We can also see from the list that there is some more work to be done. The really difficult areas, especially Introductions and Discussions, need considerable attention. We also need to consider writing up Methods and Results for research papers (RPs), as opposed to, say, lab reports. There are some smaller bits of business, such as acknowledgments and titles to be discussed. Even so, enough has been done to make it possible.

When you read an RP, you may *think* that it is a simple, straightforward account of an investigation—indeed, RPs are often designed to create this impression. However, we believe that such impressions are largely misleading. Writers of RPs, in our opinion, operate in a *strategic* manner. This is principally because such writers know that RPs have to justify themselves. They need to establish that the research questions are sufficiently interesting. They need to demonstrate that the research questions are, in theory, answerable. And they need to compete against other RPs for acceptance and recognition. As a result, RP authors are very much concerned with *positioning*—with showing that their studies are relevant and significant and have some new contribution to make.

Overview of the Research Paper

The overall rhetorical shape of a typical RP is shown in figure 10.

This diagram gives a useful indication of the out-in-out or general-specific-general movement of the typical RP. As the RP in English has developed over the last hundred years or so, the four different sections have thus become identified with four different purposes.

Introduction (I)	The main purpose of the Introduction is to provide the rationale for the paper, moving from general discussion of the topic to the particular question or hypothesis being investigated. A secondary purpose is to attract interest in the topic—and hence readers.
Methods (M)	The Methods section describes, in various degrees of detail, methodology, materials, and procedures. This is the narrowest part of the RP.

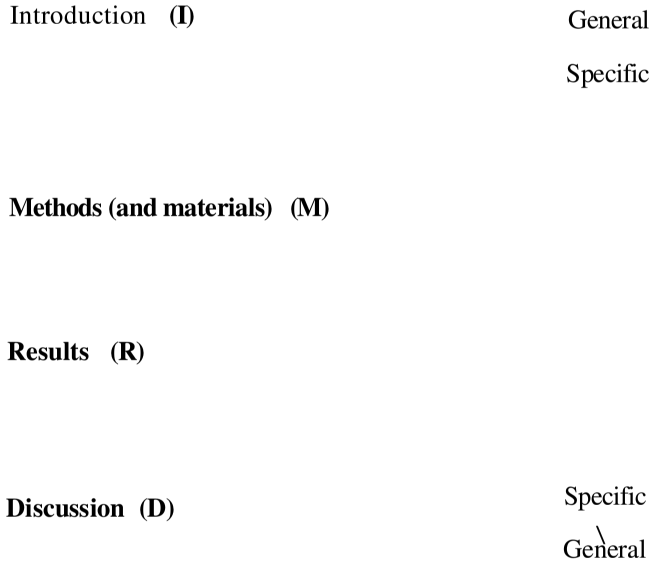

Fig. 10. Overall shape of a research paper

Results (R)	In the Results section, the findings are described, accompanied by variable amounts of commentary.
Discussion (D)	The Discussion section offers an *increasingly generalized* account of what has been learned in the study. This is usually done through a series of "points," at least some of which refer back to statements made in the Introduction.

As a result of these different purposes, the four sections have taken on different linguistic characteristics. We summarize some of these in table 17. The first line of the table shows, for instance, that the Present tense is common in Introductions and Discussions, but uncommon in Methods and Results.

Task One

In 1993 Dorothea Thompson published a useful RP on Results sections in biochemistry articles. She was particularly interested in

TABLE 17. Frequencies of Selected Items in RP Sections

	Introduction	Methods	Results	Discussion
Present tense	high	low	low	high
Past tense	mid	high	high	mid
Passive voice	low	high	variable	variable
Citations/references	high	low	variable	high
Qualification	mid	low	mid	high
Commentary	high	low	variable	high

what kinds of comments researchers made in their Results sections and whether researchers followed the guidelines in manuals. Here are eight sentences from her paper. Based on table 17 and on your own knowledge, can you guess from which of the sections they come? Mark each one *I, M, R,* or *D.* There are two sentences from each section. Work with a partner, if possible.

_____1. Only further research can determine the applicability of this study's findings to scientific disciplines outside biochemistry.
— 2. The data were analyzed both qualitatively and quantitatively.
_____3. Short communications and mini-reviews were excluded from the sample because these publications have different objectives and use a different format from that of the experimental research article.
_____4. The assumptions underlying this study are grounded largely in sociological accounts of the scientific enterprise (Knorr-Cetina, 1981; Latour, 1987; Latour and Woolgar, 1979).
_____5. These style guides are, at best, superficial descriptions of the content of these sections.
_____6. In 15 of the sample articles, these methodological narratives included explicit justifications for the selection of certain technical procedures, laboratory equipment, or alternatives to standard protocols.
_____7. Scientific style manuals reinforce the conception that Results sections simply present experimental data in a "cold," purely objective, expository manner (Council of Biology Editors, 1972; Day, 1988; Mitchell, 1968; Woodford, 1968).
8. In 38% of the JBC Results sections sampled, Kornberg and his co-authors directly relate their findings to those of earlier studies, as the following illustrate: . . .

Methods

You might have expected us to begin our discussion of RP sections with the Introduction. Instead, we are beginning with Methods. This is usually the easiest section to write and, in fact, it is often the section that researchers write first.

In Units Seven and Eight, we will involve you in the writing up of a very small research investigation of our own. Among other things, we hope in this way to illustrate certain strategic aspects of RP writing. We summarize our miniproject in Task Two.

You will remember from Unit One that sentence connectors are words like *however* and *therefore.* We became interested in the *position* of sentence connectors in written academic English sentences. We became curious about this since we found that the standard grammars of English had little to say on this topic. We are currently writing up our small-scale investigation. Like many other academics, we started with Methods.

Task Two

Here is our draft. Please read it **and answer the questions that** follow.

Methods

[1]In order to investigate the position of connectors, we examined their occurrence in academic papers published in three journals. [2]The sample consisted of all the main articles appearing in the third issues of the 1992 volumes *of College Composition and Communication, English for Specific Purposes,* and *Research in the Teaching of English.* [3](See Appendix A for a list of the articles

studied.) [4]The sample amounted to about 230 running pages of text, comprising 12 articles (four from each journal). [5]Each occurrence of a connector was identified, highlighted, and then coded for one of three positions in a clause. [6]If the connector was the first or last word in the clause, it was designated "initial" or "final" respectively. [7]If it occurred in any other position, it was classified as "medial." [8]The following examples illustrate the coding system:

A t-test was run;

however, the results were insignificant.	Initial
the results, *however,* were insignificant.	Medial
the results were, *however,* insignificant.	Medial
the results were insignificant, *however.*	Final

[9]For the purposes of this study, the category of sentence connector was interpreted quite broadly. [10]We included items like *unfortunately* that are sometimes considered to be sentence adverbs. [11]We included such items as *as it were* and *in turn,* which have an uncertain grammatical status. [12]We also counted conjunctions like *but* as connectors when they occurred as *first* elements in sentences, because they seemed to be functioning as connectors in these contexts.

1. As is customary, the main tense in our Methods section is the past. In one sentence, however, the main verb is in the present. Which one is it and why?

2. Consider the following subject-verb combinations from sentences in our Methods section:

   1. we examined . . .
   5. each occurrence was identified .. .
   6. it was designated . . .
   7. it was classified ...
   9. the category was interpreted . . .
   10. we included . . .
   11. we included . . .
   12. we counted . . .

These eight sentences describe what we did. As you can see, in four cases we used the past passive, and in four cases we used *we* and the past active. Is this switching acceptable to you? Could you do this in your field? What would your advisor or instructor recommend? Do you think we should have been consistent? In other words, do you think we should have used either the passive or *we* all the way through?

In a classic 1981 paper, Tarone et al. argue that the choice of passive versus *we* + active is not always a "free" stylistic choice. According to Tarone et al., the passive in the astrophysics papers they examined is used for standard procedures, while the use of *we* signals something new or unexpected. Do you think this might be true of your field?

3. Do you think the third paragraph should come before the second? What are the advantages and disadvantages of such a change?

4. As it happens, our account of Methods is not quite accurate. In actual fact, we conducted a pilot study on one journal. When that experience appeared to work out, we extended the sample. Is there any good reason for mentioning this part of the (true) story? When you write up a Methods section, is it appropriate to simplify or straighten out the actual process? Is it OK to "tidy up" in this way?

5. Finally, would you like to guess what our results were? What percentage of connectors were initial, medial, and final?

Language Focus: Imperatives in Research Papers

In the Methods section in Task Two, sentence 3 currently **reads:**

(See Appendix A for a list of the articles studied.)

We could, of course, have written:

(A list of the articles studied is **given in Appendix** A.)

Command-like imperatives are common in textbooks, manuals, lectures, and labs.

Analyze the results in figure 1.
Complete the following sentences.
Notice the relationship between A and B.
Prepare 5cc of distillate.
Carry this total *forward.*

In RPs, however, imperatives are less commonly used because they may be offensive. They may upset the fragile relationship between the writer and the reader, since the reader (instructor, advisor, or someone outside) can be expected to have a status comparable to or higher than the author.

However, one verb is widely used in many RP fields. Indeed, it may account for up to 50% of all the (occasional) uses of the imperative in research writing. As you may have guessed by now, that verb is *let.*

Let *p* stand for the price-cost ratio
Let *N* equal the number of consumers

A few other imperative verbs can be found in mathematical arguments, such as *suppose, substitute,* and *assume.*

A rather more difficult case occurs when you want to direct your readers' attention to some particular point, as we did when we wrote "(See Appendix A for a list of . . .)." We wanted the readers to know at this point in our paper that we have elsewhere provided full details of our data.

In RPs would you accept imperative uses of the following, and, if so, can you provide an example?

1. Notice
2. Consider
3. Imagine
4. Note
5. Refer
6. Compare
7. Recall
8. Observe
9. Take the case of, etc.
10. Disregard

If you think that an imperative might cause *offense* by being impolite, there are easy ways of escape.

Imperative	Now compare the results in tables 4 and 5.
Passive	The results in tables 4 and 5 can now be compared.
Conditional.	If we now compare the results in tables 4 and 5, we can see that . . .

Writing Up a Methods Section

One of us (John) interviewed a student planning her first research paper for her masters in social work. Mei-Lan said that the provisional title for her research paper was "Chinese Elderly Living in the United States: A Problem-free Population?" She said that she had chosen this topic because of some "prevailing myths" that the Chinese communities would always look after their elderly and that such elderly would not accept help from outsiders. She believed that certain traditional Chinese attitudes, such as "filial piety," were beginning to change in U.S. communities. She added that all the research to date had been conducted in the large communities in big cities on the East and West Coasts. She wanted to study smaller communities in a midwest town. John then asked her about methodology.

John Swales: How are you going to collect your data?
Mei-Lan: By face-to-face interviews. I want to do one-on-one interviews because I think if other family members are there the interviewees will not reveal their deep feelings and real problems.
JS: How will you find your subjects?
ML: I'll use friends and acquaintances in the local Chinese community to introduce me.
JS: Will you record the interviews?

ML: Yes, but of course I will ask permission first.
JS: Will you use English?
ML: The interviewees can use any language they prefer—Mandarin, Taiwanese, or English. Whatever is most comfortable for them.
JS: How long do you plan the interviews to last, and do you have a fixed list of questions?
ML: About an hour. I have a list of questions but I do not want to follow them very exactly. I will use what sociologists call "semi-structured" interviews. Part planned, part "go with the flow," as the Americans say.
JS: Finally, how many people will you interview?
ML: Because of limited time and contacts, only about ten. So I will be doing a qualitative analysis. There will not be enough subjects for statistics.

Task Three

Now with a partner draft the *first* sentence of Mei-Lan's Methods section. Remember to use formal style. You may wish to consider which of the following elements should be included.

1. methodology
2. the purpose of the methodology
3. the sample

Task Four

Now write a Methods section of your own. If you do not have any suitable material, you could—as an alternative—complete Mei-Lan's Methods section for her. In this case, assume that she has now completed the work.

Methods Sections across Disciplines

The two Methods sections we have been working on so far would fall under the broad category of "social science." Studies show that most Methods sections in social science disciplines share a number of characteristics:

They are explicit about details and procedures.
They are slow paced since they do not presume much background knowledge.
They contain justifications, explanations, and (sometimes) examples.
The terminology is often repeated.

In social science, education, public health, and so on, methodology is often a very important and hotly debated issue. Indeed, in some cases in these areas, the main point of an RP will be to announce some development in method. However, in science, engineering, and medical research, standard practices and established methods are much more widely available. As a result, Methods sections in these fields may be very different.

Task Five

Read this **opening to a Methods section and answer the questions** that follow.

Methods for Analysis and Functional Properties

> The standard AOAC[1] methods (AOAC, 1975) were used for the determination of total solids, nitrogen, crude fat, ash, and Vitamin C. Total sugars were determined by the method of Potter et al. (1968), and the total carbohydrates (in terms of glucose) were assayed according to the procedure of Dubois et al. (1956). The method of Kohler and Patten (1967) was followed for determining amino acid composition.
>
> (Quoted by Knorr-Cetina 1981, 157)

1. What field do you think this extract comes from?

2. What differences can you note between this Methods section and the one given in Task Two? What evidence can you find here of shared background knowledge? What is striking about the ways in which the methods in this passage are described (or, more exactly, not described)?

= Association of Operational Analytic Chemists

3. Would a Methods section written like this be possible in your field?

Task Six

We can conclude that Methods sections **vary greatly in what we** might call "speed."

Type 1 Slow (as in our own draft)
Type 2 Fairly slow
Type 3 Fairly fast
Type 4 Fast (as in the paper quoted by Knorr-Cetina)

Here is part of a Methods section written by one of our students. She is working on a Ph.D. in physiology. What "speed" would you give it?

Suppose Jun's advisor suggested that it could be "speeded up" a little. What advice do you have? There are also a couple of small mistakes toward the end. Can you correct those as well?

Binding Assay and Down Regulation Study

> Cells were cultured in **24-well** plates. Receptor binding was determined by incubating the intact cells with (3H)NMS in 1 ml buffer A at 4°C or **37°C**. Non-specific binding was defined in the presence of atropine. Incubation was terminated by washing the cells with ice-cold saline three times. Cells were scraped in 0.5ml water and suspensions were put into 5mm bio-safe scintillation fluid and then counted in a Beckman liquid scintillation counter. For the study of down regulation, cells was pre-incubated with 10mm M CCh for different periods time and then washed with a buffer A three times. The binding assay was performed as described above.
>
> (**Jun** Yang, unedited)

Where on the "speed" scale (Types 1-4) would you place your own methods descriptions and those typical of your field?

Language Focus: Hyphens in Noun Phrases

Notice that Jun's first sentence ends with the noun phrase "24-well plates." Hyphens are often used to clarify how complex noun phrases are to be interpreted. In Jun's case, her hyphen indicated that she was using plates containing 24 wells. Without the hyphen, the phrase could be interpreted as 24 plates containing an unspecified number of wells. What differences can you see between the following pairs of noun phrases?

small-car factory / small car factory
blue-lined paper / blue lined paper
university-paid personnel / university paid personnel

Read the above pairs aloud. Can you make a distinction between them in terms of stress and intonation?

Can you think of one or two similar pairs from your own field?

How would you indicate what you meant by the following **noun** phrases? All three are ambiguous, at least out of context.

artificial heart valve
rapid release mechanism
strong acting director

Results

The other section we will deal with in this unit is the Results section. Again we will begin by asking you to read the Results section of our own paper. As it stands at present, it is an incomplete draft.

Results

> A total of 467 sentence connectors was found, averaging just over two per page. Eleven of the 12 articles used connectors with some frequency, with totals ranging from 24 to 58. The one exception was the only article in the sample that dealt with literary texts,

which used only nine connectors. The scarcity of connectors in this paper may be due to its heavy use of commentary on literary passages.

Seventy different sentence connectors occurred in the sample. This large number is somewhat surprising, even taking into account our broad interpretation of "connector." Those that occurred four times or more are listed in decreasing frequency of use in table 18.

TABLE 18. Frequency of Connectors

Rank	Item	Total occurrence
1	however	62
2	first, second, etc.	52
3	thus	33
4	also	30
5	for example	29
6	in addition	20
7	finally	19
8	therefore	16
9	on the other hand	14
10	then	12
11	nevertheless	11
	for instance	
	furthermore	
14	moreover	9
	in particular	
	but	
17	in fact	8
	yet	
19	that is	6
	in contrast	
	in other words	
22	further	5
	similarly	
	of course	
25	as a result	4

There are a number of surprises in the frequency data. There was unexpectedly heavy use of the "informal" connectors *but* (nine instances) and *yet* (eight instances). Although these are known to be frequent in newspapers and correspondence, we were somewhat surprised to find so many in refereed scholarly journals. In contrast, there was minimal use of "conclusives," such as *in conclusion.* Under 2% of all the connectors fell into this category. Finally, very uneven frequencies in certain other categories were noted.

Contrasts:	however, 62	nevertheless, 11	all the same, 0
Results:	thus, 33	therefore, 16	hence, 1

We now turn to the positional data. Of the 467 connectors found, 352 occurred in initial position (75.4%), 109 in medial position, and only six in final position. Clearly, final position is very rare in this kind of writing, and we will not discuss it further. If we now examine the positional data in terms of individual connectors, we find that different connectors behave somewhat differently. In table 19 all connectors occurring four times or more are categorized for percentage of occurrence in initial position. (Informal uses of *but* and *yet* have been excluded.)

TABLE 19. Positional Categories of Connectors

Category	Connectors	Occurrence
	First, second, etc., in addition, nevertheless, finally, that is, as a result	100% in initial position
B	moreover, thus, in particular/in fact, in other words, of course	Between 75% and 99% in initial position
C	however, for instance, on the other hand, furthermore	Between 50% and 74% in initial position
D	also, for example, therefore, then	Between 25% and 49% in initial position

Task Seven

Go back and read through the Results section of our paper, underlining all the occasions where we have used numbers (ignore percentages). Can you determine the rules we followed for when to write numbers as digits (12, etc.) and when as words (twelve, etc.)? What are the rules you use in your field?

Task Eight

Notice that our Results section is not complete. Suppose we asked you what we could include in the concluding paragraph to our Results Section, based on the information in table 18? What highlighting statements would you suggest? Refer back to Unit Four if necessary. Give your suggestions in order, from the first statement to be included to the last.

Commentary in Results Sections

It is often said that the Results section of an RP should simply report the data that has been collected; that is, it should focus exclusively on the present results. Indeed, many of the books and manuals aiming at helping students and scholars to write research papers offer this kind of advice. These books argue, particularly, that all evaluation and commentary should be left until the Discussion. However, research shows that this distinction between Results and Discussion is not as sharp as commonly believed. For example, Thompson (1993) studied the Results sections from 20 published biochemistry papers. Table 20 presents what she found.

This is part of Thompson's conclusions:

> My research demonstrates that scientists—in this case biochemists—do not present results only in a factual expository manner; they also employ a variety of rhetorical moves to argue for the validity of scientific facts and knowledge claims.
>
> (P. 126)

TABLE 20. Commentary Found in Results Sections

Type of commentary	Number of papers (max. = 20)
Justifying the methodology	19
Interpreting the results	19
Citing agreement with previous studies	11
Commenting on the data	10
Admitting difficulties in interpretation	8
Pointing out discrepancies	4
Calling for further research	0

Authors often include commentary because they are aware of their audience. They can *anticipate* that their readers may be thinking, "Why did they use this method rather than that one?" or "Isn't this result rather strange?" For obvious reasons, authors may not want to postpone responding to such imaginary questions and critical comments until the final section.

Task Nine

Carefully read a Results section that you have written or read from your field and our draft on sentence connectors, marking any commentary elements. In your estimation, which of the following types are the passages most like?

Type 1 Gives straightforward description of the author's results; includes no commentary at all (no comparisons with the work of others, no justifications, no—or very few—obvious highlighting statements).

Type 2 Is mostly restricted to present findings, but includes a few minor uses of commentary.

Type 3 Consists of both description of findings and a number of commentary elements; uses several of the categories mentioned by Thompson.

Makes heavy use of commentary; uses most of the categories found by Thompson; could almost be taken for a discussion.

Be prepared to discuss your findings in class. Bring the passage from your field with you.

Task Ten

Produce a Results section from your own work (or part of one if your work is extensive). If your results are not yet complete, create some findings on your own. Alternatively, you may complete the final paragraph of the Results section for the sentence connector mini-RP.

Unit Eight
Constructing a Research Paper II

In this final unit, we deal with **the remaining parts of a research** paper in the following order:

Introduction sections
Discussion sections
Acknowledgments
Titles
Abstracts

Introduction Sections

It is widely recognized that writing introductions is slow, difficult, and troublesome for both native speakers as well as nonnative speakers. A very long time ago, the Greek philosopher Plato remarked, "The beginning is half of the whole." Indeed, eventually producing a good Introduction section always seems like a battle hard won.

Writing the Introduction of an RP is particularly troublesome. In some kinds of texts, such as term papers or case reports, it is possible to start immediately with a topic or thesis statement

The purpose of this paper is to ...
This paper describes and analyzes . . .
My aim in this paper is to ...
In this paper, we report on ...

However, this kind of opening is rare and unusual in an RP (probably under 10% of published RPs start in this way). In fact, statements like those above typically come at or near the end of an RP Introduction. Why is this? And what comes before?

We believe that the answer to these questions lies in two interconParts. The first half of the answer lies in the need to appeal to readership. In a term paper assignment, the reader is set. (In-

deed the reader is *required* to read and evaluate your paper!) On the other hand, a paper that is designed for the external world—if only in theory—needs to attract an audience. We can illustrate this by taking the case of one of those few published papers that actually does start by describing the present research. Here is the opening sentence of the Introduction:

> This study of the writing of 22 first graders and 13 third graders is concerned with how children learn the rules of punctuation.
> (Cordeiro 1988, 62)

The Cordeiro paper, "Children's Punctuation: An Analysis of Errors in Period Placement," was published in a journal called *Research in the Teaching of English.* As the title of this journal indicates, the journal covers several different research areas. Doubtless, the very specific opening to the Cordeiro paper will appeal immediately to those researchers actively involved in the topic. On the other hand, it is likely at the same time to "turn off" many other readers of the journal—readers who have no interest in this precise research area.

We believe that we can best explain the second half of the answer by using a metaphor—that of *competition* as it is used in ecology. Just as plants compete for light and space, so writers of RPs compete for acceptance and recognition. In order to obtain this acceptance and recognition, most writers use an organizational pattern that contains the following three "moves" in table 21, in the order given.

Creating a Research Space

In summary, then, the Introduction sections of RPs typically follow the pattern in table 21 in response to two kinds of competition: competition for research space and competition for readers. We can call this rhetorical pattern the Create-a-Research-Space (or CARS) model.

Task One

Read our draft Introduction to our mini-RP and carry out the tasks that follow.

TABLE 21. Moves in Research Paper Introductions

Move 1	Establishing a research territory
	a. by showing that the general research area is important, central, interesting, problematic, or relevant in some way. (optional)
	b. by introducing and reviewing items of previous research in the area. (obligatory)
Move 2	Establishing a niche[a]
	a. by indicating a gap in the previous research, raising a question about it, or extending previous knowledge in some way. (obligatory)
Move 3	Occupying the niche
	a. by outlining purposes or stating the nature of the present research. (obligatory)
	b. by announcing principal findings, (optional)
	c by indicating the structure of the RP. (optional)

[a] In ecology, a niche is a particular microenvironment where a particular organism can thrive. In our case, a niche is a context where a particular piece of research makes particularly good sense.

The Position of Sentence Connectors in Academic English
C. B. Feak and J. M. Swales

Introduction

[1]Many commentators have noted that sentence connectors (e.g., *however)* are an important and useful element in expository and argumentative writing. [2]Frequency studies of their occurrence in academic English extend at least as far back as Huddleston (1971). [3]ESL writing textbooks have for many years regularly included chapters on sentence connectors (e.g., Herbert, 1965). Most reference grammars deal with their grammatical status, classification, meaning, and use. [5]Some attention has also been given to the position of sentence connectors in clauses and sentences. [6]Quirk and Greenbaum (1973) observe (a) that the normal position is initial; (b) that certain connectors, such as *hence* and *overall,* "are restricted, or virtually restricted, to initial position" (p. 8); and (c) that medial positions are rare for most connectors, and final positions even rarer. [7]The only attempt known

to us to explain differences in position on semantic grounds is an unpublished paper by Salera (1976) discussed in Celce-Murcia and Larsen-Freeman (1983). [8]The Salera paper deals only with adversatives like *however* and suggests that initial position reflects something contrary to expectation, while medial position reflects a contrast that is not necessarily unexpected. [9]However, neither of these studies provides any descriptive evidence of the actual positions of sentence connectors in academic texts. [10]In the present paper, we report on a preliminary study of sentence-connector position in a sample of twelve published articles.

1. Divide the text into the three basic moves.

2. Look at table 21 again. Where in our Introduction would you divide Move 1 into 1a and 1b?

3. What kind of Move 2 do we use?

4. What kind of Move 3a do we use?

5. Underline or highlight any words or expressions in sentences 1 through 3 used to establish a research territory.

6. List the six citations used in our draft introduction. (Salera is cited twice.) Do you have a criticism of our review of the previous literature?

7. Where do these six citations occur in the sentence? What does this tell us?

In Unit Seven, we argued that RPs were not simple accounts of investigations. This is also very true of our own mini-RP. If you look back at our introduction, you will note that we never actually say what our motive or rationale for carrying out this small study was. Rather, the study seems to emerge as a natural and rational response to a discovered gap in the literature.

In fact, this is not how the study started at all. In Fall 1992, a student in John's Research Paper Writing class asked him if there

were any rules for where to put the sentence connectors. Not having any immediate answer, John played for time and asked what the class did. Most said they always put them first, even though they had noticed that they did not always come first in the books and papers that they read. Then one student, Arthur Hsieng, said that he remembered a sociology professor telling the class never to put *however* in initial position. As English teachers, we were so struck by this piece of grammatical folklore that we decided to investigate!

Task Two

Discuss the following issues with a group.

1. Do you think the "true" story behind our investigation should be built into the Introduction? If so, where and how?

2. Alternatively, do you think it should be made part of the Discussion? Or would the Acknowledgments be the best place to mention how the study came about? Or a footnote? Or should it be omitted altogether?

3. Do members of your group have comparable experiences to relate—perhaps stories about how pieces of research started almost by accident but are described as if they were planned?

4. How would you answer the following question? In any investigation, certain events take place in a certain order. Do you think it is necessary to keep to that order when writing an RP, or is an author free to change that order to construct a more rhetorically effective paper?

Of course, by this time you may be thinking that all this rhetorical work in Introductions is only needed in the social sciences and the humanities. There, academics may indeed need to create research spaces for themselves. Surely, you may be thinking, the CARS model is not necessary in "true" science. Before coming to any such conclusion, consider the first half of the Introduction to this Paper from aerospace and atmospheric science.

Discuss with a group the validity of each. Which do you think contribute most to our understanding of why citations are used in academic writing? Does your group have any other theories?

1. This theory is widely proposed in manuals and standard practice guides.

   Citations are used to recognize and acknowledge the intellectual property rights of authors. They are a matter of ethics and a defense against plagiarism (see Notes on Plagiarism in Unit Five).

2. This theory has many supporters, especially in well-established fields like the sciences.

   Citations are used to show respect to previous scholars. They recognize the history of the field by acknowledging previous achievements.

The remaining theories have been proposed by individual authors.

3. Ravetz 1971:

   Citations operate as a kind of mutual reward system. Rather than pay other authors money for their contributions, writers "pay" them in citations.

4. Gilbert 1977:

   Citations are tools of persuasion; writers use citations to give their statements greater authority.

5. Bavelas 1978:

   Citations are used to supply evidence that the author qualifies as a member of the chosen scholarly community; citations are used to demonstrate familiarity with the field.

6. Swales 1990:

   Citations are used to create a research space for the citing author. By describing what has been done, citations point the way to what has not been done and so prepare a space for new research.

Now suppose that we have actually carried out a study of the reasons for using citations in academic texts and have begun to write an RP. This is the draft of the introduction so far. Read it and consider the questions that follow.

M O V E 1a

[1]Citations are widely recognized as being an important and distinctive property of academic texts. [2]Indeed, the presence or absence of citations allows the casual reader to get an immediate sense of whether a text is an "academic" or "popular" one. [3]Because citation is such an obvious surface phenomenon, it has been much discussed in the academic world. [4]Indeed, there are several theories about the role and purpose of citations in academic texts.

We now have to write Move 1b.

1. How can we sequence our six theories (plus any others that have come up in your groups)? The key element in literature reviews is that *order* is imposed on the material, not so much order in your own mind, but order in the reader's mind.

2. Clearly we need to start with the two major traditional views (theories 1 and 2). How can we order the remaining four (3-6)?

- Should we organize in the chronological order as presented? Is this—at least in this case—a weak kind of ordering? Is there another way?

4. One possibility might be to *categorize* theories 3-6. Do you consider the theories by Ravetz, Gilbert, Bavelas, and Swales to be

economic theories?
sociological theories?
rhetorical theories?

We could then decide to take next the case where we have two members in the category. One plan could look like this.

Theory 1
Established major theories
Theory 2

Rhetorical	Theories 4 and 6	Theories associated with individual authors.
Economic	Theory 3	
Sociological	Theory 5	

Task Five

Write either a short review of the citation literature or a short review of at least five papers from your own field. Use the reference system that you are most comfortable with. If you review papers from your field, also hand in a rough diagram showing how you have imposed order on the material.

Language Focus: Citation and Tense

Tense choice in reviewing previous research is subtle and somewhat flexible. (It is also not very much like the "rules" you may have been taught in English classes.) The following, therefore, are only general guidelines for tense usage.

Several studies have shown that at least two-thirds of all citing statements fall into one of these three major patterns.

I Past-researcher activity as agent

Jones (1987) *investigated* the causes of illiteracy.
The causes of illiteracy *were investigated* by Jones (1987).

II Present Perfect—researcher activity not as agent

The causes of illiteracy *have been* widely *investigated* (Jones 1987, Ferrara 1990, Hyon 1994).
There *have been* several investigations into the causes of illiteracy (Jones 1987, Ferrara 1990, Hyon 1994).
Several researchers *have studied* the causes of illiteracy. [1–3]

III. Present—no reference to researcher activity

The causes of illiteracy *are* complex (Jones 1987, Ferrara 1990, Hyon 1994).
Illiteracy *appears to have* a complex set of causes.[1-3]

Note these common uses of these patterns:

Pattern I—reference to single studies—past
Pattern II—reference to areas of inquiry—present perfect
Pattern III—reference to state of current knowledge—present

Also note that in patterns I and II, attention is given to what previous researchers did, while in pattern **III,** the focus is on what has been found.

Finally note that different areas of scholarship have somewhat different preferences. Patterns I and II are most common in the humanities and least common in science, engineering, and medical research. However, all three patterns tend to occur in many extensive literature reviews, since they add *variety* to the text.

We have said that these three patterns cover about two-thirds of the cases. The reason this proportion is not higher is because writers of literature reviews can have certain options in their choice of tenses. This is particularly true of pattern I. The main verbs in Pattern I can refer to what a previous researcher *did (investigated, studied, analyzed,* etc.). By and large, in these cases the past is

obligatory. However, the main verbs can also refer to what the previous researcher *wrote* or *thought {stated, concluded, claimed,* etc.). With these reporting verbs, tense options are possible.

Jones (1987) concluded that illiteracy can be related to ...
Jones (1987) has concluded that . . .
Jones (1987) concludes that . . .

The differences among these tenses are subtle. In general, a move from past to present perfect and then to present indicates that the research reported is increasingly *close* to the writer in some way: close to the writer's own opinion, close to the writer's own research, or close to the current state of knowledge.

The present tense choice is sometimes called the *citational present* and is also used with famous or important sources.

Plato argues that . . .
Confucius says . . .
The Bible says . . .
The Constitution states ...

Comparable options exist in the subordinate clause.

Jones (1987) found that illiteracy *was* correlated most closely with poverty.
Jones (1987) found that illiteracy *is* correlated most closely with poverty.

The first sentence shows that the writer believes that the finding should be understood within the context of the single study. In the second, the writer implies that a wider generalization is possible.

Variation in Reviewing the Literature

In the language focus, we concentrated on the three main citation patterns. There are, of course, some others.

According to Jones (1987), the causes of **illiteracy are closely** related to poverty.

ones' research shows that illiteracy and poverty are inter-related (Jones 1987).

Can you come up with some more?

Good writers of literature reviews employ a range of patterns in order to vary their sentences. As this is something that we have already discussed in Task Twelve of Unit Six, you may want to review that section before doing this next task.

Task Six

Here is a review that uses only citation pattern I. As you can see, using the same structure all the time can cause the reader to lose interest. Rewrite the passage so that it has more variety. Your version will probably be shorter than the **original—another** advantage!

The Origins of the First Scientific Articles

[1]**The** first scientific journal was started in London in 1665. [2]**Obvi**ously, the first scientific articles had no direct models to build on, and several scholars have discussed possible influences. [3]**Ard** (1983) suggests that the first articles developed from the scholarly letters that scientists were accustomed to sending to each other. [4]**Sutherland** (1986) showed that early articles were also influenced by the newspaper reports of that time. [5]**Paradis** (1987) described the influence of the philosophical essay. [6]**Shapin** (1984) claimed that the scientific books of Robert Boyle were another model. [7]**Finally,** Bazerman (1988) argued that discussion among the scientists themselves made its own contribution to the emergence of the scientific article.

Move 2—Establishing a Niche

In many ways, Move 2 is the key move in Introductions. It is the **hinge** that connects Move 1 (what has been done) to Move 3 (what **ne** present research is about). Move 2 thus establishes the motivation for the study. By the end of Move 2, the reader should have a **good** idea of what is going to come in Move 3.

Most Move 2s establish a niche by indicating a **gap—by** showing that the research story so far is not yet complete. Move 2s then are a particular kind of critique (see Unit 6).

Usually Move 2s are quite short, often consisting of no more than a sentence. Sometimes, however, Move 2s can be quite complicated. Consider, for example, the Move 2 from the Almosino paper on the calculation of vortex flows. (Move 1 appears earlier in this unit.)

Task Seven

Read the middle section of the Almosino introduction (containing Move 2) and then answer the questions that follow.

M O V E 2

[6]**However,** the previously mentioned methods suffer from some limitations mainly concerning the treatment of the vortex wake formation and its interaction with the body. [7]**The** first group of **methods**[2–4] cannot treat 3D flows and is limited to very slender bodies. [8]**The** second group of **computational methods**[5–8] is time consuming and therefore expensive, and its separation prediction is not sufficiently accurate. [9]**Both** the methods in this group and the method in[9] suffer from the dependency on too many semi-empirical inputs and assumptions concerning the vortex wake and its separation. [10]**The** steady, 3D nonlinear vortex-lattice method, upon which the present method is based, eliminates many of these limitations by introducing a more consistent model, but it can treat only symmetrical flow cases.

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1. How many "critique" expressions can you find in the passage? Underline or highlight them.

2. What word signals that Move 1 has ended and Move 2 has started? What other words or expressions could also indicate this shift?

3. This Move 2 occupies five sentences. Why do you think **Almosino** has put these sentences in this particular order?

What do you think the next sentence is going to be?

As we have seen, Almosino relies mostly on verbs and adjectives to characterize weaknesses in the previous research. Care is obviously needed when selecting vocabulary of this sort.

Task Eight

Here are some "negative" verbs and adjectives. Decide how "negative" they are. Work with a partner. Use the key below.

definitely or strongly negative = ____
neutral or slightly negative = -

Verbs

However, previous research in this field has_____

a. concentrated on x.
b. disregarded x.
c. failed to consider x.
d. ignored x.
e. been limited to x
f. misinterpreted x.
____g. neglected to consider x.
____h. overestimated x.
____i. overlooked x.
____j. been restricted to x.
____k. suffered from x.
____1. underestimated x.

Adjectives

Nevertheless, these attempts to establish a link between secondary smoke and lung cancer are at **present**_____

a. controversial
b. incomplete
c. inconclusive
d. misguided
____e. questionable
____f. unconvincing
____g. unsatisfactory

Language Focus: Negative Openings

Probably the most common way to indicate a gap is to use a "negative" subject. Presumably, negative subjects are chosen because they signal immediately to the reader that Move 1 has come to an end. Note the following uses of *little* and *few*:

Uncountable	However,	little information .
		little attention . . .
		little work . . .
		little data . . .
		little research . . .
Countable	**However,**	few studies . . .
		few investigations
		few researchers . .
		few attempts . . .

Note the differences in the following pairs:

He has little research experience. (negative, i.e., not enough)
He has a little research experience. (neutral, i.e., maybe enough)

The department has few computers. (negative, i.e., not enough)
The department has a few computers. (neutral, i.e., maybe enough)

Note the use of *no/none of:*

No studies/data/calculations . . .

Use *no* when your conclusion is based on but does not directly refer to the cited literature. If you want to refer directly to the previous research, use *none of.*

None of these studies/findings/calculations . . .

Of course, not all RP Introductions express Move 2 by indicating an obvious gap. You may prefer, for various reasons, to avoid negative or quasi-negative comment altogether. In such cases, a useful alternative is to use a contrastive statement.

The research has tended to focus on . . . , rather than on . . .
These studies have emphasized . . . , as opposed to . . .
Although considerable research has been devoted to . . . , rather less attention has been paid to . . .

Two other strategies are quite common, particularly in the "harder" areas. The first is raising a question, a hypothesis, or a need. Here are some skeletal examples.

However, it remains unclear whether . . .
It would thus be of interest to learn how . . .
If these results could be confirmed, they would provide strong evidence for . . .
These findings suggest that this treatment might not be so effective when applied to . . .
It would seem, therefore, that further investigations are needed in order to . . .

Note that in these cases, sentence connectors are not limited to the *however* type.

The second strategy is continuing a line of research. This last strategy is largely restricted to RPs written by research groups who are following up their own research or that done by similar groups. The authors draw a conclusion from their survey of the previous research indicating how some finding in the immediate research literature can be extended or applied in some way. Here are three examples.

These recent developments in computer-aided design clearly have considerable potential. In this paper, we demonstrate . . .
The literature shows that Rasch Analysis is a useful technique for validating multiple-choice tests. This paper uses Rasch Analysis to . . .
uch active-R networks eliminate the need for any external passive reactance elements. This paper utilizes the active-R approach for the design of a circuit . . .

Occupying the Niche

The third and final step in the typical RP Introduction is to make an offer to fill the gap (or answer the question) that has been created in Move 2. The first element in Move 3 is obligatory. It has two main variants:

Purposive (P)	The author or authors **indicate their main** purpose or purposes.
	or
Descriptive (D)	The author or authors **describe the main** feature of their research.

Task Nine

Here are the beginning parts of ten opening Move 3 sentences. Decide in each case whether they are purposive or descriptive, and enter a *P* or a *D* in the blank. One of them is from the Almosino paper (see Move 2 in Task Seven). Can you guess which one it is? Complete at least three of the sentences with your own words.

_____1. The aim of the present paper is to give . . .

_____2. This paper reports on the results obtained . . .

_____3. In this paper we give preliminary results for . . .

_____4. The main purpose of the experiment reported here was to . . .

_____5. This study was designed to evaluate . . .

_____6. The present work extends the use of the last **model by** . . .

_____7. We now report the interaction between . . .

_____8. The primary focus of this paper is **on** . . .

9 The aim of this investigation was to test . . .

10. It is the purpose of the present paper to provide . . .

Note that Move 3 is typically signaled by some reference to the resent text, such as the uses **of** *this, the present, reported,* and *here.* If the conventions of the field or journal allow it, it is also common for the authors to switch from the impersonal to the personal by using *we,* or more rarely/. Also note that these signals come early in the sentence. It is very unusual to find:

We present the results of three experiments *in this paper.*

rather than:

In this paper we present the results of three experiments.

Language Focus: Tense and Purpose Statements

Students sometimes ask whether they should use *was* or is in purpose statements. Indeed, both were used in the phrases in Task Nine. The answer to this question depends on how you refer to your work. You have two choices:

1. Referring to the type of *text*—**paper,** article, thesis, report, research note, etc.
2. Referring to the type of *investigation*—**experiment,** investigation, study, survey, etc.

If you choose to refer to the type of text, you must use the present tense. If **you** write, "The aim of this paper was to ... ," it suggests hat you are referring to an original aim that has now changed.
" you choose to refer to the type of investigation, you can use er *was* or *is.* However, there is an increasing tendency to choose e **present,** perhaps because it makes the research seem relevant **and** fresh and new. The "safe rule" then is to opt for the present.

Completing an Introduction

There are a number of elements that can follow the purposive/descriptive statement. While these elements are typically needed in longer texts, such as theses, dissertations, or long and complex RPs, they may not be necessary in short RPs. We briefly review each in turn.

Secondary Aims or Features

Sometimes a second sentence is necessary to complete Move 3a. Here, for example, is the Almosino Move 3.

M 0 V E 3 [11]The present work extends the use of the last model to asymmetric, body-vortex cases, thus increasing the range of flow patterns that can be investigated. [12]In addition, an effort is made to improve the numerical procedure to accelerate the convergence of the iterative solution and to get a better rollup of the vortex lines representing the wake. (Copyright © 1984 AIAA—Reprinted with permission)

These secondary statements are often introduced by such language as

In addition, . . .
Additionally, . . .
A secondary aim . . .
A further reason for . . .

Stating Value

You may also want to consider whether you want to mention at this stage anything about the contribution your research will make. Of course, you will do this in the Discussion section in any case. Note that Almosino squeezes a value statement into his introduction.

> . . . , thus increasing the range of flow problems that can be investigated.

u opt for a value statement, it would be wise to be cautious and to use qualifications (see Unit Four).

Task Ten

present the Feak and Swales draft Introduction (see Task One) simply ends with a Move 3a.

> In the present paper, we report on a preliminary study of sentence-connector position in a sample of twelve published articles.

Would you advise us to add any of the following value statements? What are the advantages or disadvantages of each? If you do not like any of them, can you offer one of your own, or edit one of them to your satisfaction? Work with a partner if possible.

1. In this way, we offer a solution to a long-standing problem in English grammar.

2. It is hoped that this small study will revive interest in a long-neglected feature of academic English.

3. The information presented should be useful to all those teaching academic writing to nonnative speakers of English.

Announcing Principal Findings

There is some confusion as to whether RP Introductions should close with a statement of the principal results. One investigation (Swales and Najjar 1987) found that physicists do this about half the time, but educational researchers hardly ever include such statements. One useful guideline is to ask yourself whether the RP will open with an Abstract. If there is an Abstract, do you need to give the main findings three times: in the Abstract, in the Introduction and in the Results? We think not. If there is no Abstract, you may wish to reconsider. Another suggestion would be to follow standard practice in your field—or ask your instructor.

Outlining the Structure of the Text

A final option is to consider whether you need to explain how your text is organized. This element is obligatory in dissertations, but is only included in RPs under certain circumstances. One such circumstance arises when your text is unusual in some way, such as not using the IMRD format. Another arises if you are working in some new field. Cooper (1985) found, for example, that outlining the RP structure was quite common in computer technology. Ask yourself whether your anticipated readers need to have the organization of the RP explained.

Here is a useful example of a textual outline, well-motivated by the unusual structure of the paper. Notice how it uses a good variety of sentence structures. The paper is about currency rates in the European Common Market and was written by one of our students.

> The plan of this paper is as follows. Section II describes the current arrangements for regulating exchange rates within the EC. In Section III a theoretical model is constructed which is designed to capture these arrangements. Experimental parameters are then tested in Section IV. Finally, Section V offers some suggestions for the modification of the current mechanisms.
>
> (Pierre Martin, unedited)

Task Eleven

Below is a textual outline by another one of our students. Notice how this time it lacks variety. Can you rewrite it?

> The rest of the paper is organized as follows. Section 2 presents the theoretical concept. Section 3 presents the empirical specification, the implementation of the model. Section 4 presents the results of statistical and other computational analyses. Section 5 summarizes the findings and provides a brief discussion concerning the shortcomings of the methods employed. Finally, an appendix presenting the detailed algebraic works is presented at the end of the paper.
>
> (Abdul Malik, unedited)

Task Twelve

Now write, or rewrite, an RP introduction of your own.

Discussion Sections

It is not so easy to provide useful guidelines for writing Discussion or Conclusions sections. (We will not distinguish between these two terms, since the difference is largely conventional, depending on traditions in particular fields and journals.) See what is done in your own field.

The problem is that Discussions vary considerably depending on a number of factors. Not all these factors are understood, but one important one is the kind of research question—or questions—that the study attempted to answer. Another factor that leads to variation is the position of the Discussion section in the RP. By the time readers reach the Discussion, authors can assume a fair amount of shared knowledge. They can assume (if not always correctly) that the reader has understood the purpose of the study, obtained a sense of the methodology, and followed along with the results. Authors can use this understanding to pick and choose what to concentrate on in the Discussion. As a result, they typically have greater freedom than in the Introduction.

Overall, if Results deal with *facts,* then Discussions deal with *points;* facts are *descriptive,* while points are *interpretive.* Effective Discussion sections are similar to effective lectures, which, as Olsen and Huckin (1990) note, are based on points, rather than on facts. Further, authors of Discussions have some flexibility in deciding which of their possible points to include and then which to highlight.

Discussions, then, should be more than summaries. They should go beyond the results. They should be

more theoretical
or
more abstract
or
more general
or
more integrated with the field
or
more connected to the real world
or
more concerned with implications
or applications

AND, if possible, some combination of these.

As Weissberg and Buker note, "in the discussion section you should step back and take a broad look at your findings and your study as a whole" (1990, 160).

We have said that Discussions can be viewed as presenting a series of points. Typically, they are arranged as in table 22.

Move 1 is usually quite extensive, and Moves 2 and 3 are often quite short. At this point, you might want to observe that Move 1 and the later moves seem self-contradictory. Why, you may ask, build up something in order to apparently attack it later? However, if we remember *positioning,* we can see that authors can present themselves very effectively by both

1. highlighting intelligently the strengths of the study
   and
2. highlighting intelligently its weaknesses.

Indeed, Moves 2 and 3 can also be used to identify and open up future research space for authors and their colleagues. However,

TABLE 22. Discussion Moves

Move 1	Points to consolidate your research space (obligatory)
Move 2	Points to indicate the limitations of your study (optional but common)
Move 3	Points to identify useful areas of further research (optional and only common in some areas)

this is less likely to happen, according to Huckin (1987), in areas here there is fierce competition for research grants.

Task Thirteen

We have noted in this task nine points we would like to make in the Discussion section of the paper on sentence connectors. They are not yet in order. We believe that they fall in the following categories:

Move 1 (Consolidation)	Six Points (3 results, 1 methodology, 1 centrality, 1 literature comparison)
Move 2 (Limitation)	Two points
Move 3 (Further research)	One point

Into which category does each point fall? Fill in the blanks with the labels. The first one has been done for you. Review the Methods, Results, and Introduction sections of our mini-RP, if necessary (see Unit Seven and Unit Eight Task One). The first one has been done for you.

1. Move 2 (Limitation)
   This is a very limited study restricted to a single field.

2. _

   Position varies from one connector to another (+ example[s]).

3. _

   Sentence-connectors are quite common in academic writing (average of 2 per page).

4. _

   Our survey shows unexpected differences in the frequency with which individual connectors are used (+ example[s]).

5. _____

Further research in this area might produce materials of greater help to writers, especially nonnative speakers.

6. _____

Our survey shows that 25% of connectors do not occur at the beginning of sentences.

It is important to conduct surveys to establish where connectors actually occur in sentences.

8.

We are not yet in a position to **offer explanations for choices** of connector positions.

Twenty-five percent noninitial seems higher than the grammar books would predict, but lower than Morrow (1989), who found 53% noninitial in an economics journal (although Morrow used a broader definition of connector).

As we can see, the heart of a Move 1 typically consists of statements of results followed by a follow-up of some kind. The follow-up might take the form of examples, comparisons with other work, conclusions that might be drawn, or commentary on whether the results are expected or unexpected.

Task Fourteen

Please write our Discussion section for us. Refer to the Results section before Task Five for details of our study.

Opening a Discussion Section

As we have already suggested, there are many options in opening a Discussion. Consider the case of the following data. We studied Discussion openings in 15 articles from a small U.S. regional journal of

atural history research. We found great variation. Four sections open with the *main results.* This was the largest category, but still less than 30% of the total. Three begin with a *discussion of the literature.* Here are two examples.

a Graikowski et **al.** (1986) recovered . . . toxin from . . . and found that . .. suffered 100% mortality when . . .

b Food shortages, social stress . . . within . . . are causes of dispersal among . . . (Fritz and Mech 1981, Messier 1985, Mech 1987, Packard and Mech 1980).

Two sections start in a more dramatic way by offering a general conclusion.

c. Apparently, we are witness to the early phases of a classic population explosion.

d. From this data, it is clear that . . . are not major consumers of commercially important fish-species in ...

The remaining types of opening occur only once in the sample. We were surprised, for example, to find only *one* opening that reminds the reader of the *original purpose.*

e. The objective of the survey was to quantify the number **of . . .** within . . .

In another case, the author opens with a *summary.*

f. This report brings together all known records **of . . .** since 1959.

In another, the authors raise the level of discussion by referring to *theory.*

g The interrelationship of bird populations and the environment is extremely complex.

One author starts with a comment about *methodology.*

- There is a bias associated with using either ground or **aerial** counts, exclusively.

Another author begins his Discussion section by highlighting the special importance of his *research site.*

i. ... is one of the few sites in North America where the presence of a significant number of migrating . . . has been documented.

And in the final case, the author actually begins by discussing the *limitations* of the data.

j. The census figure of . . . is expected to be an underestimate of the total population of . . .

This small survey shows some of the many strategies that can be adopted for opening a Discussion section. The choice of strategy clearly depends in part on how the authors view their work. We will briefly comment on the last three cases. In *h* the author begins with a methodology critique of previous work, because one of his main points is that he has taken the trouble to "combine both aerial and ground surveys." In *i* the researcher begins by stressing the point that the location of his research site offers exceptional advantages. Finally, take the case of *j*. It might appear that the author of *j* has adopted a very risky strategy, but in this particular context it is not. It soon emerges that carrying out a complete census of this particular species would be very difficult. Therefore, the author presumably felt on safe ground when he opened in this way. Indeed, he can go on to claim that his numbers are much larger than anybody else has so far been able to report.

Task Fifteen

Survey and classify the openings of at least six Discussion sections from a journal in your field. Bring your findings to class.

Language Focus: Levels of Generalization

In the Results sections, statements may be quite specific **and** closely tied to the data.

As can be seen in Table **1, 84% of** the **students performed** above the 12th-grade level.

Seven out of eight experimental samples resisted corrosion longer than the controls.

On the other hand, in the Abstract or in a Summary section, space restrictions may lead to a high level of generality.

The results indicate that the students performed above the 12th-grade level.
The experimental samples resisted corrosion longer than the controls.

In the Discussion, we usually expect something in between these two levels. One common device is to use one of the following "phrases of generality."

Overall
In general
On the whole
In the main
With . . . exception(s)

Overall, the results indicate that students performed above the 12th-grade level.
The overall results indicate . . .
The results indicate, overall, that . . .

In general, the experimental samples resisted . . .
With one exception, the experimental samples resisted . . .

Limitations in Discussions

We saw in Introduction Move 2s (see page 185-89) that extensive "negative" language was a possible option. In contrast, Discussion Move 2s tend to use less elaborate negative language. The main reason is obvious; it is now your own research that you are talking about! Another reason is that many limitation statements in Discussions are not so much about the weaknesses in the research, as bout what *cannot be concluded* from the study in question. Producing statements of this kind provides an excellent opportunity for the

writer to show **that he or she understands how evidence needs to be** evaluated in **the particular field.**

Task Sixteen

Complete four of the statements in set *A*. Base two on the mini-RP on sentence connectors and two on studies you have been involved with in your field. Complete at least one statement from B.

A. Limitations of Research Scope

1. It should be noted that this study has examined **only** . . .
2. This analysis has concentrated on ...
3. The findings of this study are restricted to ...
4. This study has addressed only the question **of** . . .
5. The limitations of this study are clear: . . .
6. We would like to point out that we have not . . .

B. Limitations in Conclusions. Below are some typical openings for statements that firmly state that certain conclusions should *not* be drawn.

1. However, the findings do not imply . . .
2. The results of this study cannot be taken as evidence for ...
3. Unfortunately, we are unable to determine from this data . . .
4. The lack of ... means that we cannot be certain . . .

We said earlier that Move 2s are optional in Discussions. If you feel it is unnecessary to comment on your work in either of the above two ways, a useful alternative is to place the limitation in an opening phrase.

Notwithstanding its limitations, this study does suggest . . .
Despite its preliminary character, the research reported **here** would seem to indicate . . .
However exploratory, this study may offer **some insight into** . . .

Paragraph

Paragraph 2

Paragraph 3

Fig. 11. Shape of a longer Discussion

Cycles of Moves

Finally, we should point out that many Discussion sections run through the Move 1-2-3 (or part of it) sequence more than once. Commonly, each cycle occupies one paragraph. Further, the more research questions there are to be discussed, the more this cycling is likely to occur. Such cycling can also occur in Introductions, but it tends to be less common, especially in shorter RPs.

If you wish to write a longer Discussion, follow the shape recommended in figure 11. Begin with specifics and then move towards the more general.

Task Seventeen

Write or rewrite a Discussion section for your own **research. If you** are working with others, collaborate with them.

Acknowledgments

Acknowledgments have become an integral part of most RPs. Indeed, one famous professor of our acquaintance reported to us that he always reads the Acknowledgments section of an RP first. When we asked him why, he replied, "Oh, the first thing I want to know is who has been talking to whom." While we do not think that this is

standard reading behavior, it does show that Acknowledgments can be more than a display of necessary politeness.

Acknowledgments occur either at the bottom of the first page, following the Discussion, or sometimes at the end. They provide an opportunity for you to show that you are a member of a community and have benefited from that membership. Here we list some of the common elements in Acknowledgments.

1. Financial support

   Support for this work was provided by (sponsor).
   This research was partially supported by a grant from (sponsor).
   This research was funded by Contract (number) from (sponsor).

2. Thanks

   We would like to thank A, B, and C for their help . . .
   I wish to thank A for his encouragement and guidance throughout this project.
   We are indebted to B for . . .
   We are also grateful to D for ...

3. Disclaimers (following element 1 or 2)

   However, the opinions expressed here do not necessarily reflect the policy of (sponsor).
   The interpretations in this paper remain my own.
   None, however, is responsible for any remaining errors.
   However, any mistakes that remain are my own.

4. Other versions

   An earlier/preliminary version of this **paper was presented at** (conference or seminar).

5. Source

   This **article** is **based on the first author's doctoral dissertation.**

This paper is based on research completed as partial fulfillment for the Ph.D. requirements at (university name).

Notes

1. We believe that, if permitted, Acknowledgments should be written in the first person—/ for a single author and *We* for coauthors. It is possible to find phrases like "the present authors," but we consider them too formal for this situation.

2. As far as we can see, financial support tends to come first, followed by thanks. Disclaimers seem optional. Mentions of other versions and sources (if used) seem to come either at the beginning or at the end. (But note that, in theses or dissertations, it is customary to open with thanks to supervisors, advisors, committee-members, etc.)

Task Eighteen

Write a suitable Acknowledgments section for one of your pieces of work. If necessary, invent some forms of assistance to expand the section.

Titles

Although the title comes first in an RP, it may sometimes be written last. Its final form may be long delayed and much thought about and argued over. Authors know that titles are important, they know that the RP will be known by its title, and they know that a successful title will attract readers while an unsuccessful one will discourage readers.

What then are the requirements for good RP titles? In general, we suggest the following three.

1. The title should indicate the topic of the study.
2. The title should indicate the scope of the study (i.e., neither overstating nor understating its significance).
3. The title should be self-explanatory to readers in the chosen area.

In some cases it may be helpful to also indicate the nature of the study (experiment, case report, survey, etc.), but this is not always required.

Notice that we have so far not mentioned the length of the title. The expected length of RP titles is very much a disciplinary matter. In some areas, such as the life sciences, titles are becoming longer and looking more and more like full sentences. In others, the preferred style is for short titles containing mostly nouns and prepositions.

Finally, at this stage in your career, we advise against "clever," "joke," or "trick" titles. These can be very successful for undergraduates and for senior scholars, but in your case, such titles may simply be interpreted as mistakes. Here is an example of such a title. The author of the paper is Professor Hartley, a well-known professor of psychology who conducted many experiments on what makes English texts easy or difficult to read. In this instance, he has been comparing texts that have "ragged right" at the end of the lines with those that are straight or "justified." Here is the title:

> Unjustified Experiments in Typographical Research and Instructional Design. *(British Journal of Educational Technology* 2 [1973]: 120-31)

In this case, we can assume that Professor Hartley is making a joke. But if you wrote it?

As it happens, we have in this textbook already referred to a fair number of written texts, some written by our students, but most from published sources. Look at the titles of thirteen of them.

Are there any that appeal to you? Why?

1. Global Implications of Patent Law Variation (Suzuki, p. 110)
2. Mapping Dark Matter with Gravitational Lenses (Tyson, p. 117)
3. Blue Whale Population May Be Increasing off California (Boskin, p. 117)
4. Is There a Female Style in Science? (Barinaga, p. 117)
5. Reducing Air Pollution in Urban Areas: The Role of Urban Planners (Iseki, p. 124)
6. ESL Spelling Errors (Tesdell, p. 138)

7. Chinese EFL Students' Learning Strategies for Oral Communication (Huang, p. 142)
8. Rhetorical Patterns in English and Japanese (Kobayashi, p. 146)
9. The Position of Sentence Connectors in Academic English (Feak and Swales, p. 175)
10. High Angle-of-Attack Calculations of the Sub-sonic Vortex Flow in Slender Bodies (Almosino, p. 178)
11. Children's Punctuation: An Analysis of Errors in Period Placement (Cordeiro, p. 174)
12. On the Use of the Passive in Two Astrophysics Journal Papers (Tarone et al., p. 161)
13. Arguing for Experimental "Facts" in Science: A Study of Research Article Results Sections in Biochemistry (Thompson, p. 157)

Task Nineteen

Complete the analysis of these titles in table 23. Can you determine the system of capitalization that has been used in these titles? Is it the same as in your field? (Changes in capitalization occur in the reference list; see the notes at the beginning of our references on p. 247.)

You may have noticed that titles do not always follow the standard rules for using articles in English. Look again at titles 1 and 3. Are the articles sometimes omitted in your field?

As it happens, only two of the 13 titles use qualifications: Boskin (3) uses *may* and Tarone et al. (12) use *on.* What differences do you see between the following pairs of titles?

1a. On the Use of the Passive in Journal Articles
1b. The Use of the Passive in Journal Articles

2a. A Study of Research Article Results Sections
2b. A Preliminary Study of Research Article Results Sections

3a. An Analysis of Errors in Period Placement
3b. Toward an Analysis of Errors in Period Placement

TABLE 23. RP Title Analysis

Title	Number of words	Any verbs	Punctuation	Field
1	6	no	none	law
2		mapping		
3				
4				
5				
6				
7				
8				discourse analysis
9				
10				
11				
12				
13				

4a The Role of Urban Planners
4b The Potential Role of Urban Planners
4c A Possible Role for Urban Planners

Depending on your field, you may wish to consider using qualifications in your titles. In nearly all cases, the process of arriving at the final form of a title is one of narrowing it down and making it more specific. Qualifications can be helpful in this process.

Table 23 in Task Nineteen reveals that three of the 13 titles use a colon.

5. Reducing Air Pollution in Urban Areas: The Role of Urban Planners
11. Children's Punctuation: An Analysis of Errors in Period Placement
13. Arguing for Experimental "Facts" in Science: A Study of Research Article Results Sections in Biochemistry

Colons are widely used in titles, e.g., in the title of this book. One of the colon's typical functions is to separate ideas in such combinations as the following:

Before the Colon: After the Colon

Problem: Solution
General: Specific
Topic: Method
Major: Minor

Maybe you can **think of others.**

Task Twenty

Expand the following titles by adding a secondary element after the colon. Check back through the text where necessary (The page numbers are given in the list on pp. 206-7.)

1. Global Implications of Patent Law Variation:

6. ESL Spelling Errors:

7. Chinese EFL Students' Learning Strategies **for Oral** Communication:

8. Rhetorical Patterns in English and Japanese:

9. The Position of Sentence Connectors in Academic English:

Task Twenty-one

Bring **the** title of **one** of your papers to **class and be prepared** to discuss **its final form and** how it got there.

Abstracts

In this final section, we will work on two kinds of abstracts. First, we will work on abstracts to be placed at the beginning of an RP. In most situations, these will be abstracts based on texts that you have already written. Second, we will work on the conference abstract. In this case, you may or may not have a text to work from.

There is a third kind of abstract—the kind that occurs in an abstracting journal. Such abstracts often use special conventions and are typically written by professional abstractors. They will not concern us.

Research Paper Abstracts

RP abstracts usually consist of a single paragraph containing from about four to ten full sentences. This kind of abstract is more important for the reader than for the writer. By this we mean that an unsatisfactory RP abstract is not likely to affect whether the paper is finally accepted for publication (although the editors may suggest changes to it). It may, however, affect how many people will read your paper. We know from many studies that readers of academic journals employ a vast amount of skimming and scanning. If they like your abstract, they may read your paper, or at least part of it. If the do not like it, they may not.

There are two main approaches to writing RP abstracts. One we shall call the "results-driven" abstract, because it concentrates **on**

the research findings and what might be concluded from them. The other approach is to offer an "RP summary" abstract in which you provide one- or two-sentence synopses of each of the four sections. In both cases, the abstracts will be either *informative* or *indicative* (see 81). Most RP abstracts should aim to be informative (i.e., they should include the main findings). However, this may not be possible with very long papers or with very theoretical ones (as in mathematics).

Task Twenty-two

Read the two drafts of the abstracts **for our mini-RP. Then answer** the questions that follow.

Version A

A count of sentence connectors in 12 academic papers produced 70 different connectors. These varied in frequency from 62 tokens *(however)* to single occurrences. Seventy-five percent of the 467 examples appeared in sentence-initial position. However, individual connectors varied considerably in position preference. Some (e.g., *in addition)* always occurred initially; in other cases (e.g., *for example, therefore),* they were placed after the subject more than 50% of the time. These findings suggest that a search for general rules for connector position may not be fruitful.

Version B

Although sentence connectors are a well-recognized feature of academic writing, little research has been undertaken on their positioning. In this study, we analyze the position of 467 connectors found in a sample of 12 research papers. Seventy-five percent of the connectors occurred at the beginning of sentences. However, individual connectors varied greatly in positional preference. Some, such as *in addition,* only occurred initially; others, such as *therefore,* occurred initially in only 40% of the cases. These preliminary findings suggest that general rules for connector position will prove elusive.

1. The journal requirements state that the abstracts accompanying papers should not exceed 100 words. Do versions *A* and *B* qualify?

2. Which version is "results driven" and which is an "RP summary"?

3. Compare the tense usage in versions A and B.

4. Which version do you prefer? And why?

5. Some journals also ask for a list of *key words.* Choose three or four suitable key words.

Language Focus: Linguistic Features of Abstracts

On the basis of her research into abstracts from a wide range of fields, Naomi Graetz (1985) gives these linguistic specifications as characteristic of abstracts:

1. the use of full sentences
2. the use of the past tense
3. the use of impersonal passive
4. the absence of negatives
5. the avoidance of "abbreviation, jargon, symbols and other language shortcuts that might lead to confusion."

Despite Graetz's second conclusion (abstracts use the past tense), it seems clear that tense usage in abstracts is fairly complicated. First, the conclusions are nearly always in the present. Second, RP summary abstracts often use the present or present perfect for their opening statements. Third, there appears to be considerable disciplinary and individual tense variation with sentences dealing with results.

In the versions in Task Twenty-two, the results were all expressed through the past tense. Nevertheless, it is not difficult to find exceptions to this pattern. Here is a short abstract from the Rapid Communications section of the journal *Physical Review A* (1993).

Nuclear-Structure Correction to the Lamb Shift
K. Pachucki, D. Leibfried, and T. W. Hansch

[1]In this paper the second-order nuclear-structure correction to the energy of hydrogen-like systems is estimated and previous results are corrected. [2]Both deuterium and hydrogen are considered. [3]In the case of deuterium the correction is proportional to the nuclear polarizability and amounts to about -19kHz for the $1S$ state. [4]For hydrogen the resulting energy shift is about -60Hz.

Our investigations suggest that the shift to the present tense is more likely to occur in physical sciences such as physics, chemistry, and astrophysics and less likely to occur in the social sciences. We also found that physicists and chemists were—perhaps surprisingly—more likely to adopt a personal stance. Indeed, we have found occasional abstracts, particularly in astrophysics, which contain sequences of sentence openings like the following:

We discuss . . .
We compute . . .
We show . . .
We argue . . .
We conclude . . .

It would therefore seem that choice of tense and person may again be partly a strategic matter in abstracts. Choosing the present tense option—if permitted—can produce an effect of liveliness and contemporary relevance. Choosing *we* can add pace, by making the abstract a little shorter.

Task Twenty-three

Analyze five abstracts from a central journal in your field in terms of the five characteristics proposed by Graetz. To what extent do your findings agree with hers? Be prepared to summarize your findings in class, perhaps in the form of a table.

Conference Abstracts

This second type of abstract is somewhat diflFerent from the RP abstract. It is usually much longer; most of a page rather than a single paragraph (and can be even longer, especially in engineering). It is independent; in other words, whether you are accepted for the conference program depends entirely on how your conference abstract is perceived by the review panel. Your primary audience is, therefore, the conference reviewing committee. Appealing to the conference participants is a secondary consideration. At the beginning of this section, we mentioned another difference: it is very possible that you do not yet have a text to construct your abstract out of. Finally, it is also possible that you have not yet completed all the work for your RP. For example, you might have three experiments planned, but as the deadline descends on you, you have results from only two of them. In effect, your abstract may not be entirely *informative.*

In consequence of these and other factors, conference abstracts are much more of "a selling job" than RP abstracts. As a result, most conference abstracts have an opening section that attempts to

- create a research space,
- impress the review committee, and
- appeal (if accepted) to as large an **audience** as **possible.**

Task Twenty-four

Here are two successful conference abstracts written by two of our students. The versions presented are at least third drafts. The first is from music theory and the second from business management. Read them and carry out the tasks that follow.

Rhythm, Meter, and the Notated Meter in Webern's Variations for Piano, Op. 27

[1]One of the problematic issues in post-tonal music is the notion of rhythm and meter. [2]In the numerous analyses of Webern's Variations for Piano, Op. 27, analysts have failed to agree about the role of the notated meter in the rhythmic and metrical structure of the piece. [3]Some claim the notated meter to be purely conventional and not to be observed in performance, while others give an alternative changing meter to the one notated. [4]This paper seeks to illustrate that the notion of rhythm and meter in Webern's Op. 27 is a delicate and, more significantly, an intentional interplay between the notated meter, and the rhythm and meter arising from the phrase structure of the piece. [5]In order to demonstrate this, the paper presents an analysis examining the phrase structure of the piece, seeing it as an interaction between the pitch and the rhythmic domain. [6]The analysis employs the concept of Generalized Musical Intervals (GIS) developed by Lewin, as well as applications of the traditional notion of phrase rhythm. [7]These features are then presented in interaction with the row structure of the piece. [8]The paper closes by suggesting that an essential feature in understanding rhythm and meter in Webern's Op. 27 is the interaction between the various layers of the music: that is, the underlying row structure, the surface interpretation of the row structure, the phrase rhythm, the meter, and the notated meter.

(Tiina Koivisto, very minor editing)

Speed and Innovation in Cross-functional Teams

[1]The competitive and uncertain business environment of the 1990s requires an accelerated product development process with greatly improved coordination and integration among cross-functional teams (Denison, Kahn and Hart 1991). [2]Their successful product development effort suggests that speed and variety in perspective and expertise are compatible. [3]Although product development using cross-functional teams has been drawing much attention from academics as well as the corporate world, research into its organization and processes is still underdeveloped. [4]This deficiency is significant because the traditional literature on decision making has assumed that speed and variety are, in reality, incompatible. [5]This paper elaborates the process of cross-functional team efforts, based on interviews and observations °ver a two-year period. [6]A model is developed and operationalized with 22 survey measures and tested with data from 183 individuals on 29 teams. [7]Results show that product development using

cross-functional teams is highly correlated with time compression, creativity, capability improvement, and overall effectiveness.

(Kaz Ichijo, very minor editing)

1. Underline all instances in the two texts where the authors use evaluative language to strengthen their case for the acceptability of their research.

2. Circle all instances of metadiscourse (i.e., when the authors talk about their own texts). What difference do you see between the two authors?

3. Where are the divisions between the "scene setting" and the actual studies in these two texts? Do the proportions of each surprise you?

4. Why do you think the two abstracts were accepted? Were the reasons similar in each case?

5. Where do you suppose the students were in their studies when they wrote their conference abstracts? Circle your guess.
   In Tiina's case:

   a. All the work had been completed.
   b. All but part of the analysis of the row structure had been done.
   c. She had studied GIS, but had only tried it out on small samples.

   In Kaz's case:

   a. Almost everything had been done.
   b. All the data had been collected and analyzed, but the model was not yet developed.
   c. The data had been collected, but only analyzed in a preliminary way in order to get a sense of where it was going.

Citations in Conference Abstracts

In many cases, a conference abstract is read and assessed fairly quickly—maybe in only a few minutes. Under these conditions it does no harm to try to indicate at the beginning that you understand what is going on in your own specialized area. For that reason, many conference abstracts contain one or two carefully selected references to recent literature. In this way, authors can communicate that they are in touch with the latest developments. However, as Tiina's abstract shows, it is not always necessary or even desirable to give the citations in full.

Task Twenty-five

Your advisor contacts you about an upcoming small regional conference and suggests that you submit a conference abstract based on your current work. The deadline is ten days away. The abstracts should be anonymous and between 150 and 200 words. Make sure you have a draft ready for your next writing class.