

GUIDANCE FOR ENGLISH AS A SECOND LANGUAGE AUTHORS AND THEIR COAUTHORS

Given the challenges that face scientists in communicating their work effectively in their native language, authors who make the attempt in a second (or third or fourth) language must surmount even greater obstacles. This chapter addresses the concerns of nonnative English speakers: common pitfalls to avoid, steps toward improving language skills, and advice from nonnative English speakers. Furthermore, this chapter offers guidance for native English speakers when working with nonnative English-speaking colleagues.

Until thirty years ago or so, most scientists receiving Ph.D.s in the United States had to demonstrate proficiency in a foreign language before graduating. To keep abreast of important advances being published in other countries and in other languages, scientists needed to read somewhat proficiently in one or more foreign languages. Some well-known atmospheric scientists were fluent in many of the classical languages of science, even if not their native tongue. Tor Bergeron spoke seven languages fluently and knew some of three others. Over time, however, English has become the dominant international language of science. And when scientists adopt English, they also adopt a way of looking at the world.

Inherent in every language is a way of thinking, but all authors—whether or not native English speakers—must demonstrate their skill in perceiving and performing science in a manner that is respected within English-speaking cultures. Although a journal may reject a manuscript for significant weaknesses in writing alone, such flaws do not solely explain the lower acceptance rate for manuscripts authored by English as a second language (ESL) scientists. My experience as an editor suggests that reviewers who recommend rejection place greater emphasis on scientific errors than the mechanics of grammar.

Thus, the difficulty for ESL authors in gaining acceptance for their work goes beyond their use of the language. By being aware of these cultural differences, ESL authors can ensure greater success as a scientist.

16.1 CULTURAL DIFFERENCES REQUIRE DIRECT COMMUNICATION

English-speaking countries (e.g., Australia, Canada, England, United States) tend to be composed of people from diverse cultural and ethnic backgrounds, more so than other countries that have a more homogenous culture (e.g., China, France, Japan, Russia). This diversity means that value and belief systems vary more among members of English-speaking societies than among other countries. As a consequence, Americans, for example, have to be more explicit and direct with each other to communicate more effectively. Such a culture is referred to as a *low-context culture*.

In contrast, other countries that are more homogenous ethnically and culturally share strong common bonds among their members (a *high-context culture*). Hence, a greater part of communication between individuals in this type of society can be implicit because a common set of values and beliefs more likely underscores communication. For example, relative to English standards, French writing may appear sophisticated, Italian writing may appear flowery, Mexican writing may appear emotional, Hindi writing may digress, and Japanese writing may be imaginative and beautiful. In the context of scientific writing in English, such styles may not seem appropriate to other readers, particularly native English-speaking authors whose culture requires a more explicit approach.

Communication in science has evolved to be more explicit, partly because of the dominance of English. But because science is done by research groups all over the world, each with a different culture (or cultures), communication must be explicit and direct. As I have emphasized throughout this book, a scientist's job is to communicate so that the reader can understand, and an explicit approach most likely ensures being understood. Knowing that effective communication in science goes beyond vocabulary and grammar and incorporates this cultural context is an important step to becoming a better communicator, regardless of whether you are a native English speaker or not.

Other differences in culture may also be relevant to the last chapter's discussion of proper scientific conduct. In some cultures, memorization and imitation are acceptable ways of communicating others' results, but, in science, the preferred way is through paraphrasing and direct quotations. Duplicating others' science without attribution, either their work or their words, is unethical (Section 15.2).

16.2 COMMON WEAKNESSES IN MANUSCRIPTS WRITTEN BY ESL AUTHORS

I assembled a list of common weaknesses often found in manuscripts by ESL authors (Table 16.1). Although these problems are certainly not unique to ESL authors, the frequency with which they appear in manuscripts authored by ESL scientists suggests some validity to this list. You may recognize some of the items from this list in comments on your manuscripts from reviewers and coauthors.

The first group of weaknesses in Table 16.1 relates to the formulation of the research question. Manuscripts consisting merely of descriptions of case studies or model simulations are especially prone to this problem. New scientific results may be limited, and any unique aspects of the research are omitted or barely mentioned. Many times these manuscripts apply previously published methods to new areas, which may be a worthy contribution, but the author fails to describe the uniqueness and importance of the study. Whether warranted or not, manuscripts with these weaknesses often get rejected for publication.

The second group in Table 16.1 is closely related to the first group because authors may not be fully aware of the previous literature. Understandably, authors who have not written much in English are less likely to have read much in English. Nevertheless, as argued in Section 4.7, knowing the literature is an essential part of being a scientist. When the author does not display knowledge of the literature, reviewers question whether the research is sufficiently innovative to be published. If the author has a good grasp of the depth and breadth of the previous literature on a topic and what the current challenges are, and focuses research toward unresolved topics, the author can make a contribution to the science and receive a greater recognition by others, even if the mechanics of the language are not perfect.

A further manifestation of failing to adequately explain the purpose of the research is seen in the third group of Table 16.1. ESL authors often do not describe their data, methods, results, and reasoning in sufficient detail for readers to understand the study. These concerns are often independent of the quality of the science, but readers may interpret such omissions as the authors not understanding what they were doing or why they were doing it. Remember that to communicate in a low-context culture, you must be more explicit than you may think is necessary.

Finally, the last two groups in Table 16.1 relate to the ability to communicate effectively. Transition between thoughts helps the reader maintain focus while reading, especially within paragraphs. Help on topics more related to grammar can be found online as well as in many textbooks for the English language. Web searches often can be useful to identify correct sentence or

Table 16.1 Common weaknesses often found in manuscripts by ESL (and native English-speaking) authors, and chapters in this book that address these issues (in parentheses)

1. Formulation of research (Chapter 2)
 - ▶ Purpose of research is not clearly stated.
 - ▶ Uniqueness or utility of research is not clearly stated.
 - ▶ Research contains little, if any, new scientific results.
 2. Relevance to previous work (Chapters 2, 4, and 12)
 - ▶ Author fails to understand the relevant scientific issues of the present day.
 - ▶ Previous literature section is cursory, incomplete, outdated, or lacks synthesis.
 - ▶ Author fails to compare new results with previous research results.
 3. Writing and presenting the science (Chapters 4–7, 11, and 18)
 - ▶ Data and methods are not described in enough detail or with sufficient clarity.
 - ▶ Reasons for doing experiments are not explained.
 - ▶ Descriptions of thought processes are not transparent enough.
 - ▶ Equations alone do not convey the underlying theory and physical interpretation.
 - ▶ Results are presented with too much confidence (e.g., “models and data agree perfectly”) or with too little explanation.
 - ▶ Results are overinterpreted to a level not warranted by the data.
 - ▶ Results are not critically considered.
 - ▶ Limitations of the data are not discussed.
 - ▶ The text contains inconsistencies, often involving the figures.
 4. Organization and flow (Chapters 8–9 and 13)
 - ▶ Transition is lacking between paragraphs and sentences.
 - ▶ Sentences lack a good rhythm, and are choppy, too short, or too long.
 5. Language and style (Chapter 10 and Appendices A and B)
 - ▶ The style of the journal is not followed.
 - ▶ Phrases and words are used incorrectly.
 - ▶ Articles are improperly used or missing (*a*, *an*, and *the*).
 - ▶ Verb tense is incorrect or inconsistent (Section 9.3).
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Rewrite frequently. Ask someone to check your writing. Do not be afraid of iterating on the same writing over and over again. I always find I can improve both grammatically and scientifically after each iteration. —Fuqing Zhang, Pennsylvania State University

word structures. Commonly used phrases will have more hits, and the context of the phrasings will provide some guidance into proper usage. Not all Web sites use proper English, so be cautious; prefer reputable sites and high-quality scientific journals as your models in style.

ASK THE EXPERTS

ADVICE FROM AN ESL SCIENTIST

Zhiyong Meng, *Research Professor, Peking University*

To achieve high-quality scientific writing in English, it is important to do well in four aspects: 1) Be clear about the main point of the manuscript. 2) Organize reasonable and persuasive evidence in an easy-to-follow way. 3) Be logical and self-consistent. 4) Use correct and commonly used English expressions. The first three aspects are more in the realm of scientific research and critical thinking, so I will focus on the fourth. In my opinion, there are several ways to improve scientific writing in English.

First, read well-written journal articles by native English speakers, make notes of useful expressions, and review them from time to time. I have a document of useful expressions in different categories such as transitions, figure descriptions, numbers, equations, comparisons, and conclusions. Writing new text becomes much easier by having a word bank to look up useful expressions.

Second, use that word bank frequently through small writing projects such as summarizing after

reading an article, writing weekly work notes, and communicating with peers in formal English. After drafting a piece of work, careful and multiple revisions can improve the quality by examining if a statement can be expressed in a better way or with fewer words by checking the word bank or previous literature.

Third, learn from mistakes. Ask someone else, especially a native English speaker, to review your writing. Remember your weaknesses, and avoid them in the future. The biggest difficulties I had in writing were using articles (*a*, *an*, and *the*) and overusing the same words and phrases. A native English speaker can express an idea using only one short sentence whereas I have to pile on several sentences or even a paragraph. I learned a lot from the tracked changes or handwritten comments made to my documents by my advisor and my colleagues when they reviewed my writing. Insist upon these from your coauthors.

All in all, no easy way exists to improve scientific writing. Besides the above three tips, persistence is important. It is not realistic to become a good English writer overnight. In my experience, the best way to improve scientific writing in English is to read the literature, practice your writing, and learn from mistakes. In time, you may find writing in English is not that hard any more.

16.3 USING THE LITERATURE AS YOUR WRITING COACH

You can teach someone the skills to be a world-class diver: the mechanics, the right twists and turns, the spring off the board. If you show her the moves through example, then let her try it, she will start to learn. But doing so requires hours in the pool and on the diving platform with the coach. Ultimately, after having mastered those skills, she can develop her own style and push the limits of diving.

Being a better scientific writer is the same. You can read this book and learn the mechanics of how to assemble the manuscript, what to say, and how to say it. You can study grammar and be near-perfect. To make the most rapid progress, however, you need the right skills in hand, excellent examples of how

CAREER-SPANNING ADVICE FOR ESL AUTHORS

- ▶ Do a daily writing exercise (Section 16.3).
- ▶ Maintain a word and phrase bank.
- ▶ Maintain an article file, and read the articles frequently.
- ▶ Read scientific articles.
 - Read with a critical eye.
 - Improve your language skills.
 - Expand your knowledge.
- ▶ Research questions about proper usage in scientific articles or via a Web browser.
- ▶ Maintain a list of your personal writing weaknesses, and refer to them often.
- ▶ Find a native English-speaking colleague to serve as mentor, editor, or coauthor.
- ▶ Read Chapter 31 on how to improve your skills.

it is done, and support from colleagues to help you learn. Most of all, you need practice. And this practice best occurs before writing even starts.

Like the diver tries to imitate her coach, and then develops her own style later, imitating your role models is the route for you to develop your own style. One of the best ways to improve is to learn from good examples by reading the literature. Consider the practice part of your training not only as a scientist, but also as a student of the English language. Reading good examples of literature closely related to your research allows you to develop a sense of the terminology of the discipline, how it is used, and the grammar to say it properly. An approach recommended by Montgomery (2003, pp. 163–165) is to identify 15–25 recent articles in your discipline. The articles need not be written by well-known or highly cited researchers, but they should be written in a style you admire, are easy to understand, and are well organized. Get recommendations from your supervisors and colleagues about the best articles to select.

Once you have a hardcopy file of these articles, read and reread them regularly. Appreciate how the author laid out the problem for the audience in the introduction, explaining the purpose of the research and the methods in detail. Admire how the author develops the literature synthesis, not just as a list of accomplishments, but as an integrated, critical review of past work. Identify especially striking passages that you want to emulate.

As you continue to read, listen to the words in your head, or even read them aloud. Feel the flow of the words and how the author uses the language to express the science. Copy a few paragraphs by hand to see how the sentences are constructed and how they flow from one to the other. Study the writing style of the author. What words does the author choose that resonate with you? What sentences does the author use that communicate clearly to you in as few words as possible?

As you get more comfortable with the language, add sentences of your own into the author's text, trying to emulate the style. The sentences can be made up or derived from your own research. After writing and editing to your satisfaction, get a native English-speaking colleague to look at your exercises for any additional assistance.

If the writing of your manuscript stalls, reread the articles for inspiration and ideas. Saving your own writing exercises in a notebook and referring to them may also give you ideas. Do this exercise regularly, once per day or so. Being a better writer of scientific English will happen if you expose yourself a little every day. Repetition is crucial.

16.4 TRANSLATING YOUR NATIVE LANGUAGE OR WRITING IN ENGLISH?

After having rehearsed your writing skills, the time has come for you to begin writing (Chapters 5–7). One common question asked by ESL authors is whether they should write their documents in their native language first and then translate them into English for formal publication.

If you are an ESL author who is comfortable thinking in English or have been in an English-speaking environment for years, write your manuscript in English. If you do not know how to say some word, phrase, or sentence, write it in your native language and then ask for help from others later. This approach allows you to continue working on the manuscript without getting stalled by the language.

ESL authors who are not as comfortable with English should work toward that goal but write in the language that best facilitates delivering the content. If needed, the document can be translated into English. Because enough differences exist between languages, translating a document from a foreign language directly into scientific English is generally not straightforward. Direct translations of documents from foreign languages cannot reproduce the structure of the sentences in English, or even perhaps the order inside a paragraph. Scientific words may not have an equivalent in the foreign language. Therefore, translations, unless done by someone knowledgeable in the language, and possibly even the science, can be quite time consuming. Rather than translate a document directly, working with an editor or coauthor with more English experience can be a more productive way to write your manuscript.

Ultimately, the more practice you have using and thinking directly in English, the more quickly you will become fluent in scientific English. Although writing a single paper in English directly may take longer and be more frustrating, writing two papers (one in your native language and one in English) will almost certainly take a longer time.

16.5 SEEKING HELP

Despite ESL authors knowing their weaknesses and wanting to improve, opportunities to seek and obtain help are often unavailable at their institutions. Some native English speakers think that working with ESL authors requires too much time, especially for postdoctoral fellows who may be around for only a year or two. Volunteer peer reviewers and editors at journals are increasingly rejecting papers that do not meet guidelines for clear writing without attempting to glean kernels of scientific truth from them. The increase in such submissions to journals may have created a bias against ESL authors in the peer-review process.

These challenges are especially difficult for early career scientists. Pagel et al. (2002, p. 114) summarized their survey of faculty and postdoctoral fellows at an academic medical center on the topic of scientific writing challenges for ESL authors as follows:

We are led to the conclusion that ESL scientists have been dealt a Faustian bargain. At the time the bargain is made, the senior faculty know they want smart, hard workers that they do not have to spend too much time with, and the ESL fellows and junior faculty want an opportunity to study and work in the United States. The Faustian nature of the bargain goes unrecognized until the ESL fellow or junior faculty member learns that the growth and recognition that come from writing are not part of the bargain.

Thus, ESL authors must be even more proactive than native English speakers in developing these essential skills for career advancement. Before selecting a graduate school program or new job, find a supportive environment that has produced productive and respected ESL scientists in the past. Discuss with your potential supervisor or professor what your expectations are about being mentored in scientific communication skills. Search out Web sites and

A CHECKLIST FOR ESL AUTHORS BEFORE MANUSCRIPT SUBMISSION

- ☐ Enlist colleagues' help early in the writing and research process.
- ☐ Double-check the items in Table 16.1.
- ☐ Check your list of weaknesses for their occurrences in the manuscript.
- ☐ Run spell and grammar checkers on the manuscript.
- ☐ Visit the university writing center for help.
- ☐ Have the manuscript proofread by a native English speaker.
- ☐ Enlist a professional editing service, if needed.

other learning opportunities to improve your skills. Universities often have free writing centers that can help any writer, not only ESL authors.

Having supportive colleagues (including peers and fellow students) is important to having a successful and satisfying career, even beyond writing. Identify people, especially native English speakers, who can help you, and take the time to do so. Collaborating with them helps gain their confidence and support. Ask them for advice on your writing and presentations. Get their input on your writing *early*, and do not take advantage of them by expecting them to fix all your grammatical errors throughout the entire manuscript unless they are happy to do so. Instead, ask for general advice about the science throughout the manuscript, and specific questions about the grammar, even if only on one or two sections of the paper. Take their suggestions and rework the rest of the manuscript based on their advice.

Furthermore, do not be surprised if native speakers have difficulty helping you with grammar issues. Native speakers of any language learn what is right and wrong at an early age, but often cannot explain the rules of grammar to others as adults because they just know “what sounds right.” Sometimes ESL authors have problems in knowing whether native English-speaking colleagues’ recommendations are based on an authentic need for changes to produce clarity or merely on differences in personal writing style. Receive clarification on their comments, if they have not explained them specifically to you.

16.6 COLLABORATING AND COAUTHORING WITH ESL AUTHORS

In my experiences working with ESL authors, most want help with the microscale aspects of the manuscript (i.e., groups 4–5 in Table 16.1), often not considering the larger scales first (i.e., groups 1–3). If you are a native English speaker working with an ESL author, clearly distinguish the revisions the author thinks are necessary (microscale in Fig. 7.1) with those that would best serve the paper (synoptic scale). Do not deny the author the discussion of microscale aspects that he or she is seeking, but redirect the emphasis saying that improving the large-scale aspects of the paper needs to be done first to better serve the grammar. Then, later sessions can focus on improving the microscale aspects of the paper.

Use a specific paragraph to relate the small-scale issues to the larger-scale purpose of the paper. Then, go down the writing/editing funnel to the sentence level and word level. If transition is a problem, ask how paragraphs are designed to link together. Work through only part of the manuscript, allowing the author to learn from your comments, make these revisions, then apply your comments to the rest of the text.

Grammar is the zero law of the communication process: necessary but very far from sufficient. —Scott L. Montgomery (2003, p. 22)

ASK THE EXPERTS

PROFESSIONAL MANUSCRIPT EDITING SERVICES

Mary Golden, Chief Editorial Assistant, Monthly Weather Review, American Meteorological Society; Technical Editor; and ESL Coach

When writing a manuscript, you will reach a point at which you have made the science and the writing as strong as you can. Even native English speakers rely on others to help them improve their writing—it is quite difficult to proofread one's own work. The better the manuscript is that you submit for publication, the more likely you will succeed. Although a journal's editors will contribute their expertise, do not submit a “draft”—send your best effort.

Begin by sharing your finished manuscript with your coauthors and carefully consider their suggestions. Whether your institution requires you to run it by native English-speaking colleagues or not, doing so may help you improve it. Nevertheless, due to other time commitments, they may not give you recommendations detailed enough that, if followed, will make your paper concise, your presentation engaging, and your conclusions persuasive. (Part of the problem is that they may be poor writers themselves!)

But what if you do not have access to or receive adequate assistance from such colleagues? First, check with your institution to see if it can provide you with the services of a professional editor on staff or on contract. If not, you may need to hire a technical editor yourself and pay for it from your grant, research group resources, or your personal funds. (It is a good idea to always include a line item for technical editing services in your grant applications.) People in

many fields invest in their careers by routinely hiring professional editors because they know that their reputations depend upon good writing. Selecting a skilled editor who is knowledgeable in your field can improve your chances of receiving favorable reviews and publishing your research quickly.

Where do you find such an editor? To accommodate the growing number of ESL authors who wish to publish their scientific studies in English-language journals and need help in reducing grammatical errors and writing clearly in a second language, a number of Internet-based companies and freelance editors provide professional manuscript-editing services to scientific authors. Many of these freelancers also work for scientific journals, and some contract employees of editing companies are graduate students in the sciences.

How do you choose the company or editor who is right for you? The first thing to do is to ask your colleagues for referrals to professional editors they have worked with and trust. Some publishers, such as the AMS, list the contact information for editing services on their Web sites, though they do not endorse any particular one. By viewing the Web sites of several professional editors, you can compare their qualifications and develop a list of questions tailored to your particular paper. Before entering into a contract with a company or an individual, get satisfactory answers to the following questions:

1. How much experience does your editor have working with scientific manuscripts? With atmospheric science manuscripts (or manuscripts in your field)? How many and what percentage of the papers edited were published, and where and when? Are before-and-after samples of work edited by that particular editor available for you to examine? Is contact

In addition, you may need to lower the author's expectations by treating this first session as just one step toward producing a revised manuscript—many authors expect a perfect draft to be the end result of just one meeting. You know that writing takes time and many revisions. Impress this upon them.

information available so you can check references? What percentage of clients constitutes repeat business? If the service will be provided by a company, is that company registered with an organization to verify that it follows good business practices and complies with all applicable laws? What will be the legal relationship between you and the editor? Is a copy of the editing contract available for you to review and revise before work begins?

2. How will you work together? Will you have the option of choosing a light edit (basically, proofreading punctuation, spelling, and grammar) or a heavy edit (correcting sentence structure, transitions, and flow)? Will the editor query you if it appears that a suggested change might affect the meaning of a sentence or section? Will the editor not only make changes but add explanatory notes that tell you why? Will the editor identify patterns of errors to aid you in overcoming them? Will you be able to discuss your paper with your editor on the telephone or will everything be handled via e-mail only? Where will the work be done? How will it be transmitted between you and the editor? How quickly will you receive your edited paper? What happens if the editor fails to meet your deadline? What recourse do you have if you are not happy with the work? How will any dispute be resolved?

3. If the service will be provided by a company, what is the name of the specific editor who will edit your manuscript and what are that individual's qualifications? Will the editor communicate directly with you or only through the company? Will you have the same editor throughout the editing process? Is the editor a native English speaker? Depending upon the complexities of your manuscript and the types of errors you tend to make in your writing, you may want an editor with a Ph.D. in science or an editor whose

strength is primarily in writing. Not all editors need to have a Ph.D. or be credentialed grammarians to be effective, but they should have a sense of what is good science and excellent writing. Some graduate students may not be adept as editors, even if they attend the best universities; others may be quite thorough. Ask for a free sample edit of a page or so from your manuscript to help you see what to expect and how well you and the editor may work together as a team.

4. Will the editor or company guarantee the confidentiality of your manuscript? What safeguards exist?

5. What is the fee, how is it paid, and are there any additional bank fees? What services will you get? Some companies or individuals may quote a price that is only a fraction of what other editors propose; however, neither a high price nor a low price is any guarantee of quality. For instance, does the fee cover all work from submission of the original paper to final decision by the journal? Or does it cover only one edit? Will you have the opportunity to review the proposed changes to the original submission and send it back for another pass by the editor before you submit it? If the journal requests a revision, will another fee be required for editing it? Does the fee include editing your responses to reviewers? Will you receive a money-back guarantee of 100% satisfaction? How will that be determined?

Technical editing services can do quite a bit to help your manuscript. Although no ethical editors will ever promise that your paper will be accepted by a journal, some will stay with you throughout the peer-review process. If you choose wisely, your editor can become an essential member of your team for future publications. If your affiliation or research grant will pay for it, so much the better.

For native English speakers who may be asked to serve as coauthors of manuscripts written by ESL scientists, recall from Chapter 14 that if your name is listed, you are responsible for contributing to the success of that paper, even if it means fixing the grammar yourself. If you do not have the time to

put into the manuscript, or do not want to do so, remove yourself from the author list.

Finally, I close this section with this thought. If every native English-speaking author identified one promising ESL author to mentor and worked closely with him or her on improving communication skills, international science would benefit. The number of international collaborations would increase, cultures would be exchanged, and the quality of the science would improve.