PART I

Kinds of Articles

CHAPTER 1

Writing an Empirical Article

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You have conducted a study and analyzed the data. Now it is time to write. To publish. To tell the world what you have learned. The purpose of this book is to enhance the chances that some journal editor will let you do so.

If you are new to this enterprise, you might find it helpful to consult two additional sources of information. For detailed information on the proper format of a journal article, see the *Publication manual of the American Psychological Association* (2010) and recent articles in the particular journal to which you plan to submit your manuscript. The *Publication manual* also discusses two topics not covered in this chapter: the rules of English grammar and the appropriate terms to use when referring to gender, ethnicity, or sexual orientation. For renewing your acquaintance with the stylistic elements of English prose, you can read chapter 2 of the *Publication manual* or any one of several style manuals. I recommend *Elements of style 2017* by Richard De A'Morelli (2017). It is an updated version of the classic *The elements of style* by Strunk and White (5th edn., 2009).

As noted in the Preface, this book focuses on reports of empirical studies, but the general writing suggestions included in this chapter apply as well to the theoretical articles, literature reviews, and methodological contributions that also appear in the professional journals.

Introducing the Problem

Many articles published in psychological journals begin with an open unanswered empirical question (e.g., Do decisions made by a group tend to be more or less risky than decisions the individual group members would have made on their own?) Other articles might present or compare

Some of the material in this chapter has been adapted from Bem (1987, 1995).

explanatory hypotheses about a common observation or a previously reported empirical finding (e.g., Do groups tend to make riskier decisions than individuals because greater risk-taking is a publicly admired value in our culture or because risk-tolerant individuals dominate the group discussions?)

For Whom Should You Write?

Scientific journals are published primarily for specialized audiences who share a common background of substantive knowledge and methodological expertise. If you wish to write well, you should ignore this fact. Psychology encompasses a broader range of subjects and methodologies than do most other disciplines, and its findings are frequently of interest to a wider public. The social psychologist should be able to read an article on logistic regression in *Psychometrika*; the personality theorist, an article on hypothalamic function in *Science*; and the congressional aide with a BA in history, an article on attribution theory in *Journal of Personality and Social Psychology*.

Accordingly, good writing is good teaching. Direct your writing to the student in Psychology 101, your colleague in the Art History Department, and your grandmother. No matter how technical or abstruse your article is in its particulars, intelligent nonpsychologists with no expertise in statistics or experimental design should be able to comprehend the broad outlines of what you did and why. They should understand in general terms what was learned. And above all, they should appreciate why someone – anyone – should give a damn. The introduction and discussion sections in particular should be accessible to this wider audience.

The actual technical materials – those found primarily in the method and results sections – should be aimed at a reader one level of expertise less specialized than the audience for which the journal is primarily published. Assume that the reader of your article knows something about standard statistical techniques for analyzing data, but probably needs some introduction to Bayesian analyses – which are appearing with increasing frequency in the professional psychological literature. Assume that the reader of *Journal of Personality and Social Psychology* knows about cognitive biases in human information processing but needs some specific introduction to the phenomenon of confirmation bias.

Many of the writing techniques suggested in this chapter are thus teaching techniques designed to make your article comprehensible to the

widest possible audience. They are also designed to remain invisible or transparent to your readers, thereby infusing your prose with a "subliminal pedagogy." Good writing is good teaching.

Writing It

The primary criteria for good scientific writing are accuracy and clarity. If your article is interesting and written with style, fine. But these are subsidiary virtues. First strive for accuracy and clarity.

The first step toward clarity is to write simply and directly. A journal article tells a straightforward tale of a circumscribed problem in search of an answer. It is not a novel with subplots and flashbacks but a short story with a single, linear narrative line. Let this line stand out in bold relief. Clear any underbrush that entangles your prose by obeying Strunk and White's (2009) famous dictum, "omit needless words," and by extending the dictum to needless concepts, topics, anecdotes, asides, and footnotes. If a point seems tangential to your basic argument, remove it. If you can't bring yourself to do this, put it in a footnote. Then, when you revise your manuscript, remove the footnote. In short, don't make your voice struggle to be heard above the ambient noise of cluttered writing. Let your 90th percentile verbal aptitude nourish your prose, not glut it. Write simply and directly.

The second step toward clarity is good organization, and the standardized format of a journal article does much of the work for you. It permits readers not only to read the report from beginning to end, as they would any coherent narrative, but also to scan it for a quick overview of the study or to locate specific information easily by turning directly to the relevant section. Within that format, however, it is still helpful to work from an outline of your own. This enables you to examine the logic of the sequence, spot important points that are omitted or misplaced, and decide how best to divide the narrative between the introduction and final discussion.

An article is written in the shape of an hourglass. It begins with broad general statements, progressively narrows down to the specifics of your study, and then broadens out again to more general considerations. Thus:

The introduction begins broadly: "Individuals differ radically from one another in the degree to which they are willing and able to express their emotions."

It becomes more specific: "Indeed, the popular view is that such emotional expressiveness is a central difference between men and women … But the research evidence is mixed …"

And more so: "There is even some evidence that men may actually …"
Until you are ready to introduce your own study in conceptual terms: "In this study, we recorded the emotional reactions of both men and women to filmed scenes of …"
The method and results sections are the most specific, the "neck" of the hourglass:

[Method] "One hundred male and 100 female undergraduates were shown one of two films …"
[Results] "Table 1 shows that men in the father-watching condition cried significantly more …"

The discussion section begins with the implications of your study: "These results imply that sex differences in emotional expressiveness are moderated by two kinds of variables …"
It becomes broader: "Not since Charles Darwin's first observations has psychology contributed as much new …"
And more so: "If emotions can incarcerate us by hiding our complexity, at least their expression can liberate us by displaying our authenticity."

This closing statement might be a bit grandiose for some journals – I'm not even sure what it means – but if your study is carefully executed and conservatively interpreted, most editors will permit you to indulge yourself a bit at the two broad ends of the hourglass. Being dull only appears to be a prerequisite for publishing in the professional journals.

Rewriting It

For many writers revising a manuscript is agony. Even proofreading is painful. And so they don't. So relieved to get a draft done, they send it off to a journal, thinking that they can clean up the writing after the article has been accepted. Alas, that day rarely comes. Some may find solace in the belief that the manuscript probably would have been rejected even if it had been extensively revised and polished; after all, most APA journals accept only 15–20 percent of all manuscripts submitted. But from my own experience as an editor of an APA journal, I believe that the difference between the articles accepted and the top 15–20 percent of those rejected is frequently the difference between good and less good writing. Moral: Don't expect journal reviewers to discern your brilliance through the smog of polluted writing. Revise your manuscript. Polish it. Proofread it. Then submit it.

Rewriting is difficult for several reasons. First, it is difficult to edit your own writing. You will not notice ambiguities and explanatory gaps because you know what you meant to say and you understand the omitted steps. One strategy for overcoming this difficulty is to lay your manuscript aside for a while and then return to it later when it has become less familiar. Sometimes it helps to read it aloud. But there is no substitute for practicing the art of taking the role of the nonspecialist reader, for learning to role-play grandma. As you read, ask yourself, "Have I been told yet what this concept means?" "Has the logic of this step been demonstrated?" "Would I know what the independent variable is at this point?" This is precisely the skill of the good lecturer in Psychology 101: the ability to anticipate the audience's level of understanding at each point in the presentation. Good writing is good teaching.

But because this is not easy, you should probably give a copy of a fairly polished manuscript to a friend or colleague for a critical reading. If you get critiques from several colleagues, you will have simulated the journal's review process. The best readers are those who have themselves had articles published in psychological journals but who are unfamiliar with the subject of your manuscript.

If your colleagues find something unclear, do not argue with them. They are correct: By definition, the writing is unclear. Their suggestions for correcting the unclarities may be wrongheaded; but as unclarity detectors, readers are never wrong. Also resist the temptation simply to clarify their confusion verbally. Your colleagues don't want to offend you or appear stupid, so they will simply mumble "oh yes, of course, of course" and apologize for not having read carefully enough. As a consequence, you are pacified, and your next readers, the journal's reviewers, will stumble over the same problem. But they will not apologize; they will reject.

Rewriting is difficult for a second reason: It requires a high degree of compulsiveness and attention to detail. The probability of writing a sentence perfectly the first time is vanishingly small, and good writers rewrite nearly every sentence of a manuscript in the course of polishing successive drafts. But even good writers differ from one another in their approach to the first draft. Some spend a long time carefully choosing each word and reshaping each sentence and paragraph as they go. Others pound out a rough draft quickly and then go back for extensive revision. Although I personally prefer the former method, I think it wastes time. Most writers should probably get the first draft done as quickly as possible without agonizing over stylistic niceties. Once it is done, however, compulsiveness and attention to detail become the required virtues.

Finally, rewriting is difficult because it usually means restructuring. Sometimes it is necessary to discard whole sections of a manuscript, add new ones, and then totally reorganize the manuscript just to iron out a bump in the logic of the argument. Don't get so attached to your first draft that you are unwilling to tear it apart and rebuild it. (This is why the strategy of crafting each sentence of a first draft wastes time. A beautiful turn of phrase that took me 20 minutes to shape gets discarded when I have to restructure the manuscript. Worse, I get so attached to the phrase that I resist restructuring until I can find a new home for it.) A badly constructed building cannot be salvaged by brightening up the wallpaper. A badly constructed manuscript cannot be salvaged by changing words, inverting sentences, and shuffling paragraphs.

Which brings me to the word processor. Its very virtuosity at making these cosmetic changes will tempt you to tinker endlessly, encouraging you in the illusion that you are restructuring right there in front of the monitor. Do not be fooled. You are not. For most writers, a word processor is not an adequate restructuring tool. Moreover, it can produce flawless, physically beautiful drafts of wretched writing, encouraging you in the illusion that they are finished manuscripts ready to be submitted. Do not be fooled. They are not. If you are blessed with an excellent memory (or a very large monitor) and are confident that you can get away with a purely electronic process of restructuring, do it. But don't be ashamed to print out a complete draft of your manuscript; take pencil, scissors, and Scotch tape in hand; and then, all by your low-tech self, have at it.

If after all this, your manuscript still seems interesting and you still believe the results and interpretation of your study, submit it.

Some Matters of Style

Metacomments

It is often helpful to give readers of an article an early overview of its structure and content. But beyond that, you should avoid making "metacomments" about the writing. Expository prose fails its mission if it diverts the reader's attention to itself and away from the topic; the process of writing should be invisible to the reader. In particular, the prose itself should direct the flow of the narrative without requiring you to play tour guide. Don't say, "Now that the three theories of emotion have been discussed, we can turn to the empirical work on each of them. We begin with the psychoanalytic account of affect …" Instead, move directly from

your discussion of the theories into the review of the evidence with a simple transition sentence such as, "Each of these three theories has been tested empirically. For example, the psychoanalytic account of affect has received support in studies that …" In the results section, don't say: "Now that we have seen the results for negative affect, we are in a position to examine men's and women's emotional expression in the realm of positive affect. The relevant data are presented in Table 2 . . ." Instead use a transition sentence that simultaneously summarizes and moves the story along: "Men may thus be more expressive than women in the domain of negative emotion, but are they also more expressive in the domain of positive emotion? Table 2 shows that they are not …" Any other guideposts needed can be supplied by using informative headings and by following the advice on repetition and parallel construction given in the next section.

If you feel the need to make metacomments to keep the reader on the narrative path, then your plot line is probably already too cluttered or pretzel shaped, the writing insufficiently linear. Metacomments only oppress the prose further. Instead, copyedit. Omit needless words, don't add them.

Repetition and Parallel Construction

Inexperienced writers often substitute synonyms for recurring words and vary their sentence structure in the mistaken belief that this is more creative and interesting. Instead of using repetition and parallel construction, as in "women may be more expressive than men in the domain of positive emotion, but they are not more expressive in the domain of negative emotion," they attempt to be more creative: "Women may be more expressive than men in the domain of positive emotion, but it is not the case that they are more prone than the opposite sex to display the less cheerful affects."

Such creativity is hardly more interesting, but it is certainly more confusing. In scientific communication, it can be deadly. When an author uses different words to refer to the same concept in a technical article – where accuracy is paramount – readers justifiably wonder if different meanings are implied. The example in the preceding paragraph is not disastrous, and most readers will be unaware that their understanding flickered momentarily when the prose hit a bump. But consider the cognitive burden carried by readers who must hack through this "creative" jungle:

> The low-dissonance participants were paid a large sum of money while not being given a free choice of whether or not to participate, whereas the

> individuals we randomly assigned to the small-incentive treatment (the high-dissonance condition) were offered the opportunity to refuse.

This (fictitious) writer should have written,

> Low-dissonance individuals were paid a large sum of money and were required to participate; high-dissonance individuals were paid a small sum of money and were not required to participate.

The wording and grammatical structure of the two clauses are held rigidly parallel, only the variables vary. Repetition and parallel construction are among the most effective servants of clarity. Don't be creative; be clear.

Repetition and parallel construction also serve clarity at a larger level of organization. By providing the reader with distinctive guideposts to the structure of the prose, they can diminish or eliminate the need for metacomments on the writing. Here, for example, are the opening sentences from three of the paragraphs in the previous section on rewriting:

2nd paragraph: "Rewriting is difficult for several reasons. First …"
5th paragraph: "Rewriting is difficult for a second reason:"
6th paragraph: "And finally, rewriting is difficult because it …"

If I had substituted synonyms for the recurring words or varied the grammatical structure of these opening sentences, their guiding function would have been lost, the reader's sense of the section's organization blurred. (I try so hard to be helpful and I bet you didn't even notice. That, of course, is the point: You shouldn't notice!)

And finally, repetition and parallel construction can serve style and creativity as well as clarity. For example, they can establish metaphor: "A badly constructed building cannot be salvaged by brightening up the wallpaper. A badly constructed article cannot be salvaged by changing words, inverting sentences, and shuffling paragraphs." And, they can add humor: "The word processor encourages you in the illusion that you are restructuring. Do not be fooled. You are not. The word processor encourages you in the illusion that your drafts are finished manuscripts. Do not be fooled. They are not."

Jargon and Technical Terms

The specialized terminology of a discipline is called jargon, and it serves a number of legitimate functions in scientific communication.

A specialized term may be more general, more precise, or freer of surplus meaning than any natural language equivalent (e.g., the term *disposition* encompasses, and hence is more general than, beliefs, attitudes, moods, and personality attributes; *reinforcement* is more precise and freer of surplus meaning than *reward*). Also, the technical vocabulary often makes an important conceptual distinction not apprehended in the layperson's lexicon (e.g., genotype versus phenotype).

But if a jargon term does not satisfy any of these criteria, opt for English. Much of our jargon has become second nature to us and serves only to muddy our prose. (As an editor, I once had to interrogate an author at length to learn that a prison program for "strengthening the executive functions of the ego" taught prisoners how to fill out job applications.) And unless the jargon term is extremely well known (e.g., *reinforcement*), it should be defined – explicitly, implicitly, or by context and example – the first time it is introduced.

For example, in an article on ESP, a co-author and I decided that we could not proceed beyond the opening paragraph until we had first explicitly defined and clarified the unfamiliar but central theoretical term:

> The term *psi* denotes anomalous processes of information or energy transfer, processes such as telepathy or other forms of extrasensory perception that are currently unexplained in terms of known physical or biological mechanisms. The term is purely descriptive: It neither implies that such anomalous phenomena are paranormal nor connotes anything about their underlying mechanisms. (Bem & Honorton, 1994, p. 4)

Here is how one might define a technical term (ego control) and identify its conceptual status (a personality variable) more implicitly:

> The need to delay gratification, control impulses, and modulate emotional expression is the earliest and most ubiquitous demand that society places upon the developing child. Because success at so many of life's tasks depends critically on the individual's mastery of such ego control, evidence for life-course continuities in this central personality domain should be readily obtained.

And finally, here is a (made-up) example in which the technical terms are defined only by the context. Note, however, that the technical abbreviation, MAO, is still identified explicitly when it is first introduced.

> In the continuing search for the biological correlates of psychiatric disorder, blood platelets are now a prime target of investigation. In particular, reduced monoamine oxidase (MAO) activity in the platelets is sometimes correlated with paranoid symptomatology, auditory hallucinations or delusions in chronic schizophrenia, and a tendency toward psychopathology in