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## Cite with a Sigh

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## Cite with a Sight

Citing references in a scientific paper is becoming an increasingly important albeit challenging experience as the volume of scientific literature continues to explode. Despite the increasing average number of cited references in published papers, important and relevant papers are sometimes absent. Journal guidelines may recommend or even require the total number of citations be kept to a modest level. Consequently, authors need a balanced approach in identifying and including only the most relevant citations. In this Editorial, we discuss the importance of selecting and citing references correctly. We also discuss the impact of cited references on published research and their role in advancing the scientific discipline.

**Factors to Consider When Citing a Related Work.** Cited references add to the overall impact of the scientific research being presented in a paper. Well-balanced citations provide readers with additional resources, including background material, scientific issues that motivated the research, procedures and computational or theoretical models, and data used in the research. It is undesirable and impossible to cite every paper related to the work being discussed in a scientific paper. This is where the author's judgment comes into play in deciding which previously published works are the most appropriate and will make his/her own paper scientifically strong. Authors should be familiar with section B4 of the ACS Ethical Guidelines, which provides guidance on determining which citations an author should include. Here are a few factors to consider.

1. *Know the scope of the previous publications.* Be familiar with each paper that you plan to cite. Not too long ago, one had to physically go to the library and make copies of the papers from bound journals when determining which papers to cite. Authors read the articles before selecting the references to include. Today, with the availability of online databases, direct download of references into individual bibliography libraries, such as ACS Chemworx, EndNote, RefWorks or Mendeley, can be accomplished with the click of a keystroke, all the while never even viewing the paper. Unfortunately, it is not uncommon to see references that have little or no relevance to the topic being discussed. An earlier study concluded that only about 25% of cited papers had actually been read by the citing author (Source: Paper Trail Reveals References Go Unread by Citing Authors. DOI: 10.1038/420594a). The problem is further compounded when these inappropriate references are blindly copied from one paper into the next.

2. *Get the citation right.* Make sure that each citation is complete with all parts of the citation included (author names, journal name, pagination, etc.). Check the citation for accuracy by comparing it to the original published work. If the original entry of the record into a reference database has an error, the error gets transmitted to the user's reference library whenever the citation is downloaded. (Information on how to correct missed citations in Web of Science (WoS) is available later in this Editorial.)

3. *Manage self-citations.* Limit the number of citations that refer to your own work. Everyone recognizes the importance of

citing their publications because the previous publications provide information on earlier findings, procedures, and analyses relevant to the current work. Self-citations also help the editors, reviewers, and readers determine whether the current work is more than just an incremental advance over the earlier work. An author's own publications, however, should not dominate the cited references. Keeping the number of self-citations below the 20–25% level is a good strategy. Using excessive self-citations to boost one's own *h*-index can be easily spotted. (Bibliography databases such as WoS are capable of generating reports including or excluding an author's self-citations.)

4. *A balanced approach to citations.* Create a good blend of references to older seminal papers and to current progressive papers that are relevant to discussion. Older papers provide the origin of the concept and give credit to the authors who first came up with the idea, approach, or analysis. Recent papers, on the other hand, show the current interest in the field. (One caveat: If all of the references are 10 years or older, this may signal that this area is no longer of scientific importance.) Another issue to think about is what journals are cited as this provides a good indication of where the author's work might best be published.

5. *Keep in mind the accessibility of references.* Make sure that the cited references are readily accessible to readers. If possible, avoid citations to exclusive reports that are not publicly available or Web sites that may be transitory. Citations to a manuscript under preparation or in submission should also be avoided. It is preferable that references to unpublished works (or results) be made within the manuscript text and that a copy of the work be provided as Supporting Information for Review Only when the paper is submitted. If this unpublished work is authored by someone else, obtain permission to cite the unpublished work. Citations to articles "accepted for publication" or "in press" should include the DOI (digital object identifier). (If you do not have a DOI, do not delay returning your galley proof while waiting for one. This is especially important when publishing in expedited journals like *JPC Letters*.) *Because the DOI is a permanent, unique identifier, one can anticipate the DOI being included with all references in the future.*

6. *Responding to a reviewer's request to cite additional references.* Reviewers do check a paper's list of references while evaluating a manuscript and often point out relevant and important citations that the authors did not include (see section C8 of the ACS Ethical Guidelines). While a suggested reference may in fact be a good addition, authors should exercise their own judgment in whether to include it or not. If the suggested reference is not relevant to the current work, the authors are not obliged to cite it. In such circumstances, the authors should indicate the reason for not including the reference in the response to reviewer comments letter.

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**Citations and Databases.** Bibliography databases, such as SciFinder, WoS, and Scopus, upload article information to their databases following the publication of the paper. At the same time, they upload the citations contained in the published papers. The citations included in a publication become part of the original paper's record of cited work. Thus, the more citations a published paper receives, the greater its impact. It is important to note that these databases select journals published by established publishers. (See individual database Web sites for details.) However, many new journals are not included in these databases immediately. Google Scholar, on the other hand, does search and record all cited work on the Web, including citations from manuscripts posted on pre-print servers and institutional repositories. Hence, one sees a higher number of citations, *h*-index, and so forth with Google Scholar than with WoS.

There are two indirect measures resulting from cited references, (1) journal impact factor and (2) Author's *h*-index. Because the number of citations over the prior 2 years is used to determine a journal's impact factor, citations included in each paper collectively contribute to the impact factor of the journal. Hence, it is important that the authors cite the references in an objective way while keeping the journal focus and readership in mind. Because citations help to boost the *h*-index, one has to be careful in providing fair and balanced citations of one's own work as well as that of their colleagues/collaborators.

Citations can also influence administrative decisions made during an author's annual review or promotion at his/her institution. An increasingly common assessment tool is to use citations to evaluate the impact of an author's research among his/her peers. This can make for a risky comparison because different disciplines (even within physical chemistry) can have dramatically different citation statistics that depend on the size of the overall scientific enterprise associated with the author's paper and with customs for how work is cited (e.g., Mie's 1908 paper on light scattering is often cited explicitly and has over 5700 citations, but Schrödinger's 1926 paper on quantum mechanics is not usually cited and only has about 700 citations); therefore, one should not overgeneralize the importance of number comparisons. Popular fields, for example, like material science and energy conversion and storage have relatively high impact compared to more traditional fields such as spectroscopy or chemical kinetics. One should consider the standing within the discipline before comparing the impact of published work.

**Missed Citations in the Databases.** Have you ever noticed that the number of citations reported in different bibliography databases does not always match? The major reason for this discrepancy is the inclusion of incorrect or incomplete citations in published papers. Databases such as WoS disregard incorrect or incomplete citations from the citation count. If the author misspells an author name, enters a wrong journal abbreviation, or records a wrong year, volume or page number, and so forth, WoS does not attempt to identify the actual correct reference. Because these missed citations are not recorded as part of the cited references, the original author and the paper fail to get citation credit. A wrong entry in the author's database may carry over to other publications in the future as well. It is possible to identify missed citations by conducting a "Cited Reference Search" in WoS. An easy way to recognize missed citations is the absence of the "View Record" link next to the record. (See the Supporting Information for a step-by-step

procedure on how to identify and correct cited references in WoS.) Once an incorrect citation is identified, a correction request can be submitted online. Authors are encouraged to take extra care to correctly cite references to ensure that their paper receives full citation credit.

**Recognizing the Significance of Citation Impact.** Highly cited papers get more attention and are displayed prominently while searching papers in a journal home page or bibliographic database. Highly cited papers are quickly noticed by other authors who are searching for appropriate, significant references to cite in their own work. *Nature News* reported that high impact papers published in 2003 were found to cite more references from previous highly cited works than lesser impact papers (Source: To Be the Best, Cite the Best. DOI: 10.1038/news.2010.539). Does this that mean citations themselves can become a measure of the paper's scientific impact? Not necessarily; there are plenty of examples of seminal papers with a slow rise of citation impact. Note that Schrödinger's paper had over 20 citations in the first year after publication, while Mie's paper had less than 20 citations in the first 10 years after publication and fewer than 100 citations in the first 40 years after publication. Another example is the 1958 paper by Hummers (DOI: 10.1021/ja01539a017) on the preparation of graphite oxide. This paper received less than 70 citations during first 40 years and more than 3200 citations during last 2 years! A mechanistic model for the citation dynamics has recently been developed to determine long term predictability of citation patterns (Quantifying Long-Term Scientific Impact. DOI: 10.1126/science.1237825).

As discussed in this Editorial, citations serve as an important gauge of published work and help to strengthen the scientific content of the paper. It is important that authors follow a journal's instructions while composing a manuscript. Manuscripts submitted to *J. Phys. Chem. Lett.* and *J. Phys. Chem. A/B/C* require full article titles in the reference section. The inclusion of article titles adds relevancy to the readers. Cited references serve as an indicator to editors whether the submitted paper fits within the scope of the journal. Hence, we urge you to check your choice of references for their relevancy, accuracy, and format before submitting a paper for publication.

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### Notes

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