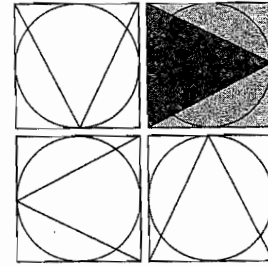


Kerlinger F  
and  
Lee H. B.

Wadsworth 1992.



## APPENDIX A

# GUIDE FOR WRITING RESEARCH REPORTS

The principal means of scientific communication is the research paper. Over the years, the format of such reports has become standardized in a way to best meet the requirements of scientific communication. The conventions for writing a scientific report are concerned with the organization of the report and the style of presentation. Report writing must be both brief and clear. Typographical errors, strikeouts, cross-outs, and badly written statements detract from the presentation of the report.

When writing the report of an experiment, it is necessary that the experimenter include everything relevant to the problem under study. The theoretical basis of the study must be emphasized. The reader of the report must be able to understand how prediction follows from theory. The report must be clear in every detail concerning the manner in which the study was carried out. The report must show precisely how conditions were set up to permit manipulation or the study of the variables in the order demanded by the hypothesis. The report must be sufficiently detailed to permit the exact duplication of the study by another independent researcher. Finally, the report must state what results were obtained and what interpretation of these can be made within the context of the theory. An experimental report is a complete cycle beginning with theory and ending with theory.

There are a number of popular styles for writing research reports. They are all similar as far as what the researcher should put into the paper. However, the details within the styles themselves differ. Among one of the more popular and "easier" styles is the one by the American Psychological Association. This style is often referred to as "APA Style." Although it was originally developed for psychology journals published by the American Psychological Association, it has made its way into non-APA journals and also non-psychology journals.

It is this style that we will present here since it is the most often used style of writing found in the social and behavioral sciences. Even many education journals have adopted this style. However, our descriptions are brief and one of the goals is to give the reader a general idea of how research papers are organized. This is no

substitute for the actual Manual of the American Psychological Association (1994). From its origin as a brief size manual, the manual has grown considerably in size and detail. The most current edition published in 1994 consists of 368 pages. Obviously, a brief section in a textbook cannot possibly capture all of the details contained in the current full-sized manual. The brief presentation here will be enough to give the reader some information that will help that person when consulting the actual manual itself. Also, there are several publications geared toward helping the beginner learn and understand this style of presentation (see Gelfand & Walker, 1990; Hubbach, 1995; Parrott, 1994; Pyrczak & Bruce, 1992). The Hubbach (1996) book includes special sections on scientific papers, APA style and excellent examples.<sup>1</sup>

The outline of the research paper for APA style is:

1. Title Page
2. Abstract
3. Introduction
4. Method
  - a. Participants
  - b. Apparatus/Materials
  - c. Procedure
5. Results
6. Discussion
7. References
8. Tables
9. Figures

## Title Page

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The title page is a separate page that contains the title of the study. It also contains the running head and the name of the author or authors with their institutional affiliation. The running head is a one to two key word description of the study and appears on every page of the manuscript. If your manuscript is submitted for publication, it serves as a useful identification tool for the editor.

The purpose of a title is to provide a miniature description of your study. To convey the most information, titles typically include the independent and the dependent variables of the experiment. A simple model of a title is as follows: THE DEPENDENT VARIABLES AS A FUNCTION OF THE INDEPENDENT VARIABLES. To write a title for your experiment you could simply substitute the dependent variable(s) and independent variable(s) into the simple model. This might give you something like, Sexual Stimulation as a Function of Caffeine or Reduction

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<sup>1</sup>The authors thank Roberta J. Landi for calling our attention to the Hubbach book.

of Anxiety by Use of Filmed Modeling. Titles such as "Psychology Experiment" or "Course Project" are NOT acceptable. The title should generally be 15 words or less.

## Abstract

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The purpose of an abstract is to provide a summary of the research paper. It must contain enough information to tell the reader the purpose and results of the research. It must contain the major points from each section of the paper:

- a statement of the problem
- a very brief description of the method
- a definition of all abbreviations and acronyms
- the most important results, and
- the conclusions.

The abstract is typed as a single paragraph with no paragraph indentation. Like the title page, the abstract appears on a page by itself. It should not exceed 15 single-spaced type-written lines or 200 words. It must not include any data or extensive interpretation. This section is labeled "Abstract" and the label is centered on the page.

## Introduction

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- a. The introduction must begin with the *background* of the experiment or study. This is an account of the theory and previous research relevant to your study. The introduction tells the reader the importance of the study by giving a brief review of the literature of papers that are relevant to this research study. Using APA style, this is the only section of the paper that does not receive a label. In different words, *no* label such as "Introduction" is to appear in the paper written in APA style. One must be accurate in reporting of previous work that was relevant to the research study. All direct copying must be encased in quotation marks, and proper reference to the source must be made. Be sure the studies cited are relevant to the experiment. Referrals to articles done by other researchers in the introduction (or any section of the paper) are done by giving the last name of each author and the year of publication. The year of publication is encased in parentheses. The complete reference for any citation must be given in the Reference section that is at the end of the paper.

### *Example*

Smith and Martin (1953) reported that the performance of their participants improved under these conditions, while a decrement in performance was observed by other investigators (Burns, 1950; Stevens & White, 1943).

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Specific references to information in a book or journal article is indicated as follows:

Thomas (1983, p. 304) reported that . . .

The results of an earlier study (Carter, 1992, pp. 279–285) led to . . .

A researcher should never list a reference that has not been read personally. In reporting information obtained from a secondary source, cite the secondary source in the text and list it in the references.

### Example

An experiment by Jones as reported by McGeoch (1982), found that . . .

- b. After the reader has been given the background for the study, the introduction proceeds with the purpose or theoretical base for your experiment. The specific problem under study is stated along with a theoretical or literary statement of the hypothesis to be tested and general predictions and expectations of the outcome of the research.

### Example

Dysphoria may serve as a significant confounding variable. . . . Therefore, we conducted a study to examine the relationships among . . .

- c. The hypothesis must then be translated into operational terms. The researcher must specify what variables are to be manipulated (independent), if any, and which are to be observed (dependent). The independent and dependent variables should be made clear *without* using a sentence that says: “The independent variable was \_\_\_\_\_ and the dependent variable was \_\_\_\_\_.” Rather, one might say something like: “In this experiment (study), the number of correct answers to test questions was investigated as a function of the rate of presentation of the questions,” or “We hypothesized that the indirect effects of marital relationship on psychosocial adjustment are mediated through. . . .”
- d. Finally, use the Introduction to define any terms that are used for the first time. If the researcher wants to refer to the Comrey Personality Scales as the CPS, a sentence such as:

The Comrey Personality Scales (Comrey, 1970), hereafter referred to as the CPS was used to . . .

A word like *learning* is probably too general to use in exact technical writing. Say exactly which learning paradigm is meant. This would be the same for words like *personality* or *anxiety*.

There is a tendency to write too much detail in the Introduction. The details of the experiment or study are not to be presented in the introduction section of the paper. The details of the experiment or study are presented in the Method section. It is allowable to have an outline or the general methodology to be followed in the introduction, but no details given. The results of the study should not appear in the Introduction. There is a separate section for that.

## Method

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The Method section has three subheadings: Participants, Apparatus/Materials, and Procedure. Each are described separately below. The Method section as a whole, describes the experimentation or the conduct of the study. It must be written in sufficient detail so that other investigators could take the description and repeat what has been done *exactly*.

### Participants

The Participants section constitutes a description of the characteristics of the participants used in the study or experiment. It tells who the participants were, how many there were, and any details that might be relevant. It also includes how the participants were selected. Among the description of the participants, most studies describe the participants in terms of gender, age, education level, ethnicity, and any other such relevant descriptors.

#### *Example*

The participants (Ss) were 48 people chosen from a sample of those seated by the fountain in front of City Hall at 10 to 11 AM on a Monday in the month of July 1998. The 18 males and 30 females, ranging in age from 15 to 35, represented every third person that stopped at the fountain for a period of at least 5 minutes. Ten other people who were contacted refused to fill out the questionnaire.

When groups of participants are used, a description must be provided telling the reader how the participants were assigned to the various groups or treatment conditions.

### Apparatus and Materials (Instrumentation)

All nontrivial materials and apparatus used in the experiment must be described in sufficient detail for someone to set up the identical situation. If the experiment required pencils, they need not be defined here unless they were unusual pencils that have a specific effect on the study. If you are using standardized materials or

apparatus, such as a personality test, they are not usually referenced here unless they had some special features that were most important in your experiment. Standard existing instruments such as the Comrey Personality Scales is referenced in the procedure section. If you construct or use new materials or apparatus, such as those of your own creation, you must describe them fully. Include information about materials used to time and/or record responses. If certain special equipment was used in the experiment such as “the Smith-Johnson Oscillator Coil Model 9” the reader should be informed as to where such a device can be obtained.

## Procedure

The Procedure section is a description or account of the sequence of events that took place during the execution of the study or experiment. In short, this tells what was done by the experimenter(s) and to the participant(s). You should describe what was done, in what order, for how long, et cetera.

### *Example*

The data were collected on each participant using a drug frequency questionnaire during the fourth period in a school day. The participants were asked to indicate the amount of alcohol they consumed.

The statistical methods used to analyze the data collected from the study and/or the design of the research study may be presented in the procedure section.

It is possible that at some time you will discover you have deviated from the procedure that you should have followed. If this happens, describe the procedure exactly as it was conducted—not as it should have been conducted. This is usually carelessness, but it is ultimately excusable.

Dishonesty is not excusable. Procedure sections may tend to get too complicated in experiments where there are several phases or conditions. In this case, it is frequently helpful to adopt labels for the phases or conditions. For example, with a teaching machine you might divide a trial into the “study phase” and the “test phase” for purposes of distinctive and simplified reference later.

## Results

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The data obtained in the study or experiment and the analysis performed on them are reported in the Results section.

- a. It begins with a description of the dependent variable measures that were recorded during the experimental session. With a teaching machine example, you would record the number of errors and the length of time to answer the questions.

- b. Next, describe the data from the experiment. The data you report will generally be some type of summary of the raw data. For example, perhaps you are going to report the results in terms of the means and standard deviations of the raw data recorded during the session. You might say, "The mean and standard deviation of the number of errors were calculated for each series of 20 questions."
- c. Then refer to the place where these data can be found. Data can be presented in either tables or figures (graphs). They are labeled using numbers and referred to by number. As an example, you might say, "The mean errors for each series of 20 questions is shown in Table 1 (or Figure 1)." If you have several dependent variables, the results for each variable may require a separate table or figure. Rules for the preparation of tables and figures are given in a later section of this appendix.
- d. After you refer to a table or figure, you should describe the important features of the data shown in the figure or table. There is much information presented in a table or figure and it is your job to aid the reader in comprehending it. You must point out the important features, the general trends, and any inversions or peculiarities that seem to you to be important; that is, which seem to be more than chance occurrences.

You should support your analysis of the information in a table or figure by giving some appropriate data values to illustrate your point. Do not, however, attempt to cite all of the data. That is what tables and figures are for. If you have 25 pages of a computer output, this output must be summarized and put into a table or figure. If the output is to be included, it will only be an attachment to the paper. Large attachments are generally unacceptable if the manuscript is submitted for publication.

### Example

As shown in Figure 1, the functions for reward and non-reward conditions begin at the same level. The mean number of errors on the first trial was approximately 4.5 for both conditions. After the first trial, the errors for the reward condition began to drop at a fairly steady rate, while the errors for the non-reward condition remained relatively constant. For instance, on the second trial, .50 fewer errors were made in the reward condition, but by the sixth trial this difference had increased until 3.39 fewer errors were made in the reward condition. Overall, the mean number of errors decreases as a function of trials in the reward condition, but not in the non-reward condition.

One final rule for writing the Results section is that there must be *no discussion* in the Results section. That is, there is no personal opinion or interpretation of the data summaries. Only the facts of the findings are presented in the Results section of the paper. This is more fully explained in the next section.

## Discussion

---

The purpose of the Discussion section is to interpret the results and to explain the conclusions to which they led. It is here that the contribution or value of your experiment or study is made clear.

- a. The discussion generally begins with a concise statement of the important results.

### *Example*

The results of the present study are in agreement with other studies comparing alcohol to drug abuse in Latin American youths.

- b. Next is the interpretation of the results. An inference is made from the particular dependent measures of the experiment to the psychological process of interest.

### *Example*

Asian youths have consistently reported lower drug use because they may feel more threatened by the perceived consequences of their acknowledged drug use.

Apparently there is a difficult distinction between Results and Discussion sections involved here. In the Results section you adhere strictly to the particular dependent variables of the study. All inferences, interpretations, extrapolations, and reasonable opinion belong in the Discussion section.

For example, in the Results section, the research study talks about a decrease in errors as a function of trials in the reward condition, while errors remain constant in the non-reward condition. In the Discussion section, this might be interpreted to mean that acquisition (or learning) took place in the reward condition, but not in the non-reward condition. The interpretation that learning has been affected differentially involves and inference made from the error data, and therefore belongs in the Discussion and not in the Results section.

- c. The results of your experiment or study should then be related to the results of other studies on the same or similar problems, and/or to any relevant theories with which you are familiar and can document. Point out how your results agree or disagree with previous work, how they extend the body of knowledge, support or disagree with theory, and so on. The relation of your results to other results or theories must also be rationalized. If there is agreement, it is sufficient to simply state exactly what the agreement is. In the case of disagreement, you should offer some possible reasons for the discrepancy. Typically, the first explanation that will occur to you is that there was some-



thing wrong with your experiment. This may or may not be true. If it is true, point out exactly what the weakness was and *why*.

- d. Any weaknesses or flaws in your experiment that limit the usefulness or generality of the conclusions that can be drawn should be discussed. When you report a weakness, also explain why it is a weakness, and indicate how it can be corrected. Do not create a lengthy list of criticisms, this will only create a bad impression to the reader/reviewer.
- e. A good way to end a discussion is to suggest what the next experiment on the same topic might be. If you attempt to do this, be sure to explain the experiment in enough detail for it to be meaningful, and explain the reasoning that makes it the logical step. Statements like the following examples must be avoided because they waste space and time.

### Examples

Bigger rewards should be used in the next experiment.  
Better participants should have been used.

You would need to explain why the current set of participants were deficient and how the newer participants would be different.

## References

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Only references cited in the body of the paper must be given in the reference list. *All citations must appear in the reference list.* The listing is in alphabetical order by first author's last name. The author's first and middle initials follow the last name. *The names of journals are written out in full.*

For journal articles, page numbers for the entire article are cited. Do not cite the total number of pages in a book. In an edited book, list only the page numbers that pertain to that part of the book (chapter) written by the author(s) you are citing. Examples of the style to be used for the most frequent types of references are given below. The type of publication is noted inside brackets only to help you to identify each—you would not do this in your paper's reference section.

Note that American Psychological Association style of writing references has the year of publication encased in parentheses, following the authors' names. The article title follows the date. Only the first letter of the first word in each sentence of the article title is capitalized. The first letter of the first word following a colon is also capitalized. The name of the journal, volume number of journal and page numbers of the article within that journal are listed next. The name of the journal and the volume number is either underlined or set in *italics*. The beginning letters of the journal title are capitalized (initial capitalization).

For books, the author's name is followed by the date of publication encased in parentheses. The title of the book is given next. Note that only the first letter of the

first word in each sentence of the book title is capitalized. The title of the book is also underlined or set *italics*. The title of the book is followed either by the edition number of the book (2nd edition [no italics]), or by the volume number (vol. 3 [no italics]). If no special edition or volume number is needed, then follow the title with a period. The city followed by a colon (:), and the name of the publisher followed by a period (.) concludes the entry.

### Examples

- Erlich, O., & Lee, H. B. (1978). Use of regression analysis in reporting test results for accountability. *Perceptual and Motor Skills*, 47, 879–882. [Journal article, two authors]
- Hollenbeck, A. (1978). Problems of reliability in observational research. In G. Sackett, Ed., *Observing behavior: Vol. 2. Data collection and analysis methods* (pp. 79–98). Baltimore: University Park Press. [Chapter in an edited volume, with volume also having a special title]
- Jeffrey, W. E. (1969). Early stimulation and cognitive development. In J.P. Hill, Ed., *Minnesota Symposia on Child Development* (vol. 3) (pp. 46–61). Minneapolis: University of Minnesota Press. [Chapter in an edited volume]
- Kerlinger, F. N. (1986). *Foundations of behavioral research* (3rd ed.). Fort Worth, TX: Harcourt Brace. [Book]
- Stevens, S. S. (Ed.). (1951). *Handbook of experimental psychology*. New York: John Wiley & Sons. [Book with editor as author]
- Yi, S. (1977). Some implications of Jeffrey's serial habituation hypothesis: A theoretical basis of resolving one-look versus multiple-look attentional account of discrimination learning. *Journal of General Psychology*, 97, 89–99. [Journal article, one author]

## The Preparation of Figures

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Figures must contain the basic information necessary for comprehension without detailed reference to the text. This requires careful labeling of coordinates and a complete caption (title). When more than one curve is shown on the same set of coordinates, you must use a legend as in Figure A.1, or label the curve directly. *The figure caption appears below the art* and consists of a very brief summary of what is plotted on the graph. Avoid captions like "Graph of the Results" or "A Graph of . . ." Only the first word in the caption is capitalized and a period is placed at the end. Number the figures successively with Arabic numerals. Use a ruler to connect the data points. Do not smooth the curve by drawing it freehand. If possible, use one of the many computer programs for generating graphs. Microsoft Excel, for example, is capable of producing some very nice-looking graphs suitable for presentation in an article. Some word-processing programs such as Microsoft Word are also capable of producing graphs. There are, of course, other very elaborate programs for constructing graphs.

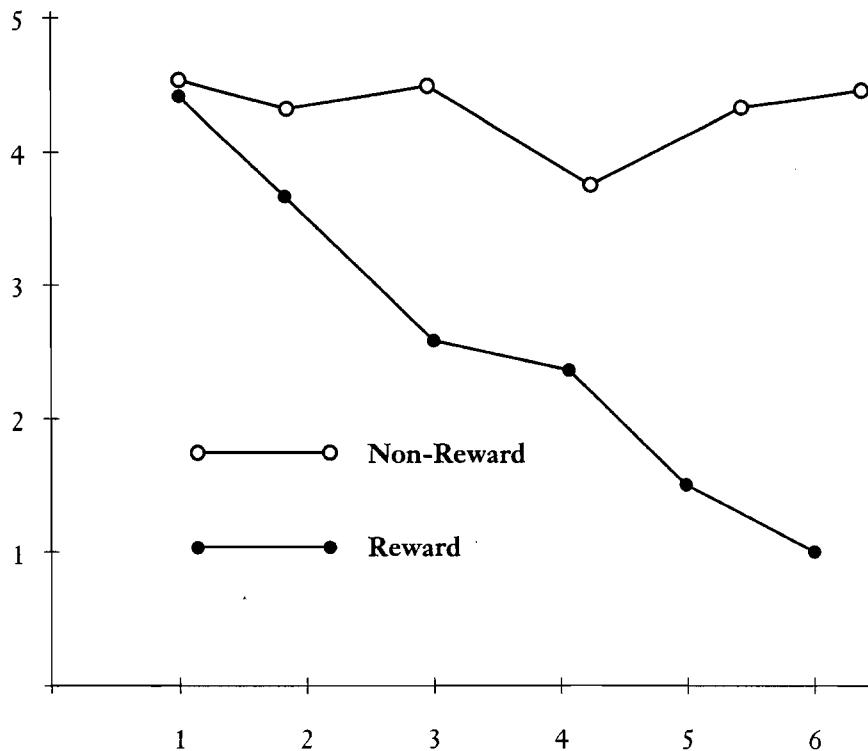
## The Preparation of Tables

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As with figures, tables must contain sufficient information to be understood largely independent of the text. The title must state concisely what is contained in the table. Make the title as specific as possible. Avoid titles like: "Data Table," "Table of

## Example

▣ FIGURE A.1 Mean number of errors as a function of trials under conditions of reward and non-reward.



Results,” or “Table showing . . .” In general, avoid uncommon abbreviations. If they are necessary, they should be explained in a footnote to the table.

Arrange the table in a form that is easy for the reader to interpret. If necessary, more than one table should be used. *The title is centered above the table.* Headings, capitalization, and other important features of a table can be derived from a study of Table A.1 (page A14) in this document. Note that computer word-processing programs such as Microsoft Word have built-in capabilities for generating tables. Be sure the data included in your table is aligned properly; that is, percent signs, decimals, and columns. This makes it easier for the reader to view and follow the data.

Although no exact limitation is set for the number of figures and tables, many journals will have limited space for articles and as such request that only the most necessary tables and figures be included in the actual paper. A researcher with a large number of tables, figures, computer output, and such can make them available to

*Example*

☐ TABLE A.1 *Mean Errors as a Function of Trials under Conditions of Reward and Non-reward.*

<i>Trials</i>	<b>Mean Errors</b>	
	<i>Reward</i>	<i>Non-reward</i>
1	4.49	4.51
2	3.80	4.30
3	2.62	4.45
4	2.31	3.87
5	1.46	4.37
6	1.12	4.51

interested readers. There is an organization that will accept these materials and for a nominal fee make them available to any one interested in seeing the additional data. If the researcher chooses to use this service, a reference or a footnote should be made in the actual paper. That footnote might look like the following.

*Example*

<sup>1</sup>The correlation matrices on which this study was based have been deposited with the National Auxiliary Publications Service. See NAPS Document No. \_\_\_\_\_ for \_\_\_\_\_ pages of supplementary material from NAPS, c/o Microfiche Publications, 248 Hempstead Turnpike, West Hempstead, NY 11552. Remit in advance, in U.S. funds only, \$ \_\_\_\_\_ for photocopy or \$ \_\_\_\_\_ for microfiche. Outside of U.S. and Canada add postage of \$ \_\_\_\_\_ or \$ \_\_\_\_\_ for microfiche postage.

This material would be prepared and submitted with the article for publication. The material would be labeled for deposit with NAPS. If the manuscript is accepted for publication, the additional information is sent to NAPS. NAPS will return to the author and journal editor the document number and charge amounts.

## The Use of Abbreviations

When a word or term is used very frequently in a report, it may be abbreviated. Abbreviations for participant(s) and experimenter(s) are standard and are almost always used:

*Examples:*

participant = S    participants = S s    participant's = S's    participants' = Ss'  
 experimenter = E    experimenters = E s    experimenter's = E's    experimenters' = Es'

Other abbreviations are not standard and must be defined the first time they are used.

*Example*

The apparatus was a visual test module (VTM). The VTM was programmed to . . . The test instrument was the Comrey Personality Scales, hereafter referred to as the CPS, consisted of eight scales.

## Style, Tenses, Et Cetera

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The activity described in the research report took place in the past and is described in the past tense. Personal pronouns are very rarely used, and so are statements about E's desires, wishes, conclusions, and so on.

*Examples*

Poor:	The E wanted to find out . . .
Better:	The purpose of the study was . . .
Poor:	We decided that the experiment showed . . .
Better:	The conclusion of the study was . . .

Avoid excessive use of parenthetical expressions. There is a tendency to refer to figures and tables parenthetically, which should be avoided. For example, avoid saying: "The mean errors decreased as a function of trials (Table 1)." For long sentences, however, readability may be improved through the use of parenthetical expressions. Keep in mind that you must write for the general reader. This means that you must explain things. However, you should not take on the task of teaching the reader about certain areas of basic understanding. For example, it is fine to refer to Skinner's theory of learning without going into the details of Skinner's theory. However, **DO NOT ASSUME THE READER** knows the study to which you are referring.

## References

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American Psychological Association (1994). *Publication manual for the American Psychological Association*. Washington, DC: Author.

- Gelfand, H., & Walker, C. J. (1990). *Mastering APA style: Student's workbook and training guide*. Washington, DC: American Psychological Association.
- Hubbach, S.M. (1995). *Writing research papers across the curriculum* (4th ed.) Fort Worth, TX: Harcourt Brace.
- Parrott, L. (1994). *How to write psychology papers*. New York: Harper-Collins.
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