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Writing the Empirical Journal 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 article is to enhance the chances that some journal editor will let you do so.

If you are new to this enterprise, you may 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* (APA, 2001) and recent articles in the journal to which you plan to submit your manuscript. For renewing your acquaintance with the formal and stylistic elements of English prose, you can read Chapter 2 of the *Publication Manual* or any one of several style manuals. I recommend *The Elements of Style* by Strunk and White (2000). It is brief, witty, and inexpensive.

Because I write, review, and edit primarily for journals in personality and social psychology, I have drawn most of my examples from those areas. Colleagues assure me, however, that the guidelines set forth here are also pertinent for articles in experimental psychology and biopsychology. Similarly, this article focuses on the report of an empirical study, but the general writing suggestions apply as well to the theoretical articles, literature reviews, and methodological contributions that also appear in our journals. (Specific guidance for preparing a literature review article for *Psychological Bulletin* can be found in Bem, 1995.)

Planning It

Which Article Should You Write?

There are two possible articles you can write: (1) the article you planned to write when you designed your study or (2) the article that makes the most sense now that you have seen the results. They are rarely the same, and the correct answer is (2).

The conventional view of the research process is that we first derive a set of hypotheses from a theory, design and conduct a study to test these hypotheses, analyze the data to see if they were confirmed or disconfirmed, and then chronicle this sequence of events in the journal article. If this is how our enterprise actually proceeded, we could write most of the article before we collected the data. We could write the introduction and method sections completely, prepare the results section in skeleton form, leaving spaces to be filled in by the specific numerical results, and have two possible discussion sections ready to go, one for positive results, the other for negative results.

But this is not how our enterprise actually proceeds. Psychology is more exciting than that, and the best journal articles are informed by the actual empirical findings from the opening sentence. Before writing your article, then, you need to Analyze Your Data. Herewith, a sermonette on the topic.

Analyzing Data. Once upon a time, psychologists observed behavior directly, often for sustained periods of time. No longer. Now, the higher the investigator goes up the tenure ladder, the more remote he or she typically becomes from the grounding observations of our science. If you are already a successful research psychologist, then you probably haven't seen a participant for some time. Your graduate assistant assigns the running of a study to a bright undergraduate who writes the computer program that collects the data automatically. And like the modern dentist, the modern psychologist rarely even sees the data until they have been cleaned by human or computer hygienists.

To compensate for this remoteness from our participants, let us at least become intimately familiar with the record of their behavior: the data. Examine them from every angle. Analyze the sexes separately. Make up new composite indices. If a datum suggests a new hypothesis, try to find further evidence for it

elsewhere in the data. If you see dim traces of interesting patterns, try to reorganize the data to bring them into bolder relief. If there are participants you don't like, or trials, observers, or interviewers who gave you anomalous results, drop them (temporarily). Go on a fishing expedition for something—anything —interesting.

No, this is not immoral. The rules of scientific and statistical inference that we overlearn in graduate school apply to the "Context of Justification." They tell us what we can conclude in the articles we write for public consumption, and they give our readers criteria for deciding whether or not to believe us. But in the "Context of Discovery," there are no formal rules, only heuristics or strategies. How does one discover a new phenomenon? Smell a good idea? Have a brilliant insight into behavior? Create a new theory? In the confining context of an empirical study, there is only one strategy for discovery: exploring the data.

Yes, there is a danger. Spurious findings can emerge by chance, and we need to be cautious about anything we discover in this way. In limited cases, there are statistical techniques that correct for this danger. But there are no statistical correctives for overlooking an important discovery because we were insufficiently attentive to the data. Let us err on the side of discovery.

Reporting the Findings. When you are through exploring, you may conclude that the data are not strong enough to justify your new insights formally, but at least you are now ready to design the "right" study. If you still plan to report the current data, you may wish to mention the new insights tentatively, stating honestly that they remain to be tested adequately. Alternatively, the data may be strong enough to justify recentering your article around the new findings and subordinating or even ignoring your original hypotheses.

This is not advice to suppress negative results. If your study was genuinely designed to test hypotheses that derive from a formal theory or are of wide general interest for some other reason, then they should remain the focus of your article. The integrity of the scientific enterprise requires the reporting of disconfirming results.

But this requirement assumes that somebody out there cares about the hypotheses. Many respectable studies are explicitly exploratory or are launched from speculations of the "I-wonder-if ..." variety. If your study is one of these, then nobody cares if you were wrong. Contrary to the conventional wisdom, science does not care how clever or clairvoyant you were at guessing your results ahead of time. Scientific integrity does not require you to lead your readers through all your wrongheaded hunches only to show— voila!—they were wrongheaded. A journal article should not be a personal history of your stillborn thoughts.

Your overriding purpose is to tell the world what you have learned from your study. If your results suggest a compelling framework for their presentation, adopt it and make the most instructive findings your centerpiece. Think of your data as a jewel. Your task is to cut and polish it, to select the facets to highlight, and to craft the best setting for it. Many experienced authors write the results section first.

But before writing anything, Analyze Your Data!

End of sermonette.

How Should You Write?

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 good organization, and the standardized format of a journal article does much of the work for you. It not only permits read-

ers 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, to spot important points that are omitted or misplaced, and to decide how best to divide the labor of presentation between the introduction and final discussion (about which, more later).

The second step toward clarity is to write simply and directly. A journal article tells a straightforward tale of a circumscribed problem in search of a solution. It is not a novel with subplots, flashbacks, and literary allusions, but a short story with a single linear narrative line. Let this line stand out in bold relief. Don't make your voice struggle to be heard above the ambient noise of cluttered writing. You are justifiably proud of your 90th percentile verbal aptitude, but let it nourish your prose, not glut it. Write simply and directly.

For Whom Should You Write?

Scientific journals are published 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 topics 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 a *Psychometrika* article on logistic analysis; the personality theorist, a biopsychology article on hypothalamic function; and the congressional aide with a BA in history, a *Journal of Personality and Social Psychology* article on causal attribution.

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 in *Psychometrika* knows about regression, but needs some introduction to logistic analysis. Assume that the reader of the *Journal of Personality and Social Psychology* knows about person perception but needs some introduction to dispositional and situational attributions.

Many of the writing techniques suggested in this article 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 Shape of an Article

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..."
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 movies..." "(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.

The Introduction

The Opening Statements. The first task of the article is to introduce the background and nature of the problem being investigated. Here are four rules of thumb for your opening statements:

1. Write in English prose, not psychological jargon.

2. Don't plunge unprepared readers into the middle of your problem or theory. Take the time and space necessary to lead them up to the formal or theoretical statement of the problem step by step.

3. Use examples to illustrate theoretical points or to introduce unfamiliar conceptual or technical terms. The more abstract the material, the more important such examples become.

4. Whenever possible, try to open with a statement about people (or animals), not psychologists or their research (This rule is almost always violated. Don't use journals as a model here.)

Examples of Opening Statements:

Wrong: Several years ago, Ekman (1972), Izard (1977), Tomkins (1980), and Zajonc (1980) pointed to psychology's neglect of the affects and their expression. [Okay for somewhere in the introduction, but not the opening statement.]

Right: Individuals differ radically from one another in the degree to which they are willing and able to express their emotions.

Wrong: Research in the forced-compliance paradigm has focused on the effects of predecisional alternatives and incentive magnitude.

Wrong: Festinger's theory of cognitive dissonance received a great deal of attention during the latter part of the 20th Century.

Right: The individual who holds two beliefs that are inconsistent with one another may feel uncomfortable. For example, the person who knows that he or she enjoys smoking but believes it to be unhealthy may experience discomfort arising from the inconsistency or disharmony between these two thoughts or cognitions. This feeling of discomfort was called *cognitive dissonance* by social psychologist Leon Festinger (1957), who suggested that individuals will be motivated to remove this dissonance in whatever way they can.

Note how this last example leads the reader from familiar terms (*beliefs, inconsistency, discomfort, thoughts*) through transition terms (*disharmony, cognitions*) to the unfamiliar technical term *cognitive dissonance*, thereby providing an explicit, if nontechnical, definition of it. The following example illustrates 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. And because success at so many of life's tasks depends critically upon 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 an 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 towards psychopathology in non-clinical samples of men. Unfortunately, these observations have not always replicated, casting doubt on the hypothesis that MAO activity is, in fact, a biological marker in psychiatric disorder. Even the general utility of the platelet model as a key to central nervous system abnormalities in schizophrenia remains controversial. The present study attempts to clarify the relation of MAO activity to symptomatology in chronic schizophrenia.

This kind of writing would not appear in *Newsweek*, and yet it is still comprehensible to an intelligent layperson who may know nothing about blood platelets, MAO activity, or biological markers. The structure of the writing itself adequately defines the relationships among these things and provides enough context to make the basic idea of the study and its rationale clear. At the same time, this introduction is not condescending nor will it bore the technically sophisti-cated reader. The pedagogy that makes this introduction accessible to the nonspecialist will not only be transparent to the specialist, but will enhance the clarity of the article for both readers.

Examples of Examples. When developing complex conceptual arguments or introducing technical materials, it is important not only to provide your readers with illustrative examples, but to select the examples with care. In particular, you should try to compose one or two examples that anticipate your actual findings and then use them recurrently to make several interrelated conceptual points. For example, in one of my own studies of trait consistency, some participants were consistently friendly but not consistently conscientious (Bem & Allen, 1974). Accordingly, we used examples of friendliness and conscientiousness throughout the introduction to clarify and illustrate our theoretical points about the subtleties of trait consistency. This pedagogical technique strengthens the thematic coherence of an article and silently prepares the reader for understanding the results. It also shortens the article by removing the need to explain the theory once in the introduction with hypothetical examples and then again in the context of the actual results.

This article you are now reading itself provides examples of recurring examples. Although you don't know it yet, the major example will be the fictitious study of sex differences in emotional expression introduced earlier to illustrate the hourglass shape of an article. I deliberately constructed the study and provided a sufficient overview of it at the beginning so that I could draw upon it throughout the article. Watch for its elaboration as we proceed. I chose dissonance theory as a second example because most psychologists are already familiar with it; I can draw upon this shared resource without having to expend a lot of space explaining it. But just in case you weren't familiar with it, I introduced it first in the context of "examples of opening statements" where I could bring you in from the beginning—just as you should do with your own readers. And finally, the Bem-Allen article on trait consistency, mentioned in the paragraph above, has some special attributes that will earn it additional cameo appearances as we continue.

The Literature Review. After making the opening statements, summarize the current state of knowledge in the area of investigation. What previous research has been done on the problem? What are the pertinent theories of the phenomenon? Although you will have familiarized yourself with the literature before you designed your own study, you may need to look up additional references if your results raise a new aspect of the problem or lead you to recast the study in a different framework. For example, if you discover an unanticipated sex difference in your data, you will want to determine if others have reported a similar sex difference or findings that might explain it. If you consider this finding important, discuss sex differences and the pertinent literature in the introduction. If you consider it to be only a peripheral finding, then postpone a discussion of sex differences until the discussion section.

The *Publication Manual* gives the following guidelines for the literature review:

> Discuss the literature but do not include an exhaustive historical review. Assume that the reader is knowledgeable about the field for which you are writing and does not require a complete digest. . . . [C]ite and reference only works pertinent to the specific issue and not works of only tangential or general significance. If you summarize earlier works, avoid nonessential details; instead, emphasize pertinent findings, relevant methodological issues, and major conclusions. Refer the reader to general surveys or reviews of the topic if they are available. (APA, 2001, p. 16)

The *Publication Manual* also urges authors not to let the goal of brevity mislead them into writing a statement intelligible only to the specialist. One technique for describing even an entire study succinctly without sacrificing clarity is to describe one variation of the procedure in chronological sequence, letting it

convey the overview of the study at the same time. (You can use the same technique in your own method section.) Here, for example, is a description of a complicated but classic experiment on cognitive dissonance theory (Festinger & Carlsmith, 1959):

> Sixty male undergraduates were randomly assigned to one of three conditions. In the $1 condition, the participant was first required to perform long repetitive laboratory tasks in an individual experimental session. He was then hired by the experimenter as an "assistant" and paid $1 to tell a waiting fellow student (a confederate) that the tasks were fun and interesting. In the $20 condition, each participant was hired for $20 to do the same thing. In the control condition, participants simply engaged in the tasks. After the experiment, each participant indicated on a questionnaire how much he had enjoyed the tasks. The results showed that $1 participants rated the tasks as significantly more enjoyable than did the $20 participants, who, in turn, did not differ from the control participants.

This kind of condensed writing looks easy. It is not, and you will have to rewrite such summaries repeatedly before they are both clear and succinct. The preceding paragraph was the eighth draft.

Citations. The standard journal format permits you to cite authors in the text either by enclosing their last names and the year of publication in parentheses, as in A below, or by using their names in the sentence itself, as in B.

A. "MAO activity in some individuals with schizophrenia is actually higher than normal (Tse & Tung, 1949)."

B. "Tse and Tung (1949) report that MAO activity in some individuals with schizophrenia is actually higher than normal."

In general, you should use form A, consigning your colleagues to parentheses. Your narrative line should be about MAO activity in individuals with schizophrenia, not about Tse and Tung. Occasionally, however, you might want the focus specifically on the authors or researchers: "Theophrastus (280 B.C.) implies that persons are consistent across situations, but Montaigne (1580) insists that they are not. Only Mischel (1968), Peterson (1968), and Vernon (1964), however, have actually surveyed the evidence in detail." The point here is that you have a deliberate choice to make. Don't just intermix the two formats randomly, paying no attention to the narrative structure.

Criticizing Previous Work. If you take a dim view of previous research or earlier articles in the domain you reviewed, feel free to criticize and complain as strongly as you feel is commensurate with the incompetence you have uncovered. But criticize the work, not the investigators or authors. Ad hominem attacks offend editors and reviewers; moreover, the person you attack is likely to be asked to serve as one of the reviewers. Consequently, your opportunity to address—let alone, offend—readers will be nipped in the bud. I could launch into a sermonette on communitarian values in science, but I shall assume that this pragmatic warning is sufficient.

Ending the Introduction. End the introduction with a brief overview of your own study. This provides a smooth transition into the method section, which follows immediately:

> Because this sex difference remains elusive, it seemed desirable to test Zanna's parental-role theory of emotional expression in a more realistic setting. Accordingly, in the study to be presented here, we exposed men and women to filmed scenes designed to evoke either negative or positive emotions and assessed their emotional reactions when they thought they were being observed by one or both

of their parents. We also sought to examine the relation of emotional expression to self-esteem.

The Method Section

The *Publication Manual* spells out in detail what needs to be included in the method section of an article. Here are some additional stylistic suggestions.

If you conducted a fairly complex experiment in which there was a sequence of procedures or events, it is helpful to lead the reader through the sequence as if he or she were a participant. First give the usual overview of the study, including the description of participants, setting, and variables assessed, but then describe the experiment from the participant's vantage point. Provide summaries or excerpts of what was actually said to the participant, including any rationale or "cover story" that was given. Describe the relevant aspects of the room. Show sample items from questionnaires, labels on attitude scales, copies of stimulus materials and/or pictures of apparatus. If you administered a standard personality test or attitude scale, describe its general properties unless it is very familiar (e.g., the MMPI or the F scale). For example: "Participants then filled out the Marlowe-Crowne Social Desirability Scale, a true-false inventory that measures the degree to which persons describe themselves in socially desirable terms (e.g., 'I have never lied')."

The purpose of all this is to give your readers a feel for what it was like to be a participant. (This is true even if you used non-human participants. Thus it is more important to describe the schedule of reinforcement and the inner dimensions of the Skinner Box—what the animal actually experienced—then its outer dimensions and the voltage of the power supply.) Such information often bears importantly on the interpretation of the behavior observed, and readers should be in a position to arrive at their own judgments about your conclusions.

Name all groups, variables, and operations with easily recognized and remembered labels. Don't use abbreviations (the AMT5% group) or empty labels (Treatment 3). Instead, tell us about the success group and the failure group, the father-watching condition and the mother-watching condition, the teacher sample and the student sample, and so forth. It is also better to label groups or treatments in operational rather than theoretical terms. It is difficult to remember that it was the high dissonance group that was offered the small incentive and the low dissonance group that was offered the large incentive. So tell us instead about the $1 group and the $20 group. You can remind us of the theoretical interpretation of these variables later when you discuss the results.

The method and results sections share the responsibility for presenting certain kinds of data that support the reliability and validity of your substantive findings, and you must judge where this information fits most smoothly into the narrative and when the reader can most easily assimilate it. For example, if you constructed a new personality scale, you need to tell us about its internal homogeneity and other psychometric properties. If you employed observers, tell us about interjudge agreement. If you mailed survey questionnaires, give us the return rate and discuss the possibility that non-respondents differed from respondents. If you discarded certain participants, tell us why and how many and discuss the possibility that this limits or qualifies the conclusions you can draw. In particular, assure us that they were not all concentrated in the same experimental condition. (Participants discarded during data analysis should be discussed in the results section.)

Discuss participant dropout problems and other difficulties encountered in executing the study only if they might affect the validity or the interpretation of your results. Otherwise spare us your tales of woe. Do tell us that some participants fled your high-stress treatment before you could assess their GSR, but do

not tell us that your dog ate your pigeon and you had to redo the experiment or that you couldn't run participants Tuesday night because the custodian inadvertently locked the building.

Manipulations and procedures that yielded no useful information should be mentioned if they were administered before you collected your main data; their presence could have affected your findings. Usually it will be sufficient to say that they yielded no information and will not be discussed further. You probably don't need to mention them at all if they were administered after you collected your main data unless you think that other investigators might try to pursue the same fruitless path. Sometimes, however, a "null" result is surprising or of interest in its own right. In this case, it should be treated as a regular datum in your results section.

After presenting the methods you employed in your study, discuss any ethical issues they might raise. If the research design required you to keep participants uninformed or even misinformed about the procedures, how did you tell them about this afterwards? How did you obtain their prior consent? Were they free to withdraw at any time? Were they subjected to any embarrassment or discomfort? What steps were followed to protect their anonymity? Were you observing people who were unaware of that fact?

If your study raises any of these issues, you should be prepared to justify your procedures. Moreover, you need to assure us that your participants were treated with dignity and that they left your study with their self-esteem intact and their respect for you and psychology enhanced rather than diminished. If you used non-human participants—especially dogs, cats, or primates—then you need to address analogous questions about their care and treatment.

End the method section with a brief summary of the procedure and its overall purpose. Your grandmother should be able to skim the method section without reading it; the final paragraph should bring her back "on line."

The Results Section

In short articles or reports of single empirical studies, the results and discussion are often combined. But if you need to integrate several different kinds of results or discuss several general matters, then prepare a separate discussion section. There is, however, no such thing as a pure results section without an accompanying narrative. You cannot just throw numbers at readers and expect them to retain them in memory until they reach the discussion. In other words, write the results section in English prose.

Setting the Stage. Before you can present your results, there are two preliminary matters that need to be handled. First, you should present evidence that your study successfully set up the conditions for testing your hypotheses or answering your questions. If your study required you to produce one group of participants in a happy mood and another in a depressed mood, show us here that mood ratings made by the two groups were significantly different. If you divided your participants into groups, assure us that these groups did not differ on some unintended variable that might bear upon the interpretation of your results (e.g., social class, intelligence). If your study required you to misinform participants about the procedures, how do you know that they were not suspicious, that participants who participated earlier had not informed participants who participated later, and that your "cover story" produced the state of belief required for the test of your hypotheses?

Here is also where you can put some of the data discussed above in "The Method Section": Reliabilities of testing instruments, judges, and observers; return rates on mail surveys; and participant dropout problems.

Not all of these matters need to be discussed at the beginning of the results section. In addition to data you think fit better in the method section, some of these other matters might better be postponed until the discussion section when you are considering alternative explanations of your results (e.g., the possibility that some participants became suspicious). Again, the decision of what to include is very much a matter of judgment. It is an important step, but don't overdo it. Get it out of the way as quickly as possible and get on with your story.

The second preliminary matter to deal with is the method of data analysis. First, describe any overall procedures you used to convert your raw observations into analyzable data. How were responses to your mail survey coded for analysis? How were observers' ratings combined? Were all measures first converted to standard scores? Some of these may also fit better into the method section and need not be repeated here. Similarly, data-combining procedures that are highly specific can be postponed. If you combined three measures of anxiety into a single composite score for analysis, tell us about that later when you are about to present the anxiety data.

Next, tell us about the statistical analysis itself. If this is standard, describe it briefly (e.g., "All data were analyzed by two-way analyses of variance with sex of participant and mood induction as the independent variables"). If the analysis is unconventional or makes certain statistical assumptions your data might not satisfy, however, discuss the rationale for it, perhaps citing a reference for readers who wish to check into it further. If your method of analysis is new or likely to be unfamiliar to readers of the journal, you might need to provide a full explanation of it. Sometimes the quantitative treatment of data is a major part of an article's contribution. Variations of multidimensional scaling, causal modeling, and circumplex representations of personality data, for example, have been more important in some articles than the data to which they were applied. In these cases, the method of analysis and its rationale have the same epistemological status as a theory and should be presented in the introduction to the article.

And finally, if the results section is complicated or divided into several parts, you may wish to provide an overview of the section: "The results are presented in three parts. The first section presents the behavioral results for the men, followed by the parallel results for the women. The final section presents the attitudinal and physiological data for both sexes combined." But as I shall argue below, this kind of "metacommentary" should be used very sparingly. In most cases, the prose itself should make it unnecessary.

Presenting the Findings. The general rule in reporting your findings is to give the forest first and then the trees. This is true of the results section as a whole: Begin with the central findings, and then move to more peripheral ones. It is also true within subsections: State the basic finding first, and then elaborate or qualify it as necessary. Similarly, discuss an overall measure of aggression or whatever first, and then move to its individual components. Beginning with one of your most central results, proceed as follows:

1. Remind us of the conceptual hypothesis or the question you are asking: "It will be recalled that the men are expected to be more emotionally expressive than the women." Or, "We ask, first, whether the men or the women are more emotionally expressive?" Note that this is a conceptual statement of the hypothesis or question.

2. Remind us of the operations performed and behaviors measured: "In particular, the men should produce more tears during the showing of the film than the women." Or, "Do the men produce more tears during the showing of the film than the women?" Note that this is an operational statement of the hypothesis or question.

3. Tell us the answer immediately and in English: "The answer is yes." Or, "As Table 1 reveals, men do, in fact, cry more profusely than the women."

4. Now, and only now, speak to us in numbers. (Your grandmother can now skip to the next result in case she has forgotten her statistics or her reading glasses.): "Thus the men in all four conditions produced an average of 1.4 cc more tears than the women, F (1,112) = 5.79, $p < .025$."

5. Now you may elaborate or qualify the overall conclusion if necessary: "Only in the father-watching condition did the men fail to produce more tears than the women, but a specific test of this effect failed to reach significance, t =1.58, $p <$ .12."

6. End each section of the results with a summary of where things stand: "Thus, except for the father-watching condition, which will be discussed below, the hypothesis that men cry more than women in response to visually-depicted grief appears to receive strong support."

7. Lead into the next section of the results with a smooth transition sentence: "Men may thus be more expressive than women in the domain of negative emotion, but are they more expressive in the domain of positive emotion? Table 2 shows they are not..." (Again, the "bottom line" is given immediately.) As the results section proceeds, continue to summarize and "update" the reader's store of information frequently. The reader should not have to keep looking back to retrieve the major points of your plot line.

By structuring the results section in this way, by moving from forest to trees, by announcing each result clearly in prose before wading into numbers and statistics, and by summarizing frequently, you permit a reader to decide just how much detail he or she wants to pursue at each juncture and to skip ahead to the next main point whenever that seems desirable.

Figures and Tables. Unless a set of findings can be stated in one or two numbers, results that are sufficiently important to be stressed should be accompanied by a figure or table summarizing the relevant data. The basic rule of presentation is that a reader be able to grasp your major findings either by reading the text or by looking at the figures and tables. Thus, figures and tables must be titled and labeled clearly and completely, even if that means constructing a very lengthy title or heading ("Mean number of tears produced by two affective films as a function of affect valence, participant sex, parental observation, and self-esteem"). Within the text itself, lead the reader by the hand through a table to point out the results of interest: "As shown in the first column of Table 2, men produce more tears (2.33 cc) than women (1.89 cc).... Of particular interest is the number of tears produced when both father and mother watch (rows 3 and 4)..." Don't just wave in the general direction of the table and expect the reader to ferret out the information. For detailed information on figures and tables, see the *Publication Manual* (APA, 2001).

On Statistics. As you know, every comparison between groups or relationship between variables should be accompanied by its level of statistical significance. Otherwise, readers have no way of knowing whether the findings could have emerged by chance. But despite the importance of inferential statistics, they are not the heart of your narrative and should be subordinated to the descriptive results. Whenever possible, state a result first and then give its statistical significance, but in no case should you ever give the statistical test alone without interpreting it substantively. Do not tell us that the three-way interaction with sex, parent condition, and self-esteem was significant at the .05 level unless you tell us immediately and in English that men are less expressive than women in the negative conditions if father watches—but only for men with low self-esteem.

If your experiment utilized an analysis of variance design, your data analysis will automatically display the effects of several independent variables on a single dependent variable. If this organization is consonant with a smooth presentation of your results, lucky you. Go with it. But don't be a prisoner of ANOVA! If the narrative flows more smoothly by discussing the effects of a single independent variable on several conceptually related dependent variables, tear your ANOVA results apart and reorganize them. Statistical designs are all right in their place, but you—and your prose—are master; they are slave.

Just as your method section should give readers a feel for the procedures employed, so too, the results section should give them a feel for the behavior observed. Select descriptive indices or statistics that convey the behavior of your participants as vividly as possible. Tell us the percent of children in your study who hit the Bobo doll or the mean number of times they did so. Remind us that a score of 3.41 on your 5-point rating scale of aggression lies between "slightly aggressive" and "moderately aggressive."

Do this even if the statistical analyses must be performed on some more indirect datum (e.g., the arcsin transform of the number of Bobo hits or the sum of three standardized aggression scores.) Display these indirect indices, too, if you wish, but give the readers' intuitions first priority. For example, in our study of trait consistency, we analyzed a standard-score index of individual consistency, but we discussed the results in terms of the more familiar correlation coefficient—on which no legitimate statistical analysis could be performed (Bem & Allen, 1974).

After you have presented your quantitative results, it is often useful to become more informal and briefly to describe the behavior of particular individuals in your study. Again, the point is not to prove something, but to add richness to your findings, to share with readers the feel of the behavior: "Indeed, two of the men used an entire box of Kleenex during the showing of the heart operation but would not pet the baby kitten owned by the secretary."

The Discussion Section

As noted earlier, the discussion section can either be combined with the results section or appear separately. In either case, it forms a cohesive narrative with the introduction, and you should expect to move materials back and forth between these two sections as you rewrite and reshape the report. Topics that are central to your story will appear in the introduction and probably again in the discussion. More peripheral topics may not be brought up at all until after the presentation of the results. The discussion is also the bottom of the hourglass-shaped format and thus proceeds from specific matters about your study to more general concerns (about methodological strategies, for example) to the broadest generalizations you wish to make. The sequence of topics is often the mirror image of the sequence in the introduction.

Begin the discussion by telling us what you have learned from the study. Open with a clear statement on the support or nonsupport of the hypotheses or the answers to the questions you first raised in the introduction. But do not simply reformulate and repeat points already summarized in the results section. Each new statement should contribute something new to the reader's understanding of the problem. What inferences can be drawn from the findings? These inferences may be at a level quite close to the data or may involve considerable abstraction, perhaps to the level of a larger theory regarding, say, emotion or sex differences. What are the theoretical, practical, or even the political implications of the results?

It is also appropriate at this point to compare your results with those reported by other investigators and to discuss possible shortcomings of your study, conditions that might limit the extent of legitimate generalization or otherwise

qualify your inferences. Remind readers of the characteristics of your participant sample, the possibility that it might differ from other populations to which you might want to generalize; of specific characteristics of your methods that might have influenced the outcome; or of any other factors that might have operated to produce atypical results.

But do not dwell compulsively on every flaw! In particular, be willing to accept negative or unexpected results without a tortured attempt to explain them away. Don't make up long, involved, pretzel-shaped theories to account for every hiccup in the data. There is a -.73 correlation between the clarity of an investigator's results and the length of his or her discussion section. Don't contribute to this shameful statistic.

Ah, but suppose that, on the contrary, your results have led you to a grand new theory that injects startling clarity into your data and revolutionizes your view of the problem area. Doesn't that justify a long discussion section? No. In this case, you should write the article so that you begin with your new theory. As noted above, your task is to provide the most informative and compelling framework for your study from the opening sentence. If your new theory does that, don't wait until the discussion section to spring it on us. A journal article is not a chronology of your thought processes.

The discussion section also includes a consideration of questions that remain unanswered or that have been raised by the study itself, along with suggestions for the kinds of research that would help to answer them. In fact, suggesting further research is probably the most common way of ending a research report.

Common, but dull. The hourglass shape of an article implies that your final words should be broad general statements of near-cosmic significance, not precious details of interest only to psychologists. Thus the statement, "Further research will be needed before it is clear whether the androgyny scale should be scored as a single continuous dimension or partitioned into a 4-way typology," might well be appropriate somewhere in a discussion section, but, please, not your final farewell. In my opinion, only Montaigne was clever enough to end an article with a statement about further research: "Because [the study of motivation] is a high and hazardous undertaking, I wish fewer people would meddle with it" (1580/1943).

You should probably settle for more modest injunctions: "If gender schema theory has a political message, it is.. .that... human behaviors and personality attributes should no longer be linked with gender, and society should stop projecting gender into situations irrelevant to genitalia. The feminist prescription, then, is not that the individual be androgynous, but that the society be gender-aschematic" (S. Bem, 1985).

But in any case, end with a bang, not a whimper.

The Title and Abstract

The title and abstract of your article permit potential readers to get a quick overview of your study and to decide if they wish to read the article itself. Titles and abstracts are also indexed and compiled in reference works and computerized databases. For this reason they should accurately reflect the content of the article and include key words that will ensure their retrieval from a database. You should compose the title and abstract after you have completed the article and have a firm view of its structure and content.

The recommended length for a title is 10 to 12 words. It should be fully explanatory when standing alone and identify the theoretical issues or the variables under investigation. Because you will not be able to mention all the features of your study in the title (or even in the abstract), you must decide which are most important. Once again, the data should guide you. For example, the most instructive findings from our fictitious study on emotional expression should determine

which of the following is the most appropriate title: "Laughing versus Crying: Sex Differences in the Public Display of Positive and Negative Emotions"; "Effects of Being Observed by Parents on the Emotional Responses of Men and Women to Visual Stimuli"; "Emotional Responses to Visual Stimuli as a Function of Sex and Self-Esteem"; "Sex Differences in the Public Display of Emotion as a Function of the Observing Audience"; "Public versus Private Displays of Emotion in Men and Women."

The abstract of an empirical article should not exceed 120 words. It should contain the problem under investigation (in one sentence if possible); the participants, specifying pertinent characteristics, such as number, type, age, sex, and species; the experimental method, including the apparatus, data-gathering procedures, and complete test names; the findings, including statistical significance levels; and the conclusion and the implications or applications.

Clearly the abstract must be very compact, and this requirement leads many inexperienced writers to make it unintelligible. Remove unnecessary words and eliminate less important details of method and results. But then let it breathe. In particular, allow yourself the space to make the problem under investigation clear to a casually browsing reader. Often you can plagiarize and abbreviate key statements from the article itself. Here is an example:

> When are men more emotionally expressive than women? One hundred male and 100 female undergraduates were individually shown a sad or a happy film, while being observed by one or both of their parents. Judges blind to condition rated participants' facial expressions, and a Lachrymeter measured their tear volume. Men cried more during the sad movie but laughed less during the happy movie than did the women (interaction, $p < .02$). However, men in the father-watching condition with low self-esteem (Darley Self-Concept Scale) cried less than all other participants ($p < .05$). It is suggested that sex differences in emotional expression are moderated by the valence of the emotion and—for men—by self-esteem and conditions of being observed.

If the conceptual contribution of your article is more important than the supporting study, this can be reflected in the abstract by omitting experimental details and giving more space to the theoretical material. Here is the title and abstract from our *Psychological Review* article on trait consistency (revised to conform to the new 100 word limit on abstracts of reviews and theoretical articles):

> On Predicting Some of the People Some of the Time: The Search for Cross-Situational Consistencies in Behavior
>
> The recurring controversy over the existence of cross-situational consistencies in behavior is sustained by the discrepancy between our intuitions, which affirm their existence, and the research literature, which does not. It is argued that the nomothetic assumptions of the traditional research paradigm are incorrect and that higher validity coefficients would be obtained if the idiographic assumptions used by our intuitions were adopted. A study is reported which shows it is possible to predict who will be cross-situationally consistent and who will not. Personality assessment must not only attend to situations—as has been recently urged—but to persons as well (Bem & Allen, 1974).

Rewriting It

For many authors revising an article is unmitigated agony. Even proofreading is painful. And so they don't. So relieved to get a draft done, they send it off to the journal thinking that they can clean up the writing after it 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 of our journals accept only 15-20% of all manuscripts submitted. But from my experience as an editor, I believe that the

difference between the manuscripts accepted and the top 15-20% 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 awhile 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 fairly polished copy of the manuscript to a friend or colleague for a critical review. (If you get a critique from two colleagues you will have simulated a trial run of a journal's review process.) The best readers are those who have themselves published in the psychological journals, but who are unfamiliar with the subject of your article. (A student from Psychology 101 would probably be too intimidated to give usefully critical feedback; grandma will be too kind.)

If your colleagues find something unclear, do not argue with them. They are right: By definition, the writing is unclear. Their suggestions for correcting the unclarities may be wrong, even dumb. 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, and so they will simply mumble "oh yes, of course, of course" and apologize for not having read carefully enough. As a consequence, you will be pacified, and your next readers, the journal reviewers, will stumble over the same problem. 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 an article 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. For journal articles in particular, I think most authors should get the first draft done as quickly as possible without agonizing over stylistic niceties. But once it is done, compulsiveness and attention to detail become the required virtues.

And finally, rewriting is difficult because it usually means restructuring. Sometimes it is necessary to discard whole sections of an article, add new ones, go back and do more data analysis, and then totally reorganize the article 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 technique of crafting each sentence of a first draft wastes time. That beautiful turn of phrase that took me 40 minutes to shape gets discarded when the article gets restructured. 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 article 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 may 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. A word processor—even in conjunction with a fancy "outline mode"—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, fine, do it. But don't be ashamed to print out a complete draft of your manuscript, spread it out on table or floor, take pencil, scissors, and scotch tape in hand, and then, all by your low-tech self, have at it.

Some Matters of Style

Omit Needless Words

Virtually all experienced writers agree that any written expression that deserves to be called *vigorous writing*, whether it is a short story, an article for a professional journal, or a complete book, *is* characterized by the attribute of being succinct, *concise*, and to the point. *A sentence*—no matter where in the writing it occurs—*should contain no unnecessary* or superfluous *words*, words that stand in the way of the writer's direct expression of his or her meaning and purpose. In a very similar fashion, *a paragraph*—the basic unit of organization in English prose—should contain *no unnecessary* or superfluous *sentences*, sentences that introduce peripheral content into the writing or stray from its basic narrative line. It is in this sense that a writer is like an artist executing a drawing, and it is in this sense that a writer is like an engineer designing a machine. Good writing should be economical *for the same reason that a drawing should have no unnecessary lines, and* good writing should be streamlined in the same way that *a machine* is designed to have *no unnecessary parts*, parts that contribute little or nothing to its intended function.

This prescription to be succinct and concise is often misunderstood, and *requires* judicious application. It certainly does *not* imply *that the writer* must *make all* of his or her *sentences short* and choppy *or* leave out all adjectives, adverbs, and qualifiers. Nor does it mean that he or she must *avoid* or eliminate *all detail* from the writing *and treat* his or her *subjects only in* the barest skeleton or *outline* form. *But* the requirement does imply *that every word* committed to paper should *tell* something new to the reader and contribute in a significant and nonredundant way to the message that the writer is trying to convey.

* * *

You have just read a 303 word essay on brevity. It is not a terrible first draft, but a good writer or copy editor would take its message to heart and, by crossing out all the non-italicized words, cut it by 81%. Savor the result:

> Vigorous writing is concise. A sentence should contain no unnecessary words, a paragraph no unnecessary sentences, for the same reason that a drawing should have no unnecessary lines and a machine no unnecessary parts. This requires not that the writer make all sentences short or avoid all detail and treat subjects only in outline, but that every word tell. [59 words]

This essay on brevity was written by Strunk and White (2000, p. 23) under the heading: "Omit Needless Words." Obey their injunction, for it is the most important piece of advice in this article. Journal articles should also omit needless concepts, topics, anecdotes, asides, and footnotes. Clear any underbrush that clutters your narrative. If a point seems peripheral to your main theme, 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.

Copy editing other people's writing is good practice for improving your own. It is also less painful than editing your own and much easier than actually writing. Any piece of prose will do. Here was an exercise for my writing class; it was part of a letter Cornell sent out to potential graduate applicants. You may wish to try your hand at it.

> Psychology is a wide field of study, and we are not equally strong in all parts of it. At present, we regard our major strengths as lying in three broadly defined domains in which we have many faculty, and a couple of smaller areas in which also have appreciable resources. The three primary areas are Biopsychology, Experimental Psychology, and Personality and Social Psychology; the others are Mathematical/Differential Psychology and Experimental Psychopathology. The areas and the relevant faculty are listed below. Please note that this listing is informal; it does not imply that the listed faculty members have no other interests or can readily be fitted into predefined areas. The actual network of faculty interests and responsibilities is too subtle to be described in a letter such as this. The listing is just a rough and ready way to tell you what the Field of Psychology at Cornell is like. [149 words]

Here is a reasonable revision:

> Psychology is a wide field, and our major strengths are Biopsychology, Experimental Psychology, and Personality and Social Psychology. We also have resources in Mathematical/Differential Psychology and Experimental Psychopathology. The following list of faculty within areas provides a rough guide to the Field of Psychology at Cornell. Faculty interests are broader than this list implies, however, and do not always neatly fit the predefined areas. [65 words, a savings of 56%]

To maintain the vigor of your prose, try to spend at least 15 minutes each day omitting needless words. Your goal should be to reach at least 30% of all words encountered. (Copy edited versions of this article will be returned unopened.)

Avoid Metacomments on the Writing

Expository writing fails its mission if it diverts the reader's attention to itself and away from the topic; the process of writing should be transparent to the reader. In particular, the prose itself should direct the flow of the narrative without requiring you to play tour guide by commenting on it. Don't say: "Now that I have discussed the three theories of emotion, we can turn to the empirical work on each of them. I will begin with the psychoanalytic account of affect..." Instead, move directly from your discussion of the theories into the literature review with a simple transition sentence like, "Each of these three theories has been tested empirically. Thus, the psychoanalytic account of affect has received support in studies that..." 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, the writing insufficiently linear. Metacomments will only oppress the prose further. Instead, copy edit. Omit needless words; don't add them!

Use 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, stylish, or interesting. Instead of using repetition and parallel construction, as in "Men may be more expressive than women in the domain of negative emotion, but they are not more expressive in the domain of positive emotion," they attempt to be more creative: "Men may be more expressive than women in the domain of negative emotion, but it is not true that they are more willing and able than the opposite sex to display the more 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 will justifiably wonder if different meanings are implied. The example above 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 high-dissonance participants were paid a small sum of money while being given a free choice of whether or not to participate, whereas the participants we randomly assigned to the large-incentive treatment (the low-dissonance condition) were not offered the opportunity to refuse.

This (fictitious) author should have written:

> High dissonance participants were paid a small sum of money and were not required to participate; low-dissonance participants were paid a large sum of money and were 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. Here, for example, are the opening sentences from three of the paragraphs in the earlier 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.)

And finally, repetition and parallel construction can serve style and creativity as well as clarity. They can provide rhythm and punch: "A sentence should contain no unnecessary words, a paragraph no unnecessary sentences for the same reason that a drawing should have no unnecessary lines and a machine no unnecessary parts." 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." 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

Jargon is the specialized vocabulary of a discipline, 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*). And the technical vocabulary often makes an important conceptual distinction not apprehended by the layperson's vocabulary (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 for the general reader. (I once had to interrogate an author at length to learn that a prison program for "strengthening the executive functions of the ego" actually 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 example—the first time it is introduced. (See the sample opening statements earlier in this article for ways to do this.)

Voice and Self-Reference

In the past, scientific writers used the passive voice almost exclusively and referred to themselves in the third person: "This experiment was designed by the authors to test ..." This practice produces lifeless prose and is no longer the norm. Use the active voice unless style or content dictates otherwise; and, in general, keep self-reference to a minimum. Remember that you are not the topic of your article. You should not refer to yourself as "the author" or "the investigator." (You may refer to "the experimenter" in the method section, however, even if that happens to be you; the experimenter *is* part of the topic under discussion there.) Do not refer to yourself as "we" unless there really are two or more authors. You may refer to yourself as "I", but do so sparingly. It tends to distract the reader from the topic, and it is better to remain in the background. Leave the reader in the background, too. Don't say, "The reader will find it hard to believe that ... " or "You will be surprised to learn..." (This article violates the rule because you and your prose *are* the topic.) You may, however, refer to the reader indirectly in imperative, "you-understood" sentences: "Consider, first, the results for women." "Note particularly the difference between the means in Table 1."

In some contexts, you can use "we" to refer collectively to yourself and your readers: "We can see in Table 1 that most of the tears..." The *Publication Manual*, however, emphasizes that the referent of "we" must be unambiguous; for example, copy editors will object to the sentence "In everyday life, of course, we tend to overestimate..." because it is not clear just who is meant by "we." They will accept "In everyday life, of course, we humans tend to overestimate..." or "In everyday life, of course, human decision makers often make errors; for example, we tend to overestimate..."

Tense

Use the past tense when reporting the previous research of others ("Bandura reported..."), how you conducted your study ("Observers were posted behind...") and specific past behaviors of your participants ("Two of the men talked..."). Use the present tense for results currently in front of the reader ("As Table 2 shows, the negative film is more effective ...") and for conclusions that are more general than the specific results ("Positive emotions, then, are more easily expressed when...").

Avoid Language Bias

Like most publishers, the American Psychological Association now has extensive guidelines for language that refers to individuals or groups. If your article requires you to discuss any of the groups mentioned in this section, you should probably consult the detailed advice in the *Publication Manual* (APA, 2001, pp. 61-76)

Research Participants. One distinctive group of people who appear in our journal articles are those whom we study. It is no longer considered appropriate to objectify them by calling them subjects. Instead use descriptive terms that either identify them more specifically or that acknowledge their roles as partners in the research process, such as *college students*, *children*, *individuals*, *participants*, *interviewees*, or *respondents*. You may still use the terms *subjects*, *subject variables*, and *subject sample* when discussing statistics or (at least for now) when referring to non-human participants.

Sex and Gender. The issue of language bias comes up most frequently with regard to sex or gender, and the most awkward problems arise from the use of masculine nouns and pronouns when the content refers to both sexes. The generic use of *man*, *he*, *his*, and *him* to refer to both sexes is not only misleading in many instances, but research shows that readers think of male persons when these forms are used (Martyna, 1978). Sometimes the results are not only sexist, but humorous in their naive androcentrism: "Man's vital needs include food, water, and access to females" (Quoted in Martyna, 1978).

In most contexts, the simplest alternative is the use of the plural. Instead of writing, "The individual who displays prejudice in his personal relations...," write "Individuals who display prejudice in their personal relations are ..." Sometimes the pronoun can simply be dropped or replaced by a sex-neutral article (*the*, *a*, or *an*). Instead of writing, "The researcher must avoid letting his preconceptions bias his interpretation of results," you can write, "The researcher must avoid letting preconceptions bias the interpretation of results."

If it is stylistically important to focus on the single individual, the use of "he or she," "him or her," and so forth is acceptable but clumsy if used very often. Alternating *he* and *she* is both confusing and distracting. Similarly, alternatives like *he*/*she* or *s*/*he* are unpronounceable and grate on the eye. Don't use them.

You may find it instructive to review how I have dealt with the pronoun problem in this article. In particular, note the many references to the "reader" or "readers." Sometimes the plural worked fine (e.g., "Don't plunge readers into the middle of your problem. Take the time to lead them..."), but in other instances the imagery of the sentence required the stylistic use of the singular (e.g., "Lead the reader by the hand through a table..."). In these cases, I have tried to minimize using the awkward "he or she" construction.

Stylistic matters aside, however, you must be accurate in your use of pronouns when you describe your research or that of others. Readers must be explicitly told the sex of experimenters, observers, and participants. When referring to males, use male pronouns; when referring to females use female pronouns. (See, for example, the earlier description of the Festinger-Carlsmith study, which used male participants.) Under no circumstances should you omit or hide sex identity in a misguided attempt to be unbiased.

The problems of gender reference become easier when we move away from pronouns. Words like *man* and *mankind* are easily replaced by terms like *people* and *humanity*. Instead of manning projects, we can staff them. The federal government has already desexed occupational titles so that we have letter carriers rather than mailmen; in private industry we have flight attendants rather than stewardesses. And in life, children need nurturing or parenting, not just moth-

ering. In all these cases, you will find it easy to discover the appropriate sex-neutral term if you think of the activity rather than the person doing it.

Next, watch out for plain old stereotyping. The author who asserts that "research scientists often neglect their wives" fails to acknowledge that women as well as men are research scientists. If the author meant specifically male research scientists, he (she?) should have said so. Do not talk about ambitious men and aggressive women or cautious men and timid women if the use of different adjectives denotes not different behaviors on the part of men and women but your stereotyped interpretation of those behaviors. Don't make stereotyped assumptions about marital sex-roles by saying that "The client's husband lets her teach part-time" if all you know is that the client teaches part-time. If the bias is not yours but someone else's, let the writing make that clear: "The client's husband 'lets' her teach part-time." "The husband says he 'lets' the client teach part-time." "The client says her husband lets her teach part-time." "The client says sarcastically that her husband 'lets' her teach part-time." The client and her husband are allowed to say such things. You are not.

And finally, select examples with care. Beware of your assumptions about the sex of doctors, homemakers, nurses, and so forth. Why not: "The athlete who believes in her ability to succeed..."? Let our writing promote the view that woman's vital needs are the same as man's: food, water, and access to equality.

Racial and Ethnic Identity. Preferences for names referring to racial and ethnic groups change over time. For example, *African American* and *Black* are currently acceptable terms, whereas *Negro* and *Afro-American* are now obsolete. Similarly, *Asian* and *Asian American* are currently acceptable designations, but *Oriental* is not. As these examples illustrate, hyphens should not be used in multiword designations, and terms like *Black* and *White* are considered proper nouns and should be capitalized.

Depending on their historical countries of origin, individuals may prefer to be called *Hispanic, Latino*, or *Chicano* (*Latina* and *Chicana* for women). *American Indian* and *Native American* are both accepted terms for referring to indigenous people of North America; but, technically, only the latter category includes Hawaiians and Samoans. Native peoples of northern Canada, Alaska, eastern Siberia, and Greenland may prefer *Inuk* (plural, *Inuit*) to *Eskimo*. Alaska Natives include many groups in addition to Eskimos. It is often relevant to be more specific in describing your participants. For example, it may be pertinent to know that they were Cuban, not just Hispanic; Chinese, Vietnamese, or Korean, not just Asian

If you are uncertain about how to describe your research participants, ask them how they prefer to be identified.

Sexual Orientation. Like terms referring to racial and ethnic identity, terms referring to sexual orientation also change over time. For example, the term *sexual orientation* itself is now preferred to the older *sexual preference*—which implies a temporary free choice rather than an enduring disposition. Although terms like *homosexual* and *homosexuality* are still technically correct and may be used in phrases such as "a homosexual orientation" or "more Americans now accept homosexuality," they should be avoided when referring to individuals or groups. Instead of referring to *homosexuals* or *bisexuals*, use *lesbians, gay men*, or *bisexual men and women*. In some contexts, the word *gay* can be used to include both men and women (e. g., "the gay rights movement"), but when referring to individuals or groups, retain the distinction between gay men and lesbians.

Sexual orientation is not the same as sexual behavior. Not everyone who engages in a sexual act with a person of the same sex should be considered gay or lesbian, and hence you should not use the terms *homosexual behavior* or *hetero-*

sexual behavior. Instead, describe specific instances of sexual behavior using terms such as *male-male, female-female, male-female,* or *same-gender sexual behavior*.

Note the use of the word *gender* in the previous sentence. Although there are differences in usage across and within disciplines, the term *sex* is usually considered to refer to biology; thus *male* and *female* are terms referring to sex. In contrast, *gender* usually refers to the cultural interpretation or elaboration of sex; thus *masculine* and *feminine* are terms referring to gender. This is not a hard and fast rule, however. For example, because the term *sex* can be confused with *sexual behavior*, the term *same-gender sexual behavior* was used in the previous paragraph even though it refers to a sexual interaction between two people of the same biological sex. The following example from the *Publication Manual* also illustrates the use of *gender* in a context where the term *sex* might be confusing: "In accounting for attitudes toward the bill, sexual orientation rather than gender accounted for most of the variance. Most gay men and lesbians were for the proposal; most heterosexual men and women were against it (2001, p. 63)."

Disabilities. When referring to individuals with disabilities, maintain their integrity as individuals and human beings by avoiding language that equates them with their conditions. Don't use nouns such as *neurotics, schizophrenics, manic-depressives, the mentally retarded*, or even *the disabled*. Also avoid terms that imply victimization (e.g., "suffers from schizophrenia," "AIDS victim") or that can be interpreted as a slur (e.g., *cripple*). In general, the preferred forms of description are "person with _____" or "person living with _____" or "person who has_____." *Challenged* and *special* are often considered euphemistic and should be used only if preferred by those who participate in your study.

There is one exception to these guidelines: the Deaf (Note the capital "D.") Although some individuals with reduced hearing may find the term *hearing impaired* acceptable, many deaf individuals do not. They regard themselves as members of a distinctive linguistic culture that communicates in a manual (sign) language. Accordingly, they take pride in referring to themselves as Deaf and do not regard themselves as impaired or disabled. Do not use the terms *hard of hearing* or *deaf mute* to describe them. If your study involved deaf participants, ask them how they prefer to be described.

Common Errors of Grammar and Usage

The following errors seem to me to be the most frequent in journal writing (listed alphabetically):

Compared with versus *Compared to*. Similar orders of things are compared *with* one another; different orders of things are compared *to* one another: "Let me not compare thee *with* previous lovers I have had; rather, let me compare thee *to* a summer's day." "Mischel's articles are often compared *with* Bandura's articles; Bem's articles are often compared *to* Mozart's sonatas."

Data. The word *data* is plural: "Analyze those data thoroughly."

Different from versus *Different than*. The first is correct, the second, incorrect (although, alas for us purists, very common and gaining respectability). The confusion arises because *than* correctly follows comparative adjectives. Thus you are correct to suppose that life is more *than* psychology, that living a good life is harder in many respects *than* writing a good article, and that living well requires broader skills *than* does writing well. Just remember that life is different *from* psychology, that living a good life is different in many respects *from* writing a

good article, and that living well requires skills different *from* those required for writing well.

None, No one. These words are singular: "None of them is likely to obtain data that are more convincing."

Since versus *Because*. *Since* means "after that." It should not be used as a substitute for *because* if there is any ambiguity of interpretation. *Wrong (but at least not ambiguous*): "Since the study of motivation is a high and hazardous undertaking, I wish fewer people would meddle with it." *Better*: "Because the study of motivation is a high and hazardous undertaking, I wish fewer people would meddle with it." *Ambiguous*: "Since I read Montaigne, I have been tempted to abandon the study of motivation." This last case is correct if the writer is using *since* in the temporal sense: "Ever since reading Montaigne, I have been tempted ..." It is incorrect if the writer means *because*.

That versus *Which*. *That* clauses (called restrictive) are essential to the meaning of the sentence; *which* clauses (called nonrestrictive) merely add further information. The following example illustrates the correct use of both words: "Dissonance theory, *which* has received major attention, is one of the theories *that* postulates a motivational process. Thus, if a person holds two cognitions *that* are inconsistent..." Most *which's* in journal writing are incorrect. You should go on a *which* hunt in your own manuscripts and turn most of them into *that's*.

While versus *Although*, *But*, *Whereas*. *While* means "at the same time" and in most cases cannot substitute for these other words. *Wrong*: "*While* inferential statistics are important, descriptive statistics are the heart of your narrative." *Right*: "*Although* inferential statistics are important, descriptive statistics are the heart of your narrative." Or, "Inferential statistics are important, *but* descriptive statistics are the heart of your narrative." *Wrong*: "*While* I like personality traits, Mischel prefers a social learning approach." *Right*: "*Whereas* I like personality traits, Mischel prefers a social learning approach." Interestingly, the following usage is correct: "*While* I like personality traits, I find merit in Mischel's social learning approach." This can be seen by substituting "at the same time" for "while": "I like personality traits; at the same time, I find merit in Mischel's social learning approach."

Publishing It

Long ago and far away, a journal editor allegedly accepted a manuscript that required no revisions. I believe the author was William James. In other words, if your article is provisionally accepted for publication "pending revisions in accord with the reviewers' comments," you should be deliriously happy. Publication is now virtually under your control. If your article is rejected but you are invited to resubmit a revised version, you should still be happy—if not deliriously so—because you still have a reasonable shot at getting it published.

But this is the point at which many authors give up. As one former editor noted,

> in my experience as an associate editor, I thought a good deal of variance in predicting eventual publication came from this phase of the process. Authors are often discouraged by negative feedback and miss the essential positive fact that they have been asked to revise! They may never resubmit at all, or may let an inordinate amount of time pass before they do (during which editors and reviewers become unavailable, lose the thread of the project, and so forth). An opposite

problem is that some authors become defensive and combative, and refuse to make needed changes for no reason.

So don't give up yet. Feel free to complain to your colleagues or rail at your poodle because the stupid reviewers failed to read your manuscript correctly. But then turn to the task of revising your manuscript with a dispassionate, problem-solving approach. First, pay special attention to criticisms or suggestions made by more than one reviewer or highlighted by the editor in the cover letter. These *must* be addressed in your revision—even if not in exactly the way the editor or reviewers suggest.

Next, look carefully at each of the reviewers' misreadings. I argued earlier that whenever readers of a manuscript find something unclear, they are right; by definition, the writing is unclear. The problem is that readers themselves do not always recognize or identify the unclarities explicitly. Instead, they misunderstand what you have written and then make a criticism or offer a suggestion that makes no sense. In other words, you should also interpret reviewers' misreadings as signals that your writing is unclear.

Think of your manuscript as a pilot experiment in which the pilot participants (reviewers) didn't understand the instructions you gave them. Analyze the reasons for their misunderstanding and then rewrite the problematic sections so that subsequent readers will not be similarly misled. Compared with the average journal reader, reviewers are almost always more knowledgeable about your topic, more experienced in writing manuscripts themselves, and more conscientious about reading your article. If they didn't understand, neither will that average reader.

When you send in your revised manuscript, tell the editor in a cover letter how you have responded to each of the criticisms or suggestions made by the reviewers. If you have decided not to adopt a particular suggestion, state your reasons, perhaps pointing out how you remedied the problem in some alternative way.

Here are some fictitious examples of cover-letter responses that also illustrate ways of responding to certain kinds of criticisms and suggestions within the revision itself.

1. *Wrong*: "I have left the section on the animal studies unchanged. If Reviewers A and C can't even agree on whether the animal studies are relevant, I must be doing something right."

   Right: "You will recall that Reviewer A thought that the animal studies should be described more fully, whereas Reviewer C thought they should be omitted. A biopsychologist in my department agreed with Reviewer C that the animal studies are not really valid analogs of the human studies. So I have dropped them from the text but cited Snarkle's review of them in an explanatory footnote on page 26."

2. *Wrong*: "Reviewer A is obviously Melanie Grimes, who has never liked me or my work. If she really thinks that behavioral principles solve all the problems of obsessive-compulsive disorders, then let her write her own article. Mine is about the cognitive processes involved."

   Right: "As the critical remarks by Reviewer A indicate, this is a conte n-tious area, with different theorists staking out strong positions. Apparently I did not make it clear that my article was intended only to cover the cognitive processes involved in obsessive-compulsive disorders and not to engage the debate between cognitive and behavioral approaches. To clarify this, I have now included the word 'cognitive' in both the title and abstract, taken note of the debate in my introduction, and stated explicitly that the article will not undertake a comparative review of the two approaches. I hope this is satisfactory."

3. *Right*: "You will recall that two of the reviewers questioned the validity of the analysis of variance, with Reviewer B suggesting that I use multiple regres-

sion instead. I agree with their reservations regarding the ANOVA but believe that a multiple regression analysis is equally problematic because it makes the same assumptions about the underlying distributions. So, I have retained the ANOVA, but summarized the results of a nonparametric analysis, which yields the same conclusions. If you think it preferable, I could simply substitute this nonparametric analysis for the original ANOVA, although it will be less familiar to the journal's readers."

Above all, remember that the editor is your ally in trying to shape a manuscript that will be a credit both to you and the journal. So, cooperate in the effort to turn your sow's ear into a vinyl purse. Be civil and make nice. You may not live longer, but you will publish more.

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