

EDITORIAL

On Scientific Writing in the Information Era: Tailoring Papers for Internet Searching and Other 21st Century Realities

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Objective: There are many domains of scientific expertise that are seldom documented. It is the objective of this paper to provide more advanced guidance on scientific writing for those who are already familiar with the basic elements of American Psychological Association (APA) style. This paper also discusses the impact of the information revolution on the consumption of scientific knowledge and makes recommendations for adapting scientific writing in light of the dominance of search engines and Internet publication. **Approach:** Communication strategies are presented for each section of an APA paper. Recommendations include: recognizing the importance of the abstract and searchable keywords; recognizing that many readers will be skimming papers for specific information and making better use of the formal structure of scientific papers to communicate to “skimmers”; recognizing that technology has reduced obstacles to incorporating tables and figures; and making more use of nontextual presentation of data. **Conclusion:** Scientific communication is changing rapidly, and we must do more to help researchers attain science communication skills as quickly as possible.

Keywords: APA style, science communication, research methods, Internet, Google

Scientific writing is a skill that one can work on for a lifetime, which is perhaps the best thing about it. Writing never gets dull and is never the same task twice. These aspects of scientific writing make it all the more surprising that so little guidance is available beyond the introductory level taught in research methods courses. Further, much commentary that is not aimed at novices tends to be indignant proclamations about the terrible state of research and frequently includes calls to publish more details. A few of these, which I choose not to cite specifically here, can even be rather condescending toward other researchers. Although not wrong in and of themselves, sometimes the perfectionist standards that are espoused seem to have little to do with the realities of preparing and consuming content in the information-saturated 21st century. Further, principles alone do not offer help with some of the challenges that any researcher will encounter when presenting scientific material. This editorial has two goals. One is to provide more advanced guidance on scientific writing that will hopefully be useful to those who have already mastered the basic elements of American Psychological Association (APA) style. The second, related to the first, is an attempt to frankly discuss scientific writing in the early 21st century.

Some realities discussed here have been around a long time, such as the way most readers skim most journal articles. We all have numerous demands on our time, and no one spends more time

than necessary extracting information from an article (nor should they). Others are newer realities, such as the explosion of scientific publication—up approximately 10-fold in violence research in the last two decades (Hamby, 2013). Another recent change is the switch to “search” as the primary way that researchers encounter the published literature, compared with browsing print copies of journals on the chance that one might encounter something worth reading. Wise authors acknowledge these realities and structure their papers in light of them. Other issues addressed here refer to complexities that might only be fully appreciated after real-world experience with data collection, data analysis, manuscript preparation, and publication.

I would like to acknowledge that I still work to improve my own writing. When we write a scientific article, most of us are writing about something we have thought about for months or years. Ideas that make sense inside our heads do not always come through clearly on the page. I would also like to acknowledge that *Psychology of Violence* receives many wonderfully clear papers from outstanding scientists. I consider many colleagues to be better writers than I am. I am sure others could offer more trenchant counsel. However, as I have said elsewhere about interventions (Hamby, 2014), the problem is not lack of individuals with advanced skills. The problem is that too many researchers are left to develop these skills painstakingly, one at a time, by trial and error, instead of better spending their time by applying themselves to our multitudinous scientific challenges. An entire realm of scientific expertise is almost entirely absent from the published literature (Hamby & Grych, 2013). Recognizing that other senior scholars might emphasize different points, I make this effort to document some of what I have learned.

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Five years in the editor's chair has influenced me at least as much as my years as an author. The view is very different from the other side of the desk. As an author, I secretly—or not so secretly—hope that my manuscript will be appreciated as is, with few revisions needed. Submitting a manuscript is often the culmination of long effort and sometimes I am too impatient during the last steps related to publication. As editor, although encouraging authors is an important part of my role, I understand that my primary obligation is to science. That sense of duty is what makes it possible to write rejection letters, especially when I know that virtually every manuscript we have ever received is the product of sincere and intensive effort. It is actually quite hard to write rejection letters—I fretted for several days about my first one. Five years into it, however, I now think of myself more like the surgeon who has learned to overcome her hesitation to cut into someone in order to meet larger, more important goals.

The Underdocumentation of Scientific Expertise

Considerable scientific expertise is traditionally transmitted through individual mentoring in graduate school, postdoctoral fellowships, and beyond. However, I can say with confidence after 5 years of editorial experience that a lot of talented students and researchers are not getting all of the information they need to succeed as scientists. Expertise tends to get passed on in very small doses, as many researchers take only one graduate student per year, and sometimes junior scholars find it difficult to access good mentoring beyond graduate school or postdoctoral fellowships (or even during graduate school and postdoctoral fellowships). To some extent, it is a matter of privilege. Would-be scholars in low-resource countries or at low-resource institutions have even less access to the training and resources they need to succeed as scientists. However, even at resource-rich institutions, training can be quite uneven.

I also recognize that some information, perhaps especially about grant writing, is kept private in part because of the competitive nature of the scientific process, the scarcity of grant funding and maybe even the increasing corporatization of academia. To all of which I can only refer back to the primary principle of prioritizing science. Yes, it feels good to have rare expertise or an insider's understanding of the publishing and funding worlds, but that does not serve the interests of science. Science is served by making the best scientific knowledge more widely available and quickening the process of attaining it. As the saying goes, a mind is a terrible thing to waste, and we are wasting an incredible amount of human capital.

The Changing Scientific Landscape

When I began my research career, the annual output of scholarly publications on violence numbered in the hundreds, not thousands. Even then, it was not really feasible to read every scientific paper on violence. However, it was possible to stay “on top” of the broader field and feasible to stay fully up-to-date in a particular subdiscipline, such as intimate partner violence or child abuse. Those days are gone and barring some sort of dystopian apocalypse, they are not coming back. Indeed, the field is only growing larger as more and more scholars in historically low-resource countries are finding ways to engage in research. Additionally, in

the United States and other high-research countries, expectations regarding output have increased at research-intensive and teaching-focused institutions alike. In recent years, almost 5,000 violence articles have been indexed in PsycInfo every year. That would mean, just to stay on top of the current year's output, one would have to read more than a dozen articles every day, every Saturday, Christmas, your birthday. Every single day. Obviously, no one can do that.

Learn to Appreciate the Experience of the Reader

How can individual researchers respond to the challenges created by the changing scientific landscape? Most of the recommendations included here can be summed up in a single sentence: Learn to appreciate the experience of the reader, including reviewers and editors. Anyone reading this article is likely to have extensive experience in the reader role, but many still seem surprised that their own articles are likely to get the quick glance and rapid evaluation of relevance that they themselves apply to everything they read. The single best piece of advice I can offer is to make that recognition front and center in everything you do as an author. It is why, for example, this editorial includes a table of the key recommendations—because I know that many readers will not read the full article, and I believe that to be my best opportunity to convey the points in this paper to them (see [Table 1](#)).

Difficult Choices All Researchers Face

On the “frontlines” of research, on the ground collecting data, conducting analyses, and preparing manuscripts, any researcher can tell you that almost every step involves difficult choices and often compromises due to limited resources of time, money, and sometimes expertise and ingenuity. This is true on the writing end as well. There is no space in scientific journals for long explanations about all of the data management and analytic considerations that go into the conduct and reporting of even the simplest study. To give just one example, the methods report we received from our survey contractor for the National Survey of Children's Exposure to Violence (NatSCEV) was in itself 51 double-spaced pages long and more than 10,000 words—not including appendixes and with no description of the measures. This content is essentially just the sample and procedures section from an APA style paper, and it alone is too long for a *Psychology of Violence* manuscript and more than 3 times as long as a full paper in many medical and scientific disciplines, where 3,000 word limits are common. Obviously, this cannot be copied unabridged into any journal article.

Tough choices have to be made. Tough choices should be made. Frankly, wading through the methodological minutiae necessary to conduct a nationally representative survey would not be a good use of time for most people who might read a NatSCEV paper (although, if anyone out there wants to do so, we will share it). There is a lot of judgment and a certain amount of art involved in deciding what to include in a scientific manuscript and how to describe what one chooses to include. Sadly, there is almost no discourse that recognizes these difficult choices, much less offers guidance on them. Indeed, recently there have been many calls to increase the amount of information published with any article, yet there is no evidence that adding this burden to researchers will improve the quality of the field. Frankly, I do not see how or when

Table 1

Key Recommendations for Preparing Empirical Papers in the Information Era

1. Learn to appreciate the experience of the reader and remember that most readers will skim papers as quickly as they can for needed information.
2. The Internet and the search revolution have transformed the ways that people encounter the research literature. Your writing should be guided by the recognition that most people will only encounter your article when it appears in a search engine result.
3. The abstract is the most important paragraph in the entire paper.
4. The objective, the novel contribution, the nature and size of the sample, the most notable results, and a specific suggestion for how this study might inform future research and practice should appear in every abstract.
5. Consider including alternative terms in the keyword list. For example, if “child abuse” appears in your title, make “child maltreatment” a keyword. This is important because otherwise someone searching by an alternative term may not find your paper.
6. Introductions should include: (a) a brief summary of the current state of existing knowledge, (b) identification of at least one gap in that knowledge, and (c) an argument about how the new study can help fill that gap and advance science.
7. Theory is important because theory provides a framework for organizing existing knowledge and identifying important and meaningful gaps.
8. Given the size of the literature in most topic areas today, a comprehensive review of the literature is neither possible nor desirable in the introduction. The review needs to accomplish the goals in #6.
9. Many careful readers of methods sections are looking for specific instruments or tools. Do not create obstacles to others making use of your work by providing insufficient information about measures and experimental protocols.
10. Tables and figures play a critically important role. They highlight the most important results and allow readers to take in far more information at a glance than can be done in text.
11. Technological improvements have made it much easier to incorporate tables and figures, and these should be used liberally.
12. The discussion has four key goals: to open with a statement of key findings, to place the current findings into the context of the broader literature, to acknowledge limitations, and to develop implications.
13. Sometimes it is difficult to know which section (introduction, method, results, or discussion) is best for some information. See the text for guidance on these choices.

Note. See text for further discussion of these and other recommendations.

most researchers would make use of most of this information. In fact, I hesitate to mention some of these points because it is also my experience that some authors' main difficulty is an overly obsessive striving for on perfection. I believe it would be more useful to facilitate faster work and more concise communication and hope these recommendations promote those.

In that regard, I would like to offer two metaphors that guide much of my own thinking. One, I do not think it is possible to write the perfect scientific article, and it is perhaps too tempting to still think of a single article as a major point in a career. I have come to believe that it is better to think of scientific articles as pearls on a necklace and not as diamond solitaires. Two, when thinking about crafting an empirical paper, remember that science communication is more like a sonnet and less like free verse. Much of the art of communicating science lies in the elegant use of formal structure. Like a poet, I struggle as much as anyone with making full use of this structure. A key first step is to understand the challenge.

Abstracts, Titles, and Keywords

Some Realities About Abstracts, Titles, and Keywords

The abstract is the single most important paragraph in any scientific paper. Indeed, it may be as important as the entirety of the rest of the manuscript. With the possible exception of students who have been assigned an article to read, other potential readers will decide whether or not to read the rest of your paper based on the abstract. Even reviewers often decide whether to take on a manuscript based on the abstract. In some cases, the abstract will determine if a reader takes the extra step to request the paper through interlibrary loan, ResearchGate, or other means. At a minimum, accessing the full-text is often several clicks away.

This is no time to be vague or coy. Most searches these days will produce dozens if not hundreds or thousands of “hits.” Readers are

skimming as fast as they can to find the articles that best meet their needs. Sometimes these needs are quite specific, such as finding a measure or locating a citation to support a specific point they want to make in their own paper. Many searches are not driven by a desire to conduct in-depth reviews of all relevant articles. Thus, in a very real sense you are competing with the other abstracts in the search results. In many cases, the first one that meets the reader's needs will be the one that is read and (or) cited. Do everything you can to communicate the “take-home message” of your paper in the abstract. If someone only remembers one thing about your paper, what would you want that to be?

Titles and keywords are also important because search is important. These seem to be afterthoughts to many authors, but they should not be. Technically, you do not need to repeat in the keywords any term or phrase that appears in the title. To some extent, this is also true of words in the abstract, although some searches may not include the abstract (less and less with every passing day). Strong titles and keywords will help move your paper up in search results.

How to Write Abstracts, Titles, and Keywords

All abstracts should clearly identify the take-home message of your paper and ideally will present at least one key finding or conclusion that will whet the reader's appetite for more. “Boilerplate” refers to generic text that could be said about almost any paper. For example, “Implications of the findings are discussed.” Despite the frequency with which one encounters such phrases, boilerplate text is a waste of valuable abstract space, because such sentences will never inspire a reader to “click” on that article to read more. Instead, it is more likely to frustrate the reader, because they cannot tell if what they need is included. It is easier to go to the next item in the search engine results than it is to open a full-text document and scroll through it on a fishing expedition. You just lost a potential reader.

Abstracts need as much specific detail as you can cram into them. The objective, the novel contribution, the nature and size of the sample, the most notable results, and a specific suggestion for how this study might inform future research and practice should appear in every abstract. *Psychology of Violence* uses structured abstracts because this helps ensure that all of this information is in every abstract. As editor, it is in my best interest to do everything I can to make an article more attractive to readers—it is good for our impact factor, download statistics, and other metrics—and authors will notice we give a lot of attention to crafting the abstract.

Titles need to focus on search-friendly constructs and take-home messages. Clever titles and titles in the forms of questions can help draw the eye but may be less important in the age of search than making sure key constructs are represented. Regarding keywords, I strongly encourage all authors to consider including alternative terms in their keyword list. For example, if you use the term “intimate partner violence” then include “domestic violence” as a keyword, so people searching by that term will also find your article. Other examples are “bullying” and “peer victimization” and “child abuse” and “maltreatment.” Some searches are for questionnaires so also consider terms related to your measures. Other searches are by population or demographic characteristic, so consider terms related to your sample and especially characteristics that are included in any analyses.

Introduction Sections

The primary task of the introduction of an empirical paper is to establish how the current study *meaningfully adds to existing knowledge*. This requires three pieces of information: (a) a brief summary of the current state of existing knowledge, (b) identification of at least one gap in that knowledge, and (c) an argument about how the new study can help fill that gap and advance science. Theory is important because theory provides a framework for organizing existing knowledge and identifying important and meaningful gaps.

Some Realities About Introductions

The introduction is probably the least-read portion of any empirical article. The reviewers and the action editor may be the only people who ever read your introduction carefully. In conversations with colleagues, I have been told many, many times that people either skip to the discussion or perhaps to the tables and then the discussion. In a few cases, when the purpose of a search is to find a measure or learn more about a technique, some might focus on the method. Outside of my work as an editor, I tend to glance at introductions and only exceptionally well-written or innovative ones are likely to hold my attention for more than a few minutes. When you prepare your introduction, you should keep these realities in mind.

A second important reality about introductions is that there is no room for a comprehensive literature review, and a comprehensive review is not the purpose of an introduction to an empirical article. This is partly related to the field’s growth. Forty years ago, a review of 5 or 6 pages could cover most of the literature. That is no longer the case. For many statements that might appear in an introduction, literally dozens of articles might suffice as a citation.

It is not necessary or even possible to cite every one. Reviewers often criticize an introduction for lack of comprehensiveness, but this reflects neither the current state of the field nor the ways that people consume introductions. At this point in time, even meta-analyses and other reviews struggle to be completely comprehensive.

A third reality is that the introduction is probably the least cited part of any empirical article. Other researchers primarily cite results or measures. Sometimes researchers will cite a conclusion, critique, or call for further research, but citations regarding such issues typically refer to review or theoretical papers. If they come from an empirical paper, they are probably more likely to be drawn from the discussion, not the introduction. As you work on a paper, bear in mind that the introduction is likely to receive the least use by others in the field. If you have prepared a comprehensive review of the literature, then I encourage you to consider preparing a second manuscript. The field is in desperate need of more integrative and synthetic work, but this is not likely to be found if it appears in an introduction.

How to Write an Introduction

Once you understand that meaningfully adding to existing knowledge is the task, several action steps follow. One, you cannot add to existing knowledge without describing the current state of the science. This means that your introduction should emphasize work from the past 5 years and clearly indicate that you are up-to-date in the field. How do you accomplish this? When you search the literature, be sure that you conduct a search that specifically looks at recent work (by setting a time parameter in your search engine such as “since 2010”). It is good to acknowledge seminal work, but it is even more important to be up-to-date. If you use Google Scholar, be aware that Google Scholar ranks results by relevance. Although the specific algorithm is not public, it is apparent that number of citations is heavily weighted. This will help you identify seminal work. Just be sure to take the additional step to identify recent work.

Two, it is important to make a case for the meaningfulness of your work. Why these variables? This is where some sort of theoretical or conceptual framework comes in. There are an almost infinite number of constructs that might be studied. A case should be made for the ones you have chosen. If they are well-studied concepts, such as emotional regulation, then the emphasis should be on the new angle that is examined in the current project. If it is a new or little-studied construct, then a case should be made for why it is important to incorporate this variable into violence research. Probably some discussion about how the new constructs relate to more familiar ones would be helpful too. The best—and, indeed, also the easiest—way to make a case for the meaningfulness is by building on a conceptual framework.

Three, stay focused. You do not have a lot of room. As another editor once told me, he tired of reading papers that started with “5 pages of why violence is bad.” The readers of *Psychology of Violence*—or almost any scientific journal—will not need basic background information. Readers know that violence is common and has many negative consequences. Briefly sketch out the general importance—brief meaning two or three sentences in the opening paragraph—and move quickly to the specific focus of your study. Another aspect of staying focused is not to get into

constructs or issues that you will not address with the current data. These will only raise questions in reviewers' minds that you will not answer. The introduction should build toward your hypotheses and/or research purposes (for qualitative or exploratory work). Psychology has a tradition of much longer introductions than other health care and scientific fields, and this has not proved helpful in advancing science.

Four, keep the skimmers in mind. Think about your own reading habits and make your papers easy to digest. A tight organization is helpful. Pages of unbroken text are not helpful, so think about adding headings, subheadings, and perhaps even tables or figures. The headings should communicate as much information as possible. They should read more like headlines or even "clickbait" and not generic, boilerplate headings that could be in any paper on any topic. For example, avoid headings like "Background" or "Past Literature." At *Psychology of Violence*, we try to improve skimmer's engagement and comprehension by standardizing some organizational elements across articles. Thus, every *Psychology of Violence* article has a statement of purpose at the end of the first paragraph—so at a glance, the main purpose can be identified. Every *Psychology of Violence* article also ends with numbered hypotheses and/or research questions, so these can also be easily located.

The Differences Between Introduction and Method Sections

Occasionally material is misplaced in manuscripts. It facilitates scientific communication if the material is easy to find, and the main way to make it easy to find is to standardize the placement of information across papers. Some of the placement questions can be tricky, however, and one issue that sometimes arises is that information that should appear in the method is in the introduction (or vice versa). Introductions often end—appropriately—with a brief summary statement that includes a description of the current study, ways this study advances our knowledge and fills gaps, and finally hypotheses. The method, of course, also includes a description of the current study. What is the difference?

The differences can be subtle, and errors here are easy to make. In general, the description in the introduction should be at the conceptual level. For example, usually the "current study" section of the introduction refers to the construct of emotional regulation, not a specific scale that measures emotional regulation. If the current paper is based on a large dataset, especially a well-known one, then it is common and appropriate to mention that dataset and the strengths it offers for the research questions under consideration. (Indeed, it is important in these cases to specify how the current paper is different from other publications with the same data.) It is almost always appropriate to refer to the strengths of the current scientific approach in conceptual terms in the introduction. Generally, specific descriptive statistics, specific measures, or other details do not go in the introduction.

It is less common, but sometimes material that is better suited for the introduction appears in the method. Most often, a rationale for the particular constructs under study or a particular sampling frame is included in the measures or procedure. Theoretical and conceptual rationales for the study design belong in the introduction. For example, if your sampling frame focuses on an understudied population, the reasoning for that and how it can improve

our scientific knowledge belongs in the introduction, not the method.

Methodological papers probably present the greatest challenge in distinguishing between introduction and method, but the principles are the same. Discuss methodological values at a higher conceptual level in the introduction and delve into specific details in the method. In scale development papers, for example, you can refer to the broader conceptual goals of scale development and avoid details such as number of items and response categories. For example, "brevity" and "appropriate for school-age children" are valuable characteristics that a new measure might offer and can be discussed at the conceptual level in the introduction. Usually, the specific steps taken to achieve brevity or child-appropriateness should be reserved for the method, as well as the number of items or the Flesch-Kincaid reading score.

Method Sections

Some Realities About Methods Sections

I consider myself a methodologist, and I often read method sections quite carefully. However, I have long been aware that this is an unusual interest even among psychological researchers. The most important reality about method sections is that many careful readers of this section will be looking for a specific measure, experimental protocol, coding scheme, or procedure that they can use themselves. In other words, even more so than for the other sections of a scientific paper, many careful readers of the method are reading for primarily utilitarian purposes. Probably the most common inquiry I receive from readers is for more information about a measure, help with scoring, or requests for permission to use a measure.

Do not create obstacles that will impede others from using and citing your work. This means that if you develop a new measure, it is usually good to include the entire measure in the methods section or an appendix. If you have a web page, post details there that cannot be included in a manuscript and include that web address in your manuscript. New information, such as newly available translations, can be posted there too. Use the online option for supplemental materials for APA journals. Do not rely on old-fashioned statements such as "Details on the coding scheme are available from the first author." This creates extra steps and delays and makes it less likely that people will use your work. Also, I am sorry to be the one to point this out, but eventually everyone retires from the field, and so these are time-limited offers. Making your work readily accessible over the long term is one key path to becoming an influential scientist.

Also regarding method, sample "type" is a key way that people organize the literature. Many people search for research with particular populations or groups of interest. So that is another reason that people might refer to a method section.

Note that reviewers usually focus on the method. It is possible to reorganize an introduction, develop discussion points, or redo analyses. It is very difficult, in most cases, to change the characteristics of the method, so be certain that the best features are emphasized.

How to Write Methods Sections

The *participants* section is the most straightforward and has the fewest problems among *Psychology of Violence* submissions. As noted elsewhere (Hamby, 2015), please provide detailed descriptions of race and ethnicity for your entire sample and do not group people from diverse backgrounds into a single “other” category. No one self-identifies as “other.” This is also good practice for other demographic characteristics. Some papers combine participants and *procedure* sections, particularly if the procedure is a straightforward survey. This is acceptable practice, although most authors separate these two sections.

For many studies on violence, the procedure section is likewise straightforward because it primarily involves survey administration. However, it is important to offer response rates if those can be determined from your sampling frame and attrition rates for any study with two or more waves. Other researchers recognize that these are not going to be 100% and 0%, respectively. It is not problematic to have some refusals to participate or some attrition, but it strengthens a study if something can be said about who joins a study and stays in it.

Measures section. By far, the most method problems I encounter in submitted manuscripts are in the measures section. The goal of the entire method section is to describe the method in such a way that someone else can either replicate it or compare it to what they did. In survey research, this means details regarding the types of questions that were asked. In experimental studies it means describing the activities in the experiment in enough detail that someone else could do it. Well-known paradigms, such as the Taylor competitive reaction time task or the hot sauce paradigm, can receive shorter descriptions.

The most common measures challenges concern questionnaires and questionnaire items. First, there needs to be enough information that clearly communicates how a construct is being operationalized. There is conceptual slippage in many popular measures. For example, some measures of “hostility” include items on aggressive behaviors as well as attitudes and feelings (Parrott & Giancola, 2007). Thus, it is hardly surprising when these are correlated with aggression measures. This conceptual slippage occurs for antecedents and consequences too. For example, some measures of spiritual well-being include items about general well-being.

Another common limitation is the exclusive reliance on internal consistency to support the psychometric quality of a measure. However, internal consistency is less important than validity (or, certainly, no more important). Internal consistency can be related to the scope of a construct and in that regard can be tied to content validity. One can mistakenly prioritize internal consistency over validity by crafting an overly narrow questionnaire that does not adequately capture all of the important elements of a construct.

The Differences Between Methods and Results Sections

Probably the most challenging distinction here is recognizing that some statistics are commonly presented in the method, and knowing which statistics belong in the method and which in results. In general, statistics whose sole or primary purpose is to characterize the sample or procedure belong in the method section.

These include simple demographic statistics. For example, average age represented by mean and standard deviation and percentages for information such as the breakdown of male and female participants (and potentially those of other gender identities). Some statistics characterizing the procedure also typically appear in the method. These include response rates, attrition rates for any study with two or more waves, and analyses of differences between nonresponders and responders.

Data reduction can raise more complex choices. The best guide is whether the statistics address a primary research question or not. Factor analyses might belong in the results if a scale’s psychometric properties are of primary interest. For example, studies have examined the number of underlying factors embodied in concepts such as psychopathy or posttraumatic stress disorder. If a primary purpose of your paper is to inform debates such as these, then factor analyses belong in the results. On the other hand, sometimes factor analysis is a preliminary data reduction step to craft variables that will be used in other analyses that address primary research questions. For example, perhaps you want to confirm that the translated version of a scale has one factor like the original version, or combine several brief indicators of parenting quality into a broader index for use in other analyses. In cases such as these, the results of a factor analysis can be described more briefly and presented in the measures.

Results Sections

As editor, I see the fewest presentation problems in the results sections. However, there are some things to keep in mind to make your manuscript as strong as possible.

Some Realities About Results Sections

The value of simplicity. Results sections are another place that is often skimmed by many readers, but perhaps for different reasons that lead to the skimming of introductions or method sections. Be aware that needlessly complicated statistics might impress some colleagues but will drive away many readers. The widest possible audience is desirable, including providers from a range of health care and social service professions, criminal justice professionals, policymakers, students, and the general public. To facilitate research-to-practice communication, use the simplest statistics that are capable of addressing the research questions. I say this as someone who likes statistics more than almost anyone I know. Certainly, knowing the implications of different statistical choices is important (Swartout, Thompson, Koss, & Su, 2014). However, I also recommend this as someone who spends a great deal of time training, educating, and trying to persuade providers and policymakers of all types to pay more attention to the latest scientific research on violence. Research on violence, like research on other public health and medical problems such as cancer or diabetes, is not supposed to be just “inside ball” for a few hundred university-based experts seeking to impress each other. Much of its value lies in being able to inform real-world practice and policy.

From that perspective, it is surprising how often results sections are comprised of complex multivariate modeling of various types and lack the presentation of even basic descriptive statistics on prevalence rates or other information that is essential to placing the results in context. It matters whether your sample has a sex

offending rate of 3% or 93%. From this perspective, one also readily sees how important it is to use meaningful metrics whenever possible. For example, rates or clinical cut-offs can be more meaningful than something like a mean of 3.5 on a scale that goes from 1 to 7. Seven what? The meaningfulness also can pertain to the sample. For example, it is problematic to call a paper a study on antisocial personality when the study is based on a college sample in which virtually every participant is scoring at the very low end of the scale.

Valuing research-to-practice communication also calls for ensuring that results map onto real-world constructs. For example, for many audiences, it is important to know whether the people in your sample that you have identified as sex offenders could legally be charged with rape or sexual assault, or whether you are talking about, for example, levels of verbal pressure that might be loathsome but are not illegal. Regarding child abuse, in the United States, where corporal punishment remains legal, it is extremely useful to know whether the reports in your study might qualify as child abuse or would more likely be deemed legal corporal punishment.

The advantages of tables and figures. The importance of tables and figures can hardly be overstated. Many readers will read the abstract and then skip to the tables and figures. Even for reviewers or other readers who will also read the introduction and method first, tables and figures play a critically important role. They highlight the most important results and allow readers to take in far more information at a glance than can be done in text. They help readers see comparisons across findings. For example, a correlation matrix can efficiently present far more information than a textual listing of dozens of correlation coefficients.

Technology has had a huge impact on tables and figures. It used to be the case that incorporating tables and especially figures was a laborious and expensive task in publishing that was sometimes actively discouraged by editors and publishers. Probably some readers can remember, as I do, the days when incorporating a figure into an article meant mailing professional-quality glossy prints to the publisher. Of course, it is much easier now. Incorporating a table or figure is only marginally more difficult than text. Figures are no longer substantially more difficult than tables; indeed, in some cases, they may even be easier as they are usually inserted as single picture files. Last year, APA began offering the option to incorporate color figures into the online versions of articles without any fees. Some publishers are aggressively pursuing more image-intense publications and even interactive ones. A picture is worth a 1,000 words, and it has never been easier to disseminate pictures. Use them.

How to Write Results Sections

Organization. Unless you have a compelling reason to do otherwise, results best follow the order of the hypotheses and research questions presented in the introduction. The main exception is that it can be helpful to start off with a section presenting basic descriptive or bivariate statistics (such as prevalence rates and a correlation matrix of all variables). As stated in our journal requirements, specifically address each individual hypothesis in the results section.

Headings should be informative and specific to your study. “Bivariate Analyses” is not a helpful heading. It could appear in

almost any quantitative paper and does not tell the reader what they should remember or cite about your study. “Correlations Between Victimization Types and Well-Being” tells the reader more—including whether they should linger over that section of the paper. Some scientists prefer even more specific headings that communicate the findings, such as “Victimization Is Directly Correlated with Mental Health Symptoms.” Such headings—almost headlines—are acceptable at *Psychology of Violence* and may improve your success at scientific communication. Another effective alternative is to make each hypothesis a subheading in your results section.

Tables and figures. Because many readers look at the tables first or even exclusively (ignoring the results text), it is important that tables and figures be as stand-alone as possible. They need titles that clearly communicate the importance of the content. Abbreviations need to be identified in a table note. Do not expect readers to scroll back to the method or, even less realistically, the introduction, to find the first instance of an abbreviation. Some will, but other readers will hit the “back” button instead and look for a more readily accessible citation. You do not want to lose a reader or a citation for lack of a table note. Good naming of constructs helps with this too—the more intuitive they are, the easier they are for people looking to understand your key points quickly (i.e., almost everyone). Give the direction of effect for scales when that is not obvious.

There is nothing wrong with the older convention of a table for sample characteristics. However, unless you have particularly interesting sample characteristics, this does not serve the best purpose of tables, which is to emphasize key points and present them in ways that allow for much faster absorption of patterns than a linear, text-based presentation of results.

Data analysis sections. Some authors, editors, and reviewers are big fans of data analysis sections. However, like most features of a manuscript, they have advantages and disadvantages. Such sections work better for some types of analyses than others, and thus, it is best to consider this a discretionary feature. Sometimes the statistics are so straightforward that it adds unnecessary length and explanation. Other times the statistics are so complex and vary so much from one hypothesis to the next that it is easier to bring the reader along by prefacing each sub-section with the analytic plan for that specific hypothesis or research question.

Qualitative data. Qualitative data can be useful for exploring levels of nuance that are not captured by existing quantitative methods, developing new methodologies, and identifying constructs that might be salient to members of a population but not yet recognized by researchers, to name just a few possibilities. Grounded theory and a variety of other inductive methods are appropriate analytic techniques. However, the standards for presentation of the data need to meet the same standards as for quantitative research (see also Tong, Sainsbury, & Craig, 2007). Specifically, the verbatim quotes from the transcripts are the data in qualitative research, and enough information about these data needs to be presented to allow readers to determine whether your conclusions are sound. It is standard in qualitative papers to require verbatim quotes for each identified theme. We sometimes receive qualitative papers that just present the themes and the researchers’ definition of those themes, but this is not sufficient. Most often, three or four quotes are offered for each theme. Many reviewers

also prefer to see some descriptive statistics, such as percentages of participants who mentioned a theme.

The Differences Between Results and Discussion Sections

Probably the most common mistake in discussion sections is an almost step-by-step repetition of the results. As elaborated more in the following section, discussion sections are not just for repeating results. When it comes to presenting findings, all of the specifics should appear in the results. Discussions should prioritize key findings and help hone the “story” of the paper, that is, the take-home message. Another common error is to introduce statistics in the discussion. The discussion should not refer to any statistic or finding that is not available in the results (including tables and figures). If you have thought of a compelling way to capture your findings, then that statistic should be presented in the results.

Discussion Sections

Some Realities About Discussion Sections

After the abstract, the discussion is the second most important part of the text. The discussion has four key goals: to open with a statement of key findings, to place the current findings into the context of the broader literature, to acknowledge limitations, and to develop implications. Many readers jump from the abstract straight to the discussion. What does this mean for authors? It means that it is essential to set your results off to best effect in the opening paragraph of the discussion. Never start the discussion with limitations. Limitations are important to acknowledge—and a required section for *Psychology of Violence* articles—but that is not what you want people to remember best. Likewise, do not start by summarizing your rationale from the introduction, discussing other people’s research, or digging into the minutiae of some small finding. The discussion should open with a statement, perhaps even explicitly numbered, of your key findings and accomplishments. If you believe you are the first, so far as you have been able to determine, to explore a variable, the association between two variables, to examine your constructs in the population included in your study, or anything else that might plausibly be a first, be sure to mention that in the very first paragraph.

Violence is an enormous public health problem that inflicts a tremendous burden on society. Like cancer, diabetes, and many other health problems, one of the primary reasons—surely the primary reason—that it is a high-priority research topic is because of the potential to alleviate this burden. Sometimes violence researchers are accused of being “advocacy researchers” who lack the total objectivity of purer scientists. This is nonsense. There are very few scientists, especially in health care, who are neutral about their topic. Cancer researchers are not neutral about whether their new medication makes tumors shrink or grow. Heart researchers are not indifferent as to whether their patients live or die. Even the mapping of the human genome was motivated in large part by the potential to alleviate suffering from a whole host of genetically related illnesses. There have been numerous calls in psychology and allied fields for better research-to-practice communication. The discussion is one place to start making these improvements.

Researchers have a responsibility, an ethical responsibility I believe, to translate their findings for providers, policymakers, and the general public.

How to Write Discussion Sections

The context of other literature. After your statement of key findings, the next few paragraphs in your discussion should normally be devoted to reflecting back on the literature covered in the introduction and commenting—briefly—on how your results correspond or do not correspond to these. Some of your findings, perhaps something unexpected, might inspire you to bring in some new literature. One of the key goals of *Psychology of Violence* is to build bridges and bust “siloes” across subdisciplines, so I would particularly encourage you to think about other related work that might be relevant. For example, if you study teen dating violence, consider the bullying literature (and vice versa); if you study intimate partner violence, consider the child abuse literature or the substance abuse literature.

Limitations. There is no such thing as a perfect scientific study. It makes you a better scientist to prepare a frank statement of limitations. Almost any paper could note limits in the sample—none of us have samples that represent the entire world—and usually limits in measures or other aspects of the procedure. Resource limitations might have prevented the level of detail one would like. Do not use boilerplate, but think about common weaknesses and see how they apply to your paper. On the other hand, some balance is required here. Do not criticize your own work to such excess that there seems to be no value left in it. I occasionally receive manuscripts where the limitations section is the longest part of the discussion. Usually one paragraph will suffice, and generally it is best to keep that under one manuscript page.

Writing good implications. Many novice scientific writers may think that these are the only tasks of the discussion, but to make your hard work truly useful to others requires developing the implications of your research. If you need help with this, ask for some. There are two areas of implications that are important to address, especially in violence research.

The first area is implications for research. Implications for research do not involve restating key points or referring to other studies. They involve thinking about future directions. This refers to thinking about the next steps in a program of research to understand more about alcohol abuse and violence or emotional regulation and violence, for example. What would the logical next step be to follow up on the most interesting results of your study? How would violence research change if your results were fully incorporated into the knowledge base? This should not be just generic calls for “more” research but specific avenues that could be pursued.

Some discussion sections do not develop implications that specifically emerge from the findings of that particular study. Generic best practice recommendations are not helpful nor are broad calls for “more services.” Anything that could have been written before your study was conducted is not, by definition, an implication of your study. Your findings should at least hint at how we might change and improve intervention, prevention, or policy. A longer version of research implications is no substitute for this.

With colleagues from the National Children's Advocacy Center, Heather Turner, Vicki Banyard, and I recently concluded a 2-year project to work on research-to-practice communication for poly victimization. I used to think that we were already pretty good at this, but talking to more provider audiences made me realize that researchers need to get much, much better at this. Even when we conduct workshops or webinars intended for providers or policy-makers, we tend to spend virtually the entire time going over basic patterns, rates, and associations and almost no time on how to translate that into changed practice.

The bar for discussion sections is pretty low, but it can be a place to at least begin thinking about this. It is usually only a paragraph or two, but probably no more than a dozen sentences about how your findings might inform practice. If this is a professional stretch, then I would encourage you to get some consultation on it, much in the same way you might get some consultation for statistics or other skills needed to execute your project.

Conclusion: Pearls and Sonnets

Some aspects of science have not changed much since the scientific method was founded and perhaps never will. In other ways, however, psychological science has been profoundly affected by the huge technological advances of the last 20 years. If you want your articles to be discovered and read, you can no longer count on the set of articles to be relatively small and for many researchers and other stakeholders to browse significant portions of that set as they emerge. The profound changes wrought by the information revolution have not yet been fully absorbed into psychological science.

Licensed health care providers of all types must complete continuing education to maintain their licenses. In science, the pressure to stay up-to-date comes mostly from the peer review process, which focuses more on the content and communication issues in a particular manuscript. Although not inappropriate, this also means that broader "lessons learned" from years of experience in science communication are seldom communicated, and sometimes expertise is not updated. Progress is slowed by the lack of advanced guidance and dearth of strategies to facilitate communication. I see that in my own work. I know without even looking that not all of my past publications live up to the guidelines presented here. Sometimes that is because I wrote them a long time ago, before I recognized some of these principles. Sometimes it is because lack of time or other resources work against manuscript quality. Sometimes it is just because I am human, and I do not manage to achieve my highest ideals on every effort.

I have found it useful to both acknowledge these imperfections and to let them go, which is how I came to the metaphor of stringing pearls on a necklace. If you look closely at almost any pearl you will find imperfections, but strung together on a necklace they can be quite beautiful. Obsessively polishing a paper in the hope it will become a brilliant diamond is a less likely path to scientific success, even more so in today's age when that paper will be just one of many to appear on that topic, perhaps even on the very day of publication. Learning to appreciate and make use of the formal structure of scientific papers, which like sonnets have a very specific organization, will facilitate getting your work out as quickly and efficiently as possible and will facilitate it getting read by the most readers possible. The many largely undocumented conventions of the field are perhaps like the meter of a sonnet; they create a rhythm that is familiar to experienced scientists and signals membership in the scientific community of practice. With this paper, I hope to make the structure more easily knowable.

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