

## Content and Organization of a Manuscript

Research is complete only when the results are shared with the scientific community. Although such sharing is accomplished in various ways, both formal and informal, the traditional medium for communicating research results is the scientific journal.

The scientific journal is the repository of the accumulated knowledge of a field. In the literature are distilled the successes and failures, the information, and the perspectives contributed by many investigators over many years. Familiarity with the literature allows an individual investigator to avoid needlessly repeating work that has been done before, to build on existing work, and in turn to contribute something new. A literature built of meticulously prepared, carefully reviewed contributions thus fosters the growth of a field.

Although writing for publication is sometimes tedious, the rewards of publication are many for the writer, the reader, and the science. The writing process initially requires a thorough review and evaluation of previous work in the literature, which helps acquaint one with the field as a whole and establishes whether one's idea is truly new and significant. Authors beginning the writing process will find that there is no better way to clarify and organize their ideas than by trying to explain them to someone else. In fact, scientists "will get to really know a field only if [they] become sufficiently involved to contribute to it" (Orne, 1981, p. 4; see section 9.02 for references cited in the *Publication Manual*). Thus, the content and the organization of a scientific manuscript reflect the

logical thinking in scientific investigation, and the preparation of a manuscript for journal publication is an integral part of the individual research effort.

Just as each investigator benefits from the publication process, so the body of scientific literature depends for its vitality on the active participation of individual investigators. Authors of individual scientific articles contribute most to the literature when they communicate clearly and concisely.

This chapter discusses several considerations authors should weigh before writing for publication—considerations both about their own research and about the scientific publishing tradition in which they are to take part. First, the answers to questions about the quality of the research will determine whether the article is worth writing or is publishable. Second, consideration of contributions to the research will suggest who will take credit and responsibility as an author. Third, a survey of the typical kinds of articles will suggest which basic organization of the article would be most effective. Fourth, the parts of a manuscript are described. Consistency of presentation and format within and across journal articles is an aspect of the scientific publishing tradition that enables authors to present material easily. Finally, questions that address the quality of presentation will help writers to judge the thoroughness, originality, and clarity of their work and to facilitate communication with others within the same tradition.

### Quality of Content

No amount of skill in writing can disguise research that is poorly designed or managed. Indeed, such defects are a major cause for the rejection of manuscripts. Before committing a report to manuscript form, you as a potential author should critically review the quality of research and ask if the research is sufficiently important and free from flaws to justify publication. If the report came from another researcher, would you read it? Would it influence your work? Most researchers have in the back of a drawer one or more studies that failed to meet this test. No

matter how well written, a paper that reflects poor methods is unacceptable.

### 1.01 *Designing and Reporting Research*

You, as an author, should familiarize yourself with the criteria and standards that editors and reviewers use to evaluate manuscripts. (See sections 8.12–8.14 for a discussion of the review process.) Editors find in submitted papers the following kinds of defects in the design and reporting of research:

- piecemeal publication, that is, the separation of a single substantial report into a series of overlapping papers;
- the reporting of only a single correlation—even a significant correlation between two variables rarely has any interpretable value;
- the reporting of negative results without attention to a power analysis (see section 1.10);
- lack of congruence between a study's specific operations (including those related to the design and analysis) and the author's interpretation and discussion of the study's outcomes (e.g., failure to report the statistical test at the level being claimed);
- failure to report effect sizes;
- failure to build in needed controls, often for a subtle but important aspect of the study; and
- exhaustion of a problem—there is a difference between ongoing research that explores the limits of the generality of a research finding and the endless production of papers that report trivial changes in previous research.

### 1.02 *Evaluating Content*

Before preparing a manuscript, you should evaluate the research and judge that it is an important contribution to the field. An editorial by Brendan A. Maher (1974) will be helpful in making that judgment, and a humorous account by Robert R. Holt (1959, "Researchmanship or How to Write a Dissertation in Clinical Psychology Without Really Trying")

makes some sharp but pertinent points about research design. The following checklist (based on Bartol, 1981) may also help in assessing the quality of content and in deciding whether the research is likely to merit publication:

- Is the research question significant, and is the work original and important?
- Have the instruments been demonstrated to have satisfactory reliability and validity?
- Are the outcome measures clearly related to the variables with which the investigation is concerned?
- Does the research design fully and unambiguously test the hypothesis?
- Are the participants representative of the population to which generalizations are made?
- Did the researcher observe ethical standards in the treatment of participants—for example, if deception was used for humans?
- Is the research at an advanced enough stage to make the publication of results meaningful?

### Characteristics of Articles

#### 1.03 Authorship

Authorship is reserved for people who make a primary contribution to and hold primary responsibility for the data, concepts, and interpretation of results for a published work (Huth, 1987). Authorship encompasses not only those who do the actual writing but also those who have made substantial scientific contributions to a study. This concept of authorship is discussed in the "Ethical Principles of Psychologists and Code of Conduct" (APA, 1992a), Principle 6.23, which is reprinted in Appendix C and discussed in section 8.05.

To prevent misunderstanding and to preserve professional reputations and relationships, it is best to establish as early as possible in a research project who will be listed as an author, what the order of authorship will

be, and who will receive an alternative form of recognition (see sections 1.15, 7.01, and 8.05).

#### 1.04 *Types of Articles*

Journal articles are usually reports of empirical studies, review articles, theoretical articles, methodological articles, and case studies. They are primary publications (for a discussion of duplicate publication, see section 8.05).

Reports of empirical studies are reports of original research. They typically consist of distinct sections that reflect the stages in the research process and that appear in the sequence of these stages:

- **introduction:** development of the problem under investigation and statement of the purpose of the investigation,
- **method:** description of the method used to conduct the investigation,
- **results:** report of the results that were found, and
- **discussion:** interpretation and discussion of the implications of the results.

(See Figures 5.1 and 5.2 in chapter 5 for a sample one-experiment paper and an outline of a sample two-experiment paper, respectively.)

Review articles, including meta-analyses, are critical evaluations of material that has already been published. By organizing, integrating, and evaluating previously published material, the author of a review article considers the progress of current research toward clarifying a problem. In a sense, a review article is tutorial in that the author

- defines and clarifies the problem;
- summarizes previous investigations in order to inform the reader of the state of current research;
- identifies relations, contradictions, gaps, and inconsistencies in the literature; and
- suggests the next step or steps in solving the problem.

The components of review articles, unlike the sections of reports of empirical studies, are arranged by relationship rather than by chronology. (See Figure 5.3 for an outline of a sample review paper.)

Theoretical articles are papers in which the author draws on existing research literature to advance theory in any area of psychology. Review and theoretical articles are often similar in structure, but theoretical articles present empirical information only when it affects theoretical issues. The author traces the development of theory to expand and refine theoretical constructs. Ordinarily, the author presents a new theory. Alternatively, the author may analyze existing theory, pointing out flaws or demonstrating the superiority of one theory over another. In this type of theoretical analysis, the author customarily examines a theory's internal and external consistency, that is, whether a theory is self-contradictory and whether the theory and empirical observation contradict each other. The sections of a theoretical article, like those of a review article, are usually ordered by relationship rather than by chronology. (See Figure 5.3 in chapter 5 for an outline of a sample review paper.)

Methodological articles are papers in which new methodological approaches, modifications of existing methods, and discussions of quantitative and data analytic approaches are presented to the community of researchers. These papers should focus on the methodological or data analytic approach at hand and should introduce empirical data only as an illustration of the approach. Methodological articles should be presented at a level that makes them accessible to the well-read researcher and should present sufficient detail that researchers can assess the applicability of the methodology to their research problem. Further, the article should allow the reader to reasonably compare the proposed approach to currently used alternative approaches and to execute the approach. In methodological articles, highly technical materials (e.g., derivations, proofs, details of simulations) should be presented in appendices to improve the overall readability of the article.

Case studies are papers in which the author describes case material obtained while working with an individual or organization to illustrate a problem, to indicate a means for solving a problem, or to shed light

*Length.* Determine the typical length of an article in the journal for which you are writing, and do not exceed that length unless you are

Before beginning to write, you should consider the following major characteristics of a journal article: length, headings, and tone.

### 1.05 *Length, Headings, and Tone*

For more information on how to protect confidentiality in case reports, see [www.apastyle.org](http://www.apastyle.org)

Other, less frequently published types of articles in APA journals include brief reports, comments and replies on previously published articles, and monographs. Although the contents of these articles are dissimilar, the manuscripts should still be logically and coherently organized according to the guidelines described in the previous paragraphs. Authors should refer to the journal to which they are submitting the manuscript for specific information regarding these kinds of articles.

On needed research or theoretical matters. In writing case studies, authors carefully consider the balance between providing important illustrative material and using confidential case material responsibly. (See Appendix C, Ethical Principle 5.08, Use of Confidential Information for Didactic or Other Purposes.) Confidentiality is generally handled by one of two means. One option is to prepare the descriptive case material, present it to the subject of the case report, and obtain written consent for its publication from the subject. The other option is to disguise some aspects of the case material so that neither the subject nor those who know the subject would be identifiable. Such disguising of cases is a delicate issue, because it is essential not to change variables related to the phenomena being described. Three main strategies have emerged for achieving this: (a) altering specific characteristics, (b) limiting the description of specific characteristics, and (c) obfuscating case detail by adding extraneous material. For additional information on the presentation of case material, see Vandenberg (2001).

writing a monograph or some other exceptional material. To estimate how long your manuscript might run in printed pages for most APA journals, count every manuscript page (including the title and abstract pages, tables, and figures) and divide the number of manuscript pages by 4 (i.e., 1 printed page = 4 manuscript pages). Discursive writing often obscures an author's main points, and long manuscripts are frequently improved by condensing. If a paper is too long, shorten it by stating points clearly and directly, confining the discussion to the specific problem under investigation, deleting or combining tabular material, eliminating repetition across sections, and writing in the active voice.

**Headings.** Carefully outline the hierarchy of the ideas you wish to present, and use headings to convey the sequence and levels of importance. Headings help a reader grasp the article's organization and the relative importance of the parts of the article (see section 3.30).

**Tone.** Although scientific writing differs in form from literary writing, it need not and should not lack style or be dull. In describing your research, present the ideas and findings directly, but aim for an interesting and compelling manner that reflects your involvement with the problem (see chapter 2 on expression of ideas).

Scientific writing often contrasts the positions of different researchers. Differences should be presented in a professional, noncombative manner: For example, "Fong and Nisbett did not consider . . ." is acceptable, whereas "Fong and Nisbett completely overlooked . . ." is not.

**Parts of a Manuscript:**

Most journal articles published in psychology are reports of empirical studies, and therefore this section emphasizes their preparation.

**1.05 Title Page**

**Title.** A title should summarize the main idea of the paper simply and, if possible, with style. It should be a concise statement of the main topic and should identify the actual variables or theoretical issues under in-



investigation and the relationship between them. An example of a good title is "Effect of Transformed Letters on Reading Speed."

A title should be fully explanatory when standing alone. Although its principal function is to inform readers about the study, a title is also used as a statement of article content for abstracting and information services, such as APA's *Psychological Abstracts* and PsycINFO database. A good title easily compresses to the short title used for editorial purposes and to the running head used with the published article (see end of this section and section 5.15).

Titles are commonly indexed and compiled in numerous reference works. Therefore, avoid words that serve no useful purpose; they increase length and can mislead indexers. For example, the words *method* and *results* do not normally appear in a title, nor should such redundancies as "A Study of" or "An Experimental Investigation of" begin a title. Avoid using abbreviations in a title: Spelling out all terms will help ensure accurate, complete indexing of the article. The recommended length for a title is 10 to 12 words.

**Author's name (byline) and institutional affiliation.** Every manuscript includes a byline consisting of two parts: the name of the author and the institution where the investigation was conducted (without the words *by* or *from the*).

■ **Author's name (byline).** The preferred form of an author's name is first name, middle initial(s), and last name; this form reduces the likelihood of mistaken identity. To assist researchers as well as librarians, use the same form for publication throughout your career; that is, do not use initials on one manuscript and the full name on a later one. Determining whether Juanita A. Smith is the same person as J. A. Smith, J. Smith, or A. Smith can be difficult, particularly when citations span several years and institutional affiliations change. Omit all titles (e.g., Dr., Professor) and degrees (e.g., PhD, PsyD, EdD).

■ **Institutional affiliation.** The affiliation identifies the location where the author or authors conducted the investigation, which is usually

an institution. Include a dual affiliation only if two institutions contributed substantial financial support to the study. Include no more than two affiliations. When an author has no institutional affiliation, list the city and state of residence below the author's name. If the institutional affiliation has changed since the work was completed, give the current affiliation in the author identification notes. (See sections 3.89 and 5.15 for format instructions.)

**Running head for publication.** The running head is an abbreviated title that is printed at the top of the pages of a published article to identify the article for readers. The head should be a maximum of 50 characters, counting letters, punctuation, and spaces between words.

### 1.07 Abstract

An abstract is a brief, comprehensive summary of the contents of the article; it allows readers to survey the contents of an article quickly, and, like a title, it enables abstracting and information services to index and retrieve articles. All APA journals, except *Contemporary Psychology: APA Review of Books* require an abstract.

A well-prepared abstract can be the most important paragraph in your article. "Once printed in the journal, your abstract is just beginning an active and frequently very long life as part of collections of abstracts" in printed and electronic forms (APA, 1984). Most people will have their first contact with an article by seeing just the abstract; usually on a computer screen with several other abstracts; as they are doing a literature search through an electronic abstract-retrieval system. Readers frequently decide on the basis of the abstract whether to read the entire article; this is true whether the reader is at a computer or is thumbing through a journal. The abstract needs to be dense with information but also readable, well organized, brief, and self-contained. Also, embedding many key words in your abstract will enhance the user's ability to find it. A good abstract is

accurate: Ensure that the abstract correctly reflects the purpose and content of the manuscript. Do not include information that does

■ **nonevaluative:** Report rather than evaluate; do not add to or comment on what is in the body of the manuscript.  
 ■ **coherent and readable:** Write in clear and vigorous prose. Use verbs rather than their noun equivalents and the active rather than the

■ Use digits for all numbers, except those that begin a sentence (consider recasting a sentence that begins with a number).  
 ■ Abbreviate liberally (e.g., use *vs.* for *versus*), although all abbreviations that need to be explained in the text (see sections 3.21–3.26, 3.29) must also be explained on first use in the abstract.  
 ■ Use the active voice (but without the personal pronouns *I* or *we*, see section 2.04).

*Ways to improve conciseness:*

■ **self-contained:** Define all abbreviations (except units of measurement) and acronyms. Spell out names of tests and drugs (use generic names for drugs). Define unique terms. Paraphrase rather than quote. Include names of authors (initials and surnames) and dates of publication in citations of other publications (and give a full bibliographic citation in the article's reference list).  
 ■ **concise and specific:** Make each sentence maximally informative, especially the lead sentence. Be as brief as possible. Abstracts should not exceed 120 words. Begin the abstract with the most important information (but do not waste space by repeating the title). This may be the purpose or thesis or perhaps the results and conclusions. Include in the abstract only the four or five most important concepts, findings, or implications.

passive voice. Use the present tense to describe results with continuing applicability or conclusions drawn; use the past tense to describe specific variables manipulated or tests applied. Use the third person rather than the first person. Avoid boilerplate sentences and phrases that contain no real information (e.g., "Policy implications are discussed" or "It is concluded that").

An abstract of a *report of an empirical study* should describe

- the problem under investigation, in one sentence if possible;
- the participants or subjects, specifying pertinent characteristics, such as number, type, age, sex, and genus and species;
- the experimental method, including the apparatus, data-gathering procedures, complete test names, and complete generic names and the dosage and routes of administration of any drugs (particularly if the drugs are novel or important to the study);
- the findings, including statistical significance levels; and
- the conclusions and the implications or applications.

An abstract for a *review or theoretical article* should describe

- the topic, in one sentence;
- the purpose, thesis, or organizing construct and the scope (comprehensive or selective) of the article;
- the sources used (e.g., personal observation, published literature); and
- the conclusions.

An abstract for a *methodological paper* should describe

- the general class of method being proposed or discussed;
- the essential features of the proposed method;

- the range of application of the proposed method; and
- the behavior of the method, including its power and robustness to violations of assumptions.

An abstract for a *case study* should describe

- the subject and relevant characteristics of the individual or organization presented;
- the nature of or solution to a problem illustrated by the case example; and
- the questions raised for additional research or theory.

An abstract that is accurate, succinct, quickly comprehensible, and informative will increase the audience and the future retrievability of your article. You may submit only one version of the abstract. If it exceeds the 120-word limit, the abstractors in some secondary services may truncate your abstract to fit their databases, and this could impair retrieve-ability. For information on how abstracts are used to retrieve articles, consult the *PsycINFO User Reference Manual* (APA, 1992b).

*Note to authors of book chapters:* Book chapters do not usually require an abstract. However, the early inclusion of a specific purpose statement will benefit the reader as well as help abstracting and indexing services to construct appropriate content representations that will assist users in retrieving your chapter. Providing up front a clear statement of the purpose and content of your chapter increases the probability of accurate representation in secondary electronic databases. For chapters that report empirical research, either the introductory sentences or the purpose statement could include a summary of the study, sample description, and findings.

## 1.08 Introduction

*Introduce the problem.* The body of a paper opens with an introduction that presents the specific problem under study and describes the research

strategy. Because the introduction is clearly identified by its position in the article, it is not labeled. Before writing the introduction, consider

- Why is this problem important?
- How do the hypothesis and the experimental design relate to the problem?
- What are the theoretical implications of the study, and how does the study relate to previous work in the area?
- What theoretical propositions are tested, and how were they derived?

A good introduction answers these questions in a paragraph or two and, by summarizing the relevant arguments and the data, gives the reader a firm sense of what was done and why.

*Develop the background.* 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. A scholarly review of earlier work provides an appropriate history and recognizes the priority of the work of others. Citation of and specific credit to relevant earlier works are part of the author's scientific and scholarly responsibility and are essential for the growth of a cumulative science. At the same time, cite 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.

Demonstrate the logical continuity between previous and present work. Develop the problem with enough breadth and clarity to make it generally understood by as wide a professional audience as possible. Do not let the goal of brevity mislead you into writing a statement intelligible only to the specialist. Controversial issues, when relevant, should be treated fairly. A simple statement that certain studies support one conclusion and others support

another conclusion is better than an extensive and inconclusive discussion. Whatever your personal opinion, avoid animosity and ad hominem arguments in presenting the controversy. Do not support your position or justify your research by citing established authorities out of context.

*State the purpose and rationale.* After you have introduced the problem and developed the background material, you are in a position to explain your approach to solving the problem. Make this statement in the closing paragraphs of the introduction. At this point, a definition of the variables and a formal statement of your hypotheses give clarity to the paper. Bear in mind the following questions in closing the introduction: What variables did I plan to manipulate? What results did I expect, and why did I expect them? The logic behind "Why did I expect them?" should be made explicit. Clearly develop the rationale for each hypothesis.

### 1.09 Method

The Method section describes in detail how the study was conducted. Such a description enables the reader to evaluate the appropriateness of your methods and the reliability and the validity of your results. It also permits experienced investigators to replicate the study if they so desire. If your paper is an update of an ongoing or earlier study and the method has been published in detail elsewhere, you may refer the reader to that source and simply give a brief synopsis of the method in this section.

We present cross-sectional and 3-year longitudinal data from a study of adults aged 55 to 84. . . . The memory tasks were those used in our previous research (Zelinski et al., 1990; Zelinski, Gilowski, & Thompson, 1980).

(See section 1.12 for treatment of multiple experiments.)

*Identify subsections.* It is both conventional and expedient to divide the Method section into labeled subsections. These usually include descriptions of the participants or subjects, the apparatus (or materials), and

the procedure. If the design of the experiment is complex or the stimuli require detailed description, additional subsections or subheadings to provide the subsections may be warranted to help readers find specific information. Your own judgment is the best guide on what number and type of subheadings to use (see section 3.32 for guidelines.) Include in these subsections only the information essential to comprehend and replicate the study. Insufficient detail leaves the reader with questions; too much detail burdens the reader with irrelevant information.

*Participants or subjects.* Appropriate identification of research subjects and clientele is critical to the science and practice of psychology; particularly for assessing the results (making comparisons across groups); generalizing the findings; and making comparisons in replications, literature reviews, or secondary data analyses. The sample should be adequately described, and it should be representative (if it is not, give the underlying reasons). Conclusions and interpretations should not go beyond what the sample would warrant.

When humans participated as the subjects of the study, report the procedures for selecting and assigning them and the agreements and payments made. (If case studies are included, see Appendix C, Ethical Principle 5.08, on informed consent and confidentiality issues.) Report major demographic characteristics such as sex, age, and race/ethnicity, and, where possible and appropriate, characteristics such as socioeconomic status, disability status, and sexual orientation. When a particular demographic characteristic is an experimental variable or is important for the interpretation of results, describe the group specifically—for example, in terms of national origin, level of education, health status, and language preference and use.

The second group included 40 Central American women between the ages of 20 and 30 years, all of whom had emigrated from El Salvador, had at least 12 years of education, had been permanent residents of the United States for at least 10 years, and lived in Washington, DC.



To determine how far the data can be generalized, it may be useful to identify subgroups:

The Asian sample included 30 Chinese and 45 Vietnamese persons

or

Among the Latino and Hispanic American men, 20 were Mexican American and 20 were Puerto Rican.

Even when a characteristic is not an analytic variable, reporting it may give readers a more complete understanding of the sample and often proves useful in meta-analytic studies that incorporate the article's results.

When animals are the subjects, report the genus, species, and strain number or other specific identification, such as the name and location of the supplier and the stock designation. Give the number of animals and the animals' sex, age, weight, and physiological condition. In addition, specify all essential details of their treatment and handling so that the investigation can be successfully replicated.

Give the total number of subjects and the number assigned to each experimental condition. If any did not complete the experiment, state how many and explain why they did not continue.

When you submit your manuscript, indicate to the journal editor that the treatment of subjects (people or animals) was in accordance with the ethical standards of the APA (see Principles 6.1-6.20 in the "Ethical Principles of Psychologists and Code of Conduct," APA, 1992a).

**Apparatus.** The subsection on apparatus briefly describes the apparatus or materials used and their function in the experiment. Standard laboratory equipment, such as furniture, stopwatches, or screens, can usually be mentioned without detail. Identify specialized equipment obtained



from a commercial supplier by the model number of the equipment and the supplier's name and location. Complex or custom-made equipment may be illustrated by a drawing or photograph. A detailed description of complex equipment may be included in an appendix.

**Procedure.** The subsection on procedure summarizes each step in the execution of the research. Include the instructions to the participants, the formation of the groups, and the specific experimental manipulations. Describe randomization, counterbalancing, and other control features in the design. Summarize or paraphrase instructions, unless they are unusual or compose an experimental manipulation, in which case they may be presented verbatim. Most readers are familiar with standard testing procedures; unless new or unique procedures are used, do not describe them in detail.

If a language other than English is used in the collection of information, the language should be specified. When an instrument is translated into another language, the specific method of translation should be described (e.g., back translation, in which a text is translated into another language and then back into the first to ensure that it is equivalent enough that results can be compared).

Remember that the Method section should tell the reader *what* you did and *how* you did it in sufficient detail so that a reader could reasonably replicate your study. Methodological articles may defer highly detailed accounts of approaches (e.g., derivations and details of data simulation approaches) to an appendix.

### 1.10 Results

The Results section summarizes the data collected and the statistical or data analytic treatment used. Report the data in sufficient detail to justify the conclusions. Mention all relevant results, including those that run counter to the hypothesis. Do not include individual scores or raw data, with the exception, for example, of single-case designs or illustrative samples. Discussing the implications of the results is not appropriate here.

*Tables and figures.* To report the data, choose the medium that presents them most clearly and economically. Tables commonly provide exact values and, if well prepared, can present complex data and analyses in a format that is familiar to the reader (e.g., ANOVA tables). Figures of professional quality attract the reader's eye, provide a quick visual impression, and best illustrate complex relationships and general comparisons but are not intended to be as precise as tables. Always be aware that the scale and form of figures can have a great influence on the resulting interpretation of the data, and be scrupulous in presenting the data in as fair a manner as possible. Figures are more expensive than tables to reproduce, and both formats are more expensive than text to compose, so reserve them for your most important data and situations where their use enhances your ability to communicate your findings. Summarizing the results and the analysis in tables or figures instead of text may be helpful; for example, a table may enhance the readability of complex sets of variance results. Avoid repeating the same data in several places and using tables for data that can be easily presented in a few sentences in the text. When you use tables or figures, be certain to mention all of them in the text. Refer to all tables as *tables* and to all graphs, pictures, or drawings as *figures*. Tables and figures supplement the text; they cannot do the entire job of communication. Always tell the reader what to look for in tables and figures, and provide sufficient explanation to make them readily intelligible (see sections 3.62–3.86 for detailed information on tables and figures).

*Statistical presentation.* The field of psychology is not of a single mind on a number of issues surrounding the conduct and reporting of what is commonly known as *null hypothesis significance testing*. These issues include, but are not limited to, the reporting and interpretation of results of hypothesis tests, the selection of effect size indicators, the role of hypothesis-generating versus hypothesis-testing studies, and the relative merits of multiple degree-of-freedom tests. A discussion of these and other issues can be found in Wilkerson (1999). It is not the role of the



*Publication Manual* to resolve these issues. The inclusion of a particular approach should not be interpreted as an endorsement of that approach or as a lack of endorsement of some alternative approach. This edition attempts only to reflect the current views on the best practices with regard to data analytic approaches, reporting, and display. It must be recognized, however, that the needs of individual studies will, at times, differ from these generalizations. In all cases, the accurate and responsible reporting of the results of research studies must guide the research scientist and journal editor.

When reporting inferential statistics (e.g.,  $t$  tests,  $F$  tests, and chi-square), include information about the obtained magnitude or value of the test statistic, the degrees of freedom, the probability of obtaining a value as extreme as or more extreme than the one obtained, and the direction of the effect. Be sure to include sufficient descriptive statistics (e.g., per-cell sample size, means, correlations, standard deviations) so that the nature of the effect being reported can be understood by the reader and for future meta-analyses. This information is important, even if no significant effect is being reported. When point estimates are provided, always include an associated measure of variability (precision), specifying its nature (e.g., the standard error). (See sections 3.57 and 3.58 for information on style of statistics.)

The reporting of confidence intervals (for estimates of parameters, for functions of parameters such as differences in means, and for effect sizes) can be an extremely effective way of reporting results. Because confidence intervals combine information on location and precision and can often be directly used to infer significance levels, they are, in general, the best reporting strategy. The use of confidence intervals is therefore strongly recommended. As a rule, it is best to use a single confidence interval size (e.g., a 95% or 99% confidence interval) throughout the course of the paper.

Assume that your reader has a professional knowledge of statistics. Basic assumptions should not be reviewed. If there is, however, a question about the appropriateness of a particular test or approach, be sure to justify its use.



*Informationally adequate statistics.* When reporting inferential statistics, include sufficient information to help the reader fully understand the analyses conducted and possible alternative explanations for the outcomes of these analyses. Because each analytic technique depends on different aspects of the data, it is impossible to specify what constitutes a set of minimally adequate statistics for every analysis. However, a minimally adequate set usually includes at least the following: the per-cell sample size, the observed cell means (or frequencies of cases in each category for a categorical variable), the cell standard deviations, and an estimate of the pooled within-cell variance. In the case of multivariable analytic systems such as multivariate analyses, regression analyses, and structural equation modeling analyses, the mean(s), sample size(s), and the variance-covariance (or correlation) matrix or matrices are a part of a minimally adequate statistics set.

- For parametric tests of location (e.g., single-group, multiple-group, or multiple-factor tests of means), a set of sufficient statistics consists of cell means, cell sample sizes, and some measure of variability (such as cell standard deviations or variances): Alternatively, a set of sufficient statistics consists of cell means, along with the mean square error and degrees of freedom associated with the effect being tested.
- For randomized-block layouts, repeated measures designs, and multivariate analyses of variance, vectors of cell means and cell sample sizes, along with the pooled within-cell variance-covariance matrix, constitute a set of sufficient statistics.
- For correlational analyses (e.g., multiple regression analysis, factor analysis, and structural equation modeling), the sample size and variance-covariance (or correlation) matrix are needed, accompanied by other information specific to the procedure used (e.g., variable means, reliabilities, hypothesized structural models, and other parameters (e.g., see Raykov, Tomer, & Nesselroade, 1991).
- For nonparametric analyses (e.g., chi-square analyses of contingency tables, order statistics), various summaries of the raw data



(e.g., number of cases in each category, sum of the ranks, sample sizes in each cell) are sufficient statistics.

■ For analyses based on very small samples (including single-case investigations), consider providing the complete data in a table or figure.

**Statistical power.** Take seriously the statistical power considerations associated with your tests of hypotheses. Such considerations relate to the likelihood of correctly rejecting the tested hypotheses, given a particular alpha level, effect size, and sample size. In that regard, you should routinely provide evidence that your study has sufficient power to detect effects of substantive interest (e.g., see Cohen, 1988). You should be similarly aware of the role played by sample size in cases in which not rejecting the null hypothesis is desirable (i.e., when you wish to argue that there are no differences), when testing various assumptions underlying the statistical model adopted (e.g., normality, homogeneity of variance, homogeneity of regression), and in model fitting (e.g., see Serlin & Lapsley, 1985).

**Statistical significance.** Two types of probabilities are generally associated with the reporting of significance levels in inferential statistics. One refers to the a priori probability you have selected as an acceptable level of falsely rejecting a given null hypothesis. This probability, called the "alpha level" (or "significance level"), is the probability of a Type I error in hypothesis testing and is commonly set at .05 or .01. The other kind of probability, the  $p$  value (or significance probability), refers to the a posteriori likelihood of obtaining a result that is as extreme as or more extreme than the observed value you obtained, assuming that the null hypothesis is true.

The APA is neutral on which interpretation is to be preferred in psychological research (although individual journal editors may hold decided opinions on the issue). Because most statistical packages now report the  $p$  value (given the null and alternative hypotheses provided) and because this probability can be interpreted according to either mode of

thinking, in general it is the exact probability ( $p$  value) that should be reported. There will be cases—for example, large tables of correlations or complex tables of path coefficients—where the reporting of exact probabilities could be awkward. In these cases, you may prefer to identify or highlight a subset of values in the table that reach some prespecified level of statistical significance. To do so, follow those values with a single asterisk (\*) or double asterisk (\*\*\*) to indicate  $p < .05$  or  $p < .01$ , respectively. When using prespecified significance levels, you should routinely state the particular alpha level you selected for the statistical tests you conducted:

An alpha level of .05 was used for all statistical tests.

Two common approaches for reporting statistical results using the exact probability formulation are as follows:

With an alpha level of .05, the effect of age was statistically significant,  $F(1, 123) = 7.27, p < .01$ .

The effect of age was not statistically significant,  $F(1, 123) = 2.45, p = .12$ .

The second example should be used only if you have included a statement of significance level earlier in your article.

*Effect size and strength of relationship.* Neither of the two types of probability value directly reflects the magnitude of an effect or the strength of a relationship. For the reader to fully understand the importance of your findings, it is almost always necessary to include some index of effect size or strength of relationship in your Results section. You can estimate the magnitude of the effect or the strength of the relationship with a number of common effect size estimates, including (but not limited to)  $r^2$ ,  $\eta^2$ ,  $\omega^2$ ,  $R^2$ ,  $\phi^2$ , Cramér's  $V$ , Kendall's  $W$ , Cohen's  $d$  and  $k$ , Goodman-Kruskal's  $\lambda$  and  $\gamma$ , Jacobson and Truax's (1991) and

Kendall's (1999) proposed measures of clinical significance, and the multivariate Roy's  $\Theta$  and the Pillai-Bartlett V.

As a general rule, multiple degree-of-freedom effect indicators tend to be less useful than effect indicators that decompose multiple degree-of-freedom tests into meaningful one degree-of-freedom effects—particularly when these are the results that inform the discussion. The general principle to be followed, however, is to provide the reader not only with information about statistical significance but also with enough information to assess the magnitude of the observed effect or relationship.

### 1.11 Discussion

After presenting the results, you are in a position to evaluate and interpret their implications, especially with respect to your original hypothesis. You are free to examine, interpret, and qualify the results, as well as to draw inferences from them. Emphasize any theoretical consequences of the results and the validity of your conclusions. (When the discussion is relatively brief and straightforward, some authors prefer to combine it with the previous Results section, yielding Results and Discussion or Results and Conclusions.)

Open the Discussion section with a clear statement of the support or nonsupport for your original hypothesis. Similarities and differences between your results and the work of others should clarify and confirm your conclusions. Do not, however, simply reformulate and repeat points already made; each new statement should contribute to your position and to the reader's understanding of the problem. Acknowledge limitations, and address alternative explanations of results.

You are encouraged, when appropriate and justified, to end the Discussion section with commentary on the importance of your findings. This concluding section may be brief or extensive, provided that it is tightly reasoned and self-contained. In this section you might address the following sorts of issues:

- **Problem choice:** Why is this problem important? What larger issues, those that transcend the particulars of the subfield, hinge on



- the findings? What propositions are confirmed or disconfirmed by the extrapolation of these findings to such overarching issues?
- Levels of analysis: How can the findings be linked to phenomena at more complex and less complex levels of analysis? What needs to be known for such links to be forged?
- Application and synthesis: If the findings are valid and replicable, what real-life psychological phenomena might be explained or modeled by the results? Are applications warranted on the basis of this research?

The responses to these questions are the core of your contribution and justify why readers outside your own specialty should attend to your findings. These readers should receive clear, unambiguous, and direct answers.

### 1.12 Multiple Experiments

If you are integrating several experiments in one paper, describe the method and results of each experiment separately. If appropriate, include for each experiment a short discussion of the results, or combine the discussion with the description of results (e.g., Results and Discussion). Always make the logic and rationale of each new experiment clear to the reader. Always include a comprehensive general discussion of all the work after the last experiment.

The arrangement of sections reflects the structure previously described. Label the experiments *Experiment 1*, *Experiment 2*, and so forth. These labels are centered main headings (see section 3.31 on levels of headings). They organize the subsections and make referring to a specific experiment convenient for the reader. The Method and Results sections (and the Discussion section, if a short discussion accompanies each experiment) appear under each experiment heading. (Refer to Figure 5.2 for the form of a two-experiment paper.)

### 1.13 References

Just as data in the paper support interpretations and conclusions, so reference citations document statements made about the literature. All citations in the manuscript must appear in the reference list, and all references must be cited in text. The reference list should be succinct, not exhaustive; simply provide sufficient references to support your research. Choose references judiciously and cite them accurately. For example, if you retrieve an abstract but do not also retrieve and read the full article, your reference should be identified as an abstract. The standard procedures for citation ensure that references are accurate, complete, and useful to investigators and readers (see sections 3.94-3.103, chapter 4, and Appendix D on citations and references).

Whenever possible, support your statements by citing empirical work, such as method and results of an empirical study or a review of empirical studies (Lalumière, 1993). When you cite nonempirical work, make this clear in your narrative:

Cho (1991) theorized that

Audeh (in press) argued that

(see discussion in Ginsburg, 1993).

Similarly, when you want to direct the reader to background information, signal the reader with phrases such as "for a review, see" and "(e.g., see [author, year])."

### 1.14 Appendix

An appendix is helpful if the detailed description of certain material is distracting in, or inappropriate to, the body of the paper. Some examples of material suitable for an appendix are (a) a new computer program specifically designed for your research and unavailable elsewhere, (b) an unpublished test and its validation, (c) a complicated mathematical proof, (d) a list of stimulus materials (e.g., those used in psycholinguistic research), and (e) a detailed description of a complex piece of equipment.

Include an appendix only if it helps readers to understand, evaluate, or replicate the study.

#### 1.15 Author Note

The author note (a) identifies the departmental affiliation of each author; (b) identifies sources of financial support; (c) provides a forum for authors to acknowledge colleagues' professional contributions to the study and personal assistance; and (d) tells whom the interested reader may contact for further information concerning the article.

In addition, the author note is the place for disclosure: for example, mentioning the bases of a study, such as a dissertation or whether the study is part of a large-scale multidisciplinary project; indicating that the results have been presented at a meeting; and explaining relevant interests or relationships that raise the possibility of being perceived as a conflict of interest. (APA authors are required to complete a conflict of interest form; see the journal's instructions to authors.) Authors of book chapters that present a revised, condensed, or expanded version of a previously published journal article should also disclose this information in a note of this type. (See sections 3.89 and 5.20 for details on the arrangement and format of the author note.)

#### Quality of Presentation

A manuscript that is important enough to write deserves thoughtful preparation. You should evaluate the content and organization of the manuscript just as you evaluated the investigation itself. The following questions (based on Bartol, 1981) may help you assess the quality of your presentation:

- Is the topic appropriate for the journal to which the manuscript is submitted?
- Is the introduction clear and complete?
- Are the techniques of data analysis clearly enough presented so that an individual with a copy of the data set and the coding system could reproduce your analyses?

- Does the statement of purpose adequately and logically orient the reader?
- Is the literature adequately reviewed?
- Are the citations appropriate and complete?
- Is the research question clearly identified, and is the hypothesis explicit?
- Are the conceptualization and rationale perfectly clear?
- Is the method clearly and adequately described? In other words, can the study be replicated from the description provided in the paper?
- If observers were used to assess variables, is the interobserver reliability reported?
- Are the techniques of data analysis appropriate, and is the analysis clear? Are the assumptions underlying the statistical procedures clearly met by the data to which they are applied?
- Are the results and conclusions unambiguous, valid, and meaningful?
- Is the discussion thorough? Does it stick to the point and confine itself to what can be concluded from the significant findings of the study?
- Is the paper concise?
- Is the manuscript prepared according to the Checklist for Manuscript Submission? (See Appendix A to this volume.)

## If Eisenhower Had Given the Gettysburg Address

*The Gettysburg Address, as Lincoln delivered it.*

Four score and seven years ago our fathers brought forth on this continent a new nation, conceived in liberty, and dedicated to the proposition that all men are created equal. Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure. We are met on a great battle-field of that war. We have come to dedicate a portion of that field as a final resting-place for those who here gave their lives that this nation might live. It is altogether fitting and proper that we should do this.

But, in a larger sense, we cannot dedicate... we cannot consecrate... we cannot hallow... this ground. The brave men, living and dead, who struggled here, have consecrated it far above our poor power to add or detract. The world will little note nor long remember what we say here, but it can never forget what they did here. It is for us, the living, rather, to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us... that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion; that we here highly resolve that these dead shall not have died in vain; that this nation, under God, shall have a new birth of freedom, and that government of the people, by the people, for the people, shall not perish from the earth.

I haven't checked these figures but 87 years ago, I think it was, a number of individuals organized a governmental set-up here in this county, I believe it covered certain Eastern areas, with this idea they were following up based on a sort of national independence arrangement and the program that every individual is just as good as every other individual. Well, now, of course, we are dealing with this big difference of opinion, civil disturbance you might say, although I don't like to appear to take sides or name any individuals, and the point is naturally to check up, by actual experience in the field, to see whether any governmental set-up with a basis like the one I was mentioning has any validity and find out whether that dedication by those early individuals will pay off in lasting values and things of that kind. . . . But if you look at the overall picture of this, we can't pay any tribute - we can't sanctify this area, you might say - we can't hallow according to whatever individual creeds or faiths or sort of religious outlooks are

*The Gettysburg Address, if Eisenhower had given it (written by Oliver Jensen):*

involved like I said about this particular area. It was those individuals themselves, including the enlisted men, very brave individuals, who have given the religious character to the area. The way I see it, the rest of the world will not remember any statements issued here but it will never forget how these men put their shoulders to the wheel and carried this idea down the fairway. Now frankly, our job, the living individuals' job here is to pick up the burden and sink the putt they made these big efforts here for. It is our job to get on with the assignment – and from these deceased time individuals to take extra inspiration, you could call it, for the same theories about the set-up for which they made such a big contribution. We have to make up our minds right here and now, as I see it, that they didn't put out all that blood, perspiration and – well – that they didn't just make a dry run here, and that all of us here, under God, that is, the God of our choice, shall beef up this idea about freedom and liberty and those kind of arrangements, and that government of all individuals, by all individuals and for the individuals, shall not pass out of the world-picture.