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Manuscript Structure and Content

In this chapter, we describe the structure of the manuscript, with a focus on function and format. For each manuscript element, we detail current expectations for the content. In each section, the following kinds of information are included:

- a definition or description of the manuscript part,
- specific guidelines on content to be included, and
- guidelines on how the part should appear in text.[1]

In this edition of the *Publication Manual*, we present updated journal article reporting standards, and these are also discussed in this chapter. These reporting standards relate to material recommended to appear in the abstract, the introduction of the research problem, the method section, the results, and the discussion of the results. Also presented are three specific modules relating to studies with manipulated conditions or interventions. The chapter ends with sample papers that illustrate the function and format of the sections described.

Journal Article Reporting Standards

Reporting standards provide a degree of comprehensiveness in the information that is routinely included in reports of empirical investigations. The motivation for the development of reporting standards has come from within the disciplines of the behavioral, social, educational, and medical sciences. Uniform reporting standards make it easier to generalize across fields, to more fully understand the implications of individual studies, and to allow techniques of meta-analysis to proceed more efficiently. Also, decision makers in policy and practice have emphasized the importance of understanding how research was conducted and what was found. A set of comprehensive reporting standards facilitates this understanding.

[1]Note that guidelines for the formatting and preparation of the complete manuscript can be found in section 8.03.

Reporting standards are based on the research design and implementation of the study being reported, not on the topical focus of the study or the particular journal that might serve as the vehicle for its publication. Reporting standards are emergent and have not yet been developed for all types of studies.

In the next section, we describe a set of reporting standards relating to the material recommended to appear in (a) the abstract; (b) the introduction of the research problem; (c) subsections of the method section describing the characteristics of the participants; sampling procedures; sample size, power, and precision; measures and covariates; and the general descriptor of the research design; (d) the statistical results; and (e) the discussion of results. These standards relate to all types of research designs. Then we present three specific modules relating to studies with manipulated conditions or interventions. You can use (or a journal editor may ask you to use) these modules in addition to the general template if they are relevant to the research at hand. One module contains standards for describing the experimental manipulation or intervention itself, and the other two modules describe features of designs with experimental (i.e., random assignment) and quasi-experimental (i.e., nonrandom assignment) research designs. We also provide a flow chart to help you describe how subjects moved through the experimental or quasi-experimental study. In the same spirit, we include standards for reports of meta-analyses. Before you begin to write a manuscript, consult the particular journal to which you are considering submitting and see whether there are journal-specific guidelines regarding your research design.

We relied heavily on previous efforts to construct reporting standards in developing the standards presented here. For example, for the Journal Article Reporting Standards, Consolidated Standards of Reporting Trials (CONSORT; 2007; see http://www.consort-statement.org/) and Transparent Reporting of Evaluations With Nonexperimental Designs (TREND; see http://www.trend-statement.org/asp/trend.asp) were used. Four earlier efforts contributed to the meta-analysis reporting standards. A complete description of how the standards were developed can be found in "Reporting Standards for Research in Psychology: Why Do We Need Them? What Might They Be?" (APA Publications and Communications Board Working Group on Journal Article Reporting Standards, 2008).

Four sets of guidelines, which can be found in the Appendix, have been created to help you decide which elements are relevant to your study. These guidelines are from the *American Psychologist* article (see previous paragraph) and include entries beyond those discussed in this chapter. For information on content, refer to Table 1 of the Appendix, Journal Article Reporting Standards (JARS): Information Recommended for Inclusion in Manuscripts That Report New Data Collections Regardless of Research Design. The additional modules for designs involving experimental manipulations and interventions can be found in Table 2 of the Appendix, Module A: Reporting Standards for Studies With an Experimental Manipulation or Intervention (in Addition to Material Presented in Table 1) and Table 3 of the Appendix, Reporting Standards for Studies Using Random and Nonrandom Assignment of Participants to Experimental Groups. The fourth set of guidelines is titled Meta-Analysis Reporting Standards [MARS]: Information Recommended for Inclusion in Manuscripts Reporting Meta-Analyses, which can be found in Table 4 of the Appendix.

Not everything in these guidelines will be relevant to every article you prepare. Also, as descriptions of research expand, so does the space needed to report them. Technological changes now allow authors to supplement their articles with additional

online-only material to facilitate complete reporting. Most scholarly publishers, including the APA, now make available to authors online supplemental archives that can be used to store supplemental materials associated with the articles that appear in print. So, some of the material in the appendices may not appear in the published article itself but rather in an online supplemental archive. We discuss supplemental material more fully in section 2.13.

Manuscript Elements

2.01 Title

A title should summarize the main idea of the manuscript simply and, if possible, with style. It should be a concise statement of the main topic and should identify the variables or theoretical issues under 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 reference purposes in databases such as APA's PsycINFO. A good title is easily shortened to the running head used within the published article.

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 terms as *A Study of* or *An Experimental Investigation of*. Occasionally a term such as *a research synthesis* or *a meta-analysis* or *fMRI study of* conveys important information for the potential reader and is included in the title. Avoid using abbreviations in a title; spelling out all terms helps ensure accurate, complete indexing of the article. The recommended length for a title is no more than 12 words.

The title should be typed in uppercase and lowercase letters, centered between the left and right margins, and positioned in the upper half of the page.

2.02 Author's Name (Byline) and Institutional Affiliation

Every manuscript includes the name of the author and the institutional affiliation of the author when the research was conducted.

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 were when the research was conducted, which is usually an institution. Include a dual affiliation only if two institutions contributed substantial support to the study. Include no more than two affiliations per author. When an author has no institutional affiliation, list the city and state of residence below the author's name. If the institu-

Table 2.1 Author Bylines

Byline variation	Example
One author, no affiliation	Mary S. Haggerty Rochester, New York
Two authors (with suffixes), one affiliation	John Q. Foster II and Roy R. Davis Jr. Educational Testing Service, Princeton, New Jersey
Three authors, one affiliation	Juanita Fuentes, Paul Dykes, and Susan Watanabe University of Colorado at Boulder
Two authors, two affiliations	David Wolf University of California, Berkeley Amanda Blue Brandon University
Three authors, two affiliations	Mariah Meade and Sylvia Earleywine Georgetown University Jeffrey Coffee Dartmouth College

tional affiliation has changed since the work was completed, give the current affiliation in the author note (see Table 2.1).

The names of the authors should appear in the order of their contributions, centered between the side margins. For names with suffixes (e.g., Jr. and III), separate the suffix from the rest of the name with a space instead of a comma. The institutional affiliation should be centered under the author's name, on the next line.

John Q. Foster II and Roy R. Davis Jr.
Educational Testing Service, Princeton, New Jersey

2.03 Author Note

An author note appears with each printed article to identify each author's departmental affiliation, provide acknowledgments, state any disclaimers or perceived conflict of interest, and provide a point of contact for the interested reader. (Students should note that an author note is usually not a requirement for theses and dissertations.) Notes should be arranged as follows.

First paragraph: Complete departmental affiliation. Identify departmental affiliations at the time of the study for all authors. Format as follows: name of the author as it appears in the byline, comma, department name, comma, university name, semicolon, next author name, and so on, and end with a period. If an author is not affiliated with an institution, provide the city and state (provide city and country for authors whose affiliations are outside of the United States, and include province for authors in Canada or Australia). No degrees should be given, and state names should be spelled out.

Second paragraph: Changes of affiliation (if any). Identify any changes in author affiliation subsequent to the time of the study. Use the following wording: [author's name] is now at [affiliation]. The affiliation should include the department and institution.

Third paragraph.

Acknowledgments. Identify grants or other financial support (and the source, if appropriate) for your study; do not precede grant numbers by No. or #. Next, acknowledge colleagues who assisted in conducting the study or critiquing the manuscript. Do not acknowledge the persons routinely involved in the review and acceptance of manuscripts—peer reviewers or editors, associate editors, and consulting editors of the journal in which the article is to appear. (If you would like to acknowledge a specific idea raised by a reviewer, do so in the text where the idea is discussed.) In this paragraph, also explain any special agreements concerning authorship, such as if authors contributed equally to the study. End this paragraph with thanks for personal assistance, such as in manuscript preparation.

Special circumstances. If there are any special circumstances, disclose them before the acknowledgments in the third paragraph. For example, if the manuscript is based on data also used in a previously published report (e.g., a longitudinal study) or a doctoral dissertation, state that information in this paragraph. Also, acknowledge the publication of related reports (e.g., reports on the same database). If any relationships may be perceived as a conflict of interest (e.g., if you own stock in a company that manufactures a drug used in your study), explain them here. If your employer or granting organization requires a disclaimer stating, for example, that the research reported does not reflect the views of that organization, such a statement is included in this paragraph.

Fourth paragraph: Person to contact (mailing address, e-mail). Provide a complete mailing address for correspondence. End this paragraph with an e-mail address and no period.

> Jane Doe, Department of Psychology, University of Illinois at Urbana–Champaign; John Smith, Department of Educational Psychology, University of Chicago.
>
> John Smith is now at Department of Psychology, University of California, San Diego.
>
> This research was supported in part by grants from the National Institute on Aging and from the John D. and Catherine T. MacArthur Foundation.
>
> Correspondence concerning this article should be addressed to Jane Doe, Department of Psychology, University of Illinois, Champaign, IL 61820. E-mail: jdoe@uiuc.edu

Place the author note on the title page, below the title, byline, and affiliation. Center the label *Author Note*. Start each paragraph of the note with an indent, and type separate paragraphs for the authors' names and current affiliations, changes in affiliations, acknowledgments, and special circumstances, if any, along with the person to contact. The author note is not numbered or cited in the text.

2.04 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 persons interested in the document to retrieve it from abstracting and indexing databases. Most schol-

arly journals require an abstract. Consult the instructions to authors or web page of the journal to which you plan to submit your article for any journal-specific instructions.

A well-prepared abstract can be the most important single paragraph in an article. Most people have their first contact with an article by seeing just the abstract, usually in comparison with several other abstracts, as they are doing a literature search. Readers frequently decide on the basis of the abstract whether to read the entire article. The abstract needs to be dense with information. By embedding key words in your abstract, you 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 not appear in the body of the manuscript. If the study extends or replicates previous research, note this in the abstract and cite the author's last name and the year of the relevant report. Comparing an abstract with an outline of the manuscript's headings is a useful way to verify its accuracy.
- **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 concise language. Use verbs rather than their noun equivalents and the active rather than the passive voice (e.g., *investigated* rather than *an investigation of; The authors presented the results* instead of *Results were presented*). Use the present tense to describe conclusions drawn or results with continuing applicability; use the past tense to describe specific variables manipulated or outcomes measured.
- **concise:** Be brief, and make each sentence maximally informative, especially the lead sentence. Begin the abstract with the most important points. Do not waste space by repeating the title. Include in the abstract only the four or five most important concepts, findings, or implications. Use the specific words in your abstract that you think your audience will use in their electronic searches.

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

- the problem under investigation, in one sentence if possible;
- the participants, specifying pertinent characteristics such as age, sex, and ethnic and/or racial group; in animal research, specifying genus and species;
- the essential features of study method—you have a limited number of words so restrict your description to essential and interesting features of the study methodology—particularly those likely to be used in electronic searches;
- the basic findings, including effect sizes and confidence intervals and/or statistical significance levels; and
- the conclusions and the implications or applications.

An abstract for a *literature review or meta-analysis* should describe

- the problem or relation(s) under investigation;
- study eligibility criteria;
- type(s) of participants included in primary studies;
- main results (including the most important effect sizes) and any important moderators of these effect sizes;

- conclusions (including limitations); and
- implications for theory, policy, and/or practice.

An abstract for a *theory-oriented* paper should describe

- how the theory or model works and/or the principles on which it is based and
- what phenomena the theory or model accounts for and linkages to empirical results.

An abstract for a *methodological* paper should describe

- the general class of methods being discussed;
- the essential features of the proposed method;
- the range of application of the proposed method; and
- in the case of statistical procedures, some of its essential features such as robustness or power efficiency.

An abstract for a *case study* should describe

- the subject and relevant characteristics of the individual, group, community, 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.

Do not exceed the abstract word limit of the journal to which you are submitting your article. Word limits vary from journal to journal and typically range from 150 to 250 words. For information on how abstracts are used to retrieve articles, consult *Record Structure for APA Databases* (Sick, 2009).

When preparing your manuscript, begin the abstract on a new page and identify it with the running head or abbreviated title and the page number 2. The label *Abstract* should appear in uppercase and lowercase letters, centered, at the top of the page. Type the abstract itself as a single paragraph without paragraph indentation.

2.05 Introduction

Introduce the problem. The body of a manuscript 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 manuscript, it does not carry a heading labeling it the introduction.

Before writing the introduction, consider the following questions:

- Why is this problem important?
- How does the study relate to previous work in the area? If other aspects of this study have been reported previously, how does this report differ from, and build on, the earlier report?
- What are the primary and secondary hypotheses and objectives of the study, and what, if any, are the links to theory?
- How do the hypotheses and research design relate to one another?
- What are the theoretical and practical implications of the study?

A good introduction answers these questions in just a few pages and, by summarizing the relevant arguments and the past evidence, gives the reader a firm sense of what was done and why.

Explore importance of the problem. State why the problem deserves new research. For basic research, the statement about importance might involve the need to resolve any inconsistency in results of past work and/or extend the reach of a theoretical formulation. For applied research, this might involve the need to solve a social problem or treat a psychological disorder. When research is driven by the desire to resolve controversial issues, all sides in the debate should be represented in balanced measure in the introduction. Avoid animosity and ad hominem arguments in presenting the controversy. Conclude the statement of the problem in the introduction with a brief but formal statement of the purpose of the research that summarizes the material preceding it. For literature reviews as well as theoretical and methodological articles, also clearly state the reasons that the reported content is important and how the article fits into the cumulative understanding of the field.

Describe relevant scholarship. Discuss the relevant related literature, but do not feel compelled to include an exhaustive historical account. Assume that the reader is knowledgeable about the basic problem and does not require a complete accounting of its history. A scholarly description of earlier work in the introduction provides a summary of the most recent directly related work and recognizes the priority of the work of others. Citation of and specific credit to relevant earlier works are signs of scientific and scholarly responsibility and are essential for the growth of a cumulative science. In the description of relevant scholarship, also inform readers whether other aspects of this study have been reported on previously and how the current use of the evidence differs from earlier uses. At the same time, cite and reference only works pertinent to the specific issue and not those that are of only tangential or general significance. When summarizing earlier works, avoid nonessential details; instead, emphasize pertinent findings, relevant methodological issues, and major conclusions. Refer the reader to general surveys or research syntheses 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 lead you to write a statement intelligible only to the specialist.

State hypotheses and their correspondence to research design. After you have introduced the problem and have developed the background material, explain your approach to solving the problem. In empirical studies, this usually involves stating your hypotheses or specific question and describing how these were derived from theory or are logically connected to previous data and argumentation. Clearly develop the rationale for each. Also, if you have some hypotheses or questions that are central to your purpose and others that are secondary or exploratory, state this prioritization. Explain how the research design permits the inferences needed to examine the hypothesis or provide estimates in answer to the question.

In preparing your manuscript, begin the introduction on a new page, identifying it with the running head and the page number 3. Type the title of the manuscript in uppercase and lowercase letters centered at the top of the page, and then type the text. The remaining sections of the article follow each other without a break; do not start a new page when a new heading occurs. Each remaining manuscript page should also carry the running head and a page number.

2.06 Method

The Method section describes in detail how the study was conducted, including conceptual and operational definitions of the variables used in the study. Different types of studies will rely on different methodologies; however, a complete description of the methods used 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 your manuscript 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 (see also section 1.10, regarding self-plagiarism). The following is an example of such a synopsis:

> 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, Gilewski, & Thompson, 1980).

If you are reporting on multiple experiments, see section 2.09.

Identify subsections. It is both conventional and expedient to divide the Method section into labeled subsections. These usually include a section with descriptions of the participants or subjects and a section describing the procedures used in the study. The latter section often includes description of (a) any experimental manipulations or interventions used and how they were delivered—for example, any mechanical apparatus used to deliver them; (b) sampling procedures and sample size and precision; (c) measurement approaches (including the psychometric properties of the instruments used); and (d) the research design. If the design of the study is complex or the stimuli require detailed description, additional subsections or subheadings to divide the subsections may be warranted to help readers find specific information.

Include in these subsections 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. Consider using appendices and/or a supplemental website for more detailed information (see section 2.13).

Participant (subject) characteristics. Appropriate identification of research participants is critical to the science and practice of psychology, particularly for generalizing the findings, making comparisons across replications, and using the evidence in research syntheses and secondary data analyses. If humans participated in the study, report the eligibility and exclusion criteria, including any restrictions based on demographic characteristics.

Describe the sample adequately. Detail the sample's major demographic characteristics, such as age; sex; ethnic and/or racial group; level of education; socioeconomic, generational, or immigrant status; disability status; sexual orientation; gender identity; and language preference as well as important topic-specific characteristics (e.g., achievement level in studies of educational interventions). As a rule, describe the groups as specifically as possible, with particular emphasis on characteristics that may have bearing on the interpretation of results. Often, participant characteristics can be important for understanding the nature of the sample

and the degree to which results can be generalized. For example, the following is a useful characterization of a sample:

> The second group included 40 women between the ages of 20 and 30 years ($M = 24.2$, $SD = 2.1$), 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, you may find it 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 used in analysis of the data, reporting it may give readers a more complete understanding of the sample and the generalizability of results and may prove useful in meta-analytic studies that incorporate the article's results.

When animals are used, 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.

Sampling procedures. Describe the procedures for selecting participants, including (a) the sampling method, if a systematic sampling plan was used; (b) the percentage of the sample approached that participated; and (c) the number of participants who selected themselves into the sample. Describe the settings and locations in which the data were collected as well as any agreements and payments made to participants, agreements with the institutional review board, ethical standards met, and safety monitoring procedures.

Sample size, power, and precision. Along with the description of subjects, give the intended size of the sample and number of individuals meant to be in each condition, if separate conditions were used. State whether the achieved sample differed in known ways from the target population. Conclusions and interpretations should not go beyond what the sample would warrant.

State how this intended sample size was determined (e.g., analysis of power or precision). If interim analysis and stopping rules were used to modify the desired sample size, describe the methodology and results.

When applying inferential statistics, take seriously the statistical power considerations associated with the 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, routinely provide evidence that the study has sufficient power to detect effects of substantive interest. Be similarly careful in discussing the role played by sample size in cases in which not rejecting the null hypothesis is desirable (i.e., when one wishes 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.

Alternatively, use calculations based on a chosen target precision (confidence interval width) to determine sample sizes. Use the resulting confidence intervals to justify conclusions concerning effect sizes (e.g., that some effect is negligibly small).

Measures and covariates. Include in the Method section information that provides definitions of all primary and secondary outcome measures and covariates, including measures collected but not included in this report. Describe the methods used to collect data (e.g., written questionnaires, interviews, observations) as well as methods used to enhance the quality of the measurements (e.g., the training and reliability of assessors or the use of multiple observations). Provide information on instruments used, including their psychometric and biometric properties and evidence of cultural validity.

Research design. Specify the research design in the Method section. Were subjects placed into conditions that were manipulated, or were they observed naturalistically? If multiple conditions were created, how were participants assigned to conditions, through random assignment or some other selection mechanism? Was the study conducted as a between-subjects or a within-subject design?

Different research designs have different reporting needs associated with them. Information that should be reported for all studies that involve experimental manipulations or interventions is summarized in Table 2 of the Appendix, Module A: Reporting Standards for Studies With an Experimental Manipulation or Intervention (in Addition to Material Presented in Table 1) and Table 3 of the Appendix, Reporting Standards for Studies Using Random and Nonrandom Assignment of Participants to Experimental Groups. When reporting studies that are not of the manipulation or intervention variety (e.g., observational, natural history studies), provide sufficient description of the study procedures to allow the reader to fully comprehend the complexity of the study and to be prepared to conduct a near replication of the study (see APA Publications and Communications Board Working Group on Journal Article Reporting Standards, 2008, for a discussion of the emergence of these standards).

Experimental manipulations or interventions. If interventions or experimental manipulations were used in the study, describe their specific content. Include the details of the interventions or manipulations intended for each study condition, including control groups (if any), and describe how and when interventions (experimental manipulations) were actually administered.

The description of manipulations or interventions should include several elements. Carefully describe the content of the intervention or specific experimental manipulations. Often, this will involve presenting a brief summary of instructions given to participants. If the instructions are unusual or compose the experimental manipulation, you may present them verbatim in an appendix or in an online supplemental archive. If the text is brief, you may present it in the body of the paper if it does not interfere with the readability of the report.

Describe the methods of manipulation and data acquisition. If a mechanical apparatus was used to present stimulus materials or collect data, include in the description of procedures the apparatus model number and manufacturer (when important, as in neuroimaging studies), its key settings or parameters (e.g., pulse settings), and its resolution (e.g., regarding stimulus delivery, recording precision). As with the description of the

intervention or experimental manipulation, this material may be presented in the body of the paper, in an appendix, in an online supplemental archive, or as appropriate.

When relevant—such as, for example, in the delivery of clinical and educational interventions—the procedures should also contain a description of who delivered the intervention, including their level of professional training and their level of training in the specific intervention. Present the number of deliverers along with the mean, standard deviation, and range of number of individuals or units treated by each deliverer.

Provide information about (a) the setting where the intervention or manipulation was delivered, (b) the quantity and duration of exposure to the intervention or manipulation (i.e., how many sessions, episodes, or events were intended to be delivered and how long they were intended to last), (c) the time span taken for the delivery of the intervention or manipulation to each unit (e.g., would the manipulation delivery be complete in one session, or if participants returned for multiple sessions, how much time passed between the first and last session?), and (d) activities or incentives used to increase compliance.

When an instrument is translated into a language other than the language in which it was developed, describe the specific method of translation (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).

Provide a description of how participants were grouped during data acquisition (i.e., was the manipulation or intervention administered individual by individual, in small groups, or in intact groupings such as classrooms?). Describe the smallest unit (e.g., individuals, work groups, classes) that was analyzed to assess effects. If the unit used for statistical analysis differed from the unit used to deliver the intervention or manipulation (i.e., was different from the unit of randomization), describe the analytic method used to account for this (e.g., adjusting the standard error estimates or using multilevel analysis).

2.07 Results

In the Results section, summarize the collected data and the analysis performed on those data relevant to the discourse that is to follow. Report the data in sufficient detail to justify your conclusions. Mention all relevant results, including those that run counter to expectation; be sure to include small effect sizes (or statistically nonsignificant findings) when theory predicts large (or statistically significant) ones. Do not hide uncomfortable results by omission. Do not include individual scores or raw data, with the exception, for example, of single-case designs or illustrative examples. In the spirit of data sharing (encouraged by APA and other professional associations and sometimes required by funding agencies), raw data, including study characteristics and individual effect sizes used in a meta-analysis, can be made available on supplemental online archives. See section 2.13 for a detailed discussion of the use of supplemental online archives. Discussing the implications of the results should be reserved for presentation in the Discussion section.

Recruitment. Provide dates defining the periods of recruitment and follow-up and the primary sources of the potential subjects, where appropriate. If these dates differ by group, provide the values for each group.

Statistics and data analysis. Analysis of data and the reporting of the results of those analyses are fundamental aspects of the conduct of research. Accurate, unbiased, com-

plete, and insightful reporting of the analytic treatment of data (be it quantitative or qualitative) must be a component of all research reports. Researchers in the field of psychology use numerous approaches to the analysis of data, and no one approach is uniformly preferred as long as the method is appropriate to the research questions being asked and the nature of the data collected. The methods used must support their analytic burdens, including robustness to violations of the assumptions that underlie them, and they must provide clear, unequivocal insights into the data.

Historically, researchers in psychology have relied heavily on null hypothesis statistical significance testing (NHST) as a starting point for many (but not all) of its analytic approaches. APA stresses that NHST is but a starting point and that additional reporting elements such as effect sizes, confidence intervals, and extensive description are needed to convey the most complete meaning of the results. The degree to which any journal emphasizes (or de-emphasizes) NHST is a decision of the individual editor. However, complete reporting of all tested hypotheses and estimates of appropriate effect sizes and confidence intervals are the minimum expectations for all APA journals.[2] The research scientist is always responsible for the accurate and responsible reporting of the results of research studies.

Assume that your reader has a professional knowledge of statistical methods. Do not review basic concepts and procedures or provide citations for the most commonly used statistical procedures. If, however, there is any question about the appropriateness of a particular statistical procedure, justify its use by clearly stating the evidence that exists for the robustness of the procedure as applied.

Similarly, missing data can have a detrimental effect on the legitimacy of the inferences drawn by statistical tests. For this reason, it is critical that the frequency or percentages of missing data be reported along with any empirical evidence and/or theoretical arguments for the causes of data that are missing. For example, data might be described as missing completely at random (as when values of the missing variable are not related to the probability that they are missing or to the value of any other variable in the data set); missing at random (as when the probability of missing a value on a variable is not related to the missing value itself but may be related to other completely observed variables in the data set); or not missing at random (as when the probability of observing a given value for a variable is related to the missing value itself). It is also important to describe the methods for addressing missing data, if any were used (e.g., multiple imputation).

When reporting the results of inferential statistical tests or when providing estimates of parameters or effect sizes, include sufficient information to help the reader fully understand the analyses conducted and possible alternative explanations for the outcomes of those analyses. Because each analytic technique depends on different aspects of the data and assumptions, it is impossible to specify what constitutes a "sufficient set of statistics" for every analysis. However, such a set usually includes at least the following: the per-cell sample sizes; the observed cell means (or frequencies of cases in each category for a categorical variable); and the cell standard deviations, or the pooled within-cell variance. In the case of multivariable analytic systems, such as mul-

[2] Issues dealing with the controversy over the use of NHST and its alternatives are complex and outside the scope of a publication manual. For those interested in this controversy, a discussion of these and related issues can be found in the article by Wilkinson and the Task Force on Statistical Inference (1999); Harlow, Mulaik, and Steiger's (1997) *What If There Were No Significance Tests?* Kline's (2004) *Beyond Significance Testing: Reforming Data Analysis Methods in Behavioral Research*; and the article by Jones and Tukey (2000).

tivariate analyses of variance, regression analyses, structural equation modeling analyses, and hierarchical linear modeling, the associated means, sample sizes, and variance–covariance (or correlation) matrix or matrices often represent a sufficient set of statistics. At times, the amount of information that constitutes a sufficient set of statistics can be extensive; when this is the case, this information could be supplied in a supplementary data set or appendix (see section 2.13). For analyses based on very small samples (including single-case investigations), consider providing the complete set of raw data in a table or figure. Your work will more easily become a part of the cumulative knowledge of the field if you include enough statistical information to allow its inclusion in future meta-analyses.

For inferential statistical tests (e.g., t, F, and χ^2 tests), include 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 (the exact p value), and the size and direction of the effect. When point estimates (e.g., sample means or regression coefficients) are provided, always include an associated measure of variability (precision), with an indication of the specific measure used (e.g., the standard error).

The inclusion 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 level, specified on an a priori basis (e.g., a 95% or 99% confidence interval), throughout the manuscript. Wherever possible, base discussion and interpretation of results on point and interval estimates.

For the reader to appreciate the magnitude or importance of a study's findings, it is almost always necessary to include some measure of effect size in the Results section.[3] Whenever possible, provide a confidence interval for each effect size reported to indicate the precision of estimation of the effect size. Effect sizes may be expressed in the original units (e.g., the mean number of questions answered correctly; kg/month for a regression slope) and are often most easily understood when reported in original units. It can often be valuable to report an effect size not only in original units but also in some standardized or units-free unit (e.g., as a Cohen's d value) or a standardized regression weight. Multiple degree-of-freedom effect-size indicators are often less useful than effect-size indicators that decompose multiple degree-of-freedom tests into meaningful one degree-of-freedom effects—particularly when the latter are the results that inform the discussion. The general principle to be followed, however, is to provide the reader with enough information to assess the magnitude of the observed effect.

Ancillary analyses. Report any other analyses performed, including subgroup analyses and adjusted analyses, indicating those that were prespecified and those that were exploratory (though not necessarily in the level of detail of primary analyses). Consider putting the detailed results of these analyses on the supplemental online archive. Discuss the implications, if any, of the ancillary analyses for statistical error rates.

Participant flow. For experimental and quasi-experimental designs, there must be a description of the flow of participants (human, animal, or units such as classrooms or

[3] Grissom and Kim (2005) provide a comprehensive discussion of effect sizes.

hospital wards) through the study. Present the total number of units recruited into the study and the number of participants assigned to each group. Provide the number of participants who did not complete the experiment or crossed over to other conditions and explain why. Note the number of participants used in the primary analyses. (This number might differ from the number who completed the study because participants might not show up for or complete the final measurement.) The flowchart in the Appendix (Figure 1) provides a useful device for displaying the flow of participants through each stage of a study (see also Figures 5.3 and 5.4, pp. 154–155).

Intervention or manipulation fidelity. If interventions or experimental manipulations were used, provide evidence on whether they were delivered as intended. In basic experimental research, this might be the results of checks on the manipulation. In applied research, this might be, for example, records and observations of intervention delivery sessions and attendance records.

Baseline data. Be sure that baseline demographic and/or clinical characteristics of each group are provided.

Statistics and data analysis. In studies reporting the results of experimental manipulations or interventions, clarify whether the analysis was by intent-to-treat. That is, were all participants assigned to conditions included in the data analysis regardless of whether they actually received the intervention, or were only participants who completed the intervention satisfactorily included? Give a rationale for the choice.

Adverse events. If interventions were studied, detail all important adverse events (events with serious consequences) and/or side effects in each intervention group.

2.08 Discussion

After presenting the results, you are in a position to evaluate and interpret their implications, especially with respect to your original hypotheses. Here you will examine, interpret, and qualify the results and draw inferences and conclusions from them. Emphasize any theoretical or practical consequences of the results. (When the discussion is relatively brief and straightforward, some authors prefer to combine it with the Results section, creating a section called Results and Discussion.)

Open the Discussion section with a clear statement of the support or nonsupport for your original hypotheses, distinguished by primary and secondary hypotheses. If hypotheses were not supported, offer post hoc explanations. Similarities and differences between your results and the work of others should be used to contextualize, confirm, and clarify your conclusions. Do not simply reformulate and repeat points already made; each new statement should contribute to your interpretation and to the reader's understanding of the problem.

Your interpretation of the results should take into account (a) sources of potential bias and other threats to internal validity, (b) the imprecision of measures, (c) the overall number of tests or overlap among tests, (d) the effect sizes observed, and (e) other limitations or weaknesses of the study. If an intervention is involved, discuss whether it was successful and the mechanism by which it was intended to work (causal pathways) and/or alternative mechanisms. Also, discuss barriers to implementing the intervention or manipulation as well as the fidelity with which the intervention or manip-

ulation was implemented in the study, that is, any differences between the manipulation as planned and as implemented.

Acknowledge the limitations of your research, and address alternative explanations of the results. Discuss the generalizability, or external validity, of the findings. This critical analysis should take into account differences between the target population and the accessed sample. For interventions, discuss characteristics that make them more or less applicable to circumstances not included in the study, how and what outcomes were measured (relative to other measures that might have been used), the length of time to measurement (between the end of the intervention and the measurement of outcomes), incentives, compliance rates, and specific settings involved in the study as well as other contextual issues.

End the Discussion section with a reasoned and justifiable commentary on the importance of your findings. This concluding section may be brief or extensive provided that it is tightly reasoned, self-contained, and not overstated. In this section, you might briefly return to a discussion of why the problem is important (as stated in the introduction); what larger issues, those that transcend the particulars of the subfield, might hinge on the findings; and what propositions are confirmed or disconfirmed by the extrapolation of these findings to such overarching issues.

You may also consider the following issues:

- What is the theoretical, clinical, or practical significance of the outcomes, and what is the basis for these interpretations? 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?
- What problems remain unresolved or arise anew because of these findings?

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

2.09 Multiple Experiments

If you are presenting several studies in one manuscript, make the rationale, logic, and method of each study clear to the reader. If appropriate, include for each study a short discussion of the results, or combine the discussion with the description of results (e.g., Results and Discussion). Always include a comprehensive general discussion of all the work after the last study. Report only conceptually linked studies in a single paper.

The arrangement of sections reflects the structure previously described. For example, label a series of experiments *Experiment 1, Experiment 2,* and so forth. 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 study) appear under each study heading. (Refer to Figure 2.2, pp. 54–56, for the form of a two-experiment paper.)

2.10 Meta-Analyses

The same factors that have led to proposals for reporting standards for manuscripts that report new data collections have led to similar efforts to establish standards for reporting the methods and results of meta-analyses. Guidelines for reporting research synthe-

ses and meta-analyses are in the Appendix (Table 4, Meta-Analysis Reporting Standards [MARS]: Information Recommended for Inclusion in Manuscripts Reporting Meta-Analyses). In the guidelines, it is assumed that the research synthesis being reported used quantitative procedures to combine the results of studies. However, many of the guidelines (e.g., regarding introductory material and literature searching procedures) could apply to a research synthesis even if meta-analytic procedures were not carried out. Because this type of research is more specialized, we do not detail each item. The terms and issues should be familiar to researchers undertaking a meta-analysis and are described in numerous texts.

Note that easy access to electronic storage of information means that all of the elements listed in the MARS guidelines need not appear in printed journal articles. The online supplemental archives of journals can be used to store supplemental materials associated with the articles that appear in print. This supplemental material might include, for example, the list of citations to the research included in a meta-analysis and the table giving descriptive information for each included study, especially when the number of included studies is large. If the number of articles contributing studies to the meta-analysis is relatively small (e.g., about 50 or fewer), they should appear in the reference list with an asterisk included to identify them. If the number of articles in the meta-analysis exceeds 50, then the references to the articles should be placed in a list and in a supplemental online archive. If an article is mentioned in the text of a meta-analytic article and the results reported in that article are included in the meta-analysis, the article should be cited both in the reference list and in the supplemental materials.

2.11 References

References acknowledge the work of previous scholars and provide a reliable way to locate it. References are used to document statements made about the literature, just as data in the manuscript support interpretations and conclusions. The references cited in the manuscript do not need to be exhaustive but should be sufficient to support the need for your research and to ensure that readers can place it in the context of previous research and theorizing.

The standard procedures for citation ensure that references are accurate, complete, and useful to investigators and readers. For detailed guidance on citing sources and preparing the reference list, consult Chapters 6 and 7.

Start the reference list on a new page. The word *References* should appear in uppercase and lowercase letters, centered. Double-space all reference entries. APA publishes references in a *hanging indent* format, meaning that the first line of each reference is set flush left and subsequent lines are indented.

2.12 Footnotes

Footnotes are used to provide additional content or to acknowledge copyright permission status.

Content footnotes. Content footnotes supplement or amplify substantive information in the text; they should not include complicated, irrelevant, or nonessential information. Because they can be distracting to readers, such footnotes should be included only if they strengthen the discussion. A content footnote should convey just one idea; if you find yourself creating paragraphs or displaying equations as you are writing a footnote,

then the main text or an appendix probably would be a more suitable place to present your information. Another alternative is to indicate in a short footnote that the material is available online as supplemental material. In most cases, an author integrates an article best by presenting important information in the text, not in a footnote.

Copyright permission. Copyright permission footnotes acknowledge the source of lengthy quotations, scale and test items, and figures and tables that have been reprinted or adapted. Authors must obtain permission to reproduce or adapt material from a copyrighted source. (See Chapter 8 for a discussion of what authors should know about permissions and copyright.)

A numbered footnote is generally used to provide source material for long quotations. For tables, the source material is provided in a table note (see section 5.16), and for figures, the source is credited at the end of the caption (see section 5.23). Use the wording below for copyright permission footnotes.

Type of source	Copyright permission footnote
Journal	From [or The data in column 1 are from] "Title of Article," by A. N. Author and C. O. Author, year, *Title of Journal, Volume,* p. xx. Copyright [year] by the Name of Copyright Holder. Reprinted [or adapted] with permission.
Book	From [or The data in column 1 are from] *Title of Book* (p. xxx), by A. N. Author and C. O. Author, year, Place of Publication: Publisher. Copyright [year] by the Name of Copyright Holder. Reprinted [or adapted] with permission.

Number all footnotes consecutively in the order in which they appear in the manuscript with superscript Arabic numerals. Footnote numbers should be superscripted, like this,[1] following any punctuation mark except a dash. A footnote number that appears with a dash—like this[2]—always precedes the dash. (The number falls inside a closing parenthesis if it applies only to matter within the parentheses, like this.[3]) Do not place footnote numbers in text headings. Subsequent references to a footnote are by parenthetical note:

the same results (see Footnote 3)

When using the footnote function in your word-processing program, place each content or copyright permission footnote at the bottom of the page on which it is discussed. Footnotes may alternatively be placed in consecutive order on a separate page after the references. Be sure that the number of the footnote corresponds with the appropriate text discussion.

2.13 Appendices and Supplemental Materials

Sometimes, material that supplements article content would be distracting or inappropriate in the body of the manuscript. Material of this type can often be included in an appendix or in a supplemental materials section—the former being an element of the print version of the article, the latter being an online supplemental archive that the publisher of the archival source maintains.

Appendices. In general, an appendix is appropriate for materials that are relatively brief and that are easily presented in print format. Some examples of material suitable for an appendix are (a) a list of stimulus materials (e.g., those used in psycholinguistic research), (b) a detailed description of a complex piece of equipment, (c) a list of articles that provided the source data for a meta-analysis but are not directly referred to in any other way in an article, and (d) a detailed demographic description of subpopulations in the study and other detailed and/or complex reporting items suggested in the reporting standards section of this chapter.

If your manuscript has only one appendix, label it *Appendix;* if your manuscript has more than one appendix, label each one with a capital letter (*Appendix A, Appendix B,* etc.) in the order in which it is mentioned in the main text. Each appendix must have a title. In the text, refer to appendices by their labels:

> produced the same results for both studies (see Appendices A and B for complete proofs).

Like the main text, an appendix may include headings and subheadings as well as tables, figures, and displayed equations. Number each appendix table and figure, and number displayed equations if necessary for later reference; precede the number with the letter of the appendix in which it is included (e.g., Table A1). In a sole appendix, which is not labeled with a letter, precede all tables, figures, and equation numbers with the letter A to distinguish them from those of the main text. All appendix tables and figures must be cited within the appendix and numbered in order of citation.

If one table constitutes an entire appendix, the centered appendix label and title serve in lieu of a table number and title. Generally, treat multiple tables as separate appendices. If multiple tables (but no text) are combined into one appendix, number the tables.

Begin each appendix on a separate page. Center the word *Appendix* and the identifying capital letters (*A, B,* etc., in the order in which they are mentioned in text) at the top of the page. Center the title of the appendix, and use uppercase and lowercase letters. Begin the text of the appendix flush left, followed by indented paragraphs.

Supplemental materials. Web-based, online supplemental archives tend to be more appropriate for material that is more useful when available as a direct download as well as materials that are not easily presented in standard print format. Some examples of materials suitable for inclusion in online supplemental archives are (a) lengthy computer code, (b) details of mathematical or computational models, (c) audio or video clips, (d) oversized tables, (e) detailed intervention protocols, (f) primary or supplementary data sets, (g) expanded methodology sections, and (h) color figures. Because this content may be useful to the field, APA and many other publishers make it possible to provide them to a wide audience by posting them on the web, with a link to the published article. These files (like an appendix) then become part of the primary journal record and cannot be augmented, altered, or deleted.

Materials for inclusion in supplemental online archives should be submitted in formats that will be widely accessible. The following multimedia formats are generally widely available to most users and are preferred:

- Text—ASCII, Word, PDF, HTML
- Tables—Excel, Word, HTML, XHTML, XML
- Audio and Video—AVI, MPG, Quicktime, RM, MP3, WAV

- Animation—GIF, JPEG, Flash/Shockwave
- Images—GIF, JPEG, TIFF

Less widely used file formats, including TeX, LaTeX, any client- or server-side scripting (e.g., Java, CGI), executable files, and software applications, are acceptable but may be of less use to the reader who does not have access to specialized programs. Many users refuse to deal with executable files or operate from systems that refuse to access them.

For APA journals, the link to online supplemental archives that appears in the published article leads readers to a landing page that includes a bibliographic citation, a link to the published article, and a context statement and link for each supplemental material file (see an example of a sample landing page at www.apastyle.org). Supplemental materials should include enough information to make their contents interpretable when accompanied by the published text. For more information on supplemental materials, see Chapter 8.

Most journals make supplemental materials subject to peer review and require that they be submitted with the initial manuscript. Once accepted, the supplemental materials will be posted with no further editing or polishing.

Include an appendix or supplemental materials only if they help readers to understand, evaluate, or replicate the study or theoretical argument being made. Be sure that all relevant ethical standards have been followed for appendices and supplemental materials, including copyright protection, accurate representation of data, and protection of human subjects (e.g., content of video clips if human images).

Sample Papers

These sample papers illustrate three kinds of manuscripts: one-experiment (Figure 2.1), two-experiment (Figure 2.2), and meta-analysis (Figure 2.3). The three manuscripts have been adapted for the *Publication Manual* from articles published in APA journals. The numbers referred to in the shaded boxes refer to numbered sections in the *Publication Manual.*

Figure 2.1 Sample One-Experiment Paper (The numbers refer to numbered sections in the *Publication Manual.*)

Running head: EFFECTS OF AGE ON DETECTION OF EMOTION 1

Establishing a title, 2.01; Preparing the manuscript for submission, 8.03

Effects of Age on Detection of Emotional Information

Christina M. Leclerc and Elizabeth A. Kensinger

Boston College

Formatting the author name (byline) and institutional affiliation, 2.02, Table 2.1

Elements of an author note, 2.03

Author Note

Christina M.

Boston College.

This researc

awarded to Elizabet

Corresponde

Department of Psyc

Avenue, Chestnut H

EFFECTS OF AGE ON DETECTION OF EMOTION 2

Abstract

Writing the abstract, 2.04

Age differences were examined in affective processing, in the context of a visual search task. Young and older adults were faster to detect high arousal images compared with low arousal and neutral items. Younger adults were faster to detect positive high arousal targets compared with other categories. In contrast, older adults exhibited an overall detection advantage for emotional images compared with neutral images. Together, these findings suggest that older adults do not display valence-based effects on affective processing at relatively automatic stages.

Keywords: aging, attention, information processing, emotion, visual search

Double-spaced manuscript, Times Roman typeface, 1-inch margins, 8.03

Paper adapted from "Effects of Age on Detection of Emotional Information," by C. M. Leclerc and E. A. Kensinger, 2008, *Psychology and Aging, 23,* pp. 209–215. Copyright 2008 by the American Psychological Association.

Figure 2.1 Sample One-Experiment Paper (continued)

Writing the introduction, 2.05

Effects of Age on Detection of Emotional Information

Frequently, people encounter situations in their environment in which it is impossible to attend to all available stimuli. It is therefore of great importance for one's attentional processes to select only the most salient information in the environment to which one should attend. Previous research has suggested that emotional information is privy to attentional selection in young adults (e.g., Anderson, 2005; Calvo & Lang, 2004; Carretie, Hinojosa, Marin-Loeches, Mecado & Tapia, 2004; Nummenmaa, Hyona, & Calvo, 2006), an obvious service to evolutionary drives to approach rewarding situations and to avoid threat and danger (Davis & Whalen, 2001; Dolan & Vuilleumier, 2003; Lang, Bradley, & Cuthbert, 1997; LeDoux, 1995).

Ordering citations within the same parentheses, 6.16

Selecting the correct tense, 3.18

For example, Ohman, Flykt, and Esteves (2001) presented participants with 3 × 3 visual arrays with images representing four categories (snakes, spiders, flowers, mushrooms). In half the arrays, all nine images were from the same category, whereas in the remaining half of the arrays, eight images were from one category and one image was from a different category (e.g., eight flowers and one snake). Participants were asked to indicate whether the matrix included a discrepant stimulus. Results indicated that fear-relevant images were more quickly detected than fear-irrelev
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Numbers that represent statistical or mathematical functions, 4.31

Numbers expressed in words, 4.32

Use of hyphenation for compound words, 4.13, Table 4.1

Calvo & Lang, 2004; Carretie et al., 2004; Juth, Lundqvist, Karlsson, & Ohman, 2005; Nummenmaa et al., 2006).

From this research, it seems clear that younger adults show detection benefits for arousing information in the environment. It is less clear whether these effects are preserved across the adult life span. The focus of the current research is on determining the extent to which aging influences the early, relatively automatic detection of emotional information.

Continuity in presentation of ideas, 3.05

Regions of the brain thought to be important for emotional detection remain relatively intact with aging (reviewed by Chow & Cummings, 2000). Thus, it is plausible that the detection of emotional information remains relatively stable as adults age. However, despite the preservation of emotion-processing regions with age (or perhaps because of the contrast between the preservation of these regions and age-related declines in cognitive-processing regions; Good et al., 2001; Hedden & Gabrieli, 2004; Ohnishi, Matsuda, Tabira, Asada, & Uno, 2001; Raz, 2000; West, 1996), recent behavioral research has revealed changes that occur with aging in the regulation and processing of emotion. According to the socioemotional selectivity theory (Carstensen, 1992), with aging, time is perceived as increasingly limited, and as a result, emotion regulation becomes a primary goal (Carstensen, Isaacowitz, & Charles, 1999). According to socioemotional selectivity theory, age is associated with an increased motivation to derive emotional meaning from life and a simultaneous decreasing motivation to expand one's knowledge base. As a consequence of these motivational shifts, emotional aspects of the

Citing one work by six or more authors, 6.12

No capitalization in naming theories, 4.16

Figure 2.1 Sample One-Experiment Paper (continued)

EFFECTS OF AGE ON DETECTION OF EMOTION 5

To maintain positive affect in the face of negative age-related change (e.g., limited time remaining, physical and cognitive decline), older adults may adopt new cognitive strategies. One such strategy, discussed recently, is the positivity effect (Carstensen & Mikels, 2005), in which older adults spend proportionately more time processing positive emotional material and less time processing negative emotional material. Studies examining the influence of emotion on memory (Charles, Mather, & Carstensen, 2003; Kennedy, Mather, & Carstensen, 2004) have found that compared with younger adults, older adults recall proportionally more positive information and proportionally less negative information. Similar results have been found when examining eye-tracking patterns; Older adults looked at positive images longer than younger adults did, even when no age differences were observed in looking time for negative stimuli (Isaacowitz, Wadlinger, Goren, & Wilson, 2006). However, this positivity effect has not gone uncontested; some researchers have found evidence inconsistent with the positivity effect (e.g., Grühn, Smith, & Baltes, 2005; Kensinger, Brierley, Medford, Growdon, & Corkin, 2002).

Based on this previously discussed research, three competing hypotheses exist to explain age differences in emotional processing associated with the normal aging process. First, emotional information m
facilitated detection of e
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principally on positive e
not negative, emotional i

The primary goal
To do so, we employed a

Using the colon between two grammatically complete clauses, 4.05

Capitalization of words beginning a sentence after a colon, 4.14

Hypotheses and their correspondence to research design, Introduction, 2.05

Using the semicolon to separate two independent clauses not joined by a conjunction, 4.04

EFFECTS OF AGE ON DETECTION OF EMOTION

rapidly detect emotional information. We hypothesized that on the whole, older adults would be slower to detect information than young adults would be (consistent with Hahn, Carlson, Singer, & Gronlund, 2006; Mather & Knight, 2006); the critical question was whether the two age groups would show similar or divergent facilitation effects with regard to the effects of emotion on item detection. On the basis of the existing literature, the first two previously discussed hypotheses seemed to be more plausible than the third alternative. This is because there is reason to think that the positivity effect may be operating only at later stages of processing (e.g., strategic, elaborative, and emotion regulation processes) rather than at the earlier stages of processing involved in the rapid detection of information (see Mather & Knight, 2005, for discussion). Thus, the first two hypotheses, that emotional information maintains its importance across the life span or that emotional information in general takes on greater importance with age, seemed particularly applicable to early stages of emotional processing.

Indeed, a couple of prior studies have provided evidence for intact early processing of emotional facial expressions with aging. Mather and Knight (2006) examined young and older adults' abilities to detect happy, sad, angry, or neutral faces presented in a complex visual array. Mather and Knight found that like younger adults, older adults detected threatening faces more quickly than they detected other types of emotional stimuli. Similarly, Hahn et al. (2006) also found no age differences in efficiency of search time when angry faces were presented in an array of neutral faces, compared with happy faces in neutral face displays. When angry faces, compared with positive and neutral faces, served as nontarget distractors in the visual search arrays, however, older adults were more efficient in searching, compared with younger adults,

Using the comma between elements in a series, 4.03

Punctuation with citations in parenthetical material, 6.21

Citing references in text, inclusion of year within paragraph, 6.11, 6.12

Prefixes and suffixes that do not require hyphens, Table 4.2

Figure 2.1 Sample One-Experiment Paper (continued)

negative stimuli were not of equivalent arousal levels (fearful faces typically are more arousing than happy faces; Hansen & Hansen, 1988). Given that arousal is thought to be a key factor in modulating the attentional focus effect (Hansen & Hansen, 1988; Pratto & John, 1991; Reimann & McNally, 1995), to more clearly understand emotional processing in the context of aging, it is necessary to include both positive and negative emotional items with equal levels of arousal.

In the current research, therefore, we compared young and older adults' detection of four categories of emotional information (positive high arousal, positive low arousal, negative high arousal, and negative low arousal) with their detection of neutral information. The positive and negative stimuli were carefully matched on arousal level, and the categories of high and low arousal were closely matched on valence to assure that the factors of valence (positive, negative) and arousal (high, low) could be investigated independently of one another. Participants were presented with a visual search task including images from these different categories (e.g., snakes, cars, teapots). For half of the multi-image arrays, all of the images were of the same item, and for the remaining half of the arrays, a sing
items was included. Participants were
the array, and their reaction times wer
differences in response times (RTs) ba
categories. We reasoned that if young
information, then we would expect sir
stimuli for the two age groups. By co
were younger adults, older adults sho
emotional items (relative to the neutra

Prefixed words that require hyphens, Table 4.3

Using abbreviations, 4.22; Explanation of abbreviations, 4.23; Abbreviations used often in APA journals, 4.25; Plurals of abbreviations, 4.29

for the arousing items than shown by the young adults (resulting in an interaction between age and arousal).

Elements of the Method section, 2.06; Organizing a manuscript with levels of heading, 3.03

Method

Participants

Younger adults (14 women, 10 men, M_{age} = 19.5 years, age range: 18–22 years) were recruited with flyers posted on the Boston College campus. Older adults (15 women, nine men, M_{age} = 76.1 years, age range: 68–84 years) were recruited through the Harvard Cooperative on Aging (see Table 1, for demographics and test scores).[1] Participants were compensated $10 per hour for their participation. There were 30 additional participants, recruited in the same way as described above, who provided pilot rating values: five young and five old participants for the assignment of items within individual categories (i.e., images depicting cats), and 10 young and 10 old participants for the assignment of images within valence and arousal categories. All participants were asked to bring corrective eyewear if needed, resulting in normal or corrected to normal vision for all participants.

Materials and Procedure

The visual search task was adapted from Ohman et al. (2001). There were 10 different types of items (two each of five Valence × Arousal categories: positive high arousal, positive low arousal, neutral, negative low arousal, negative high arousal), each containing nine individual exemplars that were used to construct 3 × 3 stimulus matrices. A total of 90 images were used, each appearing as a target and as a member of a distracting array. A total of 360 matrices were presented to each participant; half contained a target item (i.e., eight items of one type and one target item of another type) and half did not (i.e., all nine images of the same type). Within the

Identifying subsections within the Method section, 2.06

Using numerals to express numbers representing age, 4.31

Numbering and discussing tables in text, 5.05

Participant (subject) characteristics, Method, 2.06

Figure 2.1 Sample One-Experiment Paper (continued)

matrix. Within the 180 target trials, each of the five emotion categories (e.g., positive high arousal, neutral, etc.) was represented in 36 trials. Further, within each of the 36 trials for each emotion category, nine trials were created for each of the combinations with the remaining four other emotion categories (e.g., nine trials with eight positive high arousal items and one neutral item). Location of the target was randomly varied such that no target within an emotion category was presented in the same location in arrays of more than one other emotion category (i.e., a negative high arousal target appeared in a different location when presented with positive high arousal array images than when presented with neutral array images).

Latin abbreviations, 4.26

The items within each category of grayscale images shared the same verbal label (e.g., mushroom, snake), and the items were selected from online databases and photo clipart packages. Each image depicted a photo of the actual object. Ten pilot participants were asked to write down the name corresponding to each object; any object that did not consistently generate the intended response was eliminated from the set. For the remaining images, an additional 20 pilot participants rated the emotional valence and arousal of the objects and assessed the degree of visual similarity among objects within a set (i.e., how similar the mushrooms were to one another) and between objects across sets (i.e., how similar the mushrooms were to the snakes).

Numbers expressed in words at beginning of sentence, 4.32

Valence and arousal ratings. Valence and arousal were judged on 7-point scales (1 = *negative valence* or *low arousal* and 7 = *positive valence* or *high arousal*). Negative objects received mean valence ratings of 2.5 or lower, neutral objects received mean valence ratings of 3.5 to 4.5, and positive objects received mean valence ratings of 5.5 or higher. High-arousal objects received mean arousal ratings greater than 5, and low-arousal objects (including all neutral stimuli) received mean arousal ratings of less than 4. We selected categories for which both young and older adults agreed on the valence and arousal classifications, and stimuli were

Italicization of anchors of a scale, 4.21

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lar the mushrooms
equated on within-
s well as for the

overall similarity of the object categories ($ps > .20$). For example, we selected particular mushrooms and particular cats so that the mushrooms were as similar to one another as were the cats (i.e., within-group similarity was held constant across the categories). Our object selection also assured that the categories differed from one another to a similar degree (e.g., that the mushrooms were as similar to the snakes as the cats were similar to the snakes).

Procedure

Each trial began with a white fixation cross presented on a black screen for 1,000 ms; the matrix was then presented, and it remained on the screen until a participant response was recorded. Participants were instructed to respond as quickly as possible with a button marked *yes* if there was a target present, or a button marked *no* if no target was present. Response latencies and accuracy for each trial were automatically recorded with E-Prime (Version 1.2) experimental

Figure 2.1 Sample One-Experiment Paper (continued)

software. Before beginning the actual task, participants performed 20 practice trials to assure compliance with the task instructions.

Results

Elements of the Results section, 2.07

Analyses focus on participants' RTs to the 120 trials in which a target was present and was from a different emotional category from the distractor (e.g., RTs were not included for arrays containing eight images of a cat and one image of a butterfly because cats and butterflies are both positive low-arousal items). RTs were analyzed for 24 trials of each target emotion category. RTs for error trials were excluded (less than 5% of all responses) as were RTs that were ±3 *SD* from each participant's mean (approximately 1.5% of responses). Median RTs were then calculated for each of the five emotional target categories, collapsing across array type (see Table 2 for raw RT values for each of the two age groups). This allowed us to examine, for example, whether participants were faster to detect images of snakes than images of mushrooms, regardless of the type of array in which they were presented. Because our main interest was in examining the effects of valence and arousal on participants' target detection times, we created scores for each emotional target category that controlled for the participant's RTs to detect neutral targets (e.g., subtracting the RT to detect neutral targets from the RT to detect positive high arousal targets). These difference scores were then examined with a 2 × 2 × 2 (Age [young, older] × Valence [positive, negative] × Arousal [high, low]) analysis of variance (ANOVA). This ANOVA revealed only a significant main effect of arousal, $F(1, 46) = 8.41$, $p = .006$, $\eta_p^2 = .16$, with larger differences between neutral and high-arousal images ($M = 137$) than between neutral and low-arousal images ($M = 93$; i.e., high-arousal items processed more quickly across both age groups compared with low-arousal items; see Figure 1). There was no significant main effect for valence, nor was there an interaction between valence and arousal. It is critical that the analysis

Abbreviations accepted as words, 4.24

Symbols, 4.45; Numbers, 4.31

Nouns followed by numerals or letters, 4.17

Reporting *p* values, decimal fractions, 4.35

Statistical symbols, 4.46, Table 4.5

Numbering and discussing figures in text, 5.05

Figure 2.1 Sample One-Experiment Paper (continued)

revealed only a main effect of age but no interactions with age. Thus, the arousal-mediated effects on detection time appeared stable in young and older adults.

The results described above suggested that there was no influence of age on the influences of emotion. To further test the validity of this hypothesis, we submitted the RTs to the five categories of targets to a 2 × 5 (Age [young, old] × Target Category [positive high arousal, positive low arousal, neutral, negative low arousal, negative high arousal]) repeated-measures ANOVA.[2] Both the age group, $F(1, 46) = 540.32$, $p < .001$, $\eta_p^2 = .92$, and the target category, $F(4, 184) = 8.98$, $p < .001$, $\eta_p^2 = .16$, main effects were significant, as well as the Age Group × Target Category interaction, $F(4, 184) = 3.59$, $p = .008$, $\eta_p^2 = .07$. This interaction appeared to reflect the fact that for the younger adults, positive high-arousal targets were detected faster than targets from all other categories, $ts(23) < -1.90$, $p < .001$, with no other target categories differing significantly from one another (although there were trends for negative high-arousal and negative low-arousal targets to be detected more rapidly than neutral targets; $p < .12$). For older adults, all emotional categories of targets were detected more rapidly than were neutral targets, $ts(23) > 2.56$, $p < .017$, and RTs to the different emotion categories of targets did not differ significantly from one another. Thus, these results provided some evidence that older adults may show a broader advantage for detection of any type of emotional information, whereas young adults' benefit may be more narrowly restricted to only certain categories of emotional information.

Discussion

As outlined previously, there were three plausible alternatives for young and older adults' performance on the visual search task: The two age groups could show a similar pattern of enhanced detection of emotional information, older adults could show a greater advantage for

Statistics in text, 4.44

Spacing, alignment, and punctuation of mathematical copy, 4.46

Capitalize effects or variables when they appear with multiplication signs, 4.20

Elements of the Discussion section, 2.08

Figure 2.1 Sample One-Experiment Paper (continued)

emotional detection than young adults, or older adults could show a greater facilitation than young adults only for the detection of positive information. The results lent some support to the first two alternatives, but no evidence was found to support the third alternative.

Clear statement of support or nonsupport of hypotheses, Discussion, 2.08

In line with the first alternative, no effects of age were found when the influence of valence and arousal on target detection times was examined; both age groups showed only an arousal effect. This result is consistent with prior studies that indicated that arousing information can be detected rapidly and automatically by young adults (Anderson, Christoff, Panitz, De Rosa, & Gabrieli, 2003; Ohman & Mineka, 2001) and that older adults, like younger adults, continue to display a threat detection advantage when searching for negative facial targets in arrays of positive and neutral distractors (Hahn et al., 2006; Mather & Knight, 2006). Given the relative preservation of
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However, despi
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processing, given that no effects of valence were observed in older adults' detection speed. In the present study, older adults were equally fast to detect positive and negative information, consistent with prior research that indicated that older adults often attend equally to positive and negative stimuli (Rosler et al., 2005). Although the pattern of results for the young adults has differed across studies—in the present study and in some past research, young adults have shown facilitated detection of positive information (e.g., Anderson, 2005; Calvo & Lang, 2004; Carretie et al., 2004; Juth et al., 2005; Nummenmaa et al., 2006), whereas in other studies, young adults have shown an advantage for negative information (e.g., Armony & Dolan, 2002; Hansen & Hansen, 1988; Mogg, Bradley, de Bono, & Painter, 1997; Pratto & John, 1991; Reimann & McNally, 1995; Williams, Mathews, & MacLeod, 1996)—what is important to note is that the older adults detected both positive and negative stimuli at equal rates. This equivalent detection of positive and negative information provides evidence that older adults display an advantage for the detection of emotional information that is not valence-specific.

Use of an em dash to indicate an interruption in the continuity of a sentence, 4.06; Description of an em dash, 4.13

Thus, although younger and older adults exhibited somewhat divergent patterns of emotional detection on a task reliant on early, relatively automatic stages of processing, we found no evidence of an age-related positivity effect. The lack of a positivity focus in the older adults is in keeping with the proposal (e.g., Mather & Knight, 2006) that the positivity effect does not arise through automatic attentional influences. Rather, when this effect is observed in older adults, it is likely due to age-related changes in emotion regulation goals that operate at later stages of processing (i.e., during consciously controlled processing), once information has been attended to and once the emotional nature of the stimulus has been discerned.

Although we cannot conclusively say that the current task relies strictly on automatic processes, there are two lines of evidence suggesting that the construct examined in the current

Figure 2.1. Sample One-Experiment Paper (continued)

research examines relatively automatic processing. First, in their previous work, Ohman et al. (2001) compared RTs with both 2 × 2 and 3 × 3 arrays. No significant RT differences based on the number of images presented in the arrays were found. Second, in both Ohman et al.'s (2001) study and the present study, analyses were performed to examine the influence of target location on RT. Across both studies, and across both age groups in the current work, emotional targets were detected more quickly than were neutral targets, regardless of their location. Together, these findings suggest that task performance is dependent on relatively automatic detection processes rather than on controlled search processes.

Use of parallel construction with coordinating conjunctions used in pairs, 3.23

Discussion section ending with comments on importance of findings, 2.08

Although further work is required to gain a more complete understanding of the age-related changes in the early processing of emotional information, our findings indicate that young and older adults

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Construction of an accurate and complete reference list, 6.22; General desciption of references, 2.11

References

Anderson, A. K. (2005). Affective influences on the attentional dynamics supporting awareness. *Journal of Experimental Psychology: General, 154*, 258–281. doi:10.1037/0096-3445.134.2.258

Anderson, A. K., Christoff, K., Panitz, D., De Rosa, E., & Gabrieli, J. D. E. (2003). Neural correlates of the automatic processing of threat facial signals. *Journal of Neuroscience, 23*, 5627–5633.

Armony, J. L., & Dolan, R. J. (2002). Modulation of spatial attention by fear-conditioned stimuli: An event-related fMRI study. *Neuropsychologia, 40*, 817–826. doi:10.1016/S0028-3932%2801%2900178-6

Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology, 56*, 893–897. doi:10.1037/0022-006X.56.6.893

Calvo, M. G., & Lang, P. J. (2004). Gaze patterns when looking at emotional pictures: Motivationally biased attention. *Motivation and Emotion, 28*, 221–243. doi: 10.1023/B%3AMOEM.0000040153.26156.ed

Carretie, L., Hinojosa, J. A., Martin-Loeches, M., Mecado, F., & Tapia, M. (2004). Automatic attention to emotional stimuli: Neural correlates. *Human Brain Mapping, 22*, 290-299. doi:10.1002/hbm.20037

Carstensen, L. L. (1992). Social and emotional patterns in adulthood: Support for socioemotional selectivity theory. *Psychology and Aging, 7*, 331–338. doi:10.1037/0882-7974.7.3.331

Carstensen, L. L., Fung, H., & Charles, S. (2003). Socioemotional selectivity theory and the regulation of emotion in the second half of life. *Motivation and Emotion, 27*, 103–123.

Figure 2.1. Sample One-Experiment Paper (continued)

Carstensen, L. L., & Mikels, J. A. (2005). At the intersection of emotion and cognition: Aging and the positivity effect. *Current Directions in Psychological Science, 14*, 117–121. doi: 10.1111/j.0963-7214.2005.00348.x

Charles, S. T., Mather, M., & Carstensen, L. L. (2003). Aging and emotional memory: The forgettable na

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Grühn, D., Smith, J., & Baltes, P. B. (2005). No aging bias favoring memory for positive material: Evidence from a heterogeneity-homogeneity list paradigm using emotionally toned words. *Psychology and Aging, 20*, 579–588. doi:10.1037/0882-7974.20.4.579

Hahn, S., Carlson, C., Singer, S., & Gronlund, S. D. (2006). Aging and visual search: Automatic

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79–395.

related

Kensinger, E. A., Brierley, B., Medford, N., Growdon, J. H., & Corkin, S. (2002). Effects of normal aging and Alzheimer's disease on emotional memory. *Emotion, 2*, 118–134. doi: 10.1037/1528-3542.2.2.118

Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1997). Motivated attention: Affect, activation, and action. In P. J. Lang, R. F. Simons, & M. Balaban (Eds.), *Attention and orienting: Sensory and motivational processes* (pp. 97–135). Mahwah, NJ: Erlbaum.

Leclerc, C. M., & Hess, T. M. (2005, August). *Age differences in processing of affectively primed information*. Poster session presented at the 113th Annual Convention of the American Psychological Association, Washington, DC.

LeDoux, J. E. (1995). Emotion: Clues from the brain. *Annual Review of Psychology, 46*, 209–235. doi:10.1146/annurev.ps.46.020195.001233

Mather, M., & Knight, M. (2005). Goal-directed memory: The role of cognitive control in older adults' emotional memory. *Psychology and Aging, 20*, 554–570. doi:10.1037/0882-7974.20.4.554

Mather, M., & Knight, M. R. (2006). Angry faces get noticed quickly: Threat detection is not impaired among older adults. *Journals of Gerontology, Series B: Psychological Sciences, 61B*, P54–P57.

Mogg, K., Bradley, B. P., de Bono, J., & Painter, M. (1997). Time course of attentional bias for threat information in non-clinical anxiety. *Behavioral Research Therapy, 35*, 297–303.

Nelson, H. E. (1976). A modified Wisconsin card sorting test sensitive to frontal lobe defects. *Cortex, 12*, 313-324.

Digital object identifier as article identifier, 6.31; Example of reference to a periodical, 7.01

Example of reference to a book chapter, print version, no DOI, 7.02, Example 25

Figure 2.1. Sample One-Experiment Paper (continued)

Nummenmaa, L., Hyona, J., & Calvo, M. G. (2006). Eye movement assessment of selective attentional capture by emotional pictures. *Emotion, 6*, 257–268. doi:10.1037/1528-3542.6.2.257

Ohman, A., Flykt, A., & Esteves, F. (2001). Emotion drives attention: Detecting the snake in the

Article with more than seven authors, 7.01, Example 2

Rosler, A., Ulrich, C., Billino, J., Sterzer, P., Weidauer, S., Bernhardt, T., ...Kleinschmidt, A. (2005). Effects of arousing emotional scenes on the distribution of visuospatial attention: Changes with aging and early subcortical vascular dementia. *Journal of the Neurological Sciences, 229*, 109–116. doi:10.1016/j.jns.2004.11.007

Shipley, W. C. (1986). *Shipley Institute of Living Scale*. Los Angeles, CA: Western Psychological Services.

Spielberger, C. D., Gor

Palo Alto, CA:

Wechsler, D. (1987). *W*

Corporation.

Wechsler, D. (1997). *T*

III. New York,

West, R. L. (1996). An

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Footnotes

Placement and format of footnotes, 2.12

[1]Analyses of covariance were conducted with these covariates, with no resulting influences of these variables on the pattern or magnitude of the results.

[2]These data were also analyzed with a 2 × 5 ANOVA to examine the effect of target category when presented only in arrays containing neutral images, with the results remaining qualitatively the same. More broadly, the effects of emotion on target detection were not qualitatively impacted by the distractor category.

Figure 2.1 Sample One-Experiment Paper (continued)

Table 1

Participant Characteristics

	Younger group		Older group			
Measure	*M*	*SD*	*M*	*SD*	*F*(1, 46)	*p*
Years of education	13.92	1.28	16.33	2.43	18.62	<.001
Beck Anxiety Inventory	9.39	5.34	6.25	6.06	3.54	.066
BADS–DEX	20.79	7.58	13.38	8.29	10.46	.002
STAI–State	45.79	4.44	47.08	3.48	1.07	.306
STAI–Trait	45.64	4.50	45.58	3.15	0.02	.963
Digit Symbol Substitution	49.62	7.18	31.58	6.56	77.52	<.001
Generative naming	46.95	9.70	47.17	12.98	.004	.951
Vocabulary	33.00	3.52	35.25	3.70	4.33	.043
Digit Span–Backward	8.81	2.09	8.25	2.15	0.78	.383
Arithmetic	16.14	2.75	14.96	3.11	1.84	.182
Mental Control	32.32	3.82	23.75	5.13	40.60	<.001
Self-Ordered Pointing	1.73	2.53	9.25	9.40	13.18	.001
WCST perseverative errors	0.36	0.66	1.83	3.23	4.39	.042

Note. The Beck Anxiety Inventory is from Beck et al. (1988); the Behavioral Assessment of the Dysexecutive Syndrome—Dysexecutive Questionnaire (BADS–DEX) is from Wilson et al. (1996); the State–Trait Anxiety Inventory (STAI) measures are from Spielberger et al. (1970); and the Digit Symbol Substitution, Digit Span–Backward, and Arithmetic Wechsler Adult Intelligence Scale—III and Wechsler Memory Scale—III measures are from Wechsler (1997). Generative naming scores represent the total number of words produced in 60 s each for letter *F*, *A*, and *S*. The Vocabulary measure is from Shipley (1986); the Mental Control measure is from Wechsler (1987); the Self-Ordered Pointing measure was adapted from Petrides and Milner (1982); and the Wisconsin Card Sorting Task (WCST) measure is from Nelson (1976). All values represent raw, nonstandardized scores.

Selecting effective presentation, 4.41; Logical and effective table layout, 5.08

Elements of table notes, 5.16

Figure 2.1 Sample One-Experiment Paper (continued)

Principles of figure use and construction, types of figures, standards, planning, and preparation of figures, 5.20–5.25

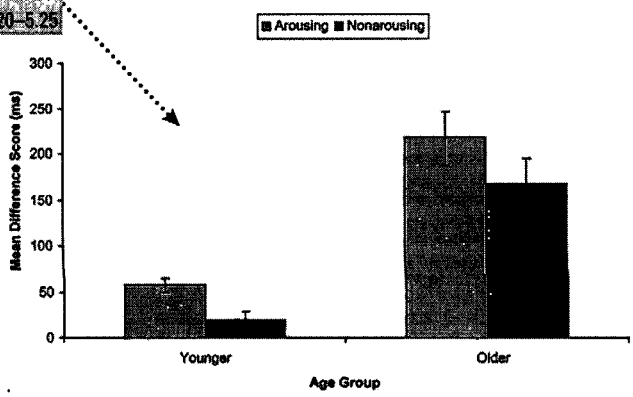

Figure 1. Mean difference values (ms) representing detection speed for each target category subtracted from the mean detection speed for neutral targets. No age differences were found in the arousal-mediated effects on detection speed. Standard errors are represented in the figure by the error bars attached to each column.

Figure legends and captions, 5.23

Figure 2.2 Sample Two-Experiment Paper (The numbers refer to numbered sections in the *Publication Manual*. This abridged manuscript illustrates the organizational structure characteristic of multiple-experiment papers. Of course, a complete multiple-experiment paper would include a title page, an abstract page, and so forth.)

Inhibitory Influences on Asychrony as a Cue for Auditory Segregation

Auditory grouping involves the formation of auditory objects from the sound mixture reaching the ears. The cues used to integrate or segregate these sounds and so form auditory objects have been defined by several authors (e.g., Bregman, 1990; Darwin, 1997; Darwin & Carlyon, 1995). The key acoustic cues for segregating concurrent acoustic elements are differences in onset time (e.g., Dannenbring & Bregman, 1978; Rasch, 1978) and harmonic relations (e.g., Brunstrom & Roberts, 1998; Moore, Glasberg, & Peters, 1986). In an example of the importance of onset time, Darwin (1984a, 1984b) showed that increasing the level of a harmonic near the first formant (F1) frequency by adding a synchronous pure tone changes the phonetic quality of a vowel. However, when the added tone began a few hundred milliseconds before the vowel, it was essentially removed from the vowel percept.... [section continues].

General Method ← Elements of empirical studies, 1.01

Overview

In the experiments reported here, we used a paradigm developed by Darwin to assess the perceptual integration of additional energy in the F1 region of a vowel through its effect on phonetic quality (Darwin, 1984a, 1984b; Darwin & Sutherland, 1984)....[section continues].

Stimuli

Amplitude and phase values for the vowel harmonics were obtained from the vocal-tract transfer function using cascaded formant resonators (Klatt, 1980). F1 values varied in 10-Hz steps from 360–550 Hz—except in Experiment 3, which used values from 350–540 Hz—to produce a continuum of 20 tokens....[section continues].

Listeners

Paper adapted from "Inhibitory Influences on Asychrony as a Cue for Auditory Segregation," by S. D. Holmes and B. Roberts, 2006, *Journal of Experimental Psychology: Human Perception and Performance, 32,* pp. 1231–1242. Copyright 2006 by the American Psychological Association.

Figure 2.2 Sample Two-Experiment Paper (continued)

INHIBITORY INFLUENCES ON ASYCHRONY 4

Listeners were volunteers recruited from the student population of the University of Birmingham and were paid for their participation. All listeners were native speakers of British English who reported normal hearing and had successfully completed a screening procedure (described below). For each experiment, the data for 12 listeners are presented....[section continues].

Plural forms of nouns of foreign origin, 3.19

Procedure

At the start of each session, listeners took part in a warm-up block. Depending on the number of conditions in a particular experiment, the warm-up block consisted of one block of all the experimental stimuli or every second or fourth F1 step in that block. This gave between 85 and 100 randomized trials.... [section continues].

Data Analysis

The data for each listener consisted of the number of /I/ responses out of 10 repetitions for each nominal F1 value in each condition. An estimate of the F1 frequency at the phoneme boundary was obtained by fitting a probit function (Finney, 1971) to a listener's identification data for each condition. The phoneme boundary was defined as the mean of the probit function (the 50% point)....[section continues].

Multiple Experiments, 2.09

Experiment 1

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continues].

Method

INHIBITORY INFLUENCES ON ASYCHRONY 5

There were nine conditions: the three standard ones (vowel alone, incremented fourth, and leading fourth) plus three captor conditions and their controls. A lead time of 240 ms was used for the added 500-Hz tone.... [section continues].

Abbreviating units of measurement, 4.27, Table 4.4

Results and Discussion

Figure 4 shows the mean phoneme boundaries for all conditions and the restoration effect for each captor type. The restoration effects are shown above the histogram bars both as a boundary shift in hertz and as a percentage of the difference in boundary position between the incremented-fourth and leading-fourth conditions.... [section continues].

Experiment 2

This experiment considers the case where the added 500-Hz tone begins at the same time as the vowel but continues after the vowel ends.... [section continues].

Method

There were five conditions: two of the standard ones (vowel alone and incremented fourth), a lagging-fourth condition (analogous to the leading-fourth condition used elsewhere), and a captor condition and its control. A lag time of 240 ms was used for the added 500-Hz tone.... [section continues]

Policy on metrication, 4.39; Style for metric units, 4.40

Results and Discussion

Figure 2.2 Sample Two-Experiment Paper (continued)

1984; Roberts & Holmes, 2006). This experiment used a gap between captor offset and vowel onset to measure the decay time of the captor effect ...[section continues].

Method

There were 17 conditions: the three standard ones (vowel alone, incremented fourth, and leading fourth), five captor conditions and their controls, and four additional conditions (described separately below). A lead time of 320 ms was used for the added 500-Hz tone. The captor conditions were created by adding a 1.1-kHz pure-tone captor, of various durations, to each member of the leading-fourth continuum....[section continues].

Results

Use of statistical term rather than symbol in text, 4.45

Figure 6 shows the mean phoneme boundaries for all conditions. There was a highly significant effect of condition on the phoneme boundary values, $F(16, 176) = 39.10, p < .001$. Incrementing the level of the fourth harmonic lowered the phoneme boundary relative to the vowel-alone condition (by 58 Hz, $p < .001$), which indicates that the extra energy was integrated into the vowel percept....[section continues].

Discussion

The results of this experiment show that the effect of the captor disappears somewhere between 80 and 160 ms after captor offset. This indicates that the captor effect takes quite a long time to decay away relative to the time constants typically found for cells in the CN using physiological measures (e.g., Needham & Paolini, 2003)....[section continues].

Summary and Concluding Discussion

Darwin and Sutherland (1984) first demonstrated that accompanying the leading portion of additional energy in the F1 region of a vowel with a captor tone partly reversed the effect of the onset asynchrony on perceived vowel quality. This finding was attributed to the formation of

a perceptual group between the leading portion and the captor tone, on the basis of their common onset time and harmonic relationship, leaving the remainder of the extra energy to integrate into the vowel percept... .[section continues].

[Follow the form of the one-experiment sample paper to type references, the author note, footnotes, tables, and figure captions.]

Figure 2.3 Sample Meta-Analysis (The numbers refer to numbered sections in the *Publication Manual*. This abridged manuscript illustrates the organizational structure characteristic of reports of meta-analyses. Of course, a complete meta-analysis would include a title page, an abstract page, and so forth.)

THE SLEEPER EFFECT IN PERSUASION 3

The Sleeper Effect in Persuasion:

A Meta-Analytic Review

Persuasive messages are often accompanied by information that induces suspicions of invalidity. For instance, recipients of communications about a political candidate may discount a message coming from a representative of the opponent party because they do not perceive the source of the message as credible (e.g., Lariscy & Tinkham, 1999). Because the source of the political message serves as a discounting cue and temporarily decreases the impact of the message, recipients may not be persuaded by the advocacy immediately after they receive the communication. Over time, however, recipients of an otherwise influential message may recall the message but not the noncredible source and thus become more persuaded by the message at that time than they were immediately following the communication. The term *sleeper effect* was used to denote such a d

Italicize key terms, 4.21

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THE SLEEPER EFFECT IN PERSUASION 4

retention, attitude and decay, and *persuasion and decay*. Because researchers often use the terms *opinion* and *belief*, instead of *attitude*, we conducted searches using these substitute terms as well.

Second, ... [section continues].

Description of meta-analysis, 1.02; Guidelines for reporting meta-analysis, 2.10; see also Appendix

Selection Criteria

We used the following criteria to select studies for inclusion in the meta-analysis.

1. We only included studies that involved the presentation of a communication containing persuasive arguments. Thus, we excluded studies in which the participants played a role or were asked to make a speech that contradicted their opinions. We also excluded developmental studies involving delayed effects of an early event (e.g., child abuse), which sometimes are also referred to as sleeper effects....[section continues].

Identification of elements in a series within a sentence, 3.04

Moderators

For descriptive purposes, we recorded (a) the year and (b) source (i.e., journal article, unpublished dissertations and theses, or other unpublished document) of each report as well as (c) the sample composition (i.e., high school students, university students, or other) and (d) the country in which the study was conducted.

We also coded each experiment in terms of ....[section continues].

Studies were coded independently by the first author and another graduate student.

Paper adapted from "The Sleeper Effect in Persuasion: A Meta-Analytic Review," by G. Kumkale and D. Albarracin, 2004, *Psychological Bulletin, 130*, pp. 143–172. Copyright 2004 by the American Psychological Association.

Figure 2.3 Sample Meta-Analysis (continued)

THE SLEEPER EFFECT IN PERSUASION 5

was satisfactory (Orwin, 1994). We resolved disagreements by discussion and consultation with colleagues. Characteristics of the individual studies included in this review are presented in Table 1. The studies often contained several independent datasets such as different messages and different experiments. The characteristics that distinguish different datasets within a report appear on the second column of the table.

Dependent Measures and Computation of Effect Sizes

We calculated effect sizes for (a) persuasion and (b) recall–recognition of the message content. Calculations were based on the data described in the primary reports as well as available responses of the authors to requests of further information....[section continues].

Analyses of Effect Sizes

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THE SLEEPER EFFECT IN PERSUASION 6

place over time....[section continues].

In light of these requirements, we first examined whether discounting cues led to a decrease in agreement with the communication (boomerang effect). Next....[section continues].

Ruling out a nonpersisting boomerang effect. To determine whether or not a delayed increase in persuasion represents an absolute sleeper effect, one needs to rule out a nonpersisting boomerang effect, which takes place when a message initially backfires but later loses this reverse effect (see Panel A of Figure 1)....[section continues].

Average sleeper effect. Relevant statistics corresponding to average changes in persuasion from the immediate to the delayed posttest appear in Table 4, organized by the different conditions we considered (i.e., acceptance-cue, discounting-cue, no-message control, and message-only control). In Table 4, positive effect sizes indicate increases in persuasion over time, negative effect sizes indicate decay in persuasion, and zero effects denote stability in persuasion. Confidence intervals that do not include zero indicate significant changes over time. The first row of Table 4 shows that recipients of acceptance cues agreed with the message less as time went by (fixed-effects, $d_+ = -0.21$; random-effects, $d_+ = -0.23$). In contrast to the decay in persuasion for recipients of acceptance cues, there was a slight increase in persuasion for recipients of discounting cues over time ($d_+ = 0.08$). It is important to note that change in discounting-cue conditions significantly differed from change in acceptance-cue conditions, (fixed-effects; $B = -0.29, SE = 0.04$), $Q_B(1) = 58.15, p < .0001$; $Q_E(123) = 193.82, p < .0001$....[section continues].

Summary and variability of the overall effect. The overall analyses identified a relative sleeper effect in persuasion, but no absolute sleeper effect. The latter was not surprising, because the sleeper effect was expected to emerge under specific conditions....[section continues].

Use at least two subheadings in a section. 3.02

Figure 2.8 Sample Meta-Analysis (continued)

THE SLEEPER EFFECT IN PERSUASION 7

Moderator Analyses

Although overall effects have descriptive value, the variability in the change observed in discounting-cue conditions makes it unlikely that the same effect was present under all conditions. Therefore, we tested the hypotheses that the sleeper effect would be more likely (e.g., more consistent with the absolute pattern in Panel B1 of Figure 1) when...[section continues].

Format for references included in a meta-analysis with less than 50 references, 6.26

THE SLEEPER EFFECT IN PERSUASION 8

References

References marked with an asterisk indicate studies included in the meta-analysis.

Albarracín, D. (2002). Cognition in persuasion: An analysis of information processing in response to persuasive communications. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 34, pp. 61–130). doi:10.1016/S0065-2601(02)80004-1

... [references continue]

Johnson, B. T., & Eagly, A. H. (1989). Effects of involvement in persuasion: A meta-analysis. *Psychological Bulletin, 106,* 290–314. doi:10.1037/0033-2909.106.2.290

*Johnson, H. H., Torcivia, J. M., & Poprick, M. A. (1968). Effects of source credibility on the relationship between authoritarianism and attitude change. *Journal of Personality and Social Psychology, 9,* 179–183. doi:10.1037/h0021250

*Johnson, H. H., & Watkins, T. A. (1971). The effects of message repetitions on immediate and delayed attitude change. *Psychonomic Science, 22,* 101–103.

Jonas, K., Diehl, M., & Bromer, P. (1997). Effects of attitudinal ambivalence on information processing and attitude-intention consistency. *Journal of Experimental Social Psychology, 33,* 190–210. doi:10.1006/jesp.1996.1317

... [references continue]

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