we call *sentence templates*.

~~As part of a long-term research effort aimed at establishing a sustainable rainfed farming system in the semi-arid and sub-humid regions of northwest China, this paper presents a detailed study on the water use patterns and agronomic performance for some cropping systems with and without fallow crops in a semi-arid environment. The objectives of this study were to: (1) determine the grain and aboveground biomass production and water use efficiency of individual crops grown in the rotation; (2) analyze the seasonal and inter-annual patterns of soil water storage and utilization as well as water stress for the four major rotation crops of winter wheat, corn, potato and millet; (3) determine the grain and aboveground biomass production and water use efficiency for different rotation systems and evaluate the capacities of the rotation systems with and without fallow crops to utilize soil water storage in conjunction with seasonal precipitation; (4) establish whether the introduction of fallow crops into the wheat monoculture significantly influences the quantity of water stored in the soil that will be used by the subsequent wheat crop; and (5) discuss the characteristics of soil conservation for different rotation systems.~~

The frameworks or templates would look like this (NP = noun phrase).

As part of a long-term research effort aimed at [NP1], this paper presents [NP2]. The objectives of this study were to: (1) determine [NP3]; (2) analyze [NP4]; (3) determine [NP5] and evaluate [NP6]; (4) establish whether [NP7] significantly influences [NP8]; and (5) discuss [NP9].

N.B. You would only use this template if it enabled you to express the meanings you were trying to make [除非该句型确实能表达你的本意，否则不要滥用]. To help you decide what sorts of meaning they might be, it is useful to list and characterize the noun phrases that you crossed out to make the template, as demonstrated in Table 3.2.

We suggest that you continue to identify relevant sentence templates [继续寻找相关句型] for yourself, whenever you read a research paper for your work, in order to add to your repertoire [添加至你自己的句库]. We suggest that you take an extra 10 minutes or so after you have read a paper for its content. Use this time to identify any useful sentence templates, and record them in a special file or notebook. It may be useful to organize these notes according to the section of the paper where the sentence template would be useful.

Table 3.2 Relevant characteristics of noun phrases (**NP**) [名词短语] for use in sentence templates.

Noun phrase	Characteristics
1 establishing a sustainable rainfed farming system in the semi-arid and sub-humid regions of northwest China	verb + ing + NP + in + [NP of location]
2 a detailed study on the water use patterns and agronomic performance for some cropping systems with and without fallow crops in a semi-arid environment	<i>a study</i> + on + NP + in + [NP of location]
3 the grain and aboveground biomass production and water-use efficiency of individual crops grown in the rotation	NP + of + [NP referring to features of study already introduced]
4 the seasonal and inter-annual patterns of soil water storage and utilization as well as water stress for the four major rotation crops of winter wheat, corn, potato and millet	NP + for + NP stating subjects of study
5 the grain and aboveground biomass production and water-use efficiency for different rotation systems	NP + for + NP stating subjects of study
6 the capacities of the rotation systems with and without fallow crops to utilize soil water storage in conjunction with seasonal precipitation	<i>the capacities of</i> [NP] to + verb + object
7 the introduction of fallow crops into the wheat monoculture	<i>the introduction of</i> + NP + into + NP
8 the quantity of water stored in the soil that will be used by the subsequent wheat crop	NP of measurement
9 the characteristics of soil conservation for different rotation systems	NP referring to type of conclusions expected from the study

Task 3.2 Drafting a sentence template for Stage 4 of an Introduction

- 1 Find the Introduction paragraph that contains the Stage 4 in each of the PEAs. To refresh your memory, Stage 4 is made up of the very specific sentences that present the purpose/objectives of the writer's study or outline its main activity or findings. What would the sentence templates look like? Draft them on a separate sheet of paper. Check your answer in the Answer pages.
- 2 Find the Stage 4 in your SA. If it is suitable as the basis of a sentence template, construct one from it. Look at the noun phrases in your SA purpose statement. List them and note down any characteristics that will help you if you want to re-use the template in the future.

3.4 More about noun phrases

Discipline-specific noun phrases make up a very important part of the writing you need to do about your research. Identifying and learning them accurately is a very useful strategy for improving your writing. Here we present some grammatical details about noun phrases, and highlight one area of common difficulty associated with them.

A *noun phrase* is a group of words that does not include a finite verb (i.e. does not include a verb with a subject), built up around a single headword. The headwords are italicized in the following examples:

- the *mechanisms* of salt marsh succession;
- *interactions* involving carbohydrates;
- the seasonal and inter-annual *patterns* of soil water storage and utilization.

Note that long noun phrases can be made up of several smaller noun phrases, often joined together with prepositions.

A special case: noun-noun phrases [由名词组成的短语]

This kind of noun phrase can cause problems for EAL writers, in our experience. An example of a *noun-noun phrase* is “resource availability.” This phrase means “availability of resources.” To shorten phrases like this, it is very common in scientific English for the second part (of resources) to be moved in front of the headword (availability). When this happens, the part that moves is always written in its *singular* form (resource) and the preposition is omitted [这种情况下，前置词通常用单数形式 (resource)，并删去 (先前连接这两个名词的) 介词]. (It is rare to find a possessive form with an apostrophe [(用撇号表示的) 所有格形式] in such cases in science writing.) Similarly, “carbohydrate interactions” means “interactions involving carbohydrates.” Table 3.3 contains some more examples, taken from the PEAs [书中提供的范文] (provided example articles).

A good way to remember this construction is the following example:

food *for dogs* is *dog* food

Using the noun phrase concept to read about unfamiliar areas of science

To summarize the section above, science writing is largely made up of sentence structures (templates), which are usable for many different areas of science, plus noun phrases, which are often specific to particular areas. Once you understand this concept, you will probably find it easier to read articles from areas of science with which you are not completely familiar. This is because you can skip over the

Table 3.3 Examples of noun-noun phrases from the PEAs.

Noun-noun phrase	Extended form of the phrase
propagule pressure	pressure exerted by propagules
invasion success	success of invasions
field work	work conducted in the field
urchin disturbances	disturbances caused by urchins
legume root nodules	nodules on the roots of legumes
bacteroid activity	activity by bacteroids
bacteroid iron acquisition	acquisition of iron by bacteroids
soybean homologue	homologue in soybeans

Task 3.3 Unpacking noun-noun phrases

Write down three noun-noun phrases commonly used in your research field. Next to each, unpack the phrase to explain what it actually means. For example

crop traits = traits exhibited by crops

Note the difference in the usage of singular and plural word forms in the two forms of the phrases. We suggest that you make a list of the noun-noun phrases you see used repeatedly in articles in your field, and learn them accurately, including whether the forms are singular or plural. This will help improve the accuracy of your writing considerably.

unfamiliar noun phrases on your first reading, just concentrating on the sentence structures and main meanings. Then you can identify which noun phrases recur frequently, and use a dictionary or website to find out their meanings, if you need to know them. This will depend on your reason for reading the article. If you need to understand more about the area of research and are new to it, then you will probably need to look up many noun phrases. If you are reading the article only to find one specific piece of information, perhaps about the use of a method, you will need to look up fewer noun phrases. As you make your decisions about which ones to look up, remember to identify the headword of each noun phrase first [切记要先找出每个名词词组的中心词], as this is the most important part for the sentence meaning.

The noun phrase idea can also help you to complete exercises in this book that involve writing about areas of science that are unfamiliar to you. For example, for readers who are unfamiliar with molecular biology and plant physiology, the PEA by Kaiser et al. (2003) may be challenging to read. Skipping over the complex noun phrases and focusing on the sentence structures will enable you to more easily do the exercises and understand the main point we are trying to teach. Of course, the same is true for the other PEA, Britton-Simmons and Abbot (2008), for readers who are unfamiliar with marine biology studies.

3.5 Concordancing: a tool for developing your discipline-specific English [索引：建立你自己的专业英语库的工具]

All languages contain words and phrases that are commonly associated with other words or phrases (e.g. theory and practice; genetically modified organisms; the effect of something on something else). These collocations [（字词的）搭配] (words that are commonly used together) can be identified and studied. If you want to identify and learn common collocations that are used in writing about your own research field, you need to study texts (examples of writing) specific to that field. In this section we introduce a type of software program that can help you do this in a systematic way: a concordance [索引工具].

What does a concordancer do?

A concordancer searches a group of texts (called a *corpus* [文本库]) for all examples of a particular search item. It displays the results as lines of text across the screen, with the search term highlighted in the middle [该索引工具将（检索）结果分行显示出来，检索词突出显示在每一行的中间位置]. Results can then be sorted according to what is on the left or right of the search term [随后可依据检索词左右出现的词分析

常用搭配] (and one, two, or three words away from the search term), and this can provide data for your language learning. If the corpus you search is specific to your research field, you can search it in this way to improve your use of discipline-specific English.

Below, we first provide an example of what can be learned from a concordancing search of a discipline-specific corpus [专业文本库] (Task 3.4), and then explain how you can download a low-cost concordancing program called ConcApp from the Internet, and also construct your own discipline-specific corpus.

Using ConcApp Software

ConcApp is a low-cost concordancing program developed by Chris Greaves and downloadable from the Internet at www.edict.com.hk/pub/concapp/ [ConcApp (AdTAT) 是一款由 Chris Greaves 编写的索引程序, 价格低廉, 可从互联网下载。网址是 www.edict.com.hk/pub/concapp/]. The program is small in size and easy to learn, yet can quickly perform the searches needed to answer EAL writers' questions about language usage.

Task 3.4 Getting familiar with concordancing

Look at the ConcApp search results below, obtained by searching for the term “soil” in a corpus of articles from the field of soil science. Then read the questions and answers that follow.

to utilise existing available soil water, unlike the perennial gr
es (4 g oven dry wt basis) of soil were weighed into 40 ml polyp
required 9 kg P/ha, whereas a soil with a high P sorption capacit
concentration by 1 mg/kg on a soil with a low P sorption capacity
00, it was expected that this soil would have consistently been t
capacity (PBC), which is the soil's capacity to moderate changes
and buffering capacity of the soil-an attempt to test Schofield's
nisms that are present in the soil-plant microcosm environment. T
etermined in a growth-chamber soil-plant microcosm study. Nodding
84) Lime and phosphate in the soil-plant system. Advances in Agro
a where crops rely heavily on soil-stored water accrued in summer
fertility on these particular soils. Although this aberration has
over in a range of allophanic soils amended with ¹⁴Clabelled gluc
alues for 9 different pasture soils, 6 and 12 months after P fert

Q1 Is soil countable, uncountable, or both in these examples?

A1 Both. Countable examples include “a soil with a high P sorption capacity” and “9 different pasture soils;” an uncountable usage can be seen in “samples of soil were weighed.”

Some of these usages are different from those found in everyday English, where soil is always uncountable. From this example, you can get an idea of how a ConcApp search of a discipline-specific text collection can help you identify English usages that are specific to that discipline.

Q2 How many different ways is the word soil used in these examples?

A2 Quite a few! For example, as well as its usage as a countable and uncountable noun it is used in noun-noun phrases, both as the headword (“pasture soils”) and as the adjective-equivalent (“soil water”); and in hyphenated adjectival constructions (“soil-stored water”) and noun-noun phrases (“soil-plant microcosm”).

Our suggestion is that you construct a corpus (meaning *body* in Latin, but in this case a special-purpose collection) of English language journal articles from your own discipline(s), so you can search it for the use of words or phrases you need in your scientific writing. This will provide data, on your own desktop, for your ongoing learning of the specific English phrases and expressions used in your discipline.

Making a corpus

To be most useful, a corpus needs to consist of documents from your own subdiscipline, and of the type you are aiming to write [文本库的文献需要来自你自己的子学科, 并且应该是你打算撰写的文章类型]. For example, a useful corpus for EAL scientists wanting to write articles for international publication would be at least 10 published research articles in their particular field [至少10篇他们自己学科领域内已发表的研究论文]. Our suggestion is that the articles to be used for a corpus be selected or approved by supervisors or leaders of research groups, to ensure that

- they are from reputable journals in the field [来自该领域内的知名刊物];
- they are well-written, by authors using English as a first language or at a comparable level [由以英语为母语或相当于母语水平的作者撰写的优秀文章];
- they cover a suitable range of subtopics within the field [能够较为全面地涵盖该研究领域的科学话题], to give a good range of language usage; and
- they cover the required range of types of writing [包括需要的文章类型](e.g. including or excluding review articles, as desired).

Preparing documents for a corpus

To be searchable by ConcApp, the texts must be saved in text-only format [纯文本格式] (ASCII). If the selected articles are available in Microsoft Word format (e.g. if the author is willing to provide the text in this format), saving the file as text-only files (.txt) is a straightforward operation. If you can download the articles in html format, then the same process is possible. In both cases, delete the tables and figures [在作为文本格式的文件保存之前, 删除所有图表、作者个人资料及参考文献清单], the author biodata, and the reference lists before saving as .txt files. If the articles are in .pdf format, then a somewhat tedious set of steps needs to be followed: see below for details. All files should be placed in a single folder on your computer for ease of searching [为方便检索, 所有文件应保存在电脑的同一个文件夹中].

Copyright issues

Making a single copy for use with a concordancer is comparable to making a single copy for research use.

Training

Notes and a tutorial on how to use ConcApp are available from the website.

Preparing text in pdf format for concordancing

A copy/paste procedure must be followed to convert the text to a text-only format. Only the written part of the article is needed, so do not copy biodata, tables and figures, reference lists, or acknowledgements, and do not include the headers or footers [页眉和页脚] on the pages. The conversion process may require some trial and error at the beginning [在初学阶段, 文本转换的过程可能需要反复尝试和摸索].

- Download the file (if online).
- Open the file in Adobe Acrobat Reader.
- Select as much text as you can without including unwanted items such as headers and footers, page numbers, tables/figures, or the reference list.

- Copy the text (Control + C).
- Open your word processor (such as Microsoft Word).
- Paste the text into a new document (Control + V).
- Repeat the steps of selecting, copying, and pasting until the whole paper is copied.
- Select the Save as ... option from the File menu in your word processor.
- In the next window, choose Text only as the file format and name the file before saving.
- Edit the text file as necessary (see below).

Some pdf files have security measures embedded to stop copying. Nothing can be done with these files. If Copy or Paste functions will not work, this is the cause. Care must always be taken not to copy the headers, footers, and page numbers into the new file. We find that the easiest method in the long term is copying the text from one page or column, pasting into a word processor, then repairing the text so that it is restored to its original continuous flow (deleting unwanted spaces in sentences, etc.) [我们发现，从长远（使用的角度）来看，最便捷的办法是将文本从某一页或某一栏中拷贝之后粘贴在文字处理器中，并将文本修复到先前的连贯状态（例如删去句中不应有的空格等）]. This avoids copying the unwanted parts from the outset. The whole process seems tedious at first, but becomes an almost mechanical routine with practice.

Task 3.5 Practice with concordancing

Practice using the concordancer (or read carefully) to examine the texts in your corpus of journal articles in order to answer the following questions.

- 1 Do article authors begin sentences with “Also”?
- 2 What about “In addition”?
- 3 How else is “addition” used?
- 4 Do authors use “I” or “we”?
- 5 What constructions are used with the verb “affect”?
- 6 What verbs are used with the noun “role”? And what prepositions are used after this word?

Now, think of other searches that you could try. Additional ideas for using ConcApp are to be found on our website at www.writeresearch.com.au.

3.6 Using the English articles (a/an, the) appropriately in science writing [科技论文写作中英语冠词(a/an, the)的正确使用]

For many of you who use EAL, the problem of using articles appropriately has been a constant since your early days of English learning. You may have seen the rules explained in many different ways, and learned them over and over again. You may be wondering why we have chosen to discuss this issue again here. We have included a section on article usage precisely because it is so difficult to master, especially for EAL users whose home language does not contain articles, and because it is often high- lighted by journal editors and referees as needing attention in submitted manuscripts.

Indeed, in our experience editors and referees who speak English as a first language, and who therefore learned article usage by immersion at their mother's knee, may have limited understanding of the complexity of this part of the English language system. This complexity is reflected in the fact that effective computer software to identify or correct article errors has not yet, to our knowledge, been developed. This lack reflects the degree to which the use of English articles with any noun phrase depends on the meaning of the phrase in its particular context in the sentence, especially whether the noun phrase is used there in a generic sense [一般用法] or a specific sense [特殊用法]. This question (generic or specific) relates also to the problems of meaning that can occur when articles are used inappropriately. It is therefore with the generic/specific question that we begin our discussion of article use.

Generic noun phrases

Generic noun phrases refer to any – or all – members of a particular class or category of living things, objects, or concepts. There are four ways to write these generic noun phrases in English.

- 1 If the noun is *countable*, you can make it generic by writing it in its plural form and not using any article.
- 2 An alternative when the noun is *countable* is to make it generic by using its singular form with the article a or an.

e.g. Healthy crops can contribute substantial cadmium to human diets.
A healthy crop can contribute substantial cadmium to human diets.

- 3 When the noun you want to use is uncountable, you make it generic by omitting any article. (Remember: uncountable nouns never have a plural form.) [当你要用的词是不可数名词时，通常不加任何冠词，以表达广义的意思（切记：不可数名词没有复数形式）]

e.g. Cadmium exists in soils in many forms.
Manipulation of soil pH can be effective in managing Cd contamination.

- 4 English has another possible way of making generic noun phrases which you need to recognize. Sometimes, a singular countable noun carries the generic meaning when used with the definite article *the* [有时，可数名词的单数形式可以和定冠词the联用而表达广义的含义]. This is often used when referring to living things or common machinery or equipment. (It is usually also possible to substitute the plural form of the word without an article, also changing the verb to agree, of course.)

e.g. The earthworm can be found in many types of soil. (or Earthworms can ...)
The computer has become an important tool for researchers. (or Computers have ...)

N.B. For science writing in particular, it is important to remember that as long as you are talking about a noun as a concept or general class (any or all of them), the noun *stays generic* (i.e. you may have to unlearn the rule that says a noun is specific after it has been used once in a passage of writing). [尤其是在撰写科技论文时，记住这一点非常重要：只要你所谈及的名词是概念性的名词或代表了一类事物，这个名词就一直要使用广义用法（也就是说，你必须要忘掉学过的那些认为前文出现过的名词要依照特定名词使用的法则）]

Specific noun phrases [特殊名词短语]

Specific noun phrases refer to particular, individual members of a class or category, rather than the class as a whole. The reader and the writer both know which one or ones of the noun are being referred to. This requires the use of *specific noun phrases*, which involve the definite article *the*. There are three different reasons why a specific noun phrase may be required, as described below.

Task 3.6 Generic noun phrases

In the first paragraph of the Introduction to the PEA by Kaiser et al. (2003), reproduced below, underline examples of generic noun phrases using both countable and uncountable nouns.

Legumes form symbiotic associations with N₂-fixing soil-borne bacteria of the *Rhizobium* family. The symbiosis begins when compatible bacteria invade legume root hairs, signalling the division of inner cortical root cells and the formation of a nodule. Invading bacteria migrate to the developing nodule by way of an 'infection thread', comprised of an invaginated cell wall. In the inner cortex, bacteria are released into the cell cytosol, enveloped in a modified plasma membrane (the peribacteroid membrane (PBM)), to form an organelle-like structure called the symbiosome, which consists of bacteroid, PBM and the intervening peribacteroid space (PBS; Whitehead and Day, 1997). The bacteria, subsequently, differentiate into the N₂-fixing bacteroid form. The symbiosis allows the access of legumes to atmospheric N₂, which is reduced to NH₄⁺ by the bacteroid enzyme nitrogenase. In exchange for reduced N, the plant provides carbon to the nodules to support bacterial respiration, a low-oxygen environment in the nodule suitable for bacteroid nitrogenase activity, and all the essential nutritional elements necessary for bacteroid activity. Consequently, nutrient transport across the PBM is an important control mechanism in the promotion and regulation of the symbiosis.

- 1 The noun phrase is specific because the phrase is referring to shared or assumed knowledge of one particular referent [该名词（短语）提及谈话双方共同所指的或都 知道的事物](= the thing being referred to).

e.g. In recent years the growth of desert areas has been accelerating in the world.

- 2 The noun phrase may be specific because the phrase is pointing back to old information already introduced to the reader [该名词（短语）重提向读者介绍过的事物].

e.g. A pot experiment was conducted in an acid soil. The experiment showed ...

- 3 The noun phrase is specific because the phrase is pointing forward to information that specifies which one or ones being referred to [该名词（短语）引出点明所谈对象的信息].

e.g. The aim of this study was to investigate the effect of liming on Cd uptake.

N.B. It is worth noting that when the structure NP1 + of + NP2 is used, the first noun phrase will be specific (i.e. have *the* in front of it) about 85% of the time [值得一提的是，当使用名词+of+名词的结构时，第一个名词十有八九是特指（即在此名词前需要加定冠词the）]. It is therefore a good idea to always use *the* in this situation, unless you are very sure that the extended noun phrase (the two noun phrases joined with *of*) is generic for some reason.

Task 3.7 Specific noun phrases

Reread the Introduction paragraph from the PEA by Kaiser et al. (2003) and draw a square around each specific noun phrase. Discuss with a colleague why each one is specific.

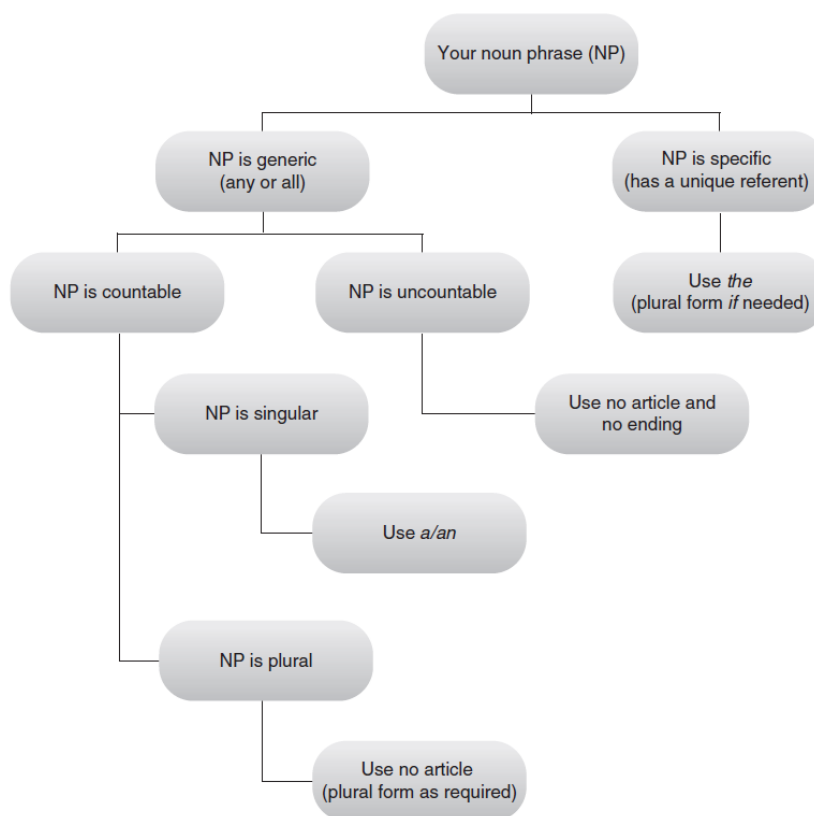


Fig. 3.1 Decision-support flowchart for the use of English articles (a/an/the) (after Weissberg & Buker 1990).

Summary flowchart for deciding on article use

Many EAL writers find the flowchart presented in Figure 3.1 helpful when they have to decide which form of the article to use with a noun phrase in a particular sentence.

Task 3.8 Articles and plurals in a science paragraph

Consulting the flowchart in Figure 3.1, fill in each blank space below with the plural marker *-s*, *a*, *an*, or *the* where necessary. (Some of the blanks do not require filling in.)

Propagule pressure

_____ propagule pressure is widely recognized as important factor that influences _____ invasion success. _____ previous studies suggest that _____ probability of _____ successful invasion increases with _____ number of propagules released, with _____ number of introduction attempts, with _____ introduction rate, and with _____ proximity to _____ existing populations of invaders. Moreover, _____ propagule pressure may influence _____ invasion dynamics after _____ establishment by affecting _____ capacity of _____ non-native species to adapt to their new environment. Despite its acknowledged importance, _____ propagule pressure has rarely been manipulated experimentally and _____ interaction of _____ propagule pressure with _____ other processes that regulate _____ invasion success is not well understood.

3.7 Using which and that

Problems with the relative pronouns *which* and *that*, and whether to use commas with them, are a common error we see in editing scientists' writing. The explanation below is designed to help you understand and remember how these two words are used.

Example 1: Land *which is surrounded by water* is an island.

The italicized portion of Example 1 is the relative clause [关系从句]. In this example the relative clause is essential to the meaning of the sentence because if it were omitted the sentence would read "Land is an island". This does not make sense, because only land which is surrounded by water is called an island. Thus the relative clause defines which land the sentence refers to: it is a defining relative clause [限定性关系从句].

The important points to note about defining relative clauses are as follows.

- Practice differs in different parts of the English-speaking world in terms of the relative pronoun that can begin a defining clause [关于引导限定性从句的关系代词，不同地域的英语在习惯用法上有一定差异]. UK practice (which is also followed in Australia, New Zealand, etc.) allows either *which* or *that*. US practice (and the grammar checker in Microsoft software products) permits only *that* in this clause type.
- Defining clauses have no commas separating them from the rest of the sentence [限定性从句和主句之间没有逗号分隔].

Example 2: Tasmania, *which is surrounded by the waters of Bass Strait*, is an island of great natural beauty.

In this example, the relative clause is not essential to the basic meaning of the sentence. If it were omitted, the sentence would read "Tasmania is an island of great natural beauty" and this makes sense. The relative clause is adding extra, non-essential information and is thus a non-defining relative clause. Another way to work out if a relative clause is non-defining is to try inserting the phrase "by the way" after the *which*. If this addition sounds acceptable, the clause is non-defining [（例句中的）关系从句是附加部分，而不是必需信息，故此是一个非限定性关系从句].

The points to note about non-defining relative clauses are these.

- They are separated from the rest of their sentence by commas: two commas if they occur in the middle of the sentence as in our example, or one comma if they come at the end of a sentence.
- They can only begin with *which*.

N.B. The same distinction holds when the *which* + *verb* is omitted, forming a phrase.

Examples: Tasmania, surrounded by the waters of Bass Strait, is an island of great natural beauty.

Land surrounded by water is an island.

Task 3.9 Punctuation with which and that

Punctuate the following examples.

- 1 Lime which raises the pH of the soil to a level more suitable for crops is injected into the soil using a pneumatic injector.
- 2 Manipulation which involves adding or deleting genetic information is referred to as genetic engineering.

(Continued

Task 3.9 *(Continued)*

- 3 Non-cereal phases which are essential for the improvement of soil fertility break disease cycles and replace important soil nutrients.
- 4 Senescence which is the aging of plant parts is caused by ethylene that the plant produces.
- 5 Opportunities that arise from the economically buoyant nature of domestic wine production must be identified and carefully assessed.
- 6 Seasonal cracking which is a notable feature of this soil type provides pathways at least 6 mm wide and 30 cm deep that assist in water movement into the subsoil.
- 7 Plants which experience waterlogging early in their development would be expected to have a much shallower root system than non-waterlogged plants.
- 8 Yellow lupin which may tolerate waterlogging better than the narrow-leaved variety has the potential to improve yields in this area.
- 9 Lucerne is a drought-hardy perennial legume which produces high-quality forage.

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